UNDERSTANDING PATIENT ENGAGEMENT: EXPLORING FACTORS AROUND UTILISATION OF SCREENING AND SURVEILLANCE SERVICES IN INDIVIDUALS WITH OR AT RISK OF RARE ENDOCRINE SYNDROMES.

A thesis submitted for the degree of Doctor of Philosophy by

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Abstract

Individuals with rare genetic endocrine syndromes, such as von-Hippel Lindau, Multiple Endocrine Neoplasia and mutations in the succinate dehydrogenase complex genes can develop diverse and unpredictable new tumour formations. Regular screening is recommended as best practice for early detection and management of tumours in those deemed at risk. However, little is known about screening attendance in gene carriers and the experiences of screening which may influence attendance. The aim of this thesis was to address this gap by gaining a deeper understanding of how individuals carrying genes for rare endocrine tumour syndromes comprehend and use health services generally and, in particular, the service provided by the Barts endocrine screening clinics.

This was a multimethod three staged study in the context of a national specialist clinic. Study 1 was a retrospective cohort study to determine screening attendance rates over a three-year period and examine the relationship between patient demographic characteristics and attendance. Study 2 examined the experience of attending appointments through in-depth interviews with 12 participants. Study 3 was designed to enhance engagement with initial screening through the co-production of an information resource using focus groups. Integration of qualitative findings explored the relationship between the themes.

Study 1 identified an 83.27% attendance rate. Attendance showed no significant association with patient demographic characteristics. Study 2 interviews illuminated how the complexities of living with an incurable diagnosis interacted with the anticipation and attendance at screening. Study 3 resulted in a simple leaflet with signposting, noting the importance of reassurance and availability of family clinics. Issues regarding data quality and recruitment were encountered.

These studies contribute to understanding of and engagement with patients with rare syndromes and screening. Considerations of data collection, life-course, diagnosis familiarity, family dynamics, practical accessibility and navigating the system are specific and novel insights that should inform future service delivery.

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Chapter 1
Introduction

1.0 Introduction

This thesis explores how individuals with specific rare genetic endocrine syndromes von-Hippel Lindau Syndrome (VHL), Multiple Endocrine Neoplasia (MEN) and mutations in the succinate dehydrogenase complex (SDHx) genes can be optimally supported to engage in the St Bartholomew Hospital (Barts) endocrine screening clinics. The services provided by these clinics are detailed later (Chapter 4) but in brief include regular surveillance for mutations which can lead to tumour formation common in these syndromes, and treatment for when such tumours form. Regular surveillance was initiated in the Barts service in the year 2003 (Tufton et al., 2019). In order to drive improvements in the service, the clinical team are keen to understand the experience of the service users and how best to optimise attendance at screening appointments.

Individual's with rare endocrine syndromes, such as VHL, MEN and mutations in the SDHx genes can develop diverse and unpredictable new tumour formation. The role of the Barts endocrine screening clinics is to detect the tumours early and treat them, usually by surgical and/or pharmacological intervention. This clinical service for patients with VHL based at Barts Health NHS Trust was recently awarded international comprehensive care status by the VHL Alliance. The endocrinology department has the largest cohort of patients in the UK under regular surveillance for mutations in the SDHx genes and is a large centre of referral for patients with MEN. The Barts team is one of the largest in the UK and comprises of specialists in endocrinology as well as oncology and surgery, as a result any decisions made about patient care are discussed in multi-disciplinary meetings. Further details of Barts endocrine screening clinics are provided in the Methodology chapter (Chapter 4).

This study focused on VHL, MEN and mutations in the SDHx genes rare endocrine syndromes as there was a clinical assumption that patients may face uncertainty if and when tumours may develop and the fact that the nature of inherited syndromes results in subsequent 'advance preview'. Clinicians believe this may impact whether

and how individuals with these syndromes interact with screening and surveillance services. For example, regarding VHL, a combination of its almost complete penetrance (patients with the genetic change will almost inevitably develop tumours), the good genotype-phenotype correlation (the 'range' of possible tumours that an individual is likely to develop can be predicted from the genetic defect) and observation of older family members with the diagnosis dictate that a given individual has an 'advanced preview' of what may happen to them in future years (Maher et al.,1991; Chittiboina and Lonser, 2015).

In contrast, the clinic is aware that not all individuals with mutations in the SDHx genes will develop a tumour, but a significant proportion of those patients the tumour will be malignant, with (currently) no appropriate treatment options. Most individuals with a mutation in the SDHx genes will know or know of a family member with malignant disease, further increasing anxiety and uncertainty. Clinicians made the observation that patients at Barts screening clinics react to the knowledge that they have inherited a genetic defect for VHL, mutations in the SDHx genes or MEN in very different ways. The clinicians also had the assumption that some individuals may become overwhelmingly anxious and request more screening than is clinically appropriate, whilst others may find it difficult to engage at all with the clinical services available.

1.1 Purpose of this PhD thesis

The need for this research arose due to the clinicians at the Barts endocrine screening clinics having some concerns of the possible issues which were occurring at the service. This included an assumed low attendance rate of patient appointments, as well as the aforementioned presumed psychological patient distress. The clinicians proposed an approach of how to possibly improve the provision of health services at the Barts endocrine screening clinics; however, they possessed a lack information around the stated assumed issues. Hence, this PhD research was undertaken to provide new information by gaining an overview of appointment attendance, as well as an understanding of the views of patients registered at the clinic towards the Barts endocrine screening clinics. Patients were also invited to design an information resource, to better support future patient engagement.

1.2 Outline of this PhD thesis

This thesis is formed of ten chapters, which are summarised below. There is an overarching thesis aim (outlined in Chapter 3) of gaining a deeper understanding and describing how rare endocrine gene carriers individuals comprehend and use health services generally, and in particular the service provided by the Barts endocrine screening clinics. Each of the three Studies 1-3 (Chapters 5-7) contribute to achieving this overarching aim of the thesis. Whilst chapter 8 presents the integration of key findings from the two qualitative arms of this thesis (Study 2 and Study 3), in order to examine the relationship between the themes from each of the two different qualitative studies in relation to the overarching aim of this thesis.

- Chapter 2: Rare hereditary endocrine syndromes

This chapter describes endocrine syndromes, with a focus on the rare hereditary endocrine syndromes involved in this research, namely VHL, MEN and mutations in the SDHx genes. Issues regarding diagnosis, screening and clinical management are examined, drawing on available evidence and current practices.

- Chapter 3: Literature review

This chapter presents a critical analysis of studies examining the proposed purpose of screening and surveillance in rare hereditary endocrine syndromes, as well as in those with comparable diagnoses. The experience of service users in screening and surveillance, as well as the suggested impact of not attending screening will be reviewed. Examining barriers and facilitators to engagement with screening and surveillance services results in the identification of gaps where future research could further inform clinical practice. The chapter culminates in the statement of the overarching aim and specific objectives of this thesis.

- Chapter 4: Methodology

This chapter presents the epistemological and ontological assumptions that guided this PhD thesis. The use of pragmatism as well as how this philosophical stance was initiated is enacted through a multimethod approach are described. Integration in multimethod research is detailed, in particular to integrating individual interview and

focus group data. This chapter also outlines the context of the research (the Barts endocrine screening clinics) and the research environment.

- Chapter 5: Study 1- Patient demographic characteristics and appointment attendance: A retrospective cohort study of rare endocrine gene carriers individuals at the Barts endocrine screening clinics

This chapter outlines the justification, detailed conduct and results of a retrospective cohort study examining patient demographic characteristics and attendance. This covers a three-year period of all individuals with VHL, MEN and mutations in the SDHx genes who were registered as patients at the Barts endocrine screening clinics during the years 2015-2017, a total of 291 patients. The aim was to examine the attendance rates, low/high attenders and any potential patterns based on patient factors. A discussion of the findings, including limitations of the study are presented.

- Chapter 6: Study 2- Capturing the patient experience: A qualitative interview study of rare endocrine gene carriers individuals at the Barts endocrine screening clinics

In order to exploring patients' experiences of, and perception towards regular screening of rare endocrine tumours at the Barts screening clinics a qualitative approach was used. Semi-structured interviews were conducted to explore how the screening service is perceived by individuals with rare endocrine syndromes, to examine what detracts and enhances the level of engagement with the screening clinics, and to understand better patients' experiences of using the clinics. Details of the sampling process, methods data collection and thematic data analysis conducted are given. The results highlight new insights into the patient experience, such as provision of patient information, which may assist in developing strategies to promote patient engagement.

- Chapter 7: Study 3- By patients, for patients: Development of a patient-led information resource

Following the insights gleaned in study 2, such as requirement of information, the first development stage of an information resource was initiated through a collaborative and iterative study. This involved three focus groups with adult patients with the aim to co-produce an information leaflet targeted at new patients at the screening clinics, with the intent that the information resource may encourage patient engagement with the Barts endocrine screening clinics. An a priori decision was made to focus on a paper leaflet to ensure that patients without access to new technologies are not overly disadvantaged (Hsu et al., 2005; Office for National Statistics, 2006). The focus on co-production and specific steps taken are detailed with the key findings of each stage is presented. This culminates in the presentation of a draft information leaflet as well as discussion on further use of this resource and study limitations.

- Chapter 8: A multidimensional view: Integration of the two qualitative studies

In accordance with the multimethod research design discussed in Chapter 4, this chapter presents the integration of key findings from the two qualitative arms of this thesis: Study 2, the qualitative interviews (Chapter 6) and Study 3, the focus groups (Chapter 7). The aim was to ascertain to what extent (if any) the interview findings concur with the focus groups findings. It was anticipated that the new information that may be uncovered could support patients and their families in using the Barts endocrine screening service services in order to meet their needs. Integration at the interpretation and reporting level was conducted using two approaches: integration through narrative and the use of a joint display. The assessment of the 'fit' of integration of the two types of data presented one of the three outcomes: partial agreement, silence and dissonance. Instances of silence between the different datasets could provide an area for future research on those topics to ensure a greater understanding of them.

- Chapter 9: Discussion

This chapter brings together the key findings from the different studies with current literature and highlights how each study informed the other to gain deeper insights into the patterns and meaning of the patient experience of screening and surveillance. Clinical implications of the findings are discussed, and the strengths together with the limitations of the overall research are examined.

- Chapter 10: Conclusion and recommendations

This chapter concludes the thesis by summarising the main findings of the research and contemplates how these studies make a unique contribution to knowledge in this field. In light of the key findings, recommendations are made for the clinicians at the Barts endocrine screening clinics and for future research.

Chapter 2

Rare hereditary endocrine syndromes

2.0 Introduction

The aim of this chapter is to give a background of the syndromes central to this thesis – von-Hippel Lindau Syndrome (VHL), Multiple Endocrine Neoplasia (MEN1 and MEN2) and mutations in the succinate dehydrogenase complex (SDHx) genes. Following a brief overview of the endocrine system, specifics regarding these syndromes including diagnosis, screening and treatment will be outlined.

2.1 Endocrine System

The endocrine system is a network of glands such as the pineal, pituitary and thyroid, which produce and release hormones, for example, adrenaline or insulin (Waugh and Grant, 2014).

Each gland of the endocrine system releases specific hormones into the bloodstream, which then travel to other cells and help coordinate or control various body processes, such as thyroid and parathyroid hormones (Hiller-Sturmhöfel and Bartke, 1998). The endocrine feedback system helps to monitor the balance of hormones in the bloodstream, if the body has too little or too much of a particular hormone, the feedback control system signals to the appropriate gland in order to correct the problem (ibid). Feedback control, both positive and negative, is a significant aspect of biological systems (Peters et al., 2007). Some of these systems seek to create a state of equilibrium or “homeostasis”. The principal endocrine systems are controlled by negative feedback, a mechanism that maintains hormone levels within a somewhat limited range (ibid). Conversely, positive feedback generally has a destabilising effect (ibid).

2.2 Syndromes of the endocrine system

Even the slightest issue with the function of one or more glands can disturb the delicate balance of hormones in the body, resulting in an endocrine disease or syndrome

(Hiller-Sturmhöfel and Bartke, 1998). One of the most common causes of hospital admissions in the western world is diabetes mellitus (Adhikari et al., 2018). Globally, however, thyroid disease has been reported as more frequent (Wilson, 2001).

Endocrine syndromes can also occur due to the development of lesions (e.g., tumours or nodules) in the endocrine system, which could affect hormone levels (Melmed et al., 2015). Hormone imbalance occurs if a feedback system has issues maintaining the correct level of hormones in the bloodstream and the body is unable to remove the hormones from the bloodstream properly (Sherwood, 2015). Rare genetic endocrine syndromes such as VHL, MEN and mutations in SDHx genes, which are the focus of this thesis, belong to this category of endocrine syndromes and can lead to diverse and unpredictable tumour formations at multiple sites in the body (Pacak et al., 2007). The development of tumours in the aforementioned syndromes is due to the inactivation of tumour suppressor genes, which can occur by means of genetic mechanisms (Baylin and Chen, 2005). The specific mechanisms underlying the gene activation routes during tumour formation have not been defined (ibid); however, regarding the rare genetic endocrine syndromes of interest, the VHL gatekeeper tumour suppressor gene is inactivated in the familial cancer syndrome VHL syndrome (Zatyka et al., 2002), MEN is caused by inactivation of the MEN1 tumour repressor gene (Frank-Raue et al., 2005), and lastly, mutations of the gene encoding SDHx results in the accumulation of succinate acid, thereby providing an advantageous environment for tumour survival (Zhao et al., 2017).

2.3 Tests to support diagnosis and monitoring of endocrine syndromes

The symptoms of endocrine syndromes vary and depend on the particular gland involved. These are tested and later monitored through various mechanisms including urine and blood tests, which are conducted to check hormone levels, the results of which can assist doctors in determining the presence of an endocrine syndrome. Furthermore, imaging screening tests such as computed tomography (CT) scans, magnetic resonance imaging (MRI), ultrasounds and mammograms are also tools that assist in the location of tumours or nodules (Lam et al., 2014). A head and neck MRI is among the most sensitive tool for screening families with paragangliomas (rare

endocrine tumours) (McCaffrey et al., 1994). Management of endocrine syndromes is complicated as the adjustment of one hormone level can impact on others (Melmed et al., 2015). Treatment options for head and neck paragangliomas can include surgery and radiation therapy (Potu et al., 2016). Thus, resulting in the need for careful and consistent monitoring, usually undertaken in specialist centres rather than under general practitioner (GP) care (Melmed et al., 2015).

2.4 Medical screening and surveillance

Screening is the active process of detection for syndromes among seemingly healthy individuals, whereas surveillance is the ongoing analytic process of monitoring to investigate such syndromes (Adhikari, 2018). Screening programmes offer patients support and guidance on making informed decisions regarding a specific disease process (Davies, 2018). They can improve quality of life through the early detection of disease or even save lives. While screening programmes are not mandatory, there is evidence to suggest they are effective in diminishing the risk of further clinical manifestations and alleviating fears towards the screening programme (ibid).

2.5 Overview of rare hereditary endocrine syndromes

2.5.1 Rare Diseases

Rare diseases are characterised by the European Union (EU) as a debilitating or life-threatening diagnosis with a prevalence rate of less than 5 per 10,000 (Ali et al., 2019). The management of such syndromes involves consolidated efforts over the lifetime of the patient to reduce mortality and morbidity (ibid). Rare endocrine syndromes present a particular challenge due to current gaps in knowledge regarding long-term outcomes; currently there is a lack of evidence-based, expert multidisciplinary care, thereby impacting the quality of care provided to the patient (ibid).

The development of tumours has been linked to rare endocrine syndromes such as VHL, MEN and mutations in the SDHx genes (Pawlu et al., 2005). Such tumours include Paragangliomas as well as pheochromocytomas, stated as tumours of the

autonomic nervous system, have an approximate yearly incidence of 1:300,000 (Neumann et al., 2004). The term paraganglioma refers to tumours in the head and neck area, whereas pheochromocytomas are tumours that develop in the adrenal gland (Pawlu et al., 2005).

2.5.2 Biological inheritance

The three syndromes that are the focus of this thesis are all genetically inherited diagnoses. Autosomal dominant refers to a pattern of inheritance in which an affected individual has one normal gene and one copy of a mutant gene on a pair of autosomal chromosomes (Maher et al., 2011). Individuals with an autosomal dominant diagnosis have a 50:50 chance of passing the mutant gene, and consequently, the syndrome to their children (Cirino and Ho, 2013).

Penetrance is defined as the proportion of individuals with a specific mutation that also exhibit a phenotype or clinical signs of the associated syndrome (Cooper et al., 2013). Conversely, disease incidence rate is the number of new cases in a given time period (Rothman et al., 2008). For instance, VHL has an incidence rate of 1 in 39,000 births per year (Bryant et al., 2003), and MEN affects approximately 1 in 30,000 individuals (Marini et al., 2006). Concerning mutations in the SDHx genes, incidence has been difficult to determine; estimates range from 1 in 30,000 to 1 in 100,000 in the general population (Oosterwijk et al., 1996).

2.5.3 Screening for rare hereditary endocrine syndromes

Medical screening and surveillance are both defined as secondary preventative strategies (Wilken et al., 2012). Medical screening differs from surveillance, in that the aim of screening is the detection of cases with an increased possibility of identifying the disorder of concern, whereas medical surveillance is a preventive strategy for advancing the health and safety of individuals (ibid). Surveillance is usually employed interchangeably with observing, and both are used as generic terms (ibid). Screening and surveillance are also tools noted to be employed for rare endocrine syndromes (De Sousa et al., 2018).

Asymptomatic patients with these rare syndromes are recommended to undergo regular screening to detect potentially life-threatening tumours when they are small, so they can be treated most effectively (Aufforth et al., 2015). Genetic testing by DNA analysis of a blood sample is conducted for rare hereditary endocrine syndromes; this method can be used to establish which family members should be followed closely due to the possession of an altered gene (The VHL Family Alliance, 2012). Furthermore, if a patient is known to be a rare endocrine gene carrier, or if genetic testing did not detect any issues for the patient or his/her family, the patient will need to continue regular medical screening (ibid). A single, negative medical screening examination does not necessarily mean the absence of a rare hereditary endocrine syndrome, as the first evidence may develop later in life (ibid). For this reason, regular medical screening is recommended for detection of a problem before the onset of symptoms and to allow patients to make more informed decisions regarding their health (NHS, 2018).

Screening children and 'at risk' families has been shown to reduce morbidity and mortality (Prasad et al., 2011) as well as to identify any lesions prior to the child being symptomatic (Davies, 2018), thus reducing the risk of additional complications which can sometimes be fatal (Johnston et al., 2000). It is crucial that any child, with or without family history, presenting with an endocrine tumour (SHDx, MEN or VHL), or any other clinical manifestations, is genetically tested (Lenders et al., 2014). Subsequently, the screening can commence at the appropriate time to identify such clinical manifestations as early as possible (Davies, 2018). A clinical surveillance protocol initiated in childhood offers the opportunity to detect and treat manifestations of such diagnoses as early as possible to prevent any negative complications, some of which can be fatal (Johnston et al., 2000). Accordingly, patients without a causative mutation can be identified at an early stage and avoid being subjected to expensive and invasive clinical surveillance (ibid).

Screening guidelines for adults with rare endocrine syndromes, such as VHL, have been established and provide clinicians with a clear plan for endocrine tumour screening and monitoring (Aufforth et al., 2015). In relation to paediatric patients with

VHL, the screening guidelines are less clear and describe no universally accepted age at which to initiate screening for endocrine tumours (ibid). Some guidelines recommend initiation of screening at eight years of age in families with known endocrine tumours (Richard et al., 2004). Conversely, Lefebvre and Foulkes (2014) recommended beginning screening at five years of age.

Nevertheless, causative mutation carriers have shown poor adherence to long-term surveillance (Rasmussen et al., 2010). As a result, many patients do not obtain the full benefit of early detection and treatment, which are fundamental to the reduction of morbidity and mortality in rare hereditary endocrine syndromes. Continued surveillance of families for whom it was not possible to identify mutations is encouraged (ibid). This recommendation is based on studies which have calculated that patients with a seemingly isolated endocrine syndrome-related tumour (e.g., VHL) with no detectable mutation have roughly a 5% risk of developing subsequent endocrine syndrome-related tumours within 10 years of the diagnosis of their first tumour (Levy and Richard, 2000).

2.5.3.1 Screening and surveillance procedures specific to paragangliomas and pheochromocytomas rare tumours of VHL, MEN and SDHx

As stated, development of tumours has been linked to rare endocrine syndromes such as VHL, MEN and mutations in the SDHx genes; such tumours include paragangliomas and pheochromocytomas. Table 2.1 below tabulates some of the procedures undertaken during screening and surveillance of the paragangliomas and pheochromocytomas rare tumours, detailing any physical and/or psychological stress:

Table 2.1. Recommended procedures that may be undertaken during screening and surveillance of paragangliomas and pheochromocytomas rare tumours of VHL, MEN and mutations in SDHx.

Screening/surveillance procedures	Possible physical and/or psychological stress
-Family history as a screening tool: The use of family history as a screening tool is recommended; as aspects of the family medical history could indicate the presence of a hereditary cancer syndrome (Knapke et al., 2012).	Short-term psychological distress due to family history screening has been stated by Qureshi et al. (2001), however, such distress did not persist. Bell (1998) noted that as the awareness of the genetic factor of syndromes increases more patients could be asked to present information regarding their family history. Thus, consideration needs to be given to whether family history screening could inadvertently raise levels of anxiety in relation to the diagnosis in question (Leggatt et al., 2000).
-Biochemical testing for diagnosis of paragangliomas and pheochromocytomas: Suggested tests include plasma free metanephrines (a metabolite) or urinary fractionated metanephrines (Lenders et al., 2014).	It has been noted that no biochemical test can be expected to have 100% specificity, moreover, 2.5% of all test results may display an elevated value that could suggest the presence of a tumour when none is really present (Eisenhofer et al., 2000). Such false-positives can result from stress, posture and medications (Jun et al., 2015). Thus, it has been suggested that collection of blood samples with the patient resting quietly in a lying position to avoid any possible acute stress connected with insertion of the needle Eisenhofer et al., 2000).
-Imaging studies (scans) are recommended for surveillance/locating any rare tumours; this should be initiated once there is biochemical evidence of a paraganglioma/ pheochromocytoma (Lenders et al., 2014): Suggested imaging studies include computed tomography (CT) and magnetic resonance imaging (MRI) (ibid).	Challenges due to the noise, enclosed space of the MRI, as well as physical discomfort and duration have been identified (Evans et al., 2017). Further, physical symptoms and anxiety only increased the challenges of undergoing an MRI scan (ibid).
-Muth et al. (2019) recommend genetic testing in all individuals diagnosed with	It has been stated that individuals who find out that they carry a mutation that

a paraganglioma/ pheochromocytoma, regardless of family history and age at presentation: Pre-test and post-test counselling are suggested; together with the recommendation that all genetic testing for paragangliomas and pheochromocytomas should be performed by accredited laboratories (Lenders et al., 2014).	predisposes them to a syndrome are likely to be more distressed in comparison to those whose test results are negative (Marteau and Croyle,1998). Some individuals receiving negative results have been described to experience difficulties in adjusting to their revised risk status (Wiggins et al., 1992). In regards to rare syndromes, anxiety levels have been noted to be prominent after genetic testing, as some syndromes symptoms become worse over time (Gonzalez et al., 2012). Further, individuals have been stated to consider genetic tests as valid information to take significant preventative decisions (Oliveri et al., 2018).

2.5.4 Genetic testing for rare hereditary endocrine syndromes

As noted above genetic testing is a common part of initial screening. Its development has transformed the management of these inherited syndromes. In most cases, at-risk patients can now be genetically identified in early childhood (Johnston et al., 2000). Genetic testing of family members has been recommended by many organisations, such as the American Society of Clinical Oncology, for determining cancer susceptibility (American Society of Clinical Oncology, 2003). Disease management is mainly concentrated on tumour surveillance that allows early detection and treatment; therefore, presymptomatic genetic testing is recommended, including for at-risk children (Rasmussen et al., 2010). Presymptomatic genetic testing is a convoluted process due to the potential social, psychological and economic implications of getting an abnormal result, plus the difficulties connected with adapting to normal results (survivor's guilt) (Burke and Press, 2006). This is even more complicated in the case of children (Fanos, 1997). However, there is a commonplace agreement that in the case of syndromes in which the potential benefits of early detection significantly override the harms connected with the test, it is justifiable to offer presymptomatic genetic testing to children (Wertz et al., 1994). The high primary uptake of genetic testing for VHL syndrome, including in children, has resulted in the

discontinuation of unnecessary screening procedures in non-mutation carriers (Rasmussen et al., 2010).

2.6 Aetiology and clinical manifestations of VHL, MEN and mutations in the SDHx genes

2.6.1 von-Hippel Lindau (VHL)

VHL is a disease resulting from a mutation of the von Hippel–Lindau tumour suppressor gene (3p25-26) (Richard et al., 2013). VHL can be separated according to its clinical manifestations (Calzada, 2010); two clinical types have been named based on the absence or presence of pheochromocytoma (Pawlu et al., 2005), with VHL type 1 being identified with a lower risk of developing pheochromocytomas (Chen et al., 1995). VHL type 1 usually results from mutations that affect protein folding (Stebbins et al., 1999), a process in which a protein folds into a stable and specific three-dimensional structure (Englander and Mayne, 2014). In comparison, the majority of VHL type 2 results from a missense mutation, which is a genetic change resulting in the exchange of one amino acid in the protein for another (Guo et al., 2004). This mutation may cause the resulting protein to be non-functional (Minde et al., 2011). The detection of tumours specific to VHL syndrome is important for diagnosis. Due to the tumours connected with the VHL syndrome being found infrequently, at least two tumours must be identified to diagnose VHL in an individual without a family history (Maher et al., 2011). It is not possible to reverse VHL mutations, but early recognition and treatment of specific manifestations of VHL can improve quality of life, hence individuals with VHL are screened routinely (Priesemann et al., 2006).

The VHL syndrome affects both genders with equal frequency (Neumann and Zbar, 1997) and is inherited in an autosomal dominant pattern (Aronoff et al., 2018). Overall, 80% of VHL gene mutation cases are inherited from the parents (Maher et al., 2011); the remaining 20% of cases are found in individuals without a family history, known as de novo mutations (Dwyer and Tu, 2017). The mean age of onset was reported to be 26.3 years (Maher et al., 1990), with a penetrance of 97% by the age of 65 (Varshney

et al., 2017). Despite recent advances in management and clinical diagnosis, life expectancy for VHL patients remains low at 40–52 years (ibid).

2.6.2 Multiple Endocrine Neoplasia (MEN)

The term MEN comprises of several distinct syndromes featuring tumours of endocrine glands, each with its own specific pattern. In some cases, the tumours are malignant, in others, benign. MEN syndromes are inherited as autosomal dominant disorders (Thakker, 2001). Two disorders caused by mutations in two different gene loci (a fixed position on a chromosome) is referred to as multiple endocrine neoplasias (MEN) (Marx and Stratakis, 2005). Multiple endocrine neoplasia type 1 (MEN 1) is caused by mutations in the MEN1 gene (11q13) and identified clinically by parathyroid, pituitary and gastro-entero-pancreatic tumours (Pawlu et al., 2005), while the adrenal cortex is also affected in up to 20% of cases. Pheochromocytomas are exceptionally rare in MEN 1 patients (much less than 1%) (Carling, 2005). On the other hand, MEN 2 is characterised by medullary thyroid carcinoma, pheochromocytoma, and parathyroid tumours. In up to 25 per cent of the cases, pheochromocytoma is diagnosed before medullary thyroid carcinoma is evident (Modigliani et al., 1995). Multiple endocrine neoplasia type 2 (MEN 2) is caused by mutations in the RET-protooncogene on chromosome 10q11.2, which encodes a transmembrane receptor tyrosine-kinase (cell surface receptor for hormones) (Pawlu et al., 2005). Furthermore, the syndrome is classified into three subtypes: MEN 2A, FMTC (familial/hereditary medullary thyroid carcinoma) and MEN 2B (Marquard and Eng, 2015).

Nearly all individuals with MEN1 have tumours of the parathyroid glands (Pawlu et al., 2005), Most of the tumours are noncancerous, but they cause the glands to produce too much parathyroid hormone (ibid) effecting the kidneys, intestines and bones (Coetzee and Kruger, 2004). Some patients with type 1 disease develop pituitary gland tumours (Lemmens et al., 1997), and nearly everyone with type 2A disease develops medullary thyroid cancer. About 40-50% of patients develop tumours of the adrenal glands, which generally raise blood pressure due to the epinephrine they produce (Scheinfeld, 2009). Most people with type 2B disease have no family history of it; in

this case, the disease is the result of a new genetic mutation (ibid). The medullary thyroid tumours in type 2B disease grow faster and spread more rapidly compared to those in type 2A disease (Moline and Eng, 2011). MEN is also inherited as an autosomal dominant syndrome; if an abnormal gene is inherited from only one parent, the disease can be passed to the child and usually one of the parents may also have the syndrome (Thakker, 2010). MEN syndromes are extremely rare, prevalence 3–20/100,000 (Marini et al., 2018) and both genders are equally affected (Romei et al., 2012). The mean age of presentation is 36 years (Wells et al., 2013), displaying almost 100% penetrance by 40-50 years of age (Arnold, 2017). The mean age of death for MEN patients is 55-60 years of age (Norton et al., 2015).

2.6.3 Mutations in the succinate dehydrogenase complex (SDHx) genes

Succinate dehydrogenase complex (SDHx) or Electron Transport Chain Complex II (Li et al., 2017) is an enzyme complex found in humans (Kita et al., 1990). The SDHx is located in the mitochondria and part of both the citric acid cycle and respiratory electron transfer chain (Li et al., 2017). Further, as a complex of the mitochondrial electron transport chain, the SDH protein is an important link between two significant biochemical mechanisms, the Krebs cycle and oxidative phosphorylation (Pawlu et al., 2005). Considering the fundamental nature of the SDH protein in cellular function, it is not currently understood why only paraganglionic cells are affected; however, the sensitivity of these cells to oxygen levels could play a role (Neumann et al., 2004). The SDHx is composed of four subunits: SDHA, SDHB, SDHC and SDHD (Gill, 2018). The SDHA, SDHB, SDHC and SDHD genes encode the aforementioned subunits of the SDHx (Bardella et al., 2011).

A germline mutation is any detectable difference within germ cells (cells that when fully developed become ovum or sperm) (Li et al., 2017). Germline mutations in the SDHB gene can cause familial pheochromocytoma, and less frequently, renal cell carcinoma, a type of kidney cancer (Escudier et al., 2014; Kirmani and Young, 2014). Some evidence has suggested that the majority of patient cases of familial (hereditary) paragangliomas and also a considerable portion of the non-familial (non-hereditary) tumours are connected with gene mutations in three subunits (out of the possible four)

of the SDHx (Baysal, 2002). Mutations in the SDHB gene are transmitted by autosomal dominant inheritance (Lefebvre and Foulkes, 2014). Every individual has two copies of the SDHD gene, which are randomly inherited from each of the parents. Mutations in one copy can increase the likelihood of developing various tumours and cancers (Kirmani and Young, 2014). SDHD mutations are equally inherited from the father or mother; there is a 50/50 random chance of passing on a SDHD mutation to sons and daughters (Welander et al., 2011). However, as an exception in rare cases, an increased risk for tumours has been demonstrated when the SDHD mutation is inherited from the father (Timmers et al., 2009). The mean age of presentation is 35.7 years of age (Burnichon et al., 2009), and the penetrance of SDH mutations is estimated to be 21% at age 50 and 42% at age 70 (Rijken et al., 2018). Life expectancy is 56-57 years of age (Kantorovich et al., 2010).

2.7 Summary and conclusion

Rare endocrine syndromes such as VHL, MEN and mutations in the SDHx genes have a significant impact on the length of and quality of life. Such rare endocrine syndromes require extensive screening and surveillance; although genetic testing is available, the manifestations of the syndromes are multifaceted (Leung et al., 2008). Therefore, medical screening plays a significant role in the identification of abnormalities and consequent follow-up of lesions. Additionally, it is used for screening of asymptomatic rare endocrine gene carriers and their long-term surveillance. For instance, screening is important due to lesions in VHL syndromes being treatable (ibid). As a result, due to the combination of clinical screening and advanced surgical techniques, the morbidity and mortality of patients with rare endocrine syndromes such as VHL have significantly reduced (Hes and Feldberg,1999). Screening guidelines for adult patients provide a precise care plan for pheochromocytoma monitoring and screening; however, in paediatric patients, such guidelines are less clear and provide no generally accepted age of when to initiate medical screening for pheochromocytoma (Aufforth et al., 2015). Despite the utility and guidance on screening for these diagnoses, little is known about how individuals with these syndromes engage and experience the process of screening and surveillance. This is important to understand, as adherence to screening generally is reported as low (Firmino-Machado et al., 2017).

This introductory chapter has provided background information on the syndromes which are the focus on this thesis. The next chapter will explore the literature in relation to such studies which examine the experience of service users in screening and surveillance, as well as barriers and facilitators that may influence attendance.

Chapter 3

Literature Review

3.0 Introduction

The aim of this narrative review is to critically evaluate literature in relation to patient screening and factors that may influence attendance of screening and surveillance appointments. The relevant literature, not yet selected, focuses on the three rare endocrine syndromes at the centre of this thesis, however, this is supplemented by other literature on related diagnoses.

Narrative reviews are aimed at establishing and summarising published research; this allows for the identification of gaps in the literature that may highlight where future research attention could best be focused (Ferrari, 2015). Further, it has been noted the review of literature is a concise analysis of the studies conducted in an area that allows researchers to view it critically and determine its relevance in a given context (Shah et al., 2018). Consequently, the present study is a critical narrative review.

This chapter aims to examine existing research:

1. To outline the risks and benefits of screening and surveillance in rare hereditary endocrine syndromes, as well as in individuals with comparable diagnoses.
2. To review research concerning the experience of service users in screening and surveillance.
3. To explore what has been published about attendance rates and the impact of not attending screening and surveillance services.
4. To examine available evidence about barriers and facilitators to engagement with screening and surveillance services.

3.1 Methods for searching the literature

3.1.1 Search Strategy

The relevant literature focused on the three rare endocrine syndromes at the centre of this thesis. However, due to the parsimonious volume of research on these rare syndromes, the search was expanded to include other related but more common endocrine syndromes that require regular screening i.e. diabetes and thyroid diagnoses, and also another rare genetic syndromes in which surveillance is prevalent, Huntingdon's disease. Huntington's disease, although a non-endocrine syndrome (Migliore et al., 2019; Roos, 2010), also requires genetic testing (Migliore et al., 2019) thereby it was included in the search criteria.

Initial search terms were selected based on the aims of the literature review; Table 3.1 below outlines the key search terms used. An Academic Liaison Librarian assisted with confirmation/ validation of key search terms and identifying suitable current library databases. The electronic databases searched were: Academic Search Complete, Web of Science (previously known as Web of Knowledge), CINAHL Plus, Scopus, Medline, Cochrane Library, PsycInfo, and PubMed Central.

Table 3.1. Search keywords and rationale

Key search terms/facilitators	Rationale
- Screening	-Term to encompass the dominant areas of disease identification. -In response to Aim 1,2,3 and 4 of the Literature Review.
- Surveillance	-Term to embrace broad topics of long-term disease observation. -In response to Aim 1,2,3 and 4 of the Literature Review.
- Benefits	-A facilitating term used alongside screening and surveillance to pick up positive outcomes. -In response to Aim 1 of the Literature Review.
- Thyroid (endocrine) - Diabetes - Huntington's	-Including thyroid and diabetes allowed for literature with endocrine non-rare syndromes that also require facets of screening and surveillance. - Although Huntington's is not a diagnosis of the endocrine system, it is classified as inherited and rare. -In response to Aim 1,2,3 and 4 of the Literature Review.
- von Hippel Lindau (VHL) - Succinate dehydrogenase gene mutation (SDHx) - Multiple endocrine neoplasia (MEN)	-Allowed for the inclusion of literature specific to the specified rare endocrine hereditary syndrome. -In response to Aim 1, 2,3 and 4 of the Literature Review.
- Experience	-A facilitating term used alongside 'screening', 'surveillance', and 'patient'. -In response to Aim 2 of the Literature Review.
- Patient	-A facilitating term used alongside 'screening', 'surveillance', and 'experience'. -In response to Aim 1,2,3 and 4 of the Literature Review.
- Attendance	-A facilitating term used alongside 'screening', 'surveillance', 'patient', and 'attendance'. -In response to Aims 3 and 4 of the Literature Review.
- Nonattendance	-A facilitating term used alongside 'screening', 'surveillance', and 'patient'. -In response to Aims 3 and 4 of the Literature Review.
- Shared decision-making	-A facilitating term used alongside 'patient information' and 'attendance'. -In response to Aim 4 of the Literature Review.
- Patient Information	- A facilitating term used alongside 'shared decision-making' and 'attendance'. -In response to Aim 4 of the Literature Review.

The electronic databases listed below, were searched using the key search terms/facilitators listed together with Boolean search operators (AND/OR). An example of the search terms in conjunction with the Boolean search operators used in the electronic data bases, is provided in Appendix 3.1.

There were inclusion and exclusion criteria developed to be applied systematically to studies retrieved, in order to ensure that all relevant publications were reviewed. The inclusion and exclusion criteria of the studies were as follows:

Inclusion criteria

- Published in the English language.
- Peer-reviewed articles.

- Pertained to the subject areas of science, medicine, social sciences, nursing, psychology or life sciences. This made for a comprehensive search that enabled literature to be retrieved from various research sectors.

- Studies on human participants, both adults and/or children (i.e. not animal studies).
- Studies related to patient screening and/or appointment attendance.

- Studies published within the ten-year time frame: 2010-2020. As a general rule, studies selected from a literature search are usually capped at five to ten years from the search date (Cronin et al., 2008). As a result, each of the database searches in the present study was limited to articles published between 2010 to 2020. This limit served the aims of the study, which focussed on service delivery and patient attendance of screening and surveillance appointments; owing to the concurrent social, cultural and economic changes over the previous decade, older studies may be less relevant.

Exclusion criteria

- Non peer-reviewed research and publications such as editorials, opinion pieces, posters and letters.

- The full-text publication of the study was not available in the English language.

- Related research where the focus fell beyond the scope of the present study, such as studies on the effects of medication on rare endocrine syndromes.

3.1.2 Data Collection and Analysis

Eligibility for inclusion was first considered based on the title and abstract of each article. Potential studies were consolidated into a single document to manage them, duplicate studies were then manually identified and removed. Full-text studies were then obtained for the studies considered relevant to the literature review aims. A conclusive assessment then excluded studies that had initially been deemed as relevant but following a more detailed reading, were considered to not meet the inclusion criteria. Finally, the reference list of each study was reviewed to identify additional articles that may meet the inclusion criteria (Figure 3.1). The final selection of studies were assessed for the quality of the evidence they presented (Smith and Noble, 2016). Appraisal tools utilised included the qualitative, cohort, systematic review and randomised control trial study checklists from the CASP (Critical Appraisal Skills Programme, 2018). These tools provided a structured means to assess the rigour of the studies being reviewed. As suggested by Shah et al., (2018) a synthesis matrix, which also includes the researcher's CASP ratings of the studies, was compiled (Appendix 3.2).

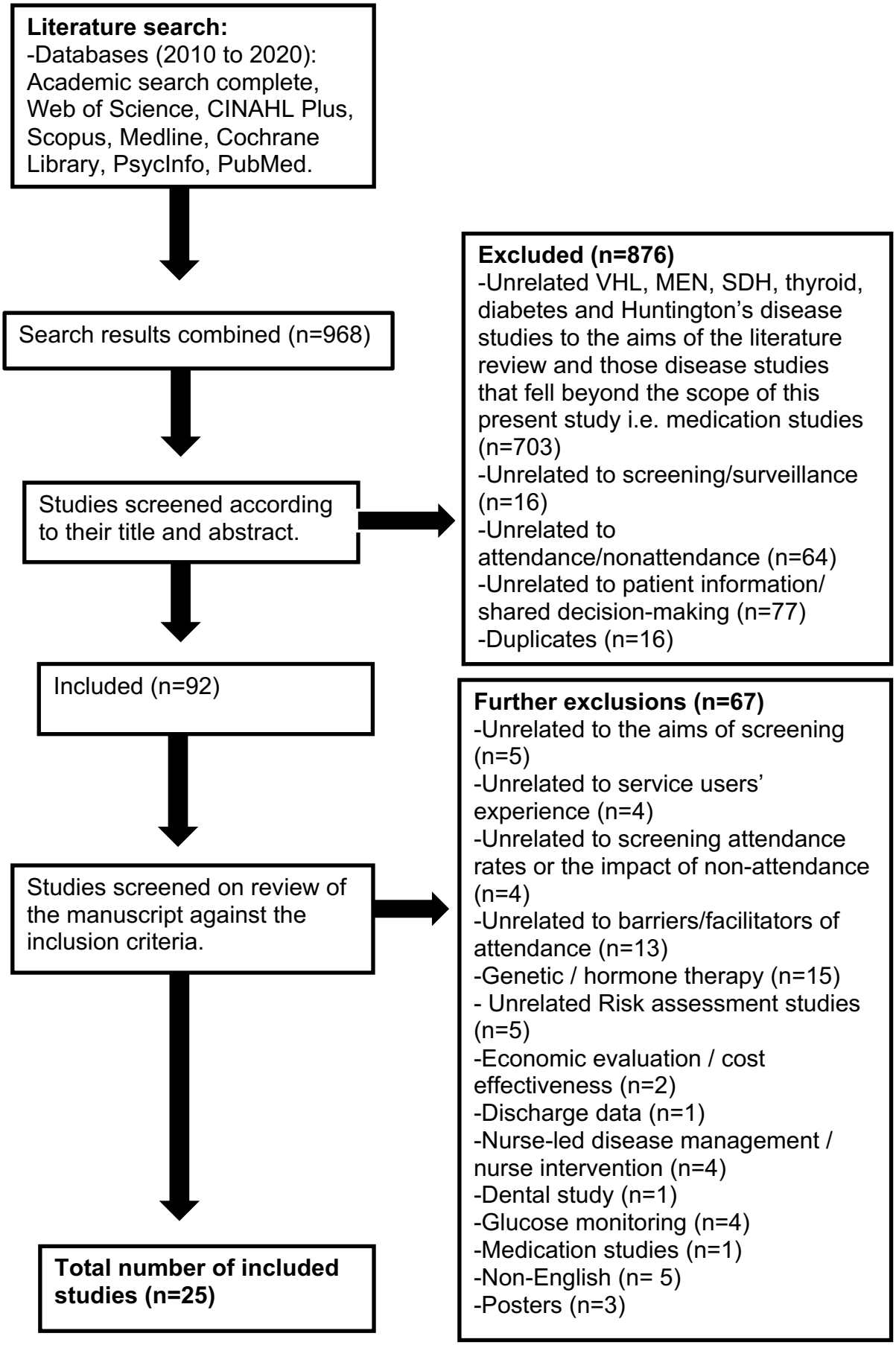

Figure 3.1. Literature search process flowchart

3.2 Literature Search Results

A total of 968 studies were retrieved from the initial databases searches (Table 3.2). In total 943 did not meet the inclusion criteria and were removed, leaving 25. Some of the studies that were excluded included VHL, MEN, mutations in the SDHx, thyroid, diabetes and Huntington's disease studies that were unrelated to the four study aims of this literature review, as well as those that fell beyond the scope of the present study, such as studies on the effects of medication on the disease. No further studies were identified through hand searching the reference lists. The studies used in the literature review were then summarised, categorised according to themes, and are presented and discussed in four main sections that directly map onto the aims of the literature review.

Table 3.2. Electronic databases initial search results

Database	**Time frame (Years)**	**Number of studies identified from electronic database**
Academic search complete	2010- 2020	29
Web of Science	2010-2020	566
CINAHL Plus	2010-2020	55
Scopus	2010-2020	89
Medline	2010-2020	57
Cochrane Library	2010-2020	46
PsycInfo	2010-2020	71
PubMed Central	2010-2020	55
Total studies identified from database search		**968**

The first theme presents literature on the screening and surveillance processes, covering both its strengths and arguments against such processes. The second theme outlines the experience of service users in relation to screening and surveillance. This follows on to the third theme which discusses attendance rates, as well as the possible impact of not attending screening and surveillance. Lastly, theme four considers possible barriers and facilitators to patient engagement with screening and surveillance.

3.2.1 The risks and benefits of screening and surveillance in rare hereditary endocrine syndromes, as well as in individuals with comparable diagnoses

Six articles focused on the means of screening and surveillance, their effectiveness and possible negative consequences (see Appendix Table 3.2- synthesis matrix for an overview of the studies for Theme 1). Four of the six studies were conceptual reviews of published information (Clement et al., 2018; Geurts et al., 2020; Sobrido et al., 2019; Tufton et al., 2017), whilst two were cohort studies (Binderup et al., 2017; Poulsen et al., 2010). The literature search revealed a lack of research attention on rare endocrine syndromes, particularly their occurrence in children and young adults. Much debate on the optimum surveillance protocol as well as the frequency of surveillance was present. This was particularly notable pertaining to carriers of SDHx genes mutations (Tufton et al., 2017).

The four review studies (Clement et al., 2018; Geurts et al., 2020; Sobrido et al., 2019; Tufton et al., 2017) presented discussions pertaining to screening and/or surveillance. Tufton et al. (2017) and Geurts et al. (2020) reviewed information advocating screening, while Clement et al. (2018) and Sobrido et al's., (2019) reviews were focussed on studies relevant to clinical guidance.

Geurts et al's. (2020) focus was not specific to a particular endocrine syndrome, rather they presented the benefits of screening in high-risk populations in general. 'High risk' in this context, referred to an array of endocrine syndromes that included thyroiditis, other rare hereditary syndromes such as VHL and multiple endocrine neoplasia Type 1 (MEN1), were also considered. Clement et al. (2018), reviewed evidence with the aim to develop consensus recommendations for thyroid cancer surveillance particular to adolescent and young adult cancer (CAYAC) survivors. Sobrido et al. (2019)'s study reviewed screening studies to provide best practice recommendations for identifying Niemann-Pick disease type C (NP-C), a non-endocrine hereditary ultra-rare inborn error of metabolism (IEMs). Whilst Tufton et al. (2017)'s study reviewed the literature in relation to the risks of radiation from some imaging protocols of carriers of SDHx genes mutations.

Three of these reviews were self-classified as systematic reviews (SRs) (Clement et al., 2018; Geurts et al., 2020; Tufton et al., 2017) and one was classified as non-systematic (Sobrido et al., 2019). Despite these claims, none of the SRs used more than one database, indicating a lack of scope, and only one (Clement et al., 2018) provided details of the selection process employed and mentioned the use of independent reviewers. Furthermore, although Geurts et al. (2020) study benefits from a clearly stated aim and referenced a wide range of resources, it should be noted that details on criteria for inclusion and exclusion, including any restrictions on the publication date, were not mentioned. This questions confidence in the evidence obtained in the conclusions and recommendations of the SRs, thereby the evidence may be regarded as limited and needs to be viewed with caution.

Furthermore, although Sobrido et al. (2019) drew from a broader range of databases and included unpublished data, essentially grey literature, which is defined as material which may not be published or peer-reviewed (Jacobs, 2008), details on the review process itself remained scant as the actual unpublished studies were not available for the reader to review and inspect. Whilst discussion of published as well as of unpublished methodological aspects of some of the authors' on-going screening studies potentially introduced some bias to the reported data, it suggests an inclusive approach to incorporate as many relevant studies as possible.

Notably, Sobrido et al. (2019) highlighted that owing to similarities in several key disease factors, much of the knowledge compiled from NP-C screening studies can be inferred to other ultra-rare IEMs. Therefore, the findings may be transferable to other similar patient cohorts. Clement at al. (2018) utilised two independent reviewers to select the studies and extract the data, thereby increasing the rigor and validity of the studies compiled. The data were then analysed by 33 multidisciplinary expert panel members through discussion of the evidence, which then developed into recommendations for surveillance that were based on expert opinion and evidence. Decisive recommendations, the strength and quality of the evidence appraising each recommendation, was arrived at by panel members concurrently and in accordance with evidence-based medicine methods that had been developed by experts such as the Cochrane Childhood Cancer Group. Further, Clement at al. (2018) illustrated that the final document of recommendations was critically evaluated by two independent

experts as well as by three patient representatives. This portrays a rigorous data gathering and assessment that was lacking in the other literature review studies.

Tufton et al. (2017) reported that the data reviewed, as well as the amassed recommendations, supported the refrainment of radiation-exposing imaging on carriers of SDHx gene mutations, since they require lifelong screening. Moreover, with respect to SDHB gene mutation, the authors reported a higher malignancy risk and noted that the aim of any screening programme should be early detection and ultimately, prevention of metastatic disease. Tufton et al. (2017) noted that if a surveillance strategy of well and non-symptomatic individuals is not possible without inflicting harm then this negates from the assumed benefits of genetic identification. This point conveys the importance of evaluating and reporting the possible risks of a screening programme as well as the benefits. The risk/benefit balance is particularly important to consider with respect to asymptomatic mutation carriers of SDHA and SDHC mutations (additional encoding genes of the SDHx) as Tufton et al. (2017) expressed how it is unclear how they fit into their suggested protocols. Such tailoring was noted as important to consider as future genotype variations emerge. As a result, Tufton et al. (2017) concluded broadly applicable optimum screening and surveillance protocols for SDHB mutation carriers: an abdominal MRI every 18 months and an MRI of the thorax, neck and pelvis every three years.

Despite limitations in the rigour of their review, Tufton et al. (2017) argue that functional imaging has a place in the detection of ‘occult functioning tumours’ otherwise known as cancers of unknown primary, (Hannouf et al., 2018), characterisation of identified lesions, and evaluation of the general metastatic tumour burden. Similar to Tufton et al. (2017), Clement et al. (2018) argued in favour of screening, specifically for thyroid cancer (DTC), this was to reduce mortality and recurrence. Evidence from some studies deemed by Clement et al. (2018) as lower quality owing to small patient numbers, suggested that treatment of DTC at an earlier stage is correlated with reduced mortality and recurrence rates. These studies were also limited to adult patients. This point was acknowledged by the authors who noted a lack of evidence regarding the morbidity impact of DTC in children. Further support for the benefits of

screening was expressed by Sobrido et al., (2019) who illustrated the benefits for those afflicted by ultra-rare IEMs such as NP-C.

Geurts et al. (2020)'s review study raised the concern of a lack of recommendations, for instance with regards to screening in patients who are at average risk for pancreatic cancer, as the specificity for screening tools such as cross-sectional imaging and serum blood markers is low, giving rise to false positives and possible overtreatment. Sobrido et al. (2019) promoted the combination of several screening diagnostic methods such as clinical, biomarker and genetic, as the most effective approach to identify NP-C cases, while also reducing the likelihood of misdiagnosis. These arguments support the consolidation of several screening types and surveillance methods in comparison to a singular modality. Despite the possible benefits of screening, both Tufton et al. (2017) and Clement et al. (2018) acknowledged the potential for patient distress around the surveillance process. It was noted that asymptomatic patients with the label of a genetic diagnosis could generate anxiety owing to the perceived implications of the syndrome, as well as future uncertainties due to its unpredictable pattern. Tufton et al. (2017) addressed this issue and illustrated how they attempt to minimise patient anxiety dealing with genetic syndromes, through provision of family clinics and with direct contact with a specialised nurse who coordinates investigations to be performed on the same day, thereby minimising the number of hospital visits for the patient. This demonstrates reduction in patient anxiety as an additional aim of the screening.

Geurts et al. (2020) described the goals of screening, in particular with high-risk patients, as a means of early identification of a life-threatening disease, whilst curtailing un-necessary procedures with intrinsic risks such as radiation exposure. Similarly to Tufton et al. (2017), Geurts et al's. (2020) review also highlighted that high-risk patients would benefit from a multidisciplinary approach and thereby should be referred to centres of excellence with suitable experience and resources to enhance patient outcomes. However, Geurts et al. (2020) concluded that there was no evidence to uphold endocrine screening for populations with average risk, but for high-risk patients for endocrine cancer, including those with inherited syndrome, early detection and intervention could dramatically affect patient outcomes. Furthermore, Geurts et al. (2020) suggested special considerations for hereditary endocrine diagnoses as they

often affect multiple organs with an elevated lifelong risk for tumour development; additionally, surgical incision of the entire organ is related to poor outcomes and morbidity.

Regarding surveillance, Clement et al. (2018) proposed that the agreed regimen should be the result of shared decision-making between the clinician and patient. It was highlighted that shared decision-making has been encouraged in screening programs for persons genetically predisposed to multiple endocrine neoplasias. The shared decision-making model presented for DTC surveillance in CAYAC patients involved communication regarding the benefits and potential issues with thyroid cancer surveillance in general. It was advised that such communication should include an explanation of the ambiguity of the available evidence at a level appropriate for the experience and cognitive abilities of individual patients.

Strengths of the Tufton et al. (2017) review included provision of a balanced discussion of the benefits as well as the potential risks of long-term surveillance for patients. This was in contrast to the Sobrido et al. (2019) study, which lacked discussion of any possible disadvantages. Tufton et al. (2017)'s provision of search terms, publication date timeframe, and criteria for the search, provided clear methodology that supported the reliability of the compiled studies. The results are applicable to the population described in the current PhD thesis study as the Barts endocrine screening clinic employs the described protocol for mutations in the SDHx genes, specifically for SDHB mutation carriers, as noted by Tufton et al. (2017). However, even though Tufton et al. (2017) presented convincing evidence through the balanced discussion, it can be expressed they partially fulfilled their aim of reviewing the literature, as the authors only searched a single database, thus a potential limitation.

As for Clement et al. (2018), they recognised that follow-up studies are required to provide more data regarding long-term DTC surveillance, as the CAYAC survivors were relatively young at the time of publication. The strength of Clement et al.'s (2018) study, which was acknowledged by the authors, is the harmonisation process used for the development of the guideline. This process involved a rigorous systematic review method for data retrieval. It was strengthened by the transparency in determining and rating levels of evidence, the multidisciplinary expert panel engaged in the process,

and the authors' comprehensive focus on defining the benefits as well as the adverse effects of screening. Moreover, the multidisciplinary expert panel, which discussed the evidence and developed recommendations, contributed to identifying gaps in knowledge that would ultimately improve surveillance, such as highlighting the lack of studies that include children. This supported the reliability of the included studies; however, it can be suggested that Clement et al. (2018) partially fulfilled aim of developing recommendations, due to the possible disadvantage of the lack of databases used for the literature review.

Geurts et al. (2020) partially fulfilled their aim of encapsulating information in relation to screening, primarily due to the employment of the limitation of using only a single search database. Further, no critical review of the research cited was undertaken by Geurts et al. (2020), therefore the quality in research undertaken by the authors could not be ascertained. However, the findings have some relevance as the patients in this review were similar to the population at the Barts endocrine screening clinic, as patients with rare endocrine syndromes were included. As a consequence, while this review is of interest, the lack of clarity and rigour in the process undermines the strength of the recommendations presented. As for Tufton et al. (2017), recognising the frequency of surveillance in the suggested protocols as a limitation, it was noted that differences in phenotype and the penetrance of the various SDHx subunits must be taken into account. For instance, less recurrent imaging protocols are noted to be generally accepted for SDHD mutation carries, due to their lower risk of malignancy, however appreciating the higher disease penetrance (likelihood that an individual caring a syndrome associated genotype will develop that syndromes, Zlotogora, 2003). This represents a limitation in the transferability of some of the suggested protocols, as they may only be applicable to the patients at the Bart endocrine screening clinic who have mutations in SDHx genes.

In comparison to the systematic reviews, limitations of non-systematic reviews have been suggested due to the involvement of selection and interpretation of research evidence so as to endorse a pre-given opinion or interest (Hammersley, 2002). Thereby, this may have introduced bias when identifying studies for inclusion in the Sobrido et al.'s (2019) review. Furthermore, Sobrido et al.'s (2019) process of compilation of screening recommendations was not as succinct as the systematic

review by Geurts et al. (2020). The Sobrido et al. (2019) study lacked employment of an external expert in the area of ultra-rare diseases (URDs) to possibly critique findings and to highlight any knowledge gaps. With reference to screening method recommendations, there was also a lack of discussion by Sobrido et al. (2019) pertaining to risks that should be communicated to patients. As a result of such limitations, it can be considered that Sobrido et al. (2019), did not fully meet their aim of extensively reviewing the applicable screening studies.

In summary, collectively these four literature-reviews present important recommendations regarding the importance of screening and surveillance, but how they should be delivered considering the associated risks and also the potential for patient anxiety. However, limitations in the process of the reviews and a lack of detail on the personal impact of screening/surveillance result in gaps remaining.

Both of the cohort studies retrieved from the literature search analysed populations of VHL mutation carriers (Binderup et al., 2017; Poulsen et al., 2010). Poulsen at al. (2010) aimed to ascertain the benefits and efficiency of VHL surveillance and present clinical guidance. In contrast, Binderup et al. (2017) aimed to establish whether the survival of VHL mutation carriers and the risk of VHL-related mortality had altered over time and how it had been impacted by gender, genotype and surveillance attendance. Both illustrated that annual central nervous system (CNS) surveillance considerably reduced manifestation risks, thereby conveying the benefits of surveillance. The two cohort studies were based on Danish populations who were VHL-mutation carriers (Binderup et al., 2017; Poulsen et al., 2010). Poulsen et al. (2010) observed the period 1971 to 2008, and Binderup et al. (2017) attended to records of individuals born between 1841 and 2016. A strength of both studies was the verification of patient medical records. More than 90% of the data used in Poulsen et al. (2010) was confirmed through GP records, and in Binderup et al. (2017), medical record verification of clinical information occurred in 94% patients; this enabled detailed analysis of VHL survival.

Poulsen et al. (2010) included subjects from 15 years of age, as at that time it was considered that regular surveillance intervals were not necessary before 15 years old. Binderup et al. (2017)’s retrospective cohort study included all known Danish VHL

families with a VHL mutation, thereby increasing validity. Individuals five years or younger at the time of death or at the end of the observation period were not included as their VHL status could not be established; this was owing to the negligible incidence of symptomatic VHL manifestations before this age. As Binderup et al. (2017) concluded the follow-up on 1 January 2016 (175 years), this was a substantially longer observation time in comparison to Poulsen et al. (2010) (37 years).

On the basis of 54 living VHL mutation carriers, Poulsen et al. (2010) determined the risks of intercurrent manifestations (defined by authors as a VHL manifestation diagnosed as a result of new symptoms in-between surveillance examinations). Accordingly, the clinical ramifications of surveillance discoveries increased. Binderup et al. (2017) included 143 patients with VHL and 137 siblings without VHL from 34 unrelated families.

Statistical analysis for both studies (Binderup et al., 2017; Poulsen et al., 2010) was conducted and both studies employed a form of survival analysis, the Kaplan-Meier method (a nonparametric test typically used to estimate the fraction of patients living for a particular amount of time following treatment; Kalra, 2016). A possible advantage of both the studies employing the Kaplan-Meier method is that it could take into account forms of suppressed data that could occur if a patient withdraws from the study or is lost to follow-up. Using this method, (Poulsen et al. 2010) the cumulative risk of diagnosis of an intercurrent manifestation was plotted against the quantity of months between examinations of the category in question. In addition, symptomatic manifestations diagnosed at patients' first VHL examinations, were not included. Binderup et al. (2017) determined how VHL survival had advanced over time using Kaplan-Meier curves (the visual representation of the survival function, Dudley et al., 2016) in groups of patients born in separate periods: (1) between 1840 and 1900, (2) between 1900 and 1955 plus, (3) between 1956 and 2010.

Binderup et al. (2017) explained that the three groups were selected to mirror periods with dissimilar methods of adulthood VHL surveillance. For instance, patients born before 1900 had no surveillance, amidst those born between 1900 and 1955, 17% had regular surveillance, whilst most of the patients born after 1955 (88%) attended regular surveillance (Binderup et al., 2017). Binderup et al. (2017) then correlated the three

groups' survival times in a Cox regression model. This increased the analysis processes rigor due to the Kaplan-Meier not being able to use multiple predictors, whereas a Cox Regression can. In order to evaluate whether improved survival among the younger patients was principally owing to a general enhanced life expectancy, Binderup et al. (2017) compared VHL survival with the survival of their non-VHL siblings for persons born after 1900. Moreover, Binderup et al. (2017) compared gender and age specific death rates for Danish birth cohorts from 1900 to 2014, with the survival times of VHL, utilising a relative survival model (a net survival measure; Sasieni and Brentnall., 2017).

Poulson et al. (2010) demonstrated that surveillance was associated with both increased incidence of VHL diagnosis in pre-symptomatic at-risk individuals from 46% to 72% plus from 89% to 94% by ages of 30 and 50 years, respectively. This is beneficial from a clinical point of view as it involves detection of VHL manifestations at younger ages, this was described as favourable in prophylactic VHL management. Plus, a reduction in intercurrent manifestation risk coincided with annual ophthalmic and abdominal examinations (1.7% and 1.2%, respectively). These findings promote an optimisation of surveillance recommendations, which could improve clinical conditions and enhance long-term outcomes for VHL patients.

However, despite these benefits, Poulsen et al. (2010) and Binderup et al. (2017), in line with Tufton et al. (2017), raise the concern of concomitant risks. These include over-investigation, psychological distress and negative financial impacts on health care systems. Therefore, and as noted by Poulsen et al. (2010) and Binderup et al. (2017), improved validity of VHL surveillance procedures requires future studies with psychological as well as with financial approaches. Binderup et al. (2017) demonstrated the benefits of surveillance in certain subpopulations that may be particularly beneficial for truncating mutation (change in DNA that may shorten the protein, Pasternak, 2005) carriers, especially if initiated in childhood; this supports identification of this type of mutation carrier for targeted therapy.

Aligned with Poulson et al. (2010), Binderup et al. (2017) highlighted the particular benefit of annual CNS surveillance for reducing the risk of truncating mutation carriers,

as they carry the greatest risk for renal cell carcinoma (RCC) and CNS hemangioblastoma (benign vascular tumour; Goo and Ra, 2015), further conveying the benefits of surveillance. However, the benefits of the effect of surveillance for missense mutation (when one DNA nucleotide is changed and a different amino acid is inserted into a protein; di Masi, 2008) on carriers' survival rates were not supported. This may be due to many patients not initiating surveillance before adulthood. The overall median age of surveillance initiation in Binderup et al. (2017) was 24 years. This further highlights the importance of early surveillance commencement to reduce mortality rates. The strengths of both the cohort studies (Binderup et al., 2017; Poulsen et al., 2010) lie in their use of medical records to verify clinical information, as discussed earlier.

Further, Poulsen et al. (2010) acknowledged that the homogeneous study population of VHL-mutation carriers generated a high specificity, in comparison to several prior VHL studies which were affected by selection bias and that this was owing to interest in specific manifestation types. One of the noted prior studies included Maher (2004), where it was expressed that the identification of the VHL gene has enhanced the diagnosis and clinical management of VHL syndrome. Although both are Danish studies (Binderup et al., 2017; Poulsen et al., 2010), aspects are applicable to the population in the present study, in particular the reported benefit of early screening of VHL clinic patients at the screening clinic.

Both cohort studies had limitations (Binderup et al., 2017; Poulsen et al., 2010). For example, the lack of data identified by Poulsen at al. (2010) in their study regarding unrecognised VHL-mutation carriers. This is because these individuals are anticipated to have later clinical onsets due to the lack of prophylactic surveillance and are likely distinct genotypes. Thus, there is a gap in knowledge in that area, with Poulsen at al. (2010) partially fulfilling their aim of ascertaining the benefits and efficiency of VHL surveillance. Regarding the Cox regression analyses demonstrated by Binderup et al. (2017), individuals born before 1900 were purposefully excluded, as the authors explained that the data collected from this period could be biased towards incorporation of the most severely affected patients. However, it should be noted that this exclusion may decrease the reliability of the regression results, as the reasoning

behind the exclusion of the pre-1900 data of being biased towards the severe cases is not confirmed in the study by the authors.

A separate critique of Binderup et al.'s (2017) study is the lack of assessment as to whether surveillance decreased VHL associated sequelae (condition resulting from a prior disease; Buck, 2016) or enhanced the patients' quality of life. This indicates further research is required to understand the optimum VHL screening process, with the authors Binderup et al.'s (2017) partially accomplishing their aim of establishing whether the survival of VHL mutation carriers and the risk of VHL-related mortality is impacted by gender, genotype and surveillance attendance. Poulsen et al. (2010) and Binderup et al. (2017) also noted that VHL may be underdiagnosed in Denmark, thereby possibly omitting patients who have yet to be diagnosed or who possibly have had de novo cases or even milder phenotypes. Moreover, both studies were retrospective and used data that was not specified for research purposes at the time of recording. Using such existing records has been noted to be a limitation of retrospective studies, as there could be missing data due to poor quality of documentation or due to variables that were not initially considered to be recorded in advance (Ramirez-Santana, 2018).

In summary, in regards to the risks and benefits of screening and surveillance, the reported benefits of screening and surveillance included the reduction of mortality rates (Poulsen et al., 2010; Binderup et al.,2017). However, the importance of providing patients with the benefits as well as the potential risks associated with long-term surveillance was indicated (Tufton et al., 2017). Arguments were also presented which advocated the benefits of screening, for instance for DTC (Clement et al., 2018) and ultra -rare IEMS's (Sobrido et al., 2019). There is a lack of evidence to support the benefits of endocrine cancer screening for populations with average risk of developing cancer; however, in relation to those at high risk of developing an endocrine cancer, early cancer detection, and intervention with a multi-disciplinary approach has been noted to may positively impact patient outcomes (Geurts et al., 2020). Shared decision-making is supported for its ability to convey benefits and risks to patients in a way that may ultimately help to reduce anxiety (Clement et al. 2018). Moreover, the findings illustrated that, within the last 10 years, all prominent studies into VHL have been based in Denmark (Poulsen et al., 2010; Binderup et al.,2017). This highlights

an international/ collective effort into the research of optimal surveillance protocols concerning rare endocrine syndromes. What can be captured and applied to future research designs is the inclusion of children and adolescents as well as research into patients' experience with screening and surveillance. Such research may contribute to understanding patients' needs, in order to be able to provide correct information and deliver it to them in a way that ultimately reduces their anxiety.

3.2.2 The experience of service users in screening and surveillance

Seven studies retrieved from the literature considered aspects of the experience of screening and/or surveillance search (see Appendix Table 3.2-synthesis matrix for an overview of the studies for Theme 2). Three of the studies used semi-structured interviews (Beard et al., 2016; Laidsaar-Powell et al., 2016; Miller et al., 2010), two of the studies were literature reviews; a systematic review (Gopie et al., 2012) and a scoping review (Kim et al., 2018), while two were surveys (Almeling and Gadarian, 2014; Godino et al., 2019). Although studies specific to patient experience of screening and surveillance in the literature are limited, the chief findings from the literature exhibit the association of surveillance of hereditary tumour syndromes with a degree of psychological distress.

Evidence indicates that patients as well as family members appreciate family involvement in consultations. In addition, the potential benefit of the primary care physician (PCP)/GP role in genetic cancer services is suggested. All three of the semi-structured interview studies only interviewed adults; Laidsaar-Powell et al. (2016) and Beard et al. (2016) both conducted semi-structured interviews on adults in Australia, Miller et al. (2010)'s population was in Canada and largely women, while Beard et al. (2016) only interviewed women.

Miller et al. (2010) raised the point that while the increased availability of genetic testing is altering the primary care role (PCP)/GP, relatively little remains known about the expectations of patients pertaining to the PCP role, as well as patient perspectives about ongoing cancer genetic care. As a result, Miller et al. (2010) sought to explore the PCP role as part of a more extensive study of patient experiences of genetic cancer services. In comparison to Laidsaar-Powell et al. (2016) and Beard et al. (2016), Miller

et al. (2010) carried out two sets of interviews with patients within four months of receiving genetic test results, as well as one year later. Advantages of Miller et al. (2010) longitudinal design study may possibly include the ability to establish sequence of events, together with the capability of identifying and relating events to particular exposures (Caruana et al., 2015). However, some disadvantages have also been noted regarding a longitudinal design study, for instance the possibility of incomplete and interrupted follow-up of participants over time (ibid).

Beard et al. (2016) also noted the advancement of genetic testing, highlighting the increased availability of population-based carrier screening for multiple hereditary syndromes. This revealed a need for research into how service users experience these screening programmes. Beard et al. (2016) examined how women experience simultaneous carrier screening for hereditary syndromes such as fragile X syndrome (FXS), cystic fibrosis (CF), and spinal muscular atrophy (SMA) through a novel reproductive genetic carrier screening program. A unique aspect of Laidsaar-Powell et al. (2016) interview study, was the acknowledgment of limited research carried out to understand patients, as well as family members (FMs) attitudes towards family involvement in cancer consultations. Hence, Laidsaar-Powell et al. (2016) aimed to investigate the experiences of patients as well as FMs concerning aspects such as family attendance and possible challenges of such family involvement. A qualitative approach was appropriate for these studies (Beard et al., 2016; Laidsaar-Powell et al., 2016; Miller et al., 2010) as it allowed for the opportunity to provide detailed descriptions of participant behaviour (not experience) in the real-world contexts in which it occurs (Price et al., 2015).

Both review studies (Gopie et al., 2012; Kim et al., 2018) reviewed literature in relation to cancer diagnoses and surveillance. Gopie et al's. (2012) systematic review highlighted a lack of knowledge regarding the benefits of surveillance for some hereditary cancer syndromes such as VHL. Thus, the aim of Gopie et al's. (2012) review was to examine the possible psychological burden of surveillance in several types of hereditary cancer syndromes in order to consider the extent of the reported benefits of surveillance against potential psychological disadvantages.

Active surveillance (AS) was the focus of Kim et al.'s (2018) scoping review of the literature. It was noted that AS is an option for managing specific cancer treatment in

order to reduce over-treatment that may impact health-related quality of life (Romero-Otero et al., 2016, cited by Kim et al., 2018) through the avoidance of definitive cancer treatment until there is evidence from testing that a patient is at risk of disease progression. An objective of Kim et al. (2018) was to explore patient experiences and perspectives of AS in order to reveal previously unconsidered concerns that could ultimately optimise service delivery to minimise the psychological stress of undergoing surveillance. As the clinical effectiveness of separate treatments was not focused on, a scoping review was justified by Kim et al. (2018).

Using the case of genetic risk, Almeling and Gadarian (2014) examined one of the fundamental claims of surveillance medicine that everybody is affected by the modernised emphasis on medical risk. Theoretical accounts of surveillance medicine assert the principal role of risk in constituting one's self (Armstrong, 1995, cited by Almeling and Gadarian, 2014). What could be considered as an unconventional study in comparison to the others included in this theme, Almeling and Gadarian (2014) constructed a survey experiment that was devised to induce a hypothetical sense of living between health and disease, a state that a patient may encounter during screening and surveillance.

Whilst a survey does not allow for the nuances of the included qualitative semi-structured interviews (Beard et al. 2016; Laidsaar-Powell et al. 2016; Miller et al. 2010), it was argued by Almeling and Gadarian (2014) that a survey allowed them to experimentally induce the conditions theorised by surveillance medicine. Particularly the unpredictability and worry posed by potential illness, which then was systematically assessed to determine who wants to undertake which types of actions in response to distinct levels and kinds of risk. The aim of the online survey of Almeling and Gadarian (2014) was to explore how individuals, irrespective of family history or health status, react to hypothetical genetic risk information by wanting to take action. Moreover, the experimental design allowed for a systematic comparison of how reactions are affected by risk level as well as by disease characteristics.

Godino et al. (2019) suggested that presymptomatic testing (PST) for hereditary cancer syndromes should include a premediated choice, which may be challenging when testing is undertaken in early adulthood. It was noted that PST is available for a variety of hereditary genetic syndromes and involves determining if an individual has

inherited a gene variant that causes familiar syndromes prior to the individual exhibiting any signs or symptoms (Evans et al., 2001; cited by Godino et al., 2019). Godino et al.'s (2019) cross-sectional self-completion survey was online as Almeling and Gadarian's (2014) was, but was also available in paper format, thus having the potential to recruit more participants due to ease of accessibility. The cross-sectional survey was built on the lead author's previous study, which indicated that young adults (YA) grew up with limited information regarding their genetic risk and that their parents exerted pressure on the YA during the decision-making process to undergo testing (Godino et al., 2016; cited by Godino et al. 2019). Godino et al. (2019) further examined possible psychological implications of PST for hereditary cancers in YA (18-30 years) together with their parents, Thereby, an objective of the cross-sectional survey was to investigate the experience of the counselling processes of both YA and parents, together with any possible influences from caregivers regarding the choice to be tested. Analysing patients' experience with respect to family relatives was also a particular focus of Laidsaar-Powell et al.'s (2016) qualitative interview study.

Both literature reviews (Gopie et al., 2012; Kim et al., 2018) drew from multiple databases, thus increasing the rigor of the compiled studies. The databases, as well as the search terms used were presented in both the review studies. Providing for a more comprehensive search strategy, research teams involved in Gopie et al. (2012) and Kim et al. (2018) reviewed the abstracts and selected relevant studies for their corresponding reviews. Gopie et al. (2012) also indicated that reference lists were scanned to identify further studies. The 26-year period applied to the literature search for Gopie et al. (2012) was substantially longer than the 10-year period utilised by Kim et al. (2018). However, as AS is a relatively recent topic in the literature, the shorter timeframe permitted Kim et al. (2018) to capture the most recent research published at that time; this was appropriate to an aim of the research of capturing studies regarding delayed treatment, referred to as 'watchful waiting'.

Kim et al. (2018) noted that the search strategy was cultivated in conjunction with a medical librarian and compiled using the Peer Review of Electronic Search Strategy reporting guidelines (McGowan et al., 2016; cited by Kim et al., 2018), which further supported the validity of the search strategy. Although the literature search period covered was only ten years, the approach, scoping, searching, screening and

extraction was clearly defined, thereby demonstrating the high quality of Kim et al's. (2018) methods.

All three semi-structured interviews (Beard et al., 2016; Laidsaar-Powell et al., 2016; Miller et al., 2010) were conducted with adults at least 18 years of age and who were based in Australia (Beard et al., 2016; Laidsaar-Powell et al., 2016) or Canada (Miller et al., 2010).

In the case of Miller et al.'s (2010) study, clinicians asked individuals at the end of each genetic test result disclosure session if they would agree to be referred to the study team to participate in the research. It was noted that potential participants were not approached if they received results by phone or if the clinician judged it inappropriate due to the patients' emotional state. This indicates that awareness of the patient's well-being was considered in the recruitment process. Twenty-five initial in-person interviews were conducted by Miller et al. (2010) within four months of individuals receiving their genetic test results. Out the initial twenty-five, twenty-one participated in the second follow-up 12 months later. A limitation reported in Miller et al. (2010) is that the participant sample was not representative of the Ontario population of the genetic cancer patients in the Canadian clinic. Therefore, results may also not be fully characteristic of the wider population of that clinic. Interviews averaged one hour in duration and were transcribed verbatim. However, to increase validity two members of Miller et al.'s (2010) research team extracted transcript segments relating to participant attitudes towards or involvement of PCPs, and coordinated the data across the two interview stages. Data were analysed using a low inference qualitative analytical approach, the advantage being the ability to illustrate the study participants' narrative without substituting the material into a more abstract form.

Beard et al.'s. (2016) female-only study involved only ten participants. All ten interviews were conducted via telephone only, which provided consistency and convenience. However, potential limitations of such telephone interviews include the omission of visual cues via telephone, which my result in the loss of contextual and nonverbal data (Novick, 2008). Interviews were carried out between one and three months after the participants completed the genetic counselling process. In comparison to Miller et al. (2010), Beard et al.'s (2016) sample was representative of the demographic of women undergoing screening at that particular screening

programme. As all participants could afford the testing fee and had tertiary-level education, it is likely that this sample reflected a relatively high socio-economic group. Interestingly, it was noted by Beard et al. (2016) that half of the participants were employed in the health-care sector, this may be a reflection of the individual who chooses to participate in research in the healthcare setting. The authors argued that the semi-structured interview allowed for in-depth exploration of participants' experiences of the carrier screening process. However, due to the retrospective nature of the interviews, the results could be affected by recall bias, in addition the lack of visual cues from the participant is a possible disadvantage.

Interviews conducted by Beard et al. (2016) lasted between 17 and 64 minutes and were transcribed verbatim. Moreover, such a research design may have made for shorter interviews and therefore less data, as Beard et al.'s (2016) telephone interviews were substantially shorter than those recorded by Miller et al. (2010) and Laidsaar-Powell et al. (2016). A narrative analysis allowed for the subjective experience of each participant to develop. The coded transcripts were also arranged into a timeline, which were then further coded and key aspects of participants' experiences were established by finding similar codes across participants' narratives. Rigour was ensured with independent co-coding by a separate researcher.

Laidsaar-Powell et al.'s (2016) semi-structured interviews were carried out in-person as well as over the telephone. Participants were recruited through several sources which provided convenience for the patient and a greater pool/variety of potential participants. For instance, recruitment was through clinic staff members as well as advocacy groups, ensuring that both active treatment as well as post-treatment views were captured. Laidsaar-Powell et al. (2016) noted that it was not a requirement of the study that both the patient and their respective FM participate in the study, therefore, there was an unequal number of patients to FMs.

A strength of Laidsaar-Powell et al.'s (2016) data collection process, in comparison to Miller et al.'s (2010) and Beard et al.'s (2016) qualitative studies, is the implementation of data saturation which the authors noted, as the recruitment of all participant groups persisted until interviews failed to divulge any new information. Thus, increasing validity of the data collection. Overall, thirty patients and thirty-three family members participated, of which sixteen were patient-FM pairs, 76% of FMs were the patients'

spouse. It was noted by Laidsaar-Powell et al. (2016) that 70% of patients and 76% of FMs were recruited from the same tertiary hospital, therefore a limitation is that patient experiences could be unique to that particular setting. On average, interviews lasted 43 minutes for patients and 35 minutes for FMs; interviews were audiotaped and transcribed verbatim. Rigor was addressed by each transcript being coded multiple times by different study team members; this provided an extensive list of themes and subthemes.

To induce a sense of living between health and disease, Almeling and Gadarian (2014) designed a three (disease) × seven (risk levels) survey experiment for a nationally representative sample of adults (general population) in the United States of America. In contrast, Godino et al.'s (2019) study design was a cross-sectional self-completion survey aimed at YA (young adults) and parents of YA in Italy. Regarding ethical considerations, Godino et al. (2019) received ethical approval from the applicable ethics boards, however, it was not clear how Almeling and Gadarian (2014) adhered to any ethical guidelines. Almeling and Gadarian's (2014) survey was administered by an impartial research firm to 2,100 participants to their personal computers. Respondents initially responded to questions regarding self-rated health status, they were then randomly assigned to read a vignette concerning colon cancer, heart disease or Alzheimer's. Following this, participants were asked to consider a hypothetical genetic risk relating to the disease they have just read about, a random risk level ranging from 20% to 80% was also assigned. Almeling and Gadarian (2014) endeavoured to counter social desirability by including questions that supported participants to affirm that they would not react in any way to the genetic risk information.

There were several strengths in regards to the experimental study design employed by Almeling and Gadarian (2014); for instance, the randomisation of risk levels in the vignettes, statistical confirmation of that process and attempts in the survey to reduce social desirability are noted as enhancing validity of the study. Therefore, the authors noted that any differences that emerge in reactions to genetic risk information could be attributed to the experimental disease treatment instead of the underlying demographic differences.

Both online and traditional modes of recruitment and data collection were employed by Godino et al. (2019). Although this could be considered to have maximised accessibility to survey participants, Godino et al. (2019) noted that many members of the Italian population do not regularly use the internet. Similar to Laidsaar-Powell et al.'s (2016) qualitative study, family members were also an aspect of Godino et al.'s (2019) survey. As it was deemed necessary to investigate both the YA and their parents' perspectives, two questionnaires were designed. To increase validity, the questionnaires were based on similar surveys utilised in previous research, they were also provided in Italian and English for ease of convenience for the participants. Further, Godino et al.'s (2019) stated that to ensure rigor a pilot survey with five of the colleagues was conducted, in order to test the online survey and data extraction process.

Both of the literature reviews (Gopie et al., 2012; Kim et al., 2018) reported aspects of service users experiencing anxiety with the surveillance process. Gopie et al.'s (2012) systematic review reported that the psychological burden associated with surveillance was greater in families that experienced surveillance for rare tumour syndromes. Surveillance of hereditary cancer syndromes, particularly those with a greater risk of tumours such as VHL, MEN-type 1 and Lynch syndrome, appeared to be related to poorer quality of life (QoL). Even though the levels of psychological distress reported for syndromes such as VHL were generally low, a significant percentage (20–40%) of persons were found to have clinically significant distress. Conversely, Gopie et al. (2012) reported that participation in surveillance programmes for most common hereditary cancers, such as ovarian cancer, were typically associated with normal levels of distress and a QoL comparable to that of the general population.

Kim et al.'s (2018) scoping review reported a paucity of research on views and experiences in decision-making by individuals in relation to AS, beyond studies concerning prostate cancer for which AS is a standard option. Cases undergoing AS reported higher QoL in comparison to those undergoing treatment, nevertheless, in some cases those on AS experienced greater depression and anxiety. This could be a factor of diagnosis uncertainty, as Kim et al. (2018) noted that patients with RCC and prostate cancer who were uncertain about prognosis were more likely to experience anxiety and depression. It was noted that it was essential for the patient to

be reassured about the capacity for future treatment options if needed, as well as the preference for shared decision-making.

Furthermore, patients with chronic lymphocytic leukemia (CLL) or prostate cancer illustrated other motivation of initiating of AS, which included smaller tumours or comorbid diagnosis, older age, an inclination to avoid the psychological /mental health side effects of treatment, as well as a preference for shared decision-making. As it was reported that the main determinant of initiating of AS was the recommendation of the service provider. This was due to the QoL for those engaged with AS being similar to those of the general population, and greater than those undergoing treatment. Thus, it was recommended that patient experience could be improved by assuring that patients are aware of and are provided with the opportunity to discuss AS.

Several factors were found by Gopie et al. (2012) to increase distress in surveillance including being female, a family member with cancer diagnosis, limited social support and pessimistic coping style. It should be noted that the risk factors reported by Gopie et al. (2012) may correlate with each other to moderate and/or mediate the psychological impact of surveillance. In addition, various demographic, psychological or clinical aspects not yet recognised could affect psychological outcomes.

A separate significant issue is the patient experience of the screening tests. Gopie et al. (2012) proposed that in order to achieve the maximum effect of a screening programme / decrease mortality, it is imperative that as many mutation carriers as possible adhere to a surveillance programme. Embarrassing and painful experiences were also reported in studies retrieved by Gopie et al. (2012), particularly MRI's and mammograms, which reduce screening compliance. As such, they recommended that efforts should be made to make the processes of these tests as comfortable as possible in terms of adequate pain control, and sedation should be considered.

In relation to rare endocrine tumour syndromes, Gopie et al. (2012) expressed that the psychological burden of surveillance is significant, particularly with syndromes such as VHL and MEN type 1, thereby, it is unknown whether the benefits of surveillance exceeds the psychological harm. However, an intriguing finding by Gopie et al. (2012) was that the majority of patients in surveillance programmes for hereditary cancers conveyed a positive attitude towards the surveillance programmes offered. Although

it can be speculated that the experience of the surveillance process may not always be reassuring, it may meet patients' needs to feel in control, resulting in the reported positive attitude.

Concerning the clinical implications of Gopie et al. (2012), in an effort to confine anxiety it was illustrated that patients may appreciate being in close contact with health professionals and being confident in the medical progress. It was suggested that medical departments work closely with psychologists to refer patients for support. Furthermore, if patients require several screening examinations, ideally a specialist in the diagnosis should coordinate examinations, guide patients through surveillance, and answer their questions. Therefore, Gopie et al. (2012) suggested it may be necessary to have a multi-disciplinary network of screening services in which several professionals can provide support in various areas as patients undergo surveillance for rare tumours.

The literature reviews revealed various limitations (Gopie et al. 2012; Kim et al. 2018). Although most of the studies reviewed by Gopie et al. (2012) included standardised measures, various questionnaires were employed to obtain a measure of general QoL, which may affect the comparability of the findings. In addition, psychological variables such as effective coping strategies that may reduce the negative impact of surveillance, were not consistently measured in the reported hereditary cancers, thereby requiring further investigation. A further limitation is that most of the studies retrieved by Gopie et al. (2012) employed a cross-sectional design, therefore limiting the extent to which changing levels of distress around the surveillance examinations could be examined. In addition, studies relating to rare tumour syndromes were limited, were restricted to a small number of patients, and while most assessed the overall psychological impact of participating in a surveillance programme, the impact of particular surveillance examinations, such as MRI's, was not assessed. As such Gopie et al. (2012) partially achieved their research aim, therefore, future studies concerning psychological facets in rare hereditary tumour syndromes should include a prospective design measurement, such as distress before and after attending surveillance appointments. Gopie et al. (2012) also highlights how individuals not attending surveillance should be included in a study design in order to act as a control group.

Kim et al. (2018) noted that their scoping review may not have included all relevant studies, thus partially meeting their aim. Publication bias or the inclination for some journals to publish studies with positive results, could have influenced the studies retrieved by Kim et al. (2018). Additionally, the challenge of comparing findings between various types of cancer due to contrasting definitions and processes for AS was noted.

A key finding of Miller et al's. (2010) semi-structured interviews was the participants expectations of PCPs. On one hand they noted the role PCPs had in recognising cancer risk, but on the other appreciated that their lack of specialist knowledge, time and indeed at times enthusiasm rendered the interactions problematic. This portrays the expression of concern by patients regarding a potential 'therapeutic gap' between genetic testing and treatment. For cancer patients, who comprised most of Miller et al.'s (2010) sample, this gap may be the result of the conveyed constraints regarding coordination of primary with specialist care, lack of knowledge within primary care, and attitudinal challenges between secondary and tertiary care concerning the primary care role. It can be regarded that Miller et al. (2010) partially fulfilled their aim, as a result of the data gap from the loss of participants in the second follow- up interview. This can be viewed as a type of selection bias, as the participants may select themselves to respond or not; further, the authors, Miller et al. (2010), did not clearly note the reasons for the four non-responders.

While Miller et al. (2010) focused on the therapeutic relationship between patient and PCP, Laidsaar-Powell et al. (2016) highlighted the role of FM's. One of the most significant roles of FMs reported by patients in Laidsaar-Powell et al.'s (2016) semi-structured interview study was the provision of emotional support during cancer consultations. Such emotional support from FMs included overt (physical support during the consultation), delayed (support after the consultation) and intangible ('being there') assistance. However, it was noted that this support role could be stressful resulting in FM's also potentially needing support.

As an extension to Miller et al.'s (2010) findings, Laidsaar-Powell et al. (2016) noted several other challenges with physician communication. These included various

patients who reported feeling incapable of discussing sensitive information with the physician as their FM was present. Further, participants described a discrepancy between the patient's and the FM's information preferences and requirements, particularly that in some instances FMs had greater information requirements than the patient. However, in the interviews some participants also described instances in which they perceived substandard clinical communication towards the FM, this included ignoring the FM, or conversely, the clinician forming an alliance with the FM and thereby the patient experienced exclusion from the conversation. Service providers therefore have the opportunity to improve the experience of patients and their FMs by acknowledging the family's presence, by communicating respect, and providing an opportunity for the family to contribute.

As the focus of Laidsaar-Powell et al.'s (2016) study was on physician-patient-family consultant communication, there was a lack of assessment of interactions between patients, FMs and other health professionals who may have had substantial contact with patients and FMs. Hence the authors partially achieved their aim, as they did not comprehensively explore the experience of cancer patients and FMs. However, the authors suggested that future studies could examine such interactions between patients, FMs, nurses and allied health professionals, as well as strategies to enhance them. This is particularly pertinent in an environment in which there is already an emphasis on multidisciplinary team-based oncology care, which is applicable to the population of this thesis study.

The telephone interviews conducted by Beard et al. (2016) highlighted the experiences of women, of which, the appreciation of the convenience of being screened for three inherited syndromes simultaneously, was notable. Moreover, participants valued the level of information that they received from their genetic counsellor; however, it is interesting to note that the primary resource used by both the female patients as well as their partners to obtain further information on their screening results, was the internet. This conveys the use of internet health related inquires, as a result there may be potential for patients to become misdirected or experience psychological harm if accessing inaccurate web pages (Case et al. 2004; cited by Beard et al. 2016). To ensure that patients receive accurate information, Beard et al. (2016) suggest that genetic screening programmes provide or guide patients and FMs to credible

information sources that will meet their requirements. This is an important consideration for screening programmers who offer carrier screening panels to the population of this thesis.

In line with the literature reviews (Gopie et al. 2012; Kim et al. 2018), Beard et al's. (2016) semi-structured interviews noted the link between service use and anxiety. In this case however it was specifically focused on the wait for test results for inherited syndromes related to pregnancy. Relief on a negative result was immediate, and access to genetic counselling following a positive result was greatly valued. Hence, there is the potential for substantial psychological impact on women, as well as on couples, who receive carrier results for syndromes with various inheritance patterns; this is an important factor to consider in screening programmes. Moreover, building accessibility to antenatal carrier screening within the population of a screening clinic, could provide more autonomy for patients who wish to have children by choosing when/if to undergo testing. The participant narrative in Beard et al. (2016) conveyed that accessibility to genetic counselling was valued because it also provided support when an adverse genetic result was received. The results of Beard et al.'s (2016) qualitative study aimed to identify experiences of receiving a carrier result through a novel reproductive genetic carrier screening program; even though the authors achieved this aim, they also noted that the results are not generalisable but can provide a foundation for further inquiry into carrier screening experiences on a larger scale or in another population.

Almeling and Gadarian's (2014) survey experiment found that respondents reacted to hypothetical genetic risk information with the motivation to act. While 33% of respondents reported that they would consult their personal doctor for information. Respondents also anticipated being more likely to use a health website (24% very likely); they were more likely to find an information source and to seek several types of information sources. Furthermore, the authors noted that individuals with personal experience witnessing family or friends battle with a diagnosis, were marginally (3%) more likely to want to seek information, confer with family, and to manage risk. Respondents were also more inclined to act in territories connected with the self and family, rather than the community. Thus, Almeling and Gadarian's (2014) partially fulfilled executed their aim, as the key claim of surveillance medicine that '*everyone'*

is affected by the new emphasis on medical risk was not convincingly demonstrated. Therefore, as genetic testing becomes more widespread, Almeling and Gadarian's (2014) findings suggest that individuals with a lack of awareness or experience with a particular diagnosis would be more inclined to act in the face of increased risk.

Regarding the service user experience of communication about a potential genetic risk, Godino et al.'s (2019) findings demonstrate that the majority of YA service users (75.5%) were informed after 18 years of age. None of the YA were younger than 12 years of age when informed. Most of the service users received the information in an unplanned conversation, only 2% of the sample reported that genetic risk was openly discussed in their family. YAs who were informed about their genetic risk in an unintentional situation were more likely to express negative feelings about their genetic screening test result. Communication considered by the YA as a casual exchange may impede full comprehension of the risk, thereby increasing the possibility of a negative emotional experience from the screening process.

The results of Godino et al.'s (2019) survey suggest that the majority of requests for genetic screening were made by the YA, however some parent participants reported that they felt that they had control over their child's decision about testing. It should be noted that all parents who participated in the study considered that their children should undergo testing. The authors speculated that the parents may have exerted pressure on their children during the testing decision-making process, however, findings suggested that YA who had been strongly influenced by their parents to be tested, were less likely to feel anxious. This may indicate that YA were tested for various reasons, and for some, parental pressure may have provided relief from the responsibility of making one's own decision. Evidence from Godino et al.'s (2019) study highlights the need for a comprehensive, longitudinal counselling process as part of the screening process that supports parent-to-child risk communication as well as YA decision-making about PST and subsequent risk management. This may include asserting that disclosure of genetic risk is a gradual process in the family, in which children are given some information at an early age that is followed by further age-appropriate information as suggested by Godino et al. (2019).

Both of the surveys (Almeling and Gadarian, 2014; Godino et al. 2019) were limited in their capacity to capture the essence of the patient experience. This may be due to

the self-report aspect, as there is no way to develop the rapport that can draw out more authentic responses. A noted limitation of Almeling and Gadarian (2014) was the presentation of hypothetical risk to the respondents and then asking how they may react in such a situation. Although facing a real genetic risk could produce various reactions, the overlap with the results of Godino et al.'s (2019) study in which participants faced actual genetic risk, supports the validity of the results. In particular, both survey studies conveyed respondents' reliance on family whether to cope in general or to make decisions. Importantly, Almeling and Gadarian's (2014) findings can be considered to shed light on the meaning of genetic screening information to individuals, rather than the actual experience of screening.

Godino et al.'s (2019) study was restricted by the small sample size, which reduced the ability to observe differences between participants and their experience of PST. This may be due to the self-report survey study design, as fewer patients would feel inclined to participate due to the lack of personal interaction. In fact, difficulties in recruiting were reported, the authors hypothesised that this may be due to the Italian population, which may have had particular reservations to share medical information over the internet. The small sample size also reduced the generalisability of the results. Lastly, as the data were collected retrospectively and not at the time of the PST appointment at the screening clinic, recall bias may have affected the data. Thus, due such limitations, Godino et al.'s (2019) study partially met their aim of examining psychological implications of presymptomatic testing for hereditary cancer in YA and their parent

In summary, although studies were limited in relation to the experience of rare endocrine syndrome service users in screening and surveillance, the findings demonstrate that the surveillance experience is associated with psychological distress in individuals with hereditary syndromes who are at a high risk for developing multiple tumours (Gopie et al.,2012). The possibility of a negative experience increased with female service users, having a first degree relative diagnosed with cancer, and with having little social support (ibid). Hence, family was an important factor in the experience of the service user in screening and surveillance. The impact of family could be positive, in terms of the provision of support during the process (Laidsaar-Powell et al.,2016), however reduced autonomy with decision-making was noted

(Godino et al.,2019). As a result of the uncertainty concerning the trajectory of a diagnosis in some cases, to support and improve the user's experience, shared decision-making (Kim et al., 2018) and the provision of genetic counselling (Beard et al., 2016 ;Godino et al., 2019) were recommended.

3.2.3 Attendance rates and the impact of not attending screening and surveillance services.

Two studies addressed screening attendance rates and the impact of non-attendance (Simmons et al., 2012; Sheridan et al., 2019) (see Appendix 3.2 - synthesis matrix for an overview of the studies for Theme 3). Simmons et al. (2012) conducted a single-blind, cluster-randomised controlled trial (RCT) that investigated the increasing prevalence of type 2 diabetes. A retrospective cohort study was later conducted by Sheridan et al. (2019). It examined the connection between suspected cancer patients, with their attendance and outcomes; such outcomes included cancer diagnosis and early mortality. Simmons et al. (2012) expressed that the benefits of screening could be smaller than proposed and recommended that it be limited to patients with a detectable disease, while Sheridan et al. (2019) found evidence to suggest that the risk of patient mortality was greater for patients who did not attend their index, 'Two Week Wait' pathway (2WW) referral, compared to those who did.

The aim of Simmons et al. (2012) was to determine the effect of a population-based stepwise screening programme for diabetes on mortality. This was based on the increasing prevalence of type 2 diabetes, which was noted to pose a preeminent public health challenge. It was suggested that population-based screening and early treatment for type 2 diabetes may reduce a growing burden. This pragmatic parallel group RCT consisted of 20,184 people aged 40 to 69 years old and at a high-risk of prevalent undiagnosed diabetes, on the premise of a formerly validated risk score. Randomisation into three groups occurred at practice level; in the first stage of randomisation, 33 recruited practices were assigned to one of the following groups: screening, which was followed by an exhaustive multifactorial treatment for persons diagnosed with diabetes (IT/n=15), screening and routine care of diabetes in accordance with national guidelines (RC/n=13), or a no-screening control group (n=5). This randomisation was blinded which adds validity to the process. The requirement

to increase the number of persons with diabetes for the treatment trial justified a second randomisation stage. The final group was assigned following two stages of randomisation and included 28 practices to IT, 27 practices to RC, and five practices to no-screening (control group).

Whilst the retrospective cohort study conducted by Sheridan et al. (2019) was of 109,433 adults registered at 105 general practices, identified as a cancer centre within The Leeds Teaching Hospitals Trust (LTHT) on the 2WW. The 2WW policy is intended to ensure that patients with suspected cancer are seen within two weeks of their referral to the centre, however due to patient non-attendance, this target can be missed.

Simmons et al. (2012) presented the results from all the practices included in the final group allocation in a parallel cohort analysis to contrast screening (intervention) practices with control practices. The authors noted that this design had the benefit of increasing the sample size for the comparison of screened versus control practices, however, they also expressed that this increased the probability of selection bias and confounding errors. Further, randomised patient assignment to treatments as well as the blinding of health workers (investigators) to group assignments potentially increased the validity of the results. While issues arose with practice withdrawal, these occurred before the start of the screening trial. Simmons et al. (2012) did not consider any differences in the practices, in relation to who withdrew or not. However, as the practices reported all withdrew (n=7) before screening, the majority of the groups at the end of the trial may be primarily the same as those at the start of the trial. Thus, non-attendance during screening could be considered to reduce factors that may affect the outcome, such as age, gender or socio-economic class. The authors also carried out an analysis that compared mortality between screening attenders and non-attenders.

The strengths of Simmons et al.'s (2012) study includes a randomised design, which possibly reduces the selection bias present in screening observation studies. A further strength is the high level of consensus for classification of cause of death; it was stated that this was achieved through two independent assessors who came to an agreement through discussion.

Conversely, a limitation of Simmons et al. (2012) study, which was acknowledged by the authors, was the of lack ethnic diversity among participants; most participants were Caucasian, the main ethnic group in the region. Moreover, Simmons et al. (2012) commented that due to a lack of ethical permission, they were unable to obtain information from NHS files of patients diagnosed with diabetes in the no-screening control group or from patients who were clinically diagnosed in the screening group following a negative screening test. As a consequence, it was not possible to contrast outcomes between those who had been clinically diagnosed and the screen detected patients. The authors discussed how due to the described medical practices serving areas of relative wealth, compared to the average English medical practice, the results may also not be applicable to more socioeconomically disadvantaged communities, as the disease risk, attendance and many other contributing factors may differ.

Simmons et al. (2012) reported that out of 16,047 high-risk individuals in screening practices, 15,089 (94%) were invited for screening during 2001 to 2006, 11,737 (73%) attended, and 466 individuals (3%) were diagnosed with diabetes. The authors noted a non-significant reduction in cardiovascular (HR 1·02, 95% CI 0·75–1·38), cancer (1·08, 0·90–1·30), as well as diabetes-related mortality (1·26, 0·75–2·10) related to an invitation to screening. Regarding the accuracy of the estimate for the treatment effect, it has been stated that confidence intervals (0.50 to 1.10) are wide (according to the Cochrane Handbook; Schünemann et al., 2019). Thus, possibly reducing the estimation of the treatment effect and indicating the lack of knowledge on the benefits of screening, hence, further investigation is required. It was concluded by Simmons et al. (2012) that in this large UK sample, screening for type 2 diabetes in patients at an increased risk was not connected with a decline in cardiovascular mortality, all-cause or diabetes-related mortality over a period of 10 years.

Adherence has been referred to as the extent to which the participant completes intervention activities and is usually reported in published randomised controlled trials (Ehlers et al., 2016). However, Simmons et al. (2012) randomised practices as opposed to patients, this may have been an effort to minimise contamination between conditions. Such randomisation of practices may have contributed to the study being underpowered or the intervention being poor, even when having enough practices

participating in the study. Thus, it can be debated that the research was unable to demonstrate that the intervention had a significant benefit and did not fulfil the authors aim.

The cohort study by Sheridan et al. (2019) aimed to describe predictors of non-attendance and to examine the relationship between patient attendance and outcomes, which included cancer diagnosis and early mortality. Sheridan et al. (2019) carried out a cohort study on routinely collected healthcare records from a single NHS hospital, the LTHT. Information was collected from the LTHT electronic heath record, Patient Pathway Manager (PPM), which was stated to integrate clinically relevant data such as patient appointments and diagnostic information on all patients within the healthcare trust (organisation unit within the NHS). Patients who were referred or reviewed with a suspected cancer diagnosis were also included, demonstrating a wide range of population data inclusion.

Sheridan et al's. (2019) study sample included all adults who had been referred to LTHT between 1st April 2009 and 31st December 2016 on the urgent referral pathway for suspected cancer, the 2WW pathway, therefore, the compiled dataset spanned just over a 7-year timeframe. Patients were followed-up for vital status until 5th July 2018, the same date that the PPM data were also extracted, including cancer stage if relevant and available. Thus, the follow-up period described was just under two years, demonstrating a reasonable provision of time for any good or harmful effect (in this case, cancer stage if relevant) to manifest.

It was explained by Sheridan et al. (2019) that patients could be referred to the 2WW pathway several times, however, where multiple referrals were recorded, only the first referral in the study window was employed as the index and established as the basis for analysis. This portrays a possible design and analysis restriction that could increase bias and decrease reliability; as the patient could have been referred several times during the study window with no indication of the timing of cancer manifestation, if applicable, unless this is clearly indicted in the retrieved patient records. However, it avoids double (or triple) counting cases. In the design the data from each patient is represented only once. Moreover, it was highlighted that only patients with complete information were included in the analysis, the authors noted that the data were not

imputed, which could be an attempt to avoid distortion of the data that may occur in the imputation process. Additional data extracted from the PPM included patient demographics (age at index, gender), referral pathway characteristics (e.g. referral date, suspected cancer area), attendance date and diagnostic outcomes (recorded referral outcome, cancer and diagnosis, and date of diagnosis).

Sheridan et al. (2019) noted that they were unable to include patient ethnicity as a variable. This exclusion was defended due to reported poor levels of recording and concerns regarding accuracy. Multiple logistic regression analysis was used to explore associations between individual and practice-level factors such as general practice deprivation and the GP-patient satisfaction score. Patients' current practice was inputted as the higher-level term for the regression analysis. As for associations between initial 2WW clinic attendance, diagnostic and mortality outcomes, data were analysed using a Cox regression model. Individual terms were outlined, these included suspected cancer (if relevant), individual factors connected with attendance, and the type of cancer diagnosed. Employment of various analysis procedures conveys consideration for accurate measurement to minimise bias and enhance validity.

Sheridan et al.'s (2019) study benefits from little missing data, however, the authors highlight that assumptions were required as the data's origin resulted in issues with its quality and completeness. An asset of this study was its context in a large multicultural city and healthcare trust, as Leeds is a typical tertiary cancer care setting. This, together with the introduction of initiatives to increase attendance and to highlight the clinical concern for cancer, could increase generalisability to other large cities with a diverse population. A possible significant limitation of Sheridan et al.'s (2019) retrospective cohort study was a lack of inquiry into the explanatory effects of ethnicity. Moreover, it was acknowledged by the authors that as a result of using routinely collected data in this study, it was not possible to assess the impact of patient variables such as cultural comprehension of disease, health, continuity of GP care, relationship status, co-morbidity, or patients' command of English, all of which could also affect a patient's capacity to communicate their symptoms as well as to navigate the health care system.

Sheridan et al's. (2019) retrospective cohort study found that a total of 5,673 (5.2%) patients did not attend their index 2WW referral, of which, 3,893 (68.6%) were scheduled to undergo an outpatient appointment. It was expressed that patients aged 18-29 and those over 85 years old had the highest percentage of non-attendance at their index 2WW referral, 7.9% and 7.7% respectively. Men were also more likely to non-attend than women (5.8% versus 4.9%), signifying a slight disproportion of attendance between the genders. It was illustrated that non-attendance also differed by the suspected cancer type; the highest percentage of non-attendance was seen in referral with suspected upper gastrointestinal cancer (8.1%) and the lowest was with suspected breast cancer (3.7%). This suggests that more research is required into the relationship between non-attendance and different types of cancer diagnosis, as patient screening and surveillance appointment attendance could be affected due to diagnosis. Further, Sheridan et al. (2019) expressed that there was a small but statistically significant effect of distance from the hospital on attendance; those who did not attend lived further away (mean=8.1 km) in comparison to those who attended (mean=7.7 km). Indicating that patient travel distance from the hospital may be related to hospital appointment attendance.

Sheridan et al. (2019) reported that 10,360 (9.6%) patients were diagnosed with cancer within six months of index 2WW referral. It was highlighted that the proportion of cancer diagnoses was greater among patients who attended their index 2WW referral (9.8%) in comparison to non-attenders (5.6%). This could be a possible indication of the advantages of early screening, as it can detect any anomalies early in the process, or that non-attenders were less concerned about their health as they felt they were in good condition. In contrast to Simmons et al. (2012) results, Sheridan et al. (2019) found evidence to suggest that non-attending patients had greater early mortality outcomes compared to attending patients with suspected cancer. Sheridan et al. (2019) noted that the risk of patient mortality was reported to be greater for patients who did not attend their index 2WW referral (31.3%) in contrast to those who attended (19.2%). This could be due to a lack of attendance, as there are fewer opportunities to screen any potential issues which may lead to mortality. However, it should be noted that mortality rate differed by diagnosed cancer sites, demonstrating the negative impact of screening non-attendance for some cancer diagnoses. For instance, the percentage of patient mortality within 12 months for those with breast

cancer was 14.3% for those who did not attend their appointment and 5.0% for those who did.

Sheridan et al.'s (2019) finding that non-attendance was associated with early mortality, may have important implications for cancer screening services and protocols, as it demonstrates that the urgent referral process (2WW) results in the majority of patients being seen promptly by a specialist. In addition, greater negative health outcomes were observed for patients in the initial non-attending group who were diagnosed with cancer. However, it was uncertain the magnitude to which the effect reported in this study is mediated through factors such as lower health literacy or multi-morbidity. Therefore, possible further investigations and replication in other healthcare trust settings are warranted, as the authors partially fulfilled their aim. Moreover, although not measured in this study, Sheridan et al. (2019) proposed that patient fear/anxiety could be related to the high rates of non-attendance connected to particular cancer sites, notably in this study, upper gastrointestinal.

To sum up, in relation to attendance rates and the impact of not attending screening and surveillance services; both studies (Simmons et al., 2012; Sheridan et al., 2019) provide contrasting messages concerning the impact of not attending screening and surveillance services on mortality outcome, and issues in both of the study designs were identified. Simmons et al. (2012) reported that non-attenders for screening were younger and more likely to be males, in regards to the impact of non-attendance the authors noted a non-significant reduction in mortality connected with an invitation to screening. As for Sheridan et al. (2019), the authors noted that men were more likely to not-attend than women and an early mortality risk in non-attenders in contrast to those who attended. The limited number of studies sourced for this theme also demonstrates a gap in the research of screening attendance rates, as well as information about the impact of non-attendance for patients with hereditary and/or rare syndromes. As Simmons et al. (2012) and Sheridan et al. (2019) found opposing views, a question still remains concerning attendance rates and the impact on individuals of such non- attendance.

3.2.4 Barriers and facilitators to engagement with screening and surveillance services

Ten studies where retrieved which reported potential barriers, as well as some facilitators to engagement of individuals attending screening and/or surveillance: three systematic literature reviews (Stacey et al., 2017; Young., et al. 2018; Graham-Rowe et al., 2018), one narrative literature review (Hofmann and Stanak., 2018), three prospective cohort studies (Rasmussen et al., 2010; Piette et al., 2010; Courtney et al., 2018), one retrospective cohort study (Malhotra et al.,2017), one cluster randomised trial (CRT) (Moin, et al., 2019) and a longitudinal qualitative study by Dambha-Miller et al. (2018). See Appendix 3.2 - synthesis matrix for an overview of the studies for Theme 4.

Despite the paucity of studies examining barriers and facilitators to engagement with screening and surveillance of patients with rare endocrine syndromes, as there was only one specific to patients with rare endocrine syndromes (Rasmussen et al., 2010), the main issues from the literature displayed the importance of the patient-service provider relationship in facilitating screening and surveillance uptake. Notably, fear of cancer screening was reported as both a barrier and facilitator to screening. Work commitments as well asymptomatic symptoms were noted as barriers to engagement. Encouragement, as well as information provision from the health service have been demonstrated to act as enablers to engagement.

The effects of decision aids in individuals facing treatment or screening decisions were reviewed. Stacey et al. (2017) described decision aids as interventions that can support patients through provision of information about options. Young et al. (2018) expressed how in order for screening to be effective in reducing cancer mortality it is important that patient engagement is high, thus this review's objective was to identify what factors explain cancer screening attendance decisions in the UK. Further than just identifying barriers and facilitators in literature, Graham-Rowe et al. (2018) illustrated that framing these in terms of theoretical domains, as well as demonstrating their likely importance for screening attendance may illustrate why some interventions are more efficient than others. The Theoretical Domains Framework (TDF) of

behaviour change (Cane et al., 2012; cited by Graham-Rowe., 2018) presents 14 ‘theoretical domains’ for determining and categorising barriers/facilitators (e.g. ‘knowledge, ‘social influences’). Thereby, Graham-Rowe et al’s. (2018) systematic review sought to identify studies detailing barriers and facilitators associated with screening attendance in patients with Type 1 or Type 2 diabetes, together with describing those most likely to influence attendance.

Hofmann and Stanak’s (2018) narrative review, similarly to Stacey et al. (2017), explored engagement factors for individuals with a diagnosis such as diabetes. Hofmann and Stanak (2018) however presented the concept of nudging as a purposeful alteration of choices presented to individuals which intends to make them choose in predicted ways. It was illustrated by the authors that nudging has been employed to ensure high engagement with screening programmes, however it has been criticised on the basis of undermining free choice and shared decision-making. Thus, the objective was to explore nudging strategies in screening along with presenting arguments in support and opposition.

There was a lack of studies pertaining to barriers and facilitators regarding hereditary syndromes. However, both Rasmussen et al. (2010) and Courtney et al. (2018) prospective cohort studies aimed to examine factors which may influence screening adherence among carriers of hereditary syndromes. In particular screening adherence for VHL related mutation carriers in Mexico City (Rasmussen et al., 2010) and among BRCA1/2 or mismatch repair (MMR) gene mutation carriers in a screening programme in Singapore (Courtney et al., 2018). Piette et al. (2010), which was also a prospective cohort study, presented the results of a three-way comparison of different methods for diabetes screening in central Honduras. Piette et al. (2010) indicated that a follow-up clinic is usually required for fasting plasma glucose (FPG) testing and this (the follow-up) was studied as a potential barrier to screening.

It was reported by Malhotra et al. (2017) that there were limited data concerning the impact of service provider- patient ethnicity and gender concurrence on cancer screening rates. As such an examination of the possible impact of service provider-patient ethnicity and/ or gender concurrence regarding engagement of cancer

screening in the United States was conducted through a retrospective analysis of publicly available data.

Moin et al. (2019) expressed that real-world engagement of the diabetes prevention programme (DPP) which aimed to reduce type 2 diabetes risk among patients with prediabetes remains low. The authors of this cluster randomised trial (CRT), with clinics as the unit of randomisation, suggested that shared decision-making could increase awareness as well as engagement with the DPP. Thereby, the objective of Moin, et al. (2019) was to determine the efficacy of a prediabetes shared decision-making intervention concerning engagement with the DPP in the United States.

Dambha-Miller et al's. (2018) longitudinal qualitative analysis also explored service provider- patient interactions, as did Malhotra et al's. (2017) retrospective cohort study. Dambha-Miller et al. (2018) noted that interactions between service providers and patients have the ability to delay progressions of complication in type 2 diabetes. Moreover, there is a relative paucity of UK data that examines patient-service provider interactions. To address this, views of patients with types 2 diabetes were explored on factors that are important to them after diagnosis in relation to patient-service provider interactions.

It was indicated that multiple databases were used to search for studies, in addition, several members of the research teams reviewed the abstracts and titles as part of the methods for each of the literature review studies (Stacey et al., 2017; Young., et al. 2018; Graham-Rowe et al., 2018, Hofmann and Stanak., 2018), thereby increasing the rigor of the search methods. Further, Graham-Rowe et al. (2018) searched the grey literature, the advantage of this was the provision of data not found within commercially published literature, thus reducing publication bias by fostering a balanced picture of the available evidence (Paez, 2017). However, the disadvantage would that such publications may not be peer-reviewed (Jacobs, 2008). Quality assessment tools were also used by some of the studies, using items from the CASP qualitative checklist (Young et al., 2018; Graham-Rowe et al., 2018) or a mixed methods appraisal tool (Graham-Rowe et al., 2018). By taking into account, for

example, the CASP tool a level of consistency was applied through conceptual relevance and contribution to the aims of review. A final decision of the included studied was made by consensus amongst the Graham-Rowe et al. (2018) research team, further increasing rigor.

Search limitations were described regarding literature studies search strategies, for instance, Young et al. (2018) limited their search to only UK studies as they argued that there are international differences in the organisation and delivery of screening. This may have reduced the scope of the search results as it was just limited to UK studies, however, it was noted by the authors that there is a requirement for patient engagement strategies to consider the context of the health as well as societal and cultural norms (Weller and Campbell, 2009; cited by Young et al., 2018).

Graham-Rowe, (2018) limited the search to the first 15 pages of the Google search, but as this was only in relation to one of the eight databases used, thus, any methodological rigor concerns are limited. Conversely, Hofmann and Stanak's (2018) narrative review did not adopt any limitations beyond peer reviewed publications. As it was deemed by the authors that significant information and convincing arguments may be found in poor as well as good publications, therefore there was no consistent level of quality standards placed on the compiled studies. Moreover, as the objective was to identify significant aspects in screening (content) and not extension (counting how many times particular aspects are discussed), Hofmann and Stanak (2018) narrative review did not intend to be exhaustive.

Narrative reviews have been characterised as adopting a less formal approach in comparison to systematic reviews (Jahan et al. 2016). Such an informal approach is exemplified in Hofmann and Stanak's (2018) narrative review, which in comparison to the systematic literature reviews (Stacey et al., 2017; Young et al., 2018; Graham-Rowe et al., 2018) lacked the presentation of the rigorous aspects of methodology, which in this instance was the lack of search terms, inclusion and exclusion criteria. Therefore, there may be additional search words or databases that may have increased the number of identified issues concerning nudging.

Each of the literature reviews also applied an analysis technique on the search findings from the compiled literature studies. Search results were pooled by Stacey (2017)

using mean differences (MDs) and risk ratios (RRs) and a random -effects model, which has the ability to consider differential effects (Clarke et al. 2010). Moreover, a subgroup analysis was carried out of studies that employed a patient decision aid prior to the consultation and of those that used it whilst in the consultation. Rigor was increased by using GRADE to assess the strength of the evidence; GRADE (Grading of Recommendations, Assessment, Development and Evaluations) is a transparent framework for presenting summaries of evidence and supporting a systematic approach for making clinical practice recommendations (Guyatt et al., 2008).

The synthesis of the findings by Young et al. (2018) involved interpretative analysis using meta-ethnography to identify possible shared themes, from the undertaking of thematic coding, so to generate higher level interpretations. Meta-ethnography has the advantage of synthesising qualitative research and developing models that interpret findings across several studies (Atkins et al., 2008). However, it has been noted that a possible limitation of meta-ethnography is the lack of the formal methodological evidence (France et al., 2019).

Graham-Rowe et al's. (2018) systematic review followed an analysis method applying the TDF of behaviour change (Atkins et al., 2017; cited by Graham-Rowe et al., 2018) to interview transcripts from semi-structured interviews. TDF acts as a vehicle to aid in the application of theoretical approaches to intentions aimed at behavioural change. Interviews groups' data, such as participant quotes reporting barriers/enablers, were extracted and deductively coded (informed by a theoretical framework to guide barrier identification) into domains from the TDF, with domains representing areas of theoretical barriers/facilitators suggested to mediate behaviour change.

Inductive thematic analysis was conducted by Graham-Rowe et al. (2018) within domains to describe the role each domain plays in aiding or hindering screening attendance. Domains that were repeatedly coded and for which more themes were created were considered by the authors more likely to facilitate patient attendance. This hybrid approach of deductive coding and inductive analysis undertaken by Graham-Rowe et al. (2018) was noted by the authors to be a strength of this review. Further, rigour was enhanced through group verification by the research team of item extraction.

In regards to Hofmann and Stanak's, (2018) literature review, the study articles were also analysed in accordance with standard content analysis but no further details were given, thus, there was a lack of transparency. The longest reported follow-up study period in the prospective studies was Rasmussen et al's. (2010) study, where a 5-year follow-up was carried out of 109 individuals that underwent presymptomatic genetic testing for VHL mutations, including 43 children under the age of 18. A disadvantage of a long follow-up period was the possibility of a long wait period in order for events or diseases to manifest (Song and Chung, 2010). Whilst Piette et al. (2010) study's follow-up period of was at least 24 hours, Courtney et al. (2018) had a follow-up period of at least 6 months, which the authors considered to be a short follow-up period and a limitation in their research.

It was indicated that participants in Rasmussen et al. (2010) and Piette et al. (2010) prospective cohort studies filled out questionnaires which gathered information such demographic data, socio-economic and/or psychological information. However, Courtney et al. (2018) used databases and medical charts to gather such demographic and clinical data. As the authors did not have to rely on participants recall, the data gathered by Courtney et al. (2018) would be more reliable, in comparison to Rasmussen et al. (2010) and Piette et al. (2010). Further, personalised genetic counselling was stated to be provided by Rasmussen et al. (2010) pre, as well as post-test. A stated advantage of such genome-based 'personalised medicine, is the suggested potential that it instigates individuals to make lifestyle adjustments that mitigate their disease risk (Hamburg and Collins., 2010; McBride et al., 2010).

Malhotra et al's. (2017) retrospective study included participants who complete the Medical Expenditure Panel Survey (MEPS) and the data were extracted over an 8-year period from 2003 to 2010. In the survey the participants were asked to identify one healthcare provider they deemed to be their frequent source of care and were the likely service provider recommending screening to the patient. It was noted that Individuals were excluded if age was less than 18 or ethnicity data were missing for the patient or service provider.

Pertaining to analysis, Rasmussen et al. (2010) used logistic regression models in order to estimate crude and adjusted odds ratios (ORs). Logistic regression was appropriate in this instance as it not only gave a measure of how the predictor is (coefficient size) but also the direction of the association (negative or positive) (Ranganathan et al. 2017). Test of adherence to surveillance was evaluated using a two-sided design-based test. Initial analyses by Piette et al. (2010) compared the sociodemographic characteristics of participants who returned for confirmatory diagnostic testing and those who were asked to return but did not attend. Equivalent to Rasmussen et al. (2010), logistic regression models were also used by Piette et al. (2010). Where among the patient subset who were asked to return for follow-up, logistic regression models were used by Piette et al. (2010) to determine sociodemographic and clinical characteristics independently connected with returning for follow-up.

Both Rasmussen et al. (2010) as well as Piette et al. (2010) provided clear multi-step rigorous analysis procedures for each of the steps that were undertaken in the study, which increases reliability of the analysis methods. Whilst Courtney et al. (2018) provided a less clear analysis procedure, with the authors commenting on the use of descriptive statistics and that surveillance adherence rates displayed the number of individuals who were either fully or partially adherent to risk management guidelines as a proportion of the total number of individuals displayed as a percentage.

Demographic characteristics of patients by receipt of cancer screening was performed by Malhotra et al. (2017). Methods of analysis were clearly presented in comparison to Courtney et al. (2018), this included sample frequencies, means, and standard deviations (Malhotra et al. 2017). Further data were analysed using multilevel logistic analysis for estimating the effect of gender as well as ethnic concurrence on cancer screening. An advantage of logistic regression is that it allowed Malhotra et al. (2017) to evaluate several explanatory variables (Sperandei, 2014), in this instance gender and ethnicity.

A major stated strength of prospective cohort studies (Rasmussen et al., 2010., Piette et al., 2010, Courtney et al., 2018), is the accuracy of data collection in relation to exposures, confounders, and endpoints, but this is realized at the cost of an unavoidable loss of efficiency, as this design can be time-consuming because of the

usually long follow-up period (Euser et al. 2009). Contrarily, the retrospective design, such as Malhotra et al. (2017), is time-efficient, but one has no alternative than to work with what has been measured in the past, usually for a separate purpose other than the one under investigation (Euser et al. 2009).

The CRT which was designed by Moin et al. (2019) had the capability of where intact social units of individuals, rather that separate individuals, where randomly allocated to intervention groups (Donner, 1998). Moin et al. (2019) conducted the CRT over a 3- year period from 2015 to 2018, 20 clinics were stratified by clinic size and mean patient age, randomising 10 clinics to the Shared decision-making (SDM) intervention and 10 to the usual care. An advantage of using electronic medical records to identify overweight individuals with prediabetes, is that it did not rely on patient recall, thus increasing reliability. Moin et al. (2019) described a clear analysis process, which included use of a generalized linear mixed effects models; with the primary endpoint measure being uptake of DPP and/or metformin (a Type 2 diabetes treatment) uptake at 4 months, and the secondary endpoint being weight change at 12 months between the groups.

Dambha-Miller et al. (2018) carried out a qualitative descriptive analysis of free-text comments to an open-ended question within the CARE measure questionnaire at 1 and 10 years after diagnosis with type 2 diabetes. The free-text comments were noted to be brief, thereby inhibiting a detailed thematic analysis to fully comprehend the relationships between themes. Therefore, adopting a descriptive approach to analysis was more appropriate (Neergaard et al., 2009; cited by Dambha-Miller et al., 2018). The CARE measure tool was described by Dambha-Miller et al. (2018) as a patient-rated experience measure that has been developed and undergone validation within the primary care setting; the measure, thereby, appropriately reflects the range of service providers that interact with patients in the management of type 2 diabetes in care.

Similarly to Graham-Rowe et al's. (2018) systematic review/meta-analysis, a hybrid approach to analysis was utilised by Dambha-Miller et al. (2018), this process added strength to this study due to the flexibility of thematic analysis, as formerly discussed. The coding process was described Dambha-Miller et al. (2018) to be guided pragmatically by the research aim, this had the advantage of capturing any possible

underlying views on patient-service provider interactions which may have not been reflected within the high quantitative CARE scores. However, allowances were made for inductive analysis (themes emerging from participant's comments) of unforeseen topics.

Several modes of ensuring validity and rigor was undertaken by Dambha-Miller et al. (2018), for instance: to ensure validity of the coding, a separate researcher independently reviewed 10% of the transcripts; an interim descriptive account was discussed with the research team early in the analysis process, thus supporting the validity of the emerging findings. Analysis continued until no new topics emerged. Thus, acknowledgment of theoretical saturation was displayed in analysis by the research team regularly discussing findings. In addition, the authors noted that a peer debriefer from the same department as Dambha-Miller et al. (2018), validated the findings, thus strengthening the analysis and ensuring trustworthiness of the process.

The combined content and framework analysis undertaken by Graham-Rowe et al. (2018) identified six TDF domains as the most significant factors in facilitating screening attendance: 'social influences', 'knowledge', 'environmental context/ resources', 'decision processes', 'emotions' and 'beliefs about consequences'. Thereby, interventions that target these areas could be more likely to increase screening attendance. Conversely it was proposed that interventions such as optimism, reinforcement and skills are less likely to facilitate screening attendance and act as a barrier. It was noted by the authors that there was a lack of published studies which explored factors which impacted young adults with Type 2 diabetes (18-39 years old) as well as among older adults (over 40 years old). However, it was expressed that younger adults had a greater number of barriers to screening in comparison with older adults. Factors/TDF domains which appeared to be significantly relevant to younger adults, were 'social comparison to others' as well as 'concerns for the impact on the family unit'.

Thus, based on the thematic analysis four key recommendations were made by Graham-Rowe et al. (2018), these included: reducing inconvenience to individuals with diabetes, as several barriers/facilitators were identified concerning perceptions of convenience for instance, distance to the screening clinic, difficulties with transport,

competing health/time demands, lack of support and scheduling appointment issues were stated to be significant factors that could hamper screening attendance. Whereas provision of flexible appointments, 'one-stop shops' (integration screening with other appointments) and improving accessibility were reported to facilitate attendance.

The second recommendation was increasing patient awareness of the importance of screening, as both patients and health care providers reported that lack of understanding of diabetic retinopathy was a barrier to screening attendance, whereas provision of a blindness prevention programme was reported to be a facilitator. Aspects of communication between the patient and health service provider, in terms of how information provision affects patient screening attendance, were reported in both Graham-Rowe et al. (2018) and Young et al. (2018). The perceived absence of a health service provider recommendation to attend screening and/or lack of information provision reported by Young et al. (2018), was a barrier to screening attendance. Thereby facilitating health service providers to provide such encouragement to patients could address this barrier, moreover, a reported, usually untapped, resource was to employ local community networks to improve awareness and promote attendance.

Graham-Rowe et al's. (2018) third recommendation included increasing the sense of comfort and support among individuals with diabetes, as some narrated barriers relating to difficulties with communicating with health service providers. Such barriers included a lack of trust in doctors, paucity of emotional support and negative emotions such as fear and worry. There were limited reports of possible facilitators to overcome such barriers, however, there was some discussion in regards to social/cultural compatibility between the patient and health service provider which, along with compassion from the service provider, may allow feelings of support and trust.

The final recommendation from Graham-Rowe et al. (2018), was to improve message content, as the absence of symptoms was a commonly voiced barrier to attendance. Further, some individuals regarded screening as not necessary for their diagnosis, particularly if they felt their diabetes was under control, were young in age and if their prior test result was clear. Thus, providing information that emphasised and highlighted the asymptomatic nature and benefits of early detection, as well the

reassurance a positive result can provide, which may overcome the barriers around emotional concerns and fears. Graham-Rowe et al. (2018) acknowledged that as the review was analysed and interpreted by the study authors, it was possible that their datasets could have been biased; in that the authors selectively reported findings on perceived barriers/facilitator that were more prevailing or had a better fit with their stated research questions. A further limitation, which was acknowledged by the authors, was that the theoretical framework used was restricted in that it failed to specify relationships between the domains, thereby the likely strength of the direct impact of barriers on behaviour was not known. As a result of the stated limitations and possible biases, Graham-Rowe et al. (2018) partially achieved their aim of the study in identifying barriers/enablers connected with screening attendance.

From Young et al's. (2018) meta-ethnography study, three primary themes emerged. Young et al. (2018) stated that the first theme 'relationships with the health service', was the most significant factor; patient responses to screening invitation was noted to be largely explained in terms of the individual's relation with the health service provider. Graham-Rowe et al. (2018) also highlighted the aspect of communication between patient and health service provider. As with Graham-Rowe et al. (2018), aspects of social/cultural compatibility or in this instance incompatibly, were also touched on by Young et al. (2018), as immigrant populations did not have trust in the services, generally choosing to be screened in their native land, where a more well-established relationship prevailed with their health service provider.

Furthermore, language issues were noted by Young et al. (2018), to be barriers which inhibited patients from asking questions and thereby forming a trusting relationship. There were reports of mistrust of interpreters arranged by the NHS, which were depicted as unskilled in translating medical terminology. The flow of communication from the health service provider to the patient had influence over attendance, as those who did not attend often lacked knowledge and understanding about screening, which they had a lack of motivation to overcome. Further, Young et al. (2018) noted that there was a belief by patients that screening needs to occur in a clinic environment, and that individuals are the passive beneficiary of care from the screening provider. In particular regarding females, the connection with the health service provider was generally not recognised to be compelling enough to contemplate the possibility of

attending screening; as it could be obligatory to expose sections of their body to an unfamiliar individual, thereby, creating emotional distress.

As previously illustrated, negative emotions such as fear were reported by Graham-Rowe et al. (2018) to be barriers to screening, however Young et al. (2018) second theme 'Fear of cancer screening', interestingly was both a barrier, as well facilitator to screening attendance. For instance, the cancer screening experience agitated variable degrees of fear, usually a reason for avoidance of delay in screening engagement. Non-attenders narrated being 'frightened to death' by the screening invitation, leading to a quick decision of not responding. A less intense portrayed experience of fear was the negotiation by talking to others to seek more information about screening. Counter-wise, a facilitator to engage in screening is the prospect that in doing so the fear would be minimised. Moreover, the angst of developing cancer in the omission of screening was noted to be a significant facilitator, which aided in overcoming perceived barriers to screening. Ramifications of an abnormal screening test result was the main source of fear, this was interpreted as 'fear of the unknown', which together with the actual screening methods was also a factor of fear, either from personal experience or anecdotes from others.

Further, the third theme 'Experiences of risk' reflected patient strategies to negotiate fear levels, this included use of screening as a coping strategy and creation of an alternate personal risk discourse. For instance, Young et al. (2018) expressed that the official dialogue on screening from the health service provider was that the individual is 'at risk', and non-attenders are at an even higher risk, however some resistance has been portrayed to this discourse. Similar to Graham-Rowe et al. (2018), the absence of symptoms was the reason of non- attendance, as such absence placed individuals at low risk, as they felt they had nothing to gain or lose by attending screening. Hence, this may be a coping method to obtain reassurance from the ambiguity and risk of the cancer diagnosis. The studies included by Young et al. (2018) were published over a wide time frame (1994–2016), therefore a limitation would be that the experiences of individuals might not mirror the present position of screening in the UK. In addition, Young et al. (2018) noted that recall bias may have influenced the data of included studies due to participants recalling past experiences. The authors noted that individuals who are the most reluctant to engage in screening were possibly

marginalised in the data, as they could be less likely to engage in a research study of this subject matter. Due to such limitations, Young et al. (2018) were partially successful in accomplishing their aim of improving understanding of the experiences of patients being invited to cancer screening and the connected decision-making.

Both Graham-Rowe et al. (2018) and Young et al. (2018) highlighted that communication between patient and health service provider was a topic of discussion. In relation to communication, Stacey et al. (2017) presented decision aids as facilitators, as these were reported to reduce the proportion of undecided participants, together with having a positive effect on patient-service provider communication, thereby, potentially supporting patient engagement with screening. Moreover, in terms of a decision-making process and satisfaction with said decision, greater patient satisfaction was reported by those exposed to the decision aid. Nevertheless, the authors noted the use of the decision aid increased the length of consultation by 2.6 minutes, thus adjustments to the consultation would need to be implemented to consolidate the extra time required for consultation with the patient, in anticipation of increased of engagement. However, in terms of anxiety, general health outcomes as well as diagnosis-specific health outcomes did not appear to differ from those who received usual care.

Stacey et al. (2017) did not report any adverse events associated with the use of decision aids. As no difference was found when comparing results for decision aids used in preparation for the consultation and the decision aids used during consultation, finding comparable improvements in amalgamated analysis for knowledge and accurate risk perception. Advantages of Stacey et al's. (2017) systematic review includes the conveyance of the potential of the patients' decision aid in the improvement of several outcomes across a range of decision contexts, as well as across a variety of populations. Further, the authors noted that potential biases in this review are due to limitations connected with possession of an inadequate power to detect possible differences in effectiveness between subgroups in order to differentiate between the most efficient factors with the patient decision aid. As such due to the potential biases, Stacey et al. (2017) were partially successful in achieving their aim

of the study in determining the effects of decision aids in people facing treatment or screening decisions

Although the term nudging was not clearly defined by Hofmann and Stanak (2018), it was presented with the aim to guide individuals in making decisions and supporting them to choose in their extensive self-interest. Further, it was noted by the authors that nudging was employed to ensure screening engagement uptake and health outcomes. Thus, it could be considered to not be a patient centred process, as it carries the potential loss of free choice. Several forms of nudging in screening were identified by Hofmann and Stanak's (2018) narrative review, such as default bias, authority bias or framed information. The data suggested that nudging for purposes of increased engagement worked, however, this possibly displaced the intrinsic individual engagement in screening due to possible lack of knowledge regarding its benefits.

Hofmann and Stanak (2018) expressed that as no screening is 100% sensitive and specific, thus, one should never offer a screening program unless the benefit-harm ratio justifies nudging. This presents the difficult question of whether nudging is justified in some instances. Further, the ethical principle of non-maleficence and integrity are relevant as well. As the benchmark for nudging, appears to be what extent of an individuals' experience of which nudging affects their self-determination. If an individual does not feel pushed to engage in a particular way, but instead is nudged to become a better decision maker, and to choose more in correspondence with their values, then nudging could be less objectionable and more appropriate as a facilitator in engagement.

Hofmann and Stanak (2018), expressed that employment of nudging strategies has been criticised for "crowding out" the intrinsic motivation –forcing out the natural reasons of why individuals tend to engage in screenings –which was driven by comprehension of the benefit of screening (Underhill, 2016; cited by Hofmann and Stanak., 2018). Even though nudging strategies have been used in England and Germany to increase successful engagement (an increase of 50% in Germany and 70% in England) of participants in breast cancer screening programmes. However only 2–4% of both British and German women comprehended the benefit of screening. Thereby facilitators to engagement appears to be moderate nudging, which does not

infringe any ethical principles, together with full provision of appropriate information to the patient regarding the benefits of screening and surveillance not only to encourage engagement but to become ‘better choosers’. A limitation includes the possibility of other researchers interpreting findings differently, thereby the findings may have led to conclusions other than those Hofmann and Stanak (2018) would have made.

Hofmann and Stanak’s (2018) study possess a possible particular type of bias, as the factors of individuals becoming ‘better choosers’ are from the point of service providers, rather than the context of patients’ everyday life not just at a clinic, but also at home, family, work and relationships. Thereby, it can be debated if this is considered to be a true shared decision-making process, as a result of the lack of input from the patients. Hofmann and Stanak (2018) thus fulfilled their study aim, as the tentative arguments presented by the authors explored nudging strategies identified in screening, as well as arguments for and against nudging.

Rasmussen et al’s. (2010) prospective cohort study identified mutations in 36 VHL patients, 17 of whom were previously asymptomatic. At the end of five years, only 38.9% of the mutation carriers continued participating in the tumour surveillance program, conveying a considerable drop of attendance over time. During that time, 14 mutation carriers developed a total of 32 new tumours, three of whom died of complications. Rasmussen et al. (2010) reported that gender, religiosity, education, income and marital status were not found to be connected with engagement with surveillance. Moreover, follow-up adherence was also separate to pre-test depression, severity of the diagnosis, or number of affected family members.

The only statistically significant facilitator of surveillance engagement was being symptomatic at the time of testing (OR = 5; 95% CI 1.2 - 20.3; p = 0.02), which supports Graham-Rowe et al’s. (2018) review study, which expressed that the absence of symptoms (asymptomatic) resulted in individuals deciding not to attend screening. Rasmussen et al. (2010) reported that pre-test anxiety was more frequently observed in patients that terminated follow-up (64.7% vs. 35.3%; p = 0.01), thus conveying anxiety as a possible barrier to engagement.

Rasmussen et al. (2010) concluded that the high initial engagement rate of genetic testing for VHL syndrome, including in minors, allowed the discontinuation of unnecessary screening procedures in non-mutation carriers. However, mutation carriers showed poor adherence to long-term tumour surveillance. Thus, several patients did not obtain the full benefit of early detection and treatment, which the authors noted is key to the reduction of morbidity and mortality in the VHL syndrome. A strength of this study was the reported inclusion of children, however the differential loss to follow up may have produced bias from self-selection of the mutation carriers. Thus, the authors partially fulfilled their aim of describing the uptake of diagnostic and presymptomatic genetic testing and to identify the factors influencing such adherence.

Piette et al's. (2010) prospective cohort study reported that a significant proportion of patients (35%) did not return for follow-ups and thus were not appropriately diagnosed. Those who failed to return were not a random subset of the at-risk population. Specifically, the barriers to engagement conveyed by not returning for confirmatory testing was stated to be significantly higher for men and for patients with hypertension. The authors noted that these patients may have been more likely to miss their follow-up visits due to work commitments, less appreciation of the significance of managing asymptomatic diagnoses, factors which were included in both Graham-Rowe et al. (2018) and Rasmussen et al. (2010) studies. Further, Piette et al. (2010) found that 43% of patients with chronic illnesses reported having to cancel a clinic appointment at least once in the previous year due to transportation problems. Piette et al's. (2010) study benefited from the large number of participants sampled. However, a limitation of Piette et al's. (2010) study is the possible selection bias from the initial stage of participant selection, as participant selection was not done at random, as such the authors partially fulfilling their aim of the study in evaluating alternatives to the FPG test for diabetes screening.

Courtney et al's. (2018) prospective longitudinal follow-up study of BRCA1/2 mutation carriers reported that the overall engagement rate for cancer surveillance was 96.2%, including 37 (74.0%) fully engaged and 13 (26.0%) partially- engaged individuals, with five cancers subsequently detected. Among the 28 *BRCA1*/*2* mutation carriers, adherence to breast cancer risk management was also high (89.3%), although uptake

of risk-reducing bilateral salpingo-oophorectomy (surgery to remove the ovaries and fallopian tubes, Erekson et al., 2013) was not as common (60%).

The overall adherence rate to risk management is high in patients with hereditary cancer diagnoses seen at the clinic in Singapore. This a possible reflection of cultural aspects, which may acts as a facilitator to engagement, as there is the possibility that both the patient and service provider would speak the same language. However, language does not equal culture, so, while this may be true there could also be cultural attitudes towards healthcare and screening in general that are at play here. The great majority (67.9%) of *BRCA1*/*2* mutation carriers included in Courtney et al. (2018) study had a prior history of breast cancer, therefore, it is possible that this would be a facilitator for women to be more motivated to engage in breast cancer risk management if they are on close follow-up or a prior cancer as has previously been reported. Although the rate did decrease with increasing age of patients, engagement to breast cancer risk management remained greater than 85%. Courtney et al's. (2018) study assessed risk management adherence in a Singaporean population following cancer genetic testing, therefore findings may not be generalizable to other populations. Although limited by a small sample size and short- follow up period, it has strengths in the ability of collecting data across all the public health institutions through the integrated electronic medical record system. As such, due to the stated small sample size and short follow-up period, it may be expressed that Courtney et al. (2018) partially achieved their aim of examining adherence behaviour among mutation carriers who attended the Cancer Genetics Service.

Malhotra et al. (2017) included 32,041 patient– service provider pairs in their retrospective cohort analysis. Overall, patient engagement with cancer screening were more likely to be non-Hispanic, better educated and wealthier. Patient– service provider gender discordance was an engagement barrier which resulted with lower rates of breast (OR, 0.83; 95% confidence interval (CI), 0.76–0.90), cervical (OR, 0.83; 95% CI, 0.76–0.91), and colorectal cancer (OR, 0.84; 95% CI, 0.79–0.90) screening engagement in all patients. This connection was also considerable after adjusting for ethnic concordance. Contrarily, among non-Hispanic whites and non-Hispanic blacks, patient– service provider ethnic concordance was not connected with screening engagement.

Although Malhotra et al's. (2017) results were not completely generalisable to the population of this thesis, it is interesting to note that authors results are conflicting with aspects of social/cultural compatibility which were also discussed. For instance, Graham-Rowe et al. (2018) and Young et al. (2018), as Malhotra et al. (2017) reported that among Hispanics, patient– service provider ethnic discordant pairs had higher breast (58% vs. 52%) and colorectal cancer (45% vs. 39%) screening engagement rates in comparison with concordant pairs. However, Graham-Rowe et al. (2018) and Young et al. (2018) expressed that individuals from some ethnic backgrounds in the UK find it difficult to form patient-service providers interrelationships with the service provider, even with the presence of an interpreter, due to possible language barriers, this was also conveyed by Malhotra et al. (2017). This may be due to non-Hispanics being more comfortable with a different ethnicity due to emotional barriers such as shame from the stigma of cancer, also expressed by Young et al. (2018).

Malhotra et al. (2017) concluded that gender concordance between patients and service providers was connected with a significantly higher rate of cancer screening engagement and therefore patients should have access to both female and male service providers, thereby acting as a facilitator to engagement with screening and surveillance. The large, nationally representative sample was a strength of this study, as this made it possible to examine combinations of ethnic concordance categories. The cross-sectional analysis of the self- reported survey data also prevented making any causal inferences. Service provider shortages in rural areas were reported to limit the ability of patients to choose a racially/ethnically concordant provider. Even with such limitation in rural areas, it may be considered that the large sample resulted in Malhotra et al. (2017) accomplishing their aim of the study.

Moin et al's. (2019) CRT study demonstrated uptake of DPP and/or metformin was greater among SDM participants (n = 351) than controls who received usual care (n = 1028; 38% vs. 2%, $p < .001$). At 12-month follow-up, adjusted weight loss (lbs.) was higher among SDM participants than controls (− 5.3 vs. − 0.2, $p < .001$). Both were statistically significant results. Further, it was expressed that a pharmacist-led SDM intervention for diabetes prevention was connected with a higher uptake and engagement of DPP and/or metformin at 4-month and weight loss at 12- month follow-up thus conveying the service provider facilitation in patient engagement in screening

and surveillance. It was noted that eighty-four million American adults have pre-diabetes, however the majority are unaware of their diagnosis and few engage in evidence-based therapies, such as intensive lifestyle change and/or metformin, to decrease their risk of developing type 2 diabetes. Thereby, Moin et al's. (2019) noted that shared decision-making has a potential role in increasing prediabetes awareness; by aiding patients in making informed decisions concerning options for diabetes prevention which aligns with their preferences and values which patients are inclined to follow through on.

Moin et al. (2019) expressed the advantage of prediabetes being the ideal diagnosis to apply SDM, since prevalence of this diagnosis was stated to be high, awareness is low, and various efficient and reasonable options are available to patients. Thereby, the authors fulfilled their aim of the study. It was recommended by the authors, since pharmacists may not be widely available in health care systems, future studies should therefore examine SDM delivery led by other health care professionals. Limitations of Moin et al. (2019) study included limited generalisability to other service settings as this trial was conducted in a large network of primary care clinics.

Dambha-Miller et al. (2018) longitudinal qualitative study described that at the 1-year follow-up, 311 out of 1106 (28%) participants had responded; whilst 101 out of 380 (27%) participants responded at 10-year follow-up and 46 participants provided responses at both times. The authors expressed that response rates were reported to be low at both sampling points, and the follow- up was a limitation, given the span of the study. However, it was argued by Dambha-Miller et al. (2018) that those who commented at both time points possessed characteristics which reflected those of patients with type 2 diabetes within the practices included in this study. Analysis of free-text comments highlighted the significance that patients placed on face-to face contact, length of interactions with service providers and comparative continuity of care.

Contrasting the early responses with those 10 years later suggested that patients continue to value such factors, however, they found delivery less satisfactory over time. Hence this could be a possible barrier to engagement which manifests concurrently over time. Dambha-Miller et al's. (2018) study illuminated that patient

preferences were met less well over time as the diabetes duration increased. It was noted that this may have been hindered further by the UK primary care system. This was owing to aspects such as the reported clinical workload and increased prevalence of chronic disease potentially acting as a barrier to ideal patient-service provider interactions, as described by the authors in regards to engagement with screening and surveillance.

A main strength of Dambha-Miller et al's. (2018) study was the extended longitudinal follow-up from recent diagnosis to 10 years of living with the diagnosis. As follow-up data were collected until the end of 2016, this study remains relevant to patient care today. Limitations included the heterogeneous aspects of the participants in relation to factors such as ages and rates of complications, which could itself have contributed to the reported diminishing follow-up over the 10 years. Further, the study sample mainly included Caucasian males, thus there was a lack of diverse participants. Dambha-Miller et al. (2018) indicted that the study was set within existing trials, therefore, it was possible that the trial setting and the intervention itself may have influenced patients' perceptions of care. Moreover, as some of the comments were brief, this restricted the ability to provide in-depth and detailed interpretation of the data. Although Dambha-Miller et al. (2018) is clearly valuable, the follow-up and low numbers are a limitation. Further the authors did not note the reasons for the non-responders. Thus, due to the interruption of the follow-up of individuals, it has been expressed that there may be a notable threat to the representative nature of the dynamic sample in such a longitudinal study (Caruana et al., 2015). Thereby, it may be that Dambha-Miller et al. (2018) were partially successful in fulfilling their aim of the study of exploring the views of patient's factors that are of importance to them in patient–practitioner interactions.

In summation, regarding barriers and facilitators to engagement with screening and surveillance services, the patient- service provider relationship was an important facilitator to engagement with screening and surveillance; as it was expressed that an individual's relationship with the health service had a possible effect on engagement (Young et al., 2018; Moin et al., 2019; Dambha-Miller et al., 2018). For instance, recommendations from a healthcare professional acted as a facilitator (Young et al., 2018). Decision aids appeared to have a positive effect on the communication

between patient-service provider and may be a countermeasure to engagement barriers with screening and surveillance services (Stacey et al. 2017; Moin, et al. 2019). Further, reported barriers to engagement included patients who are more likely to miss appointments due to work commitments or had less appreciation of the importance of managing asymptomatic conditions (Piette et al., 2010). Gender, religiosity, education, income and marital status were not found to be connected with facilitating engagement with VHL surveillance, with the only statistically significant facilitator of adherence was being symptomatic at the time of testing (Rasmussen et al., 2010). Although fear of cancer screening, was reported as both a barrier and facilitator to screening (Young, et al., 2018), there was a lack of how applicable this is to individuals with a rare endocrine syndrome. In addition, there was a paucity of studies which examined barriers and facilitators to engagement with screening and surveillance services of younger patients.

3.3 Conclusion

Studies have indicated evidence of the benefits for screening and surveillance for most hereditary cancers, such as the connection to a positive psychological outcome. The quantity of studies of rare hereditary endocrine syndromes was limited and were mainly focused on syndromes such VHL and MEN (Type 1 and 2). There was a gap in the literature concerning patients with mutations in the SDHx genes. Further, the studies noted the desire of patients to know more about surveillance and involvement in decision- making, specifically in the face of illness uncertainty and trajectory of the syndrome. Qualitative studies in particular have provided some in-depth understanding of patients accounts regarding screening and surveillance. For instance, the challenges faced by patients; negative emotions such as anxiety and fear were conveyed in relation to the experience of screening and surveillance. Family members are a source of support and their involvement is appreciated. Nonetheless, these patient accounts lacked those of individuals with rare hereditary endocrine syndromes, together with those of a younger age. With reference to the cohort studies, low numbers of surveillance attendance of mutation carriers were reported, and male patients had a seemingly higher attendance rate in comparison to female patients.

This review of existing studies has identified gaps in relation to rare hereditary endocrine syndromes, in particular to consideration of appointment attendance, accounts of the patient experience with screening and surveillance, together with a lack of what type of information/approach is required to possibly facilitate engagement with the service. In cases where the patient experience of, or attendance at, a rare endocrine clinic was investigated, most of the studies examined VHL patients and there was a lack of data from children.

In addition to children being understudied, there was a limited quantity of literature in relation to rare endocrine syndromes. With regards to the range of the 25 studies comprising the review, a small proportion were UK based studies (n=4), with the majority of the studies being literature reviews and cohort studies focused on clinics. Further, most of the studies focussed on rare endocrine syndromes were not UK based, thus may not be applicable to a UK health system. Thus, the strength of the evidence base for contemporary UK Healthcare in the field of services for people with rare hereditary endocrine syndromes is lacking. Barts Health NHS Trust supports what is needed as a result of this lack of research, through provision of the rare endocrine screening clinics to conduct such research.

In relation to the overall quality of the 25 studies, in terms of CASP outcomes, they are proportional, and the strength of the quality overall is adequate, which is an indication of the value of the group of studies. In terms of confidence in the research quality, although valuable, some aspects of the literature should be viewed with caution.

3.3.1 Outline of barriers and facilitators

An outline of potential barriers and facilitators to service user engagement with screening and surveillance services identified in this literature review are summarised in Table 3.3 below. The summarised barriers and facilitators are organised by individual and organisational factors.

Table 3.3. Summary of potential barriers and facilitators to engagement identified in the literature review

Factors	Barriers	Facilitators
Individual	-Negative emotions /fear/anxiety (Tufton et al., 2017; Kim et al., 2018; Graham-Rowe et al., 2018; Rasmussen et al., 2010) -Absence of symptoms (Graham-Rowe et al., 2018) -Language/communication barriers (Young et al., 2018, Graham-Rowe et al., 2018; Malhotra et al., 2017) -Male individuals with suspected cancer/risk of diabetes (Sheridan et al., 2019; Piette et al.,2010) - Weak relationship between female individuals and service-providers (Young et al., 2019) -Individuals younger in age (Sheridan et al.,2019, Young et al., 2018) -Individuals older in age (Sheridan et al., 2019) - Greater distance to the hospital/transport difficulties (Sheridan et al., 2019; Graham-Rowe et al., 2018) -Lack of awareness and understanding of the diagnosis by the individual (Graham-Rowe et al., 2018) -Lack of trust in the services and doctors (Young et al., 2018; Graham-Rowe et al., 2018) -Painful and embarrassing MRI experience (Gopie et al., 2012)	-Being symptomatic at time of testing (Young et al., 2018; Rasmussen et al., 2010) -Fear about cancer screening (Young et al., 2018) -Gender concordance between the individual and service-provider (Malhatora et al., 2017) -Family involvement/ support and influence (Laidsaar-Powell et al., 2016; Almeling and Gadarian, 2014; Godino et al., 2019) -Male mismatch repair gene mutation carriers (Courtney et al., 2018) -Female BRCA1/2 mutation carriers (Courtney et al., 2018) - Social/cultural compatibility between the individual and service provider (Graham-Rowe et al., 2018)

Organisational	-Lack of enthusiasm from service providers (Miller et al., 2010) -Limitations in knowledge by the service provider (Miller et al., 2010)	-Service provider recommendations/supportive attitude/interaction (Young et al., 2018, Moin et al., 2019, Miller et al., 2010; Graham-Rowe et al., 2018, Dambha-Miller et al.,2018) -Reduction of inconvenience by flexible appointments and 'one-stop shops' (Graham-Rowe et al., 2018) - Reviewing individuals in family clinics (Tufton et al., 2017) - Utilisation of a specialist endocrine nurse (Tufton et al., 2017) **-** Shared decision-making (Clement et al., 2018; Moin et al.,2019) -Exposure to decision aids potentially resulting in a more active role in decision-making (Stacey et al., 2017) -Provision of genetic counselling (Beard et al., 2016; Godino et al., 2019; Rasmussen et al.,2010) -Nudging strategies boosted the attendance of some cancer screening programs (Hofmann and Stanak, 2018)

3.3.2 Limitations

The total number of studies selected for this review may have been limited by search terms that were not included as part of the search strategy (Table 3.1). For instance, a limitation lies with the inclusion of 'benefits' only as a search term, but not 'risks'. The objective of a literature search has been noted to be the retrieval of all publications that are possibly relevant to the aim of the study (Lefevre et al., 2011), thereby, minimising bias in the formation of conclusions (ibid). Further, it has been indicated that search results are mainly evaluated by two measures: precision and recall (Salvador-Oliván et al., 2019). Therefore, it is imperative to find an equilibrium between them (ibid). Thereby, by only including the 'benefits' as a search term, may have resulted in some distortion of said ideal equilibrium between recall and precision of the retrieved studies, through the potential bias of the retrieved studies towards 'benefits' as opposed to 'risks'. An error-free search strategy can enhance the recall of relevant studies and thus, the quality of the literature review (Sampson and McGowan, 2006; Goossen et al., 2018). Moreover, the selected studies were not reviewed independently by a separate individual

Therefore, for future literature studies, in order to improve the quality of searches and bypass errors, a recommended approach is that whilst planning the search strategy the MeSH database can be consulted to determine all suitable terms, both descriptors/facilitators and synonyms (Salvador-Oliván et al., 2019). Further, the rigor in the literature review may be further strengthened by a separate researcher checking the primary screening of the studies.

3.3.3 Overarching aim and specific objectives of this thesis

This PhD thesis will build on findings from previous studies, with the overarching aim of gaining a deeper understanding and describing how rare endocrine gene carriers individuals comprehend and use health services generally, and in particular the service provided by the Barts endocrine screening clinics.

The specific objectives for this thesis are to:

1. Understand the relationship between patient demographic characteristics and appointment attendance at screening clinics.

2. Explore the patient experience of attending screening appointments.
3. Develop a patient information resource aimed at enhancing engagement with early screening appointments.

The next chapter will present the epistemological and ontological assumptions that guided this PhD thesis. The chapter will also outline the context of the research (the screening clinics) and the research environment.

Chapter 4

Methodology

4.0 Introduction

This chapter is split into two sections. The first part outlines the methodological approach of pragmatism which underpins the thesis and the use of multimethods to respond to the specific objectives of this thesis outlined at the end of Chapter 3, section 3.3.3. Integration in multimethod research is presented, in particular to integrating findings of the two qualitative studies. It will also briefly introduce the three specific studies illustrating how they interact and are connected. The second part focuses on the context of the study site namely, St Bartholomew's Hospital NHS Trust (referred to as Barts throughout the thesis) endocrine screening clinics.

Three studies were required to achieve the thesis objectives. Figure 4.1 below provides a visual representation in the form of a flow diagram, which conveys the design of the programme of research.

1. Study 1 – A retrospective cohort study was undertaken to identify the relationship between patient characteristics and indications of appointment attendance and non-attendance. A full description of the Study 1, it's findings' and implications are presented in Chapter 5.

2. Study 2 – An exploration of the experience and perceptions of individuals attending the Barts endocrine screening clinics was conducted, using semi-structured, face to face interviews. This second study was required to explore reasons underlying the results found in Study 1. A full description of the Study 2, it's findings' and implications are presented in Chapter 6.

3. Study 3 – Focus groups involving service users were used to explore how to promote the engagement of new patients in the Barts endocrine screening clinics, to address the issues raised in Study 1 and Study 2. A full description of the Study 3, it's findings' and implications are presented in Chapter 7.

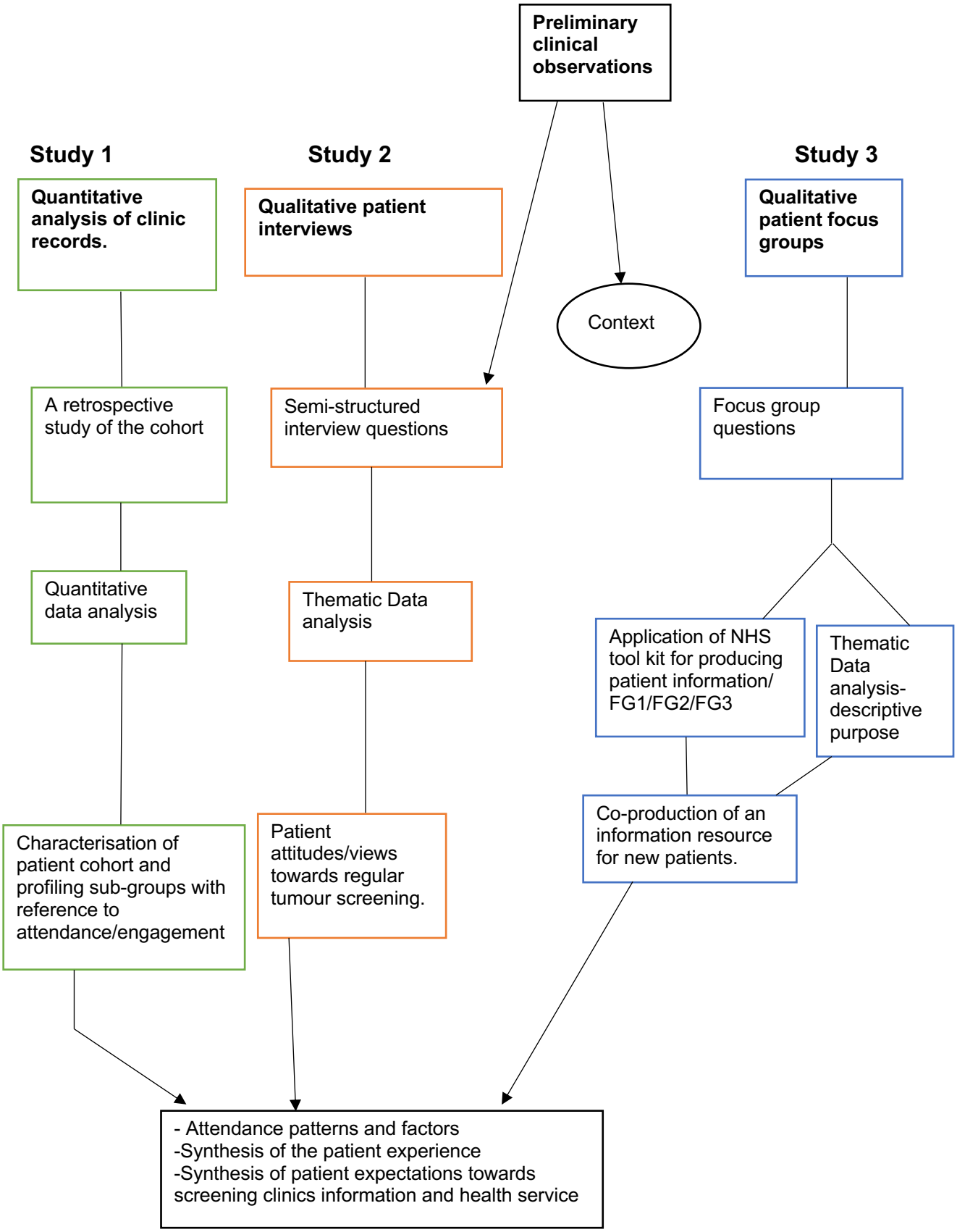

Figure 4.1. Thesis studies flow diagram

4.1 Pragmatism as a research paradigm/ a pragmatic solution

Pragmatism is a philosophy that addresses the practical nature of reality, acquiring truth in the solutions of problems and the consequences of actions (Cherryholmes, 1992). In contrast to positivistic researchers, who argue for attaining objective knowledge by exploring empirical evidence, and constructivists, who suggest that knowledge is relative and reality too convoluted, pragmatists believe that the mechanism of acquiring knowledge is a continuum rather than two mutually exclusive poles of either objectivity and subjectivity (Goles and Hirschheim, 2000). Thereby, pragmatism is located somewhere in the middle of the paradigm continuum with regard to the mode of inquiry (Kaushik and Walsh, 2019) and presents a flexible approach to research design (Morgan, 2007; Feilzer, 2010). By adopting this position, the pragmatist researcher is able to select the research design and the methodology which is most appropriate for addressing the research question (Kaushik and Walsh, 2019).

Taking a pragmatic approach is common in programmes of studies which involve different methods. Due to its inclusivity and flexibility (Kaushik and Walsh, 2019), as it addresses the research question with the most suitable research method (Feilzer, 2010). There is a general accord in favour of taking a pragmatic stance when conducting multimethods research (Kaushik and Walsh, 2019). For instance, Teddlie and Tashakkori (2003) listed at least 13 separate studies which have notably advocated the employment of the pragmatist position in the use of different methods design and concluded that pragmatism is most frequently advocated for in the multimethod literature. It has also been expressed that health services research is progressively attentive with the study of complex mechanisms that include multiple aspects, target multiple levels and donate to multiple outcomes (Leeman et al., 2015). The pragmatic approach has specific utility for health-based research, as it is linked to clinical practice and the importance of service users' views and experiences (Long et al., 2018). For instance, pragmatism in relation to health service research includes a sensitivity to research context and the consideration of differing forms of knowledge, together with the provision of a more flexible response to the rapidly developing context of health services application and evaluation (ibid).

In relation to this study, the overarching aim of this thesis is to gain a deeper understanding and describe how rare endocrine gene carriers individuals comprehend and use health services generally, and in particular the service provided by the Barts endocrine screening clinics; a pragmatic position enabled the researcher to consider attendance at screening at multiple different levels, what patient characteristics may influence it, their experience of it and what may facilitate engagement.

Pragmatism has been criticised by Hall (2013) from a methodological viewpoint for not detailing 'what works' in relation to research methods, as Hall (2013) argued that the benefit of research methods cannot be determined before the research is completed. However, Maarouf (2019) is not convinced with this argument, as the purpose, strength and limitations of every research method are apparent and have been examined by an abundance of researchers. Therefore, Maarouf (2019) argues that the aptitude of the pragmatic researcher relies on their capability to determine which research method aids which research purpose, in a way which gains the strengths of both quantitative and qualitative methods whilst avoiding their limitations (Maarouf, 2019).

4.2 Multimethod approach

This thesis was guided by the principles of a multimethod approach as a response to the pragmatic perspective. Multimethod research has been characterised as the practice of applying two or more different methods of research within the same study in lieu of confining the research to a single method (Brewer and Hunter, 2006; Creswell, 2015). Incorporating two or more qualitative and quantitative methods has an advantage over a single method research method, in particular when examining a complex phenomenon that unfolds at several levels of analysis (Matsaganis, 2016).
Unlike mixed method research, multimethod is not confined to combining qualitative and quantitative methods, instead, it is open to the comprehensive variety of potential methodological combinations (Hunter and Brewer, 2015). Ahmed and Sil (2012) noted that the most typical multimethod designs in the social sciences incorporate a form of qualitative research with statistical analysis. Further, multimethod scholarship has

contributed to methodological pluralism by suggesting that quantitative and qualitative methods are valuable tools (Ahmed and Sil, 2012).

4.2.1 Strengths and challenges in adopting a multimethod approach

Multimethod research denotes a coherent, consolidated strategy for subjugating the trade-offs of separate methods and for developing more valid inferences than any single method can achieve on its own (Gerring, 2011). Viewed in such terms, multimethod research is not solely a pragmatic option for managing different elements of a research programme or the feasible challenges that may arise in the course of research, instead, it produces better research by employing two or more methods in the execution of a single project (Ahmed and Sil, 2012).

The additional stated benefits of adopting a multimethod approach, as outlined by Davis et al. (2011), include compensating for the weakness of a single research method and the opportunity to respond to broader research questions, together with the provision of a holistic understanding of the phenomena. Regarding the challenges, a high level of methodological expertise is required to conduct the study throughout the different stages and ensure the application of the most suitable procedures at each point (Anguera et al., 2018). Furthermore, multimethod research involves more resources in terms of money and the time required to conduct it (Davis et al., 2011). Thus, multimethod research was considered to be appropriate to adopt for this thesis study; as the three studies (Study1-3) employed to answer the three specific objectives of this thesis, will tell us something about engagement, but very different things: how much and what factors influence, experience and response to engagement, how to enhance engagement and what facilitates that.

4.2.2 Integration in multimethod research

There are several possible designs of multimethod research, in regards to this thesis study, the convergent design was used. In this design both the different types of data, for instance interview and focus groups data, are collected and analysed separately before being integrated. It is argued that this approach provides multiple perspectives of a research objective (Creswell, 2015). In relation to integration of the datasets, it has been noted that ‘merging’ is suited for this convergent study design; this is

described as when the datasets are compared and assessed for concordance/partial agreement, dissonance or silence between the datasets (Curry and Nunez-Smith, 2015; Farmer at al., 2006). Different procedures of data merging have been proposed, which includes transformation of one type of data into the other prior to direct comparison, integration through narrative or side-by-side visual displays (Fetters et al., 2013; Creswell, 2015).

It has been proposed that integration in multimethod research should be comprehended as a specific practical relationship between different methods, analytical findings, perspectives or sets of data (Moran-Ellis et al., 2006). Further, 'integration' indicates a particular relationship between two or more methods where the different methods preserve their paradigmatic nature but are interplayed with each other in pursuit of the objective of 'knowing more' about a research topic (ibid). The rationale for integration tends to centre around validation of data and/or attaining a fuller picture of the topic under inquiry (Mason, 2006). Validation rationale are also based on the assumption that mixing methods allows researchers to avoid the blind spots and biases innate in each method (Monrad, 2013). It has been noted that some projects integrate at later stages of the process; for instance, each method could be implemented at some distance from the others, or/and the datasets can be brought together only at the point of analysis, interpretation or theorising (ibid).

There are different approaches to theoretical interpretation (Moran-Ellis et al., 2006); integration at the point of the research process after separate analysis is described as interpretive integration, this is where an explanation is produced from the empirical work which combines the knowledge, combining it into a coherent account (ibid). This specific approach does not integrate the methods or analysis but instead takes each set of findings and integrates them into one explanatory framework (ibid). This contrasts from Kelle's (2005) approach, in that there is little or no integration between the datasets during the analysis process. Thus, any contradictions, convergences and divergences in the findings generated by each analysis are only reconciled at the stage of interpretation and explanation (Moran-Ellis et al., 2006).

4.2.3 Integrating individual interview and focus group data

Just as it is possible to combine quantitative and qualitative methods, a common approach to multimethod is the mixing of qualitative data collection approaches in order to further comprehensively investigate a research objective (Darlington and Scott, 2002). Even though individual interviews and focus groups are independent data collection methods, their combination could be advantageous, as complementary views of the phenomenon can be produced (Lambert and Loiselle, 2008). Rationales for this combination includes aiming towards data completeness and/ or confirmation (integrated use), the requirement to contrast and compare individuals' perspectives (parallel use) and for pragmatic/practical reasons (Adami and Kiger, 2005; Halcomb and Andrew, 2005). When exploring data completeness, it is presumed that each method uncovers different areas of the phenomenon of interest (complementary views) and assists in a more comprehensive understanding (extending the range and/or depth of the findings) (Lambert and Loiselle, 2008). In regards to this thesis study, the findings of the two qualitative studies (Study 2 and Study 3) will be integrated (Chapter 8), utilising the approach characterised by Fetters et al. (2013), comparing findings to the literature review.

4.3 Context of study

4.3.1 Introduction to Barts endocrine screening clinics

The following provides some context of the Barts endocrine screening clinics which both initiated the need for this study, as well as providing data and access to participants. This information was compiled through discussions with key informants, which included lead consultants and specialist nurses, examining key trust documents, and observation/in-clinic shadowing of the clinicians during patient appointments. The observation sessions at the clinic at the three different clinics occurred from November 2016 to June 2017, an approximate 50 hours were spent in attendance, doing this observation.

Barts is an internationally renowned teaching hospital in the City of London, situated near St Paul's cathedral. The hospital is regarded as a centre of excellence for cancer care **(**St Bartholomew's Hospital, 2019**).** The Barts endocrine screening clinics are part

of the Endocrinology department and are located at the East Wing at Barts hospital. The Barts team is one of the largest in the UK and comprises specialists in endocrinology as well as oncology and surgery; consequently, any decisions made about patient care are discussed in multi-disciplinary meetings. This approach supports that aim for patients to have the best possible treatment and outcome (Barts Health NHS Trust, 2019). The Barts Health Endocrine Department has access to imaging and complex endocrine tests that are not universally available across the UK; it aims to deliver consultant-led care in the outpatient and inpatient setting, along with offering very specialist treatment and care for patients with complex syndromes. There is also a committed endocrine investigation unit and inpatients ward, which is managed by a team of specialist nurses (ibid). The distinctive advantage of having such a team of endocrine clinical nurse specialists is the provision of a single point of contact for patients. Their goal is to expertly support and guide patients through their diagnosis and ensure that individuals are capable of making informed decisions regarding their care and treatment (ibid).

The stated ethos of the department is to deliver consultant led care in the inpatient and outpatient setting, it has also aided in pioneering research and treatments in endocrinology (Barts Health NHS Trust, 2019). Further, their reputation for clinical expertise is such that they accept referrals from across the UK and beyond (ibid). The Barts endocrine clinical team acknowledge that the patient benefit lies in the advantage of early detection and intervention. Hence, they offer the endocrine screening clinics, which aim to detect such tumours early and treat them (ibid). This reflects current best practice in the long-term management of patients (Ro et al., 2013).

Key informants indicate that numbers of patients referred to the screening clinics have increased. However, there was also an expressed concern that non-attendance at screening was increasing, and that this may have been having a negative impact on the service's ability to provide effective and timely care for the patients. A focus on attendance is in line with the Barts Health NHS Trust wide focus on reducing did not attend (DNA) rates for clinics to 10% or less (Barts Health NHS Trust, 2016). Lack of engagement in screening is relevant because it can result in significant negative health impacts for the individual and more significant demands on health services in the long

term (MCIS, 2017). However, beyond anecdotal concerns with attendance, little was known empirically about attendance rates in the Barts endocrine screening clinics.

4.3.2 Barts Health Endocrine Clinics Framework

Patients are referred to the Barts Health Endocrine department in various ways; one is through internal referrals, for example from ENT (Ear, Nose and Throat services); another is through family tracing through the Genetics Department, in addition to external hospitals referrals. Patients are assigned to specialist clinics according to their diagnosis; this will either be the VHL, SDH or MEN clinics. The MEN clinics are on months that have five Tuesdays, the VHL are on months which have five Wednesdays, and the SDH clinics, which are the most frequent, are usually held on the third Thursday of the month. There are specific designated family clinics where a paediatric specialist is also in attendance, which allows families to attend collectively if they wish. The preliminary clinical observations (Appendix 4.1) showed that some of the families took advantage of this and attended together, but others did not find the concept of family clinics an appealing factor for attendance.

The outpatient appointments at the Barts endocrine screening clinics usually involve multiple planned engagement points. This may include blood test, further scans such as an MRI, consultation with the specialist doctor and potentially further specialist involvement if indicated. To manage this in a timely way these are all organised in one way to maximise the time efficiency for the patient who is often travelling considerable distance. Regular surveillance for patients was introduced in the screening clinics in 2003 (Tufton et al., 2019). Patients initially had a review appointment at least once a year, whereas some had more than one appointment in the same year. However, due to an increase in demand for the service and research indicating these tumours are slow growing (Tufton et al. 2017), a protocol of an abdominal MRI every 18 months and an MRI of the pelvis, neck and thorax every 3 years was recommended (ibid). Taking into account the difference in phenotype and penetrance of the syndrome (ibid).

4.3.3 Practicality of clinic attendance

The Barts endocrine screening clinics are based in the East Wing building and is easily accessible by public transport; however, the car parking facilities are limited to Blue Badge holders only (East Wing Building Guide, 2020). On arrival, patients are met by a manned reception desk where they are directed to the appropriate clinic area. There is a spacious patient waiting area where families can be seated together, however, the clinic rooms' space is limited. Consultation are approximately 10–15 minutes in length, with one doctor and the nurse.

The majority of patients who attended the clinics voiced no complaints during the consultations with the health service providers regarding the health care they receive. The researcher observed that some patients, in comparison to newer patients, were more resistant to change the health professional they were due to see, as some articulated during appointments that they preferred to see their regular consultant, rather than the newly appointed registrar. During consultations, it was observed that female patients, regardless of age, were more communicative with the doctor, expressing their emotions more freely. Furthermore, some male patients voiced embarrassment when discussing highly sensitive topics with a female doctor.

Bart's Health services are accessed by a variety of people from different ethnicities and backgrounds. Whilst the researcher did observe some language barriers, manifested by some patients requiring support from family members or professional interpreters, however, in terms of engagement and interaction the researcher did not notice any specific differences based on ethnic background. During family clinic observations some trends were noted. These include how certain younger, male patients would not attend regularly with their families; they would either skip appointments altogether or request separate appointments. Some parents, whose children refused to attend appointments (for reasons such as the noise involved during an MRI screening, which came to light during the clinic observations), have even contemplated tricking their children into attending screening appointments by informing them that it was just a general check-up.

4.3.4 Additional support for patients

Patients with rare syndromes can also face a considerable emotional toll (Mukherjee, 2019), as very little may be known regarding a particular diagnosis (Lauterbach et al., 2016). It was indicated by the service providers that patients at the Barts screening clinics reacted to the knowledge that they have inherited a genetic defect for VHL, mutations in the SDHx genes or MEN in very different ways. As some were reported by the service providers to became overwhelmingly anxious and request more screening than is clinically appropriate, whereas others find it hard to engage at all with the clinical services available.

It has been demonstrated that disregarding problems intensifies illness and increases health care costs (Carlson and Bultz, 2004). When the emotional needs of patients remain unresolved, they are more likely to visit their GP, use community health services and spend more time in hospital (ibid). The subject of emotional needs is highlighted by unpublished preliminary data (Dr Caroline Dancyger, Barts Health, Clinical Psychologist) which suggested that addressing the psychological needs of patients going through screening is demonstrably worthwhile and appreciated by those individuals. The same preliminary data also revealed that patients exhibit varying degrees of psychological distress, as some find the prospect too frightening and decide to not attend their medical screening appointments, which also echoed in other literature (Macmillan Cancer Support, 2010).

In addition to the services that the researcher observed (blood tests, MRI, consultations), the clinic also offers psychological support. Patients are referred to specialist psychological services to combat these possible psychological issues, these services are run within the hospital and the patients have access to on the appointment day. Such services include Macmillan Cancer support, or AMEND, which is a patient support group which provides information to those affected by MEN syndromes and endocrine tumours.

4.4 Conclusion

This chapter introduced the methodological overview of this PhD thesis. It detailed the rationale for utilising the multimethod approach as the most appropriate to answer the research questions. Furthermore, the context of the study was presented in terms of an introduction to the Barts endocrine screening clinics, from where the population of the study was derived.

The next chapter will present a retrospective cohort study, examining patient characteristics and attendance. This covers a three-year period of all individuals with VHL, MEN and mutations in the SDHx genes who were registered as patients at the Barts endocrine screening clinics during 2015-2017, a total of 291 patients.

Chapter 5

Study 1- Patient demographic characteristics and appointment attendance: A retrospective cohort study of rare endocrine gene carriers individuals at the Barts endocrine screening clinics

5.0 Introduction

This chapter presents the quantitative study used to examine the demographic characteristics and clinical data of individuals with VHL, MEN and mutations in the SDHx genes who were registered as patients at the Barts endocrine screening clinics during the years 2015, 2016 and 2017. Firstly, the aim and specific objectives of this retrospective cohort study are given in section 5.0, followed by the methods and details of data management in sections 5.1 and 5.2. Data analysis is outlined in section 5.3. The results are presented in section 5.4, and the findings are discussed in section 5.5.

For individuals with rare hereditary endocrine syndromes, the benefit of clinical screening lies in the advantage of early detection of tumours, leading to appropriate management (Aufforth et al., 2015). In relation to endocrine cancers, the Endocrinology Department at Barts sees approximately 200 new cases per year (Barts Health NHS Trust, 2020). Individuals are offered different numbers of clinic appointments a year based on their needs, but these are usually collated so numerous activities occur in one appointment. Research has shown that a lack of engagement in screening appointments can result in negative health impacts for the individual and more significant financial costs for health services in the long term (Cameron et al., 2013). This is particularly important for genetics clinics, as a significant amount of preparation is usually required before a clinic appointment (Humphreys et al., 2000). In regards to attendance, the national average non-attendance rate, that was currently available at the time of this study, for outpatient clinics in the United Kingdom was noted to be around 12% (Committee of Public Accounts, 1995; Murdock et al, 2002).

Information about individuals who miss multiple appointments has been noted to be limited (Ellis et al., 2017). Prior research has concentrated on single instances of non-attendance, instead of on individuals who miss multiple appointments (ibid); such

episode-based designs analysed missed appointments across an entire patient population rather at an individual patient level (ibid). Nevertheless, a large audit of NHS outpatient appointments determined that one in 50 patients who missed one appointment continued to miss three or more further appointments within three months (HSCIC, 2015). Preliminary research by Waller and Hodgkin (2000) also established that a limited core group of patients who miss several appointments were plausible to exist; with the likelihood of missing a subsequent appointment increasing amongst individuals who had missed at least one appointment in the preceding 12 months (ibid). It has been expressed by Williamson et al. (2017) that low engagement includes missing healthcare appointments. It is assumed that missing such appointments repeatedly may reflect a pattern of behaviour (ibid); UK clinicians have reported that some individuals who frequently miss appointments are of specific concern as they could have poor health, be socially disadvantaged and be high users of unscheduled care, in comparison with individuals who sometimes or never miss appointments (Watt et al., 2012). Thus, the need to differentiate patients who miss several appointments from patients who do not, as in low or high attenders, would be advantageous; as this categorisation approach is utilised for understanding whether continuously missing appointments acts as a possible risk marker for poorer health outcomes (Ellis et al., 2017). Moreover, missing multiple appointments has also been expressed as an indication of lack in engagement (Williamson et al., 2014).

There is a lack of key predictors of appointment non-attendance levels in reference to rare endocrine syndromes in the literature, thereby it is important to consider other patient populations as to identify possible predictors. It has been suggested in some primary care studies that patients who are aged 16–30 years or older than 90 years are more likely to miss appointments (Ellis et al., 2017). Therefore, age may be a factor in patients missing appointments. In addition, women attended more appointments overall than men (ibid) raising a question regarding the characteristic of gender being a factor in non-attendance. In an earlier study, gender and ethnicity were not associated with appointment compliance (Barron et al.,1980), conversely Mitchell and Selemes (2007) reported that age and gender are key predictors of attendance in a psychiatric patient's study. Further, in previous studies, ethnicity was found to be a predictor of non-attendance in some studies, but not others (Smith and Yawn, 1994; Goldman et al., 1982). However, it was noted that studies differed in their

categorisation of ethnicity (George and Rubin, 2003). Geographical distance of the patient from the hospital in some studies has been associated with higher non-attendance rates (Dantas et al., 2018), others reported a small effect of distance travelled on attendance in patients with suspected cancer (Sheridan et al., 2019).

Many of the factors outlined above are considered to be patient demographics and this generally includes age, gender (NHS Employers, 2019), as well as name, address, date of birth and NHS number (NHS Digital, 2020). This demographic information is often routinely collected in NHS records; thus, it was considered feasible to consider how these factors may interact with attendance. The data that was ethically approved and available for this cohort study from the Barts endocrine screening clinics gatekeeper included: diagnosis, date of birth, gender and appointment attendance. Ethnicity data was not routinely collected, and patient address were not available to the researcher.

There was a need to understand more about patient demographic characteristics for each of the three Barts endocrine screening clinics (SDH, MEN and VHL) and to explore which group of patients were the most or least likely to attend appointments to better understand the characteristics of the Barts' endocrine screening clinic population in relation to attendance. Consequently, the aim of this retrospective cohort study was to understand the relationship between patient demographic characteristics and appointment attendance at the screening clinics.

Specific objectives:

1. To describe the distribution of patient demographic characteristics in the screening clinics.
2. To describe patient clinic appointment attendance rates for each of the clinics per year.
3. To examine the association between the explanatory variables (diagnosis, demographics) and patient attendance, and determine effect size.

5.1 Methods

5.1.1 Study Design

To address these objectives, a retrospective cohort study was conducted. A clinical

audit methodology was not feasible, as there was a lack of previous audits conducted on the Barts endocrine screening clinics' data. Consequently, there was no definitive pre-existing data to use as a benchmark for comparing findings, nevertheless, in relation to non-attendance target rates Barts Health NHS Trust has expressed a goal of reducing DNA rates for appointments for clinics to 10% or less (Barts Health NHS Trust, 2016). However, as stated, the national average non-attendance rate for outpatient clinics in the United Kingdom is noted to be around 12% (Committee of Public Accounts, 1995; Murdock et al, 2002).

The current study focused on the information provided in patients' records from the years 2015 to 2017, which were managed by the specialist endocrine nurse for patients with MEN, VHL and mutations in the SDHx genes. Besides appointment attendance status, the records provided the date of birth, gender, and type of diagnosis. The initial aim was to retrieve data that covered the attendance predictors noted from other studies, such as ethnicity and travel distance from the clinic. The process of data retrieval was through a gatekeeper, the specialist endocrine nurse, who's role was to retrieve the data for the researcher. However, some of the data was not available due to it not being routinely collected by the clinic or was not accessible by the nurse as it required a separate gatekeeper. As previously stated, some of the key predictors variables of appointment non-attendance levels have been reported as age and gender, thereby, these patient demographic characteristics formed the basis of this study.

5.1.2 Participants

Potential study participants included those living in their local communities, who had been referred to the Barts endocrine screening clinics by their general practitioners (family doctors) or from diagnostic centres. Referrals were accepted nationally and internationally and were not restricted to areas local to the Barts endocrine screening clinics. All individuals with a diagnosis of MEN, VHL and mutations in the SDHx genes were included. There were no exclusion criteria.

At present, there is limited screening services for rare endocrine syndromes outside London, for instance, a specialist clinic for VHL syndromes is based at the Leeds Teaching Hospital (Thomas, 2014). As such, most patients with a diagnosis of VHL, MEN and mutations in the SDHx genes are likely to be referred to the Barts endocrine

screening clinics in London, thereby providing a viable cohort for analysis.

5.1.3 Ethical Considerations

Ethical approval (Appendix 5.1) was acquired from the College of Health and Life Sciences Research Ethics Committee (DCS) at Brunel University London on the 19th January 2018 (459-NHS-Jan/2018- 10914-2). Next, approval from the London - Central Research Ethics Committee of the NHS National Research Ethics Service (Appendix 5.2) was received on the 14th of June 2018 (18/LO/1046). Health Research Authority (HRA) and Health and Care Research Wales (HCRW) approval was given (Appendix 5.3) on the 22nd of June 2018 (244880 18/LO/1046).

Computer devices such as desktops and laptops were password protected, and the files were encrypted using high levels of security in accordance with the Brunel University London and Barts Health Endocrinology Service protocols for the security and storage of data. Furthermore, all memory sticks used were encrypted and password protected. As individual informed consent was not possible, careful attention was given to the consideration of patient confidentiality and privacy. In accordance with IRAS section A59 and A60, the researcher only had access to the information in relation to patients at the Barts endocrine screening clinics (VHL, MEN, SDH clinics). Therefore, the researcher was provided with the anonymised retrospective medical records of the patient of those clinics, these records were only used to identify factors that may affect levels of engagement in the screening service. Patients' data were anonymised by removing names, addresses and other unique identifiers such as NHS and/or hospital numbers prior to the data being given to the researcher, and a unique study code number was allocated to each individual.

5.1.4 Data Collection

The specialist endocrine nurse for the Barts endocrine screening clinics provided the anonymised cohort retrospective dataset to the researcher; these data represent the total population of patients at the Barts endocrine screening clinics. Due to the limited access to data, this resulted in the researcher lacking control over the data collection process, issues reported in other studies, such as by Song and Chung (2010). The

data files included diagnosis, gender, date of birth and appointment attendance information. A two-year period of data collection is recommended as the minimum number of years to increase stability of the results (Menec at al., 2000). In the present study, the cohort data was extracted over a three-year period from the 15th of January 2015 to the 29th of November 2017 (corresponding to the first and last clinic dates in that three-year period), thereby exceeding the minimum requirement.

5.2 Data Management

Anonymised data for the three screening clinics' VHL, MEN and SDH patients were provided to the researcher by a secure file transfer from the specialist endocrine nurse, who was responsible for the upkeep of records. The total dataset included 291 individual patient records, which were utilised for descriptive and clinical analysis (Table 5.1).

The raw data was cleaned into a format suitable for use into a separate excel sheet, this was done by inspecting the raw data documents and removing unwanted observations. Any missing data for some patients were managed by performing a 'complete-case analysis'/listwise deletion, as suggested by Papageorgiou et al. (2018). It involved the removal of all cases with one or more values missing in any of the variables that were essential for analysis (Papageorgiou et al., 2018). This method was selected over others, for example, mean imputation, as the distribution of the imputed variables may get highly distorted and the variance underestimated due to each missing value being assigned the same imputation value (Lodder, 2013).

Following this concept, 56 cases (all in the MEN clinic patient group) were found to be missing their date of birth. These cases were included in the total descriptive and clinical analysis, resulting in a cohort of 291 cases, but were subsequently removed from the Poisson regression analysis (n=235).

5.3 Data Analysis

5.3.1 Descriptive analysis of the patient demographic data

The cohort for analysis included 291 patients who met the inclusion criteria. For demographics of patients (Table 5.1) the categorical variable, gender, is shown by frequency and percentage, while the continuous variable, age, is shown as mean±SD

and range.

In relation to the clinical/appointment data of patients (Table 5.2 and Table 5.3), it was clear from the raw data if the patient attended their offered clinical appointment at that day/time. However, in relation to non-attendance, if this was a DNA (did not attend) or a cancellation/UTA (unable to attend), this information was not available. However, an NHS guideline considers both DNAs and cancellations both as patient non-attendance (Staffordshire and Stoke on Trent Partnership NHS Trust, 2014). Thus, a 'non-attendance' was denoted to each of the appointments where the individual was not present, which was noted in the files, at their offered clinical appointment that particular day/time.

A pilot analysis, based in the UK, by Williamson et al. (2017) demonstrated that during a 3-year period just over 60% of their sample missed no appointments, whilst 30% missed one or more appointments and roughly 10% of patients missed three or more appointments. This UK based retrospective study (Williamson et al et al.,2017), although using GP appointment data, was deemed an appropriate approach in order to categorise levels of patient attendance; moreover, this analysis criteria also allowed to expand on low/high attenders by exploring 'never' and 'medium' categories.

Therefore, taking the distribution/analysis criteria by Williamson et al. (2017), which appear to be similar to the approaches used by other studies such as Ellis et al. (2017) and McQueenie et al. (2019), it was therefore decided that an appropriate approach would be to classify patients based on the number of appointments missed, into the following groups/classifications:

-Never missed appointments: 0 over a 3-year period.

-Low missed appointments: 1 over a 3-year period.

-Medium missed appointments: 2 over a 3-year period.

-High missed appointments: >2 over a 3-year period.

Using the analysis criteria as justification from Williamson et al. (2017) pilot study, which was also adopted by the separate ensuing studies (Ellis et al., 2017; McQueenie et al., 2019) as stated, patient demographics between missed appointment groupings was established for each of the Barts endocrine screening clinics (Appendix 5.4).

Patients were categorised into attendance categories over the previously stated three-year period from the 15th of January 2015 to the 29th of November 2017. This involved calculation of the total number of appointments scheduled/offered during the three-year period for each patient, the number of appointments attended, in addition to the number and percentage of appointments missed. The patients were then classified on the basis of their rate of appointment non-attendance over the three years in accordance with the classifications above (Never, Low, Medium or High). Patients' age was categorised withing six broad groups, in accordance with the United Nations guidelines on standard international age classifications (United Nations, 1982), approximately equivalent to infancy, youth, young adulthood, middle adulthood and older adulthood to average retirement age, retirement (under 1,1-14, 15-24, 25-44, 45-64 and 65+ years).

5.3.2 Poisson Regression analysis

To explore whether patient age, gender and diagnosis have a statistically significant effect on appointment attendance, a Poisson regression model was utilised. A statistician was consulted, and this approach was agreed as suitable for this study. Poisson regression is used to model response/dependent variables (Y-values) that are counts. The model conveys which predictor/independent variables (X-values) have a statistically significant effect on the response/dependent variable (Zeileis et al., 2008). Poisson regression involves estimating the regression coefficients using maximum likelihood (MLE) (Glen, 2015). MLE employs known probability distributions, such as the normal distribution, and compares datasets to those distributions to find an appropriate match for the data (ibid).

The current study involved count data, the number of patient appointments, which took on discrete values reflecting the number of occurrences of an event in a fixed period of time (Coxe et al., 2009). In statistics, Poisson regression is a type of regression analysis used to model such count data (Cameron and Trivedi, 2013), making it suitable for the current study.

As discussed in section 5.2. above, 56 cases (all in the MEN clinic patient group) were found to be missing their date of birth from 'complete-case analysis'/listwise deletion as way of managing missing data. Therefore, the patient data (n=235) was inputted into Stata (Appendix 5.5) and analysed using Stata (StataCorp, 2019). The data comprised of the response/dependent variable (number of appointments attended), predictor/independent variables (age, gender and diagnosis) and the exposure variable, which was the number of possible appointments offered to the patient.

As stipulated, Poisson regression fits models of the number of occurrences (counts) of an event (StataCorp, 2019), and some of the assumptions and features of the model are as follows:

1. A quantity called the *incidence rate* describes the rate at which events occur (StataCorp, 2019).
2. The incidence rate can be multiplied by the *exposure* to obtain the expected number of observed events (StataCorp, 2019).
3. Independence acknowledges that events (conditional on predictors) must be independent (Penn State, 2018).
4. The conditional mean and variance are equal (StataCorp, 2019).
5. The time period (or space) must be fixed (Penn State, 2018). The term used for modelling the time period or area of space is exposure. This variable modifies each observation so that the count outcome is weighted based on the time period or space (Mayer, n.d).

5.4 Results

5.4.1 Demographic characteristics of the patient cohort per year for each clinic

The year-by-year trends of the data from the 15th of January 2015 to the 29th of November 2017 are shown below in Table 5.1. The total number of patients registered increased by 32.92% from 2015 (n=161) to 2016 (n=214). There was a further 4.67% increase in registered patients from 2016 (n=214) to 2017 (n=224). The total increase of patients over the three years was 39.13%, with the greatest increase of 62.12% observed for the SDH clinic cohort.

Regarding gender distribution over the three years, in 2015, the total gender distribution of the registered cohort was comparable, with male patients comprising 50.31% (n=81) and female patients comprising 49.69% (n=80). The most apparent difference in gender distribution for this period was observed in the VHL clinic, with male patients at 61.11% (n=22) and female patients at 38.90% (n=14) registered. This margin of difference in VHL patients decreased in 2016, as male patients were 57.14% (n=20) compared to female patients at 42.86% (n=15); however, in 2017, the distribution of males increased compared to females again, with males at 60.53% (n=23) compared to female patients at 39.47% (n=15). In the 2017 SDH clinic, compared to previous years for that clinic, the difference in distribution between the female patients at 63.55% (n=68) to male patients at 36.45% (n=39) was the greatest, whilst for the MEN clinic throughout the years, the gender distribution, although not exact, was comparable.

Regarding the age distribution over the three years, the total mean age of patients in all of the 2015 clinics was 42.41 years (± SD= 18.74); VHL patients had the lowest mean age in 2015, with 37.31 years (± SD= 16.29). In 2016, the mean age of patients was 41.07 years (± SD= 18.53), with VHL patients again having the lowest mean age of 33.15 years (± SD= 15.31). With respect to the 2017 patient cohort, the mean age of patients was 39.98 years (± SD= 19.20), with VHL patients once more having the lowest mean age range of patients with 31.84 years (± SD= 14.50).

In summary, there was an increase in the total number of patients registered with the clinic over the three-year period. Moreover, there were variations in the gender split across the years and diagnostic groups. The downward decrease in the total mean age range from 2015 to 2017 is also worth noting.

Table 5.1. Demographic characteristics profiles of 291 patients attending the VHL, MEN and SDH clinics from 2015 to 2017.

		Demographic characteristics profile/ Diagnosis (clinic)			
2015	**Demographic profile/clinic**	**MEN (n = 59)**	**VHL (n = 36)**	**SDH (n = 66)**	**2015 Total (n=161)**
	Male: Female	29 : 30	22 : 14	30 : 36	81 : 80
	%	49.15% : 50.85%	61.11%: 38.90%	45.45%: 54.55%	50.31% : 49.69%
	Age (years)*:	* Excluding n=27 MEN patients			
	Mean	Mean =52.09	Mean= 37.31	Mean= 40.50	Mean= 42.41
	± SD	± SD= 15.14	± SD= 16.29	± SD= 20.05	± SD= 18.74
	Range (Min- max)	Range= 25 - 82	Range= 10- 70	Range= 5 - 89	Range= 5- 89
2016	**Demographic profile/Clinic**	**MEN (n = 85)**	**VHL (n = 35)**	**SDH (n = 94)**	**2016 Total (n=214)**
	Male: Female	44 : 41	20 : 15	39 : 55	103 : 111
	%	51.76% : 48.24%	57.14%: 42.86%	41.49%:58.51%	48.13% : 51.87%
	Age (years)*:	*Excluding n=43 MEN patients			
	Mean	Mean= 48.36	Mean= 33.15	Mean= 40.68	Mean= 41.07
	± SD	± SD= 16.30	± SD= 15.31	± SD= 19.40	± SD= 18.53
	Range (Min- Max)	Range= 8- 82	Range= 8- 67	Range= 5- 89	Range= 5-89
2017	**Demographic profile/Clinic**	**MEN (n =79)**	**VHL (n = 38)**	**SDH (n = 107)**	**2017 Total (n=224)**
	Male: Female	40 : 39	23 : 15	39 : 68	102 : 122
	%	50.63%: 49.37%	60.53%: 39.47%	36.45%: 63.55%	45.54% : 54.46%
	Age (years)*:	* Excluding n= 44 MEN patients			
	Mean	Mean= 48.54	Mean= 31.84	Mean= 40.00	Mean= 39.98
	± SD	± SD= 16.02	± SD= 14.50	± SD= 20.45	± SD= 19.20
	Range (Min- Max)	Range= 9- 82	Range= 9- 68	Range= 4 - 89	Range= 4- 89
***Age calculated excluding patients with MEN diagnosis who had missing date of birth.**					

Key: MEN- Multiple endocrine neoplasia, VHL- von Hippel-Lindau, SDH- mutations in the succinate dehydrogenase gene complex

5.4.2 Appointment attendance per year

From 2015 to 2017 (Table 5.2.), there was an attendance rate of 83.27% (95% CI, 80.37% to 85.63%), thus an overall non-attendance rate of 16.73% (95% CI, 13.43% to 18.57%). Overall, there was a decrease in total patient appointment attendance between 2015 and 2017. From 2015 to 2016, attendance dropped by 1.27% (from 88.42% to 87.15%), whilst from 2016 to 2017, a larger drop of 10.76% (from 87.15% to 76.39%) was observed. Differences are noted across the three clinics (Table 5.2). In 2015, VHL (95% CI, 85.09% to 100.91%) and SDH clinic patients (95% CI, 87.07% to 98.93%) attended 93.00% of their appointments, while MEN patients attended the fewest appointments at 82.28% (95% CI, 73.53% to 90.47%). In 2016, VHL patients attended most of their appointments at 91.49% (95% CI, 82.82% to 99.18%), with SDH patients having attended the least appointments at 83.67% (95% CI, 75.56% to 90.44%). However, in 2017, VHL clinic patients had the least percentage of appointment attendance at 53.45% (95% CI, 40.16% to 65.84%) compared to MEN patients in 2017, who attended 88.19% (95% CI, 82.35% to 93.65%) of their appointments. Over the three-year period, there was an increase in the percentage of appointment attendance by MEN clinic patients; however, for the SDH clinic patients, there was a decrease in the percentage of appointment attendance. There was also a decrease in the percentage of appointment attendance of VHL clinic patients, with a notable 38.04% drop (from 91.49% to 53.45%) in attendance from 2016 to 2017.

Table 5.2. Clinical data/patient appointment attendance of VHL, MEN and SDH clinics from 2015 to 2017.

Year	Diagnosis/clinic	No. of appointments offered (n)	No. of appointments attended (n)	Attendance per clinic (%) (95% Confidence Interval)	Total attendance per year (%) (95% Confidence Interval)
2015	**MEN**	79	65	82.28% (73.53% to 90.47%)	88.42% (83.38% to 92.62%)
	VHL	40	37	93.00% (85.09% to 100.91%)	
	SDH	71	66	93.00% (87.07% to 98.93%)	
2016	**MEN**	143	126	88.11% (83.67% to 93.33%)	87.15% (82.12% to 90.88%)
	VHL	47	43	91.49% (82.82% to 99.18%)	
	SDH	98	82	83.67% (75.56% to 90.44%)	
2017	**MEN**	127	112	88.19% (82.35% to 93.65%)	76.39% (71.21% to 80.79%)
	VHL	58	31	53.45% (40.16% to 65.84%)	
	SDH	120	90	75.00% (67.25% to 82.75%)	
Total for the years 2015 to 2017 (n)		783	652	Overall attendance for the years 2015 to 2017 (%)	83.27% (80.37% to 85.63%)

Key: see Table 5.1.

5.4.3 Overall appointment attendance for each of the clinics for the combined years of 2015, 2016 and 2017

The total patient appointment attendance for each of the separate screening clinics for the combined years of 2015, 2016 and 2017 is presented below in Table 5.3. The highest rate of attendance was observed for the MEN clinic patients at 86.82% (95% CI, 82.36% to 89.64%), and the VHL clinic patients had the lowest rate of attendance at 76.55% (95% CI, 69.05% to 82.95%).

Table 5.3. Total patient appointment attendance for each of the VHL, MEN and SDH clinics from 2015 to 2017.

Diagnosis/clinic	**No. of appointments offered (n)**	**No. of appointments attended (n)**	**Total combined attendance per clinic the years 2015, 2016 and 2017 (%) (95% Confidence Interval)**
VHL	145	111	76.55% (69.05% to 82.95%)
SDH	289	238	82.35% (77.57% to 86.43%)
MEN	349	303	86.82% (82.36% to 89.64%)

Key: see Table 5.1

5.4.4 Demographics of low/high appointment attenders for each of the clinics for the combined years of 2015, 2016 and 2017

Patient demographics between missed appointment groupings for each of the separate screening clinics for the combined years of 2015, 2016 and 2017 are presented in Tables 5.4a and 5.4b. below. Overall, 67.36% (95% CI, 61.60% to 72.40%) of individuals have the status of 'Never' missing an offered/ scheduled appointment at the Barts endocrine screening clinics (Table 5.4a).

In regards to each of the different Barts endocrine screening clinics (Table 5.4b), the majority of patients were found to be high attenders by having the appointment status of 'Never' missing any of their offered appointments; with 70.19% (95% CI, 61.19% to 78.81%) of the MEN patient group (Table 5.4bi), 53.85% (95% CI, 39.43% to 66.57%) of the VHL patient group (Table 5.4bii) and 70.37% (95% CI, 62.27% to 77.73%) individuals of the SDH patient group (Table 5.4biii) never missing of their offered appointments. The highest frequency of 'Never' missed appointments status was among the SDH patient group at 70.37% (95% CI, 62.27% to 77.73%), whilst the lowest frequency of 'Never' missed appointment status was among the VHL patient group at 53.85% (95% CI, 39.43% to 66.57%). As for the highest frequencies of 'Low' 30.77% (95% CI, 17.54% to 42.46%) and 'Medium' 15.38% (95% CI, 5.29% to 24.71%) individuals missed appointment status this was found amongst the VHL patient group. Regarding low attenders, as in those with 'High' status of missing appointments, those were found at a very low frequency in the SDH patient group with 1.48% (95% CI, -0.68 to 2.68%), closely followed by the MEN patient group at 0.96% (95% CI, -1.00% to 2.83%).

Regarding age range, the highest frequency of 'Never' missed appointment status (high attenders) was among patients aged 45-64 years at 50.00% (95% CI, 33.67% to 66.33%) in the MEN clinic group, however, aged between 25-44 years if part of the VHL at 39.29% (95% CI, 20.93% to 57.07%) as well as the SDH patient group at 35.79% (95% CI, 25.41% to 44.59%). Whilst the lowest frequency of 'Never' missed appointment status was amongst patients aged 15-24 years at 0.00%, also in the MEN clinic group. The highest frequencies of 'Low' missed appointment status was amongst SDH patients aged 25-44 years at 43.75% (95% CI, 25.85% to 60.15%). As for the highest frequency of 'Medium' appointment status was amongst VHL patients aged 15-24 years at 50.00% (95% CI, 15.35% to 84.65%) and MEN patients aged 45-64 years at 100% (% (95% CI, 100.00% to 100.00%). In regards to 'High' frequency of missed appointments (low attenders), this status was present amongst patients aged 25-44 years at 50.00% (95% CI, -19.30% to 119.30%) and 45-64 years at 50.00% (95% CI, -19.30% to 119.30%), both in the SDH clinic group.

In relation to gender, the highest frequencies of 'Never' missed appointment status

were amongst males in the VHL patient group at 67.86% (95% CI, 49.58% to 84.42%), followed by males in the MEN patient group at 61.65% (95% CI, 49.81% to 72.19%). Whilst amongst the SDH group, the 'Never' missed status, females have a slightly higher frequency of never missing an appointment at 51.58% (95% CI, 40.95% to 61.05%) in comparison to males amongst the SDH group at 48.42% (95% CI, 37.95% to 58.05%).

In sum, high attenders ('Never' status) were SDH clinic patients, aged between 45-64 years and male. Low attenders ('High' status) were likely to be SDH or MEN patients, aged between 25-44 or 45-64 years and be female. As for the reported confidence intervals (CIs), at points they are considered to be very wide, as noted by Schünemann et al. (2019).

Table 5.4a. Total missed appointment groupings overall for the Barts endocrine screening clinics from 2015-2017

Missed appointment category	**MEN, SDH & VHL clinics n=291 (100%) individuals on file** n (%, 95% Confidence Interval)
Never	196 (67.36%, 61.60% to 72.40%)
Low	68 (23.37%, 18.16% to 27.84%)
Medium	24 (8.25%, 4.88% to 11.12%)
High	3 (1.03%, -0.14% to 2.14%)

Table 5.4bi. Patient individuals' demographics between missed appointment groupings for the MEN clinic from 2015 to 2017. Missed appointment category was determined as the rate of missed appointments over the 3-year period, as follows:
Never, 0; Low, 1; Medium, 2; High, > 2. Data are n=individuals (%, 95% Confidence Interval)

Missed appointment category	**Never**	**Low**	**Medium**	**High**
MEN diagnosis/clinic				
MEN n=104	**73 (70.19%, 61.19% to 78.81%)**	**20 (19.23%, 11.46%to 26.54%)**	**10 (9.62%, 0.04% to 15.77%)**	**1 (0.96%, -1.00% to 2.83%)**
***Age (years)** MEN n=48 -*Excluding n=56 missing d.o.b.				
Under 1; no one registered under the age of 1 on file				
1-14	2 (5.56%, -1.80% to 13.80)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
15-24	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
25-44	11 (30.56%, 15.03% to 44.97%)	3 (30.00%, 1.60% to 58.40%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
45-64	18 (50.00%, 33.67% to 66.33%)	4 (40.00%, 9.64% to 70.36%)	2 (100.00%, 100.00% to100.00%)	0 (0.00%, 0.00% to 0.00%)
65+	5 (13.89%, 2.67% to 25.33%)	3 (30.00%, 1.60% to 58.40%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
Gender				
Male	45 (61.65%, 49.81% to 72.19%)	9 (45.00%, 23.20% to 66.80%)	6 (60.00%, 29.64% to 90.36%)	0 (0.00%, 0.00% to 0.00%)
Female	28 (38.36%, 26.87% to 49.13%)	11 (55.00%, 33.20% to 76.80%)	4 (40.00%, 9.6% to 70.36%)	1 (100.00%, 100.00% to 100.00%)

Key: see Table 5.1.

Table 5.4bii. Patient individuals' demographics between missed appointment groupings for the VHL clinic from 2015 to 2017. Missed appointment category was determined as the rate of missed appointments over the 3-year period, as follows:
Never, 0; Low, 1; Medium, 2; High, > 2. Data are n=individuals (%, 95% Confidence Interval)

VHL diagnosis/clinic				
Missed appointment category	**Never**	**Low**	**Medium**	**High**
VHL n= 52	**28 (53.85%, 39.43% to 66.57%)**	**16 (30.77%, 17.54% to 42.46%)**	**8 (15.38%, 5.29% to 24.71%)**	**0 (0.00%, 0.00% to 0.00%)**
Age (years)				
Under 1; no one registered under the age of 1 on file				
1-14	3 (10.71%, -1.10% to 21.11%)	2 (12.5%, -3.92 to 27.92%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
15-24	5 (17.86%, 3.19% to 30.91%)	6 (37.5%, 13.34% 60.66%)	4 (50.00%, 15.35% to 84.65%)	0 (0.00%, 0.00% to 0.00%)
25-44	11 (39.29%, 20.93% to 57.07%)	6 (37.5%, 13.34% to 60.66%)	3 (37.50%, 3.54% to 70.46%)	0 (0.00%, 0.00% to 0.00%)
45-64	6 (21.43%, -2.80% to 14.80%)	2 (12.5%, -3.92% to 27.92%)	1 (12.50%, -10.52% to 34.52%)	0 (0.00%, 0.00% to 0.00%)
65+	3 (10.71% -1.11% to 21.11%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
Gender				
Male	19 (67.86%, 49.58% to 84.42%)	10 (62.50%, 38.22% to 85.78%)	5 (62.50%, 28.36% to 95.64%)	0 (0.00%, 0.00% to 0.00%)
Female	9 (32.14%, 14.72% to 49.28%)	6 (37.50%, 13.34% to 60.66%)	3 (27.50%, -3.76% to 57.67%)	0 (0.00%, 0.00% to 0.00%)

Key: see Table 5.1.

Table 5.4biii. Patient individuals' demographics between missed appointment groupings for the SDH clinic from 2015 to 2017. Missed appointment category was determined as the rate of missed appointments over the 3-year period, as follows:
Never, 0; Low, 1; Medium, 2; High, > 2. Data are n=individuals (%, 95% Confidence Interval)

SDH diagnosis/clinic				
Missed appointment category	**Never**	**Low**	**Medium**	**High**
SDH n=135	**95 (70.37%, 62.27% to 77.73%)**	**32 (23.70%, 15.90% to 30.10%)**	**6 (4.44%, -4.00% to 7.31%)**	**2 (1.48%, -0.68 to 2.68%)**
Age (years)				
Under 1; no one registered under the age of 1 on file				
1-14	9 (9.47%, 3.60% to 15.40%)	5 (15.63%, 2.63% to 27.37%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
15-24	8 (8.42%, 2.82% to 13.97%)	1 (3.13%, -2.91% to 8.91%)	2 (33.33%, -4.62% to 70.64%)	0 (0.00%, 0.00% to 0.00%)
25-44	34 (35.79%, 25.41% to 44.59%)	14 (43.75%, 25.85% to 60.15%)	2 (33.33%, -4.62% to 70.64%)	1 (50.00%, -19.30% to 119.30%)
45-64	30 (31.58%, 21.70% to 40.30%)	10 (31.25%, 14.98% to 47.02%)	2 (33.33%, -4.62% to 70.64%)	1 (50.00%, -19.30% to 119.30%)
65+	14 (14.74%, 7.02% to 20.98%)	2 (6.25% -2.9% to 14.23%)	0 (0.00%, 0.00% to 0.00%)	0 (0.00%, 0.00% to 0.00%)
Gender				
Male	46 (48.42%, 37.95% to 58.05%)	14 (43.75%, 25.85% to 60.15%)	2 (33.33%, -4.62% to 70.64%)	1 (50.00%, -19.30% to 119.30%)
Female	49 (51.58%, 40.95% to 61.05%)	18 (56.25%, 38.80% to 73.20%)	4 (66.67%, 28.10% to 103.90%)	1 (50.00%, -19.30% to 119.30%)

Key: see Table 5.1.

5.4.5 Appointment attendance in relation to patient demographic

A Poisson regression was fitted to explore which of the predictor variables, age, gender or diagnosis, has a statistically significant effect on clinic appointment attendance. Table 5.5 presents the interpretation of the Poisson regression in terms of incidence rate ratios rounded up (see Appendix 5.6 for the exact Stata table-Poisson regression output).

Table 5.5. Poisson regression Stata output in terms of incidence rate ratios

Attended[a]	**IRR**[b]	**Std. Err.**[c]	**z**[d]	**P>z**[d]	**(95% Confidence Interval)**[e]
Age	1.002	0.00	0.69	0.49	(1.00 -1.01)
Gender					
Female	1 (base)				
Male	1.04	0.09	0.39	0.70	(0.87 -1.24)
Diagnosis					
MEN [h]	1 (base)				
SDH [i]	0.93	0.10	-0.72	0.47	(0.75- 1.14)
VHL [j]	0.87	0.11	-1.07	0.28	(0.67 - 1.13)
Intercept[f](possible appointments)	0.81	0.13	-1.26	0.21	(0.59 - 1.12)
	1 (exposure) [g]				

Key:
a. Attended= Response variable in the Poisson regression. Underneath 'Attended' are the predictor variables.
b. IRR = Incidence rate ratios for the Poisson model.
c. Std. Err = The standard errors of the individual regression coefficients.
d. z/ P>z = The test statistic and p-value, respectively.
e. 95% Confidence Interval = The CIs for the rate ratio.
f. Intercept= Indicates the number of times appointment attendance could have occurred.
g. exposure= The option exposure imposes STATA to restrict the coefficient of ln(logexposure) to be 1.
h. MEN= Multiple endocrine neoplasia.
i. SDH= Mutations in the succinate dehydrogenase gene complex.
j. VHL= von Hippel-Lindau.

Male patients compared to female patients while holding the other variables in the model constant, are expected to have a rate 1.04 (95% CI, 0.87 to 1.24) times greater for appointment attendance, a statistically non-significant result (p= 0.70). Compared to the MEN clinic patients, the attendance rate of SDH clinic patients would be expected to decrease by a factor of 0.93 (95% CI, 0.75 to 1.14), a statistically non-significant result (p= 0.47), while holding all other variables in the model constant. Compared to MEN clinic patients, the attendance rate of VHL clinic patients would be expected to decrease by a factor of 0.87 (95% CI, 0.67 to 1.13), a statistically non-significant result (p= 0.28), while holding all other variables in the model constant. For a one-year increase in age, the attendance rate would be expected to increase by a factor of 1.00 (95% CI, 1.00 to 1.01), a statistically non-significant result (p= 0.49).

In summary, older patients, male patients and MEN clinic patients are expected to attend more clinic appointments. However, no patient demographic predictor/independent variables had a statistically significant effect on the patient appointment attendance response/dependent variable. The resulting confidence intervals (CIs) reported are approximately between 0.50 to 1.10, hence these intervals are considered very wide, as stated by Schünemann et al. (2019).

5.5 Discussion

5.5.1 Overview

This retrospective cohort study aimed to describe the demographic characteristics distribution of the patient cohort and clinic appointment attendance, as well as to examine which of the predictor variables has a statistically significant effect on appointment attendance. To our knowledge, this was the first investigation that concurrently examined patient demographic characteristics in relation to appointment attendance of the three (VHL, MEN and SDH) Barts endocrine screening clinics over three years. The study's findings pertaining to the research objectives are discussed below in relation to the literature.

5.5.2 Patient demographic characteristics

The finding that the total number of the patients registered at the Barts endocrine screening clinics increased per year from 2015 to 2017 may be a reflection of the increased number of referrals to the screening clinic or the success of early childhood detection by genetic testing, which has transformed the management of these inherited syndromes (Johnston et al., 2000). Another possible explanation for the increase may be that a single medical screening examination does not guarantee the absence of a rare hereditary endocrine syndromes, as the first evidence of a syndrome may develop later in life (The VHL Family Alliance, 2012); therefore, the increased numbers of patients registered over the years could be the result of the relatives of diagnosed patients being referred to the clinic due to the hereditary aspects of the rare endocrine diagnoses. Moreover, the increase in the numbers could be a reflection of the improved surveillance capabilities of persons utilising the extensive application of molecular diagnostics, as discussed by Maher et al. (2011) and Decker et al. (2014).

On the subject of gender distribution, the male to female ratio for the 2015 demographic characteristics profile was approximately 50:50. The close ratio of gender distribution in the year is similar to studies which discussed how the three rare endocrine syndromes, SDH, MEN and VHL, affect both genders with equal frequency (Neumann and Zbar, 1997; Romei et al., 2012; Welander et al., 2011). Therefore, this cohort is generally characteristic of what would be expected for gender distribution for the three endocrine syndromes. The differences across the years and diagnoses could be explained by the literature. For instance, the gender distribution in the diagnostic groups observed in 2016 and 2017, which displayed a lower ratio of males to females, may be interpreted by the contrasting patterns of referrals as well as the different responses by male and female patients, as highlighted by Hon et al. (2002).

The differences in age distribution for the different diagnostic/clinic groups across the years (Table 5.1) may express the mean age of onset of the syndromes outlined by previous studies for each of the rare endocrine syndromes: for MEN, presentation

was the highest at 36 years (Wells et al., 2013), for SDH, presentation was 35.7 years (Burnichon et al., 2009) and the mean age for VHL was the lowest at 26.3 years (Maher et al., 1990). It is interesting to note that the VHL clinic patients had the lowest maximum age range compared to the other clinics; the oldest VHL patient was 70 years in the 2015 clinic. This finding could be attributed to the reduced life expectancy reported for VHL compared to the other two endocrine syndromes (Wilding et al., 2012). Furthermore, the low numbers of VHL clinic patients (Table 5.1) across the years, in comparison to the other two clinics, may be an indication of the severity/high mortality rate of VHL compared to the SHD and MEN endocrine syndromes, thereby mirroring the findings of Couch et al. (2000), who demonstrated that VHL patients with genetic changes will almost inevitably develop tumours.

In contrast to earlier findings concerning life expectancies for MEN and SDH clinic patients, the mean age of death for MEN patients was stated to be 55-60 years old (Norton et al., 2015), while SDH life expectancy was reported to be at 56-57 years old (Kantorovich et al., 2010). However, as a result of this descriptive analysis of the Barts endocrine screening clinics cohort, it was established that the maximum age across the three years for patients at the MEN and SDH clinics is over 80 years old. The presence of patients in that maximum age group suggests that screening programmes may be beneficial for diminishing risk of further clinical manifestations (Davies, 2018). However, while it is promising to see patients in this older age group, the reasons for their survival cannot be confirmed without further research.

5.5.3 Clinic appointment attendance

The results demonstrated that patient appointment attendance over the three -year period (from 2015 to 2017) was 83.27%. In regards to non-attendance rates, this increased over the stated three-year period, with an overall non- attendance rate of 16.73%. This reflects the clinical impression that non-attendance was needing some attention.

As reported by the Department of Health, during the period from 1996 to 1997, the national average non-attendance rate for outpatient clinics in the United Kingdom

was 12% (Committee of Public Accounts, 1995; Murdock et al, 2002). In this current study, the overall outpatient appointment non-attendance rate was 16.73%, which is not exceptional in comparison to the national average but is not ideal; since missing appointments can still act as a moderate barrier to the optimal provision of genetic health services, as debated by Humphreys et al. (2000).

Exceptional demands on these patients, such as having to take a full day to attend the clinic and arranging time off work, may be an explanation why some struggle to attend appointments. Travelling some distance, as the clinic has a national/international catchment area, although unsubstantiated may also be a factor on attendance. As it has been noted that traveling to and from a medical centre can be a burden to some individuals (Cheng and Levy, 2017), along with the duration of the commute to the medical centre and the form of transportation (ibid). Further, some issues which have been raised in relation to rare syndromes which may influence attendance, includes patients and families facing hidden costs (both financial and psychological) regarding the management of care as well as the challenge of receiving coordinated care (Genetic Alliance UK, 2016)

It has been reported that up to 50% of non-attenders in an outpatient clinic described forgetting their appointment or not knowing about it (Pal et al., 1998); due to the long-term treatment of the rare endocrine syndromes and the Barts endocrine screening clinics dates being spaced out, forgetfulness may indeed account for the decreased appointment attendance over the years. This suggests there is a need to remind patients of their clinic appointments in advance (Dockery et al., 2001). For example, it has been demonstrated that last-minute short message service (SMS) reminders and booking appointments no more than six weeks in advance may be more productive and cost-effective to reduce non-attendance (Milne, 2010). An alternative reason for the decrease in attendance may be due to long-term psychological issue, as endocrine syndromes are thought to be possibly associated with a wide range of psychological symptoms such depression and anxiety (Sonino et al., 2015). Thereby, some patients may find it difficult to cope with the psychological factors, as aspects of life expectancy may remind them of how vulnerable they are.

It was also found that overall, MEN clinic patients attended the most appointments, with a non-attendance rate of 13.18%. Although this was still above the 12% national average non-attendance rate for outpatient clinics in the United Kingdom (Committee of Public Accounts, 1995; Murdock et al, 2002), it is lower than the average no show-rate of 23% reported in a recently published systematic literature review (Dantas et al., 2018). This reinforces the need to understand the experience of patients and what makes attendance more or less likely.

5.5.4 Patient demographics between missed low and high attenders

As noted above overall patient appointment attendance over the three-year from 2015 to 2017 was 83.27%. Moreover, in regards to individual low/high attenders, the results indicated that the majority of the patients from each of the different Barts endocrine screening clinics were high attenders, as they were amongst the status of 'Never' missing any of their scheduled/offered appointments over the three-year period at 67.36%. As such, most of the individuals being high attenders possibly supports the implication in the literature that genetic patient clinic patients who do attend consider their visit to the clinics to be more important, in comparison to those who do not attend (Humphreys et al., 2000). Moreover, the majority of patients at the Barts endocrine clinics 'Never' missing an appointment may convey that those individuals are aware of the significance of attending screening sessions; as prior research found that perceived urgency of clinic visits to be significantly linked with compliance (Barron,1980). In relation to Williamson et al. (2017) analysis criteria which was deemed appropriate to use, Williamson et al. (2017) study is somewhat comparable to this thesis population; in that as it was also demonstrated in Table 5.4a above, that during a 3-year period just over 60 % (67.36%) individuals never missed an appointment at the Barts endocrine screening clinics

The lower frequency of the VHL patients' group of being amongst the 'Never' status of missing an appointment is notable, as previously stated VHL patients will almost inevitably develop tumours (Couch et al.,2000). Moreover, the lower frequency of VHL patients amongst the 'Never' status of appointment attendance (amongst high attenders) over the three-year period suggests possible long-term poor attendance

of that particular patient group. This result agrees with the finding of a study that stated that VHL mutation-carriers demonstrated poor adherence to long-term tumour surveillance (Rasmussen et al., 2010). Such lower frequency of VHL appointment attenders may be due to the diverse range of VHL specific experience reported in the literature; this includes continued uncertainty regarding future tumour development, as well as difficulties when communicating with others about VHL (Kasparian et al., 2015). Interestingly, the patients aged between 25-44 and 45-64 years, in regards to the SDH group, were found in this study to be both high and low appointment attenders; thereby conveying some ambiguity in relation to the literature suggesting a possible association between age and appointment attendance. This finding of patients aged between 25-44 and 45-64 years being both high and low appointment attenders, is in accordance with Hardy et al. (2001), which discussed that appointment non-attendance occurs in all age groups.

Conversely, in regards to low appointment attenders, the low frequency of patients amongst the 'High' missed appointment status across the three screening clinics (with only two SDH patients and one MEN patient with high status of missing appointments) indicates that most patients did not miss more than two of their offered appointments. Thus, the high frequency of appointment attendance by the Barts endocrine screening clinic patients may be indication of the benefits of the 'one-stop shop'; the benefits of 'one-stop' shops are highlighted in a study where more patients attended their screening appointments at a single appointment one-stop clinic in comparison to multiple appointments at ad hoc clinics (Fraser et al., 2007). The authors ultimately expressed how an optimum screening service is based on one-stop clinics offering regular inclusive surveillance and psychological support (ibid).

Regarding the specific individuals' demographics of low appointment attenders, for instance those amongst 'High' status of missed appointments, the findings convey that patients, as stated, are marginally likely to be part of the SDH patient group, aged between 25-44 or 45-64 years and female. The stated finding in relation to the age range of individuals amongst the 'High' status, thus low attenders, slightly conflicts with Ellis et al. (2017) which found that patients in the age groups 16–30 years and older than 90 years were more likely to miss multiple appointments, however this study

was at a general practice. Moreover, patients in this study aged between 25-44 and 45-64 years who missed multiple appointments are classed at 'middle/older adulthood' and 'average retirement age' in accordance with the United Nations guidelines (United Nations, 1982); this finding contradicts previous research which discussed how younger adults are more likely to miss a higher proportion of appointments (Ellis and Jenkins, 2012). Possible explanations in the literature for those individuals aged between 25-44 and 45-64 years who were amongst the 'High status', includes suggestions that family obligations and work could be significant reasons for missing scheduled outpatient appointments (Ofei-Dodoo et al., 2019). As for the high frequency of appointment attendance by younger patients, this may be due to the possible influence of parents' beliefs on attendance (Cameron et al., 2014).

Regarding the gender of low and high appointment attenders, as noted males were determined to be high attenders (amongst the status of 'Never' missing an appointment) for two of the clinics of the MEN clinic group and the VHL clinic group. However, for the SDH clinic group, females had a slightly higher frequency of 'Never' missing an appointment. This finding of males being higher appointment attenders for the VHL and MEN clinics supports Ellis et al. (2017) study which suggests that females are more likely to miss multiple appointments. Reasons in particular for women to miss appointments that are highlighted in the literature includes: lack of transportation, presence of an unwell child or relative, scheduling issues and forgetfulness (Campbell et al., 2000). As for females attending slightly more SDH appointments in comparison to males, factors shown to be connected with imaging appointment non-attendance included being male, as it was shown that males were 1.57 times less likely to attend their appointment than females (Mander et al., 2018). Thus, in relation to gender and low/high attenders, there is some ambiguity. Such ambiguity is reflected in several studies which have concluded that the gender of the patient does not have an impact in the probabilities of no-shows (Shrestha et al., 2017; Daye et al., 2018).

With respect to some of the very wide reported confidence intervals (Tables 5.4a and 5.4b), this has been noted to indicate that there is little knowledge about the effect, and thus more information is required (Schünemann et al., 2019). Moreover, it has been expressed that larger studies are inclined to give more precise estimates

regarding the effects (and thus narrower confidence intervals) in comparison to a smaller study (ibid) such as this current one.

5.5.5 Clinic appointment attendance in relation to patient demographic characteristics variables

The incidence rate ratios estimated from Poisson regression, as previously highlighted, presented very wide CIs. It has been suggested that with small sample sizes, as in this study, CIs are relevant for examination since statistically significant differences are affected by sample size (Page, 2014). Wide intervals are said to demonstrate insufficient knowledge regarding the effect, and this imprecision affects the certainty in the evidence; therefore, further information is required before a more certain conclusion can be drawn (Schünemann et al., 2019).

Overall, the results were not significant and there was no size difference of note and CI were wide- while statistical significance has been questioned and researchers urged to consider the size of difference, in this Study 1 neither were of note. In relation to the non-significant results, as discussed by Schünemann et al. (2019), this is commonly interpreted as evidence that the patient key demographic characteristics has no effect on the outcome (appointment attendance); however, an alternative interpretation is that there is a high probability that the observed effect on the outcome is a result of chance alone (ibid). Statistical significance has been thought to be synonymous to clinical importance (Du Prel et al., 2009), but it has been debated that due to the P-value being a dichotomous measure for the amount of evidence against a null hypothesis (i.e., a P-value near zero supplies greater evidence against the null hypothesis), it does not supply any information regarding the clinical importance of a research finding (Aarts et al., 2012). Consequently, it has been deliberated by Sterne and Smith (2001) that medical research cannot advance if the results are interpreted using the precise difference between significance or non-significance. Aarts et al. (2012) argues that researchers should be more concerned with the size of the observed result rather than if the result is statistically significant.

Contrary to what has been previously reported (Ellis et al., 2017), this study has been unable to demonstrate that women were more likely to attend appointments than men. This result is more in line with an earlier study by Sims et al. (2012), which found that gender was not a substantial predictor of attendance at an outpatient clinic in London. One potential influence could be the encouragement of family members; Rasmussen et al. (2010) demonstrated this by discussing that most family members with VHL mutations were likely to take the same attitude towards long-term screening surveillance. Thus, if the majority of the same family attend screening, this may encourage other members of the family to attend. This explanation may also relate to MEN clinic patients, with the highest appointment attendance of 86.82% for the combined three years.

In this study, it was found that for a one-year increase in age, the appointment attendance rate is expected to increase by a factor of 1.00 (95% CI, 1.00 to 1.01), however not a statistically significant result. The effect of age on appointment attendance has been expressed in prior research, which stated that younger patients are more inclined to miss a higher proportion of appointments (Sharp and Hamilton, 2001; Costa el al., 2010), however this result was not found in this study. There have been several explanations put forward to explain the positive association between attendance and older patient ages; for instance, it has been theorised that older people had fewer contesting commitments compared to younger people (Parikh et al., 2010). While this did not hold in this study and is not clear, thus it requires further investigation.

5.5.6 Limitations and strengths

Retrospective cohort studies have their advantages and disadvantages (Hammoudeh et al., 2018). They are time efficient and economical on account of the data that has been collected previously and is available for analysis (Euser et al., 2009). Nevertheless, retrospective cohort studies use information that has been collected for another purpose other than that of the present study (ibid). The

fundamental disadvantage of this study design is the limited control that the researcher had over data collection (Song and Chung, 2010). While the data provided was taken from clinical records, thus could have been inaccurate and as was demonstrated at times incomplete (Hulley et al., 2001).

The data provided was collected as part of routine clinical data, and not for the purpose of research as stated; therefore, how the data was collected and checked, and the accuracy, cannot be confirmed and thus potentially impacting the robustness of the conclusion that can be drawn. Some of the difficulties with acquiring such data for this study, which was not collected for research purposes, is that the individuals who did not attend on their originally offered appointment that day/time, some of whom could have been able to rebook (the data for this was not available), thus, it could be regarded in some cases that the 16.73% of non-attendance may possibly be an overestimation. The use of routinely collected patient data for research and other purposes has been debated for its strengths and limitations; information technology has allowed high volumes of data to be available even if its presentation is chaotic, thereby limiting its value (de Lusignan and Mimnagh, 2006). Such, incomplete data provision, as discussed by de Lusignan and Mimnagh (2006), was mirrored in this study. Nevertheless, due to the immediate availability of the data, this study design is relatively less costly and quicker than prospective cohort studies (Song and Chung, 2010).

Moreover, the limitations of the sample size/inadequate power are acknowledged, due to the small sample size of the dataset for this study; it has been suggested by Weaver et al. (2015) that a larger dataset may yield different results. Possible factors that have may have contributed to why none of the patient variables/demographic characteristics had a relationship with appointment attendance, is that the dataset was underpowered. This is supported by the Genetic Alliance UK (2016), who noted significant limitations associated with existing datasets for rare syndromes, as it was expressed that datasets are unlikely to be sufficient in order to collect the full range of relevant information that was required for their specified study. A possible countermeasure for future studies could be to include data from other similar centres which carry out screening for rare endocrine syndromes, such as stated centre located

in the Leeds Teaching Hospital. For instance, the VHL clinic Leeds data would be added to the overall sample size, but the total size would likely to continue to be small, due to the nature of syndrome affecting a small number of the population. Moreover, future studies could be designed at an international level. However, other factors may come into play, for instance, insurance systems are likely to have an impact and the results consequently would not be generalisable, or indeed potentially relevant to any particular context.

It is also worth considering that other factors may be important to consider. For example, economic deprivation, given that some authors have suggested that those from lower socioeconomic status (Barron,1980) or those who are on receipt of long-term welfare payments (Wolff et al., 2019) were less likely to attend appointments
A further issue is the level of missing data. This was particularly noted regarding patient ethnicity and address, which were not provided but have been noted as potential predictors of attendance in the literature. There was limited access to variables, such as addresses as noted, which would have been of interest but were not routinely collected. In addition, the data provided required a substantial effort to clean, combine and analyse. Further, the lack of data and missing aspects, made the use of this data for research somewhat limited.

Following Mitchell and Selmes (2007), who described age (years) and gender (male/female) as examples of key predictors of non-attendance levels, such possible dependent variables were available for each patient. However, some factors of possible relevance also highlighted by Mitchell and Selmes (2007), which were not recorded consistently or routinely at the clinic; these included socioeconomic status, concurring with Barron (1980), and distance of the patient's place of residence from the clinic. Furthermore, as expressed, ethnicity information was also not available in the records given; this may be because gathering this information is not part of their routine processes, or it was reported but was not in the data that the researcher could access. Moreover, ethnicity may not have been reported because the three different rare endocrine disorders are seen in all ethnic groups (Couch et al., 2000; Moore and Zaahl, 2010; Andrews et al., 2018).

The main strength of this study is that the data used comprised the diagnostic/ demographic characteristics and attendance information, all of which was recorded in the patient record at the time of the consultation by a health professional and therefore did not rely on a patient self-report or recall.

5.5.7 Future work and implications

Further research is needed to determine what variables characterise patients who miss appointments. This can include analysis of patient engagement patterns of other healthcare usage (Williamson et al., 2017) that may be related. Moreover, to further understand the impact on the current study's outcome, it would be useful to collect the following information: the patient distance from the clinic, socioeconomic status and ethnicity. This approach may develop a better understanding of who to target with optimised information in order to maximise clinic appointment attendance.

Regarding the topic of data quality, some of the main quality dimensions have been reported as completeness, accuracy and accessibility (Mashoufi et al., 2018). Customarily, data quality describes the degree to which the data suits its intended function, and fulfils the users' expectations (Sebastian-Coleman, 2013). As the quality assurance of the data in healthcare systems is an accentuation of the continuity of the quality of care (Wu et al., 2013), the technologies used in the clinic require complete and accurate data (Cuzzocrea et al., 2011). Regarding completeness, missing data accounted for 19.24% of cases, as it was age, an essential variable, the cases were not used in the regression model. With reference to accuracy, there is no reason to believe that the data provided were not accurate. As for accessibility, due to reasons of confidentiality and ethicality, the data could only be accessed by the researcher through a gatekeeper (see section *5.2.4*).

5.6 Conclusion

This study aimed to describe the distribution of patient demographic characteristics and clinic appointment attendance as well as to examine which patient demographic variables had a statistically significant effect on appointment attendance. The findings suggested that there was an increase in the total number of patients registered at the Barts endocrine screening clinics in the three-year period, and overall appointment attendance was at 83.27%. In regards to low/high attenders, this study indicated that high appointment attenders ('Never' status) were likely to be SDH clinic patients, aged between 45-64 years and males, in particular for the MEN and the VHL clinic group. Whilst low attenders ('High' status), although found at very low frequency, are likely to be SDH or MEN clinic patients, aged between 25-44 or 45-64 years and be female. While the study did not confirm that any of the key patient demographic characteristic variables had a statistically significant effect on appointment attendance, it did demonstrate that appointment attendance has decreased over the years. Due to the retrospective design of Study 1, it was not possible to identify the exact reasons for non-attendance.

As discussed, the Poisson regression analysis result of this Study 1 was that there were no significant differences between attenders/non-attenders by gender, age and diagnosis, this suggests that the reasons for attending/missing appointments are probably more individual. A major motive of undertaking this thesis project is the desire to help the rare endocrine clinic patients at the Barts endocrine screening clinics with such issues which may impact patient motivation to turn up for appointments. It has been expressed that appointment non-attendance is only partly explained by logistical issues (Brewster et al., 2020), as qualitative studies propose for instance, possible psychosocial factors are involved (ibid). Thus, there is need to discover those individual issues by speaking to patients about them, which is why patient interviews were conducted in the next study (Study 2).

The next chapter will present Study 2, where 12 semi-structured interviews were conducted in order to explore patients' experiences of and perceptions toward the regular screening of rare endocrine tumours at the Barts endocrine screening clinics.

Chapter 6

Study 2- Capturing the patient experience: A qualitative interview study of rare endocrine gene carriers individuals at the Barts endocrine screening clinics

6.0 Introduction

This chapter outlines the qualitative study used to explore and understand patients' experiences toward the regular screening of rare endocrine tumours at the Barts endocrine screening clinics. The aim of this study is given below, followed by a justification for the use of a qualitative approach with details on the epistemological and ontological positions which frame the chosen paradigm of the research in section 6.1. Sections 6.2 to 6.6 then detail the methods along with how the participants were recruited in preparation for the subsequent data collection and eventual data analysis. Section 6.6 examines reflexivity and ethical considerations, while the findings are provided in section 6.7 and lastly section 6.8 presents the discussion.

There is an increased desire for rigor in both the conducting and reporting of qualitative research (Dunt and McKenzie, 2012), as a result a set of reporting guidelines have been defined for qualitative studies (Clark, 2003). A number of criteria are listed by EQUATOR, an example being the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007). COREQ outlines a 32-item checklist; how these items on the COREQ checklist were addressed in regards to this study is detailed in Appendix 6.1. These criteria were used to guide the development and reporting of this chapter.

The results from Study 1 (Chapter 5) highlighted that although the majority of patients never missed an appointment, 16.73% of patients did fail to attend appointments at the Bart's endocrine screening clinics. Missed appointments are perceived as a moderate barrier to the optimal provision of genetic health services (Humphreys et al., 2000). Moreover, as demonstrated in Chapter 2, very little is known about what factors

may influence patients' decisions to attend or not to attend appointments, as well as the experience of attendance.

As a result, the focus of this study is to understand the individuals' perceptions and experience of the clinics – with the aim to identify factors that potentially enhance or detract from attendance and engagement with the Barts endocrine screening clinics.

6.1 Qualitative research

Qualitative research is an umbrella term (Mohajan, 2018) that refers to a range of research approaches and methodologies with the overall purpose of exploring the depth and meaning of a specific phenomenon. The experience of health cannot always be counted and estimated, qualitative methods have been described to answer such questions pertaining to experience, perceptive and meaning, usually from the viewpoint of the participant (Hammarberg et al., 2016). The objectives of this study focus on the meaning patients ascribe to their experience of the screening clinics, thus making a qualitative approach suitable.

Two theoretical approaches which have particular relevance to this study are constructivism and interpretivism and it is noted that they closely linked (Gray, 2013). Constructivism considers that truth and meaning are created by the individuals' interactions with the world, meaning reality is socially constructed not discovered (Mertens, 2005; Gray, 2013). Given this research is focused on a specific context, the screening clinic, considering this specific influence is relevant. While interpretivism also considers the creation of meaning it focuses more on how the participants make sense of themselves and their experience of phenomena, therefore this also resonates with the aim of understanding individual experience (Chilisa and Kawulich, 2012).

In the context of this study therefore, participants are conceived as constructing their own knowledge within the social structural context of the screening clinic, influenced by their previous knowledge and understanding. An insider's view is then articulated, allowing the researcher to make sense of what is being revealed. It should be noted, however, that each individual makes sense of reality differently due to their differing experiences. In demonstrating the various issues that arise within each individual

participant account, a wider aim is to try and look for commonalities as well as divergences, thus, illustrating how individuals make sense of the screening clinics (Pouliot, 2007). Such an approach is necessarily inductive in nature (Mohajan, 2018).

6.1.1 The role of the researcher in qualitative research

The researcher is considered part of the context and subsequently part of the research (Denzin and Lincoln, 2005,). It has been noted that it is difficult to separate the 'inquirer' from the 'inquired into' (Guba and Lincoln, 1989), for instance throughout the selection of questions as well as the interpretation of the data (Jacobs and Manzi, 2000). The active role the researcher has in the construction of knowledge is acknowledged, since their own interpretations of the data are a social construction. For that reason, it is important for the researcher to recognise their beliefs and experience, which can aid in the development of knowledge (Audi, 2003); in order to avoid treating their own accounts as material truth or concrete realities (Jacobs and Manzi, 2000). Thus, recognising the impact of the researcher's own background and experiences on the research becomes an important feature (Mackenzie and Knipe, 2006). As a consequence, reflexivity is maintained by the researcher in order to remain aware of how their views of social reality may impact on the construction of the data. In the following sections details on how these approaches were enacted within this study are detailed.

6.2 Sampling

6.2.1 Sampling strategy

This study used a purposive sampling strategy, which involved the deliberate non-random selection of specific participants due to the crucial information they may provide about their screening clinic experience (Bowling, 2009). All the interview participants had a rare endocrine diagnosis; the main aim was to include participants from each of the three clinics (VHL, MEN and SDH). The researcher actively kept the option open to invite participants, given findings from the literature regarding the

absence of their voice (Morel and Cano, 2017) – hence this was considered in the recruitment process and study information.

Sample size in qualitative research has been noted to be an area of conceptual debate and practical ambiguity (Vasileiou et al., 2018). It has been expressed that research samples should be large enough to ensure that all or most of the perceptions are disclosed, however, if the sample is too large data can become repetitive (Mason, 2010). Further, it has been recommended that qualitative studies require a minimum sample size of at least 12 in order to reach data saturation (Braun and Clarke, 2013). Thus, it appears there is no right or wrong approach in relation to sampling strategy, nevertheless, it was desired by the researcher to have some variety, but also the capacity to review the data in sufficient detail. Following a discussion with PhD supervisors and considering the small patient cohort from which participants could be recruited, the approach that was taken by the researcher was with respect to the idea of saturation and of a pragmatic decision. Hence, the aim was a sample size of 12 interview participants.

6.2.2 Inclusion criteria

- Patients registered at, and attending, the Barts endocrine screening clinic.
- Patents diagnosed with a rare endocrine syndrome (SDH/MEN/VHL).
- Capacity to provide informed consent or assent for children, as determined by use of English language.

6.2.3 Exclusion criteria

- The lack of capacity to consent/assent
- Issues of risk identified by the clinical team, such as upcoming surgical operation or other medical procedures.

6.2.4 Recruitment

6.2.4.1 Recruitment period

The interview participants were recruited from the Barts rare endocrine screening clinics, the recruitment period was between the 26th June 2018 and 6th September 2018.

6.2.4.2 Recruitment methods

Prior to approaching the potential interview participants, permission to carry out the study was sought from the appropriate ethics board. After full ethical approval was given, the Adult and Child Interview Patient information sheets (PIS) (as well as information sheet for parents where applicable) (Appendix 6.2) and consent/assent forms (Appendix 6.3) were provided to patients at the end of clinic appointments. The researcher did not approach those patients whom the clinician felt it was not appropriate to invite, for instance they may be due for surgery.

At the end of their clinic appointment, the researcher approached each patient and explained the research study. Adult patients who expressed an interest in participation provided their phone number and were given a PIS and consent form to read in their own time. Patients who had expressed interest and provided contact information then received a follow up call from the researcher to answer further questions or to book an interview appointment. Other interested patients opted instead to contact the researcher themselves, when out of the clinic, by phone or email, to ask any questions or to express an interest in participating and booking an interview appointment. Consent was taken from the adult participants before the interview commenced.

In regards to children, separate PISs and assent forms were prepared for children aged 6 to 12 years, as well as for children aged between 13–15 years. Similarly, they were approached after their appointment, if they were interested in taking part the child asked their parent/carer to email or phone the researcher to ask any questions they would like. If they decided to participate, an interview appointment was made, whereby

informed written assent was taken from the child and informed written consent was taken from the parent/carer before the interview commenced.

6.3 Methods

6.3.1 Data collection: semi-structured interviews

The purpose of the data collection phase of the research was to focus on participants' experiences of the Barts endocrine screening clinics. Semi-structured interviews (SSIs) were chosen as the appropriate research method to gain insight into this. The data presented from SSIs provide knowledge and understanding by representing and expressing the nature and quality of the participants' experiences. SSIs allow a degree of freedom with regards to the content of the patient interviews, as they take an exploratory approach. SSIs have the advantage of being flexible in the order of questioning, along with the convenience of re-wording questions and allowing interviewees the option to spend less or more time on the questions (Robson, 2002). SSIs evoke the interviewee's views, in lieu of directing them towards preconceived choices. Due to the importance of the interview participants' interpretations of events, SSIs support the development and examination of an understanding of the essence of the interview participants' individual experiences within their particular context (ibid). By virtue of the nature of the SSI, particular questions were not delivered to all the interview participants; the interview structure was adaptable to permit responding to and following up points raised by the interviewee that may not have been expected.

The interview process commenced with an introduction to the intentions of the research (Bogdan and Knopp Biklen, 1998) as well as to assure participants of anonymity and confidentiality. Due to previous observations within the clinic, the researcher was not a stranger to the interviewees, therefore rapport building, which creates a platform and sets the tone for the interview (Srivastava, 2014), was already established. When conducting the interviews, it was essential to provide enough time for the interview participants to examine all the issues that could be raised. The researcher was required to be confident in the applicable interview strategies for initiating and sustaining the discussion. This could include the use of pauses and/or

probes. Furthermore, it was essential that distractions were kept to a minimum, therefore some consideration was made regarding the environment, however the actual location of the interview was ultimately at the interview participants' discretion.

6.3.2 Topic guide

An interview topic guide was designed for use in the SSIs (Appendix 6.4). Clinical preliminary observations together with the overarching thesis objectives were used to provide broad areas for the interview topic guide. Table 6.1 below summarises how various literature and preliminary clinical observations informed the development of the patient interview topic guide.

In addition, the background literature regarding the design of semi-structured interviews conveyed several factors that need to be addressed when constructing an interview topic guide (Robson, 2002). Seven questions, each with their own sub-questions, comprised the final topic guide. First, it was essential to formulate questions in an unbiased way, using language that potential interviewees would be comfortable with (Landrige, 2004). Furthermore, each of the questions were phrased in an open-ended manner, thereby allowing the interview participants to speak openly about their feelings and thoughts (Smith, 1995). Moreover, this allows the interviewer to develop questions which are responsive to each individual participant. In order to assist interviewees in further elaborating on a specific area of interest, probes were supplemented (displayed in brackets) alongside the question (DeJonckheere and Vaughn, 2019).

The order of the questions was considered using guidance from Robson (2002). This comprised of: an *introduction*, where the researcher introduced herself, restated the purpose of the interview, discussed confidentiality issues and asked permission to tape-record, answered any questions and obtained written consent forms before commencing the interview; a *warm-up*, involving asking non-threatening questions to facilitate interviewees into the main central portion of the interview; the *main body* of the interview, which covered the fundamental objective of the interview in a logical progression; and finally a *cool off*, which was employed to alleviate the intensity of the

interview with a few simple questions and *closure*, where the interview participant was thanked.

The topic guide was reflected upon beforehand in collaboration with the supervisors, an example of the process of evaluation of the preliminary interview topic guide (Kallio et al., 2016). This technique is thought to provide important information about the topic guide, for example removing ambiguities (Barriball and While, 1994). The procedure of reflection and constructing the interview topic guide included some redrafting. As recommended by Smith (1995), feedback on the questions' difficulty and wording was sought from PhD supervisors. As a result from the feedback, some minor changes were made to the wording of some questions and the topic guide was shortened. The final topic guide divided into sub-sections, taking up two pages; topic guides which are overtly long are said to be more likely to yield superficial, rather than in-depth, information (Arthur and Nazroo, 2003). In addition, the topic guide underwent expert review, where it was overseen by specialists at the screening clinic who are external to the research team, as advised by Chenail (2011).

The final topic guide was piloted. However, due to the challenge of accessing participants with rare syndromes, this was done within the supervisors and role play. A supervisor assumed the role of the participant and was interviewed by the researcher providing feedback and insight into how it feels to be interviewed. This outlined as an ethical way of conducting the research around sensitive topics (Chenail, 2011). It helped the researcher to build up her expertise and confidence and heightened her sense of personal knowledge around the interviewing process (Polanyi, 1958) or intuition, for instance, the crucial point of picking up hidden cues that reside within the body and through inference.

Table 6.1. Topics used for the topic guide and the rationale behind them.

Topic guide questions	Topic aim	Rationale behind the topic aim
1) Background	To gather background contextual information which may have a bearing on experiences and can be followed up and explored during interview.	- Collins et al. (2011) - From the clinical observations, it emerged that several family members have the same diagnosis. The intent was to discover if this has an any impact on their experiences at the clinic.
2) Recent experience as a patient at the Barts endocrine screening clinics	To capture spontaneous reflections on the most recent experience and which aspects were important to participant.	- Purcărea (2016) - Patients in the clinic display differing levels of satisfaction towards it, so it was considered worthy to further enquire into their overall impressions of the clinic.
3) Awareness of clinic services	To discover how patients understand the screening clinics.	- Bell et al. (2017) - The overall benefits of screening were well established in clinical observations, however patient awareness of what is available at the screening clinics was not clearly determined. Thereby, it was believed that asking the participants what they think is available, besides health screening, would highlight areas of lack of patient information.
4) Engaging with the screening clinics	To establish the manner in which patients make decisions about using the service.	- Ubel (2010) - In clinic, patients display a reliance on the medical staff for information. Details on how patients source information, in regards to their healthcare outside the clinic, may provide insight into their decision-making processes.
5) Utilising the service	To understand how patients go	- Bischoff et al. (2012)

	about using the screening clinics.	- Clinic observations revealed patient awareness of the timing of their next appointment at the clinic. Therefore, asking the interview participants of any routine actions when attending the clinic may provide an idea of how participants deal with upcoming appointments.
6) Overall experiences as a patient using the screening clinics	To understand the lived experiences of patients with a certain endocrine syndrome	- Garau (2016) - It has been noted that individuals with a rare diagnosis may face challenges such as a lack of support and information.
7) Suggestions for improvements	To obtain patients' suggestions for what would improve the Barts endocrine screening clinics and close the interview on a positive note.	- Gill et al. (2015) - In clinic, patients generally did not voice any apparent suggestions for improvement; this may be due to the lack of time in consultation as time is limited for each patient. Moreover, the clinical environment may not be conducive to freely discuss opinions and thoughts. Therefore, participants may feel more comfortable in sharing their opinions for improvement in the interview.

6.3.3 Process of the patient interviews

The twelve patient interviews were carried out from 4th July 2018 to 8th September 2018. The interviews were conducted in an area of the patient's choosing, where the participants felt most at ease in privacy, to ensure integrity of the individual (Salzmann-Erikson and Söderqvist, 2017), this was mostly at their home. Nine of the interviews were on a one-to-one basis; the other three under-18 interviewees were accompanied by a parent. To have the patient interview data captured more efficiently, digitally

recording the patient interviews was considered an appropriate choice so as to produce a verbatim transcript of the interview later (Jamshed, 2014). Each interview was anticipated to last a minimum of forty-five minutes, no longer than one hour (with a 15-minute rest break if requested by the participant); this has been suggested as an appropriate duration to produce a more involved and intense interview (Smith, 1995).

6.3.4 Staging of the interviews

Each of the twelve participant interviews involved six stages, as outlined by Legard et al. (2003).

-Stage one: arrival

As most of the interviews took place in the participants' home, the researcher assumed the role of a guest. Any conversation was conducted in a fairly polite manner; when the participant seemed comfortable and ready, the interview began. The successful management of this stage is acknowledged as being critical to the development of the connection first established whilst recruiting each interview participant, and ultimately to the success of the interview (Kvale, 1996; Legard et al., 2003).

-Stage two: introducing the research

The interview participants read and signed a consent and/or assent form (Appendix 6.3) before the interviews. Furthermore, they were asked to complete a short demographic data form (Appendix 6.5) before commencing the interview; this was to provide an overview of the interview participant details such as age, gender and diagnosis. Such demographic details may provide some important context in which to consider alongside the data provided, as discussed by Roberts et al. (2019).

Once the interview participant seemed at ease, the research topic was introduced. Each interview participant was reminded of the purpose of the research, confidentiality was re-affirmed, and permission was sought to audio-record the interview. As soon as the tape-recorder was switched on and the 'pleasantries' came to a natural end, the researcher worked through the interview topic guide.

-Stage three: beginning the interview

The opening questions for each interview participant were focused on background information, such as what and how long they had been diagnosed with the syndrome. It is recommended that this information be sought at an early stage because participants usually find that discussing familiar topics allows them to settle down (Holloway and Wheeler, 2002). Furthermore, it provides contextual information to aid the interviewer, thereby avoiding the interview flow being broken by asking for factual information later on (Legard et al., 2003). Techniques to encourage hesitant participants included showing an interest in what they were discussing through non-verbal means such as nodding and smiling encouragingly (Robson, 2002).

-Stage four: considerations during the interview

As each interview progressed, the interview participant was taken from a surface level of everyday conversation to a deeper level, focusing on the topics set out in the guide (Appendix 6.4), in addition to any new insights that may have emerged. If the responses to the initial questions regarding a specific topic lacked adequate detail, follow-up questions were asked. These questions are referred to as 'probes' and are worded in such a way as to explore, clarify and amplify the responses (Legard et al., 2003). Non-verbal prompts to evoke detailed information were also used; this included using eye contact, gestures and posture. The value of using pauses to obtain information was recognised and incorporated (Sorrell and Redmond, 1995).

-Stage five: ending the interview

Interview participants were informed of the end of the interview through the use of a phrase, for example 'ok last question'. On concluding the interviews, the voice recorder was turned off. The interview participants were then thanked for their time and asked how they felt after being interviewed about the topics, to ensure they were not affected by any of them. None of the interview participants communicated a requirement for 'debriefing' or further elaboration on anything due to the interview.

-Stage six: after the interview

After the interview, all the interview participants were given the opportunity to ask any questions. When it was felt the participant had nothing more to share, the participant was thanked and assured again that the information shared was to be treated in a confidential manner. Following each interview, the researcher's reflections were recorded in a field note diary, such as the setting of the interview or how the participant responded to her questions (for example field notes see Appendix 6.6). This provided the establishment of a context so to aid the interpretation of the interview data during the data analysis phase (Patton, 2002).

6.4 Data management

6.4.1 Transcription of the participants' interviews

Transcription of the patient interview data is one of the most prevalent ways to prepare it for analysis (Bazeley, 2007). The audio data was transcribed verbatim by a professional transcriber. To ensure the quality of the transcription and to remove any errors, it was decided that all the interview transcripts were to be checked against the original patient interview recording. Even though no issues were flagged with the quality of the transcription provided, this was beneficial, not only to make any necessary amendments required due to inaudible sections, but also to re-familiarise with the data to aid with the data analysis process. Furthermore, all potential patient identifiers were removed from the transcript to ensure anonymity and confidentiality. The checked anonymised transcripts were then uploaded onto NVivo.

6.4.2 Computer assisted qualitative data analysis (CAQDAS)

To manage large amounts of qualitative data in a systematic manner and to ensure the effective retrieval of that data, several computer software packages have been developed (Hilal and Alabri, 2013). Even though such packages assist with the data analysis, they are not an alternative to the researcher's effort, time and skills but have been viewed as a method to enhance the rigor of qualitative studies (Bazeley, 2007). Furthermore, the packages can increase the proximity of the researcher to the data

(Pope et al., 2000). It has been suggested that such computer specialist software packages may have several advantages and may substantially enhance the quality of research (Hilal and Alabri, 2013). The NVivo software reduces a substantial number of manual tasks and yields the researcher more time to discover tendencies, recognise themes and determine conclusions (Wong, 2008). Thus, as stated, following the transcription of interviews into Microsoft Word, the interview data were stored and managed using a specialist software for qualitative data (NVivo, 2018).

6.5 Analysis

6.5.1 Thematic data analysis: rationale for selection

The aim of qualitative data analysis is to discover patterns, insights and understandings (Patton, 2002). Thematic data analysis was considered suitable to the focus of this study, in order to understand the perceptions and experiences of individuals regarding screening for rare endocrine tumours. Further consideration was given to the suitability of the approach for the sample size and dataset (Wilkinson et al., 2004).

Thematic data analysis is appropriate for small samples (Joffe and Yardley, 2004), and provides a qualitative framework for a content-driven analysis (Guest et al., 2006). In addition, it is concerned with making sense of people's lived experiences (ibid) and deduces themes across the whole data corpus, drawing themes and similarities (Huxley et al., 2011). In their 2006 paper, Braun and Clarke state that thematic analysis involves searching across a dataset, for example, interviews or focus groups, in order to find repeated patterns of meaning. Moreover, Huxley et al. (2011) echo this, commenting that the main emphasis is on themes/commonalities across the dataset, rather than the detail of individual experience. While commonalities are the main driver, dissenting voices through negative case analysis also maintains focus on the uniqueness of experience. This search for common perspectives is harmonious with the aims of the current research. Lastly, its breadth of scope granted the researcher the opportunity to draw themes across the whole 12 data corpus for rare endocrine gene carrier patients, on a latent level, which looks beyond what has been

said (Braun and Clarke, 2006) and involves an inductive process driven by the data (ibid). This fits with the aims of the current research.

6.5.2 Thematic data analysis process

After the transcription stage, the researcher read through the interviews several times; this is considered to be a key stage of analysis (Bird, 2005) and is referred to as the data familiarisation process. When reading through the transcriptions, the aim was to identify extracts at the latent level (Braun and Clarke, 2006), as opposed to a semantic level, which is within the surface meaning of the data (ibid). Transcripts were read line by line and extracts of important text were highlighted and emerging codes noted (ibid) (see Appendix 6.7 for details of NVivo 12 coding). This was an inductive process whereby codes were generated, and data were examined for these codes or for other interesting developments in the data. An inductive approach is when the themes established are heavily connected to the data themselves (Patton, 1990). Therefore, inductive analysis is a process of data coding without trying to fit into an existing coding frame, even of the researcher's analytical preconceptions; this form of analysis is data-driven, 'bottom-up' way (Braun and Clarke, 2006; Braun and Clarke, 2013).

Memos were also recorded during coding (Appendix 6.8), to identify any compelling aspects in the data items and any emerging impressions that could form the basis of themes across the dataset (Nowell et al., 2017).

After the first transcript was coded, it was discussed with the two supervisors; thereby checking the development process by providing the chance to start defining the codes, and to look at clarity of the labelling and confirmation of the density of the coding. Moreover, this process of supervisor discussions was continued throughout the analysis to enhance the rigor of the process. During these meetings there were critical discussions, which challenged the researcher's ownership of the presented codes and subsequent themes during these reflexive discussions. Some initial codes were discarded or merged at this stage due to overlap with others. The emergent codes were then compared against the focus of the study in order to establish that codes that contributed towards the research aim were pursued.

When the initial coding of all of the interview transcripts was completed, the component elements of each code were deliberated for coherence or overlap with other codes. These codes were deliberated on and overarching themes and sub-themes were developed from the coding groups, connecting the data together and likewise meaningfully connecting back to the study aim. Latent thematic analysis was chosen for this study; the development of the themes involved interpretative work (Braun and Clarke, 2006). The themes were organised in accordance to the latent content of the codes, and a deeper exploration of their meaning was explored. This focus on latent meaning is in-keeping with the underlying interpretive approach.

A theme is defined by Boyatzis (1998) as a pattern found in the information that, at a minimum, describes potential observations or at a maximum interprets facets of the phenomenon. Braun and Clark (2006) suggest that deciding on themes is a question of prevalence, in terms of both the space within each data item and its prevalence across the entire dataset. There needs to be a number of extracts for a theme across the dataset, however a higher predominance does not automatically make the theme more important to the research. There is no set rule for the proportion of data or number of themes (ibid). A theme should not be treated as a percentage of a dataset, or even the length of a quote. Predominance should not be the deciding aspect of whether to include a pattern of data or theme; the researcher's judgement decides the themes. The data and themes should capture something significant in relation to the overall research aim (ibid).

Nevertheless, predominance was viewed in terms of how many interview participants conveyed similar experiences. However, any minority voices were noted, together with a singular view of one patient that highlighted a subject that no one else discussed. Subsequent to this stage, the themes were reviewed and refined. Once more, this involved removing themes due to insufficient data or merging two themes into one. Braun and Clarke (2006) advise that "Data within themes should cohere together meaningfully, while there should be clear and identifiable distinctions between themes" (p.91). Coded extracts were then re-read in the context of the theme to contemplate whether a pattern was conveyed in the data extracts. The themes were accordingly defined and named. During the analysis process, the researcher re-visited previous analysis-sessions, thereby maintaining an iterative approach.

A detailed description of the processes of thematic analysis and how they were operationalised is provided in figure 6.1 below. Even though thematic analysis as documented by Braun and Clarke (2006), is presented as a six-phased method, it is actually an iterative and reflective process that develops over time and involves a consistent moving back and forward between the phases (Nowell et al., 2017).

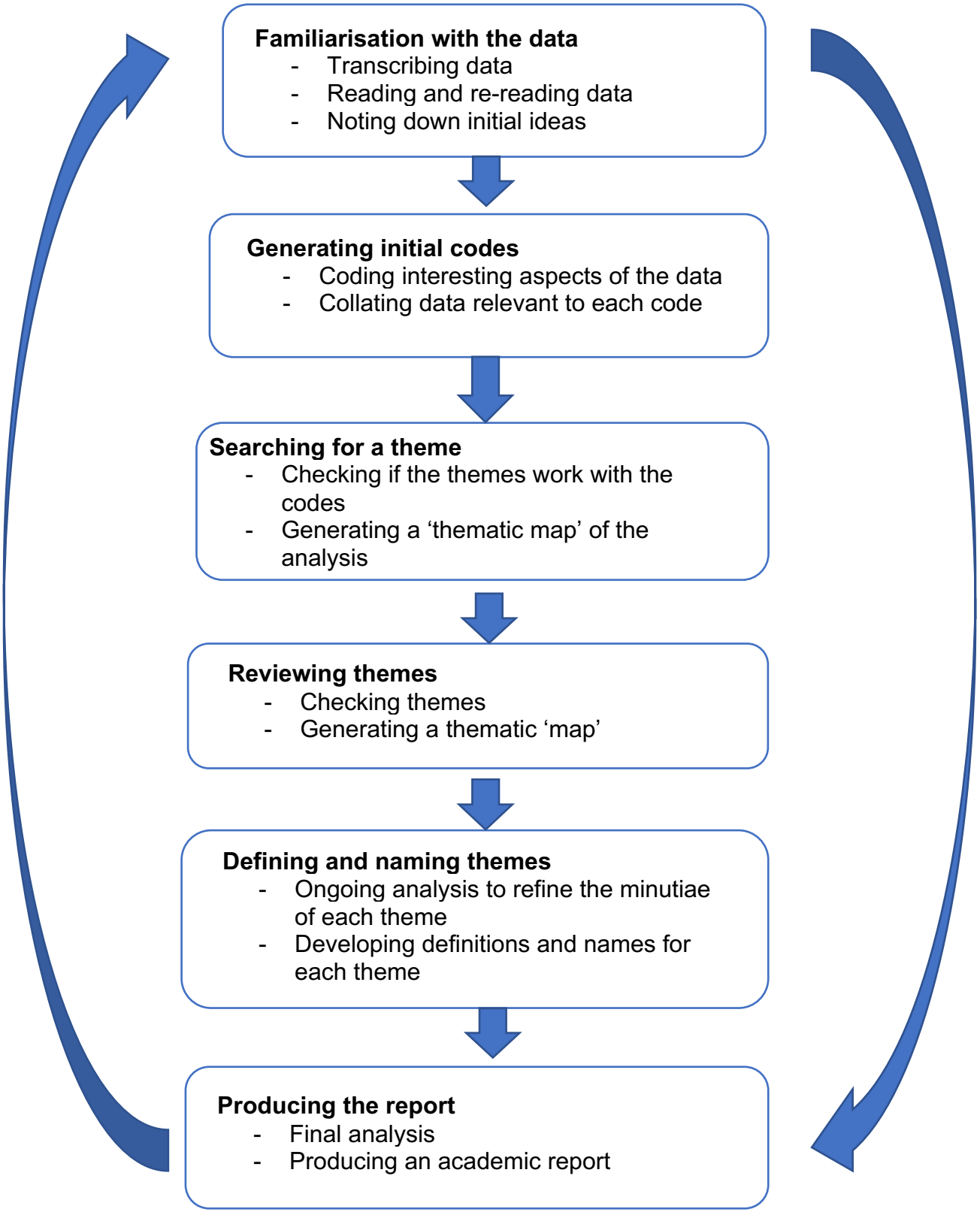

Figure 6.1 Phases of Thematic Analysis (Adapted from Braun and Clarke, 2006, p.87).

6.6 Reflexivity and rigour

6.6.1 Reflexivity

In qualitative research, the relationship between participants and researchers is widely acknowledged (Finlay,2011). Researchers identify their pivotal role in a co-construction of data, thereby they are required to explore this dynamic reflexively (ibid). Reflexivity improves methodological rigour by ensuring the researcher is aware of the potential impact of their own biases (Bott, 2010)

Reflexivity was chosen as its aim is to make the researcher's personal values, background and cultural suppositions as transparent as possible (Gearing, 2004). As a result of the process of identification of the researcher's own suppositions and ideas about the phenomenon, their impact on the phenomenon under investigation can therefore be accounted for (ibid). Reflexivity requires that the researcher develops a conscious self-awareness (Finlay, 2011). It has been suggested that central to maintaining reflexivity is the requirement for the researcher to continually locate and relocate themselves within their work, and to remain in discourse with research practice, participants and methodologies (Bott, 2010).

A strategy that was used to address reflexivity in this study was the use of a reflexive/field notes diary throughout the course of the participant interviews (Appendix 6.6) and memos during the data analysis process (Appendix 6.8). The reflexive diary provided an insight into the researcher's own abilities as an interviewer, this was useful in developing and improving her interviewing technique (Holloway and Wheeler, 2010). In addition, reflexivity was maintained throughout the research by engaging in regular PhD supervision at the University, debating and reflecting on the research process and examining initial findings. Examples from the reflexive diary are given in Appendix 6.6.

6.6.1.1 The researcher's role- implications of the insider/outsider dichotomy

The researcher's role has been described to range from the researcher being an insider, operating as an observer as well as member of a group/organisation, to being an outsider, attempting to examine an unfamiliar environment and attain its

characteristics in detail (Finefter-Rosenbluh, 2017). The researcher's role could affect a study in several ways, for example, the researcher may influence the participants' responses in an interview (ibid). The possible impact on the interviewee is referred to as the interviewer effect; namely, how interviewees respond inconstantly, reliant on how they perceive the interviewer (Denscombe, 2007). There are advantages and limitations to each of the researcher's stance, for instance, those with the role of an outsider may find it challenging to gain access to participants, further, such participants could be unwilling to reveal their attitudes (Borrill et al., 2012). As for the insider, the researcher may come from an advantageous position of being aware of what to ask the participants and being less intrusive to the researched context. However, in contrast to outsider-researchers, it has been noted that participants may grapple to offer a neutral, balanced and distinct point of view to insider-researchers (Chawla-Duggan, 2007). Such methodological challenges have been noted to potentially affect the quality of a study (Thomas et al., 2000).

The researcher being an insider, thus being familiar with the research setting or participants, may also result in role confusion (Dwyer and Buckle, 2009); which is when the researcher responds to the participants or analyses the data from a perspective other than that of a researcher (Asselin, 2003). As an insider, the researcher's perceptions could be blurred by their personal experience of being a 'member' of the group/organisation, thus, there may be some difficulty separating it from that of the participant, possibly resulting in an interview guided by the central aspects of the researcher's experience rather than the participant's (Dwyer and Buckle, 2009). Being an insider could raise factors of undue influence of the researcher's perspective, however it has been noted that being an outsider does not necessary create immunity to the influence of personal perspective (ibid). Further, even though there may be implications to being an insider, as previously stated, access to the group would not be possible if the researcher was a not a member of said group (ibid). As being an outsider may place limitations on access to the group. For example, an outside position may decrease the potential to access subgroups (Brannick and Coglan, 2007), such as clinicians within the screening clinic, or access to the everyday features of their working practice and local culture.

Furthermore, it has been indicated that participants may at times 'second-guess' what the researcher is requiring, or alter their answers, depending on the environment or

experiment (McCambridge et al., 2012), this is described a participant bias (Gove and Geerken, 1977). Participant bias has been described as the participant reacting to what they think the researcher desires (Greenberg et al., 1969). Being an insider to the research domain, provides the ability to connect naturally with the members of the group, however, such familiarity may result in a loss of 'objectivity, especially in aspects of involuntary making incorrect assumptions based on the researcher's' previous experience and/or knowledge (Breen, 2007). The idea of insider research is usually differentiated with research undertaken by an 'outsider' who is not a member or has prior knowledge of the group/organisation in which the research is being carried out (Fleming, 2018).

The researcher's insider role may have some implications, that need to be considered, which differ from those that can arise when the researcher is an outsider (Fleming, 2018). The insider researcher within a group/organisation needs to be aware and manage any relationships or activities which are normal to the everyday process of an organisation, however, when part of a formal research this may take on different perspectives (ibid). It has been indicated that there is a perception of implied coercion during recruitment which should be addressed where a possible power relation may exist; as 'inside' research can usually be difficult when the researcher is closely involved with the potential participants, as they are conscious of the role as a researcher (ibid). Suggested strategies for recruitment for consideration include employing systems that do not involve the researcher directly in the process (ibid).

In regards to conducting qualitative research as an insider, this raises some potential unique implications for the researcher (Asselin, 2003) that can be examined; this can include issues such as bias, particular to insider research, which implicates trustworthiness or validity in the research design (Thomas et al., 2000). Study participants could have perceptions of the researcher's insider role that could affect how they interact with said researcher, thus the quality and quantity of the information they disclose could be influenced (Asselin, 2003). For instance, in terms of participants' willingness to be critical of care provision; a participant may not be open in expressing their true feelings or concerns, due to possibility of the patient's perception of the potential impact on continuing care if critical of the service/care. Thereby, the researcher may not be able to attain the true meaning of the participants'

perspective or obtain the breadth or depth of data required in order to gain a more comprehensive understating of the phenomenon under investigation (ibid).

In relation to this thesis study, broad insights included the position of the researcher as an insider (due the extended period of observation) but perhaps also aspects of being an outsider as she was not a trained health care professional. Further, her previous experience as an interpreter within the NHS had resulted in her hearing many charged stories and when similar issues arose in the interviews, that history resulted in emotional reactions. However, subsequently the participants' perception of the researchers' insider role may have included some hesitation by some participants, as stated above, in relation to participants being less inclined to criticise the screening clinics. As participants may perceive that any criticism of the clinical service may have any effect on their ongoing care. However, the researcher also being an outsider, may have at a point given some participants the opportunity to share some personal aspects. Thus, the advantages and limitations of each of the researchers' dichotomous positions should be taken into account, with reflexivity maintained by close awareness of one' own personal perspectives and biases, which may reduce any potential implications stated with the researcher's role of being an insider.

6.6.2 Strategies used to enhance the quality of the study

While the role and wording of specific criteria to evaluate the trustworthiness of qualitative research is debated, four commonly used areas to consider methodological adequacy are credibility, dependability, transferability and confirmability (Holloway and Wheeler 2010). Credibility considers the matter of 'fit' between what the participants say and the depiction of such viewpoints by the researchers (Padgett, 2008), whereas dependability examines whether the findings of the study are factual and consistent (Holloway and Wheeler, 2010). Transferability describes the degree to which qualitative findings notify and assist insights within contexts other than that in which the research was administered (Carpenter and Suto, 2008). Finally, confirmability is characterised as the degree to which the findings are established by the respondents and conditions of the query and not by their motivations, biases, perspectives or interests (Lincoln and Guba, 1985).

Strategies used to enhance methodological rigour in this study included:

1. Audit trail (dependability): the research process has been fully documented for this study (for example, through the inclusion of an appendix) and will be in any consequent disseminations, thereby ensuring confidence in the process. Correspondingly, sufficient detail will be provided in any potential publications to allow other professionals to determine the relevance of the results to their own patient populace (transferability).

2. Peer review of the data (credibility) involved utilising the PhD supervisory team who have extensive experience in qualitative research procedures to facilitate and advise at different stages of the analytical process. Peer review provided a chance for any disproportionate themes to be detected and offer alternatives to the researcher's own working suggestions (Holloway and Wheeler, 2010).

3. Reflexivity approaches, which were employed to allow the researcher's own experiences to be acknowledged. This is in order to establish openness to the interview participants' narrative through the adoption of the phenomenological attitude (confirmability).

Further details on how trustworthiness was ensured during analysis is given in table 6.2 below.

Table 6.2. Establishing trustworthiness during each of the separate phases of thematic analysis (Adapted from Nowell et al., 2017)

Phases of Thematic Analysis	**Method of Establishing Trustworthiness** (Nowell et al., 2017)	**Examples of how trustworthiness was implemented in this study**
Phase 1: Familiarisation with the data	- Extend engagement with data - Triangulate diverse data collection modes - Record theoretical and reflective thoughts - Record thoughts about possible codes/themes - Store raw data in well-organised storage	- Extended engagement with data - Recorded theoretical and reflective thoughts through field notes (Appendix 6.6) - Recorded thoughts about possible

	- Keep records of all data field notes, transcripts, and reflexive journals	codes/themes (Appendix 6.9) - Stored raw data in well-organised, secure storage area. - Kept records of all data field notes, transcript, and reflexive journals
Phase 2: Generating initial codes	- Researcher triangulation - Reflexive journaling - Employment of a coding framework - Audit trail of code generation - Documentation of all research team meetings	- Kept memos during coding process (Appendix 6.8). - Documented all researcher and PhD supervisor meetings.
Phase 3: Searching for themes	- Researcher triangulation - Illustration to make sense of theme connections - Keep intricate notes regarding development and hierarchies of concepts and themes	- Critical, reflexive discussion occurred during meeting with PhD supervisors - Kept notes of meetings
Phase 4: Reviewing theme	- Researcher triangulation - Themes and subthemes checked by research team members	- Further reflexive discussion occurred during meeting with PhD supervisors - Challenged ownership of theme, pushed understanding
Phase 5: Defining and naming themes	- Researcher triangulation - Research team consensus on themes - Documentation of team meetings regarding themes	- Documentation of researcher and PhD supervisors' meetings
Phase 6: Producing the report	- Describing process of coding and analysis in adequate details - Detailed descriptions of context - Description of the audit trail - Describing reasons for theoretical, methodological, and analytical choices throughout the entire study	- Coding and analysis process described - Context is described - Reasons for the theoretical methods are given

6.6.3 Ethical Considerations

-Ethical approval

Brunel University Research Ethics Committee approved this study in January 2018, reference number 459-NHS-Jan/2018- 10914-2 (Appendix 5.1). Following this, the favourable opinion from the London - Central Research Ethics Committee of the NHS National Research Ethics Service (Appendix 5.2) was received on the 14th of June 2018 (18/LO/1046). Health Research Authority (HRA) and Health and Care Research Wales (HCRW) approval was given (Appendix 5.3) on the 22nd of June 2018 (244880 18/LO/1046).

-Minimising patient anxiety and Lone worker policy

Research ethics were cautiously considered and adhered to; most of the issues deliberated were associated with the protection of the interview participants. Nevertheless, additional considerations were made with respect to the researcher's lone working within the community.

To ensure interview participants were fully informed about all facets of the study, they were provided with adequate space and time to reflect on the study before consenting (Tod, 2010). Interviews may provoke negative emotions from the participant when reflecting on present or past situations which are psychologically painful (Holloway and Wheeler, 2010). The researcher was conscious that interview participants are occasionally unaware of these risks (ibid) and for that reason the researcher was prepared to stop the study and signpost the patient to psychological support if the need arose. Whilst risks connected with the researcher carrying out patient interviews independently in the community were determined and minimised by adhering to the lone worker policy (Appendix 6.10).

6.6.4 Practices attending to ethics

Just as various paths generate credibility and other markers of qualitative quality, an assortment of practices attend to ethics in qualitative research, comprising of procedural, situational, relational and exiting ethics (Tracy, 2010):

-Procedural ethics

Procedural (categorical) ethics applies to ethical actions governed as universally imperative by larger organisations, governing bodies or institutions (ibid). Procedural ethics comprises the significance of accuracy and avoiding fabrication, omissions and fraud (ibid). For instance, as a method of procedural ethics, the researcher ensured that the participant knew the nature of the research and understood that their participation was voluntary. In addition, the researcher safeguarded the interview participants from undue exposure by securing all the patient personal data in a locked draw and a password-protected laptop.

Confidentiality was assured for all the interview participants. Pseudonyms were used when anonymising the interview transcripts, moreover, the exact ages of the participants were not disclosed. Audio recordings of the participant interviews were stored on an encrypted laptop and deleted from the Dictaphone following transcription. Only the researcher and the transcriber (who was bound to a company-stated guaranteed confidentiality agreement) listened to the patient interview audio recordings.

Upon completion of the patient interview, participants were given an opportunity to ask any further questions, they were also given the researcher's university email address if they wished to contact her. Furthermore, interview participants were asked if they would like to receive a summary of the results. Those that requested this information will receive a summary of the aims, main findings and implications.

It was also reiterated to all the interview participants that they had the right to withdraw from the study before or during the interview. If this request from the participant was

made, their interview data was destroyed and removed from the research. Following the completion of the research, the data is not being stored against individual names, therefore interview participants were not able to withdraw their data after participation.

-Situational ethics

Situational ethics considers the ethical practices that arise from the context of the research (Tracy, 2010). Situational ethics considers that each circumstance is unique and that the researcher should constantly reflect and question their ethical decisions. As a method of situational ethics, the researcher based her ethical decisions on the particulars of the setting where the interview took place; if the setting was a public space, she tried to suggest a secluded part so to create a more private atmosphere in that public domain. Furthermore, during the interview the researcher's emotions were managed by being in a neutral state so as not to affect the flow of the interview and disrupt the conversation.

-Relational ethics

Relational ethics concerns an ethical self-consciousness, where the researcher is mindful of their action, character and the consequences on others (Tracy, 2010). As a method of relational ethics, the researcher offered to share the findings with the participants, so as not to solely engage in the research but also return to the 'scene' (ibid) and share their findings. A further example of relational ethics was the management of power dynamics during the interview (Reid et al., 2018), this was achieved by providing a relaxed atmosphere to allow the interview participant to answer the questions at their own pace, in an order they felt comfortable with, with no fear of judgment and insistency.

Furthermore, a transparent approach was adopted throughout the research process to encourage mutual confidence and respect between the researcher and the interview participants. Informed consent/assent was received from all the interview participants who gave their permission to be interviewed as well as permission to have the interview audio recorded (see Appendix 6.3). The PIS outlined issues such as confidentiality, data storage and protection and their right to withdraw. At the beginning

of each of the interviews, time was also spent with each of the interview participants describing what the research involved. This was done verbally as well as in written form (see Appendix 6.2).

-Exiting ethics

Exiting ethics refers to the ethical considerations that continue beyond the data collection phase, regarding how the researcher leaves the setting and shares the results. As a method of exiting ethics, the interview participants were debriefed, and consideration was given to how best to present the research so to avoid any unintended or biased consequences. An additional method of exiting ethics was also implemented by the maintenance of anonymity and confidentiality in portraying the interview study findings, which includes the interview transcript and audio data.

6.7 Interview findings

6.7.1 Demographic profile of study participants

Twelve (12) participants who attend the Barts endocrine screening clinics participated in the interview study. The representation of age, gender and diagnosis varied; an overview of the participant profile can be found in Table 6.3 below. Of these, six (50%) were female and six (50%) were male, with ages ranging from 10 to 66 years old. The median length of time taken by the 12 interviews was 21 minutes (range 05:00- 33.00 minutes). Table 6.3 details the demographic profile of the interview participants. (Age has been indicated by decade of life or under 18 for children and pseudonyms used to protect confidentiality).

Table 6.3. Interview participants' demographic profiles

Participant pseudonym	Age decade	Gender	Diagnosis	Length of time using the service
Emma	60s	Female	SDH	15 years
Olivia	40s	Female	SDH	16 years
Abigail	60s	Female	SDH	2 years
Elsa	50s	Female	MEN	43 years
Emily	Under 18	Female	MEN	8 years
Grace	Under 18	Female	MEN	10 years
Andrew	30s	Male	MEN	30 years
David	50s	Male	VHL	26 years
Jacob	50s	Male	VHL	29 years
Connor	Under 18	Male	VHL	2 months
Nolan	60s	Male	MEN	36 years
Miles	50s	Male	VHL	20 years

Key: MEN- Multiple endocrine neoplasia, VHL- von Hippel-Lindau, SDH- mutations in the succinate dehydrogenase gene complex

Following the thematic analysis process, four major themes were developed from the data, namely 'perception at a distance', 'seeing my future self', 'the body and person in clinic' and 'the patient or doctor, who knows best?' (see Table 6.4 below). See figure 6.2 below for the final thematic tree map, which includes examples of extracts which formed the theme. A worked example of how themes were developed is shown in Table 6.5 below, including input of supervisory team, and how divergences were addressed.

Each of the themes is briefly introduced followed by a detailed description of the subthemes. Descriptive interview participant quotations are used to illustrate the sub-themes. A reference for each quote is provided using a pseudonym, gender, diagnostic group followed by a line number which corresponds directly to the original interview transcript.

Table 6.4. Main themes and sub-themes.

Main theme	Sub-themes
Perception at a distance	- Out of sight, out of mind - Anticipating the hospital visit
Seeing my future self	- Snapshot of the future - Family matters
The body and person in clinic	- Disembodiment - The balance between trust and scepticism
The patient or doctor, who knows best?	- Weight of expertise - Assumed expertise

Table 6.5. Worked example of how a main theme was developed

Phase of thematic analysis		**Process of each phase outlined**
RAW DATA (transcripts)		
Phase1: Familiarisation with the data		- The researcher read and the re-read the interviews transcripts, noting down initial ideas (Appendix 6.8).
Phase 2: Generating initial codes		-The researcher then coded interesting features of the data in a systematic manner across the entire dataset, collating data applicable to each code (Appendix 6.9). -Code examples for this main theme included: • Avoidance • Pre-appointment anxiety • Uncertainty
Phase 3: Searching for a theme	Input	-Ensuing this, the researcher collated codes into potential sub-themes and main themes, with close reference to the research question, gathering pertinent data to each potential theme (Appendix 6.9). - Critical, reflexive discussion occurred during meeting with PhD supervisors. -The PhD supervisors acted as a 'critical friend' (Baskerville and Goldblatt, 2009), by listening, raising questions and providing impartial feedback as the researcher talked through and clarified ideas through discussion.
Phase 4: Reviewing themes	Input	-The researcher afterwards moved onto the next stage of cross-checking if the theme functioned in terms to the coded extracts and the entire dataset, producing a thematic map of the analysis (Figure 6.2). -Further reflexive discussion occurred during meeting with PhD supervisors. -The researcher was challenged regarding ownership of the theme by supervisors, which pushed understanding. -Divergences were addressed through discussion and clarification and reflection. A consensus was drawn, however ultimately the final decision was with the researcher.
Phase 5: Defining and naming themes		-The theme was then refined through ongoing development; a clear definition and name for the theme was labelled. -Resultant sub-themes: • Out of sight, out of mind • Anticipating the hospital visit -Resultant theme: • Perception at a distance
Phase 6: Producing the report		Vivid, compelling data extracts examples were selected for this theme (Theme 1), which related back to the research question (Section 6.7.2).
Main theme: Theme 1. Perception at a distance		

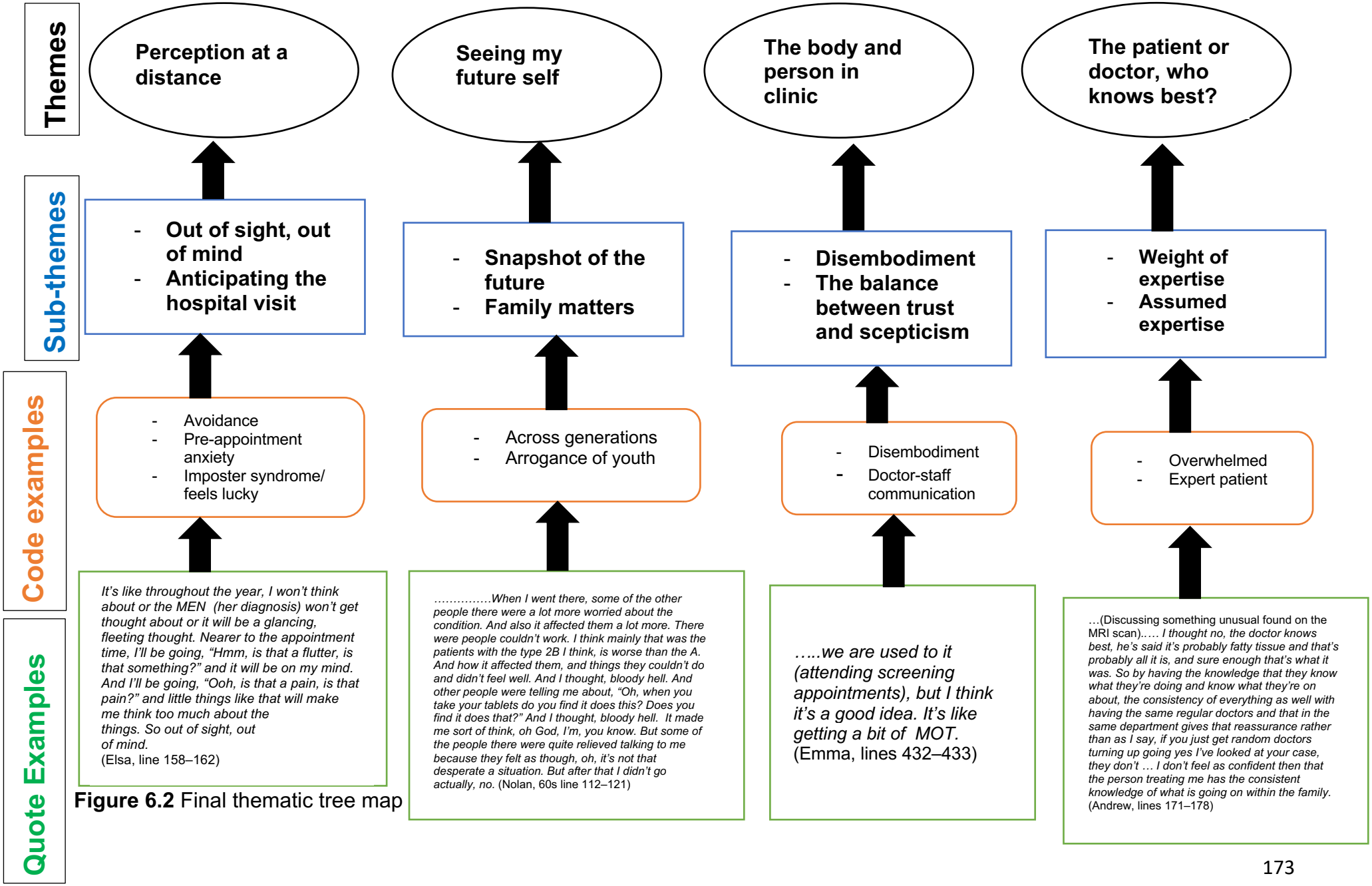

Figure 6.2 Final thematic tree map

6.7.2 Theme 1. Perception at a distance

The theme 'Perception at a distance' encapsulates how the participants regarded the screening service when they are out of the clinic. While the theme is short, two distinctly different approaches to the clinic were apparent. These have been organised into two subthemes; '*Out of sight, out of mind'* describes how participants tuned out any thoughts of the clinic when they are at home. For some participants, re-emergence of the diseased- self occurred once they are reminded of a forthcoming appointment, as illustrated in the second subtheme *'Anticipating the hospital visit'.*

6.7.2.1 Subtheme 1: Out of sight, out of mind

Participants commented on how generally they do not think of their diagnosed syndrome or clinic appointment throughout the year:

> *It's like throughout the year, I won't think about (clinic) or the MEN (her diagnosis) won't get thought about or it will be a glancing, fleeting thought . . . so out of sight, out of mind.*
> (Elsa, 50s, F, MEN, line 158–162)

Elsa would at most briefly think of her diagnosis.

Emma is similarly apparently undisturbed with thoughts or worry regarding her diagnosis:

> *Well I'm not the worrier. You've just missed him* (her husband), *the worrier. He's just gone back to work. He's just been up the doctor's now. Yes, you see I don't worry. I don't worry until they (the doctors) tell me what the bottom-line of something is….*
> (Emma, 60s, F, SDH, line 498–501)

Emma portrays a sense of detachment from her diagnosis when she is outside the clinic and in everyday life. However, it is evident that this is a suspended concern, which has the potential to re-emerge if her situation changes. For others, the integrity of that suspension is challenged as a clinic appointment draws near. As a

consequence, the sentiment that their syndrome is truly out of sight or mind is undermined, as explored next.

6.7.2.2 Subtheme 2: Anticipating the hospital visit

Patients recounted that closer to the time of their screening clinic appointment, an apparent shift is created, and this brings the reality of living with their diagnosis to the foreground:

> *. . . Nearer to the appointment time, I'll be going, "Hmm, is that a flutter, is that something?" . . . And I'll be going, "Ooh, is that a pain, is that pain?" and little things like that will make me think too much about the things . . .*
> (Elsa, 50s, F, MEN, line 159–161)

Elsa explains when getting close to her appointment at the clinic she starts to experience imaginary pains and she becomes more vigilant about potential symptoms related to her diagnosis.

For others, the receipt of a tangible letter concerning an upcoming appointment from the screening clinic also results in strong emotions, this time anxiety prompted by the anticipation of what may lie ahead:

> *. . . when the letter comes through because obviously it's stamped on the envelope (Barts Health) and I'm like, you know, I start thinking the dread because I don't want to . . . it's with the anxiety I feel that I don't want to be shut in or because obviously going into the tunnel now it's a bit like horrible but they make as . . . they always say to push the buzzer and we'll let you out.*
> (Olivia, 40s, F, SDH, line 318–324)

For Olivia what happens in clinic (for her the MRI scan), is an event to 'dread' which creates significant anxiety. Interestingly, this is triggered through identification of the Barts stamp, suggesting memories of previous experience, despite reassurances of appropriate care, are important in the emotional response to clinic attendance. The receipt of the letter when out of the clinic is not a neutral event; it indicates the psychological shift that the letter precipitates.

In addition to the emotional response, there are several practicalities that need to be managed in response to a clinic appointment. For instance, in preparation for the routine for the appointment, participants illustrated the series of arrangements that needed to be made:

> *So another problem is the fact that I've got to take a day off work to go all the way up to Bart's to have the scan done or to have the blood tests done and then go back up. So it's two days' annual leave that I have to use up, because my work won't give me the time off and by the time I get up there – I could go really early in the morning and have half a day, but the cost is phenomenal . . .* (Elsa, 50s, F, MEN, line 116–120)

Here, Elsa communicates the challenges of arranging annual leave with what appears to be an unsympathetic employer to attend her appointment. That together with the excessive cost of travel creates significant hurdles for the participants to overcome and may amplify any patient pre-appointment anxiety that may be present.

Even though the inconvenience of taking a full day to attend the clinic is noted, there are some participants who instead recognise the worthwhile aspects of paying the travel costs and having a full day at the clinic:

> *. . . Well, it does seem to some because it's obviously it's a whole day taken of your life . . . and I said, we've analysed this, and I said, it's two days out of 365 and it costs me £20 to go up there, get the results, like we usually did; I'll see you in a year/18 months' time. You can ask any questions you want to ask . . .* (Emma, 60s, F, SDH, line 82–86)

Emma explained how she has the chance to ask the doctors about anything that may concern her; she appreciates that it is only two days out of the year and the cost is comparable. This may be an encouraging aspect to patients in attending their screening appointment, as they see the benefits in spending time with the specialist staff at the clinic.

In summary, participants described how they suspended the thought of the clinic and diagnosis when in everyday life. However, as the time draws nearer to the clinic and reminders are received, feelings of anxiety were shown to be brought to the forefront prompted by concerns with symptoms, clinical tests or the practicalities or attendance.

While some participants could rationalise some of these experiences, for others they could potentially impact on their willingness to attend.

6.7.3 Theme 2: Seeing my future self

Some questions during the interview explored what influences the level of engagement with the screening clinics. From these descriptions, participants reiterated having glimpses of their future self with respect to their diagnosis. The first sub-theme *'Snapshot of the future'* conveys engagement beyond the physical, by providing patients a positive or negative glimpse of their potential impending future, with respect to their diagnosis. The second sub-theme '*family matters'* outlines how participants manage the multigenerational family clinics and how intergenerational knowledge is managed between family members.

6.7.3.1 Subtheme 1: Snapshot of the future

Participants discussed the patient support groups provided by the clinic; these groups are intended to bring patients who are part of the screening clinic process and who have a similar diagnosis, together in a supportive environment. Nolan illustrated how, during the first and only time attending one of these groups and interacting with others who have the same diagnosis, he began to compare his state of diagnosis to theirs. His comments convey a sense of anxiety through the realisation that he too was in fact also inflicted:

> *. . . When I went there, some of the other people there were a lot more worried about the condition. And also it affected them a lot more. There were people couldn't work. I think mainly that was the patients with the type 2B I think, is worse than the A. And how it affected them, and things they couldn't do and didn't feel well. And I thought, bloody hell. And other people were telling me about, "Oh, when you take your tablets do you find it does this? Does you find it does that?" And I thought, bloody hell. It made me sort of think, oh God, I'm, you know. But some of the people there were quite relieved talking to me because they felt as though, oh, it's not that desperate a situation. But after that I didn't go actually, no.*
> (Nolan, 60s, M, MEN, line 112–121)

The patients who attend these meetings are at different stages of their diagnosis and, as Nolan describes, the comparison of each other's 'stages' in the development of the

syndrome and his apparent transfer of their status to himself served to prompt his disengagement.

However, participants also discussed how both the development of science and seeing someone with the same diagnosis who has overcome the odds has given them hope for the future. Elsa explained that observing how medical research has evolved over time and witnessing the survival of her cousins has given her a positive outlook and possibly the prospect of a prolonged future:

> *Touch wood, the way things are, medical science has improved so rapidly within this research – I know I've got two cousins who have survived, so I'm fully aware that it is not the death sentence that it used to be.*
> (Elsa, 50s, F, MEN, line 80–83)

Thusly, seeing other people – which can happen outside of the clinic (as with Elsa) but is also promoted through clinic access and services can provide both positive but also negative snapshots of future histories which may impact on engagement.

6.7.3.2 Subtheme 2: Family matters

Participants commented that attending together as a family unit in some respects was positively viewed:

> *I think it's a positive ultimately because having the family there, especially now, makes it even better, because any issues that come up with myself or my mum, or my kids, we're all aware of. I think it's good that they try to get myself and my mum in before my girls because my mum's had a few issues with the thyroid condition that we've got, which if you were to sit there saying oh yes, you've got this, you've got this, you've got this, it's nothing to worry about but we're going to monitor it, it could worry the girls at their age, whereas the older they get the more they realise that yes okay, that condition could occur but because they're monitoring it it's not a bad thing.*
> *(Andrew, 30s, M, MEN, line 160–167)*

Andrew illustrated how being together as a family in consultation allowed for the full disclosure of information. If any health issues of a family member were identified, then

being together provided a source of support and encouragement when faced with difficult situations. Moreover, Andrew illustrated the benefit of the children also being present; it allows them to get accustomed to the process of the clinic and gives them an impression of how it will be in the future and not to be worried. However, echoing some aspects of Nolan's experience, Andrew explained how exposure to future issues needed to be managed carefully to avoid undue distress. Consequently, for Andrew choosing to attend the clinic as a family conveys a sense of managing intergenerational knowledge and allowing the flow of information between the adults and children.

This careful management of information sharing across generations was also described by Emma:

> *That's every time and as I said, you can ask questions and we don't feel that we're rushed. We are going in now as all three of us went in together. I sometimes say is that a good idea? What if the children want to ask something that they don't want me to know or vice versa . . .*
> *. . . Yes. We all keep saying … I think even this time, with the last time we went, they went, "You all coming in together?" So, we yelled, "Yes." . . . but I did think would it be for me . . . now as I'm getting older, I don't seem to have so many things wrong but they hear as well . . . if they say something's shown up, we need to do this, this and this, yes, I've got both my children there, but seeing that we're a close family anyway, I'm going to tell them, you know. It's not that it's private, so I'll tell them when I came home anyway.*
> *(Emma, 60s, F, SDH, line 96–112)*

Emma narration illustrates a dilemma on information management. On one hand she is somewhat hesitant to go into the consultation room as a family, adding that she can always inform relatives at home if something is wrong, yet on the other they continue to attend as a family. The desire to separate one's self from family members during clinic consultation, as expressed by Emma, portrays a process of management of future self. By managing intergenerational information, participants may restrict certain information as a way of protecting family members from potentially upsetting information; they may feel they have control on how to deliver, or not deliver, information to them, in particular to children.

Even with the option of attending clinics as a family unit or separately, participants communicated that some family members choose not to attend at all:

> *. . .There's only nine of us left like cousins but one parent had four girls, but they won't be checked, which I think is stupid, but my other aunt had two boys and one of them and I mean he's 69 and they said he got the gene, so he'll sort his family out and the other one I think he's got it as well . . .*
> *. . . I think they don't want to know because they think it's me. They're . . ."Oh no, we are okay."*
> *(Abigail, 60s, F, SDH, line 285–294)*

Despite witnessing the dwindling numbers of family members left, which portrays a potential future outcome, Abigail illustrates that her cousins will not go to the clinic to get regular screening. Her assumption is that her cousins think it is an isolated incident affecting Abigail and that it will not affect them. Therefore, while a future outcome may be apparent, it is one that they either do not believe is their future outcome or choose to engage with. As a consequence, the potential positive impact of family awareness as indicated by Emma and Abigail, but specifically Elsa is no guarantee for engagement with clinic appointments.

This is further emphasised by Miles:

> *Well, he (son) does understand it because his aunt died of it. But he just seems to think he's just one of them people who's invincible. He's young and he thinks, yes, I'm all right, nothing wrong with me, you know what I mean?*
> (Miles, 50s, M, VHL, line 301–303)

Miles illustrated that his son does not attend the clinics, despite experiencing the death of his aunt from the same diagnosis he has. He explained how his son feels indestructible due to his youth. This may suggest that witnessing family members going through difficult challenges which lead to their demise may only deter some participants from attending clinic appointments if these experiences do not connect with their idea of future self.

It is not however just the family that may influence decisions to engage or not to engage. Olivia's daughter has informed her that she is planning to stop going to the screening clinics once she turns 18.

> *My daughter, she's had a few people say nasty things at school. I mean she's 15, she doesn't get why she has to go for it. She says when she's 18, she's not going to have it done (screening appointment). That's just her age talking I think. She doesn't realise how important it is to actually have the scans done.* (Olivia, 40s, F, SDH, lines 343-347)

This possibly conveys how some younger patients may compare themselves to their peers in terms of what the future holds for them, which may present some complications due to their diagnosis being compared to people who are not affected. Especially when young people are being singled out and ridiculed due to their differences, their reaction maybe to cease any contact with the clinic so as to feel 'normal' like everyone else.

In summary, participants illustrated how others with the same diagnosis, whether in support groups or family members, have given them a negative or positive outlook in regard to the trajectory of their diagnosis. Likewise, multigenerational family screening clinics and how intergenerational knowledge is managed created dilemmas regarding sharing and protecting ideas of future self. This was further complicated for younger people managing peer responses. Each of these factors may impact on individual or group decision to attend or not to attend clinic.

6.7.4 Theme 3: The body and person in clinic

This theme focuses on the participants' experiences in clinic and how these may enhance or deter clinic attendance; it represents the apparent disconnection between the external physical body and the interpersonal self that forms connections with others. The subtheme '*Disembodiment*' centres on the detachment that participants conveyed from their physical bodies in relation to aspects of their diagnosis. The dynamic interrelationships of trust and mistrust between the clinic's staff and patients is portrayed in the subtheme '*The balance between trust and scepticism'.*

6.7.4.1 Subtheme 1: Disembodiment

Participants illustrate how they feel whilst attending the clinic; they detail how they are now acquainted with the process and the analogy/metaphor of undergoing an MOT is used to refer to the screening process:

> *. . . we are used to it (attending screening appointments), but I think it's a good idea. It's like getting a bit of MOT.*
> (Emma, 60s, F, SDH, lines 432–433)

This analogy imparts a sense of the screening being a positive aspect, a way to get a review of how their body is functioning, which they hopefully pass. However, reference to an MOT is also suggestive of a mechanistic view of an individual, a point referenced by other participants.

Participants compared the clinic process of undergoing several procedures in one day, such as undergoing blood tests, having an MRI and a consultation, as being part of revolving seats in a restaurant:

> *. . . It's a good way of spreading people out if they all arrive at once and dealing with it like a restaurant I suppose. Make them wait over there, then you move them there, then you move them in.*
> (Nolan, 60s, M, MEN, lines 150–152)

Like Emma, Nolan recognises the benefits of undergoing such procedures in one day. However, his response displays a sense of being a passive recipient with not much control over what happens in the clinic, in comparison to being engaged with the management of his diagnosis. Moreover, the use of a restaurant analogy portrays an impersonal view that the participant may hold towards the clinic process. Nolan appears to think of the process as a conveyor belt, where he is the object being moved from A to B to C etc.

The sense of splitting your physical form, from your embodied self is also echoed during a specific procedure:

> *. . . (during the MRI scan) Yes, so I'm just picturing I'm on the beach somewhere in Barbados, you know, so they make it quite fun and relaxing for me because as soon as I go in they see I suffer from anxiety.* (Olivia, 40s, F, SDH, lines 698–701)

In this instance Olivia describes how her imagination can remove her from anxiety created by the discomfort she experiences in the MRI. She finds this process provides her with some anxiety relief, and possibly the detachment is a coping strategy.

All three examples suggest somewhat contradictory positions. On one hand the process of clinic attendance benefits from a certain level of disembodiment. Yet the clinic itself requires the participants to engage in their own management. The following sub-theme explores how this balance between embodied and disembodied clinic experience is in part regained.

6.7.4.2 Subtheme 2: The balance between trust and scepticism

Participants also discussed the importance of interpersonal interactions and for the most part, these included positive aspects of being in the clinic and interacting with the staff. Eleven out of the 12 interview participants have been using the service for at least 10 years, so they have developed extensive interpersonal connections with the staff at the clinic:

> *Yes, I trust them, they know us, we know them really. No, I feel quite happy ...* (Abigail, 60s, F, SDH, lines 43–44)

Abigail communicates how she trusts the staff at the clinic, and she feels that both she and the staff are well acquainted to each other, which, perhaps, provides her with a feeling of contentment.

Participants further described how comfortable they felt in the clinic due to some favourable actions of the staff and how accommodating they can be to each patient:

> *I really like it, they're really friendly; I suffer from anxiety and they're just brilliant with me when I have my scans, they make me feel at ease, they allow other people to come in with me (come into the MRI room).*
> (Olivia, 40s, F, SDH, lines 26–28)

Olivia commented on how she suffers from anxiety, which is elevated by the MRI scans, as discussed in the previous *disembodiment* sub-theme. She elaborates here on how the staff make an exception by allowing extra people in the MRI room for support and in doing so demonstrate a personalised approach to her care.

Moreover, an extra sense of comfort was expressed due to the familiarity of participants with the in-clinic staff by virtue of the on-going history of the syndrome:

> *We've got to know them. It's just like going to see your mate, because you've seen them so many times over the years. They're not strangers, you can tell them anything you want.*
> (Miles, 50s, M, VHL, lines 342–344)

Such descriptions illustrate a friendly, easy-going clinic environment, in which roles such as patient and care provider disintegrate into friendships over time. The consequence for Miles is the ability to conduct no-barriers conversations which infers a sense of equality within the interactions.

This familiarity that participants expressed in some cases may be the reason behind the lax use of formal language between the patients and in-clinic staff:

> *. . .We like it. I mean you get a bit of banter going, which makes it more relaxed. I know older people don't normally like. . .they like still like to be referred to, 'I'm Mrs Peters', you know, but they don't, they call you Emma and it's more relaxed isn't it? But you still feel that you might have a slight joke about something but when it's serious and you are asking a question…*
> (Emma, 60s, F, SDH, lines 445–450)

Emma referred to this as '*banter',* which can brighten the situation when discussing serious matters regarding their diagnosis, thus allowing her to ask questions freely.

Indeed, going to the same hospital and seeing the same faces seems to have given Nolan a sense of security and confidence.

> *. . . I think if I moved away that would probably make me a bit nervous going to a different hospital and things like that. I always feel a bit safe with Barts.*
> (Nolan, 60s, M, MEN, lines 268–269)

In addition, due to the ongoing history of participants going to the clinic, some have come to regard it as an overall full life check, and issues besides the main diagnosis have been discussed:

> *So, you know, it's not even related to what we go there for and they always ask is there anything else you want to talk about and even with my daughter, you know, she'll chat about other things; what's been going on about at school because she had a little bit of bullying and then talk to her about that and they gave her some advice and it's just . . . you're not just there to have that done and thank you very much and go. They spend a lot of time with us.*
> (Olivia, 40s, F, SDH, lines 94–100)

This gives an opportunity for patients to use the clinic as a 'general clinic' and ask about any issues that could also be affecting them. This breadth in engagement conveys a sense of holistic care and further humanisation within the clinic environment. Along with being viewed as an individual with individual health needs, in addition to their hereditary endocrine diagnosis.

It is interesting to highlight how Olivia adds that the positive interrelations between the clinic and participants can also show how the younger patients are treated by the in-clinic staff:

> *They're great with the kids when we've gone up for the follow-up and everything. You know, they talk to children as well. They're not asking us as adults, they actually talk . . . I mean Gabby (her daughter) is old enough to know anyway but the other two, they're 10 . . . but they would talk to them, you know, let them answer the questions which is nice. You now, they talk to them like young adults really and just everything overall, I've not really got a bad thing to say.*
> (Olivia, 40s, F, SDH, lines 681–687)

Olivia indicates how the staff interactions with her children signifies a sense of respect for the younger patients.

Indeed, a younger patient confirmed that the staff do indeed try to make the children more comfortable during their clinic visit. Emily explained that due to her needle phobia, she appreciates the staff at the clinic who distract her and try to alleviate the anxiety she feels during such a process:

> *The people who use the toys to distract you* (when dealing with needles).
> (Emily, under 18, F, MEN, line 16)

While not explicit in the narratives, this positive connection between the staff and younger patients may be a reason why some of them will choose to still attend screening appointments in the future and keep those interpersonal links intact.

Contrary to the trust that was portrayed by the participants towards the clinic staff, some conveyed a sense of concern regarding the information provided to them during communication with the clinic staff:

> *I don't think you really need to know everything. But it would be nice if there is something that they are watching and they aren't saying, just to tell you.*
> (Miles, 50s, M, VHL, lines 116–117)

This comment indicates that for Miles a balance needs to be struck between all detail and necessary detail, a point also noted by Nolan. While not explicitly stated it could be inferred that there have been times when Miles has not been clear on this balance. A positive interpersonal relationship between the patients and the medical staff as described previously, may assist in the navigation and negotiating of that balance.

Participants explained how researching their own diagnosis only increased their suspicion regarding not receiving full information from the medical staff at the clinic:

> *Years ago when I was first diagnosed I did used to try and look things up and find a bit more about it. But then every time I did that I ended up just frightening*

> *myself to death. And then ended up sometimes getting an earlier appointment and thinking, hang on, they've been telling me a load of lies here, this isn't right, you know. And then I'd go up and see Professor Johnson and he'd put my mind at rest, so that was okay. After that I'd given up looking things up. If there's something I really want to know I'll ask the doctors.*
> (Nolan, 60s, M, MEN, lines 72–78)

The resolution that Nolan describes here further emphasises the importance of the interrelationship between patient and staff and also his increased confidence in his care.

However, too much detail may overwhelm and cause such anxiety:

> *. . . I mean, Professor Jones when I first met him, he did start worrying me, because he gave me so much detail. And then after a while I realised that was his way of being and got used to him . . .*
> (Nolan, 60s, M, MEN, lines 312–314)

Nolan described how he got used to Professor Jones' style of delivery of information during consultations, possibly due to the lengthy time attending the clinic. Finding that balance between too little and too much information would perhaps be the ideal way to deliver information to patients and keep them fully informed about the status of their diagnosis.

Participants also described how the balance of trust and distrust also related to particular tests, informed by previously perceived negative procedural experiences:

> *. . .The guy, the radiographer said we only got a minute to finish* (during the MRI scan). *I said no I can't take any more because my back is hurting. I told them, the first place they lied to me I'm only going to be in for 15, 25 minutes, I've been in the machine for two hours . . .*
> (Jacob, 50s, M, VHL, lines 49–52)

Jacob illustrated his experience of feeling that he has been deceived during his MRI scan, regarding how long the scan would take. Jacob reacted to this assumed miscommunication by letting the MRI staff know that he feels lied to. A negative experience of feeling that ones' treatment at the screening clinic was inappropriate,

such as this MRI example, may deter patients from future screening appointments, as the patient may now feel distrust towards the staff at the clinic as a result.

In summary, participants described how they felt whilst attending the screening clinic, with some participants illustrating examples of somewhat depersonalising or disembodying practices which in themselves were considered positive or appropriate coping methods. but equally, the significance of the interpersonal relationships in the screening clinic was noted by participants with most emphasising that familiarity brokered trust which enhanced the humanisation of care.

6.7.5 Theme 4: The patient or doctor, who knows best?

This theme focuses on the development as well as the expectation of patient expertise. The subtheme *'Weight of expertise'* illustrates the responsibility towards the management of diagnosis; some participants have complete reliance on the opinion of the medical staff, whilst others discuss the responsibility of self-management. The subtheme *'Assumed expertise'* conveys the automatic expectation placed on some participants in consultation that they are expert patients concerning all aspects of the diagnosis, even from the initial referral to the clinic.

6.7.5.1 Subtheme 1: Weight of expertise

Some of the participants discussed how they manage their screening clinic visits, in terms of undergoing medical tests and hearing the results. Andrew depicted how his concern over an MRI scan which highlighted a potential issue was alleviated due to the confidence which he places in the doctor's opinion that it may be a minor issue:

> . . . (Discussing something unusual found on the MRI scan) *. . . I thought no, the doctor knows best, he's said it's probably fatty tissue and that's probably all it is, and sure enough that's what it was. So by having the knowledge that they know what they're doing and know what they're on about . . .*
> (Andrew, 30s, M, MEN, lines 171–174)

In this passage, Andrew conveys a sense of confidence in the doctor's expertise built through time and trust. That confidence and acceptance of external expertise assist in his management of self. Indeed, he later explains the benefit of having the same knowledgeable doctor for each clinic visit:

> *. . . the consistency of everything as well with having the same regular doctors and that in the same department gives that reassurance rather than as I say, if you just get random doctors turning up going yes I've looked at your case, they don't . . . I don't feel as confident then that the person treating me has the consistent knowledge of what is going on within the family.*
> (Andrew, 30s, M, MEN, lines 174–178)

Having a doctor who is familiar with the medical history of all the family members potentially provides such consistency, which further provides reassurances regarding the competence of the medical professional in the clinic.

The portrayed expertise of the doctors at the clinic was also appreciated by some of the younger participants:

> *Knowing that the doctors know what they're on about, I guess.*
> (Grace, under 18, F, MEN, line 70)

Grace explained how knowing that the doctors are knowledgeable in terms of her diagnosis is an important aspect to her when attending the clinic. This aspect may give Grace a sense of security and a feeling that she is in safe hands.

However, such confidence in the judgment of medical staff is not echoed by all the interview participants:

> *…GP, they've done something wrong, but they know my case because on the screen I have gout which is really bad for the kidney I know, I'm using for that medicine, Allopurinol 200mg. When I have a gout attack, you can't use 400mg Allopurinol. They gave me it (400mg) but I didn't use.*
> *. . .now, I go double check . . . It's happened to me one time in St Bart's Hospital about seven years ago in the MRI scan. They give me the wrong injection . . .They done it and after they said sorry, we have some problem. What's the problem? They said, the MRI department, they said sorry, we done the wrong thing, maybe you're going to lose your kidney.*
> (David, 50s, M, VHL, lines 401–405; 462–477).

David recounted his perceived negative incidents, where he felt that he received inappropriate treatment from his GP, and also feeling that his treatment at the screening clinic was inappropriate. This has resulted in an overly cautious nature, which David exemplifies through his double checking of every GP prescription and administered procedure at the screening clinic. David portrays a sense of self-responsibility concerning his health. Furthermore, such lack of confidence in the medical staff by the patient may create tension in the clinic, potentially hindering the level of engagement that the patient has with the clinic.

Such sense of self-responsibility for their own health was also illustrated. The after-effect of the on-going history of the diagnosis that some participants face is represented by their depiction of having considerable expertise of their health, which they feel is comparable to a medical professional:

> *. . . They couldn't find anything. It's more than one year they try to find, they couldn't find anything. Still I'm using the blood tablets now and I'm feeling tired, and I know haemoglobin is down. Iron tablets I should go and use. My blood is getting down. I'm feeling down, I'm like a doctor now. I have too much experience of my life.*
> (David, 50s, M, VHL, lines 4545–458)

David conveys some frustration and mental health issues as a result of dealing with a certain continuing issue with his health, which is related to his VHL diagnosis. Perhaps as a result of the long-term management of his diagnosis. David feels he has built up significant experience of his own management. However, the use of 'too much experience' gives a sense that this knowledge and ownership is not carried lightly in his case.

Medical professionals and the participants themselves were not the only sources of information. Participants commented on the how they utilised others, such as family members or external medical professionals, for knowledge regarding their diagnosis:

> *The doctors and I have my family . . .* (abroad), *the doctors* (abroad) *I'm asking to them* (about his diagnosis) *as well.*
> (David, 50s, M, VHL, lines 103)

David explained how he consults family or doctors he knows abroad when he requires advice regarding certain medication, for example. Perhaps because English is David's non-native language, he feels more comfortable discussing his diagnosis in his first language. By doing so, this may relieve some mental burden by making the participant feel they have the correct information concerning their diagnosis and treatment.

Similarly, participants demonstrated a further example of diminishing the responsibility of acquiring the correct knowledge:

> *If I was to have the adrenal gland* (removed) *and if I felt I needed any support, then I know they're* (clinic staff) *there. But I've also got cousins who have gone through it, so I just nag them and pester them.*
> (Elsa, 50s, F, MEN, line 165–167)

By consulting with family members with the same diagnosis, Elsa explained that even though she is aware of the support available at the clinic, she prefers to ask her cousins if she has any queries about her syndrome. This is an example of passed-on expertise between family members, possibly diminishing the personal accountability of some participants in acquiring the correct knowledge.

In contrast, participants who have children with the same diagnosis commented on how they feel the responsibility to be knowledgeable about the details of their health diagnosis:

> *I mean I should do more of my research* (about her diagnosis) *really because my daughter* (oldest is affected) *. . . my son had the blood test and he doesn't carry the gene but my* (youngest*) daughter's now due to go and have the blood test; she's only three, so we want her to have the blood test now.*
> (Olivia, 40s, F, SDH, line 150–153)

Olivia noted that she should become more proficient about the diagnosis in order to support her youngest daughter, who is now approaching the stage of initial testing for the hereditary diagnosis. This passage indicates that Olivia may now be feeling the increased responsibility to be informed and gain necessary expertise to support her dependents more fully.

Olivia continued by explaining that this sense of responsibility of conveying the correct information also pertains to informing the children's school:

> *. . . they've always given us leaflets that we can go away and research and it's all there but sometimes I have to explain a few things for Gabby's school when I say, "Well she's got a scan coming up." They do like to know what it's about and it's hard to explain it as I said she just carries the gene and we're just going to make sure that it is not, you know, she's a gene carrier of this certain thing. I don't even know what it's called.*
> (Olivia, 40s, F, SDH, lines 140–146)

She described how even though she has been given information leaflets from the clinic, she finds it hard to explain to her children's school about their syndrome, as she herself is not fully clear about the details and definitions. Olivia portrays a sense of obligation to be an expert for the sake of others, in this case the children.

6.7.5.2 Subtheme 2: Assumed expertise

While many of the participants described the development of their expertise, this was not universal. As a result of the rare status label of the diagnosis, some of the recently diagnosed participants are unaware of the specifics of the syndrome. This sub-theme derives predominantly from the experiences of Connor, who has been registered at the screening service for less than six months. At the start he uses the analogy of feeling like he turned up at an exam without sufficient preparation when describing his clinic appointment experience:

> *It's just expecting me to ask something when I'm not provided with enough information to ask things. It's a bit like going into an exam without any revision, you don't know what you're being asked.*
> (Conner, under 18, M, VHL, lines 81–83)

This analogy demonstrates that when in consultation, the doctor had expected a certain level of expertise from his patient. This thereby resulted in asking questions which Connor, due to his lack of patient expertise, was not equipped to answer. In

addition, this exchange conveys a lack of communication when in consultation between the doctor and participant, as the participants' level of knowledge regarding his diagnosis was not clarified.

Connors' mother, who was also present in the consultation room, further reiterates that clinic patients are expected to know the ins and outs of their diagnosis even from the initial appointment attendance:

> *. . .You're asked a lot of questions, but because you had no idea of the disease or the consequences, you give general information. It's not specific, so it's only later on when you understand about the disease that you realise that actually, although that seemed insignificant for a general sort of medical history giving out information, these smaller things are actually very relevant. So yes, I suppose a lot of emphasis is on actually the patient knowing already so much.*
> (Conner's Mother, F, lines 84–89)

This illustrates an abundance of questions being asked in the initial consultation which may overwhelm the participant; in conjunction with the lack of diagnosis knowledge which the participant may hold, this could result in inadequate information being supplied during the consultation. Retrospectively, perhaps the participants' parent now appreciates the reasoning behind such basic medical history questioning, as at the time of consultation she was not aware of the importance of such questions and regarded them as trivial. This conveys the gradual acquirement of expertise concerning the diagnosis and the consultation clinic, even in this short time. To maximise the time and receipt of sufficient and correct information in consultation, the requirement for specific introductory clinic/diagnosis is further highlighted.

Due the expressed minimal information given to new patients at the clinic, some participants have consequently taken an active approach towards gaining information about their diagnosis. Conner explains that since his referral to the screening clinic, he has not been provided with any information, therefore he was compelled to independently source the desired information about his diagnosis. This inquiry

represents an active position which the participant chose to take with respect to their diagnosis:

> *Well, I haven't really been provided with any information. All the information about the condition I've done myself by research from the internet.*
> (Conner, under 18, M, VHL, lines 93–94)

Moreover, participants explained that they would generally be appreciative of such information about the diagnosis and clinic if provided:

> *Information, definitely. If I know more about something that I have, then I can deal with it better.*
> (Conner, under 18, M, VHL, lines 285–286)

Conner describes that the more informed regarding his diagnosis, the more he can manage the issues resultant from it. This desire for information conveys the need for the control and management of diagnosis. Perhaps such control may provide a sense of empowerment and of taking control of the situation for participants.

Along with the lack of diagnostic knowledge provided from the clinic, which was depicted by participants, there was also a lack of awareness regarding the clinic set-up, particularly regarding the role of prominent staff at the screening clinic:

> *This is the first time I've heard of (when asked about the role of the specialist clinic nurse) . . .I don't know what she does.*
> (Conner, under 18, M, VHL, lines 149–152)

The participants were asked about the role of the specialist nurse, as it was assumed they all had contact with her at some point. Conner was the only interview participant who was unaware of the specialist nurse at the screening clinic. Conner, who was recently referred to the clinic, explained how he was unfamiliar with the specialist nurse and not sure of her role in the screening clinic. Considering the noteworthy role the specialist nurse plays in terms of being the link between the patients and clinic, it is important and beneficial for recently referred patients to be aware of her position amongst staff. Informing patients of the screening clinic set-up, including the roles of the staff who are regularly present at the clinic, early on in the screening process may provide the incentive for subsequent screening clinic attendance.

In summary, participants conveyed different opinions regarding managing their diagnosis; some took responsibility whereas others relied on the opinion of the medical staff at the screening clinic. Moreover, participants illustrated the expectations of patient expertise, and for individuals only recently diagnosed, that lack of expertise created different hurdles to navigate.

6.8 Outline of barriers and facilitators

An outline of potential barriers and facilitators to service user engagement with screening and surveillance services identified as an outcome of this qualitative interview study (Study 2) are summarised in Table 6.6 below. The summarised barriers and facilitators are organised by individual and organisational factors.

Table 6.6. Summary of potential barriers and facilitators to engagement as an outcome of Study 2

Factors	Barriers	Facilitators
Individual	-The individual becoming aware of an upcoming appointment. -Pre-appointment anxiety felt by the individual. -Receival of appointment reminder, for instance a letter. -Travel distance to the clinic. -The individual having to arrange annual leave. -The individual having to arrange/book a travel method. - Excessive cost of travel and/or parking. -Prior uncomfortable/ negative experiences perceived by the individual, for instance during the MRI process.	-The opportunity for the individual to ask any questions of concern freely. -Being optimistic due to the development of science. -Being optimistic by observing the positive progress of family members/those with the same diagnosis at the clinic overtime. -Attending the clinic as a family, which provides a source of support and encouragement. -To familiarize the children in the family to the process of the clinic.

	-Attending the clinics as a family at times causes a hindrance of information management and limitations speaking freely for some individuals. -Assumption that some family members are not engaging as they think the diagnosis is an isolated incident and not applicable to them. -Witnessing family members going through difficult challenges which lead to their demise. -Younger patients possibly comparing themselves to their peers. -Younger patients not appreciating/understanding the importance of engagement. -The individual feeling that the health professional is withholding information/lack of trust. -Lack of confidence by the individual in the medical staff. -Communication issues and/or language limitations between the individual and clinic staff.	-The feeling of undergoing a full review/MOT of one's own body. -The individual having trust and a sense of familiarity towards the clinic staff. -Younger individuals feeling that they are being treated with respect by the clinic staff. -The individual confidence in the doctor's expertise/opinion.
Organisational	- Lack of availability of parking spaces at/near the screening clinics. -The provision of such patient support groups are not suitable for some individuals, as not a positive experience for some patients. -Lack of clinic/diagnostic information from the clinic to the patient.	-The convenience of a 'one-stop' available at the clinic. -The clinical staff accommodating the patients' comfort needs. -Provision of a personalised approach to care for each patient. -A positive interpersonal relationship between patients and in-clinic staff.

		-A friendly easy- going clinic environment. -Provision of the same clinical personal interacting with the patient when they attend the clinic. -Provision of an opportunity of a 'general clinic' within the appointment. -Provision of a specialised clinic for each separate diagnosis. -Balanced information provision to the patient from the clinic staff. -Provision of a specialised endocrine nurse.

6.9 Discussion

The focus of this study was on understanding the individuals' perception and experience of the clinics – with the aim to identify factors that potentially enhance or detract from attendance and engagement with the Barts endocrine screening clinics. The four major themes resulting from the analysis were, 'Perception at a distance', 'Seeing my future self', 'The body and person in clinic' and 'The patient or doctor, who knows best?'.

6.9.1 Factors which potentially detract from attendance and engagement

Patients who schedule appointments and fail to attend have been demonstrated to have a negative impact on patient care, as well as clinic productivity (Lacy et al., 2004).

Therefore, considering the factors behind patient attendance and engagement may be valuable in informing strategies to increase patient attendance to the screening clinics.

The interview participants revealed multiple perspectives towards the screening clinics. Knowledge of these perceptions is potentially important to improve the screening service; the importance of collecting feedback has been illustrated by Gill et al., (2015) to be an acceptable and beneficial means of evaluating health services. One feature of participants' accounts was the avoidance of thoughts regarding their diagnosis and the screening clinics, most of the time in everyday life. While the exact reason for this cannot be known, literature indicates that denial or in this case avoidance is a known strategy for people with chronic or incurable diagnoses (Pourang and Besharat, 2011). What was also evident was that while participants reported not to worry on an everyday basis, significant others, in Emma's case her husband, did. This is an example of a 'spillover' effect of the diagnosis which is portrayed in the form of worry by Emma's husband. Having an ill relative establishes a well-documented burden on caregivers and non-caregiving family members (Wittenberg et al., 2013a). These 'spillover' effects of illness can affect several aspects of a family members' lives, from emotional health to quality of life (Davidson et al., 2008). This is perhaps due to the interdependence of the relationship, the diagnosed spouse could produce a series of effects on the healthy spouse due to the potential shifting of responsibility, along with the direct burden of the diagnosis (Wittenberg et al., 2013b). It has been noted that the impact of an illness in a family seemed to differ distinctly by whether the ill person is a dependent, for instance, a child's chronic diagnosis was reported as more consuming than a spouse's illness (ibid).

It has been recommended to remind individuals about their upcoming appointment in order to facilitate attendance (Ullah et al., 2018). However, in this study, reminders of a clinic appointment led to a resurgence of thoughts related to diagnosis. For some this triggered difficult memories of procedures, for others the onset of potentially phantom symptoms and for many the burden of organising access. In each of these scenarios what seems apparent is that the clinic appointment potentially acts as reminder that everyday life is not quite normal and triggers recipients to resume a patient role in preparation for attending the screening. In the case of apparent increase in symptoms and vigilance, these could be an example of white coat syndrome. While

often associated with hypertension, this syndrome indicates an increase in symptoms as a result of anticipation and anxiety brought on by medical attendance (Cobos et al., 2015). Elsa's narration of possible pain may be due to the anxiety as a result of the anticipations of being in the clinic office and in the presence of the doctor. However, it is also possible that Elsa may be rehearsing her responses by seeking out if she has pain or another symptom that she may be asked to tell the doctor about.

Olivia's perception of the screening service is portrayed through her narration of experiencing anxiety and not wanting to be *'shut in'* during the MRI scan. Such anxiety in the MRI could be related to claustrophobia, as portrayed by Olivia feeling *'shut in'*, or other factors such as possible diagnosis, environmental factors (needles) or fear of hospital staff (Munn and Jordan, 2011). Anxiety and claustrophobia are prevalent during MRI scanning, it has been reported that around 2 million scans worldwide cannot be performed annually either due to premature scan termination or refusal due to claustrophobia (Munn et al., 2015). It is important that the patients remain immobile during the scan so to acquire optimal images, high levels of claustrophobia or anxiety during imaging may result in increased patient movement, resulting in lowering the quality of the diagnostic value of the scan (Harned and Strain, 2001).

MRI designs have become more patient-friendly, with the introduction of open scanners and reduced noise (Lemaire et al., 2009). It has been noted that when patients are anxious they prefer open MRI to closed MRI systems (Michel et al., 2002), as an open MRI structure can increase comfort and reduce anxiety, it is likely that motion artefacts could be reduced (Bangard et al., 2007). Nevertheless, scanning time can be up to twice as long in open MRI systems which may lead in an increased demand on the patient, which could result in elevated nervousness and therefore movement (Michel et al., 2002). In spite of these technological advancements there has not been a reduction of claustrophobic reactions (Hunt et al., 2011) and head examinations especially still seem alarming for claustrophobic patients, even in more patient friendly designs (Michel et al., 2002). These experiences and perceptions in regards to MRI screening, as well as medical equipment in general, may be factor of why some patients choose not to attend their screening appointments at the clinic. For instance, the patient who expressed that he had to stop his MRI scan which was taking

two hours due and resulted in his discomfort, this may be a factor in non-attendance due to the uncomfortable situation that occurred.

Such conveyed induced anxiety by some of the participants in this study may be prevented by implementing the following principles, referred to as the CARE process by Lerwick (2016): (1) Choices: suggest power in a powerless environment; (2) Agenda: allows patients and families to know what to expect in the screening clinic and what is expected of them; (3) Resilience: highlights positives and reimagines negatives; and (4) Emotional support: identifies common fears and responses. Implementing the CARE principles could help patients and their families who attend the screening clinics feel empowered and may reduce and even alleviate risk of anxiety towards the clinic.

As reported by Prang et al. (2015), social support is defined as information that aids individuals to believe that they are cared for and belong to a network of communication and requires mutual obligation. Literature has depicted that social support aids with moderation of life stress and positively influencing anxiety and depression (Mao et al., 2015). Patients who are supported were demonstrated to cope better with their diagnosis, compared to patients who have less social support (Guruge et al., 2015). However, Nolan's narrative which fits in the subtheme *'Snapshot of my future'*, does not convey reinforcement of such positive experiences of social support. He recounted his experience when going to a patient support group, which is an option offered to patients by the screening clinic. As a result, he was confronted with a possible negative future by comparing his diagnosis to other patients present in the support groups and has chosen not to engage further with the group. This is in accordance with the social comparison theory; social comparison occurs between people with similar issues (Festinger, 1954), such as chronically ill patients, thereby helping them to evaluate their situation (Dibb and Yardley, 2006). This is depicted by Nolan, by his realisation that in fact, he too is diagnosed with the same chronic rare endocrine syndrome and with its possible consequence.

Nolan's portrayal of possible anxiety whilst attending the patient support groups, is analogous with the findings of Palant and Himmel (2019), who reported feelings of uncertainty and anxiety of patients when listening to other people in support groups.

The feeling of anxiety with social groups may also be a factor in the lack of engagement of patients in the screening clinic, as they are also confronted with patients at the clinic who are diagnosed with same chronic illness.

Participants, in the sub-theme *'Family matters'*, highlighted that some younger family members either decided not to attend screening programmes or those who currently attend the screenings with their families, have communicated that they intend to stop going in the future. While this was not demonstrated in Study 1, young people are noted to miss more scheduled medical appointments of all kinds than other age groups (Paterson et al., 2010). For instance, for younger patients with diabetes, the transition from paediatric to adult clinic is demonstrated to be crucial, with many patients dropping out of the system altogether (Jones and Hamilton, 2008). This possibility of dropping out is conveyed by Olivia's daughter who informed her that she is planning to stop going to the screening clinics once she turns 18 years old. The reluctance to attend the screening appointments by young people may be due to concerns that the clinic consultations may not remain confidential, especially concerning sensitive issues (Carlisle et al., 2006). This is possibly exemplified by Olivia's daughter who has experienced a few people saying *'nasty things at school';* due to her diagnosis and possibly due to her taking time off school to attend the appointments, which could have been noticed and commented on by others at school.

Interview participants illustrated how they feel whilst attending the screening clinic, which is depicted in the theme *'The body and person in clinic'*. An interesting aspect of the findings, in relation to patients' experiences, is the illustration made by participants such as Emma, who used the analogy of undergoing a MOT to refer to the experience of the screening process. Her narration fits in the sub-theme of *'disembodiment'*; this analogy imparts a sense of the screening being a positive aspect, however, during the process they feel detached from their physical body through the description of their body as being mechanical and finely tuned, to some extent a mechanical person. Moreover, Nolan compared the clinic experience of undergoing several procedures in one day, such as undergoing blood tests, having an MRI and a consultation, as being part of revolving seats in a restaurant. Therefore, he may considers himself to be somewhat part of a conveyer belt of patients just passing

through the clinic, thereby creating an impression of the patient being detached and not engaged in the screening clinics environment.

A further example of being detached in the screening clinic environment, is described by Olivia by illustrating that she envisions herself on a relaxing beach setting whilst undergoing her MRI scan. She finds that this process provides her with some anxiety relief, and possibly the detachment is a coping strategy. Disassociating, as a form of coping with trauma, is echoed in the literature by Kennerly (1996) and Mollon (2001). The processes depicted by participants such as daydreaming of a beach, is described by Kennerly (1996) as a mild form of blacking out, or an out of body experience. When a patient imparts the need to go through this detachment from reality, this may be an indication that the clinic environment does not provide the necessary support for patients who experience some apprehension regarding the screening process. Perhaps creating a more purposeful, greater individualised service for the screening patients will resolve some of the detached environment that the clinic may convey.

The experiences that participants with rare endocrine syndromes face when attending the screening clinic, such as lack of appropriate information, is depicted in the sub-theme *'Assumed expertise'.* Individuals with rare diseases may face challenges that are different from those experienced in more common medical diagnoses (Von der Lippe et al., 2017); therefore, reliable and up-to-date information is crucial for patients to be able to make informed choices about their diagnosis (Muir, 2016). Conner explains how he was not provided with any information and consequently he had to do the research by himself; this is echoed by Muir (2016) who discussed that nearly 70% of his study respondents with a rare syndrome did not feel that they were provided with sufficient information on their syndrome following diagnosis. Furthermore, a key finding presented by Muir (2016) is that patients with a rare syndrome are frequently left to research their diagnosis (with very little help or direction). Conner further explains the importance of research, as the information attained provides him a sense of empowerment towards his diagnosis, as he '*can deal with it better*'.

Participants explained how researching their own diagnosis resulted in getting an earlier appointment to the clinic due to being worried from the information they have found. In the sub-theme *'The balance between trust and scepticism',* Nolan narrates

that initially he researched some information in regards to his diagnosis, however he *'ended up just frightening'* himself and rescheduling his appointment to an earlier slot. Although obtaining information regarding his diagnosis increased Nolan's engagement with the screening service, this was under the premise of anxiety and worry that he was not given the correct information from the staff at clinic; '*..they've been telling me a load of lies here..'.* However, when he does go to the clinic the doctor would put his mind at rest in regards to his diagnosis. Despite the probable benefits of being able to access online health resources, some concerns have been expressed about the possible anxiety-provoking effects of online medical information (Muse et al., 2012). In accordance with the cognitive-behavioural model (CBT; Warwick and Salkovskis, 1990), an episode of health anxiety, as exhibited by Nolan in the findings, can occur when dysfunctional health related beliefs are activated by internal or external stimuli (in Nolan's case looking up his diagnosis online), causing them to be misconstrued as evidence of a significant health threat. Moreover, Nolan's stated narration of '*hang on, they've been telling me a load of lies here',* supports the CBT theory in relation to doctor distrust (Wells, 1997), where doctor distrust could lead to a need to justify one's concerns.

6.9.2 Factors which potentially enhance attendance and engagement

Family networks were a positive factor in the level of engagement in the clinics; the sub-theme *'Family matters'* includes Andrew's anecdote of the importance of attending the clinics as a family, and the support which as a result they provide each other. Immediate networks such as family and close friends were discussed to be of essential importance when in relation to mammography screening behaviour (Kaltsa et al., 2013). Fear acted as a motivator, but also as a barrier in regards to mammography screening engagement (ibid), thereby having family members supporting each other in consultation, as illustrated by Andrew, may be a factor in the continuous engagement of some patients in the screening clinic. Patient and family-centred care is considered a key factor of high-quality care and has been increasingly linked to better health outcomes and decreased use of health services (Herrin et al., 2016).

In the sub-theme '*The balance between trust and scepticism',* participants discussed the importance of interpersonal interactions; for the most part positive aspects of being in the clinic and interacting with the staff were recounted by the participants. The patient-provider relationship was rated second only to family relationships in level of importance to patients (Erdem and Harrison-Walker, 2006). Such relationships have been demonstrated to be built through effective communication and interaction, this is embodied by Miles who refers to the experience of going to the clinic, as going to see his '*mates',* thus conveying the ease and informality of interaction. Information exchange and fostering trusting relationships have been described as significant aspects of successful interpersonal communication between patients and care providers (Arora et al., 2009). High quality patient-provider communication has been demonstrated to correlate with longitudinal continuity of care (Katz et al., 2014), and therefore likely to influences patients' interpersonal relationships with their healthcare providers and consequent screening clinic attendance. Moreover, Olivia narrates that staff are '*great with the kids.. they talk to children as well…',* this highlights the importance of provider communication skills in listening to patients, answering their questions and involving patients in decision-making about their care (Tabler et al., 2014).

In relation to behavioural maintenance factors, there is evidence (Conroy et al., 1999) that health anxious individuals will seek reassurance from sources such as the doctor, exemplified again by Nolan, thereby increasing engagement with the screening clinic. Those with health anxiety may be more inclined towards experiencing doctor disadvantages, perceiving such disadvantages could result in the use of alternative sources such as the internet (Norr et al., 2015). Consistent with this, interviews carried out by Singh et al., (2016) demonstrated that participants used the internet to filter problems before consulting doctors, therefore becoming 'expert patients'. Becoming an expert patient aided participant's to rapidly reduce anxiety and uncertainty before a doctor visit (ibid), as a result potentially increasing engagement with the clinic. In sum, aspects that influence the level of engagement with the screening service includes information reassurance from the health service professional, patient empowerment through becoming an 'expert patient' and obtaining information about diagnosis under the premise of anxiety.

Although the focus of this study was about the screening clinics, participants also expressed additional issues. Issues that would merit future research include the topic of 'survival' (Elsa), intergenerational knowledge and experience. This research is a 'snapshot' in time; longitudinal studies following up patients across the years and across the family generations maybe helpful. A further issue that warrants future research is that some individuals with long-term diagnoses have been noted to report more difficulties in comparison to the general population in comprehending the health information and actively engaging with healthcare service providers (Friis et al., 2016). For instance, symptoms may be interpreted by the individual to be less severe, which is noted to act as a barrier to engagement (Taber et al., 2015). This is exemplified by Miles when talking about son, who does not engage with the service, expressing that '*nothing wrong with me'*, thus such individuals may generally don't consider themselves to be 'patients', an area also worth of exploration.

6.9.3 Strengths and Limitations of this study

Strengths included recruitment of participants across the screening clinics as desired, which also included some children which is noted to be an absence in the previous literature. Cooperation of the study interview participant's and willingness to convey individual experiences of the screening clinic was an advantage. The study participants were recruited at a single tertiary referral centre, Barts endocrine screening clinics, thus just participant views from one geographical location.

A further strength was the comparable narrative which arose across the three different clinics. Across the three diagnosis clinics, a similar topic that was expressed was the of familiarity and ease which the clinic offers. For instance, Miles who attends the VHL clinic, is comfortable with the staff to the point he refers to going to see his *'mates'* at the clinic, whilst a younger patient Emily an MEN patient, points out that the staff to aid with the comfort of the patient she appreciated that they '*use the toys to distract you',* as for Emma, an SDH clinic patient, further conveys the familiarity of the clinic through the lax use of formal language between the patients and in-clinic staff as a result of the '*bit of banter going, which makes it more relaxed'.*

In regards to limitations, this study included two child interviews which were short in length. Child interviews possess limitations as they can be a complex and challenging task (Clark, 2010). It has been recommended that when conducting an interview with a child, additional practical and methodological considerations should be taken into account (Dayan, 2008). Such considerations pertain to the inherently greater power adults possess in their relationships with children (Clark, 2010); adults are accustomed to instructing children whilst expressing little interest in the child's opinion on how to manage their world (Ponizovsky-Bergelson et al. 2019). By virtue of these power-based relations, children are likely to respond to adult questions in an obligatory manner, they wish to please the adults by producing the 'right' answer (Theobald et al., 2015). Further it has been expressed that it is difficult to achieve a valid comprehension of the child's wishes, due to the potential biases and expectation that adults bring to their evaluation of the situation (Ponizovsky-Bergelson et al. 2019). It is also recognised that the gender and ethnicity of the young person and the researcher may exacerbate issues of communication, comprehension and interpretations of the child's world (Beoku-Betts, 1994), of which many ethical issues can arise in the process.

Moreover, the difficulty of engaging young children in the interview process has been commented on, in that the question-answer format is less successful then entering an extended conservation (Fleer and Li, 2016). Thus, to overcome difficulties with child interviews include the aim of creating a dialogue and reduction of the power-submissive relationships; child friendly methods are suggested so to encourage children to express themselves openly (Ponizovsky-Bergelson et al. 2019). Future research may explore the most common interview methods, which includes using drawing and pictures (Sahimi and Said, 2011). In addition to employment of specialised interview topic guides for children and young people, as it has been noted that interview guides require deliberate tailoring to ensure that the child's perception is captured (Patel et al., 2016).

Additional limitations are in relation to the length of the adult interviews, which are short, this is acknowledged, however with the adult participants the topics were covered effectively. Further, the interview transcripts were not returned to the

participants for comment; member checking would have been used to validate or assess the trustworthiness of the qualitative results (Doyle, 2007).

With respect to the topic guides used for the interviews, the guide appeared to be appropriate for the adult patient, however a topic that was raised which was not included in the topic guide, was the possible issue with language proficiency. As participants such as David explained how he consults family or doctors he knows abroad when he requires advice regarding certain medication for example. This was also a surprising finding, considering the rare status of the diagnosis. It may be assumed a patient would depend on the specialist advice, as it has been suggested that deficient expertise of the health care provider is an issue in the specialised treatment of a rare diagnosis, thus the patient usually becomes an expert in their diagnosis (Budych et al., 2012). Therefore, some of participants narrating that they seek advice/explanations outside the specialised clinics, in the form of family members or those abroad, was an unexpected finding. In relation to the use of the interview topic guide with children, as stated, the interview guide for the children was not fully appropriate, due to some of language and presented topics, possibly exhibited in the short length of the interviews.

Regarding specificity, the personal views expressed by some patients are based in one setting, the Barts endocrine screening clinics. Thus, context specific, as much with qualitative work, hence the views expressed are likely to different from others, as they pertain to their own experiences and construction of their own meaning of the world. Therefore, the views are not generalisable to all of the patient group using the screening clinics.

6.9.4 Conclusion

To our knowledge, this is one of the first research studies to explore the experiences of patients regarding regular screening for rare endocrine syndromes. Study 2 identified themes based on participants' experiences, and from these, has highlighted several areas which could be developed to promote regular patient engagement. The importance of careful management of projections of self, balancing information

overload and honesty, interpersonal relationships and humanisation of care and assisting with the early navigation for the non-expert individual were all highlighted.

The next chapter presents Study 3, the first stage of a resource development, which involved a cycle of focus groups with adult patients to co-produce an information leaflet targeted at new patients to the clinics with the aim to an information resource encourage patient engagement with the Barts endocrine screening clinics.

Chapter 7

Study 3- By patients, for patients: Development of a patient-led information resource

7.0 Introduction

This chapter describes Study 3, which entailed the co-production of an information resource for new patients at the Barts endocrine screening clinics. First, the background and aims of this study are provided in Section 7.1. The methodological approach is presented in Section 7.2, whilst the focus group cycles, participant recruitment, the materials (topic guides) used in the study and process plan is detailed in Section 7.3. Section 7.4 presents data management, while Section 7.5 outlines ethics. The findings of these focus groups are provided in Section 7.7. Finally, Section 7.8 serves as a discussion and conclusion.

The findings from Study 1, the quantitative research conducted in Chapter 5, provided insights into patient attendance numbers at the clinic—16.73% of patients failed to engage, meaning they did not attend their appointment. The patient interviews from Study 2 in Chapter 6 highlighted areas that could be further developed to promote regular patient engagement with the screening clinics, such as communication, interpersonal relationships and reliable information provision, specifically for non-expert new patients. This chapter outlines a study which initiates steps to address these issues.

7.1 Background

Evidence indicates that satisfaction with outpatient consultation is associated with greater engagement, compliance and better health outcomes (Becker, 2014). Lack of information provision was cited as a common cause of poor service performance in the 2008/2009 NHS Patient Survey Programme (Griffin et al., 2004). This finding echoed an earlier national survey of outpatients which found that 27% of first-time outpatients would have appreciated more clinic information (Fleissig et al.,1999). Further, this desire remains relevant now as illustrated in the findings of Study 2

(subtheme *Assumed expertise*). It has been noted that when patients visit their doctor, information is customarily provided through a verbal explanation—it is only sometimes accompanied by a printed information leaflet (Colledge et al., 2008). Patients also generally have difficulty recalling important information accurately, especially those who are anxious or older (Kessels, 2003).

Overall, only about half of the information provided to patients is accurately recalled (Laws et al., 2018). Patients have expressed a desire to be more effectively informed and a willingness to spend more money and time to achieve this (Rajasundaram et al., 2006). There are many alternative formats for health information provision that are generally recognisable and accessible but rarely used in mainstream practice (Colledge et al., 2008). Some of these alternatives have been evaluated through randomised controlled trials, including the internet /web portal (Swartz et al., 2006), video/pre-made videos (Walker and Podbilewicz-Schuller, 2005) and text message (Vidrine et al., 2006). While such alternative formats are increasing, the patient information leaflet has been stated to be a widely used as a source of information (Protheroe et al. 2015).

Written information can help bridge the communication gap between patient and doctor by reinforcing verbal explanations (Bernardini et al., 2001), for instance, this may be about information regarding the clinic and its structure for the specific aim of increasing attendance. While there are certainly benefits to electronic patient information leaflets, there are concerns over patients who depend on physical materials (Hammar et al., 2016).

Two discourses have been distinguished describing patient information leaflets (Dixon-Woods, 2001): the prevalent discourse of patient education; the second, overlapping discourse is that of patient empowerment (Protheroe et al., 2015), in that by provision of information, patients will have the capability to make informed decisions about their health care, for instance to attend appointments. It has been noted that patient information leaflets are generally positioned in waiting rooms, further, there is evidence from a qualitative study that patients appreciate and access such information materials (Moerenhout et al., 2013). However, queries have been raised

as to whether information tools can be read and understood by patients and whether they are beneficial for encouraging and maintaining good health (Protheroe et al., 2015).

Some researchers conclude that patients do want and use patient information leaflets, but many of these leaflets have been stated to be poorly written (Kenny et al. 1998). There have been various frameworks for determining the quality of patients' information leaflets (Garner et al., 2012), a main factor of these is the 'readability' of the information or how effortlessly the text can be read and comprehended (Protheroe et al. 2015). The complexity of written materials can be assessed by measuring readability using formulas that check word and sentence length, for instance 'Flesch Reading Ease' and 'Flesch–Kincaid Grade Level' (Flesch, 1948; Kincaid et al.,1975). Albeit these formulae are not without criticisms: for example, the aforementioned formulas do not take into account the employment of unavoidable medical terms and they were developed in America rather than the UK, however they have reported excellent reproducibility and have been utilised in several previous studies (Protheroe et al. 2013).

Given that more information regarding clinics has been noted as a need, both in the literature and through the interviews, for instance in some of the literature it has been described to potentially enhance attendance, thus a process to create an information resource was undertaken. An a priori decision was made to focus on a paper leaflet to ensure that patients without access to new technologies are not overly disadvantaged (Hsu et al., 2005; Office for National Statistics, 2006). Further, use of internet health related inquiries were also noted to have a capacity for patients to become misinformed of experience phycological harm if accessing incorrect web pages (Case et al., 2004). It has also been recommended that enablers associated with screening attendance includes reducing inconvenience and increasing support to individuals (Graham-Rowe et al's., 2018). Thus, it is anticipated that a paper leaflet may reduce such inconvenience and increase support regarding information access in relation to the screening clinics.

7.1.1 Aim: Development of an Information Resource for Patients

The primary aim of this study was to develop an information leaflet for new adult patients in collaboration with expert patients who are familiar with Barts endocrine screening clinics. As patient consultations are often restricted in terms of length (Becker, 2014), we sought to develop a leaflet that could be used as a reference for new patients on what is available and who to contact if necessary, thus encouraging patient engagement with the screening clinics.

7.2 Methodological Approach

It has been noted that there is an enhanced commitment to the significance and contribution public involvement can give to research (INVOLVE, 2012); as such involvement can result in empowering individuals who use health-care services, providing a way for contributing change and improvement in factors which affect individuals most (ibid). Further, the advantages of involving service users includes the recognition that they are experts in their experience, who usually possess an adequate knowledge of how the service and the system works (NHS, 2010).

One way to involve service users' individuals with the development of what is provided through the service is through co-production (Evans et al., 2019). Co-production is an approach that encourages collaboration between service providers and service users (Holland-Hart et al., 2019). The phrase 'co-production' was originally popularised by Ostrom (1996) but refined by Cahn (2000). Descriptions of co-production vary (Vooberg et al., 2015) but it is generally agreed upon that the process aims to promote the democratisation of decisions between citizens and service providers to allow for citizen-centred outcomes. Co-production occurs in healthcare when patients partner with providers to contribute to the provision of health services (Vennik et al., 2016). This can occur on a macro level (between government and patient organisations), a meso level (between a health organisation's board of directors and their client council), and a micro level (between healthcare professionals and patients) (ibid). This study focused on the micro-level, micro as the co-production was between patients, the researcher with some input from a healthcare service provider.

Co-production involves shared decision-making among professionals and patients, making it quite useful in crafting resources for patients (Elwyn et al., 1999). The traditional model of healthcare service construction is characterised by professionals designing and supplying high-quality services to patients (Boivin, 2012). Patients are generally viewed as passive recipients of care; they trust that professionals operate in accordance with their professional ethics/ethical code (Farr, 2012). However, an increasing need for personalised care has altered conceptions of the patient's role (Boivin, 2012). The 'co' in 'co-production, therefore, refers to an activity designed mutually by patients and providers, though not necessarily through direct interplay of their efforts (Pestoff, 2006).

Holland-Hart et al. (2019) note that their participants were typically supportive of the concept of co-production once they are aware of its meaning, the authors also suggest that co-production is generally focused towards patient engagement in decisions over their personal care processes. Whilst others (Bovaird and Loeffler, 2013) illustrate its use in developing more effective and competent services through for example production of an information resource that is reflective of the needs of both patients and providers.

This study aims to use the unique knowledge of experienced patients to bring about more effective and competent services, as narrated in Bovaird and Loefflers' (2013) study, through the production of an information resource that is reflective of the needs of both patients and providers.

7.3 Methods

7.3.1 Focus groups cycles

In order to co-produce the information resource with expert patients, a forum enabling creative thinking, discussion of shared meanings, and personal experiences was required. Focus groups constituted the most appropriate method to achieve this. Focus groups are useful for accessing views of minority groups that are generally perceived as hard to reach (Hennings et al., 1996). They can also evoke spontaneity

and candour from participants, which may yield data that is usually withheld or left untapped by more conventional methods (Barbour, 1999). Focus groups are used extensively in healthcare research to gather group opinions regarding a shared topic of interest (Goodman and Evans, 2010). These group discussions draw from complex personal experiences, perceptions, attitudes and beliefs through moderated interaction (Hayward et al., 2004). Focus groups are often considered to be an encouraging option in participatory research (Morgan, 1996), thereby providing a platform for contrasting worldviews (Guba and Lincoln, 1994).

A focus group discussion is a group-based process. As such, it is subject to the biases found in all group settings (Nyumba et al., 2018). One of these is the possible negative effects of group dynamics (Finch and Lewis, 2009). For instance, the personalities of participants and how they relate to one another, through disagreements or misunderstandings, can hinder group performance (Goodman and Evans, 2010). A further potential drawback involves confidentiality. In this study, the importance of confidentiality was emphasised in all of the focus groups; nevertheless, the researcher has limited control over what is discussed outside the group (ibid). Further, the topic was not very sensitive or personal, thereby confidentiality was less likely to be of a concern.

This study used a small-scale variant known as the mini focus group, which generally includes between two and five participants (Kamberelis and Dimitriadis, 2005). The mini focus group was considered appropriate due to recruitment and scheduling obstacles stemming from the geographical spread of patients (Nyumba et al., 2018). Such small groups usually comprise individuals with high levels of expertise (Hague, 2002). This method fits with this study because the health syndromes being studied are quite rare and those living with these diagnoses generally have extensive experience over several years.

Using focus groups enabled the researcher to gather information from multiple participants in the same space and time around a topic of mutual interest, thereby forging a wealth of information (Goodman and Evans, 2010). Due to the small number of participants and the design only allowing for one-off experiences, the topic could

not be exhaustively discussed with a single group discussion (Nyumba et al., 2018). Therefore, in line with Burrows and Kendall (1997), three mini focus groups were conducted, each with different participants and a unique objective.

7.3.2 Co-production cycles

The co-production method involved a six-cycle process, below is a brief summary of each of the cycles, accompanied by a visual diagram (Figure 7.1) of the procedure:

1) **Cycle 1- Orientation and scope: Service provider/observation.**

Preliminary clinical observations resulted in the accumulation of basic information (Appendix 4.1)—such as the services offered by the clinic—which should be reinforced in the patient information resource, as outlined by an NHS toolkit (NHS, 2003). This toolkit provided initial guidance for producing written information for patients. The lead clinician at the Barts Health endocrine screening clinic was consulted prior to Cycle 2/FG1 in a meeting on the Barts site with the researcher. This is where the clinician requested that the information resource be aimed at new participants.

2) **Cycle 2- Focus group 1 (FG1)**

The aim of FG1 was to gather participants opinions regarding how they access and use healthcare information and to ascertain potential content of the co-produced information leaflet.

The first focus group session was directed by the topic guide using the applicable parts of the focus groups topic guide (Appendix 7.3) and examples of existing patient information leaflets were shown to the participants (Appendix 7.17). Decisions were made with respect to the format and possible content of the leaflet. To ensure successful communication through the leaflet, several features of the written information were considered, suggested considerations included design, content and readability (Adepu and Swamy, 2012; Guillot and Keenan, 2016).

3) Cycle 3- Focus group 2 (FG2)

The aim of FG2 was to explore what encourages participants to use a patient information resource at the early stages and to further consider specific content, thereby building on the work from Cycle 2/FG1. Participants were provided some examples of existing patient information leaflets in order to comment on text size, readability, quality (Appendix 7.10; Appendix 7.13 and Appendix 7.14). The second focus group session was carried out using the topic guide (Appendix 7.3). Following the completion of cycle 3 an interim mock-up of the patient leaflet was produced.

4) Cycle 4- Service provider input

Further input was received prior to Cycle 5/FG3 as part of the co-production process—the lead clinical approved the size of the leaflet and requested the inclusion of additional information concerning the prohibition of discussing patients who are not in the same room. The title was also refined from 'What Can We Do To Help You' to 'How Can We Assist You', as the clinician viewed the word 'assist' as more appropriate than 'help'. This title was used for the interim leaflet, which was shown to the FG3 participants (Appendix 7.11).

5) Cycle 5- Focus group 3 (FG3)

The aim of FG3 was to re-examine perspectives of the patient information resource from recently diagnosed patients and to review and comment on the leaflet content and presentation.

The FG3 focus group participants 'user-tested' the leaflet mock-up by reading it and ensuring that they could understand the intended meaning (Pryce et al., 2018). Any comments or notes about the leaflet were recorded; any typing and/or grammatical errors were highlighted (Appendix 7.11). Thus, FG3 helped to refine the wording and structure of the information leaflet.

As part of the session the interim leaflet was in separate sections and the participants were asked to work together to put the leaflet sections back together like a puzzle (Appendix 7.12). The aim of this activity was to ensure the leaflet is readable, legible and sufficient for patients (Coleman, 2003). Moreover, it has been suggested that patients find text easier to read when broken down into 'moves' (Clerehan et al., 2004). Moves are a series of sections in the text that follow logically from one to another. Moves should be separated by headings, and long paragraphs should be avoided entirely (ibid). The third focus group session was carried out using the topic guide (Appendix 7.3). The final mock-up of the patient information was co-produced (Appendix 7.15).

6) Cycle 6- Production of final leaflet for pilot review and readability testing.

To maximize efficiency, the level of written language should be appropriate for the intended patient group (O'Connor et al., 2009). This facilitates easy comprehension, leading to knowledge enhancement and adherence to diagnosis-management instructions (McGrath, 1999). Readability formulas help to evaluate reading level (Adepu and Swamy, 2012). The Flesch-Kincaid Grade Level (FK-GL) and the Flesch Reading Ease (FRE) scores, both available on Microsoft Word, were used to assess the readability of the patient information leaflet.

The FK-GL score is based on the average number of syllables per word and words per sentence (Kumaran et al., 2009). The FK-GL assesses text on an American grade scale (i.e., a score of 8.0 means an individual in eighth grade/year 9 UK could comprehend the text—the lower the score, the easier it is to understand; Protheroe et al., 2015). In a 2011 Skills for Life survey (Department for Business Innovation and Skills, 2012), 15% of the English working-age population was found to possess literacy skills lower than those of an average 11-year-old schoolchild (comparable to an American grade 5–6). In the same survey, 43% of the working-age population was found to possess skills lower than or equal to those of 13–14-year-old schoolchildren (American grade 8–9). The FRE test assesses text on a 100-point scale; the higher the score, the easier it is to understand. A Flesch readability of ≥60 is considered

straightforward and easy to comprehend (Protheroe et al., 2015). To calculate these scores, text from the leaflet was transferred into a Microsoft Word 2019 document; the readability statistics were derived using the Spelling and Grammar tab and then compared with the data from the 2011 Skills for Life survey (Department for Business, Innovation and Skills, 2012).

Proposed post co-production steps include dissemination and pilot testing of the patient information leaflet. Due to limitation in the project period the pilot review itself was not included in this thesis study.

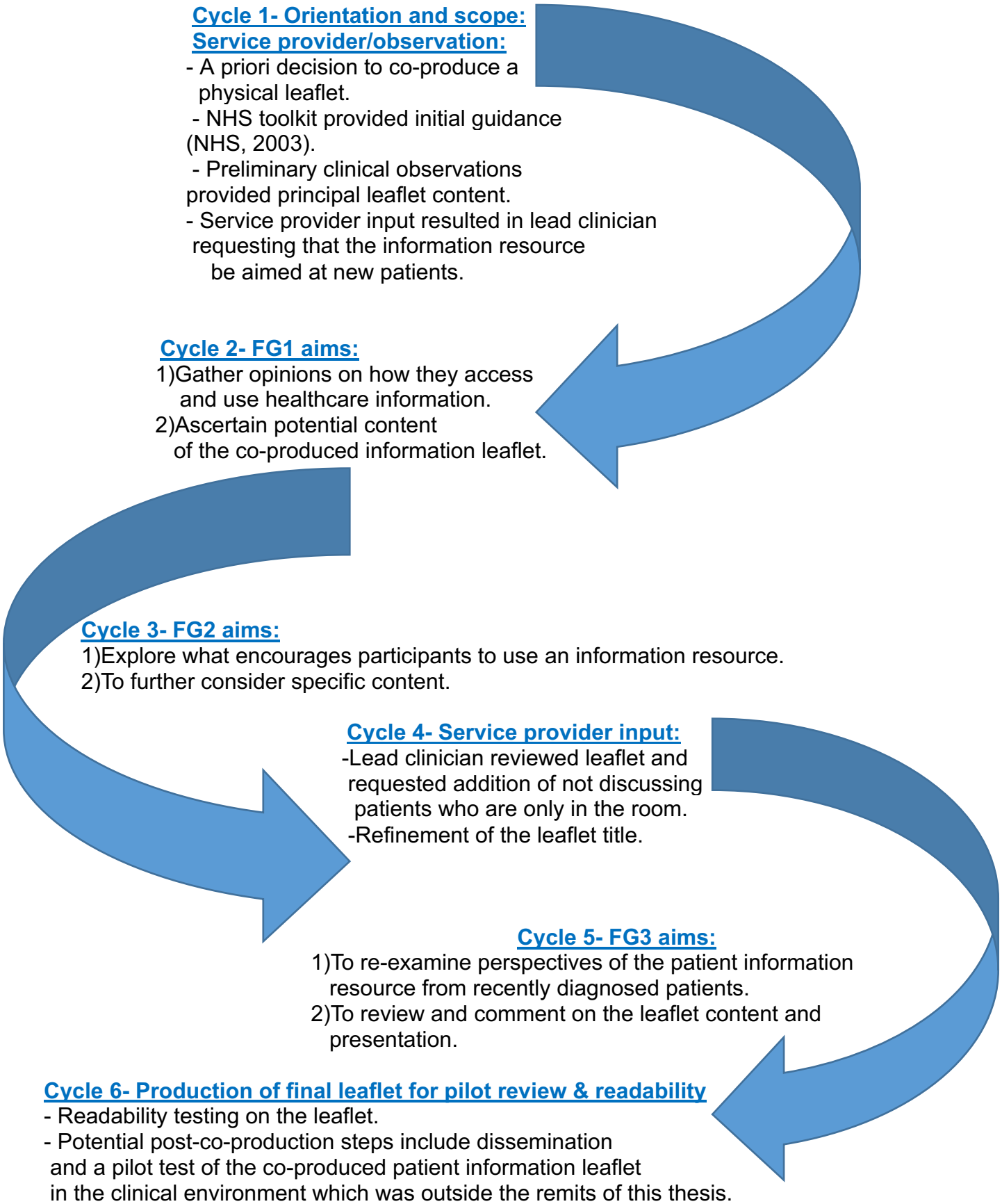

Figure 7.1. Diagram to show the six-cycles of the co-production process.

7.3.3 Participants

Participant identification may be the most crucial step, as the method relies on group synergy (Green et al., 2003). For some, self-disclosure is comfortable and natural; for others, however, it requires effort and trust (Nyumba et al., 2018). Some authors have suggested that trust can be achieved more readily within a homogenous group in which participants share some characteristics, such as age or gender (Krueger, 1994). In contrast, some researchers argue that participants in unfamiliar settings can give more authentic and spontaneous responses by overcoming pre-existing relationships and patterns of leadership (Thomas et al., 1995). Moreover, mixed-gender focus groups may enhance the quality of discussions and their outcomes (Freitas et al., 1998). In this study, considering the wide geographical range of potential participants, a diverse group of participants, such as in terms of patient expertise and time registered at the clinic, was desired. Finally, as the information leaflet is aimed at new adult patients—and because children have shorter attention spans and lose focus relatively quickly (Nyumba et al., 2018)—only adults were included.

-Sampling Strategy

Purposive sampling is preferable, as focus group discussions depend on the ability of participants to supply relevant information (Morgan, 1988). This study used a purposive sampling strategy, which involved the deliberate non-random selection of specific patients due to crucial information that they may provide about their screening clinic experience (Bowling, 2009). All focus group participants were adults with rare endocrine diagnoses. The main aim of sampling was to include participants from each of the three clinics (VHL, MEN and SDH). Additionally, participants who were unfamiliar with one another were recruited to allow for a diverse range of views and thus such unfamiliarity may have prevented patients feeling intimidated or uncomfortable and more open in their participation (Villard, 2003).

-Inclusion Criteria included participants:

- Aged 16 or over, in accordance with NHS guidelines stating that people aged 16 and over are able to consent (NHS, 2019).
- Did not participate in the qualitative interviews (to allow for alternative views

and experiences).

- Registered as a patient at the Barts endocrine screening clinics.
- Diagnosed with a rare endocrine syndrome, specifically VHL, MEN or mutations in the SDHx genes.

-Exclusion Criteria included participants:

- Unable to consent/assent.
- Identified by the clinical team as a risk for any reason, such as an upcoming surgical operation or medical procedures.

-Recruitment

As in Study 2, after full ethical approval was given, a Patient information sheet (PIS) (Appendix 7.1) and consent forms (Appendix 7.2) were provided to adult patients at the end of clinic appointments. Once again, the researcher did not approach those patients whom the clinician felt it was not appropriate to invite. Patients were provided adequate time to look at the PIS and were informed they were free to take the forms with them and to contact the researcher if they were interested in participating in the focus groups. Patients who wished to provide their contact details at this point in the clinic before leaving received a follow up call to answer further questions or to book a day and time for their allocated focus group session.

7.3.4 Materials—Topic Guide

As in Study 2, topic guides for the focus groups following a 'logical sequence' (Robson, 2002) were developed (Appendix 7.3). Aspects of an NHS 'toolkit' for producing written information for patients (NHS, 2003), thesis/study objectives as well as background literature provided a broad area for each of the focus group topic guides. Notwithstanding, the focus groups were also non-directive, which supported exploration of the focus group participant's discourse. The topic guides were discussed with the PhD supervisors and relevant amendments were made, for example in ambiguities in the wording (Barriball and While, 1994). Table 7.1 (see Appendix 7.4) provides the rationale behind the topic guide points.

As the target population was very small, it was not possible to conduct a pilot study; the argument behind carrying out a pilot study has been noted to be based on the assumption that researchers, in particular novice researchers, would be better informed and prepared to face challenges that may arise in the substantive study (Malmqvist et al., 2019). Due to the lack of a pilot study, it was suggested by Breen (2006) to be reflexive and critically aware of the amount of influence that the researcher may have during the sessions. For instance, such awareness when reviewing the audio recording, and when attributing opinions to the focus group, in cases where the researcher introduced that opinion to the group.

7.3.5 The focus group process

-Location

An essential step was to identify an appropriate venue for the focus groups, as evidence suggests that participants should be in a familiar setting with adequate room for activities (Nyumba et al., 2018). Therefore, the discussions were held in a patient and family information centre in Barts Health NHS Trust, as it was a large, familiar and accessible venue.

-Duration

It is essential to consider the length of focus group sessions, as participants can suffer from fatigue if discussions are too long (Nyumba et al., 2018). Considering the intricacy of the topic under investigation, the number of participants and the number of questions being asked, some authors have suggested that a length between one to two hours is appropriate (Gibson, 2012). Thus, the goal for each focus group session was to last for no more than 90 minutes, including a rest break.

-Conducting the mini focus groups

The three focus groups were held at an agreed-upon time and location between November 8, 2018, and December 7, 2018. To ensure efficiency and accuracy, the sessions were digitally recorded (using an Olympus digital voice recorder) and turned

into ‘verbatim transcripts’ (Jamshed, 2014). A positive atmosphere is crucial for a successful focus group (Finch and Lewis, 2009). Thus, light refreshments were provided before discussions began.

-Focus Group Stages

Each of the three focus groups consisted of five stages, as outlined by Ritchie et al. (2013).

- *Stage One: Scene-Setting and Ground Rules*

Managing the start of focus group sessions is essential. As the participants arrived, they were thanked and welcomed. Once everyone had arrived, the researcher formally started the session with a personal introduction and a description of the research topic and the study’s purpose. The researcher then stressed the importance of confidentiality and laid the ground rules. The Chatham House rules were also explained- participants were free to use the information they heard but speaker identities could not be revealed (Chatham House, 2019). This rule encourages participants to share sensitive information without fear of it being circulated (O’Sullivan and Chéilleachair, 2019). The researcher stressed that there were no right or wrong answers before emphasising that they were free to speak openly and noting that the session will be recorded, so they needed to speak one at a time. As with Study 2 (patient interviews), before beginning the focus group sessions, the participants completed a demographic form (Appendix 6.5) and signed the consent forms (Appendix 7.2). The demographic form was to provide an overview of participant details, including such as age, gender and diagnosis. It is common to offer some sort of ‘thank you’ to participants after the completion of a focus group (Sherriff et al., 2014). Thereby, participants were asked to provide any relevant travel expenses, and these were reimbursed at the current government mileage rate in the form of local shop vouchers.

- *Stage Two: Individual Introductions*

Before the Dictaphone was switched on, the participants were asked to introduce themselves with their names and simple background information. The background introductions served to allow participants to build up a degree of familiarity. Moreover,

they provided opportunities for each participant to both speak and listen, rehearsing the two roles that are essential to the discussion process. When the introductions were complete, the Dictaphone was turned on after checking with all participants that they consented to the session being recorded.

- *Stage Three: The Opening Topic/The Introductory Question*

The general discussion was started by introducing the aim of the session and posing the introductory question. The aim at this point was to promote discussion and use the opening topic to engage as many of the participants as possible. At this early stage, it was beneficial to get everyone to say something; silence can become difficult to break from as the group progresses and participants begin to feel left out. Broadening the discussion at this early stage also served to minimize any dependency on the researcher—it often takes some time before participants respond to one another rather than directly to the researcher. The researcher encouraged focus group interactions by allowing brief pauses to invite thoughts or highlight similarities and differences in views. Furthermore, the researcher used non-verbal cues (e.g., eye contact maintenance, leaning forward in an interested manner).

- *Stage Four: Discussion*

Through active observation and listening, the researcher kept mental notes of what was being said and probed both individual participants and the focus group as a whole using open-ended questions expressed in simple language. It was necessary to direct the flow of conversation over pertinent topic areas and keep the discussion broadly focused on the research subject. At the same time, attempts were made to include every participant and to balance individual contributions.

- *Stage Five: End of Discussion*

Pacing was carefully considered toward the end of the discussion to allow the group time to anticipate the conclusion and avoid too abrupt a finish. The researcher signalled that the conclusion was near: ‘Is there anything else that you wanted to say but haven’t yet had a chance to’? Once participants had a chance to answer, the Dictaphone was turned off. Finally, the researcher thanked the focus group and

highlighted how helpful the discussion was. In some instances, confidentiality was reaffirmed, particularly if sensitive issues were covered.

After each focus group, the researcher spent a few moments reflecting on the session and their performance as a facilitator. This process, recorded through field notes/self-reflexive journals (see Appendix 7.5) enabled gradual technique-improvement over the course of the study (Elo and Kyngas, 2008), such notes included reflection of the researchers' position, as well as any possible influence from previous focus group sessions. Further, with respect to qualitative methodologies, such ongoing data analysis throughout the study has been supported to enhance trustworthiness in research (Charmaz and Belgrave, 2012).

7.3.6 Accounting for the Researcher—Reflexivity and enhancing rigor

-Role of researcher in the focus groups

Researchers, known in this setting as facilitators, are pivotal in focus groups, as they must establish a comfortable environment for participants who are unfamiliar with each other (Nyumba et al., 2018). A successful focus group discussion depends on the facilitator's ability to lead the conversation in the right direction (Morgan, 1996). Facilitators must be able to foster an honest and open dialogue among diverse individuals, adapt to the flow of the discussion, and remain impartial by maintaining objectivity (Litosseliti, 2004). Co-production challenges the researcher to learn new forms of working/researching, thereby altering their professionally oriented culture and established forms of interaction (Tuurnas, 2016). If co-production is to be successful, researchers must actively engage with and motivate participants (ibid).

The researcher behind this study directly organised and facilitated the co-production process. This allowed the researcher to feel comfortable with the focus group environment and, in turn, construct a trusting and productive relationship with the participants (Pickering and Watts, 2013). Of course, in the same way participants are influenced by their context, researchers are the product of their experiences and greater society (Berger, 2015). Therefore, this researcher abided by the practice of

reflexivity, which calls for recognising one's own contributions to the research process (Flick, 2014). Reflexivity embraces both reflection and critical reflection; the practice of critical reflection and self-awareness is equally as important in both familiar and unfamiliar settings (Maharaj, 2016).

-Reflexivity and enhancing rigor

Reflexivity is necessary to develop a rapport with participants and foster a productive conversation (Delamont, 2002). Reflexivity has been described as a process of self-examination, through the explorations of one's emotional reactions, assumptions or cultural positioning through a particular action such as debriefing with others or keeping a journal (Probst, 2015). Further, exploring one's own biases and values has been noted to lead to more robust findings (Bryman, 2001).

Taking field notes/keeping reflexive journal (Appendix see 7.5) is a component of both data collection and memos (see Appendix 7.6 for memo example) during analysis, which enhances the depth of the qualitative findings (Phillippi and Lauderdale, 2018). Further, the field notes allowed for a thorough assessment of the researcher's own feelings, performance, and biases (Watt, 2007). As such, throughout the focus group process, the iterative-reflection process aided reflection on the methods, particularly in terms of accounting of possible researcher influence on the process. This was facilitated through critical reflection after each focus group and ongoing discussions between the researcher and PhD supervisors, which allowed for reflexive engagement through the detailing of thoughts and feeling about the study in a similar way to the reflexive process carried out in Study 2. While not formally analysed, the field notes/reflexive journal provided helpful context for understanding the data (Fetter and Rubinstein, 2019).

For instance, bias may have occurred, as the researchers' experience includes being a language interpreter and having several family members who work in the health service sector. Thus, it was imperative that any negative aspects expressed from the participants did not impact the researcher during the discussion and analysis as the researcher had only positive experiences from working as an interpreter and what was narrated from family members. Hence, the researcher made sure in the event if any

less than positive aspects of health service-provision was discussed, that the response from the researcher was as neutral as possible. Thus, the researcher was very conscious in any corresponding discussions, in that not to show visually or in comments, regarding any personal emotional response and analysis. As for confirmability, this was adhered to through impartiality to produce data that accurately represents the information provided by participants (Elo et al., 2014). Moreover, quotations were used in the study write-up to enhance trustworthiness (Polit and Beck, 2012).

7.4 Data Management

The focus groups were recorded using a Dictaphone and transcribed verbatim by an independent professional transcriber. Following transcription, each group's recording was listened to numerous times to ensure accuracy. To maintain confidentiality and anonymity, all potential individual identifiers from the transcripts were removed. The checked anonymised transcripts were then uploaded onto NVivo.

The researcher has undergone EduCare Data Protection training and training on the new Data Protection Regulations (GDPR). Laptops used were password-protected and data files were encrypted. All relevant documents or recordings were stored in a locked filing cabinet in a locked office. Demographic data and speaker identification were maintained using pseudonyms. Information that could identify an individual was stored securely and not linked to any identifiable data.

7.5 Ethics

Prior to approaching potential participants, permission to carry out the study was sought from the relevant ethics board. This entailed submitting a request for an amendment to the original IRAS/ethics form by providing the focus group topic guides (Appendix 7.3) to the ethics board. After a full ethical approval (Appendix 5.1-3; Appendix 7.7), PISs (Appendix 7.1) and consent forms (Appendix 7.2) were provided to patients following clinic appointments. Ethics procedures were similar to those for Study 2. Ethical considerations dealt with confidentiality, anonymity, consent and the right to withdraw at any time, as stipulated by the PIS (Appendix 7.1).

Regarding ethical considerations for focus groups, they are in line with those for most other methods of social research (Homan, 1991). For instance, when selecting participants, the researcher clearly communicated the intended use of the participants' contributions. Being candid with participants, keeping them informed about expectations and not pressurising them to speak are all elements of good practice (Gibbs, 1997).

7.6 Analysis

Each of the three mini focus groups datasets were considered independently. The inductive process of actual analysis in relation to re-reading, coding and amalgamation of themes followed the thematic process as described by Braun and Clarke (2006) in Study 2 (Chapter 6). However due to the more structured nature of the focus groups, the analysis was more descriptive in its purpose. In a recent publication put forward by Braun and Clarke (2020), the authors contend that thematic analysis with a descriptive purpose remains an interpretive activity implemented by the researcher, as they are positioned in several ways, and read the data through the lens of their specific social, cultural and ideological positionings. As a result, all aspects of reflexivity that were considered in Study 2 were also relevant in this focus groups study, despite the fact that a more descriptive approach was undertaken.

As in study 2, 'codes' were generated, and data were examined for these codes or for other interesting developments in the data (see Appendix 7.8 for details of NVivo 12 coding), further, memos were recorded during the coding process (Appendix 7.6), thereby enabling the researcher to reflect on and record emergent patterns, themes and concepts in the data, as illustrated by Saldaña (2016). Table displaying coding to theme process (see Appendix 7.9 for table). Reflecting and writing about the data analysis process has been shown to increase critical thinking, challenge researcher assumptions and increase study credibility (Rogers, 2018).

7.7 Findings

Three focus groups, which comprised nine participants overall, were conducted. Their demographic profiles are detailed in Table 7.2. Age is shown in broad categories to aid anonymity. The mean time of the focus groups was 67 minutes (range 54-98 minutes). Each focus group was completed in one sitting.

7.7.1 Participant Profiles

The number of focus group participants was based on practicalities related to interest (n=12) and availability on the specific day (n=9). The nine participants formed three mini focus groups and details are illustrated in table 7.2 below.

Table 7.2. Focus group participant profiles

FG1- Cycle 2				
Participant Pseudonym	**Age**	**Gender**	**Diagnosis**	**Length of Time Using the Service**
Paul	70s	Male	SDH	8 years
Laura	40s	Female	MEN	6 years
Tracy	50s	Female	MEN	1 year
FG2- Cycle 3				
Participant Pseudonym	**Age**	**Gender**	**Diagnosis**	**Length of Time Using the Service**
Rachael	50s	Female	SDH	12 years
Zoe	60s	Female	MEN	22 years
Hannah	40s	Female	MEN	14 years
Becky	50s	Female	MEN	33 years
FG3- Cycle 5				
Participant Pseudonym	**Age**	**Gender**	**Diagnosis**	**Length of Time Using the Service**
Peter	50s	Male	SDH	8 months
Tom	20s	Male	MEN	4 months

Key: MEN- Multiple endocrine neoplasia, SDH- mutations in the succinate dehydrogenase gene complex.

7.7.2 Focus groups thematic analysis findings

Key aspects of each of the focus group's output (FG1/FG2/FG3) will be presented sequentially. Quotes are included to aid the transparency of findings; individuals are identified using a pseudonym. See figures 7.2-4 below for the final thematic tree maps for each of the focus groups, these maps include examples of extracts which formed the themes.

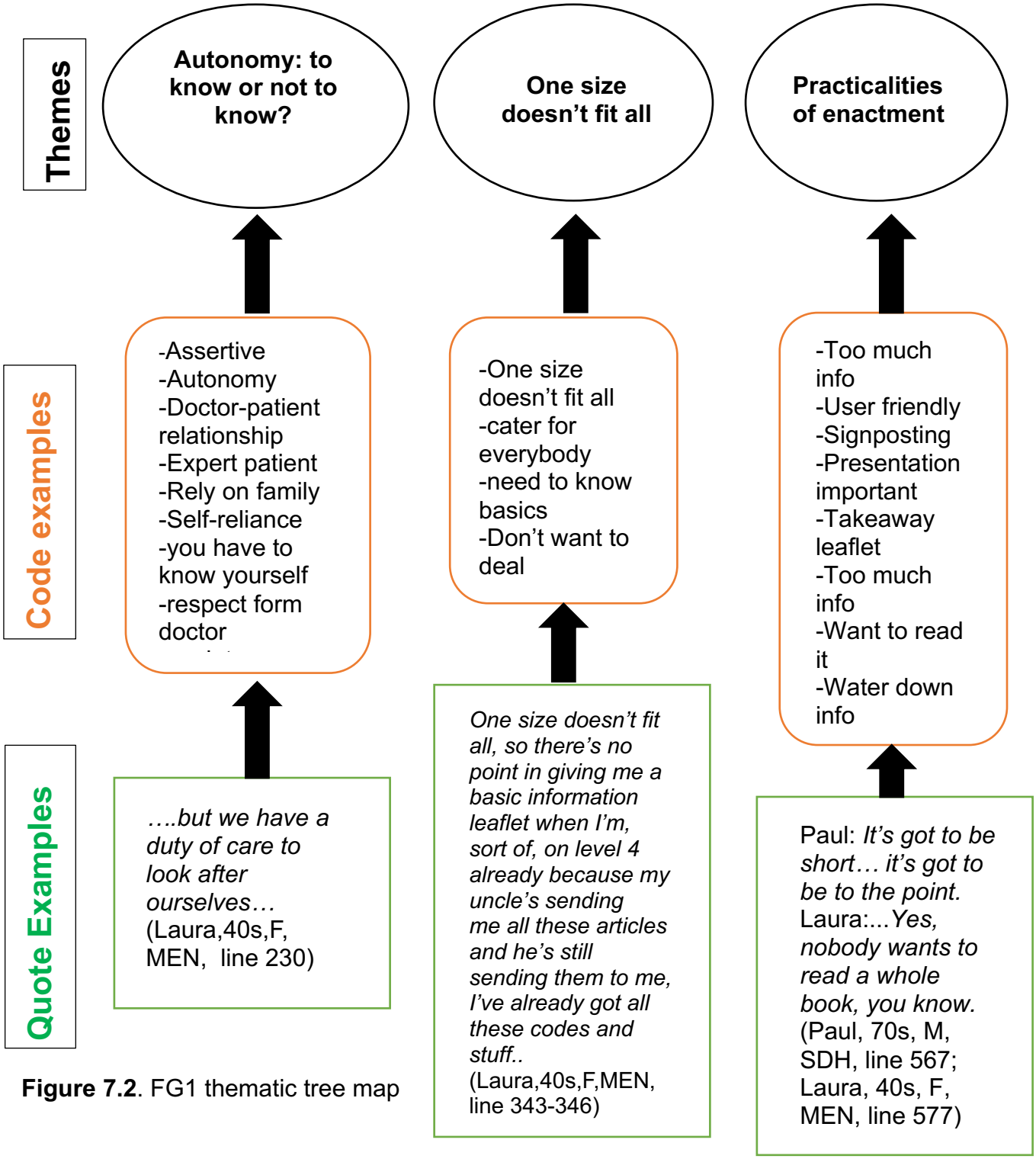

Figure 7.2. FG1 thematic tree map

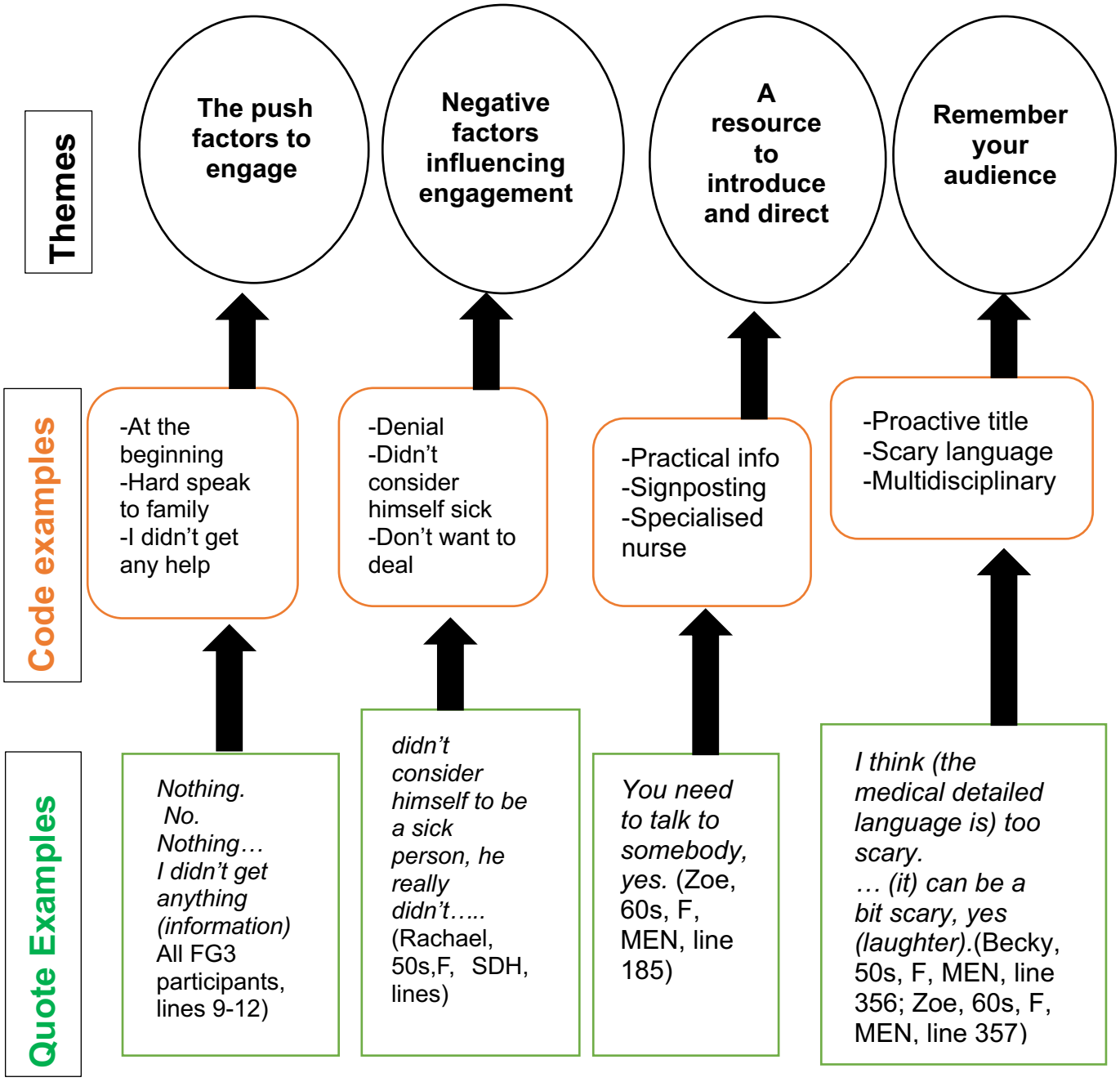

Figure 7.3. FG2 thematic tree map

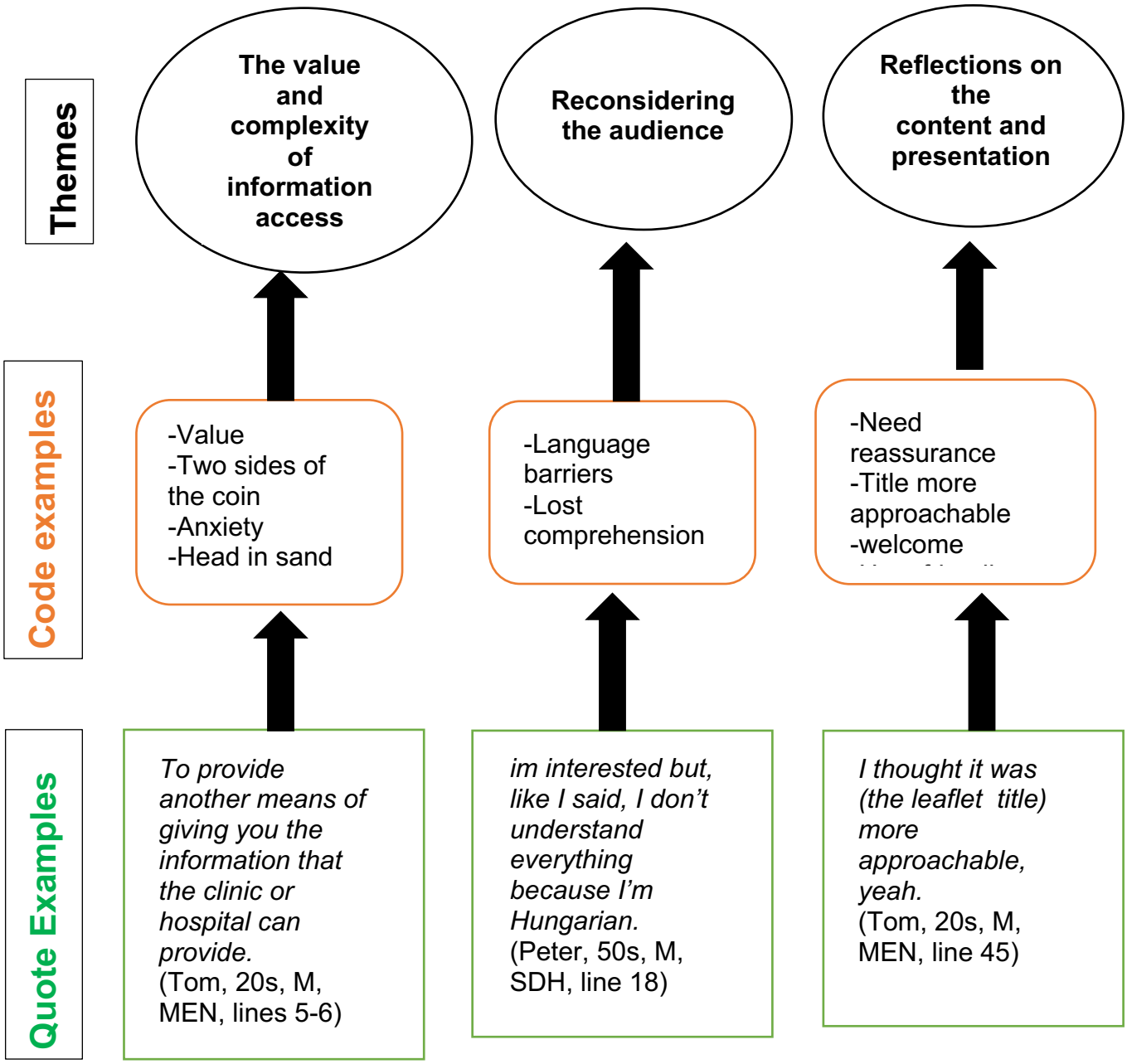

Figure 7.4. FG3 thematic tree map

7.7.2.1 FG1 Themes

The aim of the FG1 was to gather the participants opinions in relation to how they access and use healthcare information and to ascertain potential content of the co-produced information leaflet. Following the thematic process, three major themes were developed from the data, namely 'Autonomy**:** to know or not to know?', 'One size doesn't fit all' and 'Practicalities of enactment'.

-Theme 1. Autonomy: to know or not to know?

The theme 'Autonomy: to know or not to know?' encapsulates the complexity in how participants express their duty to self and the role of information gathering in that process. In this theme they describe the feeling of having responsibility to look after themselves and the consequence that information facilitates their communication with the clinical provider. But there is also a conflicting desire to not be in charge of their medical care.

Participants expressed that they have a duty to themselves to find information, a need to manage themselves, in a possible effort to take control of their diagnosis:

> *Yes, but we have a duty of care to look after ourselves…*
> *And you know, "Why am I here? (in the clinic)" So you have to really know yourself.*
> (Laura, 40s, F, MEN, lines 230, 318-319)

Laura expressed that she feels a sense of responsibility towards her own healthcare, she further explains that she wants to know the purpose behind her attendance at the clinic, thereby autonomy is of importance to her.

Tracy likewise discussed her desire to take control through information and considered that if she knew more and was more articulate, this would allow an enhanced ability to

navigate the systems and resources in clinic as well as in conversation with the healthcare providers in clinic:

> *Generically, sorry, I was going to say, that on the back of it as a caveat to what you were saying, and yourself, that they tend to have more time for you, the more research you go away and do.*
> (Tracy, 50s, F, MEN, lines 302-304)

Conversely, not all of the participants felt the need to find their own information and be in control of the situation. For example, in relation to seeking information Paul commented:

> *My daughter's mother went on it.*
> (Paul, 70s, M, SDH, line 85)

Paul explained how he did not feel the need to seek out information, as the responsibility of that was bestowed on his daughters' mother. He later added:

> *I could go into it but I still won't know as much as them (the medical team), even if I did.*
> (Paul, 70s, M, SDH, line, line 442)

This suggests a sense of futility of engaging in such a search, as he appreciated that the healthcare professional would know more information.

In summary, patients generally want information to assist them in navigating, as well as assisting them in the process of the health care system. What, how and when they can access information is an important factor and needs to be considered. For instance, participants expressed the need to cater for the pragmatic aspect of what will happen at the clinic; as patients such as Paul feel no need to find information by themselves as they feel the professional will always know more.

-Theme 2: One size doesn't fit all

The theme 'One size doesn't fit all', encompasses the need for the leaflet to be pitched at the right individuals and at the right stage, together with the correct balance to accommodate those who would like to have an abundance of information and those who do not.

It was expressed by some of the participants that the patient information leaflet needs to be pitched at an appropriate level to what is required for a new patient, however concurrently, not everyone requires the same depth of information:

> *One size doesn't fit all, so there's no point in giving me a basic information leaflet when I'm, sort of, on level 4 already because my uncle's sending me all these articles and he's still sending them to me, I've already got all these codes and stuff. I haven't got time to read all that…..*
> *I wish I was more like Paul, I pick up everything, I have to know everything, I have to read everything.*
> (Laura 40s, F, MEN, lines 343-346; 497-498)

Laura requires a depth of information and would like to know everything; whereas Paul exclaimed that that he attends the clinic to receive updates in relation to his diagnosis, for instance the latest health test results, any extra information out the realm of that clinical session is no use to him:

> *Well, like I said, I just go here find out how it's going because whatever I read, I don't think it's going to help (finding own information)…..*
> *Well, how can it help, at the end of the day? I'll still be coming here, getting the tests, if the test is alright, I suppose I'm alright for a while…..*
> *Well, I can't do anything else.*
> (Paul, 70s, M, SDH, lines 428-429; 433-434, 438)

This suggests that Paul does not require everything, but does value having practical information regarding the clinic.

In sum, participants demonstrated that individuals want the information relevant to them, therefore there needs to be a balance between an abundance of information, for individuals such as Laura who exclaimed that she wants to know everything, hence

the desire to include signposting in the patient information leaflet. In addition to the practical pragmatic information, that can facilitate individuals at the right level and at the appropriate stage.

-Theme 3: Practicalities of enactment

The theme 'Practicalities of enactment' focuses on the actual practicalities of the information resource, the importance of accessibility as well the multiple different factors that such accessibility composes, in terms of length, looking patient friendly and being able to easily take away the leaflet from the clinic.

FG1 participants were asked about their initial thoughts on the range of patient information leaflets presented to them (Appendix 7.17). Tracy instantly remarked on which one she would likely pick up first (see Appendix 7.10 for the leaflet Tracy was referring to):

> *I'd pick that up because it looks a little bit more patient-friendly.*
> (Tracy, 50s, F, MEN, lines 471–472)

Tracy was asked to elaborate on why she is more receptive to that particular resource, which was in a simple format and appeared less medically detailed relative to others:

> *Because it looks like a women's magazine.*
> (Tracy, 50s, F, MEN, line 476)

The participants debated the preferred level of detail. Laura commented on materials produced by patient-support groups, which are often several pages long and use extensive medical language; she felt they come across as too serious:

> *Just what it looks like, the information and how it's laid out and stuff, it just looks a bit, like, too serious.*
> (Laura, 40s, F, MEN, lines 564–565)

Paul commented further on these materials and noted that he favours an opposite, less dense approach. Laura agreed:

> Paul*: It's got to be short… it's got to be to the point.*
> Laura: *….Yes, nobody wants to read a whole book, you know.*
> (Paul, 70s, M, SDH, line 567; Laura, 40s, F, MEN, line 577)

This focus on simplicity was emphasised in Tracy's desire for something that was in an easy-to-read type face, such as Arial, but critically that it was short.

> *Yes, you can read that—you haven't got fifteen minutes…….It's a nice size and it's Arial setting, so that is always easier to read.*
> (Tracy, 50s, F, MEN, , lines 288, 554–555)

Another participant, Paul, continued with this idea explaining how 'little leaflets' that he has seen in the past have been convenient to read outside the clinic setting, such as on the bus, and 'take away':

> *I remember I used to go in and just take these leaflets and just read them on the bus on the way home; they were really helpful rather than (the magazines)… sometimes you'd get the whole magazine through the post (by mail) and it's like you have to carry the magazine everywhere you go (if given in clinic), so sometimes it's helpful to have the little leaflets. But it's good to have the magazine in the hospital but to take away* (prefers the small leaflet example)… *it's good for this.*
> (Paul, 70s, M, SDH, lines 525–529)

Despite patients with various diagnoses attending the Barts endocrine screening clinics, the FG1 participants decisively agreed on the use of a single leaflet for all new patients regardless of diagnosis. They expanded on their reasoning for this recommendation. For example, Laura and Tracy felt that specific medical information was not required:

> Laura*: Yes, just one……*
> Tracy*: Yes, … you don't need to go too deep into (specific information)…… …….I think you're right, I think you can go into it too much.*
> (Laura, 40s, F, MEN, line 603; Tracy, 50s, F, MEN, line 405,409)

Indeed, Laura went further, explicitly suggesting that there could be unfavourable consequences of including too much information at this early stage. Moreover, all of the FG1 participants later agreed on including only basic clinic information in the new-patient leaflet:

> Laura: *… it can start to mess with your head a bit and you start projecting stuff into the future of what's going to happen…*
> *Researcher: …one (leaflet) with the basic information..then…?*
> All: *Yes, definitively.*
> (Laura, 40s, F, MEN, lines 411–412; Researcher line 605;
> All Cycle-1 participants, line 607)

While participants preferred limited detail, they appreciated signposts for where to go if an individual wanted more information. The availability of supplemental web-based resources was seen as an asset, as it would allow for some autonomy. Laura thought that this was beneficial, as it provided a suitable starting point for further research:

> *Yes, and then they can put the website address on there if you wanted to go into a little bit further information.*
> (Laura, 40s, F, MEN, lines 290–291)

To summarise, from FG1, the practicalities of enacting the tool was emphasised. Useful aspects such as the leaflet needing to be accessible, and such accessibility to the right person has multiple different components to it in terms of length, looking 'patient friendly' and being easy to takeaway.

Overall, from the main findings from FG1, participants preferred a shorter leaflet for new patients/at the early stages at the Barts endocrine screening clinics. They also felt that general pragmatic information is preferable to diagnosis-specific information. They argued for something that feels friendly, accessible and offers support as well as signposts that enable further research by proactive patients. Moreover, the FG1 participants appreciated simple, straightforward language in an Arial typeface. The

ease of accessibility in the form of being able to ‘take away’ as Paul commented, the leaflet is validation of the a priori decision of the convenient format of a paper leaflet.

7.7.2.2 FG2 Themes

The aim of FG2 was to examine what encourages participants to use a patient information resource at the early stages and to further consider specific content, thereby building on the work from FG1 which noted the importance of the leaflet needing to be targeted at the right area and level. Following the thematic process, four major themes were developed from the data, namely: ‘The push factors to engage’, ‘Negative factors influencing engagement’, ‘A resource to introduce and direct’ and ‘Remember your audience’.

-Theme 1. The push factors to engage

The theme ‘The push factors to engage’, embodies the dynamics of knowledge acquisition by the participants, this builds on theme 1 from FG1. Push factors, forces an individual to engage with the information, for instance, as a result of the lack of information provided from clinic. In addition to factors which encourage an individual to take action in information engagement, this includes the desire for an individual to acquire more knowledge regarding the clinic and their syndrome.

The FG2 participants initially exclaimed that there was no information given them as new patients:

> *Becky: Nothing.*
> *Rachael: No.*
> *Hannah: Nothing.*
> *Zoe: I didn’t get anything.*
> (All FG2 participants, lines 9-12)

Zoe further added that in her experience communication in general was a little lacking.

Such a lack of information in the initial stages of the patients' journey resulted in a push to independently seek the information they needed, as Rachael explains:

> *- (I) was trying to find out what the disease meant, what the current treatments were, what the prognoses were, what treatments, you know, it was practical trying to find out practical information in order to interact with the doctors who were managing my brother's care…..*
> (Rachael, 50s, F, SDH, line 49-52)

Rachael wanted to make sense of her diagnosis and its management, therefore this required her to find out practical information. As such it was recommended to include what to expect at first visit to the Barts endocrine screening clinic for new patients.

A further push factor was exemplified in the absence of support and information from family members of participants, who may also not be diagnosed with the same syndrome:

> *Well, I just kept quiet because whenever I discussed anything it would upset someone in the family that didn't know, have any information….*
> *….. I was quite young, I was 20 and I think it was always just when I grew up my mum was always depressed so it was always oh, just don't mention it, just get on with it, you know, and my sister didn't have the gene. I had a couple of cousins who did but they didn't want to talk about it either, so it was pretty much just listen to what the doctors have to tell me; I'd ask them an odd question but I didn't really know the ins and outs of it.*
> (Becky, 50s, F, MEN, lines 14-15; lines 31-35)

For Becky consulting family members was not an option, the lack of support pushed her into seeking out her own information, in her case through listening to the doctors,

As a reiteration of findings in FG1, Zoe reflected on the need to engage in information in order to receive knowledge of how to navigate oneself through the system:

> *- I mean, if you do know something then that's when you have to consider what you do next.*
> (Zoe, 60s, F, MEN, line 1016)

To sum up, the push factors in relation to patient engagement with information are important to consider, as they convey reasoning behind why a patient may choose to engage with such information. Such push factors highlighted in FG2, included the lack of initial information provided to them, a need to know the details behind the diagnosed syndrome and the lack of support from immediate family members. These factors reinforce the findings of FG1 and suggest that basic information and signposting would be appropriate in the leaflet.

-Theme 2. Negative factors influencing engagement

The theme of 'Negative factors influencing engagement', encompasses what factors, which are all negative, that impede patient engagement in general.

One example, described by Rachael, related to the perception of risk and the sense that a lack of active symptoms would discourage engagement:

> *By the time I came to Bart's, my brother had….. Pheochromocytoma when he was twelve and that was non-malignant, had had five eruptions of that during his teens and then it went dormant for 18 years and he was absolutely the most glass half full person in the world and wasn't, didn't consider himself to be a sick person, he really didn't, you know, didn't make anything of it at all…..*
> (Rachael, 50s, F, SDH, lines 37-40)

Hannah discussed a parallel situation with her brother, who she describes as very unwell in his younger years, but more stable as an adult. This resulted in clear dilemmas about when engagement should be encouraged:

> *Well I, I think it's not a, that's not an easy one to answer. If I look at my brother's situation, he was profoundly ill aged twelve, he then had a series of operations through his teens. He, when he became an adult, he hadn't got the slightest sense of what had happened, what, how much danger he'd been in, but he was a profoundly happy adult. He'd always felt very, you know, so had we really forced him to understand his position, would he have then had a happy 18 years that he had? You know, I don't think there's an easy answer to this -*
> (Hannah, 40s, F, MEN, lines 662-667)

For her, pushing knowledge and engagement too early or at the wrong time could have had detrimental effects on his outlook on life. This concern was reiterated by Zoe who describes the complications with her son's engagement based on emotional response to his diagnosis:

> *….it was much more difficult to get some, my older son to come, keep his appointments and to, because he, I think he was a bit, he was angry about it, I think and he still is a bit. I mean, and he's the one that forgets to take his pills or forgets to order his pills and he's the one, I mean, so that's why we come as a group, the three of us come, because we need to get Tim to come –*
> (Zoe, 60s, F, MEN, lines 166-170)

These three different examples demonstrate how individual responses to diagnosis and presentation of symptoms over time can result in resistance to engagement. While those referred to were not all at the initial stages of diagnosis, they do raise potential issues with information, timing and emotional reactions which should be considered.

To sum, for some individuals they can know too much information even when they personally do not feel afflicted with an illness. Thereby, keeping information in the patient information leaflet pragmatic with signposting is crucial, allowing the individuals to engage when and where they want. This also reinforces the idea of not forcing the information on individuals and allowing them to make decisions on what information to access and when.

Therefore, the patient information leaflet requires the pragmatic basics and important signposting for those who are ready to engage more, this is similar to what was found from FG1, but from a slightly different angle.

-Theme 3. A resource to introduce and direct

The theme of 'A resource to introduce and direct' builds on the FG1 participants' decisions on omitting diagnosis-specific information and including practical clinic

relevant information at the early stage, the FG2 participants considered the necessary content even further.

Rachael suggested the leaflet would act as a guide, that directs the patient in a simple manner to find what they want. Moreover, she proposed that the leaflet content should aim to welcome, reassure and provide the next steps for new patients at the screening clinic:

> *… a sort of navigation path so that someone can read through simply to see where to get what they want…….*
> *Okay. This is trying to welcome… new patients… (to) reassure and provide next steps…*
> (Rachael, 50s, F, SDH, lines 124–125; 958–961)

The participants debated the type of content that is relevant to new patients. Rachael felt that excessive information would not be beneficial, in line with sentiments expressed in FG1. Conversely, Hannah thought that new patients would want all available information:

> Rachael: *Well, too much detail isn't helpful.*
> Hannah:……*But new patients want to know everything.*
> (Rachael, 50s, F, SDH, line 122; Hannah, 40s, F, MEN, line 700)

Zoe suggested a remedy to this, by providing details but only those pertaining to the practical information relating to screening clinics. She suggested that this should not focus on the diagnosis but the elements that a patient may undergo when at the clinic:

> *So, they need the practical information.*
> (Zoe, 60s, F, MEN, line 706)

Participants described the type of content they would like to see in a new-patient leaflet. Zoe noted that she would prefer only information about the clinic and nothing about specific diagnoses. Furthermore, she proposed including procedures that a patient may undergo at the clinic, such as blood tests:

> *Not even about the disease, about the clinic.*
> *… things that you may need to do or may need to have done, maybe like scans, maybe the blood tests…*
> (Zoe, 60s, F, MEN, line 616, 633–634)

Rachael added to this discussion by suggesting signposts for where patients can get more information; this was also expressed during Cycle 1. Rachael further explained that signposting would make the leaflet applicable to a wide range of people:

> *… not depth, but just a sort of signpost to all the different ranges of topics that people might want (to find out more about).*
> *… then, (the leaflet) caters (to) the spectrum of people…*
> (Rachael, 50s, F, SDH, lines 739–740, 742)

Another participant, Hannah, reiterated Rachael's idea:

> *… to have the umbrella brochure that then very clearly leads you to these kind of other subcategories…*
> (Hannah, 40s, F, MEN, lines 756–757)

One area of content highlighted for inclusion was signposting of support groups. The participants discussed the role patient-support groups played in their journey. Becky explained that when she was first diagnosed, there was no support; she feels this may have caused some problems for her upbringing. She then discussed modern options, including counselling through patient-support groups:

> *… because if my mum had had that (support), I think my upbringing would have been slightly different but there was no help whatsoever. You were just sent away and that was it and even, you know, when I was first diagnosed we had nothing, only (now) through AMEND (can I get help)…*
> *… that we've now got counselling… (genetic counselling offered to patients)*
> (Becky, 50s, F, MEN, lines 180–182, 184)
>
> *You need to talk to somebody, yes.*
> (Zoe, 60s, F, MEN, line 185)

Patient support group were of importance to her. Becky felt that the benefits of patient-support groups should be noted in the leaflet; she avoided the groups for a while but now attends them and sees the benefits. She now believes that the non-judgemental nature of the support groups is an asset that enables patients to freely share their stories:

So, none of that was available and I think, I do think now, having gone to patient groups through AMEND, I avoided that for such a long time but I think if patients can, you know, if there is something on there about the benefits of that because it's not for everyone but my husband and I had avoided it for so many years. ……It was just too painful, you know, and I realise that now, as an adult, and we went to, in the end, we did go to one because they kept saying to us, 'Oh, you know, you really should go to one of these because, you know, maybe just to support other people', and we went along and we were able to help other people and they asked us to share stories and my husband, for the first time, was able to speak very freely and a few of the mums came up to him and said, 'You have said exactly what I cannot say out loud'.
(Becky, 50s, F, MEN, lines 190-193, 197–202)

The patient-support groups can provide vital help if a patient cannot find it elsewhere. Becky further noted that the groups provided an outlet for her, as it was difficult to speak to family members regarding her syndrome:

Yes, I think the kind of facts, you know, you can look up the facts about things but it's that kind of putting your arms around somebody (provides reassurance). You can't really go home and talk to family, you know, there's this thing about you can go back and talk to whoever (but) I can't talk to my sister about it, you know, it's just hard.
(Becky, 50s, F, MEN, lines 214–217)

Subsequently, all of the participants concluded that information on patient-support groups should be included in the leaflet.

In relation to an introduction, all members of the FG2 were clear that introducing Anne, the specialist endocrine nurse, was essential. Most of the participants were familiar with Anne, the specialist endocrine nurse. Rachael commented on the benefits she provides:

Yes, I mean, I find (her)… absolutely extraordinary…
(Rachael, 50s, F, SDH, line 235)

Rachael described how Anne organised her appointment and arranged various aspects, such as the blood tests:

Yes, but Anne organises (the appointment), she contacts me to make the arrangements for the appointment, arrangements for me to have the bloods,

make sure the timing work(s) so the doctors got the bloods through for the appointment…
(Rachael, 50s, F, SDH, lines 293–295)

Hannah discussed how an advantage of the clinic and Anne may have been a factor in preventing her genetic diagnosis from passing down to the next generation:

… and that (the advantage), this (clinic) and Anne, it hasn't gone down to the next generation.
(Hannah, 40s, F, MEN, line 559)

As such, the participants deemed it important to include the nurse's unique role and contact information in the leaflet.

They further suggested that some reference was made to the family approach, both in how the clinic is run but also the family related testing. The availability of family clinics was appreciated by the focus group participants. Hannah described how it helped her feel united as a family facing her diagnosis. Moreover, as children go to the clinic with adults, they learn to attend clinics as well, which is a positive effect. Becky agreed:

Hannah:*… and I think you're facing it together, and as parents, we're showing (the children) our attitude and so I would say a lot more emphasis on what we're doing with us together because a lot of this is kind of like, so you've got this (providing encouragement to each other)…*
Becky: *Yes (in agreement).*
(Hannah, 40s, F, MEN, lines 534–536; Becky, 50s, F, MEN, line 537)

The participants discussed including information on genetic testing (antenatal) at the clinic. In relation to this information about the tests that are available in the clinic were highlighted as being important to include in the leaflet. Hannah added that this is also related to family planning. Becky added that this option is a relatively new service:

Zoe: *Genetic testing is available, yes.*
Hannah:*… and planning a family (antenatal)……*
Becky:*… and genetic testing and all of that (family planning), that's all… relatively new.*
(Zoe, 60s, F, MEN, line 130; Hannah, 40s, F, MEN, line 131; Becky, 50s, F, MEN, line 186)

In regards to attending the screening clinic, the participants acknowledged how important it is for patients to attend their clinical appointments and felt that this should be included in the leaflet. Zoe added that appointments should be prioritised and not forgotten about. Rachael agreed and noted the importance of regular attendance for new patients:

> Zoe: *Yes, if you had a sentence in like research has shown that it's important to, to follow-up any treatment that you have, that you continue to come (so can get treated).*
> Zoe:*… there should be something there about (appointment attendance). In some way, sort of saying like, you need to, you need to, erm, not put this aside and forget about it.*
> Rachael:*… absolutely that should be in a leaflet.*
> (Zoe, 60s, F, MEN, lines 715–716, 720–721; Rachael, 50s, F, SDH, line 723)

Finally, the participants discussed what should be included on the back cover of the leaflet. Hannah felt that should have the contact details. Rachael agreed:

> Hannah*: Well, the back is contact details…*
> Rachael*:… and maintained (contact details). So, yes, the back page would definitely be the… contact details.*
> (Hannah, 40s, F, MEN, line 772; Rachael, 50s, F, SDH, line 781)

-Theme 4. Remember your audience

The theme 'Remember your audience' highlighted language use as important, in line with FG1, with a focus on simplicity and accessibility. The participants considered the language that should be used to target new patients at the early stage.

Some of the FG2 participants commented on some of the medically detailed information resources they have encountered. They described how they found some of the language intimidating:

> Becky: *I think (the medical detailed language is) too scary.*
> Zoe: *… (it) can be a bit scary, yes (laughter).*
> (Becky, 50s, F, MEN, line 356; Zoe, 60s, F, MEN, line 357)

Zoe continued by suggesting the information should be more suitable for patients, as reading about the physiological and medical aspects of a diagnosis can be upsetting. Zoe expressed how medically detailed language makes them feel uncomfortable and does not help:

> *If you could produce some kind of information that's sort of patient-friendly. You know like, if, I mean like, the description of the disease or whatever, you know, sometimes you get, (if) it's some kind of medically complicated thing, people get upset.*
> *… make you feel, people feel uncomfortable and (I can) not understand (the medical language).*
> (Zoe, 60s, F, MEN, lines 362, 365–366, 478)

Several suggestions were made regarding the title, which included commenting that the clinic is part of the endocrine department at Barts Health, thus a possible note for inclusion:

> *It's (part of) the (neuro-)endocrine department, isn't it?*
> (Zoe, 60s, F, MEN, line 941)

Rachael proposed a title that emphasises assistance from the clinic:

> *How We Can Help You.*
> (Rachael, 50s, F, SDH, line 943)

Hannah suggested a title communicating material provision to the patient:

> *Information for You.*
> (Hannah, 40s, F, MEN, line 951)

Zoe exclaimed that the title should catch the reader's attention:

> *You want something that catches the eye, don't you?*
> (Zoe, 60s, F, MEN, line 952)

Hannah added that the title should be concise:

> *I think something briefer; 'Do You or a Family Member Have a Hereditary Risk of Cancer' (is) a bit long.*
> (Hannah, 40s, F, MEN, lines 954–955)

After some discussion, Rachael suggested ‘What Can We Do to Help You’. Rachael explained that the title serves to welcome, reassure and orient new patients while appealing to a wide range of individuals:

> *You know, ‘What Can We Do to Help You is my best.*
> *… welcome, reassure and orientate…*
> *… so, you know, it’s quite a high level of umbrella, isn’t it?*
> (Rachael, 50s, F, SDH, lines 971–972, 981, 1069)

Hannah agreed with Rachael’s suggestion, as it sends the same message as ‘We Will Support You’. She felt that this type of title communicates a non-transactional relationship between the clinic and patient. Zoe agreed and acknowledged that, indeed, the clinic is proactive with their help:

> Hannah:… *and then, yes, ‘We Will Support You’ … and then it just is like very proactive……to imply it’s not just any transactional event where they help you (for something in return), ……*
> Zoe: *They do something (offer help), yes.*
> (Hannah, 40s, F, MEN, lines 1078–1080; Zoe, 60s, F, MEN, line 1081)

The FG2 focus group ultimately decided on ‘What Can We Do to Help You’ as the title.

Additionally, the FG2 participants debated how the leaflet should be delivered to new patients. Rachael felt that, after a potentially distressing conversation, patients would appreciate a single leaflet rather than a large inventory of information. Hence, the group decided on a single leaflet:

> *… if you go in… and have what is a shocking conversation from your point of view, you (are) probably not going to opt to browse the catalogue of things.*
> (Rachael, 50s, F, SDH, lines 838–839)

Rachael added that the leaflet can act as a default source of information if the health professional is not sure what resource to offer the patient. Furthermore, she explained that no matter how well designed the leaflet is, patients may not ever pick it up so it should be handed to patients at the clinic:

> *You have to be handed it, and then if there isn't a, you know, so if it isn't obvious for the doctor what they need to hand you, or it's not even part of what they're going to be thinking about, then no matter how well it is (designed), people aren't going to pick it up.*
> (Rachael, 50s, F, SDH, lines 841–843)

In summation, the FG2 focus group produced a leaflet signposting how 'we can help you'. The leaflet is not about diagnoses but the healthcare facility itself. Signposting enables patients to be proactive in what they choose to do next. The aim is to reassure new patients and provide basic information in patient-friendly language about the help and services offered by the clinic. In line with the theme of 'Remembering your audience' from the expert participants of FG2 who have been at the clinic for a while who appreciated the need for simpler terminology for newer patients, FG3 participants who are more at the beginning of their Barts endocrine screening clinics journey re-affirmed such need for a less medicalised and more accessible terminology in the leaflet. This is indicative of the lesser medical language fluency of new patients of FG3, therefore consideration should be given in relation to what stage the patient is at, in relation to their screening clinic journey, when producing the information resource.

These decisions on signposting and simplicity were in line with opinions from FG1. Other content suggested in FG2 included practical information on patient-support groups and the role of the specialist endocrine nurse. Another outcome was the inclusion of contact information on the back cover. The group also decided that the leaflet should be handed directly to patients at the clinic to ensure that the material is looked at. Prior to moving onto the last focus group, FG3, the lead clinician reviewed the leaflet. This review led to the addition of information about not discussing patients who are not present in the room as well as the refinement of the title from 'What Can We Do to Help You' to 'How Can We Assist You'. This resulted in the creation of the interim mock-up leaflet (see Appendix 7.11), which was taken into the FG3 focus group.

7.7.2.3 FG3 Themes

The aim of FG3 was to determine how participants view the purpose of an information patient information resource with individuals who were recently registered at the Barts endocrine screening clinics. The focus group participants in FG3 were asked to look over the interim mock-up leaflet (Appendix 7.11) to confirm the content and suggest possible amendments. The focus group topic guide was used (see Appendix 7.3). Three themes are presented: 'The value and complexity of information access', 'Reconsidering the audience' and 'Reflections on the content and presentation'.

-Theme 1. The value and complexity of information access

The theme of 'The value and complexity of information access' conveys the participants' views on the importance of the information resource and complexity of accessing information.

A participant expressed the value of a patient information leaflet:

> *To provide another means of giving you the information that the clinic or hospital can provide.*
> (Tom, 20s, M, MEN, lines 5-6)

Tom appreciated that the leaflet has the capability of providing some of the information when the individual is not at the healthcare service.

However, in line with FG2, the desire to access such information was complex, as Tom further describes some hindrance, in terms of emotional turmoil between ignoring the information and seeking reassurance as a result of healthcare provider assistance:

> *I feel like there's two sides of the coin with avoidance, because there's one which is sticking your head in the sand and saying, "I don't want to know anything about this. I know it's bad but I'm just going to let it build up." And there's also wilful avoidance in terms of putting your condition in the hands of experts and being reassured and then not necessarily avoiding but just letting them do some of the work because they're the experts, and that can be reassuring. So I don't know. That probably comes under the umbrella of anxiety, not this. So maybe this, yeah, isn't important.*
> (Tom, 20s, M, MEN, lines 765-771)

Tom further expresses that there is some avoidance in engaging with the information as an individual, however at the same time there is some reluctance in engaging with the healthcare professional, even though he acknowledges they are the experts in the field which is reassuring. Thereby, provision of both clinic specific links, as well as information regarding patient groups who are familiar with patients with such rare endocrine syndromes may assist patients in navigating their path with such turmoil and anxiety.

-Theme 2. Reconsidering the audience

The theme 'Reconsidering the audience' builds on the theme 'Remember your audience' from FG2, by re-examining the purpose of the leaflet from the perspective of new patients registered at the clinic.

The first point that was raised was that the language used should be targeted to new patients at an early stage:

> *I'm interested but, like I said, I don't understand everything because I'm Hungarian……. Those words, you know, like this, these types of words. It's just more the medical terms. I don't understand them because I've never used in my life, so…*
> (Peter, 50s, M, SDH, lines 18; 140-141)

It was highlighted that the language used is important, with a focus on simplicity and accessibility.

Participants validated some aspects of the leaflet's purpose. The mock-up was intended to convey key information on Barts endocrine screening clinics for new adult patients. Peter felt the information provided was adequate, as any more information could make it unappealing to read through:

> *I think it's okay. Because if you put more, it's no good because people don't like to read a lot. It should be simple.*
> (Peter, 50s, M, SDH, lines 255–256)

The participants were asked to comment on whether they consider the leaflet to be appropriate for adult patients. Both considered it to be suitable:

> Peter: *I think it's good.*
> Tom: ….*For new adult patients? … Yeah.*
> (Peter, 50s, M, SDH, line 518; Tom, 20s, M, MEN, lines 520–254)

-Theme 3. Reflections on the content and presentation

Theme 3 encompasses consideration and perspectives of the FG3 participants on the content and presentation of the interim leaflet, in terms of approachability, colour and font and any other suggestions from the group.

Participants discussed modifying the leaflet title. While Tom liked the original title, he suggested a change from 'How Can We Assist You?' to 'What Can We Do for You?' Peter agreed:

> Tom: *Yeah, I think it's nice. I wrote down a suggestion of maybe like 'What Can We Do for You?' I don't know, it's just the same really…*
> Peter: …*Yeah, that sounds better, like you said (laughter).*
> (Tom, 20s, M, MEN, line 31; Peter, 50s, M, SDH, line 35)

FG3 participants recognised some of the information outlined in the mock-up. Tom noted that the information was in line with what he was familiar with as a patient:

> *Yeah, it aligns with how I've used the service, how the service has worked for me. So yeah, I think it was good.*
> (Tom, 20s, M, MEN, lines 70–71)

Tom further endorsed the information on blood tests. He illustrated how the dedicated blood wing at the Francis Fraser Ward is a feature unique to Barts and discussed why it is important to include it in the patient information leaflet:

> *Yeah, I go up to the Francis Fraser Ward. I guess it is mentioned then. But that's like, quite special, I think, because in a lot of hospitals that I've been to*

and I've been to a few around the country, they do the blood tests in just a general blood test area…
Because the standard of care is better. There's (a higher) nurse-to-patient ratio. They are clearly giving you a tailored service. You don't feel like a number in the system…
(Tom, 20s, M, MEN, lines 225–227; 239–240)

When asked how they originally became aware of the endocrine specialist nurse, one of the participants explained that he wasn't made aware of her (Anne) by the clinic but by his general practitioner (GP)—he made sure to ask about the nurse during his first appointment:

It was at the local GP's. So, it wasn't just on that but that came up. So, I wasn't actually aware at all of the fact that specialist nurses exist in clinics, so once I realised that, that made me ask—like, when I got referred, I was like, 'Right, that's one of the things I have to ask about.' And so, I specifically asked in my first screening about meeting with someone on the MEN-1 clinic team and they gave me Anne's details. That's the only reason I knew about it.
(Tom, 20s, M, MEN, lines 402–406)

Tom noted on the interim mock-up leaflet (Appendix 7.11) that the information concerning the nurse was key; he considered it to be a crucial element that must be included. He added that the endocrine specialist nurse is another aspect that is unique to Barts endocrine screening clinics; patients should be aware of the services that the specialist nurse offers:

I've written that this is the key information, the stuff about the specialist endocrine nurse. I think that's the most important thing to get across, because, well, I don't know if you've been to other hospitals in the country, but I have and people don't know about this sort of thing. They know they go to the clinic, they know they get a repeat appointment and they come back after six months, but they don't know that they've got this.
(Tom, 20s, M, MEN, lines 443–447)

Participants commented on the mock-up's presentation. Tom explained how the information must be displayed in a way that is clear. For instance, he felt the leaflet should display the content on what is offered at the clinic for each diagnosis in a more precise way:

> *… like talking about seeing a family together, and then it seemed like, well, fine, that's great, but then there's this (lack of description for MEN clinic subheading) stuff. Maybe that could be presented in a way that it's like, 'Oh, this is for VHL and SDH'.*
> (Tom, 20s, M, MEN, lines 79–81)

As part of the puzzle activity (Appendix 7.12), the FG3 participants discussed refining the ordering of the paragraphs as well as the paragraph headings. Tom argued that renaming the introductory paragraph to 'Who We Are' would complement the following paragraphs, 'What We Offer' and 'What to Expect'. He noted that, while 'Who We Are' may not immediately provide an answer to the new title of 'What Can We Do for You?', it effectively leads into the other sections, which provide the desired answers:

> *Yeah, yeah, I might call it 'Who We Are', because you've got 'What We Offer', 'What to Expect', so it matches. And then the title says 'How Can We Assist You' or 'What Can We Do for You', how can you quickly grab the reader's attention to answer that question within the leaflet. Maybe 'Who We Are' doesn't immediately answer that question… But 'What We Offer', 'What to Expect' and the nurse thing definitely do.*
> (Tom, 20s, M, MEN, lines 562–566)

The mock-up, in line with the discussion from FG2, was intended to welcome, reassure and guide patients. The intended reassurance was recognised and acknowledged by Tom without prompt or guidance:

> *I thought it was good. When I first started reading under 'Welcome', I was like, 'Is this marketing? Am I reading a marketing thing? Do I want to read that? Maybe I do, maybe I don't.' But then as I started to read further… I thought, 'Ah, this is about reassurance', and I liked that.*
> (Tom, 20s, M, MEN, lines 169–172)

Participants expressed their opinions on the statistical information in the interim mock-up (Appendix 7.11). Tom, reflecting on the aims of the leaflet to welcome and reassure, commented on how the inclusion of such statistics does not work well in context. In fact, he conveyed a potential sense of feeling 'lost in the system' due to the fear of being invisible on account of the large number of patients:

> *When it said, 'seeing over 2,000 new patients a year', I was like, 'Is that reassuring though? I'm not sure if that's reassuring or not (laughter). I don't want to be lost in the system.'*
> (Tom, 20s, M, MEN, lines 179–180)

Peter explained further by the numbers (2000 new patients) of how many patients the endocrine department sees only served to convey the number of individuals with issues, which made him feel uneasy. Therefore, the group decided to remove this information from the leaflet:

> *I wouldn't like the number, because some people would think, 'Oh, so many people are ill, so many people have problems'. For me—2,000—oh, I (don't) feel good if I see numbers like this.*
> (Peter, 50s, M, SDH, lines 196–197)

Tom pointed out information missing from the 'What We Offer' section. Consequently, this was added to the leaflet:

> *Under 'What We Offer', there was a description for VHL and for SDH but none for MEN1. I thought it seemed a bit strange.*
> (Tom, 20s, M, MEN, lines 71–72)

The participants were asked to comment on the font used for the leaflet. Peter felt it was appropriate:

> *The* (font*) size is okay, even for me….*
> *I think it's fine because I can read it without my glasses.*
> (Peter, 50s, M, SDH, lines 464, 468)

The participants were shown two different options with different colour combinations (see Appendix 13 and Appendix 14 for exact leaflets shown). Both rejected the brightly coloured leaflet (Appendix 7.13) preferring a more standard —a white background (Appendix 7.14), black text and colour accents from the NHS/Barts charity logos:

> Peter: *No, no, no, no (laughter).*
> Tom: ….*No, that's too (much for me) as well. (the brightly coloured leaflet)*
> (Peter, 50s, M, SDH, line 486; Tom, 20s, M, MEN, line 488)

They appreciated seeing the NHS and Barts Health logos on the front-page and suggested the inclusion of the NHS logo given this is an NHS based service. Tom emphasised that he even expected the NHS logo to be present on a patient-information leaflet:

> *Surely there's some NHS logos.*
> (Tom, 20s, M, MEN, line 591)

As a result, both logos were included, and colour elements were maintained.

It was suggested by a focus group participant to introduce abbreviations (e.g., NET) using brackets alongside the meaning:

> *… or put these words in the brackets and explain what it is.*
> (Peter, 50s, M, SDH, line 211)

Tom proposed removing names in the specialist endocrine nurse paragraph, which names the specialist nurse (Anne), and instead using basic pronouns:

> *Then you wrote, under the specialist endocrine nurse for patients heading, 'What Can She Offer?' I mean, I know it's Anne, but should that be like she/he or…?*
> (Tom, 20s, M, MEN, line 93-94)

Participants highlighted some errors they noticed in the mock-up which were amended as a result. For instance, Tom pointed out a missing determiner:

> *Under the multidisciplinary team, someone wrote, 'All patients newly diagnosed with NET'. I think it should be 'with an NET'.*
> (Tom, 20s, M, MEN, lines 104–105)

In summation, the final focus group, FG3, confirmed the content and layout of the information leaflet for new adult patients at the Barts endocrine screening clinics. In

particular, the FG3 participants emphasised the unique features of Barts, such as the dedicated blood wing and the specialist endocrine nurse. The title and the ordering of information was adjusted. The participants were able to easily find information in the leaflet when asked. The aim of the leaflet to reassure the patient, as requested by the FG2 focus group, which was observed and confirmed by the FG3 participants. All three focus-group discussions overlapped with regard to the importance of a simple and approachable leaflet with significant signposting. Moreover, participants in all three co-production cycles expressed that the leaflet should be *'patient-friendly'*.

7.7.3 Overview/Justification of the final patient information leaflet

The patient-information leaflet (see Appendix 7.15) was intended to be distributed in the following ways:

- To new patients referred to the Barts endocrine screening clinics, preferably directly handed to patients and discussed before the consultation, with the aim of better preparing them for their initial consultation.
- To new patients during their consultation (if it is not possible to provide the leaflet prior to the appointment).

The patient information leaflet is divided into seven 'sections'; the text is clearly divided by headings and space between the paragraphs, as stipulated by the toolkit for producing patient-friendly information (NHS, 2003).

7.7.3.1 Content

- **What Can We Do for You? A Service for Neuroendocrine Patients and Their Families**

The title of the leaflet on the front cover reflects its intended purpose and target audience. The front cover also includes the NHS logo, a consistent element when presenting information to patients (NHS, 2003).

- **Who We Are:**

The leaflet starts off with background information about the clinic. This section emphasises the clinic's specialist expertise in providing specialised care to patients with rare endocrine syndromes. It depicts the type and quality of care that patients can expect at the clinic while avoiding an emphasis on numbers.

- **What We Offer:**

This section details the services offered by the clinic, including the various specialist clinics for each type of diagnosis. This section ends with details on the family clinics, a noted priority in FG2 (Theme 3). Aspects unique to the clinic are also listed here, which may encourage patients to seek further information during their consultation. Additionally, at the request of the lead clinician, this section emphasises that only patients present in the consultation room can be discussed, as some patients may have several family members registered at the clinic. The need to identify specific information that should be included in a patient information leaflet from a clinician is depicted in the toolkit for producing patient information (NHS, 2003, p.6).

- **Specialist Endocrine Nurse for Patients with MEN, VHL and Familial Paraganglioma Syndromes:**

This section illustrates the bridging role that the specialist nurse plays between the patient and the screening clinic, again at specific request of the FG participants. It describes that the nurse provides assistance to patients and support to their families. This is intended to convey that the clinic provides personable service and that

someone from the clinic can be contacted (within the specified time range) if patients have a query or if they wish to reschedule their appointment.

- **What to Expect from Your Outpatient Appointment**

This section details what the patient should expect at their first appointment. It notes the possibility of a blood test. The clinic's location and that of the dedicated blood tests wing are given.

- The Multi-Disciplinary Team (MDT)

The inclusion of MDT information highlights the integration and collaboration of various health professionals with the aim of providing care tailored to the patient's individual needs. This section emphasises the efficient use of resources and the benefits that come from attending the clinic.

- The Importance of Attending Regular Appointments:

This section emphasises the need to consistently attend their clinic appointments and encourages patients to contact the endocrine nurse if they need to rearrange their appointment.

- Useful Contacts:

This section provides succinct information regarding the patient-support groups available at the clinic alongside their websites and telephone numbers. The website links allow patients to find the latest reliable information concerning their particular diagnosis. Contact details for the specialist endocrine nurses—both adult and paediatric—are also listed. Basic information, such as opening times, are also listed here.

7.7.3.2 Format and Design

- The information resource is printed as a dimension lengthwise (DL) six-page leaflet. This format was suitable because the total word count is under the 850-word limit (NHS, 2003) and it uses a 12-point Arial font, as it was specified by the NHS toolkit for producing written information (ibid, 2003), thereby making the leaflet portable as stipulated from the focus group.

- The leaflet bears a light background with a dark-black print; this allows for the best possible contrast (ibid, 2003), and was also the option the patients liked most.
- The leaflet is arranged in small blocks of text divided by headings. The white space between paragraphs allows for easier reading.

7.7.4 Development of the Patient-Information Resource

To ensure successful communication, several stylistic features were considered when producing the leaflet (Guillot and Keenan, 2016). These considerations include design, readability and content (Adepu and Swamy, 2012).

7.7.4.1 Design

Written information that is visually appealing is more likely to be noticed (Hirsh et al., 2009). Therefore, an appealing design is necessary to encourage patients to read the leaflet. The primary design considerations dealt with the following:

- Font size: This should be 12 pt. or larger, for ease of reading (ibid).

- Structure: Patients found the text easier to read when broken down into ‘moves’ (Clerehan et al., 2005). Moves are series of sections in the text that follow logically from one to another. Separating moves with headings is helpful for clarity; for the same reason, long paragraphs should be avoided (ibid).

7.7.4.2 Readability

The final mock- up of the patient information leaflet was assessed for readability. Text from the leaflet was transferred into Microsoft Word 2019, and the readability statistics analysed using the Spelling and Grammar tab. The FRE score was calculated at 52.3 and FG-KL score was 10.1 (Appendix 7.16). An FRE score of 70 and above is considered easier to read (McGrath, 1999), the FG-KL score of 10.1 denotes to a reading level of grade 10 which is comparable to a reading age of a 15-16 year old.

7.7.4.3 Content (User-Testing/Refinement)

This stage was completed within FG3, where the FG3 participants 'user-tested' the resource by reading it to ensure that it is understandable and that its intended meaning is clear (Pryce et al., 2018). Notes were made on the mock-up interim leaflet (Appendix 7.11); any typos and grammatical errors were highlighted. Moreover, the FG3 focus group helped refine the wording and arrangement of the information (Appendix 7.12).

7.8 Discussion

7.8.1 The Leaflet

This chapter has outlined the process and rationale for the co-production of a patient leaflet in order to increase attendance rates. To the best of our knowledge, this is the first co-produced patient-information leaflet for new patients at the Barts endocrine screening clinics on a micro level.

The findings of this study suggest that participants prefer simple, patient-friendly leaflets with signposting on a white background with black text. This is in line with Bernardini et al. (2001), who found that most patients do not like the use of colours in leaflets; black is generally preferred. Bernardini et al. (2001) also found that individuals associate non-black colours with serious messages—this may explain why some participants in the FG1 focus group remarked that the colourful leaflets examples from the patient-support groups looked 'serious'. The focus group participants' insistence

that the information leaflet be simple reflects evidence indicating that readers retain the structure of text better if it is simple and straightforward (Haute Autorité de Santé, 2008). Moreover, it was important for the leaflet to be approachable and patient friendly. This is in line with general medical-information guidance, which emphasises that simple and clear language reaches a wider audience (ibid). Written information that is visually appealing is more likely to be noticed by patients (Hirsh et al., 2009), further it has been suggested that the font size should be 12-point or larger for ease of reading (ibid).

The importance of signposting was also highlighted by the focus groups, which resulted in the inclusion of relevant website links and contact details. This gives patients some autonomy. This is in line with Coleman (2003), who argues that while using the internet can never replace the relationship between the patient and the healthcare professional, it can act as an important agent for promoting self-care. This is further supported by Vennik et al., (2016), who discuss how the healthcare professionals can actively support and guide patients to access sources of information while they develop their own strategies to cultivate effective communication. Participants also confirmed the a priori choice of a physical format for the patient-information leaflet, for reasons such as it can be read on the bus. This is consistent with Wilson (2009), who explained that one advantage of the physical form is that the patient can absorb the information away from the hospital environment.

The level of written language should be appropriate for the patient group to ensure that the information is understandable (O'Connor et al., 2009). Easier comprehension results in enhanced knowledge and stronger adherence to diagnosis-management instructions (McGrath, 1999). Readability formulas are a simple way to evaluate reading level (Adepu and Swamy, 2012). The Flesch-Kincaid Grade Level (FK-GL) and Flesch Reading Ease (FRE) scores are both available on Microsoft Word as stated and were used to assess the information leaflet. FK-GL score is based on the average number of syllables per word, and words per sentences (Kumaran et al., 2009). The final leaflet mock-up received a Flesch Reading Ease (FRE) score of 52.3 and a Flesch–Kincaid Grade Levels (FK-GL) score of 10.1—in line with 15–16-year-olds (see Appendix 7.16 for leaflet readability and level statistics). In comparison, 15% of the English population has literacy skills lower than US 6th graders, or 11–12-year-

olds (Department for Business Innovation and Skills, 2012). Alongside the fact that the leaflet received an FRE score well below 70—the point at which a text is considered 'easy'—this suggests that the text is somewhat challenging to read (McGrath, 1999). In an Australian study, where the demographics are likely to be comparable to this current study, it was found that the average FRE score for medical leaflets was 51 (Adepu and Swamy, 2012). Furthermore, while the FRE score could certainly be improved, the focus group participants did not subjectively find the text difficult to read, this may be due to the participants being experts and attenders.

There is evidence that most patient-information leaflets have a reading age above the recommended level. Additionally, current NHS guidelines for patient information do not emphasise a writing level below grade 6 comprehension (11-12 years old) (Williamson and Martin, 2010). Therefore, reading level guidelines should be addressed by the NHS. The high reading age for the co-produced leaflet in this study may be due to the medical terminology used. While medical terminology was limited, this likely still raised the reading age score, as medical terms tend to have multiple syllables (Kenny et al., 1998). It was important to include relevant information while maintaining simplicity. However, anything simpler would have run the risk of excluding important information, lacking authority or even patronising patients (ibid). As a result of this dilemma, new patients may simply need to ask some questions during their consultation to ensure comprehension, contrarily, individuals with low literacy levels may not feel comfortable expressing that they do not understand. The leaflet however was designed for adults, so appears to be appropriate, but will need to be tested with the target patient population in order to determine if the readability is adequate for all adult service users. A separate similar development would be needed to provide information to children/ young people.

7.8.2 Strengths of the Study

The use of a co-production model of iterative cycles of focus groups with clinician input in this study enabled debate about a research topic that requires a diverse range of views. The usefulness of focus groups is limited by the possibility of group biases and

raising participants' expectations that cannot be actualised. However, working with participants who have already gone through the experience of being new patients allowed the researcher to incorporate patients from those who would know better than anyone else. This strategy is in line with Queiroz et al. (2008), who saw including patient opinions as crucial.

One of the strengths of this focus groups study is the interaction between group participants. Co-production potentially ensures it meets the needs of the patients, while also serving the needs of the service provider. The efficiency of the co-production process in this study can be seen through the contribution of opinions from all of the focus group participants. The quotes provided in the results section demonstrate the interplay among the participants. The adeptness of co-production is also demonstrated by the input from the service provider not only prior to Cycle 1, but also to Cycle 4 of the co-production process (Figure 7.1 above). Therefore, the co-production process appeared to be successful for all parties involved.

In this study, co-production empowered the focus groups by encouraging participants to share their opinions. Buckwalter (2014) argues that citizen empowerment is measurable in project outcomes, as outcomes display effort—such effort can be seen in the participants' quotes. Moreover, the participants did not merely speak—they were heard and understood (ibid). Similarly, Halvorsen (2003) describes empowerment as a concept where citizens assume that their comments are taken seriously by the decision-makers. The leaflet in this study directly reflects the participants' contributions, showing how seriously they were taken.

Another benefit of co-production study was the potentially improved relationship between the patient and the healthcare service provider. This relationship should optimally consist of mutual learning (Kim and Lee, 2012); it can be expressed from two different viewpoints. First, the patient has the opportunity to learn something during this co-production process by listening to the viewpoints of the other participants (Halvorsen, 2003) with the aim of personal development (Kim and Lee, 2012). Second, the healthcare provider—in this study, the screening clinic—can also learn from the co-producers as a result from their input in the research (ibid).

7.8.3 Limitations of the study

The patient-information leaflet was intended for new patients at the screening clinics. Participants in both FG1 and FG2 were experts in hindsight, as they have been attending the clinics for years, thereby were familiar with what the clinic offers and should offer as standard procedure. However, this was counterbalanced by the FG3 participants, who have only been registered for less than 12 months. In this way, they could give their opinions on the leaflet as fairly new patients and what they thought would be useful for a new adult patient to know about the clinic. Another limitation was that all of the participants were attendees of the screening clinics; it would be beneficial to evaluate the perception of the clinics from non-regular attendees. Additionally, the people who volunteered to participate may not necessarily represent all patients at those particular screening clinics, a point echoed by Tang and Newcomb (1998). However, the consistency of some of the findings across the three cycles—such as the emphasis on patient-friendly simple leaflets with signposting—enhances the reliability of the conclusions despite the limitations of the focus group method. Also, not all screening clinics groups were represented, for instance there were no VHL clinic patients in any of the focus groups, although some were initially invited/expressed interest. Moreover, the second and last focus groups were comprised of all women and men, respectively.

The total number recruited was suboptimal. The researcher encountered difficulty recruiting participants that could attend the focus groups at the same time. Greater numbers, as pointed out by Hui et al. (2015), would have likely provided a greater understanding of the patients' needs. Nonetheless, recruitment difficulties are a standard issue with focus groups (Tausch and Menold, 2016). A remedy for this, as suggested by Dyas et al. (2009), is to employ numerous recruitment methods from the outset. For instance, healthcare professionals could be trained to recruit patients during consultations.

In regards to the topic guides used for the focus groups, they appeared to be not fully appropriate, as the participants raised matters which were not considered and not

included in the topic guide. For instance, the discussion of accessing information/support when fellow diagnosed family members were not an option, conveys the possible limitations the focus group topic guides possess. However, raising of such matters organically by the participants, portrays the advantages of the focus groups, in that individuals are more likely to narrate more candid responses (Leung and Savithiri, 2009). In addition, focus groups can be employed alongside other techniques using a mixed-methods approach (Nyumba et al., 2018). Nevertheless, some topics are more challenging to discuss in focus groups (larger gatherings) than in individual interviews (ibid). As such, the researcher was aware of such restraints when preparing the initial focus group questions.

This study only involved adult participants who supported a physical patient-information leaflet. Incorporating younger participants could aid in a transition towards digital formats, as young adults are more likely to be internet users (Kontos et al., 2014). Digital formats have been noted to provide several benefits, including instant updates, which are quite useful for healthcare services (Hammar et al., 2016). Additionally, the government now aims to spend less on printed materials (Johnstone-Waddell, 2018). Hammar et al. (2016) determined that a prospective transition to a digital format should be supported by comprehensive information and education provided to patients who are unfamiliar with new technology. Whilst alternative formats to physical leaflets are promising, they have yet to be rigorously tested and evaluated (Vennik et al., 2016). Moreover, some argue that patients should at least have an option of paper-based information, as older patients often prefer physical formats (Hammar et al., 2016).

There were some challenges with the co-production process that should be considered. For instance, in this study, the participants all came from a small and specific clinic population; thus, there is no assurance that they are representative of the community (Vanleene et al., 2015), in terms of other rare endocrine syndromes. Moreover, whilst all of the focus group participants voiced their opinions, some were more vocal than others; thereby, the most vocal participants may have imposed their views and influenced group decisions. Vanleene et al. (2015) refers to this co-production limitation as ‘crowding in/out’, which is the invisible boundary that may limit

the ability of disadvantaged (less vocal) citizens to benefit from or even contribute to the co-production process.

Whilst the focus groups participants welcomed the opportunity to engage in the process, the idea of mutual responsibility is controversial (Ewert and Evers, 2014); as it has been expressed that it is neither feasible nor desirable to share power and accountability equally between patients and health service-professionals in all circumstances (Batalden et al., 2016).Thus, the burden of responsibility has been noted to fall disproportionality on service providers due to the burden for medical error for instance (ibid), therefore, service providers possess a possible hold over clinical undertakings, which may constitutes a barrier to true co-production (ibid).

In this study, the service provider did, in fact, make some a priori decisions and request modifications to the leaflet, as this was a co-production their input was supportive to the development of the leaflet. Greater participation would have been beneficial, including input from the wider multidisciplinary team with the participants at the same time, which may have enhanced the communication. This potential barrier to true co-production can be mitigated in the future by incorporating 'normal' patient-involved co-production into everyday clinical practices as much as possible, for instance, in relation to management of the diagnosis, as it has been expressed that clinics should take a patient-centred approach (Baim-Lance et al., 2019). A further limitation is that the information may become out of date, thus a regular review needed of the patient information resource is required.

In relation to the outcome, is it interesting to note the unexpected findings in Theme 1, FG2, of 'The push factors to engage', in particular to some of the participants feeling that there was a lack of information provision as new patients at the screening clinics. The lack of information, as discussed, forced some individuals to engage with the information, thus it is anticipated that provision of information to new individuals at the clinic will inspire them to take action in engagement, resultant in more of a 'pull factor'. Thus, minimising possible stress to the individual through provision of the appropriate information and signposting.

7.8.4 Implications/Recommendations

The leaflet may be tested as a means of increasing patients' perceived knowledge, thereby improving the overall patient experience (Guillot and Keenan, 2016) and encouraging regular attendance. The information leaflet was aimed at new patients to enhance patient-service provider communication from the outset in a setting where time restrictions often limit this relationship (ibid). This point was highlighted by Cycle-2 participants, who suggested the patients be handed the leaflet directly at the clinic. Doing this and answering any questions that arise provides extra assistance; this is important, as the leaflet's readability level is above some citizens' abilities (Department for Business Innovation and Skills, 2012). One alternative to providing the leaflet in the clinic, which is suggested in the literature, is sending it out with the initial appointment letter for new patients. This would also serve to prepare patients for their upcoming initial consultation (Becker, 2014).

Further stages that could be incorporated in the co-production process, which were outside the scope of this PhD study, includes piloting of the leaflet, with the objective of consideration of how the leaflet would be used, and whether the leaflet has any impact on initial attendance. For instance, after five years, which is a proposed duration of time expressed by the service providers, a service evaluation can be conducted to determine whether the patient information leaflets have helped their patients engage in screening. In the long term, leaflet distribution methods must be considered, such as the leaflet possibly being sent out prior to initial appointments or just exclusively distributed at the screening clinic. Other options include making it available on a rack (general services) or emailing it directly to patients (NHS, 2003). Moreover, the responsibility for distribution and funding source ought to be considered (ibid).

With respect to justification of a paper leaflet, as stated, recommendations which have been noted to be associated with screening attendance, included the reduction of inconvenience and increasing support to individuals (Graham-Rowe et al's., 2018), this is anticipated to occur with the employment of the co-produced paper patient-information leaflet (Appendix 7.15). Further steps which are required based on this literature includes increasing awareness of the significance of screening and

enhancing message content (ibid); this point was discussed in Theme 3, FG2 and subsequently the importance of attendance was included in the final leaflet. Further emphasis on the importance of screening communicated from the service providers, in conjunction with the leaflet, may be beneficial in encouraging appointment attendance.

It would also be beneficial to consider patient type in those who participate in research. For instance, Baim-Lance et al. (2019) detail various patient characterisations, from the 'proto-professional' (Swaan, 1988), who is familiar with the vocabulary and culture of the healthcare environment, to the 'natural helper', who complement their own healthcare with their independent activities. No single 'type' captured the participants in this study. This is likely because these categorisations are based on a field of semi-scripted possibilities, as noted by Renedo and Marston (2015). Therefore, it is important to consider patients as fulfilling multiple patient roles (Baim-Lance et al., 2019), Possible future research which would be helpful to advance knowledge on this issue, would be the involvement of a greater number of patients so to engage all possible patient types to gain an enhanced understanding.

7.8.5 Conclusion

To conclude, this study presented the process and results of the co-production of a paper information leaflet for new patients on a micro level. The findings of this study suggest that patients prefer a simple, patient-friendly leaflet with relevant signposting. While the concept of co-production is not new, applying co-production to this research topic provided a novel opportunity for care provision at the Barts endocrine screening clinics. As discussed by Klaassen et al. (2018), creating opportunities for service providers and focus group participants to work together may lead to enhanced health outcomes and advancement towards a truly patient-centred approach. Providing new patients at the Barts endocrine screening clinics with information leaflets which may have some benefit, which needs to be tested, to all involved by fostering an increased understanding of the clinic mechanics and where to access the appropriate information and, in turn, reducing patient anxiety. Further research as stated should attempt to pilot the leaflet with new patients over a set period of time and then investigate any impact on patient engagement. Moreover, it would be interesting to use the co-

production process in the development of alternative formats, such as digital information resource, and to explore the co-production of similar information resources for children and young people with rare hereditary endocrine syndromes who need regular clinical monitoring.

The ensuing chapter 8 presents the integration of key findings from the two qualitative arms of this thesis: Study 2, the qualitative interviews (Chapter 6) and Study 3, the focus groups (Chapter 7).

Chapter 8

A multidimensional view: Integration of the two qualitative studies

8.0 Introduction

In keeping with the multimethod research design discussed in Chapter 4 (section 4.2.2 and 4.2.3), this chapter presents the integration of key findings from the two qualitative arms of this thesis: Study 2, the qualitative interviews (Chapter 6) and Study 3, the focus groups (Chapter 7). The aim is to determine to what extent (if any) the interview findings concur with the focus groups findings. It is anticipated that integration may facilitate a more complete and robust multidimensional understanding of the patients' experiences. This chapter begins by expressing the aim in Section 8.1, followed by the methodological approach in section 8.2, with the methods presented in Section 8.3. The analysis is described in Section 8.4 and the findings in Section 8.5. The findings are discussed in Section 8.6, whilst the strengths and limitations and implications are presented in Section 8.7 and 8.8. The chapter ends with the conclusion in Section 8.9.

8.1 Aim

The aim of this chapter is to explore the relationship between the themes (key findings) from each of the two different qualitative studies (Study 2 and Study 3). This is in relation to the overarching aim of this thesis: to gain a deeper understanding and describe how rare endocrine gene carrier individuals comprehend and use the screening clinics, and thereby gain a more comprehensive understanding of the patients' experiences of living with a rare endocrine syndrome and undergoing screening and surveillance. It is anticipated that the new information that may be uncovered through such integration, could support patients and their families in using the Barts endocrine screening service in order to meet their needs.

8.2 Methodological Approach

8.2.1 The Integration framework

The approach chosen for this integration was the framework of Fetters et al. (2013) due to its stated consolidation of pragmatism (practical application), specificity (practice based) and generality (principle directed) (McCrudden and McTigue, 2019), which makes it accessible to researchers. Integration is characterised by Fetters et al. (2013) at three levels: firstly, integration at the design level denotes the conceptualisation of the study and the type of design selected to investigate the research topic; secondly, integration at the methods level connecting the methods of data collection and analysis; and lastly, integration at the interpretation and reporting level occurring when the researcher combines the two datasets to demonstrate how they are more informative then either dataset alone. Integration at the interpretation and reporting level includes integration through describing the data in a report (narrative), integration through data transformation and integration through joint displays. A joint display is described as a visual display employed to represent the different data analyses of the results in a single display (Creswell, 2015; Plano Clark and Sanders, 2015). In relation to this chapter, the third level of integration at the interpretation and reporting level was conducted and will be described.

8.3 Methods

8.3.1 Design

To address the aim of this chapter, a multimethod convergent design was used (Figure 8.1 below), with qualitative data collection using semi-structured interviews (Study 2), followed by qualitative data collection using focus groups (Study 3). Each of the studies were analysed separately in advance of integrating the findings.

8.3.2. Integration at the interpretation and reporting level

Integration at the interpretation and reporting level was implemented via two approaches: integration through narrative and the use of a joint display. Integration thorough narrative occurred as the researcher described the separate interview and focus groups findings in separate reports/chapters (Fetters et al., 2013). The findings were then organised in an integrated results matrix, a joint display employed to juxtapose interview findings and focus group findings, in order to permit side-by-side comparisons and determine the evidence required to assist the researcher's process of gathering meta-inferences/metathemes and unique insights into the topic (Guetterman et al., 2015; Plano et al., 2015).

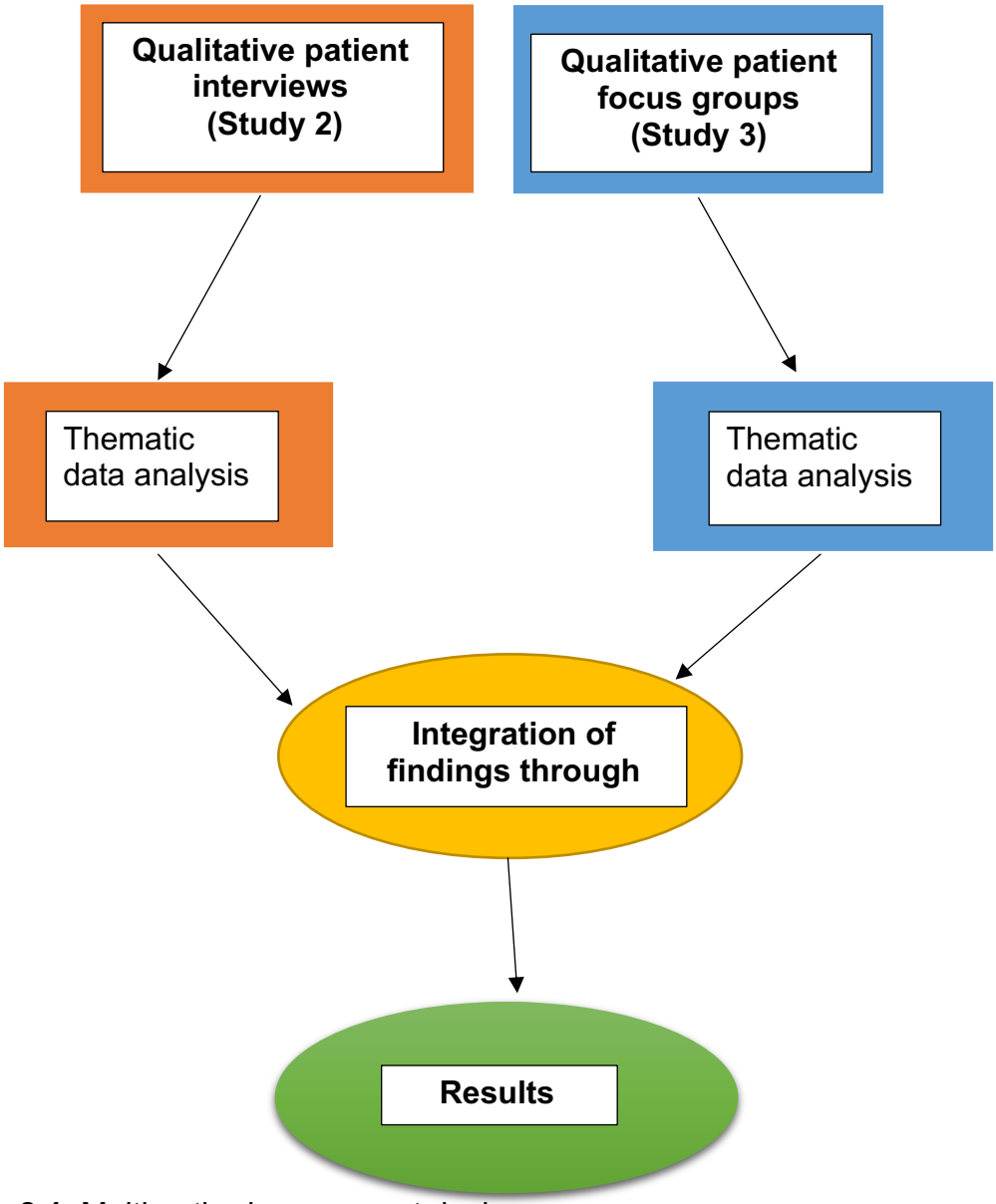

Figure 8.1. Multimethod convergent design

8.4 Data analysis

8.4.1 Integration of the qualitative interview findings and the qualitative focus group findings

As suggested by Creswell (2015), side-by-side joint displays were used to integrate findings from the interview and focus group studies. This involved merging the results from the two datasets via a side-by-side comparison to assess for 'fit' (level of agreement) of the two types of data. The 'fit' of data integration refers to the coherence of both sets of findings (Haynes-Brown and Fetters, 2021). This assessment of the 'fit' of integration is likely to have one of the three outcomes: partial agreement, silence and dissonance (Farmer et al., 2006). Partial agreement occurs when there is agreement on one but not both elements of the findings (e.g. the meaning/prominence of the themes are the same, limited coverage or particular examples are the same); silence occurs when one set of findings covers the theme whereas the other set of results is silent on the theme; and dissonance occurs, for instance, if the interview and focus group findings are inconsistent, contradictory or disagree with each other (e.g. the meaning and prominence differ) (ibid).

Integration through joint display analysis has the advantage of compelling the researcher to think concurrently regarding both types of data for connected constructs (Haynes-Brown and Fetters, 2021). Consequently, this may result in new insights beyond the information gained from the data compiled separately, based on the interview and focus groups findings (Fetters et al., 2013). At the interpretation and reporting level, a side-by side/joint display narrative method is efficient for achieving integration in the reporting of multimethod results (Creswell and Plano Clark, 2018).

Constructing a joint display requires some commonality in the domains being examined (for example, in this study the resultant themes) across the two datasets (Guetterman and Fetters, 2020). Affinity in such domains can be used to govern the gathering of both types of data, helping to ensure that the compiled data can be connected in a joint display (Fetters, 2020). Joint display analysis is flexible and iterative in nature as the researcher usually undergoes several cycles of revision and refinement (Haynes-Brown and Fetters, 2021). Such a process is employed to aid

researchers in their attempts to ensure a compelling integration analysis (Guetterman and Fetters, 2020).

After constructing the details in the side-by-side joint displays of the integrated findings in relation to how individuals comprehend and use the clinics, the visual displays further facilitated the researcher with the data analysis by aiding in the assessment of the 'fit' of integration (level of agreement) between the datasets. Such identification was made by comparing and contrasting the interview and focus group datasets, which resulted in the integrated findings being conveyed as metathemes (topics), as displayed in Table 8.1 and Table 8.2 below.

8.5 Findings

Side-by-side joint visual displays of the integrated findings related to how individuals comprehend (Table 8.1) and use (Table 8.2) the screening clinics are presented and discussed below. In the joint display tables, the themes already identified through the separate qualitative analysis of the interviews or focus groups are displayed (**in bold type**) and supported by the use of illustrative participant quotes. The term **'INTV-*'** refers to an interview finding and '**FG-*'** indicates a focus group finding, whereas the number (*) after the terms refers to where the findings are located in the results tables. For conciseness, an exemplar quote is used for each point discussed; the complete and further quotes, in relation to the particular theme/ sub-theme, are provided in the interview and focus groups chapter (Chapters 6 and Chapter 7). The level of agreement displayed in the joint display tables is related to the assessment of the 'fit' of integration, which can be one of three outcomes: partial agreement, silence and dissonance (Farmer at al., 2006), as outlined in Section 8.4 above.

8.5.1 Integrated findings of how rare endocrine gene carrier individuals comprehend the Barts endocrine screening clinics.

There was a partial agreement between the datasets regarding the individual's awareness of the screening clinics, whereby there is a *Suspension of thought* when outside the clinic environment (**INTV-1** & **INTV-2**, **FG-1**, Table 8.1). Although some of the participants conveyed a personal temporary *Suspension of thought*, with

awareness resurfacing once the appointment time neared (**INTV-1** & **INTV-2**, Table 8.1), others' perception of the clinic was suspended as an implied method of emotional protection by others, in this instance family members during childhood (**FG-1**, Table 8.1). This slight discrepancy may indicate that some patients' understanding of the screening clinic may be affected as a result of family influence as it was implied that knowledge was withheld from the patient by family members when the patient was younger (**FG-1**, Table 8.1).

There was an absence of *A sense of familiarity* towards the screening clinics in the focus group data; however, themes of perceived familiarity between patient and service-provider with the implication of trust was communicated in the interview data (**INTV-3**, Table 8.1). Nevertheless, there was partial agreement between the datasets in terms of suggested *Animosity from a younger perspective* towards the clinics (**INTV-4**, **FG-2**, Table 8.1). It was implied that those who do currently attend the clinics harboured some animosity as a result of the treatment by others, and they expressed their view that once they are older, they will cease their attendance (**INTV-4**, Table 8.1). Moreover, it was emphasised by one participant how difficult it was to encourage the attendance of a family member due to the emotional response of the son regarding his diagnosis (**FG-2**, Table 8.1). This suggests that complications may occur in regards to clinical engagement when younger patients reach the age of consent, as some may maintain a sense of animosity towards the clinic and their diagnosis when they are older, thereby potentially negatively impacting appointment attendance.

Interpersonal relationships were also discussed in terms of information provision. The interview data highlighted *Trust as essential but fragile* and concern that information was withheld during one-to-one communication between the patient and service provider (**INTV-5**, Table 8.1). The focus group data, in the same metatheme, indicated that information provision in general was lacking and not provided to patients, particularly at the start of their clinical journey (**FG-3**, Table 8.1). Such a lack of information from the service provider to the patient may have resulted in the expressed trust issues as the lack of information may have caused the patient to seek unreliable information outside the clinical environment, which in some cases only increased the distrust between patient and provider (**INTV-6**, Table 8.1). In contrast to suspicion, a perceived *Confidence in them and myself- (autonomy to know/not know)* at the

screening clinic was also expressed by patients in both sets of the data (**INTV-7**, **FG-4**, Table 8.1). It was noted that such perceived confidence in the screening clinics was due to the established service providers' expertise which gave the patient some reassurance (**INTV-7**, Table 8.1). In the focus group data, this confidence in the service provider allowed some participants to forfeit their autonomy in relation to seeking to information (**FG-4**, Table 8.1) as it was understood that the professional would possess more information regarding the diagnosis.

Although some patients conveyed their sense of reliance in the service provider's expertise, others expressed a differing view represented in the metatheme *Expected patient proficiency*. This was noted in both sets of data as part of the participants' comprehension of the screening clinics (**INTV-8**, **FG-5**, Table 8.1), and was particularly stated to occur at the start of the participants' patient journey at the clinic. For instance, a younger patient illustrated that even with the lack of information provision, he was expected to have a particular level of expertise as a result of the type of questions he was being asked (**INTV-8**, Table 8.1). Meanwhile, a separate participant explained that due to the lack of information this resulted in the push to independently seek the information, in order to aid in the communication with the service provider (**FG-5**, Table 8.1). Thereby, it is suggested in both of the datasets that, at times, comprehension in relation to diagnostic and in some instances even practical clinical information, by some patients was somewhat limited.

A metatheme of *Appreciating the importance of attendance* was conveyed by participants in both datasets (**INTV-9**, **FG-6**, Table 8.1), though with some dissonance. Specifically, although witnessing other family members succumbing to the diagnosis, some individuals do not attend the screening clinics to get *"checked"* (**INTV-9**, Table 8.1); in contrast, when discussing the information to include in the patient information resource, participants emphasised the communication of not only the importance but also the continuation of attendance (**FG-6**, Table 8.1). This discrepancy regarding the appreciation of the importance of attendance somewhat highlights the complex nature of appointment attendance; in that even though the potential advantages of screening attendance is conveyed to individuals, this may not be sufficient to encourage individuals to appreciate the importance of engagement with the screening clinics.

The participants' awareness of *A tailored service* of the screening clinics was absent in the interview data; nevertheless, the provision of a tailored unique service was highlighted by a focus group participant who gave the example of the provision of a dedicated blood test area (**FG-7**, Table 8.1). However, even with the expressed unique service provided by the screening clinics, partial agreement regarding the metatheme of the *Terminology hurdle* faced by some participants in-clinic was noted in both sets of data (**INTV-10**, **FG-8**, Table 8.1). Such a terminology hurdle was noted to occur regarding the comprehension of information provided by the clinic; as one participant illustrated, the hurdle was faced when explaining information pertaining to informing her child's school (**INTV-10**, Table 8.1). The limited capacity to understand the terminology was also echoed by a focus group participant when reviewing patient information resources (**FG-8**, Table 8.1). This finding suggests that even when information was provided by the screening clinics, the comprehension of the information was, at times, an obstacle for some of the participants.

Table 8.1. Side-by-side joint visual display of integrated findings related to how individuals comprehend the screening clinics

Metatheme/Topic	**Interview findings (INTV-*)**	**Focus group findings (FG-*)**	**Assessment of the 'fit'/ Level of agreement**
Suspension of thought	A metatheme of **Suspension of thought** was supported by the subthemes: **(INTV-1)** ***Out of sight, out of mind*** *It's like throughout the year, I won't think about (clinic) or the MEN (her diagnosis). …. so out of sight, out of mind.* (Elsa, 50s, MEN) **(INTV-2)** ***Anticipating the hospital visit*** *. . . Nearer to the appointment time, I'll be going, "Hmm, is that a flutter, is that something?" . . .* (Elsa, 50s, MEN)	A metatheme of **Suspension of thought** was supported by the theme: **(FG-1) Negative factors influencing engagement** *…If I look at my brother's situation, he was profoundly ill aged twelve, he then had a series of operations through his teens. He, when he became an adult, he hadn't got the slightest sense of what had happened, what, how much danger he'd been in, but he was a profoundly happy adult…*(Hannah, 40s, F, MEN)	Partial agreement
A sense of familiarity	A metatheme of **A sense of familiarity** was supported by the subtheme: **(INTV-3)** ***The balance between trust and scepticism'*** *Yes, I trust them, they know us, we know them really. No, I feel quite happy ...* (Abigail, 60s, SDH)		Silence in focus group data
Animosity from a younger perspective	A metatheme of **Animosity from a younger perspective** was supported by the subtheme: **(INTV-4)** ***Family matters***	A metatheme of **Animosity from a younger perspective** was supported by the theme: **(FG-2) Negative factors influencing engagement**	Partial agreement

	My daughter, she's had a few people say nasty things at school. I mean she's 15, she doesn't get why she has to go for it. She says when she's 18, she's not going to have it done (screening appointment). That's just her age talking I think. She doesn't realise how important it is to actually have the scans done. (Olivia, 40s, SDH)	*….it was much more difficult to get some, my older son to come, keep his appointments and to, because he, I think he was a bit, he was angry about it, I think and he still is a bit…* (Zoe, 60s, F, MEN)	
Trust as essential but fragile	A metatheme of **Trust as essential but fragile** was supported by the subtheme: **(INTV-5)** ***The balance between trust and scepticism*** *I don't think you really need to know everything. But it would be nice if there is something that they are watching and they aren't saying, just to tell you.* (Miles, 50s, VHL) **(INTV-6)** ***The balance between trust and scepticism*** *Years ago when I was first diagnosed I did used to try and look things up and find a bit more about it. But then every time I did that I ended up just frightening myself to death. And then ended up sometimes getting an earlier appointment and thinking, hang on, they've been telling me a load of lies here, this isn't*	A metatheme of **Trust as essential but fragile** was supported by the theme: **(FG-3) The push factors to engage** *Becky: Nothing.* *Rachael: No.* *Hannah: Nothing.* *Zoe: I didn't get anything.* (All FG2 participants)	Partial agreement

	right, you know. And then I'd go up and see Professor Johnson and he'd put my mind at rest, so that was okay. After that, I'd given up looking things up. If there's something I really want to know, I'll ask the doctors. (Nolan, 60s, MEN)		
Confidence in them and myself- (autonomy to know/not know)	A metatheme of **Confidence in them and myself- (autonomy to know/not know)** was supported by the subtheme: **(INTV-7) *Weight of expertise*** *. . . I thought no, the doctor knows best, he's said it's probably fatty tissue and that's probably all it is, and sure enough that's what it was. So by having the knowledge that they know what they're doing and know what they're on about . . .* (Andrew, 30s, MEN)	A metatheme of **Confidence in them and myself- (autonomy to know/not know)** was supported by the theme: **(FG-4) Autonomy: to know or not to know** *I could go into it but I still won't know as much as them (the medical team), even if I did.* (Paul, 70s, SDH)	Partial agreement
Expected patient proficiency	A metatheme of **Expected patient proficiency** was supported by the subtheme: **(INTV-8) *Assumed expertise*** *It's just expecting me to ask something when I'm not provided with enough information to ask things. It's a bit like going into an exam without any revision, you don't know what you're being asked.* (Conner, under 18, VHL)	A metatheme of **Expected patient proficiency** was supported by the theme: **(FG-5) The push factors to engage** *(I) was trying to find out what the disease meant, what the current treatments were, what the prognoses were, what treatments, you know, it was practical trying to find out practical information in order to interact with the doctors who were managing my brother's care.....* (Rachael, 50s, SDH)	Partial agreement

Appreciating the importance of attendance	A metatheme of **Appreciating the importance of attendance** was supported by the subtheme: **(INTV-9) *Family matters*** *. . .There's only nine of us left like cousins but one parent had four girls, but they won't be checked, which I think is stupid...(Abigail, 60s, SDH)*	A metatheme of **Appreciating the importance of attendance** was supported by the theme: **(FG-6) A resource to introduce and direct** *Yes, if you had a sentence in like research has shown that it's important to, to follow-up any treatment that you have, that you continue to come (so can get treated).* (Zoe, 60s, F, MEN, lines 715–716	Dissonance
A tailored service		A metatheme of **A tailored service** was supported by the theme: **(FG-7) Reflections on the content and presentation** *Yeah, I go up to the Francis Fraser Ward. I guess it is mentioned then. But that's like, quite special, I think, because in a lot of hospitals that I've been to, and I've been to a few around the country, they do the blood tests in just a general blood test area…* *Because the standard of care is better. There's (a higher) nurse-to-patient ratio. They are clearly giving you a tailored service…* (Tom, 20s, MEN)	Silence in interview data
Terminology hurdle	A metatheme of **Terminology hurdle** was supported by the subtheme: **(INTV-10) *Weight of expertise*** ***…****sometimes I have to explain a few*	A metatheme of **Terminology hurdle** was supported by the theme: **(FG-8) Reconsidering the audience** *Those words, you know, like this, these*	Partial agreement

	things for Gabby's school when I say, "Well she's got a scan coming up." They do like to know what it's about and it's hard to explain it, as I said she just carries the gene and we're just going to make sure that it is not, you know, she's a gene carrier of this certain thing. I don't even know what it's called. (Olivia, 40s, SDH)	*types of words. It's just more the medical terms. I don't understand them because I've never used in my life, so…* (Peter, 50s, SDH)	

8.5.2 Integrated findings of how rare endocrine gene carriers individuals use the Barts endocrine screening clinics.

Agreement with respect to the individuals' utilisation of the screening clinics as a method of *Control over identities/future selves* was a prevalent metatheme in both sets of data (**INTV-12**, **FG-9**, Table 8.2). Control in terms of the management of information shared across family generations was described (**INTV-12**, Table 8.2); such management was implied as a method of managing the future self through the desire to manage intergenerational information by attending the clinic appointment alone. The metatheme of *Control over identities/future selves* was also expressed in terms of the effort to take control over the diagnosis (**FG-9**, Table 8.2). The metatheme of *Control over identities/future selves* agreed in both sets of the data, may possibly suggest an approach that is utilised by participants as to how they use the screening service, which is exemplified by either controlling information that was shared with others or by an effort to take control of their diagnosis by seeking out information.

There was further agreement between the datasets in relation to the metatheme of *Reducing/managing fear and anxiety* (**INTV-12**, **FG-10**, Table 8.2). A mechanism of how participants use the screening clinics to reduce such fear and anxiety involved detachment as a coping strategy during an MRI experience (**INTV-12**, Table 8.2); this process was aided by the stated supportive nature of the service providers. The theme of individuals using the screening service as a method for *Reducing/managing fear and anxiety* was also illustrated by some participants seeking reassurance through the assistance of the service provider (**FG-10**, Table 8.2). However, the focus group data further demonstrated that reducing/managing fear and anxiety by seeking such reassurance is not without its complexities as some participants face hindrance due to the emotional turmoil which can occur for some when seeking reassurance from the information and/or service provider. This finding suggests that service providers may play a role in how individuals use the screening clinic, in that they may aid in reducing or managing anxieties of the patients.

The data suggested how individuals affected patients' use of the screening clinics; usually this was an effect on family members while outside and inside the screening clinic environment (**INTV-13**, **INTV-14**, **FG-11**, Table 8.2). Individuals used the

screening clinics with an *Optimistic perspective*. This metatheme was silent in the focus group data; however, the interview data illuminated how witnessing the survival of a family member of the same diagnosis, outside the clinic environment, resulted in the adoption of the screening services with a positive outlook (**INTV-13**, Table 8.2).

However, when inside the screening clinic, a metatheme of *Adaptation to the needs of the individual- (one size doesn't fit all)* of how individuals use the screening clinics was prevalent, with some dissonance, across both of the datasets (**INTV-14/15**, **FG-11/12/13**, Table 8.2). This metatheme of *Adaptation to the needs of the individual- (one size doesn't fit all)* was conveyed in three aspects: family, as an individual and as a patient. Firstly, with respect to family (**INTV-14**, **FG-11**, Table 8.2), the interview data indicated how using the screening clinics in a family manner/united front was met with some positivity and preference (**INTV-14**, Table 8.2). In contrast, the focus group data exemplified how some individuals lack such an approach when using the screening clinics (**FG-11**, Table 8.2); thus, some patients are pushed to engage with the clinics, with a consequent lack of support from family members. Thereby, the matter of individuals using the screening clinics in a positive, supportive family manner is not the automatic experience, or perhaps even preference of some patients. Secondly, an interesting aspect of this metatheme in relation to the individual was noted in the focus group data regarding the expected level of interaction by the individual when using the clinic (**FG-12**, Table 8.2). This is noteworthy as it implies that screening clinics must adapt to the needs to the individual, as *"one size doesn't fit all…"*(Laura 40s, F, MEN). It was expressed that some individuals require a depth of information when using the clinic as they feel they already possess a high level of information, as in this example, whereas others may, perhaps, just want the pragmatic updates. This finding provides an insight into not only how some individuals use the clinic but also their expectation of the level of information that should be shared with them when doing so. Perhaps engagement is a factor here; as patients who believe they possess a high level of information or may think they are not at risk of developing health issues such as tumours, hence may not feel the need to attend a screening appointment to see if any tumours are present. Lastly, a strong dissonance between the two datasets with respect to the patient aspect of this metatheme of *Adaptation to the needs of the individual- (one size doesn't fit all)* was demonstrated regarding the utilisation of the patient support groups by the individuals, as part of how they use the

screening clinics (**INTV-15**, **FG-13**, Table 8.2). Utilisation of the patient support groups was noted by one participant as resulting in anxiety and ultimately disengagement from the support groups as he began to compare his state of diagnosis to others (**INTV-15,** Table 8.2). Whereas a separate individual endorsed the benefits of attending patient support groups and supported the inclusion of the support groups in the patient information resource, as the environment of the groups allowed the participant to freely expresses their experiences (**FG-13**, Table 8.2). Thereby, the benefits of utilisation of the patient support groups were acknowledged by some patients, however others, even with a supportive environment, may not be comfortable with others in the same environment due to the potential for comparison.

Further dissonance occurred in the two datasets with respect to the metatheme of *The nurse- the bridge between patient and clinic* (**INTV-16**, **FG-14**, Table 8.2). Despite the noteworthy role the specialised endocrine nurse plays as the link between the screening clinics and patients, which one participant expressed their appreciation of when using the clinics (**FG-14**, Table 8.2), a lack of awareness of the nurse was shown by a young, recently referred interview participant (**INTV-16**, Table 8.2). This possibly highlights the lack of understanding of how to use the screening clinics, in particular by new patients, regarding the important roles the clinical staff play at the clinics.

There was weak agreement between the datasets, with silence in the focus group data, regarding the relevance of the metatheme of participants using the screening clinics as a *Holistic life check* (**INTV-17**, Table 8.2). An interesting aspect in relation to the ongoing history of clinic attendance is that some have come to use the clinics for a holistic life check by discussing non-clinical related issues in addition to the main diagnosis. Such utilisation of the clinics may indicate how comfortable the patients have become with the service providers in that they discuss personal issues, for instance a younger patient potentially encouraging further engagement.

Nevertheless, the metatheme of individuals using the screening clinics generally as *A point of reference* regarding their diagnosis was common to both datasets (**INTV-18**, **FG-15**, Table 8.2). Even with the expressed inconvenience of having to take a full day to attend the clinical appointment, one participant nonetheless deemed it worthwhile as they utilised the appointment as a point of reference to "*ask any questions you*

want" (**INTV-18**, Table 8.2). Whereas the focus group data indicates that the clinic provides a general point of reference of information for some participants (**FG-15**, Table 8.2), this finding suggests that even with the availability of information resources outside the clinic, some may use the clinics when attending as their main point of reference regarding their particular diagnosis.

Table 8.2. Side-by-side joint visual display of integrated findings related to how individuals use the screening clinics

Metatheme/Topic	**Interview findings (INTV-*)**	**Focus group findings (FG-*)**	**Assessment of the 'fit'/ Level of agreement**
Control over identities/future selves	A metatheme of **Control over identities/future selves** was supported by the subtheme: **(INTV-12) *Family matters*** *….We are going in now as all three of us went in together. I sometimes say is that a good idea? What if the children want to ask something that they don't want me to know or vice versa . . . Yes. We all keep saying ... I think even this time, with the last time we went, they went, "You all coming in together?" So, we yelled, "Yes." . . . but I did think would it be for me . . . now as I'm getting older, I don't seem to have so many things wrong but they hear as well . . . if they say something's shown up, we need to do this, this and this, yes, I've got both my children there, but seeing that we're a close family anyway, I'm going to tell them, you know. It's not that it's private, so I'll tell them when I came home anyway.* (Emma, 60s, SDH)	A metatheme of **Control over identities/future selves** was supported by the theme: **(FG-9) Autonomy: to know or not to know?** *Yes, but we have a duty of care to look after ourselves…* *And you know, "Why am I here? (in the clinic)" So you have to really know yourself.* (Laura, 40s, MEN)	Partial agreement
Reducing/managing fear and anxiety	A metatheme of **Reducing/managing fear and anxiety** was supported by the subtheme:	A metatheme of **Reducing/managing fear and anxiety** was supported by the theme:	Partial agreement

	(INTV-12) *Disembodiment* *. . . (during the MRI scan) Yes, so I'm just picturing I'm on the beach somewhere in Barbados, you know, so they make it quite fun and relaxing for me because as soon as I go in they see I suffer from anxiety.* (Olivia, 40s, SDH)	**(FG-10) The value and complexity of information access** *…there's also wilful avoidance in terms of putting your condition in the hands of experts and being reassured and then not necessarily avoiding but just letting them do some of the work because they're the experts, and that can be reassuring. So I don't know. That probably comes under the umbrella of anxiety..* (Tom, 20s, MEN)	
Optimistic perspective	A metatheme of **Optimistic perspective** was supported by the subtheme: **(INTV-13) *Snapshot of the future*** *Touch wood, the way things are, medical science has improved so rapidly within this research – I know I've got two cousins who have survived, so I'm fully aware that it is not the death sentence that it used to be.* (Elsa, 50s, MEN)		Silence in focus group data
Adaptation to the needs of the individual- (one size doesn't fit all)	A metatheme of **A*daptation to the needs of the individual- (one size doesn't fit all)*** was supported by the subtheme: **(INTV-14) *Family matters*** *I think it's a positive ultimately because having the family there, especially now, makes it even better, because any issues that come up with myself or my*	A metatheme of **A*daptation to the needs of the individual- (one size doesn't fit all)*** was supported by the subtheme: **(FG-11) The push factors to engage** *Well, I just kept quiet because whenever I discussed anything it would upset someone in the family that didn't know, have any information….*	Dissonance

	mum, or my kids, we're all aware of. (Andrew, 30s, MEN) **(INTV-15) *Snapshot of the future*** *….other people were telling me about, "Oh, when you take your tablets do you find it does this? Does you find it does that?" And I thought, bloody hell. It made me sort of think, oh God, I'm, you know. But some of the people there were quite relieved talking to me because they felt as though, oh, it's not that desperate a situation. But after that I didn't go actually, no.* (Nolan, 60s, MEN)	(Becky, 50s, MEN) **(FG-12) One size doesn't fit all** *One size doesn't fit all, so there's no point in giving me a basic information leaflet when I'm, sort of, on level 4 already, because my uncle's sending me all these articles and he's still sending them to me, I've already got all these codes and stuff. I haven't got time to read all that…..*(Laura 40s, F, MEN) **(FG-13) A resource to introduce and direct** *…having gone to patient groups through AMEND, I avoided that for such a long time, but I think if patients can, you know, if there is something on there about the benefits of that because it's not for everyone but my husband and I had avoided it for so many years…It was just too painful, you know, and I realise that now, as an adult, and we went to, in the end, we did go to one because they kept saying to us, 'Oh, you know, you really should go to one of these because, you know, maybe just to support other people', and we went along and we were able to help other*	

		people and they asked us to share stories and my husband, for the first time, was able to speak very freely and a few of the mums came up to him and said, 'You have said exactly what I cannot say out loud'. (Becky, 50s, MEN)	
The nurse- the bridge between patient and clinic	A metatheme of ***The nurse – the bridge between patient and clinic*** was supported by the subtheme: **(INTV-16)** ***Assumed expertise*** *This is the first time I've heard of (when asked about the role of the specialist clinic nurse) . . .I don't know what she does.* (Conner, under 18, VHL)	A metatheme of ***The nurse – the bridge between patient and clinic*** was supported by the theme: **(FG-14) A resource to introduce and direct** *… Anne organises (the appointment), she contacts me to make the arrangements for the appointment, arrangements for me to have the bloods, make sure the timing work(s) so the doctors get the bloods through for the appointment…* (Rachael, 50s, SDH)	Dissonance
Holistic life check	A metatheme of **Holistic life check** was supported by the subtheme: **(INTV-17)** ***The balance between trust and scepticism*** *So, you know, it's not even related to what we go there for and they always ask is there anything else you want to talk about and even with my daughter, you know, she'll chat about other things…* (Olivia, 40s, SDH)		Silence in focus group data
A point of reference	A metatheme of ***A point of reference*** was supported by the subtheme:	A metatheme of ***A point of reference*** was supported by the theme:	Partial agreement

	(INTV-18) ***Anticipating the hospital visit*** *. . Well, it does seem to some because it's obviously it's a whole day taken of your life . . . and I said, we've analysed this, and I said, it's two days out of 365 and it costs me £20 to go up there, get the results, like we usually did; I'll see you in a year/18 months' time.* *You can ask any questions you want to ask . . .* (Emma, 60s, SDH)	**(FG-15) The value and complexity of information access** *To provide another means of giving you the information that the clinic or hospital can provide.* (Tom, 20s, MEN)	

8.6 Discussion

The metathemes (topics) which emerged from the integrated findings of the interview and focus group datasets (Tables 8.1 & 8.2) are discussed in the following subsections with respect to assessment of the 'fit' (level of agreement) and the applicable literature.

8.6.1 Partial agreement

There were points of partial agreement between the interview and focus group qualitative integrated findings regarding patients' experiences of living with a rare endocrine syndrome and undergoing screening. Each of the established metathemes (topics) from the integration which possess the level of partial agreement between both of the different qualitative datasets are discussed below with reference to the appropriate literature.

Participants described coping strategies, including disengaged comprehension and use of the screening clinics. Disengagement was expressed through the metatheme of *Suspension of thought* when outside the clinical environment, as well as when undergoing particular medical procedures inside the clinic as part of the metatheme of *Reducing/managing fear and anxiety*. A disengaged perception was also reported as a form of implied protection by others of a younger patient's comprehension of his diagnosis and the reasoning behind his presence at the screening clinics. Such coping strategies, as disclosed through the integrated findings, echo previous research which has expressed disengagement as a coping strategy; Dijkstra and Homan (2016) discuss how disengagement from a stressful event through avoidance is connected to the individual's lower perceived control of the situation. The authors further note that such expressed disengagement is correlated with negative psychological well-being (Dijkstra and Homan, 2016). Therefore, the combination of the metatheme finding of *Suspension of thought* and the literature indicates that disengagement as a coping strategy is a possible reflection of the patients' negative perception of the clinic, even when outside the clinical environment. This coping strategy of expressed disengagement may also affect the patient's family members, in terms of resulting in a similar perception of the clinic. Hence, the delivery of the clinical service may benefit from exploring the reasoning behind the mechanism of disengagement outside the

clinic as a coping mechanism, with the aim of possibly assisting the patient in circumstances of negative mental health.

Conversely, the integrated findings also indicate engaged coping strategies; the metatheme of *Reducing/managing fear and anxiety* demonstrates participants' engagement with the screening clinic through the use of reassuring thoughts. The literature suggests that this strategy correlates with a greater sense of control and, thus, psychological well-being (ibid). Regarding the finding of the implied protection of a younger patient's comprehension of his diagnosis, which ultimately resulted in his disengagement of the actual clinical process, the literature discusses the importance of direct communication with the child so that they can become engaged in their decision-making and medical care (Bell and Condren, 2016). The authors argue that making younger patients more accountable may aid in the improvement of their overall health over the long-term (ibid). In consolidation of the metatheme finding of *Reducing/managing fear and anxiety* and the literature, it is implied that engaged coping strategies, as illustrated, are a method for the patient to gain a sense of control over the clinical experience. For this reason, together with the partial agreement assessment of fit of this metatheme across the data, patients and their families need to feel empowered to address instances where individuals feel a lack of control over their clinical experience. Possible remedies include the significance of direct communication between patient and service-provider, which is a tool with the potential to reduce, or even aid, in the expressed coping strategies.

The findings further demonstrate the subject of control regarding how the participants use the screening clinics, particularly concerning personal *Control over identities/future selves*. This was narrated by participants as control over information shared between family members, as well as the attempt of control in the form of finding out information individually as a participant. The reasoning behind this metatheme of participants using the clinics as a method of control over identities/future selves can be found in one study that noted that some individuals are more willing to make choices today that could benefit them at some point in the years to come, particularly when it is seen in a positive aspect (Hershfield, 2011). Therefore, participants who use the clinics as a method of control over identities/future selves may do so with the appreciation that their decision of whether to withhold certain information from family

members, or source their own diagnostic information, is of benefit to their own future in some manner. The metatheme finding of *Control over identities/future selves* and the literature both indicate that some patients desire control over information, in terms of what is shared with family members, or of what is personally acquired as they may deem this process of control constructive to their future prospects. Screening clinics' awareness of how some patients use the clinics with respect to information retrieval – for instance, alone without family in an effort to control what is shared or by taking personal initiative – may support clinical service provision to the individual who is future-conscious.

Integration of findings included the perspective of hostility, particularly as displayed by younger participants towards the screening clinics. Such hostility was mainly a consequence of the younger patients' diagnoses. For instance, within the metatheme of *Animosity from a younger perspective,* one participant illustrated that her daughter had some issues at school and a separate patient, also in relation to his diagnosis, displayed some resentment. Research has found that adolescents and young adults with a cancer diagnosis are at greater risk of depression, compared to older adults, due to potential disruptions in their development and an increased burden of physical symptoms (Park and Rosenstein, 2015). The hostility exhibited by some of the younger patients, who either expressed the intention to cease engagement or have difficulty engaging with the screening clinics without family encouragement, thus, may be an indication of unmet needs among some younger individuals at the clinics. Research has evidenced rates of unmet needs among young patients with mental health problems; for instance, the findings of Moscrop et al. (2012) suggest that young patients who miss appointments are more likely to suffer from underlying psychological distress, which may or may not have been uncovered. Moreover, Parsons et al. (2021) also note that patients with mental health problems, including those who are younger (<21 years), are more likely to miss appointments. Interestingly, a study of adolescents' mental health also noted that those most in need of assistance are most likely to avoid receiving it (Wilson et al., 2010). Therefore, the association of animosity exhibited by either the expressed intended future non-attendance or general non-attendance, in particular by younger patients, may be understood in terms of their help-seeking behaviour, signalling possible psychological distress or an unwillingness to convey mental health symptoms for possible fear of

stigma (Moscrop et al., 2012). As such, the amalgamation of the metatheme finding in both sets of data of *Animosity from a younger perspective* and the literature suggests that younger patients may have experiences specific to the early stage of their clinical screening journey, potentially affecting long-term clinic engagement. Hence, the specific needs of younger patients, as well as their families, should be addressed by health care providers, as there may be underlying issues of stigma and unmet needs for the younger patient which require addressing in order to maintain future long-term engagement with screening appointments.

How patients discerned the interpersonal relationship with the service-provider was also highlighted. The metatheme of *Trust as essential but fragile* indicates some scepticism towards the clinical staff by the participants. This includes not only the sense that the information provided to the patient may have not been at full disclosure, but also the belief that there was a lack of information in general from the clinic, which was noted as a push factor for participants to find their own diagnostic information. The topic of trust between the patient and service provider is presented in the literature as a complex multifaceted construct. Even though the importance and possible fragility of this topic is acknowledged as important, attempts to measure and conceptualise patient trust have been limited (Pearson and Raeke, 2000). However, studies have found that trust can take different forms (Goold, 2002); anticipated trust refers to the disposition a patient has at a first encounter (Kramer and Tyler, 1995), experiential trust is cultivated by knowledge of the one trusted over time, and identification trust is established through a sense of shared values (ibid). Such different forms of trust are consistent with this metatheme of *Trust as essential but fragile*, which indicates a lack of experiential trust, conveyed through the patients' perceptions of a lack of disclosed information, in addition to the lack of anticipated trust in the form of the absence of patient information provision experienced by some participants as new patients at the screening clinics. Keating et al. (2002) demonstrate that negative experiences regarding communication decrease trust in service providers, indicating that trust issues are a result of miscommunication between the patient and service provider. The service providers' readiness to listen, and the delivery and content of the information, were found to be more significant to patients rather than the perceived engagement in decisions (Schneider,1998). Moreover, the experience of the patient–service provider communication by the individual was emphasised as having possible

implications for patient autonomy and shared decision-making (Goold, 2002). Thus, the partial agreement metatheme finding of *Trust as essential but fragile* across the two datasets may be of importance, as together with the literature this expresses the importance of not only clear but also open communication between the patient and service provider. This is because trust can be built or broken by the quality of communication between the two parties.

The interpersonal patient–service provider relationship was further highlighted in the findings through a different aspect: the assumption of proficiency put-upon the patient by the service provider. In the metathemes of *Expected patient proficiency* and *Terminology hurdle,* participants narrated their experiences when attending clinical appointment in terms of communication and information provision. This included a younger, new patient describing how there was an expectation from the service provider that as a new patient, he would know the right questions to ask. Meanwhile, the lack of proficiency was further demonstrated by the hindrance in terminology comprehension experienced by some of the participants, not only in terms of face-to-face communication with others, but also regarding the understanding of information resources. Such expectation as expressed by the participants is supported by one study which suggests that service providers view all patients as experts (Shaw and Baker, 2004). However, the authors expand on this by noting that such assumed expertise by the service provider was in tandem with how misinformed or uninformed the patient was regarding health issues (ibid). With respect to the topic of the terminology hurdle, a report by the Royal College acknowledges that physicians normally use words unfamiliar to patients or that they do not fully comprehend (Rimmer, 2014). Therefore, such expectation of patient expertise by the service provider, demonstrated by the narrated dialogue with the patient, may be due to the potential appreciation of such patient expertise by the provider. However, the level of expertise may be dependent on where the patient is in their clinical journey; thereby, the findings demonstrate a possible further point of miscommunication between patient and service provider, both verbally and through the provided health literature. The metatheme findings of *Expected patient proficiency* and *Terminology hurdle* across the datasets, in conjunction with the literature, further highlight not only the importance of communication between patient and service provider, but also the patients' comprehension of said communication. Hence, the delivery of clinical

services should consider the stage of the 'patient journey' of the individual as patients early in the clinical screening process may not possess an advanced level of 'patient expertise' regarding how the screening clinic is managed, in addition to the terminology used in the screening clinics.

Even though incidences of miscommunication have been disclosed in the findings, the positive aspect of the patients' experience of the clinics was also evident from the findings of both datasets. Individuals appreciate the expertise of the service provider and acknowledge the benefits of engaging with the clinic in order to access such expertise in the form of information from the clinic as a patient. The metathemes *Confidence in them and myself (autonomy to know/not know)* and *A point of reference* may indicate the consensual surrender of patient autonomy by the individual through the placement of confidence in the service providers. Contrarily, in the literature personal autonomy is highly valued as it is connected with permitting or allowing patients to make their own decisions regarding healthcare (Walker, 2008). However, research has suggested that a focus on decision situations is disputable, as when combined with the propensity to stress the significance of patients' independence in choosing, it may distract from other significant elements of the challenges to autonomy in health care (Entwistle et al., 2010). The evidence suggests that service providers may affect patient autonomy by virtue of their possible effects, not only in terms of the patient's choices but also regarding their ability for autonomy (ibid). The preference of some participants for using the clinic as a point of reference for information is in despite the increasing evidence of patients seeking information elsewhere; as patients appear to utilise the internet as a supplementary resource, to an already existing and appreciated relationship with the service provider (Stevenson et al., 2007). Therefore, the metatheme findings of *Confidence in them and myself- (autonomy to know/not know)* and *A point of reference,* in addition to the literature, indicate there is an appreciation of having face-to-face contact with the service provider at the clinic. Clinical service delivery should perhaps be receptive of this as even though there is reported use of the internet as an information source, some patients nonetheless surrender autonomy to the service-provider; therefore, demonstrating a positive indication of the confidence some patients possess in the service provider, particularly when in-person.

8.6.2 Dissonance

The interview and focus group qualitative integrated findings, at points, indicated some dissonance in relation to the patients' experience of living with a rare endocrine syndrome and undergoing screening. Each of the established metathemes (topics) from the integration which possess the level of dissonance between both of the different qualitative datasets are discussed below with reference to the appropriate literature.

Participants' discrepancy in terms of *Appreciating the importance of attendance* of the clinical appointments was identified; some were aware of the advantages of attendance, whereas others chose not to attend. Such discrepancy in the appreciation of the significance of attendance may be an indication of the patients' knowledge of the diagnosis and management plan; in this instance this would include continued screening attendance. Yadav et al. (2019) find this to be an integral component of patient education as the capability for the patient to comprehend the diagnosis and management plan is integral to the patients' outcome. Therefore, the amalgamation of the literature and the metatheme finding of *Appreciating the importance of attendance* has identified some dissonance between the datasets, suggesting some discord among individuals who are diagnosed (or at risk of a diagnosis) of a rare endocrine syndrome regarding their awareness of the advantages of consistent appointment attendance at the screening clinics. This is particularly applicable to family members who choose not to attend, therefore denoting an area in which the clinical service can explore the possible reasoning behind the lack of these individuals' engagement, even though they may be aware of family members who do attend whilst recognising the benefits of doing so.

Disparity in how some participants use the services of the screening clinics in terms of family clinics, as a patient and as an individual were apparent in the metatheme *Adaptation to the needs of the individual (one size doesn't fit all).* There was some discrepancy in the discussion of the topic of family clinics, as the data indicates that some participants viewed attending as a family as a positive, however, for others attending as a family was not an option. The literature acknowledges that family

members play a significant role in the care of patients, which includes contributions to decision-making and aiding in home care (Entwistle and Watt, 2006).

Even though the importance of involving the family in patient care has been noted, as it offers several benefits for patients as well as staff (Jazieh et al., 2018), the findings indicate that family member involvement is not an automatic option for every patient. In relation to the 'patient' aspect of this metatheme, this was regarding the utilisation of the patient support groups; even though one participant chose to cease attendance, a separate participant valued the support she found there. Such dissonance in the use of patient support groups is consistent with the literature, which discusses how despite all the possible benefits, engagement in these groups is notably low (Hu, 2017). The possible reasoning behind such low utilisation of these groups includes a lack of time and lack of awareness (ibid). Consistent with the participant who expressed that it was his first and last experience at a patient support group, evidence suggests that patients are confronted with the negative aspects of their diagnosis at these groups (Van Uden-Kraan et al., 2011), thus indicating a possible deterrent. With respect to the individual aspect of the metatheme *Adaptation to the needs of the individual- (one size doesn't fit all)*, it was implied by one patient that they felt they possessed a high level of information; those who feel they know everything may decide to not fully engage with the clinics. However, in addition to information provision, the clinics are essentially for the screening and surveillance of possible tumours; this point is an interesting one for clinical service delivery. The pretence of some patients that they feel they know sufficient information, together with the general lack of discussion regarding the attendance of clinic appointments for tumour surveillance in both sets of data, may be an indication of denial. As Kreitler (1999) discusses, the adverse effects of denial may manifest as noncompliance, a delay in attending health services or not attending follow-ups. Given the combination of the metatheme *Adaptation to the needs of the individual (one size doesn't fit all)* and the literature, clinical services should be attentive to how patients use the screening clinic, in that ultimately one size does not fit all individuals – whether it is information provision, who the patients attend with, or the utilisation of services such as patient support groups. Therefore, clinical service provision is optimised if delivered to the patient at a level appropriate to the level/clinical journey of the individual. Moreover, it would be advantageous if it is made clear to the patient the reasoning/purpose behind attending the screening clinics, in

that it is not only for information provision. but also the surveillance of any potential tumours.

Moreover, discrepancy in the awareness and appreciation of the role of the specialised endocrine nurse was expressed in the metatheme of *The nurse – the bridge between patient and clinic*; the data suggest this disparity is a consequence of a patient not being aware of the specialised nurse, whereas others knew who the nurse was as well as her role. The role of the 'liaison nurse', or in some aspects the 'specialist nurse', has been acknowledged in the literature, wherein the role of this individual has been described as 'bridging the gap' between the hospital and outside the care unit (Tabanejad et al., 2014). Furthermore, by combining medical knowledge with advanced practice nursing, the specialist nurse role has gained in popularity and acceptance with staff and patients (McNamara et al., 2009). Thereby, such a lack of awareness by some participants of the significant role that the specialist nurse plays in the screening clinics may be a possible reason why only some patients were in contact with her. The provision of initial information of the role and the means by which to contact the nurse by the health service in the early stages of the patient journey are crucial to building and maintaining that important ship and 'bridge' between the patient and screening clinics.

8.6.3 Silence

Aspects of patients' experiences of living with a rare endocrine syndrome and undergoing screening, which only came to light in relation to a particular qualitative dataset, were determined. Each of the established metathemes (topics) from the integration which possess the level of silence in one of qualitative datasets are discussed below with reference to the appropriate literature.

The interview data suggests that participants comprehend the screening clinics with *A sense of familiarity.* Such familiarity with the clinical staff implies a more positive experience with engaging with the clinics. Studies have indicated the benefits of familiarity; in that patients have been noted to have explicit preferences regarding seeing a familiar clinician and giving this greater priority when the issue is ongoing and of a high emotional burden (Gerard et al., 2008), which is applicable to patients with a

rare syndrome diagnosis. Given that this aspect of familiarity has been expressed as being part of the positive patient perception of the clinics, it can therefore be used in the delivery of the clinical service as a method to maintain engagement with the screening clinics

The interview data also reveals how individuals use the screening clinics; in that some participants took the opportunity to use the clinics as a *Holistic life check,* whereas a separate individual uses the clinic from an *Optimistic perspective*. Holistic care is defined in the literature as a comprehensive style of care in which patients' complete needs are addressed (Jasemi et al., 2017). The screening clinics' provision of a holistic life check for patients may be an effort to contribute to the patient's satisfaction with the healthcare (Selimen and Andsoy, 2011). The role of the provision of holistic care has also been examined in terms of a more comprehensive understanding of the effects of diagnoses on patients' responses and their authentic needs (Thompson et al., 2008). For this reason, a holistic approach to the delivery of clinical services would likely be beneficial in that patients would be afforded the opportunity to use the screening service in a more all-encompassing manner, therefore encouraging a more positive consistent engagement with the clinic, in addition to a possible elevated level of wellness. With respect to participants using the screening clinics from an optimistic perspective, there is evidence that optimism may influence mental and physical well-being (Conversano et al., 2010). For most patients, being optimistic may simply be a mechanism that they utilise as they shift into a new, difficult reality (Malone et al., 2012). This therefore highlights how some patients approach the use of the screening clinics when faced with difficult news; in some instances it is with enthusiasm. However, such optimism may be not genuine; by virtue of that the continued optimism overtime by a screening patient is possibly due to them dealing with some difficult challenges. Therefore, clinical service delivery should be aware that such optimism may change, as patients adjust to the possible progressive nature of a diagnosis (ibid).

Contrarily, the focus group data demonstrated that participants comprehended the screening clinics as *A tailored service*; the provision of unique curated facilities at the clinic which all the patients frequent when attending it, for instance the specialised blood wing, may be an indication of a possible approach to improving the patient experience through the provision of amenities and advanced technology (Torpie,

2014). Furthermore, this is consistent with the idea of 'tailoring', defined as developing communications in which information regarding an individual is utilised to determine what specific content they will receive and by whom it will be presented, in addition to the means by which it will be delivered (Kreutere et al., 1999). Tailoring aims to enhance message impact thorough individualisation (Hawkins et al., 2008) and may improve the relevance of the information presented (Kreuter and Wray, 2003), as indicated to be appropriate by a participant. Therefore, a specialised clinic, such as Barts endocrine screening clinics, which has the advantage of rare endocrine syndrome-specific patient-centred care (Jain and Dewey, 2021), also has the advantage of enabling all patients who attend their clinical appointment to engage with the clinic through the provision of its stated unique facilities as 'standard practice'.

8.7 Strengths and limitations

The integration of the different datasets allowed for a multidimensional interpretation of the participants' experiences (Mason, 2006), in particular concerning how they live with a rare endocrine syndrome and undertake screening. In this current research, integrating themes from the interview and focus group datasets assisted in the identification of the prevailing metathemes (topics) that cut across topics, methods and respondents. Studies have found that this generates a higher-level interpretation of the data for the specific research question (Farmer et al., 2006); in this instance, a more comprehensive understanding of the patient experience. Moreover, findings that are found to be consistent across two different datasets provide increased confidence in the credibility of a study's findings (Fielding and Fielding, 1986; Knafl and Breitmayer, 1991). This is in addition to the greater certainty in the interpretation of the findings, which offers the potential of transferring pivotal learning to other similar backgrounds (Farmer et al., 2006).

In contrast, instances indicated in the findings of dissonance/silence between the datasets may provide an opportunity for further research to investigate the source of differences (ibid). These findings, for example silence between the data, may be due to the participants not having the opportunity to discuss particular discussion points as they were not guided or challenged in the session. This may therefore be a possible limitation regarding the interpretation of the 'silent' data. Moreover, challenges were

presented at times due to the complex integration process of the two datasets. Due to the differences in the datasets, for instance in their purpose, the content varied at times. This indicates that such differences could have had some implications in how the data were analysed and the extent to which the content of the datasets were precisely or imprecisely related to the research question of interest (Farmer et al., 2006). There was a different scope of *themes* across the different datasets. Such differences, including the absence or presence of themes between the different datasets or methods, may be due to the inherently different qualities of the datasets of the method themselves (ibid). This therefore may have posed a limitation at times in terms of establishing the source of the dissonance or silence among the themes across the datasets. As has been noted, the topic guides that guided and focused the discussions that generated the two different datasets were different in content.

8.8 Implications

Potential implications of the metathemes (topics) for patient engagement with health services have been highlighted as a result of the integration of the datasets. This includes addressing issues of possible mental health of the individual patient with a diagnosis of a rare endocrine syndrome who are required to attend lifelong regular screening appointments. This was portrayed through the narration of instances of anxiety, not only when at the clinic but when outside of the clinical environment. The integrated findings suggest that, in comparison to older patients, younger participants may harbour different psychological issues as a consequence of the unknown trajectory of the diagnoses. Therefore, the provision of geared information and communication styles by the clinical services to younger patients and their families, while acknowledging possible mental health issues specific to that younger age group, may aid in not only the current engagement of younger patients, but also in encouraging continued lifelong engagement.

The significance of the patient–service provider interpersonal relationship has been demonstrated to be significant in that in can affect whether the patient perception of the clinic is positive or negative. Therefore, recognition of the importance of the patient–service provider communication by the screening services is imperative; thus, appropriate training in relation to communication skills is necessary. This is particularly

important as rare endocrine syndrome patients and their families are required to attend the clinics on a regular basis in order to gain the full benefits of the screening service, thus they will interact with the same staff repeatedly.

As part of the patient–service interaction, understanding how the patient comprehends this, in regards to the screening clinic and their autonomy, would aid in the patient–service provider communication and the expectations on each side. Especially as the integrated findings indicate that some participants have full confidence in the provider, whereas others take control of their diagnosis in terms of sourcing their own information. The clinical service being aware of how individual patients operate in terms of reliance on the service provider may assist in suitable provision to assist patient engagement with the screening clinics.

As stated, instances of dissonance/silence between datasets could provide an opportunity for further research by the clinical service to explore the source of differences, in particular as they indicate that 'one size does not fit all' in relation to how participants use the screening clinics. This includes how patients use patient support groups; the findings indicate that some participants appreciate the service such groups provide; however, others prefer not to attend as the group atmosphere exasperates them. Therefore, it is appropriate to indicate the availability of patient support groups to the patient; however, attendance should be voluntary as some patients may not prefer the group atmosphere. Moreover, the topic of family clinics could be examined, as the family clinic may not be an option for individuals and their families. Even though the option of family clinics was highly appreciated by participants, the findings demonstrate that some would like to attend by themselves, or in some cases attending as a family was not a viable option, perhaps due to differing family dynamics and preferences. It should therefore, perhaps, not be automatically assumed that patients want to, or even can, attend clinics as a family and the opportunity to attend as an individual or as a family unit should be made clear.

Findings which were unique to a particular dataset included the appreciation of the tailored services available at the screening clinics for the rare endocrine screening patients, in addition to the opportunity for participants to use the clinic as a holistic life check. The provision of facilities exclusive to the rare endocrine syndrome clinics may

provide patients with an extra incentive to engage with the screening clinics, as such facilities specific to these syndromes may not be provided elsewhere. This is in conjunction with the opportunity of patients and their families to use the screening clinics to ask the service provider any questions unrelated to the diagnosis, which may also be a positive factor for prolonged patient engagement with the clinics.

8.9 Conclusion

To conclude, the main outcomes of the integration of the two different datasets indicate factors which are possibly indicative of patient engagement. Agreement between the findings of the different datasets demonstrates a convergence in interpretation; this includes the significance of the interpersonal relationship between the patient and service provider and factors including communication and trust. How patients used the clinics were determined; this was illustrated by aspects of autonomy and methods for reducing fear and anxiety. Issues specific to engagement in relation to younger patients were highlighted, with the implication that the mental health of such individuals needs to be acknowledged, in particular to those younger in age and thus potentially new to the challenges of their diagnosis, as they are at the start of their clinical journey. Dissonance between the datasets included how participants used family clinics and patient support groups, whereas issues unique to a particular dataset encompassed the comprehension of the clinics as providing a tailored service in terms of their diagnosis of a rare endocrine syndrome, in addition to those who do engage with the clinics, doing so as part of a holistic life check. With respect to the interpretation of an issue relating to one dataset but not the other, the instances of silence between the datasets, as noted, may be simply due to participants not being asked the same topic points in both the interviews and focus groups. This therefore provides an area for future research on those topics to ensure a greater understanding of them.

The next chapter consolidates the key findings from the different studies with the current literature. Clinical implications of the findings are also discussed, and the strengths together with the limitations of the overall research are examined.

Chapter 9
Discussion

9.1 Introduction

The studies in this thesis investigated, for the first-time, appointment attendance rates at clinics and perceptions of individuals diagnosed with three different rare endocrine syndromes, VHL, MEN and mutations in the SDHx genes. These clinics were attended by patients registered at the Barts endocrine screening clinics. The overarching unique aim of the research of this thesis was to gain a deeper understanding and to describe how rare endocrine gene carriers individuals comprehend and use health services generally, and in particular the service provided by the Barts endocrine screening clinics. This was investigated by quantifying the use of the screening clinics, exploring patients' experiences and impressions of using the service, as well as examining how a co-produced patient information resource could be used as a reference for new patients on what is available and who to contact if necessary, thus encouraging patient engagement with the Barts endocrine screening clinics.

The formative findings of Study 1 in this thesis showed no significant association between attendance and patient characteristics. Study 2 highlighted the importance of factors including anxiety, family issues and the patient-service provider relationship in relation to the patient experience, and a greater understanding of what information is important to new patients at the clinics was demonstrated through Study 3. The overarching aim and specific objectives addressed across Studies 1–3 in this thesis presented new information and added unique knowledge to the field of investigation. However, the aim and objectives are only partially fulfilled, gaps still exist, and new areas worthy of investigation are identified for future research.

This chapter draws together the three studies and considers their combined findings to critically consider their contribution to existing knowledge. It will summarise to what degree the results of the studies have achieved the specific objectives of this thesis, in addition to the overarching aim, that is, as stated, of gaining a deeper understanding and to describe how rare endocrine gene carriers individuals comprehend and use

health services generally, and in particular the service provided by the Barts endocrine screening clinics.

This chapter will open with a discussion of relevant topics which cut across the different studies. Section 9.2 discusses factors affecting attendance, 9.3 explores the role of emotions in response to clinic expectation and attendance, the role of the family in relation to clinic attendance is further examined in 9.4, whist section 9.5 discusses the relationship between the patient and service provider and how these impacts on the attendance experience. A conceptual model is considered in Section 9.6. The significance of the findings is shown in Section 9.7, implications/applications of the study are considered in Section 9.8, whilst Section 9.9. presents the original contributions to knowledge that are potentially transferable beyond the service provided at St Barts. The chapter concludes with the strengths and limitations of the study in Section 9.10.

9.2 Patient appointment attendance – possible factors and underlying reasoning

A unique investigation of the appointment attendance rates at the three Barts endocrine screening clinics (Study 1) revealed that the vast majority of individuals did engage, with an overall attendance of 83.27% for the years 2015 to 2017. Non-attendance, however increased over the three-year period, with the most notable drop in attendance (10.76%) observed from 2016 to 2017, showing some patients' lack of engagement over that particular period.

9.2.1 Appointment attendance rates – syndrome type and gender a factor?

Although Study 1 was a retrospective study, aspects of decreasing patient attendance over a period of time in part concur with the prospective cohort study findings of Rasmussen et al. (2010), in particular in relation to VHL gene carriers. Rasmussen et al. (2010) found that only 38.9% of VHL patients continued to participate in a VHL tumour-surveillance programme. While Study 1 in this thesis found that attendance at VHL-clinic patients in the Barts endocrine screening clinics were considerably higher

than that of Rasmussen et al. (2010). However, it was demonstrated in Study 1 that the VHL clinic had the lowest rate of appointment attendance over the three-year period (76.55% attendance and a non-attendance rate of 23.45%), compared to the other two clinics. Moreover, in regards to low/high attenders, the VHL patient group had the lowest frequency of individuals 'Never' missing appointments, at a lower frequency of 53.85%, in comparison to the other clinics. Thus, whilst the VHL clinic may not be reaching the national average non-attendance rate for outpatient clinics in the United Kingdom of 12% (Committee of Public Accounts, 1995; Murdock et al, 2002), in comparison to the literature, Barts endocrine screening clinics appear to be excelling in aspects which encourage such patient engagement. This lower engagement on the part of some VHL patients, noted in the literature as well as in this study, is interesting, as the VHL syndrome has been noted to have a high degree of penetrance by the age of 60 (over 80%) (Binderup et al., 2017), approaching 100% by the age of 75 (Maher et al., 2011). Thus, the low attendance at screening by this particular VHL patient group is concerning, and leaves room for possible further research to ascertain whether this is characteristic of this patient group and, if so, why.

Original joint analysis of appointment attendance of the three different rare endocrine screening clinics, in relation to key patient demographic variables, of age, gender and diagnosis, resulted in such variables being identified as non-significant in relation to attendance rates (Study 1). Moreover, in determining low/high attenders, males were high attenders in relation to the MEN and VHL clinics, however females were slightly more higher attenders for the SDH clinic (Study 1), thus displaying further uncertainty on the connection between gender and appointment attendance. In relation to the literature, Rasmussen et al.'s (2010) study reported that gender was not found to be connected with engagement with surveillance, although this latter study was conducted only with VHL patients (n=109) and based in Mexico. However, the finding of this thesis study that gender is not related to attendance refutes the reported reasoning to engagement is illustrated by Piette et al. (2010), who found that male patients were less likely to attend appointments than female patients. It appears that the quantitative results of Study 1, in conjunction with the literature, convey an ongoing ambiguity regarding the degree to which gender has a bearing when using screening services, and this area, thus, warrants further research.

9.2.2 Age and prior history – debatable influences on attendance

The quantitative data in Study 1 did not indicate an association between the explanatory variable of age and attendance, nevertheless, low attenders were found equally in both of the age ranges between 25-44 and 45-64 years, whilst high attenders were patients aged between the age range of 45-64 years. The finding of low attenders of being in the higher age group of 25-64 differs from literature, where Graham-Rowe et al. (2018) noted that younger adults had a greater number of barriers to screening in comparison with older adults. However, in relation to high attenders at the screening clinics being between the age range of 45-64 years, this is consistent with the literature, such as Sheridan et al's. (2019) retrospective cohort study, which expressed that those instead with a younger age range of 18-29 and those at an older age range of over 85 years, had the highest percentage of non-attendance. This is in addition to some primary care studies, where it has been noted that patients aged 16-30 years are more likely to miss appointments (Ellis et al., 2017).

As for the qualitative data from Study 2, Study 3 and the integration Chapter 8 they found that individuals from different generations differed in how they use the screening clinics. As an example, in Study 2 reference was made to younger family members feeling; "invincible" and therefore not attending (*Subtheme 2: Family matters*). A point reiterated in Study 3 as well (FG 2- Theme 2: Negative factors influencing engagement); where it was expressed that a family member who was younger had a low perception of risk, and the sense that a lack of active symptoms discouraged engagement. With respect to the integration Chapter 8, the metatheme *Animosity from a younger perspective* suggested that when younger patients reach the age of consent some may maintain a sense of animosity towards the clinic and their diagnosis when they are older, thereby potentially negatively impacting appointment attendance. This finding aligns with the literature that younger patients who may not experience symptoms were less likely to attend appointments (Graham-Rowe et al., 2018; Rasmussen et al., 2010; Piette et al., 2010). Further, such non-attendance by younger patients may be explained by their feeling that screening was not necessary for their diagnosis; particularly if they felt their diagnosis was under control, they were younger and a prior test result had shown no issues (Graham-Rowe et al., 2018). Another

individual described in *Subtheme 2: Family matters* (Study 2) and in the metatheme *Appreciating the importance of attendance* (Chapter 8) of how some family members choose not to attend, despite witnessing the dwindling numbers of family members who had survived. The participant's cousins would not go to the clinic for regular screening as they perceived the incidence in other family members as isolated, thereby not affecting them. This choice by the non-attenders may be due to distress experienced by those non-attending individuals observing a family member going through their diagnostic journey. As Gopie et al. (2012) reported that distress in surveillance of hereditary and various rare syndromes was increased by having a family member with a cancer diagnosis.

However, the aspect of non-attendance of screening appointments by participants' gene carrier family members, even when witnessing the possible negative effects of the diagnosis, as discussed in Study 2 and the integration Chapter 8, is contrary to findings of the literature on different gene carriers. For instance, Courtney et al. (2018) explained how a prior family history was sometimes actually a facilitator for engaging BRCA1/2 mutation carrier individuals in breast-cancer screening. Such possible difference in engagement with screening between rare endocrine syndromes and breast cancer patients may be a result of the differences in the management of such gene carrier individuals, particularly in the family context. For example, it has been stated that a rare syndrome diagnosis, such as those at the Barts endocrine screening clinics, can produce devastating long-term functional and mental disabilities that strain families' emotional resources (Field and Boat, 2010). Further, even for rare syndromes that are less severe, uncertainty regarding the course of the diagnosis and the frequent lack of effective treatments may have a significant impact (ibid). Thus, it can be speculated that, even with a prior history with engagement, as described in *Subtheme 2: The balance between trust and scepticism* (Study 2) and in the metatheme *A sense of familiarity* (Chapter 8), emotional factors and the lack of an effective treatment may hinder patient engagement. Furthermore, the women attending breast cancer clinics in the study of Courtney et al. (2018) may have had different attendance requirements and experiences to the patients who attend the Barts endocrine screening clinics, due to the varied environment of the screening clinics in terms of age, gender and diagnosis, as conveyed in the demographics of Study 1. Consequently, it would be beneficial to determine the differences existing

between gene carrier individuals in terms of engagement with screening along with how the individual's prior history may affect this.

With regards to the younger patients who do attend their clinic appointments, they may feel obliged to do so as they are under the age of NHS consent (16 years old) or come as a result of parental encouragement. Moreover, Graham-Rowe et al. (2018) discussed a factor/TDF domain. which appeared to be significantly relevant to younger adults in regards to as a barrier to screening, which was 'social comparison to others'. Such factors may have an influence on younger patients, as aspects of this was illustrated in *Subtheme 2: Family matters* (Study 2) and the metatheme *Animosity from a younger perspective* (Chapter 8), where a participant's daughter informed her parent that she was planning to stop attending the screening clinics once she turned 18. Further, Theme 2: Negative factors influencing engagement (Study 3, FG2) and the metatheme *Animosity from a younger perspective* (Chapter 8), illustrated how a patient found it difficult to persuade her older son to keep his appointments, hence the family chose to come as a group for encouragement. The results of this research (Chapter 6 and 8) demonstrated the positive effect family members can have on patient engagement and is supported in the literature; Laidsaar-Powell et al. (2016) explained how patients valued family involvement and appreciated this support. This result also aligns with the findings of Godino et al. (2019), who reported that some young adults did not understand the implications of the genetic test but complied with it as a result of parental pressure.

In relation to age, the example of the daughter insisting that she will stop attending the clinics once she is 18 (Study 2), is reflected in the literature. Sheridan et al. (2019) noted that patients aged 18–29 had some of the highest non-attendance rates. Regarding the quantitative results of this thesis study (Study 1), it was reported that there was no association between appointment attendance and age. The qualitative results supplements that although family encouragement occurs within some families, the decision to attend ultimately lies with the individual, as they reach the age to take their own decisions; some will not attend, or intend not to do so, as expressed in Study 2 and Chapter 8, regardless of family encouragement and history.

Overall, the findings of this thesis seem to concur with the literature on the approach of young people to screening appointments, in that it has been expressed that young adults do not appear to recognise the significance of testing for hereditary cancers. Nevertheless, the issue appears to be complex, going beyond mere compliance and involving other matters. Due to the limited number of young participants in Study 2, in addition to the unique results regarding the three rare endocrine clinic individuals of non-association between age and appointment attendance result in Study 1, further research focusing on the views and opinions of younger patients may be helpful. For instance, this may include exploring younger patients' experience of the family support/obligation, the motive on why they may choose not to engage and what may encourage them to maintain engagement as they become more in control of their own health management.

9.2.3 Barriers to appointment attendance – possible factors in relation to language proficiency and travel

The qualitative results from this thesis have provided narratives of where at times it was expressed that the lack of language proficiency was a barrier in communication, thus potentially impacting the patient experience. There is a lack of in the current research in relation to factors which may be such barriers when accessing healthcare, in particular to individuals at UK specialised rare endocrine syndrome clinics. However, the results from the qualitative research of this thesis have provided an unprecedented insight on individuals attending rare endocrine screening clinics.

For instance, Study 2 reported how an interview participant asked a family member who was a doctor living abroad for advice regarding certain medication (*Subtheme 1: Weight of expertise*). It was suggested by that participant that English was not his native language, thus he may have felt more comfortable discussing his diagnosis in his first language. This suggestion is supported by Graham-Rowe et al. (2018) who found that patients experience difficulties with communicating with health service providers, and this presents a barrier to engagement. Further, this concept can also be seen in Study 3, Theme 2: Reconsidering the audience (FG3) and in the metatheme *Terminology hurdle* (Chapter 8), where a FG3 participant expressed his

struggle to comprehend patient information as English was not his first language. Difficulties experienced by some non-native UK patients with their healthcare service were also reflected in the study of Young et al. (2018), who noted that some populations lacked trust in the services, usually opting to be screened in their home country where a stronger relationship existed with the healthcare provider. Further, the role of language barriers in explaining racial or ethnic imbalances in health care has been corroborated (Saha et al., 2007). This may also be attributed to the interview participant in Study 2 who sought information in their home country as well, as a result of ease of the communication with the doctor abroad regarding medication advice. Even though ethnicity is not related to language proficiency, it is interesting to note that the literature expressed that ultimately ethnic concordance was not related to engagement with patient screening (Malhotra et al., 2017)

Studies with access to ethnicity data reported that some patients struggled with language and that this may have affected their ability to engage with the health services. For example, the flow of communication between the health provider and patient has been noted by studies such as Young et al. (2018) and Sheridan et al. (2019) to influence attendance with a negative effect of the patient's lack of comprehension of the screening process and inability to fully communicate their symptoms. As communication and provision of such information differ between patients, "*one size doesn't not fit all"*, as noted by a FG1 participant (Study 3) in Theme 2: One size doesn't fit all**,** and the 'individual' aspect of the metatheme A*daptation to the needs of the individual- (one size doesn't fit all)* (Chapter 8). Further, good communication between the patient and the service provider has been noted to be an important factor in assisting those health professionals in identifying any individual needs (Markides, 2011). Thus, in the potentially anxious event of attending the screening clinics, as conveyed by a participant (*Subtheme 1: Disembodiment;* Study 2) and the metatheme of *Reducing/managing fear and anxiety* (Chapter 8)*,* any issue in language proficiency would only add to an already heightened experience of being in the screening clinics. As expressed, it is important to note that ethnicity data certainty does not equate to language fluency and should, therefore, be approached with caution, as language fluency can be affected by several factors.

Participants also considered language proficiency in terms of being a new patient at the clinic in Theme 4. Remember your audience (Study 3, FG 2), where some commented on how they found some of the language in the information resources intimidating. As stated, the conveyed experience and perceptions of individuals at rare endocrine clinics currently is lacking, however, in regards to access, experience and outcome based on non-English proficiency in relation to other diagnoses and environments, this is a recognised issue in the literature. For instance, Ali and Johnson (2017) explored patients and language proficiency in the UK; the authors discussed how with the increase in the internal and external migration and mobility of individuals from/to different parts of the world, the plausibility of experiencing language barriers whilst providing and receiving health care has increased. The results of this thesis study have highlighted how some of the individuals, in particular in Study 2 and Study 3, experienced struggles and frustration in their experience of the health service and the Barts endocrine screening clinics as a result of language proficiency barriers. This is relevant to the overall aim and the second and third objectives of the thesis.

However, due to the lack of language proficiency data, this presents a non-comprehensive interpretation of the patient experience, in particular to communication between the patient and health service provider. Hence, this issue is not simply resolved by use of interpreter's, due to potential trust factors, as indicated by some participants towards some of the service providers in *Subtheme 2: The balance between trust and scepticism* (Study 2) and the metatheme *Trust as essential but fragile* (Chapter 8). Moreover, this issue appears to be not just about literal language and one that also clearly impacts on these patient groups; as the literature also suggests that social/cultural compatibility between the patient and health service provider may allow feelings of support and trust (Graham-Rowe et al's., 2018). It has been expressed that an understanding of language barriers can aid service providers in finding suitable strategies to overcome such potential barriers and, thereby, enhance the provision of effective care to patients affected by language barriers (Ali and Watson, 2018). Therefore, research into the possible connection between patient language proficiency and attendance is justified, as it may shed further light on how patients use and experience the screening service, helping to provide an efficient, targeted service to facilitate appointment attendance.

The narratives from *Subtheme 2: Anticipating the hospital visit* (Study 2) and the metatheme *A point of reference* (Chapter 8), included for the first-time, individuals expressing the inconvenience of having to travel so far to the specialist rare endocrine clinics; having to take annual leave and the excessive cost of travel to their appointment. However, separate participants exclaimed in the same subtheme and the metatheme of *Holistic life check* (Chapter 8), that they were not concerned for instance by the high cost of travel; as they recognised the benefits of the full day at the clinic and took advantage of this to resolve any queries, which they considered mitigated the travel costs. This is interesting to note as the issue may not be the cost of travel per se, more that it may be the trade-off between cost and perceived value by the individual. Travel distance to appointments, as well as transport issues, are supported as factors in appointment attendance in the literature. For instance, Sheridan et al. (2019) noted a small but statistically significant effect of distance from the hospital on attendance, and Piette et al. (2010) reported patients with chronic illnesses having to cancel a clinic appointment at least once in the previous year due to transportation problems. This topic is related to the first objective of this thesis, regarding understanding a possible link between characteristics and attendance, as travel distance, planning and costs involved may be factors.

Potential barriers identified through the participant interviews (Study 2) could not be quantified from the cohort study (Study 1), as such data were not collected and/or could not be accessed. Nevertheless, it is possible that communication barriers, distance from and the cost of travelling to the clinic may be concerns, as it has been indicated in both this thesis study and the literature that these are factors in patient appointment attendance. Therefore, consideration should be given to the patient travel distance, as well as the mode of transport to the clinic, as this may be significant factors in appointment attendance. In addition to relaying the importance of appointment attendance to the individuals, provision of pre-booked, reliable hospital transport at a reasonable cost may aid in transport issues such as the expressed issues with cost and parking in the results, thus possibly encouraging engagement. Screening programs are considered to be a cornerstone of care in relation to rare endocrine syndromes such as VHL, as they have been stated to have considerably

improved median overall survival of affected individuals (Schmid et al., 2014). Therefore, not only attendance, but consistent appointment attendance is important.

9.3 Emotions- a major component

9.3.1 Anxiety triggers

Anxiety was reported by patients in the studies as well as being acknowledged in the recent literature and is related to the second objective of this thesis. Anxiety is an important factor to consider; Sheridan et al. (2019) proposed that patient fear and anxiety could be related to high rates of non-attendance but noted that this is connected to particular cancer sites, notably the upper gastrointestinal tract. Further, Rasmussen et al. (2010) noted that pre-test anxiety was reported more frequently in patients who terminated follow-up.

Patient anxiety was discussed in *Subtheme 2: Anticipating the hospital visit* (Study 2) and the metatheme of *Suspension of thought* (Chapter 8), where a female patient narrated that receipt of a tangible letter regarding an upcoming appointment from the screening clinic resulted in feelings of anxiety. Tufton et al. (2017), Clement et al. (2018) and Poulsen et al. (2010) reported the potential for patient distress around screening processes and this was reflected in experience of the MRI process in *Subtheme 1: Disembodiment of a patient* (Study 2) and the metatheme of *Reducing/managing fear and anxiety* (Chapter 8), where a patient described how she suffers from anxiety and detaches herself from the screening clinic environment in a possible coping method. Emotional turmoil in the form of anxiety was also reported in the FG3 Theme 1: The value and complexity of information access (Study 3) and the metatheme of *Reducing/managing fear and anxiety* (Chapter 8), where a participant described how avoiding engagement with the information as an individual and reluctance in engaging with the health professional were manifestations of his anxiety.

Kim et al. (2018) also confirm the occurrence of patient anxiety, together with the assumption that anxiety may be due to uncertainty regarding the prognosis of the diagnosis. This identification of anxiety as possibly connected to future progression

aligns with *Subtheme 1: Snapshot of the future* (Study 2) and the 'patient' aspect of the metatheme of *adaptation to the needs of the individual- (one size doesn't fit all)* (Chapter 8), where a participant described how attending a patient support group session resulted in him comparing himself to others at different stages of their diagnosis, resulting in anxiety about his future health prospects.

Overall, as stated, the topic of anxiety in patients is relevant to the second objective of this thesis, as it was demonstrated that, in addition to the diagnosis – anxiety in anticipation occurs, in the processes themselves or in engaging in a location where others may be present and therefore having to confront their future self.

9.3.2 The fear factor

Expressed less frequently than anxiety by patients was the experience of fear. In *Subtheme 2: The balance between trust and scepticism* (Study 2) and the metatheme of *Trust as essential but fragile* (Chapter 8) a participant discussed how, when he was first diagnosed, he researched his diagnosis, causing him to *"frighten himself to death".* This emotion of fear was reported in the literature by Graham-Rowe et al. (2018) who identified it as a barrier to screening, as well as by Young et al. (2018) who noted in their theme 'Fear of cancer screening' that this was both a barrier and a facilitator to screening attendance. Further, Young et al. (2018) reported that non-attenders recounted being 'frightened to death' by the screening invitation, the same expression used by the participant in Study 2. The expression of fear by participants is pertinent to the overarching aim and second objective of the thesis, through the description of patient actions using health service information and experiencing fear in relation to what they read in the course of their research.

This extreme emotional reaction of fear may just be an extension of anxiety; however, it is important to note that the use of such language possibly indicates a less than positive perception of the screening clinics and is supported by the literature in terms of a barrier to attendance. By reason of such individuals expressing fear and anxiety about anticipation, processes, their future, consideration should be made into how those feelings are acknowledged, discussed and managed in the screening clinics.

9.4 Family matters – makes or breaks the experience

Besides prior history, as discussed above, different aspects of family members' influence, as well as how they are utilised for information, were prevalent in the unique results of the qualitative studies. As the rare syndromes in the population of this thesis are hereditary, it was not surprising that the topic of family is reflected in the results of the qualitative studies as well as the literature.

In *Subtheme 2: Family matters* (Study 2) and in the 'family' aspect of the metatheme *Adaptation to the needs of the individual- (one size doesn't fit all)* (Chapter 8), participants highlighted how attending the screening clinic together as a family unit and being together in some respects was viewed positively, as providing a source of support and encouragement when faced with difficult situations. Further, in Theme 3: A resource to introduce and direct (Study 3, FG2), the availability of family clinics was appreciated by the focus group participants, with one participant describing how it helped her feel united with her family, facing her diagnosis. The importance of family support is also reported by Laidsaar-Powell et al. (2016), who noted the significance of emotional support to patients in their study of cancer consultations. Further, Tufton et al. (2017) discussed how provision of such family clinics minimizes patient anxiety dealing with genetic syndromes. Thus, it may be possible to suggest that this may be one reason why the attendance on the whole is pretty good – because the Barts endocrine screening offers this facility, which is generally well regarded.

In the same theme, *Subtheme 2: Family matters* (Study 2), an interview participant illustrated the benefit of his children also being present, as it allowed them to become accustomed to the clinic processes. However, the same participant explained that his daughters needed to be at the right age to be able to share his positive perception of the clinic. The positive effect of children attending clinics with adults was also highlighted in Theme 3: A resource to introduce and direct (Study 3, FG2). The assumption that the participants' daughters will hold the same views as their father on the screening process at the Barts endocrine screening clinics is not guaranteed. Study 1 showed that patients as young as four years old attend the clinic for screening. Assumptions that parent and child will potentially hold the same views or even have the same engagement with screening may result in parental pressure in the child's decision-making process. Such aspects conveyed in the results of potential parental

influence was touched on in the literature by Godino et al. (2019), where the parents exerted pressure on their children to undergo testing.

However, challenges were also reported in family clinics. In *Subtheme 2: Family matters* (Study 2) and in the metatheme of *Control over identities/future selves* (Chapter 8)*,* a participant narrated how she was somewhat hesitant to go into the consultation room with her family, adding that she could always inform relatives at home if something was wrong. This constraint that the presence of family members may cause in discussing matters openly with the service provider is also discussed in the literature. For instance, Laidsaar-Powell et al. (2016) noted that patients reported feeling unable to discuss sensitive information with the physician if family members were present. This indicated that there needs to be flexibility in who attends and when, which was also indicated in one of the narratives where the participants discussed some things individually and then shared with others (Study 2).

In terms of acquiring information about aspects of the patients' diagnosis, family members were a source of information for some. *Subtheme 1: Weight of expertise* (Study 2) demonstrates how a patient reduces the responsibility of acquiring the correct knowledge by asking her cousins who have previously experienced the same clinical journey. Moreover, an FG1 participant in Theme 2: One size doesn't fit all (Study 3) and the metatheme of *Adaptation to the needs of the individual- (one size doesn't fit all)* (Chapter 8) who required substantial information, narrated she already had basic information provided by her uncle. Guidance from family members is illustrated in the literature; both Godino et al. (2019) and Almeling and Gadarian (2014) reported respondents' reliance on family, whether to cope in general or in making decisions.

Nonetheless, not all patients have the option to speak to family regarding their diagnosis and this was discussed in Theme 3: A resource to introduce and direct (Study 3, FG2) and the metatheme of *Adaptation to the needs of the individual- (one size doesn't fit all)* (Chapter 8), where a patient noted that patient support groups provided an outlet for her, as it was difficult to speak to family members regarding her diagnosis. This diverges from the narrative of family reliance in the current literature,

such as Godino et al. (2019) and Almeling and Gadarian (2014), as there was a lack of current discussion concerning the potential disconnect that may occur in patients who lack family support. While family can be a source of support and having the ability to engage collectively is regarded a benefit for many, consideration must be given to the requirement in flexibility of clinic service provision, as not all individuals are able, for various reasons, to rely on that support and family knowledge. Further, there may be other individual experiences, not just those who do not feel they can speak to their families, but those with family members who may have a different response to the diagnosis, or indeed those who are the first in their family to get the diagnosis.

Overall, the topic of family matters is pertinent to the overarching aim, as well as the second and third objective of the thesis. As it illustrates the complexity of family involvement – on one hand supportive and generally well received, but also unclear if that intergenerational support is always valued (particularly by younger generations), or available. Therefore, it is imperative that services should include the option of flexibility and consideration, in relation to how and who uses the family clinics. Inter-relationships between parents and children, particularly with rare endocrine screening clinics, in this regard is worthy of further exploration

9.5 The patient- service provider – a polarising relationship

9.5.1 The positive

The patient-service provider relationship was communicated as part of the experience when attending the clinic. In the studies of this thesis, positive aspects were highlighted, together in some cases with the hesitation by some individuals in fully placing trust in the clinical staff.

For the first time this thesis study reported perceptions of rare endocrine gene carriers individuals, which were positive, in relation to the endocrine screening clinics at Barts. This included the communication between the patient and clinic staff during appointments. For instance, such communication was recognised as a worthwhile aspect of taking the time off to travel to the clinic. In *Subtheme 2: Anticipating the hospital visit* (Study 2) and the metatheme *A point of reference* (Chapter 8), a patient

explained how she had the chance to ask the doctors about anything that might concern her. In the same theme and study, the portrayed expertise of the doctors at the clinic was also appreciated by some of the younger participants. One patient stated that this gave her a sense of security and a feeling that she was in safe hands. A male participant in *Subtheme 1: Weight of expertise* (Study 2) and the metatheme *Confidence in them and myself- (autonomy to know/not know)* (Chapter 8) had confidence in the service provider's opinion, which decreased his concern over an MRI scan. Such positive aspects of the patient and service providers relationship have been described as the privileged patient–physician relationship (Laidsaar-Powell et al. 2016).

The specialist endocrine nurse was also reported to provide a positive patient experience in Theme 3: A resource to introduce and direct (Study 3, FG2) and the metatheme *The nurse – the bridge between patient and clinic* (Chapter 8); all the members of the FG2 were clear that introducing Anne, the specialist endocrine nurse, was essential, as she was noted to provide invaluable services such as organising appointments and arranging blood tests. This provision may be another explanation of the relatively good attendance rates conveyed in Study 1 and reflects what Tufton et al. (2017) states -specifically in terms of how the specialist endocrine nurse coordinates the investigations to be performed on the same day, thus minimizing the number of visits to the hospital and inconvenience for the individuals/families, as well as patient anxiety. The benefit to patient attendance of such a multidisciplinary approach was discussed in Theme 3. Reflections on the content and presentation (Study 3, FG3) and the metatheme *A tailored service* (Chapter 8); this benefit is supported in literature and referred to as a 'one-stop shop' by Graham-Rowe et al. (2018), which is what is provided by the Barts endocrine screening clinics, a point also highlighted by Tufton et al. (2017) and Geurts et al. (2020).

An additional positive aspect of the patient and service provider relationship was the comfort arising from patients' familiarity with the in-clinic staff by virtue of the ongoing history of the syndrome. In *Subtheme 2: The balance between trust and scepticism* (Study 2) and the metatheme *A sense of familiarity* (Chapter 8), a participant described how this familiarity resulted in a no-barriers conversation at the clinic because he views the staff as his friends. A separate patient in the same theme and study referred to

this as *banter,* which could brighten the situation when discussing serious matters regarding her diagnosis, thus allowing her to ask questions freely. Moreover, in the sub-theme *Subtheme 1: Snapshot of the future* (Study 2) and the metatheme of *Optimistic perspective* (Chapter 8) participants expressed a positive outlook in relation the trajectory of the diagnosis. Such positive perceptions were also portrayed in the literature; Gopie et al. (2012) discussed how the majority of patients in surveillance programmes for hereditary cancers conveyed a positive attitude towards the surveillance programmes offered.

Related to what the two female patients conveyed regarding their positive relationship with the service provider in *Subtheme 1: Weight of expertise* (Study 2), Young et al. (2018) highlighted that for female patients in particular, their relationship with the health service was usually not considered strong enough to increase their likelihood of attending screenings. The inferred differences between the patient and service provider relationship of the female population of the thesis and those in Young et al.'s (2018) study could be due to differing screening processes to determine the diagnosis. But also, potentially because of the particular relationships that the service providers at the Barts endocrine screening clinics create; given that these relationships are deemed important in understanding how the Barts endocrine screening clinics achieve and sustain this, it would be worth further exploration.

9.5.2 The less than positive

However, confidence in the judgment of medical staff was not echoed by all participants. In *Subtheme 1: Weight of expertise* (Study 2), a patient recounted a negative experience when he felt he received inappropriate treatment from his GP, and also felt his treatment at the screening clinic was inappropriate, which resulted in the patient adopting a sense of self-responsibility concerning his health to prevent further perceived mistakes from happening. The topic of 'self-responsibility' over personal health was also found in Theme 1: Autonomy: to know or not to know? (Study 3) and the metatheme of *Control over identities/future selves* (Chapter 8). Such an experience of a health service provider not being fully versed in genetic services was referenced in the literature by Miller et al. (2010); however, this was in relation to primary care physicians.

In regards to the perceived negative experience of receiving the inappropriate treatment from his GP which as stated caused him to take responsibility in the *Subtheme 1: Weight of expertise* (Study 2), Theme 1: Autonomy: to know or not to know? (Study 3, FG1) and the metatheme of *Control over identities/future selves* (Chapter 8). Whilst others expressed the expectation from the service provider of patient expertise in *Subtheme 2: Assumed expertise* (Study 2) and the metatheme *Expected patient proficiency (*Chapter 8). Regarding patient expertise, interestingly in the literature it has been expressed that individuals who possess an in-depth knowledge of their diagnosis encounter problems, as expertise taught to individuals in one branch of medicine may be regarded as non-compliance by service providers who are not specialised in that area (Snow et al., 2013). Moreover, in regards to those who are specialised in that area, such as specialist doctors and nurses, it has been noted that they were not comfortable with individuals who possess such a high level of expertise (ibid). Thus, it would be compelling to gain the point of view from the specialised service providers, in relation to their perception and experience of the expert patient. If such discomfort towards the expert patient from the specialised service provider does exist, in the realm of a rare endocrine screening clinic, the reasoning behind this would potentially result in the provision of the appropriate support for both patient and service provider to overcome such issues.

In terms of the patient- service provider relationship, patients at the Barts endocrine screening clinics conveyed both a sense of security and mistrust towards the staff. Such sense of security was acknowledged through the expertise of the clinical staff, '*doctor knows best'* in *Subtheme 1: Weight of expertise* (Study 2) and metatheme of *Confidence in them and myself- (autonomy to know/not know)* (Chapter 8). However, this was not the case across the board, as one participant reported feeling that he is "*like a doctor now",* also in the same sub-theme. Some patients also conveyed a sense of concern regarding the information provided during communication with the service provider; in *Subtheme 2: The balance between trust and scepticism* (Study 2); where one the patient stated that full information should be provided to patients during appointments. In the same theme and study, this sense of mistrust was also illustrated through the sense of distrust towards the clinical staff due to a negative procedural experience at the clinic. One patient illustrated how he reacted to a miscommunication event by letting the MRI staff know that he felt lied to, and the process resulted in the

individual feeling upset and frustrated. Such embarrassing and painful experiences were also reported by Gopie et al. (2012), particularly regarding MRIs and mammograms, which the authors explained reduced screening compliance.

In addition to the concern regarding the information provided during patient-service provider communication, some participants commented on the lack of such information from the service provider in *Subtheme 2: Assumed expertise* (Study 2), Theme 1. The push factors to engage (Study 3, FG2) and the metatheme of *Expected patient proficiency* (Chapter 8), which caused some individuals to source their own diagnostic information. The importance, the plausible opportunity and the complexity of information access from the clinic, was also communication by a FG3 participant in Theme 1: The value and complexity of information access (Study 3), *Subtheme 2: Anticipating the hospital visit* (Study 2) and the metatheme of *A point of reference* (Chapter 8). Whereas other participants recommended in Theme 3: Practicalities of enactment (Study 3, FG1) that if an information resource is to be provided, it should have the relevant signposting included for where to go if an individual wanted more information. In relation to the literature, the importance of information provision by the service provider is supported by Beard et al. (2016), which noted that patients may be misguided or experience potential psychological harm by accessing unreliable webpages. The advantage of provision of an information resource was further highlighted in Theme 3. A resource to introduce and direct (Study 3, FG2), where participants discussed the importance of practical clinical information. Such positive effects as a result of providing information resources for patients is supported in the literature by Moin et al's. (2019) and Stacey et al. (2017), who expressed that a decision aid for instance, has a positive effect on patient-service provider communication, thus, potentially supporting greater patient engagement.

Overall, the topic of the patient- service provider relationship is pertinent to the overarching aim, as well as the second and third objective of the thesis; as it conveys how the individuals describing how they use the service, including their personal experiences with the providers, both positive and not, in addition to describing the appreciation of the specialist endocrine nurse. However, there is still a need to further explore perceptions of children and young adults, regarding their relationship with the service providers. This may be distinct, as younger patients potentially haven't had the

opportunity yet to be familiar with the service providers, as most of the interactions with the providers would be in the presence of parents/guardians, which may result in a different dynamic in comparison to a one-one interaction between the child/young person and service provider.

9.6 A conceptual model for conveying the amalgamated findings/topics

The 'Structure-Process-Outcome' framework described by Donabedian (Donebedian, 1988) was employed to amalgamate the findings/topics presented above (sections 9.3-9.5), in a proposed conceptual model (Figure 9.1) – to understand and to describe how rare endocrine gene carriers' individuals comprehend and use the service provided by the Barts endocrine screening clinics. It has been noted how Donabedian acknowledged the importance and the primacy of the patient's perspective in quality assessment, with respects to ascertaining the utilities for possible benefit and harm that could ensue from health care (Rupp, 2018). As the arrows represent, the Structure→ Process→ Outcome model proposes that a directional affect exists between three elements of health care (ibid). Nevertheless, it was noted that Donabedian did not imply that structure, process, or outcome are themselves aspects of quality, instead he offered them as different means or perspectives that may be taken to obtain information about the presence or absence of the facets that describe quality (ibid).

Donabedian's three-part concept informs this proposed conceptual model, as it has been stated that it allows quality assessment to be feasible (Liu et al., 2011). Such quality assessment/outcome, in the context of this thesis study, is proposed to be patient appointment attendance at the screening clinics. This is assuming structure (e.g. aspects of clinical or information resources plus organisational format), impacts mechanism (what is actually done in receiving and giving clinical care), which impact outcome (e.g. attendance/engagement) (Donebedian, 1988). The Donabedian's model was chosen as it is extensively used and permits both the policymakers and researchers to conceptualise the fundamental mechanisms that can contribute to not just poor quality of care for patients (Liu et al., 2011), but includes aspects that describe quality (Rupp, 2018).

To establish this conceptual model, Donabedian's structure-process-outcome framework was instituted first, then further components, which were presented above, were then added. To summarise the conceptual model, it is proposed that impediments and positives reported in the thesis, in relation to the structure/organisation, (i.e. the strong emotions resultant from/towards the environment of the clinics, service provider communication issues, and possible interference from family members) may implicate process (such as patient comfort, diagnosis and engagement). Such structural/organisational and process/performance shortcoming could ultimately lead to poor outcomes, particularly to patient attendance data.

9.6.1 Structure

In accordance with Donebedian (2005), structure can be considered not only as the physical setting in which the care takes place, but also the organisation of care and the qualifications of the service providers. Section 9.4 and 9.5 above conveys the presence of quality in relation to the availability of family clinics, one-stop shop and the reported positive aspects of the relationship between the patients and the service providers at Barts. It was narrated how some individuals appreciated the expertise, thus the service providers qualifications, however others felt they had to take the matter of their health care into their own hands due to some perceived unfortunate experiences. Such 'structural' differences convey the abundant presence of facets that describe the presence of quality of the screening clinics, together with some small incidences which describe the absence of quality. Thus, describing the patient experience as a result of the 'Structure' of the Barts screening clinics, which can be described as high quality, thus a possible reasoning behind patient attendance to their screening clinic appointment.

9.6.2 Process

The conceptual model (Figure 9.1) conveys several facets that describe the quality for the process at the Barts endocrine screening clinics, in addition to potential issues in relation to the overall comfort of the patients, diagnosis and family members.

The presence of aspects that describe quality of the screening clinics in relation to the 'Process' are discussed in section 9.4 and 9.5 above; this included the specific blood test clinic, a specialist endocrine nurse to help navigate, the option to attend the screening clinics as a family unit, but also some simple/less positive facets like the lack of signposting information right at the start of the patient journey to aid in navigation.

Although in paucity, separate examples of the absence of the facets that describe quality are narrated in sections 9.2, 9.3 and 9.5., among these are the lack of comfort which may arise from issues of cost, travel and communication barriers. In addition to the lack of trust in the expertise of the clinic staff, either from an unfortunate experience of personal issues. Further process issues such as undergoing MRI, could result in the reported anxiety or the unfortunate issue with procedural matters. Finally, some issues can be exacerbated from attendance as a family to the clinic, either due to loss of freedom of communication, or pressure to actually attend.

9.6.3 Outcome

The structure and process measures are important because they essentially may convey the quality of care, and the outcome of whether individuals make the decision to attend or not, which is the focus of this PhD thesis study. Overwhelming results from Study 1 is that they do (83% attendance over the three years)– so it is worth looking at the positive reasons why that is the case. But focusing on the other factors which may limit engagement in some way can help inform future service development. It also suggested that emotional reactions, such as those discussed in section 9.3, may also be an outcome. However, it has been noted by Liu et al. (2011) that any patient outcomes should consider individual patient characteristics such as age and comorbidities.

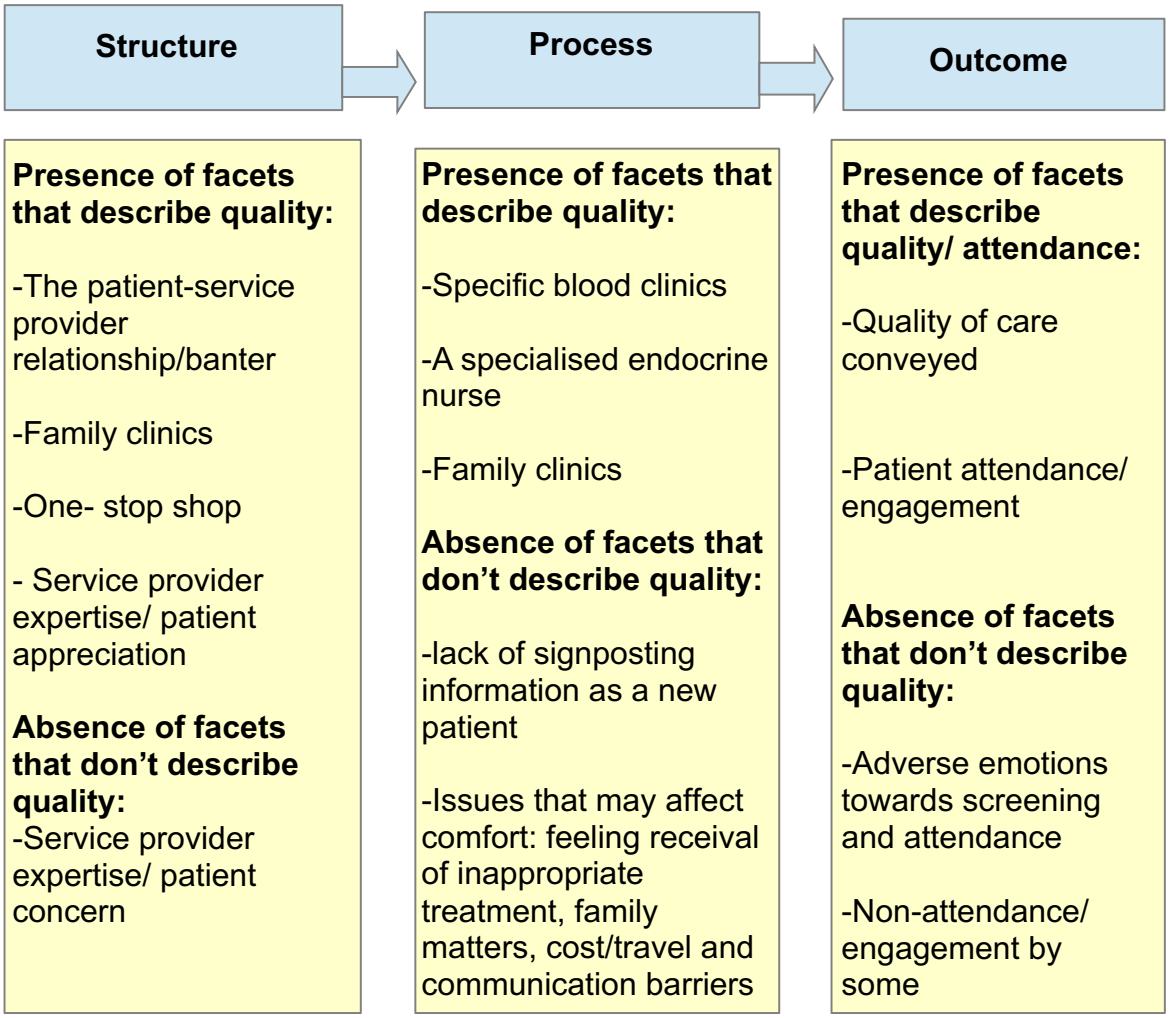

Figure 9.1. A conceptual model for conveying the amalgamated findings/topics.

This proposed conceptual model attempts to express how particular structural issues inherent in providing care in the clinics to rare endocrine carriers individuals may affect processes and result in the outcome of patient non-attendance. The model endeavours to provide a balanced overview of what the Barts endocrine clinics does well, in addition to what can be improved.

If the outcome criteria that describe such presence of facets the describe quality care, which potentially results in an individuals' engagement are plausible; it may be demonstrated such further improvements in outcome (for instance, the absence of facets that don't describe quality) will emerge, if the process of care in the Brats screening clinics are updated. Likewise, if the quality of care criteria based solely on clinical structure are to be plausible, it may be demonstrated that disparity in that structure generates differences in outcome (Brook et al., 1997). It has been considered

that the measure of quality of care that includes all the aforementioned concepts is more compelling than one that only includes one of these elements (Shi, 1997). Nevertheless, disadvantages of employment of the Donabedian's model should be noted, this involves the difficulty in demonstrating the connection between structure, process, and outcome (Donabedian, 2005). In addition, there could be some issues establishing whether some elements are strictly part of the structure and/or process or outcomes, or an overlap between them could exist.

9.7 Significance of these unique findings and gaps

This is the first multimethod study concurrently considering these rare endocrine gene carriers' patient groups in the UK. Recommendations below outline aspect from the findings which should be maintained at the Barts endocrine screening clinics, in addition to what may need to be reconsidered.

9.7.1 What should be maintained

9.7.1.1 Family clinics

The findings portrayed the importance and appreciation of the option of attending and experiencing the clinical appointments as a family. Significant findings included the support given and the relatability/unity that can occur from family members (Study 2), however, integrated qualitative findings also demonstrated how clinics need to adapt to the needs of the individual, as a 'one size doesn't fit all', in terms of how some patients use the clinics (Study 2, Study 3 & Chapter 8). Nevertheless, this also may result in the hesitancy in being the same room as family members and some patients would rather be seen separately, as the findings noted that some individuals use the screening clinics as a way to control over identities/future selves (Study 2, Study 3 & Chapter 8). In regards to children, they were not amongst the low appointment attenders/'High' status of missing appointments (Study 1), thus attending as a family is anticipated to permeate the parents' positive perception of the clinic and prolonging consistent attendance to the clinic of both parent and child (Study 2). However, from the reported future intentions of some children, as well as the non-attendance of others, such parental encouragement by attendance of a family may not be enough to encourage decision-making in terms of engagement/consistent future attendance by

the younger patients. As findings also reported there was some animosity from some younger patients as result of their diagnosis and thus, their perception of the screening clinics (Study 2 & Chapter 8).

Notably, a separate meaningful result is in relation to those who do not have the option of family support (Study 3 & Chapter 8), and thus found an outlet in the patient support groups, thus conveying the importance of adapting to the needs of the patients for those which attending family clinics is not a feasible option. This is related to the overarching aim of the thesis, as it conveys attendance of some gene carriers as a family to the screening clinic, and the alternative to the lack of such support from family members, which is the utilisation of the service provided by the patient support groups. In addition to the second objective of this thesis, as it portrays the positives and issues which an individual may experience of attending the clinic as a family. Thus, the family clinics and the provision of some of the patient support groups on the hospital grounds, together with the information of how to get in contact with such support groups, is an important aspect to the structure of Barts endocrine screening clinics and is very much appreciated by the patients.

9.7.1.2 The positive aspects of the patient- service provider relationship

An important finding is the relationship between the patient and the service provider (Study 2, Study 3 & Chapter 8). This is important due to the potential long-term contact between the patient and provider, as a result of the continuous management, in the form of screening, required of such rare endocrine syndromes. This resulted in the natural progression of familiarity between the patient and service provider (Study 2 & Chapter 8), due to the high level of speciality of the doctors and nurses at the clinic, patients tended to see the same faces each time and trusted the value in their opinions, such confidence in the service provider was conveyed through the implied forfeiting of the individuals' autonomy to know/not know to the service provider (Study 2, Study 3 & Chapter 8). The relationship between the patient and the specialist nurse, was particularly appreciated (Study 2, Study 3 & Chapter 8), as this served as a bridge between the patients and clinic and is important in arranging appointments and providing a point of contact for the patients. This is relevant to the third specific objective of the thesis, providing contact details of relevant staff is pertinent to patients,

particularly when outside the clinic setting. It seems that the overall the relationship and communication between the patient and the service provider is positive and an important aspect for the patient, however such communication can be disrupted due to language barriers. Thus, having the specialist endocrine nurse serving as the bridge of contact between both parties is an imperative functional aspect of the screening clinics at Barts.

9.7.2 What may need to be reconsidered

9.7.2.1 Data issues

Low attenders were aged between 25-44 or 45-64 years and be a female (in regards to MEN and VHL clinic) (Study 1), however there were no association between age or gender and attendance (Study 1), which is in agreement with Selemes (2007). This is pertinent to the first objective of this thesis, as there appears to be no relationship between patient characteristics and appointment attendance. Nevertheless, critically besides the general data collated and easily accessible in the clinic, some of that data was missing, whilst other types data was not available; such data which was missing or not accessible may be key data potentially highly relevant for this type of analysis.

Additional highlighted issues in obtaining data, includes patient addresses which is not routinely collected. It can be assumed that patient travel distance to the clinic is an unlikely factor in relation to appointment attendance, however, findings of Study 2 and chapter 8 indicated that factors such as parking and taking full days to attend the hospital are factors relevant to the routine of the patient when attending the screening clinic. Further, Study 1 noted the inability of accessing data in relation to distance from the clinic. This together with the conflicting literature results regarding the benefits of attending screening by Simmons et al. (2012) and Sheridan et al. (2019), results in the consideration that this should be addressed at the clinic, in terms of provision of accessible usable data and being aware of possible travel issues experienced by the individuals coming to the screening clinics.

9.7.2.2 Communication issues

The confidence by the individual in the service provider is delicate and can vary in the presented cases of miscommunication, such as when a participant feeling his treatment at the screening clinic was inappropriate (Study 2). This is significant as it may not only result in the loss of confidence in the expertise of the service providers, but also trust which was demonstrated to be essential but fragile (Chapter 8), as the lack of trust resulted in the patient feeling they have to take on the responsibility of gathering their own information and being vigilant during their appointment at the clinic (Study 2, Study 3 & Chapter 8). Thus, clear open communication is a very important aspect between the individual and the service providers and should be at the forefront of the service provision by the screening clinics.

9.7.2.3 Across the family members

The qualitative research produced in-depth unique and significant results which provided descriptions and understanding of how individuals with rare hereditary endocrine syndromes use the Barts screening clinics. Applicable to the overall aim of the thesis; interview participants described how they comprehend the importance of such screening clinics, and the resultant frustration which can occur if some family members choose to not to attend, as some voiced they will no longer attend when they reach consenting age (Study 2 & Chapter 8). Thus, there is a requirement to understand interrelationship and more about why some make this decision to disengage. As a potential disparity was suggested in terms of how individuals, in particular those from different generations, understand and use health services; in particular screening services with younger patients displaying more personal reluctance to engaging with the service at times, as well the lack of comprehension of the importance behind attending their screening appointments. Further, the lack of children and young people participating in the research provided a limited understanding into their experience as younger gene carriers attending the screening the clinic. Such intergenerational disparities could be manged by reconsideration of how information and consultations are carried out with younger patients. As information delivery to the younger groups could be carried out in a more personalised

way, providing the most suitable information which is applicable to the individuals' age group and/or level of comprehension.

As the rare endocrine syndromes in this thesis study are hereditary, it is important that there is the understanding, of not only the value gained of consistent attendance by all individuals at the clinics, but also appreciating the importance of attendance (Study 2, Study 3 & Chapter 8). Thus, the provision of information that clearly articulates the importance of attendance and the rationale behind consistent attendance, together with the support from the screening clinics to facilitate attendance, should be catered to the different age groups, as they are in different stages of life, in order to support young persons' decision-making in relation to engagement with the service.

9.7.2.4 Travel

Narration of patient experiences illuminated an array of compelling descriptions of how individual use and experience attending the screening clinics, for instance, some as a point of reference (Study 2, Study 3 & Chapter 8). Moreover, some participants conveyed how they access the health services. For instance, in terms of travel, this was differing. Some participants voiced the inconvenience of taking annual leave and parking at the hospital, however, at the same time understanding the importance of attendance but with slight annoyance in the process. Conversely, others who also understand the important of the screening clinic, attend with appreciation of the experience of having the opportunity to ask anything in the clinic, thus the travel costs and arrangements was not an issue (Study 2). Therefore, from the qualitative data it appears that travel distance and the mode of travel may be factor to the consistency and experience of attendance. Further, as this is a specialised service that holds clinics during the weekdays as well as at particular times of the year, the finding of the topic of travel is important. In an effort to balance the conveyed inconvenience and perceived value of attending the appointments at the Barts endocrine screening clinics, this can be established by provision of flexible appointment in terms of days and times. This is urged in order to accommodate those that may be required to travel quite a distance and require some conscious planning, in particular if children are also attending.

9.7.2.5 Emotional support

The finding of emotions playing a critical part of the patient experience is noteworthy, as this was reported to be part of such an experience before attending, as well as during the clinic, for instance some individuals use the screening clinics for reducing/managing fear and anxiety (Study 2, Study 3 & Chapter 8). Anxiety, which was a prominent emotion, was expressed in some cases as early as the arrival the appointment letter and during some procedures such as the MRI scan (Study 2). Although some discomfort is to be expected during an MRI scan, it is interesting to note some emotional turmoil from receiving an appointment letter from a patient who has been attending the Barts endocrine screening clinics for a while. As the feeling of anxiety/fear may reduce over time as a result of consistent attendance, as some of the participants discussed how they became more comfortable overtime with the service providers, however, this may not be the case due to the uncertainty that is attached to the progression of the rare endocrine syndromes. The reported finding of the experience of a more intense emotion, fear, although less narrated than anxiety, is significant as this resulted from negative experiences of using health services in general to find information, as well as negative experiences which occurred in the clinic. Such emotional turmoil is significant, as the narrated consequence of this can result in the process of detachment as a coping mechanism (Study 2, Chapter 8) and is relevant to second objective of this thesis. Thus, as the type of fear and anxiety varies at individual level as well as which stage in the process – subsequent further research may provide a comprehensive understanding of this, thereby allowing for more person-centred responses where concerns can be acknowledged, and appropriate management strategies put in place.

9.8. Clinical applications/ implications of findings

The clinical applications/implications for clinical services which are suggested below include practical propositions, in terms of improvement of the structure and methods of services, in addition to consideration of the information provided to patients and the quality of patient data.

9.8.1 Structure and methods of services

In regards to applications for clinical services at the Barts endocrine screening clinics, this includes increasing the sense of comfort for the patient. This may include increasing the trust in the expertise of the service providers and provision of emotional support if needed. To increase such trust and support to patients, the structure of methods of clinical service could consider adapting to the needs of the individual, as the integration analysis (Chapter 8) conveyed some dissonance in relation to the notion that 'one size doesn't fit all'. For instance, even though some individuals appreciated the patient support groups (Study 3), others reported in the studies that they were not comfortable in a group situation (Study 2). Thus, patient emotional support should be available from the service providers with whom the individual is familiar with and in regular contact, as some may not want to attend the patient support groups.

Moreover, integration findings in partial agreement included trust, as essential but fragile, a factor in relation to patient's perception of the screening clinics (Chapter 8). Lack of trust and negative emotions such as fear and worry have been reported by Graham-Rowe et al. (2018) to be a barrier of engagement, thus, strategies to support patients as part of the method of service could be developed, including actions that address some worries expressed by participants regarding their experience when attending screening appointments. In order to improve the patient's trust in the service provider, the literature reports interventions such as service provider training and patient education (Rolfe et al., 2014). A further proposed area of consideration in relation to the Barts endocrine screening clinics and possibly reducing fear/worry of the patient around attending appointments, included awareness of the reported inconveniences regarding difficulty with transport and accessibility in car parking. The issue for transport may be specific to women, as they were demonstrated to be low attenders (Study 1), particularly for the VHL and MEN clinics; transport issues for women were noted to be an issue by Blankson et al. (1994) who interviewed women within 24 hours of missing a clinic appointment, and one the main reasons for missing an appointment included difficulties with transportation.

Although a modest aspect, in terms of the expressed issue of language proficiency results in Study 2 and as part of the topic of a 'terminology hurdle' in the integration

results, it is significant as the encouragement of use of interpreters as part of the structure of the services may also be advantageous in relation to patient engagement. However, interpretation may only be part of the issue, as although using professional interpreters is considered to be useful (Ali and Watson, 2018), nonetheless limitations have been connected to using an interpretation service, such as availability of interpreters and confidentiality and privacy related issues (ibid). Therefore, communication and trust are issues way beyond language, and how that can be managed carefully needs consideration given the importance of trust in these patient-service provider relationships. Moreover, it has also been stated that most organisations in the UK prohibit the use of family, friends and children as interpreters (Ali and Johnson, 2017), this may be issue when individuals whose first language is not English attend the family clinics.

9.8.2 Information provision to patients

A one size doesn't fit all approach was also conveyed in terms of information provision as part of the integrated findings (Chapter 8), particularly regarding the level of information. Thus, clinical services would benefit in relation to awareness of the patients' stage in their clinical journey and what level of information to provide in correspondence to that level. Conscious awareness that each individuals' need may differ in terms of information would be beneficial, as it has been stated that such a 'kinds-based approach' to clinical practice, which recognises that are different kinds of patients, is usually resisted (Hadorn, 1997).

Some disparity in relation to information provision was found in the integrated findings (Chapter 8) in relation to the role of specialist nurse at the screening. Participants expressed the importance of the role of the nurse (Study 2), which acts as a bridge between the clinic and patient's clinic importance. However, such disparity was conveyed in that a new patient was not aware of the significant role the nurse plays. Thus, information provision regarding the clinical services, particularly to new patients could be advantageous; as patient- centred care has been described to involve sharing information fully in a timely manner to patients as well as their families so they can make informed decisions (Catalyst, 2017).

Information provision needs to expand on the idea that attendance is not only for updates of test results, but also the importance of tumour surveillance, as integrated findings found that appreciating the importance of attendance was at some dissonance (Chapter 8). Thus, such information provision is beneficial in order to increase the individuals' awareness of the importance of screening and of regular attendance, in particular to children and young people; as integrated findings demonstrated, at a partial agreement, the aspect of animosity from a younger perspective in regards to the perception of the screening clinics (Chapter 8). Hence, information that is geared towards the younger patient may implement the foundation in advocating life-time engagement, as the absence of symptoms may be a barrier to attendance. Aspects of these proposed applications for clinical services are also conveyed in the Graham-Rowe et al. (2018).

Moreover, in relation to low attenders (Study 1), targeting those who don't attend the screening clinics could be considered by clinical services. As the qualitative results expressed that that were family members, such as cousins (Study 2), who decided not to engage with the screening clinics with some having never attended, to those who initially did attend, but with time, ceased engagement. Integrated findings also demonstrated, at a dissonance, the topic of individuals appreciating the importance of attendance (Chapter 8). To encourage engagement, evidence has indicated that patient incentives may be effective in assisting in episodes of behaviour change, for instance, regarding cancer screening (Sutherland et al., 2008). As it was noted where direct costs are recognised to be a barrier to such behavioural change, counteracting those costs may contribute to behaviour change in engaged patients (ibid). Moreover, for those who do opt out but would like to later re-engage in the screening clinics, provision of clear, accessible information on what that process would entail may encourage and assist that individual in a smooth transition back into engaging with the screening programmes.

Aspects of patient- service provider relationships were also highlighted in the results of this thesis with respect to information provision. Integrated findings, with partial agreements, demonstrated the surrender of patient autonomy to the service-provider (Chapter 8). Such confidence displayed in the service-provider in relation to information provision should be acknowledged and encouraged and by the clinical

services. As stated, it has been noted by Beard et al. (2016) that there is the potential for patients to be misguided or experience potential psychological harm by accessing inaccurate webpages, as highlighted in this thesis by the results where a patient experienced fear as a result of researching their own diagnosis (Study 2). Further, it has been expressed that clinical communication may alter the patient-service provider communication training about cancer (Brindle, 2017), in addition to the subsequent decision that the individual may take regarding management and treatment of the diagnosis (ibid). Thus, provision of a simple patient information leaflet (Study 3) as part of the patient-service provider communication process is justified.

9.8.3 Data quality enhancement

In the above discussion in was noted the limitations included the lack of data in terms of ethnicity and address and date of birth for the MEN diagnoses group. The absence of the date of births in the received files which resulted in cases being deleted from the analysis, may be an indication that there is a requirement for the improvement of data quality. It has been suggested that data quality can be managed by performing a data audit, where a sample of the central database is compared to the source of the data (Whitney et al., 1998). Moreover, in accordance with the World Health Organization (WHO), if the healthcare institution aims to take deliberate actions concerning data quality, a plan is required to be developed for improving quality of the data as well as the information resulting from the data (World Health Organization, 2003).

Thereby, it is suggested by Sadoughi et al. (2013) that the appropriate authority approves and implements a plan for enhancing the data, establish an accurate guideline regarding investigation and governing the data quality, and lastly monitoring its execution. Enhanced data quality would have value to a research study, as it has been noted that high quality data is important to the NHS, as it can result in enhancements in patient care (NHS, n.d). Quality data contributes to developing services and decision-making, along with being able to identify any trends and patterns and evaluate services (ibid). Further, good data quality has been indicated to translate into good service and good relationships with the individuals (Missier et al., 2003).

9.9 Original contributions to knowledge that are potentially transferable beyond the service provided at St Barts

Below is an overview of the original contributions to knowledge of this thesis that can be potentially replicated in other clinics.

-For the first time, appointment attendance rates of patients at three different rare endocrine syndrome clinics were investigated in a London clinic. This revealed that the majority of patients (83.27%) did engage with the clinics. The high attendance conveys that high engagement of patients with hereditary rare syndromes, with currently no cure, who also require regular screening and surveillance, is a possibility. This level of engagement can be compared to the VHL clinic at the Leeds teaching hospital, to ascertain if high engagement if prevalent in separate UK cities. However, this high engagement possibly does not resonate with all rare endocrine clinics worldwide, as some have reported a drop of VHL mutation carriers participating in the tumour surveillance programme.

-In addition to overall attendance, low/high attenders at three different rare endocrine syndrome clinics were also determined. The VHL patient group attended less combined appointments overall and had the lowest frequency of individuals 'Never' missing appointments over the three-year period. Such low engagement of VHL patients may signify an awareness to other VHL specialist clinics; for instance, clinics in Leeds and Denmark, a potential area of interest for further research behind potential lower VHL individual engagement, compared to other rare endocrine syndrome clinical groups. This is important as it has been stated that VHL patients with the genetic change will almost inevitably develop tumours.

-In regards to gender and attendance, there remains some ambiguity. As men were shown to be high attenders for the VHL and MEN clinic, however women were slightly higher attenders for the SDH. This possibly indicates to other clinics that the area of gender and attendance of patients with rare endocrine syndromes remains a domain which requires further investigation.

-Overall, no association was found between explanatory variables and attendance. This implication may aid clinics who specialise in screening and surveillance of rare

endocrine syndromes to consider factors such as patient experience, which may have an effect on attendance.

-A unique investigation reported experiences and perceptions of rare endocrine gene carriers individuals; this included the significance of factors including anxiety, family issues and the patient-service provider relationship in relation to the patient experience. As continued engagement with the screening clinics is required for the hereditary syndrome, the factors demonstrated from the qualitative analysis of the interviews, can be potentially transferable to other clinics which also require continued screening for comparable hereditary diagnoses.

-For the first time a patient information resource for new patients was co-produced with patients, using focus groups, at the Barts endocrine clinics. The findings suggested that patients prefer a simple, patient-friendly leaflet with relevant signposting. This finding can be potentially transferable to clinics as standard practice to give to any new patients, as a patient information resource could be used as a reference for new patients on what is available and who to contact if necessary, thus potentially encouraging patient engagement with the particular clinic/health service.

-Unique integration of the two different qualitative studies considered relationships between themes, for instance in relation to autonomy to know/not know, one size doesn't fit all and reducing/managing fear and anxiety. Potential implications of these metathemes regarding engagement with health services was discussed in relation to service providers and service users. Implications potentially transferable to other rare endocrine syndrome clinics includes addressing issues of possible mental health of the individual patient, the significance of the patient-service provider interpersonal relationship and the aspect that one size doesn't fit all, for instance, in terms of family clinics and patient support groups.

9.10 Strengths and limitations and conclusion

The multimethod research methodology allowed for the examination of the complex phenomenon at various levels of analysis. Strengths include the cohort study (Study 1), which included individuals from three different rare endocrine syndrome clinics,

across the age range. Due to the status of rare syndromes, advantages of having access to such a patient group to carry out recruitment for the interviews and focus groups allowed for a unique insight into patient experiences. For instance, the strengths of the semi-structured interviews (Study 2) included the unique in-depth exploration of the participants experiences and perceptions of the Barts endocrine screening clinics, which resulted in rich information, which at times conveyed some personal and/or sensitive issues. Whilst the focus groups strengths (Study 3) provided an opportunity for the participants to be more candid in their responses (Leung and Savithiri, 2009). Further, given the nature of the focus groups, it facilitated the discussion for the participants to build on each other's ideas, which resulted in, for the first time, the co-production of an information resource for new individuals at the Barts endocrine screening clinics.

An issue reported in Study 1 was the absence of patient characteristics employed in the Poisson regression, such as ethnicity, due to the poor quality of usable data routinely collected in clinic. This limitation was also reported as a factor by Simmons et al. (2012) and Sheridan et al. (2019). It is important to note that as stated, ethnicity certainty does not equate to language issues and should, therefore, be approached with caution. However, from the researchers' long-term experience as an interpreter, as well as the preliminary observations conducted in clinic (Appendix 4.1), it may be of advantage for clinics to collect data on ethnicity as well as language proficiency to potentially improve the patient experience. A further limitation in Study 1 was the lack of data concerning the distance patients had to travel to Barts for screening, as well as the mode of transport. Access to patients' addresses was not possible, which would have been advantageous in enabling this to be examined as a variable in terms of engagement. Although ethnicity was not available to the Barts cohort study, it was known for Simmons et al.'s (2012) study, who noted that even when data on patient ethnicity is available, homogeneous ethnic groupings may still be an issue in regards to screening. Further, the need to consider ethnicity with respect to the patient experience is highlighted by Malhotra et al. (2017), even though patient–service provider ethnic concordance was ultimately found to be not related to engagement with patient screening.

The difficulties and limitations of doing research into children with these syndromes was encountered. Children were included in the interviews, however, this had some difficulties, such as limited engagement of the children in the interview, indicated in the short length of the interviews and the interjection of the parent to encourage or prompt the child. Lack of research including children may be a possible reflection of the difficulties that are encountered. Regarding the patient information leaflet, there was limited clinical service provider input and the leaflet was not piloted; due to the time constraint of accessing the correct staff and time limit of the study. In addition to perhaps a lack of design that was geared specifically to engage them, given the findings and issues encountered in data collection a specifically designed study to children is warranted, as it has been noted that successful focus groups with children involves awareness of their developmental needs and abilities (Adler et al., 2019).

Due to the nature of the methods and population utilised in this study, the findings cannot be comprehensively generalised to other patient samples, as the experiences narrated were from individuals who undergo screening/surveillance for syndromes which currently have no cure. However, the findings do illuminate the experience of the individuals and their families of the screening clinics, which includes both positive and challenging aspects.

9.10.1 Conclusion

This thesis has contributed to knowledge and understanding of how individuals with rare endocrine syndromes comprehend and use the Barts endocrine screening clinics, a prominent UK specialist clinic in a major city. The research has contributed to conveying the personal, unique insight and understanding of the rare endocrine gene carrier individuals' experience- both the challenges and aspects they appreciate. In light of the key findings, recommendations are made for the clinicians at the Barts endocrine screening clinic and for future consideration.

The next chapter concludes the thesis by summarising the main findings of the research and contemplates how these studies make a unique contribution to knowledge in this field. Recommendations for future research are also discussed.

Chapter 10

Conclusions and Recommendations

10.0 Introduction

This chapter concludes the thesis and its exploration of the meaning behind how individuals understand and use health services – in particular, the Barts endocrine screening clinics. It will summarise the findings from Studies 1–3 and provide recommendations for further research in the field of facilitating patient engagement through regular screening and surveillance.

10.1 Overview of the research

This research has enhanced the existing body of knowledge through its examination of the patient experience of screening and surveillance services – in particular, for carriers of rare endocrine genes. It has also addressed some of the gaps identified in the literature review (Chapter 3), including research relating to rare endocrine syndromes, and particularly to patients with mutations in the SDHx genes, as most of the literature examined VHL patients. The study also provided insights into appointment attendance, low/high attenders and the patient experience among children, together with an insight regarding what patients desire in terms of an information resource at the early stages of their clinical journey. Moreover, Integration of key findings determined relationships between the themes from each of the two different qualitative studies.

This thesis study has contributed to the state of play with respect to rare endocrine gene carriers individuals accounts of screening and surveillance. These new insights from the perspectives of individuals have added to the current understanding of the patient experience and have clinical relevance for health professionals looking to improve the patient-service provider relationship. It also examined the type of information and approach required to facilitate patient engagement with a screening service.

The uniqueness of this thesis was exemplified by the study sample, which was designed to elicit views and opinions about experience and engagement. It included individuals from three different rare endocrine syndrome clinics and from different age ranges, who provided an intimate awareness of their perception of the screening programme. Appointment attendance and other factors for patients at the three clinics were also explored. A further unique aspect of this thesis study was the creation of an information leaflet co-produced with patients who have extensive experience of living with a rare endocrine syndrome and was designed to inform new gene carrier patients.

10.2 Overall findings

Collectively, the findings of all three studies illuminated a deeper understanding and described how rare endocrine gene carriers understand and use the service provided by the Barts endocrine screening clinics. Whilst the integration of key findings from the interviews and focus groups explored the relationship between the themes from the two different qualitative studies, which aided in a more complete and robust multidimensional understanding of the patients' experiences.

The thesis has provided insights into patients' appointment attendance and individuals who are low/high attenders, in addition to how they perceive and experience the service provided by Barts, as they navigate through their somewhat unpredictable trajectory of such rare endocrine syndromes. Furthermore, as a result of a co-production process, expert patients expressed their preferences in terms of patient information and how it should be delivered to new patients at the screening clinic. Integrated qualitative findings presented metathemes in relation to how patients comprehend and use the clinics, this included the aspect of one size doesn't fit all, and how some use the clinics a method of reducing/managing anxiety. Findings also identified the importance of the patient-service provider relationship, family clinics and the provision of patient information at the correct time. The clinical applications of the findings from all the studies provided additional insights, understanding and ideas that might inform the management of screening and surveillance practices for patients with rare endocrine syndromes.

10.3 Recommendations for future research

The aim of this thesis was to bring greater understanding to the meaning of the rare endocrine gene carrier individuals experience and to examine how such individuals use the Barts endocrine screening clinics.

Recommendations for future research include a greater focus on mutations in the SDHx, as there is a lack of such focus in the literature in the realm of SDHx gene carriers attendance and experiences of screening and surveillance; with most of the current research focusing on the genetic/imaging protocol aspect of the syndrome. In regards to gender, it may be insightful to research the differences between the genders in their engagement and management, particularly for rare endocrine syndromes. Further, this may be extended to exploring the differences in engagement among those with hereditary syndromes, as this may vary for those with rare syndromes due to the current unavailability of a cure. Younger patients are in particular need of future research, as their experience may be more complex due to the intensity of being diagnosed at such a young age, and possibly witnessing family members going through the process. As it has been demonstrated that patients experiences and attitudes may change over time, from newly diagnosed to experienced patient, longitudinal studies looking at how patients navigate both living with their health condition and engaging with health service providers maybe beneficial. Finally, investigating and targeting those who do not attend may provide a more comprehensive understanding of the reasoning behind their non-engagement.

Specific recommendations include:

10.3.1 Clinical piloting of the co-produced patient information leaflet

Recommendations for future research include evaluating the co-produced information leaflet for new adult patients (Study 3) in a clinical setting, as this was beyond the scope of this thesis. Piloting of the leaflet would link with the original need discussed in Chapter 1, whereby service providers had an assumption regarding the low attendance of patients to the Barts endocrine screening clinics and wanted to understand why they were not attending. The thesis presents some insights regarding why patients engage with the screening clinics and the possible reasons for not doing

so. Thus, the co-produced information leaflet may support new patients attending the clinics as a source of primary information for the clinic, however, it will need to be evaluated.

10.3.2 Proposed cohort studies of the screening clinic and the service delivery personnel

A prospective cohort study is recommended, using data collection tools that would enhance the quality of the data obtained and capture information not available for this study. Such data may include the individuals travel distance, ethnicity and even language proficiency. Moreover, this research has explored patient perceptions and experiences regarding the screening clinics, and how this may impact patient appointment attendance, but it has not examined the clinic and clinicians, and that could be an area of future research. Participants noted that health service providers have a significant role in the identification of familial cancer risk (Study 2 & Chapter 8) as well as reassurance resultant from the confidence in the providers (Study 2, Study 3 & Chapter 8), but the literature reported that service providers struggle to be confident, can experience time obstacles and sometimes lack enthusiasm (Miller et al's., 2010). This portrays the expression of concern among patients regarding a potential 'therapeutic gap' between genetic testing and treatment. Thereby, a potential area for further exploration is the perspective of the service provider in the context of the clinical environment and how, if at all, this would affect service provision and the relationship with the patient.

10.3.3 Interviews and focus groups tailored specifically to children / young people

As discussed in Studies 2 and 3, there was lack of input from children and young people. Areas of greatest consideration for future participation of children and young people have been noted to include their involvement in developing materials, such as towards the informed consent form and topic guides, as well as the research process, such as the methods (Modi, 2020). It has also been identified that awareness of research should be promoted among children and young people, as well as developing opportunities for them to get involved from the start – not just 'youth-proofing'

participant information leaflets (ibid). Thus, recommendations for future research includes improvement in the specialised topic guides as suggested, together with and a focused study of children of varying ages which may include such specific topic guides and methods of carrying out interviews and focus groups suitable for children.

10.3.4 Engaging the unengaged – there are others out there

It would also be beneficial to consider patient types. Baim-Lance et al. (2019) detail various patient characterisations, from the 'proto-professional' (de Swaan, 1988), who is familiar with the vocabulary and culture of the healthcare environment, to the 'natural helper', who complements their own healthcare with their independent activities. As stated, no single 'type' was captured the participants in this study. A potential reason is that these categorisations are based on a field of semi-scripted possibilities, as noted by Renedo and Marston (2015). Therefore, it is important to consider patients as fulfilling multiple patient roles (Baim-Lance et al., 2019). Possible future research to advance knowledge on this issue would be the involvement of a greater number of participants, so as to engage all possible patient types and gain an enhanced understanding of issues regarding building patient expertise over time.

10.3.5 Findings that are potentially transferable beyond the service provided at St Barts

-As discussed in Study 1, no association was found between explanatory variables and clinic appointment attendance of the rare endocrine syndrome patients. Thus, it is proposed for clinics who are concerned about the importance of attendance, for instance a diagnosis which require consistent screening, to consider possible psychosocial factors, as it was noted that non-attendance can only be partially explained by logistical issues (Brewster et al., 2020).

- It is suggested for clinics/health services which require patients to attend clinics on a consistent basis, to consider issues highlighted in this thesis (Study 2) as part of the patient experience and perception of rare endocrine screening clinics, these include

the significance of factors including anxiety, family issues and the patient-service provider relationship.

-In relation to an information resource for new patients, as part of findings of Study 3, a simple, patient-friendly leaflet with relevant signposting is proposed for the new patient at the start of their journey in a new clinic or health service.

-Integration of key findings from the two qualitative arms of this thesis determined the significance of a “one size doesn’t fit all” approach to how individuals use the screening clinics. Thus, clinics which provide a service to patients, in particular to family clinics, patients support groups, and even information provision, should be aware that service provision should be ideally adapted to each patient.

Finally, this thesis demonstrated the wealth of information ascertained from exploring how rare endocrine gene carriers understand and use the Barts endocrine screening clinics. Insights included the lived experiences of individuals with or at risk of a rare endocrine syndrome, in addition to the significant role of service providers in the identification of familiar cancer risk as well as in reassurance to the individual.

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Appendix

Appendix 3.1: Search terms and Boolean search operators used in the electronic data bases

Search Term 1	Screening and surveillance
Search Term 2	Search Term 1 AND benefits
Search Term 3	Search Term 2 AND Huntington's
Search Term 4	Search Term 2 AND thyroid
Search Term 5	Search Term 2 AND diabetes
Search Term 6	Search Term 2 AND Von Hippel Lindau
Search Term 7	Search Term 2 AND multiple endocrine neoplasia
Search Term 8	Search Term 2 AND succinate dehydrogenase gene mutation
Search Term 9	Life expectancy AND succinate dehydrogenase gene mutation
Search Term 10	Life expectancy AND Von Hippel Lindau
Search Term 11	Life expectancy AND multiple endocrine neoplasia
Search Term 12	Search Term 1 AND patient AND experience
Search Term 13	Search Term 1 AND patient AND attendance
Search Term 14	Search Term 1 AND patient AND nonattendance
Search Term 15	Patient information AND shared decision making AND attendance

Appendix 3.2: Synthesis Matrix/ table of the studies which met the inclusion criteria, including CASP ratings.

Research study	Aim/Research question	Population (n)/ Age/diagnosis etc.	Design/method	Results / Found what	Strengths & Limitations	Conclusion of authors
Theme 1						
Tufton et al. (2017)	Review the literature about the risks of radiation from some imaging protocols.	Inherited SDHx mutations	Systematic literature review.	-Refrainment of using radiation-exposing imaging. - Frequency of surveillance remained a difficult topic to answer.	- Balanced discussion of the benefits as well as potential risks of long-term surveillance. - The use of a single database engine.	-Functional imaging has a place in the detection of occults functioning tumours.
Clement et al. (2018)	To develop consensus recommendations for thyroid cancer surveillance.	CAYAC survivors.	Systematic literature review.	Authors presented an argument in favour of screening, specifically for DTC screening.	- The harmonisation process used for the development of the guideline. - The employment of a single search database, PubMed,	CAYAC persons at risk for DTC should be counselled about the risk and options for surveillance.
Sobrido et al. (2019)	Review extensive screening studies to identify which was the most successful approach to identify cases of NP-C.	Inherited URDs	Non-systematic Literature review.	Benefits of screening for ultra-rare IEMs, such as NP-C.	-Use of more than one database and defined search terms and Boolean operators. - Non-systematic study limited.	- Emergence of new diagnostic approaches over the last 5-10 years.

Geurts et al. (2020)	Encapsulate the information advocating screening.	High-risk populations for a range of endocrine afflictions eg. thyroid and inherited conditions, VHL and MEN (Type 1 &2).	Systematic literature review.	- Lack of evidence to support endocrine cancer screening for populations with average risk. -High-risk patients would benefit from endocrine cancer screening and a multidisciplinary approach.	-Clearly focused research aim. -Only one database was used, Pubmed, within an also undisclosed timeframe.	Special consideration ought to be given in setting of hereditary endocrine conditions.
Poulsen et al. (2010)	Effect of long-term surveillance.	Danish Subjects with VHL mutations.	Retrospective Cohort study.	Promotion of optimisation of surveillance recommendation.	- A high level of data reliability. - Lack of data on unrecognised VHL-mutation carriers.	Establishment of optimum surveillance regarding VHL is debatable.
Binderup et al. (2017)	Establish survival of VHL mutation carriers and the risk of VHL- related mortality.	Danish VHL mutation carriers.	Retrospective Cohort study.	- Estimated mean life for male and female patients. - Survival was influenced by gender and genotype of the patient.	- Medical record verification of clinical information. - Lack of assessment whether surveillance enhanced the patients' quality of life.	Surveillance is particularly beneficial for truncating mutation carriers, especially if initiated at childhood.

Theme 2						
Gopie et al. (2012)	Investigate the psychological burden of surveillance in and to discuss whether the benefit of surveillance outweighs psychological burden.	Individuals under surveillance for hereditary cancers and various rare conditions eg. VHL and Multiple Endocrine Neoplasia (MEN).	Systematic literature review.	- Surveillance for most hereditary cancers was connected with positive psychological outcomes. - Nonetheless surveillance of patients at high risk for developing multiple tumours appeared to be connected with increased distress and lower quality of life.	-Two of the authors were involved in reviewing the abstracts and selecting relevant articles. Clearly defined search terms and multiple data bases were used. - Majority of the included studies used a cross-sectional research design, therefore it was not possible to assess possible changes in levels of distress due to the surveillance examinations. Plus, the studies related to rare tumour conditions were limited.	Surveillance for most hereditary cancers was connected with normal levels of psychological distress. In families with hereditary tumour conditions with a high risk of developing multiple tumours, a variable degree of psychological distress.
Kim et al. (2018)	To characterise research on patient and provider communication about Active	Populations with types of cancer for which AS has been used eg. prostate cancer:	Scoping literature review.	AS patients desired more information about AS and reassurance about future treatment options, involvement in	- Demonstrated rigorous searching and screening processes of studies: e.g. search strategy	Further research is required to assess interventions aimed at patients

	surveillance (AS), and associated determinants and outcomes.	ductal carcinoma in situ (DCIS), chronic lymphocytic leukemia (CLL), renal cell carcinoma (RCC) and prostate cancer		decision-making and assessment of illness uncertainty and supportive care needs during follow-up.	was developed in conjunction with a medical librarian and complied using appropriate reporting guidelines. Several databases were used. Plus, evaluated patient as well as service provider experience of AS. Two authors screened titles and abstracts. All members of research team also reviewed the eligibility criteria. - Difficult to compare findings for different types of cancer due to potentially contrasting descriptions and processes for AS.	and/or providers to improve AS experience.
Miller et al. (2010)	To explore the primary care physician (PCP)/GP role as part of a larger study of	Patients in Canada who had received genetic test results for hereditary breast/ovarian	-Two sets of open-ended semi-structured interviews-	Some patients anticipated an ongoing PCP role constituting risk-appropriate surveillance or	-A longitudinal design, with interviews post-test result and 1 year later. Plus two	Patients assume the role of PCP in cancer genetic services to be expansive e.g.

	patient experiences of cancer genetic services.	cancer or hereditary nonpolyposis colorectal cancer (HNPCC) and were at least 18 years of age and fluent in English.	25 initial & 21 follow up interviews. -Averaged 1 hour.	reassurance, particularly as specialist care diminished.	members of the research team abstracted transcript sections and aligned data across the two interviews. Plus a 'low inference' qualitative descriptive analytic approach was used. - Reported sample is not representative of the Ontario population of cancer genetic patients.	the significant role for PCPs in ongoing care once genetic test results are received.
Laidsaar-Powell et al. (2016)	To explore the attitudes and experiences of cancer patients and family members (FMs).	Australian adult cancer patients and FMs of cancer patients.	Semi-structured interviews- 30 patients 33 family members. 16 patient-FM pairs. - Average length of interviews for patients lasted for 43 minutes, whilst for the FMs it was 35 minutes	- Patients valued family involvement and appreciated FMs' support. Challenges were also reported by patients (e.g. preserving privacy) and FMs (e.g. emotional cost of supportive positions).	- Interviews were conducted by a trained qualitative researcher. Plus, rigour was undertaken by repeated coding of transcripts by separate team members - 70 % of patients and 76 % of FMs were recruited from the same tertiary hospital. Hence,	Appears that both patients and FMs appreciate family involvement in consultations.

					these participant experiences may be unique to that setting. Plus due to retrospective nature of the interviews, could be affected by recall bias.	
Beard et al. (2016)	Aimed to examine how women experience simultaneous carrier screening for three inherited conditions.	Females 18 years of age or older in Australia who speak and read English, all had received a carrier result for one of three inherited conditions: cystic fibrosis (CF), spinal muscular atrophy (SMA), and fragile X syndrome (FXS).	10 Semi-structured telephone interviews. -Interviews were between 17 and 64 minutes	- Participants reported anxiety and stress while waiting for their partner's carrier screen result (CF or SMA carriers) or the pregnancy's CVS result (FXS carrier). - Majority of participants endorsed population carrier screening for these conditions, ideally before conception.	- All were telephone interviews conducted for consistency. Plus, the transcripts were co-coded by a separate researcher independently ensuring data analysis was rigorous. - Study aimed to establish the experiences of a group of women who had received a carrier result through a novel reproductive genetic carrier screening program, for that reason the results are not generalizable.	Need to improve public awareness of carrier screening is improved to allow couples to undergo screening prior to pregnancy.

Almeling and Gadarian (2014)	To explore one of the key claims of surveillance medicine: that everyone is affected by the new emphasis on medical risk.	A nationally representative sample of American adults.	Experimental survey.	-People in the general population- respond to hypothetical genetic risk information by wanting to take action, - People's reactions are stronger in areas connected to self and family than to community.	- The randomisation of the study was favourable: as the chi-square tests demonstrated there were no significant differences across conditions in the proportion of demographic variables. - Presented respondents with a hypothetical risk and asked how they may react in such a situation.	As new genetic tests for common diseases are developed, increasing number of people will be have the option in deciding whether to learn about their own genetic risks.
Godino et al. (2019)	The aim of examining the psychosocial implications of presymptomatic testing for hereditary cancer.	Young adults (YA) (18–30 years) or parent of a YA in Italy who had undergone presymptomatic genetic testing (PST) who met the inclusion criteria was invited to take part in the study.	Cross-sectional self-completion survey (online & paper).	Some young adults did not comprehend the implications of the genetic test but complied with parental pressure.	-The statistical tests and the SPSS outcomes were assessed by all the authors, who are experienced researchers, to maximise validity. Plus for rigour, a pilot of the survey was carried out with five colleagues, so to test the online surveys and data extraction.	Young adults could benefit from a multistep approach when undergoing genetic testing.

					-The limited number of PIQ (Italian sample) reduced the feasibility of observing differences between groups about their experience of PST. Plus the data was collected retrospectively and not at the time of PST.	
Theme 3						
Simmons et al. (2012)	Determine the effect of a population-based stepwise (marked by a gradual progression) screening programme of mortality	UK Patients at high risk of prevalent undiagnosed diabetes	Single blind, cluster-randomised controlled trial (RCT).	A non-significant reduction in cardiovascular (HR 1·02, 95% CI 0·75–1·38), cancer (1·08, 0·90–1·30) as well as diabetes-related mortality (1·26, 0·75–2·10) connected with an invitation to screening.	- Randomised design. - The of lack ethnic diversity in the participants.	-The benefits of screening could be smaller than proposed and limited to patients with a detectable disease.
Sheridan et al. (2019)	Describe predictors of non-attendance as well as to examine	UK Patients with suspected cancer.	Retrospective cohort study.	Early mortality risk in non-attenders (31.3%)	-The levels of missing data were low.	-Cancer diagnosis was less likely in non-

	the relationship between patient attendance and outcome.			in contrast to those who attended (19.2%),	- Inclusion of data only from adults.	attending patients.
Theme 4						
Young et al. (2018)	Aimed to better understand experiences of patients being invited to cancer screening and the associated decision-making.	Qualitative evidence explaining UK cancer screening attendance decisions	Systematic review of 34 qualitative literature studies. The synthesis of findings involved interpretative analysis using meta-ethnography.	Three themes emerged from the synthesis: 'Relationships with the health service', 'Fear of cancer screening' was both a motivator and barrier and 'Experiences of risk' .	- Meta-ethnography, as a methodology for qualitative evidence synthesis may could contribute robust evidence for policy and practice. - The studies were published over a wide time frame (1994–2016), hence the experiences of participants may not all reflect the current state of screening in the UK. Recall bias may have influenced the data because participants reported past experiences. Those who are least likely to engage in screening were probably	The findings highlight the importance of the provider–patient relationship in screening uptake and enrich our understanding of how fear and risk are experienced and negotiated. This knowledge can help promote uptake and improve the effectiveness of cancer screening.

					underrepresented in the data since they may be less likely to partake in a research study on the topic.	
Stacey et al. (2017)	To determine the effects of decision aids in people facing treatment or screening decisions.	Individuals facing health treatment or screening decisions.	Cochrane systematic review-intervention	Decision aids reduced the proportion of undecided participants and appeared to have a positive effect on patient-clinician communication.	- The strength is that the patient decision aids improved several key outcomes across a wide variety of populations and decision contexts. -The potential biases in the review process may be due to limitations connected with having inadequate power to detect potentially significant differences in effectiveness between the subgroups.	Individuals exposed to decision aids feel more knowledgeable, better informed, plus clearer about their values. Further research is required on the effects on adherence with the chosen option and utilisation with lower literacy populations.

Hofmann, and Stanak (2018)	To explore nudging strategies identified in screening, and present arguments for and against nudging.	Conditions such as diabetes.	Narrative literature review.	Nudging for the purposes of increased participation worked, but possibly crowded out the intrinsic motivation for participation in screening.	-Rigor shown by a member of the research team checking the primary screening of the studies. -Authors identified the review as non-exhaustive.	Nudging should not only target patient attendance rates, but also on making individuals better choosers.
Graham-Rowe et al. (2018)	To identify barriers/enablers connected with screening attendance, plus to determine those most likely to influence attendance.	Patients with Type 1 or Type 2 diabetes who attend retinopathy screening	Systematic Review/ Meta-analysis using deductive analysis and inductive analysis.	-Identified six theoretical domains as the key mediators of diabetic retinopathy screening attendance. -Examples of barriers populating these domains included confusion between routine eye care and retinopathy screening. Recommendations by healthcare professionals and community-level media coverage acted as enablers.	- Second author rescreened 10% of the titles and abstracts to check reliability. Plus, final decision of the included studies was made by consensus amongst the review team. CASP tool was also used for quality assessment. - The dataset may have been biased; the authors may have selectively reported findings on perceived barriers/enablers that were more prevalent or had a better fit	There are common barriers to and enablers of retinopathy screening that can be targeted in to increase screening attendance.

					with the research question.	
Rasmussen et al. (2010)	We describe the uptake of diagnostic and presymptomatic genetic testing and to identify the factors influencing their adherence to a long-term follow-up program for hereditary cancer.	17 families in Mexico City (n=109), 43 children under the age of 18, who were tested for VHL mutations.	Prospective cohort study design. Mixed methods which included: interviews, questionnaires and statistical analysis.	At the end of five years, only 38.9% of the mutation carriers continued participating in our tumour surveillance program. Follow- up adherence was also independent of pre-test depression, severity of disease, or number of affected family members.	-Inclusion of children in the study. -Differential loss to follow up can produce bias.	Many patients did not receive the full benefit of early detection and treatment, which is key to the reduction of morbidity and mortality in VHL. Therefore studies geared towards improving adherence to protocols will be necessary to enhance treatment and quality of life in patients with hereditary cancer conditions.
Piette et al. (2010)	To evaluate two alternatives (the screening test equation and the POC-A1c) to the fasting plasma glucose (FPG) test	800 study participants over 18 years old, not pregnant, and had not had a heart attack in the three months preceding	Prospective cohort study. A Pearson's χ^2 test was used for categorical variables plus a Student's *t*-	The odds of not returning for confirmatory testing were higher for males and for patients with hypertension.	-Large number of participants sample.	Both the screening equation and POC-A1c are alternatives to an FPG test for determining patients with

	for diabetes screening.	participation in central Honduras.	test was used for continuous variables. ST A T A was used to fit maximum-likelihood receiver operating characteristic (ROC) curves by plotting the sensitivity of screening scores against the false-positive rate (1 – specificity). Questionnaire responses and clinical measurements were used to calculate patients' probability (*p*) of diabetes in accordance to Tabaei et al. (2005) logistic regression equation.	Patients may have been more likely to miss screening appointments due to work commitments and had less appreciation of the significance of managing asymptomatic conditions.	- A limitation of this study is possible selection bias from the initial stage of participant selection. Participants selection was not done at random. No children in the cohort.	diabetes. Due to the barriers to current recommended screening procedures, these options could have important public health benefits in Latin America.
Courtney et al. (2018)	To examine adherence behaviour among mutation carriers who have attended the Cancer	Patients who have attended the CGS at the at the National Cancer Centre Singapore	Prospective Longitudinal follow-up study. Cohort study deign.	The adherence rate was higher for males (100%, *n* = 8) compared with females (95.5%, *n* = 42),	- ability to collect data across all public health institutions through an integrated	Whilst overall adherence in the cohort was high, *BRCA1/2* mutation carriers

	Genetics Service (CGS).	(NCCS) for hereditary cancer conditions.		although their numbers were much smaller. Adherence was similar across the age groups, however, decreased with increasing age.	electronic medical record system. - limited by a small sample size and short- follow up period.	could require targeted interventions to enhance ovarian cancer risk management uptake.
Malhotra et al. (2017)	To examine the impact of patient–provider race and ethnicity and/or gender unity on receipt of preventive care	Patients in America undergoing cancer screening for breast, cervical, and colorectal cancer.	Retrospective cohort study Cross-sectional analysis of self-reported data. Quantitative study design.	Overall, patient's adherent to cancer screening were more likely to be non-Hispanic, better educated, married, wealthier, and privately insured.	- The large, nationally representative sample made it possible to examine combinations of race and ethnic concordance categories. The cross-sectional analysis of self-reported survey data inhibited from making any causal inferences. - Provider shortages in rural areas limited the ability of patients to choose a racially/ethnically concordant provider.	Gender concordance between patients and service providers was connected with a significantly higher rate of cancer screening engagement and therefore patients should have access to both male and female providers.

Moin et al. (2019)	To test the efficiency of a prediabetes Shared decision-making (SDM) intervention regrading uptake of the Diabetes prevention programme (DPP).	American population of overweight/obese adults with prediabetes. 1222 Participants met all initial eligibility criteria.	A Cluster randomised trial (CRT) with clinics as the unit of randomisation.	Uptake of DPP and/or metformin was higher among SDM participants (n = 351) than controls receiving usual care (n = 1028; 38% vs. 2%, p < .001). At 12-month follow-up, adjusted weight loss (lbs.) was greater among SDM participants than controls (− 5.3 vs. − 0.2, p < .001)	-Prediabetes was an ideal condition to apply SDM since predominance of this condition is high and awareness is low, and a variety of reasonable and effective options are available to patients. - Absence of DPP supplier participation data for matched patients in usual care clinics.	A prediabetes SDM intervention led by pharmacists increased patient engagement was connected with significantly greater uptake of DPP.
Dambha-Miller et al. (2018)	To explore the views of patient's factors that are of importance to them in patient–practitioner interactions in primary care after diagnosis, and over the last 10 years of living with the diagnosis.	Patients with type 2 diabetes In UK primary care.	A longitudinal qualitative analysis over 10 years. Data were analysed cross-sectionally.	Comments on preferences for face-to-face contact, more time with service providers, and relational continuity of care were more prevalent over time.	-The extended longitudinal follow-up from recent diagnosis to 10 years of living with the disease. which made the study relevant to primary care at 2016. - Not identifying individuals for triangulation of findings and incapability to perform member-checking. Response	Highlighted issues connected to the wider context of interactions between patients and service users in the healthcare system over the last 10 years since diagnosis. Contradictory, these same aspects of care

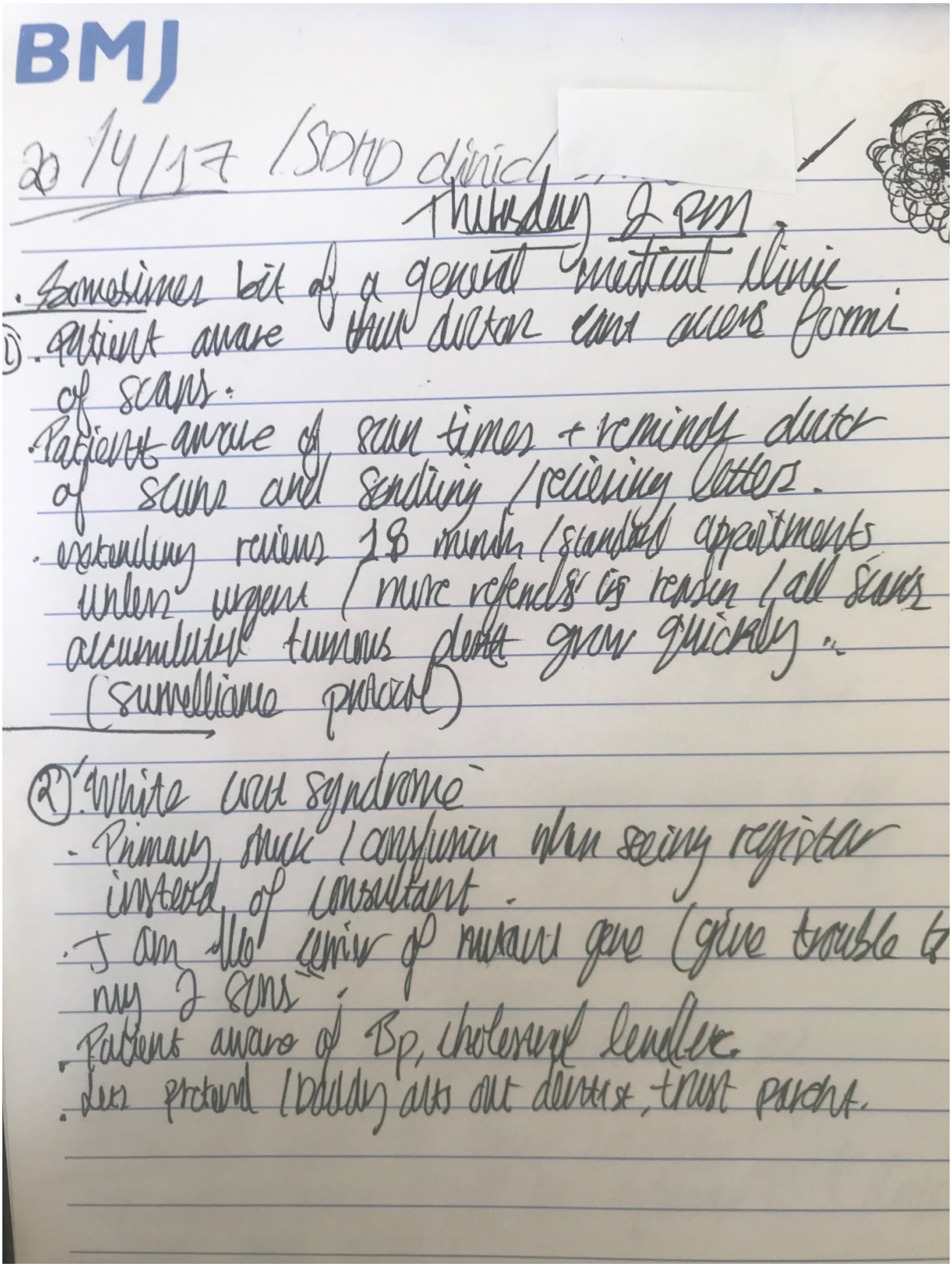
						rates were also low at both sampling points, and follow-up was a limitation given the duration of the study. The sample was mainly white males.	that are valued over time from diagnosis are also progressively unprotected in UK primary care.
The researcher's CASP ratings of the literature reviews								
Author(s)	1.Did the review address a clearly focused question?	2.Did the authors look for the right type of papers?	3.Do you think all the important, relevant studies were included?	4.Did the review's authors do enough to assess quality of the included studies?	5.If the results of the review have been combined, was it reasonable to do so?	8.Can the results be applied to the local population? (your population/setting)	9.Were all important outcomes considered?	10.Are the benefits worth the harms and costs?
Tufton et al. (2017)	Yes	Yes	Can't tell	No	Yes	Yes	Yes	Yes
Clement et al. (2018)	Yes	Yes	Can't tell	Yes	Yes	No	Can't tell	Yes
Sobrido et al. (2019)	Yes	Yes	Can't tell	No	Yes	No	Can't tell	Yes
Geurts et al. (2020)	Yes	Can't tell	Can't tell	Can't tell	Yes	Yes	Yes	Yes
Gopie et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Young et al. (2018)	Yes	Yes	Can't tell	Yes	Yes	No		Yes	Can't tell	
Kim et al. (2018)	Yes	Yes	Can't tell	Yes	Yes	No		Can't tell	Yes	
Stacey et al. (2017)	Yes	Yes	Yes	Yes	Yes	No		Yes	Can't tell	
Hofmann and Stanak (2018)	Yes	Yes	No	Yes	Yes	No		No	Can't tell	
Graham-Rowe et al. (2018)	Yes	Yes	Yes	Yes	Yes	No		Yes	Can't tell	
The researcher's CASP ratings of the qualitative studies										
Author(s)	1. Was there a clear statement of the aims of the research?	2. Is a qualitative methodology appropriate?	3. Was the research design appropriate to address the aims of the research?	4. Was the recruitment strategy appropriate to the aims of the research?	5. Was the data collected in a way that addressed the research issue?	6. Has the relationship between researcher and participants been adequately considered?	7. Have ethical issues been taken into consideration?	8. Was the data analysis sufficiently rigorous?	9. Is there a clear statement of findings?	10. Is the research valuable?
Miller et al. (2010)	Yes	Yes	Can't tell	Can't tell	Yes	No	Yes	Yes	Yes	Yes
Laidsaar-Powell et al. (2016)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Beard et al. (2016)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Godino et al. (2019)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Dambha-Miller et al. (2018)	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Yes	Yes	Yes
The researcher's CASP ratings of the randomised controlled trials (RCT)										
Author(s)	1.Did the study address a clearly focused research question?	2.Was the assignment of participants to interventions randomised?	3.Were all participants who entered the study accounted for at its conclusion?	4.Were the participants/ investigators 'blind' to intervention they were given/giving?	5. Were the study groups similar at the start of the randomised controlled trial?	6. Apart from the experimental intervention, did each study group receive the same level of care (that is, were they treated equally)?	7. Were the effects of intervention reported comprehensively?	8. Was the precision of the estimate of the intervention or treatment effect reported?	9. Do the benefits of the experimental intervention outweigh the harms and costs?	10. Can the results be applied to your local population/in your context? 11. Would the experimental intervention provide greater value to the people in your care than any of the existing interventions?
Simmons et al. (2012)	Yes	Yes	Yes	Yes	Can't tell	No	Yes	Yes	No	No Can't tell
Moin et al. (2019)	Yes	Yes	No	Yes	Can't tell	No	Yes	Yes	Yes	No Can't tell

The researcher's CASP ratings of the cohort studies										
Author(s)	1. Did the study address a clearly focused issue?	2. Was the cohort recruited in an acceptable way?	3. Was the exposure accurately measured to minimise bias?	4. Was the outcome accurately measured to minimise bias?	5.Have the authors identified/taken into account all important confounding errors?	6.Was the follow up complete enough?	7. Was the follow up long enough?	8.Do you believe the results?	9.Can the results be applied to the local population?	10.Do the results of this study fit with other available evidence?
Poulsen et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes
Binderup et al. (2017)	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes
Sheridan et al. (2019)	Yes	Yes	Can't tell	Can't tell	Can't tell	Yes	Yes	Yes	No	Can't tell
Rasmussen et al. (2010)	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Piette et al. (2010)	Yes	Can't tell	Can't tell	Can't tell	Yes	Can't tell	No	Yes	No	Can't tell
Courtney et al. (2018)	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Malhotra et al. (2017)	Yes	Can't tell	Can't tell	Can't tell	Yes	Can't tell	Yes	Can't tell	no	Can't tell
Almeling and Gadarian (2014)	Yes	Can't tell	Yes	Yes	Yes	Can't tell	Can' tell	Can't tell	No	Can't tell

Appendix 4.1 Preliminary clinical observations example



Appendix 5.1*:* Brunel University Research Ethics Committee approval

College of Health and Life Sciences Research Ethics Committee (DCS)
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom

www.brunel.ac.uk

19 January 2018

LETTER OF APPROVAL

Applicant: Miss Samia Elyoussfi

Project Title: Patient decision making.

Reference: 4459-NHS-Jan/2018- 10914-2

Dear Miss Samia Elyoussfi

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the studyYou may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor Christina Victor

Chair

College of Health and Life Sciences Research Ethics Committee (DCS)
Brunel University London

Appendix 5.2: London - Central Research Ethics Committee approval

Health Research Authority

London - Central Research Ethics Committee
3rd Floor, Barlow House
4 Minshull Street
Manchester
M1 3DZ

Telephone: 0207 1048 007

Please note: This is the favourable opinion of the REC only and does not allow you to start your study at NHS sites in England until you receive HRA Approval

14 June 2018

Miss Samia Elyoussfi
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH

Dear Miss Elyoussfi

Study title:	**Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.**
REC reference:	**18/LO/1046**
IRAS project ID:	**244880**

Thank you for your letter of 12 June 2018 responding to the Proportionate Review Sub-Committee's request for clarifications and changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact please contact hra.studyregistration@nhs.net outlining the reasons for your request.

Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Appendix 5.3: Health Research Authority (HRA) approval

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Miss Samia Elyoussfi
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH

Email: hra.approval@nhs.net
Research-permissions@wales.nhs.uk

22 June 2018

Dear Miss Elyoussfi

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.**
IRAS project ID:	**244880**
REC reference:	**18/LO/1046**
Sponsor	**Brunel University**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

How should I continue to work with participating NHS organisations in England and Wales?
You should now provide a copy of this letter to all participating NHS organisations in England and Wales, as well as any documentation that has been updated as a result of the assessment.

Following the arranging of capacity and capability, participating NHS organisations should **formally confirm** their capacity and capability to undertake the study. How this will be confirmed is detailed in the "*summary of assessment*" section towards the end of this letter.

You should provide, if you have not already done so, detailed instructions to each organisation as to how you will notify them that research activities may commence at site following their confirmation of capacity and capability (e.g. provision by you of a 'green light' email, formal notification following a site initiation visit, activities may commence immediately following confirmation by participating organisation, etc.).

It is important that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details of the research management function for each organisation can be accessed here.

Appendix 5.4: Missed appointment groupings for each of the VHL, MEN and SDH clinics from 2015 to 2017

VHL 3yr (2015-2016-2017)	attended	possible app.	no.missed	pct_appointments_MISSED	% appointments attended	Missed appointment category	AGE	Age range	Gender	m or f
1	3	3	0	0	100	0	52	4	M	1
2	5	5	0	0	100	0	52	4	M	1
3	1	1	0	0	100	0	47	4	M	1
7	4	4	0	0	100	0	37	3	F	2
8	4	4	0	0	100	0	32	3	M	1
10	1	1	0	0	100	0	67	5	M	1
12	2	2	0	0	100	0	47	4	M	1
15	1	1	0	0	100	0	10	1	M	1
16	1	1	0	0	100	0	70	5	M	1
17	1	1	0	0	100	0	21	2	F	2
18	1	1	0	0	100	0	10	1	M	1
19	2	2	0	0	100	0	33	3	M	1
20	1	2	1	50	50	0	17	2	F	2
23	1	1	0	0	100	0	37	3	F	2
29	2	2	0	0	100	0	25	3	F	2
30	4	4	0	0	100	0	49	4	F	2
35	1	1	0	0	100	0	13	1	M	1
36	2	2	0	0	100	0	20	2	M	1
37	3	3	0	0	100	0	28	3	M	1
38	4	4	0	0	100	0	68	5	M	1
39	3	3	0	0	100	0	34	3	F	2
41	2	2	0	0	100	0	43	3	M	1
44	3	3	0	0	100	0	54	4	M	1
45	4	4	0	0	100	0	19	2	M	1
46	1	1	0	0	100	0	16	2	M	1
47	1	1	0	0	100	0	27	3	F	2
49	1	1	0	0	100	0	32	3	F	2
52	1	1	0	0	100	0	44	3	M	1
4	4	5	1	20	80	1	44	3	F	2
5	1	2	1	50	50	1	41	3	M	1
11	2	3	1	33.33333333	66.66666667	1	24	2	M	1
13	0	1	1	100	0	1	51	4	F	2
14	3	4	1	25	75	1	15	2	M	1
21	4	5	1	20	80	1	16	2	M	1
22	1	2	1	50	50	1	62	4	M	1
26	1	2	1	50	50	1	11	1	M	1
27	1	2	1	50	50	1	8	1	M	1
31	1	2	1	50	50	1	32	3	F	2
32	4	5	1	20	80	1	28	3	F	2
34	2	3	1	33.33333333	66.66666667	1	16	2	M	1
42	2	3	1	33.33333333	66.66666667	1	16	2	M	1
43	2	3	1	33.33333333	66.66666667	1	39	3	F	2
48	3	4	1	25	75	1	25	3	M	1
50	0	2	2	100	0	1	20	2	F	2
6	4	6	2	33.33333333	66.66666667	2	38	3	M	1
9	3	5	2	40	60	2	23	2	F	2
24	3	5	2	40	60	2	24	2	F	2
25	1	3	2	66.66666667	33.33333333	2	15	2	M	1
28	2	4	2	50	50	2	46††	4	M	1
33	3	5	2	40	60	2	24	2	M	1
40	2	4	2	50	50	2	33	3	M	1
51	2	4	2	50	50	2	37	3	F	2

0=Never
1=Low
2=Meduim
3=High

0= under 1
1= 1-14
2= 15-24
3= 25-44
4=45-64
5= 65+

m=1
f=2

MEN (2015-2016-2017)	attended	possible app.	no. missed	pct_appointments_MISSED	% appointments attended	Missed appointment category	AGE	Age range	Gender	m or f
3	3	3	0	0	100	0	26	3	F	2
4	2	2	0	0	100	0	51	4	M	1
6	2	2	0	0	100	0	39	3	M	1
7	3	3	0	0	100	0	63	4	F	2
8	3	3	0	0	100	0	62	4	M	1
11	3	3	0	0	100	0	58	4	F	2
12	5	5	0	0	100	0	43	3	F	2
13	6	6	0	0	100	0	57	4	M	1
14	6	6	0	0	100	0	59	4	M	1
15	2	2	0	0	100	0	57	4	M	1
16	5	5	0	0	100	0	48	4	F	2
17	5	5	0	0	100	0	75	5	F	2
19	3	3	0	0	100	0	32	3	M	1
20	2	2	0	0	100	0	34	3	M	1
21	3	3	0	0	100	0	50	4	F	2
23	2	2	0	0	100	0	46	4	M	1
24	5	5	0	0	100	0	48	4	F	2
26	2	2	0	0	100	0	38	3	M	1
28	3	3	0	0	100	0	36	3	F	2
31	5	5	0	0	100	0	46	4	M	1
32	5	5	0	0	100	0	49	4	M	1
33	6	6	0	0	100	0	70	5	M	1
34	4	4	0	0	100	0	50	4	M	1
35	5	5	0	0	100	0	62	4	M	1
36	5	5	0	0	100	0	62	4	M	1
37	3	3	0	0	100	0	61	4	M	1
38	3	3	0	0	100	0	34	3	M	1
39	3	3	0	0	100	0	37	3	M	1
40	2	2	0	0	100	0	12	1	F	2
41	2	2	0	0	100	0	9	1	F	2
42	2	2	0	0	100	0	82	5	M	1
43	2	2	0	0	100	0	63	4	F	2
45	1	1	0	0	100	0	44	3	F	2
46	1	1	0	0	100	0	82	5	F	2
47	2	2	0	0	100	0	74	5	M	1
48	2	2	0	0	100	0	34	3	M	1
49	7	7	0	0	100	0			m	1
50	2	2	0	0	100	0			f	2
51	2	2	0	0	100	0			m	1
54	1	1	0	0	100	0			m	1
55	1	1	0	0	100	0			f	2
56	1	1	0	0	100	0			m	1
61	5	5	0	0	100	0			m	1
64	3	3	0	0	100	0			m	1
65	4	4	0	0	100	0			m	1
67	4	4	0	0	100	0			m	1
68	3	3	0	0	100	0			f	2
69	3	3	0	0	100	0			f	2
70	2	2	0	0	100	0			f	2
71	4	4	0	0	100	0			f	2
72	1	1	0	0	100	0			m	1
74	2	2	0	0	100	0			f	2
76	3	3	0	0	100	0			m	1
77	1	1	0	0	100	0			f	2
79	2	2	0	0	100	0			m	1
80	4	4	0	0	100	0			m	1
81	3	3	0	0	100	0			m	1
82	3	3	0	0	100	0			m	1
83	1	1	0	0	100	0			m	1
85	2	2	0	0	100	0			m	1
86	2	2	0	0	100	0			f	2
87	1	1	0	0	100	0			f	2
88	3	3	0	0	100	0			m	1
90	1	1	0	0	100	0			f	2
92	4	4	0	0	100	0			m	1
93	1	1	0	0	100	0			f	2
94	5	5	0	0	100	0			f	2
96	1	1	0	0	100	0			m	1
97	1	1	0	0	100	0			m	1
100	0	1	1	100	0	0			f	2
101	1	1	0	0	100	0			m	1
102	3	3	0	0	100	0			m	1
103	1	1	0	0	100	0			m	1
1	0	1	1	100	0	1	66	5	F	2
2	6	7	1	14.28571429	85.71428571	1	42	3	M	1
5	6	7	1	14.28571429	85.71428571	1	28	3	F	2
10	2	3	1	33.33333333	66.66666667	1	52	4	F	2
22	2	3	1	33.33333333	66.66666667	1	70	5	F	2
25	0	2	2	100	0	1	64	4	M	1
27	2	3	1	33.33333333	66.66666667	1	32	3	F	2
29	5	6	1	16.66666667	83.33333333	1	59	4	M	1
30	6	7	1	14.28571429	85.71428571	1	70	5	M	1
44	2	3	1	33.33333333	66.66666667	1	57	4	F	2
52	1	2	1	50	50	1			f	1
53	3	4	1	25	75	1			m	1
59	4	5	1	20	80	1			m	1
60	4	5	1	20	80	1			f	2
62	4	5	1	20	80	1			f	2
63	1	2	1	50	50	1			m	1
66	3	4	1	25	75	1			f	2
73	5	6	1	16.66666667	83.33333333	1			m	1
91	2	3	1	33.33333333	66.66666667	1			f	2
98	1	2	1	50	50	1			f	2
9	3	5	2	40	60	2	56	4	F	2
18	3	5	2	40	60	2	48	4	F	2
58	4	6	2	33.33333333	66.66666667	2			m	1
75	5	7	2	28.57142857	71.42857143	2			f	2
78	5	7	2	28.57142857	71.42857143	2			m	1
84	2	4	2	50	50	2			m	1
89	1	3	2	66.66666667	33.33333333	2			m	1
95	7	9	2	22.22222222	77.77777778	2			m	1
99	3	5	2	40	60	2			m	1
104	2	4	2	50	50	2			f	2
57	3	7	4	57.14285714	42.85714286	3			f	2

SDH 3yr (2015-2016-2017)	attended	possible app.	no.missed	pct_appointments_MISSED	% appointments attended	Missed appointment category	AGE	Age range	Gender	m or f
2	1	1	0	0	100	0	78	5	M	1
3	3	3	0	0	100	0	73	5	M	1
4	3	3	0	0	100	0	73	5	F	2
5	3	3	0	0	100	0	73	5	M	1
6	3	3	0	0	100	0	69	5	M	1
7	4	4	0	0	100	0	64	4	F	2
8	2	2	0	0	100	0	64	4	F	2
9	2	2	0	0	100	0	52	4	M	1
10	4	4	0	0	100	0	61	4	F	2
11	2	2	0	0	100	0	58	4	F	2
13	1	1	0	0	100	0	58	4	M	1
14	4	4	0	0	100	0	56	4	F	2
15	1	1	0	0	100	0	56	4	F	2
16	3	3	0	0	100	0	54	4	M	1
17	3	3	0	0	100	0	53	4	F	2
19	2	2	0	0	100	0	52	4	F	2
21	2	2	0	0	100	0	49	4	F	2
22	1	1	0	0	100	0	49	4	F	2
24	2	2	0	0	100	0	48	4	M	1
25	2	2	0	0	100	0	48	4	F	2
26	3	3	0	0	100	0	46	4	F	2
27	2	2	0	0	100	0	46	4	M	1
30	3	3	0	0	100	0	41	3	M	1
31	2	2	0	0	100	0	41	3	M	1
32	2	2	0	0	100	0	35	3	M	1
35	2	2	0	0	100	0	33	3	M	1
36	1	1	0	0	100	0	33	3	F	2
37	3	3	0	0	100	0	32	3	F	2
38	1	1	0	0	100	0	32	3	M	1
39	1	1	0	0	100	0	32	3	M	1
40	3	3	0	0	100	0	32	3	M	1
41	3	3	0	0	100	0	30	3	M	1
42	3	3	0	0	100	0	39	3	M	1
44	3	3	0	0	100	0	27	3	M	1
45	3	3	0	0	100	0	26	3	F	2
46	1	1	0	0	100	0	20	2	F	2
47	2	2	0	0	100	0	20	2	F	2
50	2	2	0	0	100	0	15	2	M	1
52	3	3	0	0	100	0	12	1	F	2
53	3	3	0	0	100	0	11	1	M	1
56	3	3	0	0	100	0	6	1	F	2
57	1	1	0	0	100	0	**27**	**3**	F	2
58	2	2	0	0	100	0	**28**	**3**	F	2
62	2	2	0	0	100	0	**30**	**3**	M	1
64	2	2	0	0	100	0	**33**	**3**	M	1
65	2	2	0	0	100	0	**33**	**3**	M	1
66	2	2	0	0	100	0	**38**	**3**	F	2
67	2	2	0	0	100	0	**41**	**3**	M	1
69	2	2	0	0	100	0	**50**	**4**	F	2
70	1	1	0	0	100	0	**51**	**4**	M	1
71	3	3	0	0	100	0	**55**	**4**	F	2
73	1	1	0	0	100	0	**57**	**4**	M	1
74	2	2	0	0	100	0	**83**	**5**	M	1
75	1	1	0	0	100	0	48	4	F	2
76	1	1	0	0	100	0	38	3	F	2
78	2	2	0	0	100	0	29	3	M	1
79	2	2	0	0	100	0	27	3	M	1
80	1	1	0	0	100	0	18	2	M	1
81	1	1	0	0	100	0	56	4	M	1
82	1	1	0	0	100	0	11	1	F	2
83	1	1	0	0	100	0	65	5	M	1
84	1	1	0	0	100	0	66	5	M	1
85	1	1	0	0	100	0	36	3	M	1
89	2	2	0	0	100	0	36	3	F	2
90	1	1	0	0	100	0	5	1	M	1
91	1	1	0	0	100	0	55	4	F	2
92	1	1	0	0	100	0	78	5	F	2
95	1	1	0	0	100	0	7	1	F	2
96	4	4	0	0	100	0	67	5	F	2
97	1	1	0	0	100	0	77	5	M	1
98	2	2	0	0	100	0	54	4	F	2
99	2	2	0	0	100	0	34	3	M	1
101	2	2	0	0	100	0	64	4	M	1
103	2	2	0	0	100	0	5	1	F	2
104	3	3	0	0	100	0	71	5	F	2
105	1	1	0	0	100	0	28	3	M	1
107	2	2	0	0	100	0	22	2	F	2
108	4	4	0	0	100	0	89	5	F	2
110	1	1	0	0	100	0	68	5	M	1
112	1	1	0	0	100	0	17	2	F	2
113	1	1	0	0	100	0	46	4	F	2
120	1	1	0	0	100	0	19	2	M	1
121	1	1	0	0	100	0	36	3	M	1
122	1	1	0	0	100	0	45	4	F	2
124	2	2	0	0	100	0	34	3	F	2
126	2	2	0	0	100	0	4	1	F	2
127	3	3	0	0	100	0	12	1	F	2
128	1	1	0	0	100	0	15	2	M	1
129	1	1	0	0	100	0	36	3	F	2
130	1	1	0	0	100	0	42	3	F	2
131	1	1	0	0	100	0	26	3	F	2
132	1	1	0	0	100	0	33	3	M	1
133	1	1	0	0	100	0	25	3	F	2
134	1	1	0	0	100	0	45	4	F	2
135	1	1	0	0	100	0	47	4	M	1
1	1	2	1	50	50	1	79	5	M	1
12	1	2	1	50	50	1	58	4	M	1
20	2	3	1	33.33333333	66.66666667	1	50	4	F	2
23	4	5	1	20	80	1	48	4	F	2
28	3	4	1	25	75	1	45	4	F	2
29	1	2	1	50	50	1	44	3	M	1
34	0	3	3	100	0	1	33	3	F	2
48	2	3	1	33.33333333	66.66666667	1	20	2	F	2
51	3	4	1	25	75	1	12	1	F	2
54	2	3	1	33.33333333	66.66666667	1	10	1	F	2
55	2	3	1	33.33333333	66.66666667	1	9	1	F	2
59	2	3	1	33.33333333	66.66666667	1	**28**	**3**	M	1
60	0	1	1	100	0	1	**28**	**3**	M	1
61	1	2	1	50	50	1	**29**	**3**	M	1
63	0	1	1	100	0	1	**31**	**3**	M	1
72	2	3	1	33.33333333	66.66666667	1	**57**	**4**	F	2
77	1	2	1	50	50	1	77	5	F	2
87	2	3	1	33.33333333	66.66666667	1	56	4	M	1
88	0	1	1	100	0	1	29	3	M	1
93	1	2	1	50	50	1	41	3	M	1
94	1	2	1	50	50	1	56	4	F	2
100	0	2	2	100	0	1	41	3	M	1
102	1	2	1	50	50	1	7	1	F	2
106	3	4	1	25	75	1	35	3	F	2
114	1	2	1	50	50	1	43	3	F	2
115	2	3	1	33.33333333	66.66666667	1	47	4	F	2
116	0	1	1	100	0	1	29	4	M	1
117	0	1	1	100	0	1	34	3	F	2
118	0	1	1	100	0	1	29	3	M	1
119	0	1	1	100	0	1	59	4	F	2
123	0	1	1	100	0	1	31	3	M	1
125	2	3	1	33.33333333	66.66666667	1	14	1	F	2
33	2	4	2	50	50	2	38	3	M	1
43	2	2	0	0	100	2	29	3	F	2
49	2	4	2	50	50	2	18	2	M	1
68	2	4	2	50	50	2	**45**	**4**	F	2
86	2	4	2	50	50	2	20	2	F	2
111	1	3	2	66.66666667	33.33333333	2	56	4	F	2
18	3	6	3	50	50	3	53	4	F	2
109	3	6	3	50	50	3	30	3	M	1

Appendix 5.5: Cleaned data table- Poisson regression data inputted

attended	possible_app	AGE (static)	Gender	Diagnosis
0	1	66	F	MEN
6	7	42	M	MEN
3	3	26	F	MEN
2	2	51	M	MEN
6	7	28	F	MEN
2	2	39	M	MEN
3	3	63	F	MEN
3	3	62	M	MEN
3	5	56	F	MEN
2	3	52	F	MEN
3	3	58	F	MEN
5	5	43	F	MEN
6	6	57	M	MEN
6	6	59	M	MEN
2	2	57	M	MEN
5	5	48	F	MEN
5	5	75	F	MEN
3	5	48	F	MEN
3	3	32	M	MEN
2	2	34	M	MEN
3	3	50	F	MEN
2	3	70	F	MEN
2	2	46	M	MEN
5	5	48	F	MEN
0	2	64	M	MEN
2	2	38	M	MEN
2	3	32	F	MEN
3	3	36	F	MEN
5	6	59	M	MEN
6	7	70	M	MEN
5	5	46	M	MEN
5	5	49	M	MEN
6	6	70	M	MEN
4	4	50	M	MEN
5	5	62	M	MEN
5	5	62	M	MEN
3	3	61	M	MEN

3	3	34	M	MEN
3	3	37	M	MEN
2	2	**12**	F	MEN
2	2	**9**	F	MEN
2	2	82	M	MEN
2	2	63	F	MEN
2	3	57	F	MEN
1	1	44	F	MEN
1	1	82	F	MEN
2	2	74	M	MEN
2	2	34	M	MEN
3	3	52	M	VHL
5	5	52	M	VHL
1	1	47	M	VHL
4	5	44	F	VHL
1	2	41	M	VHL
4	6	38	M	VHL
4	4	37	F	VHL
4	4	32	M	VHL
3	5	23	F	VHL
1	1	67	M	VHL
2	3	24	M	VHL
2	2	47	M	VHL
0	1	51	F	VHL
3	4	15	M	VHL
1	1	10	M	VHL
1	1	70	M	VHL
1	1	21	F	VHL
1	1	10	M	VHL
2	2	33	M	VHL
1	2	17	F	VHL
4	5	16	M	VHL
1	2	62	M	VHL
1	1	37	F	VHL
3	5	24	F	VHL
1	3	15	M	VHL
1	2	11	M	VHL
1	2	8	M	VHL
2	4	46	M	VHL
2	2	25	F	VHL
4	4	49	F	VHL
1	2	32	F	VHL

4	5	28	F	VHL
3	5	24	M	VHL
2	3	16	M	VHL
1	1	13	M	VHL
2	2	20	M	VHL
3	3	28	M	VHL
4	4	68	M	VHL
3	3	34	F	VHL
2	4	33	M	VHL
2	2	43	M	VHL
2	3	16	M	VHL
2	3	39	F	VHL
3	3	54	M	VHL
4	4	19	M	VHL
1	1	16	M	VHL
1	1	27	F	VHL
3	4	25	M	VHL
1	1	32	F	VHL
0	2	20	F	VHL
2	4	37	F	VHL
1	1	44	M	VHL
1	2	79	M	SDH
1	1	78	M	SDH
3	3	73	M	SDH
3	3	73	F	SDH
3	3	73	M	SDH
3	3	69	M	SDH
4	4	64	F	SDH
2	2	64	F	SDH
2	2	52	M	SDH
4	4	61	F	SDH
2	2	58	F	SDH
1	2	58	M	SDH
1	1	58	M	SDH
4	4	56	F	SDH
1	1	56	F	SDH
3	3	54	M	SDH
3	3	53	F	SDH
3	6	53	F	SDH
2	2	52	F	SDH
2	3	50	F	SDH
2	2	49	F	SDH

1	1	49	F	SDH
4	5	48	F	SDH
2	2	48	M	SDH
2	2	48	F	SDH
3	3	46	F	SDH
2	2	46	M	SDH
3	4	45	F	SDH
1	2	44	M	SDH
3	3	41	M	SDH
2	2	41	M	SDH
2	2	35	M	SDH
2	4	38	M	SDH
0	3	33	F	SDH
2	2	33	M	SDH
1	1	33	F	SDH
3	3	32	F	SDH
1	1	32	M	SDH
1	1	32	M	SDH
3	3	32	M	SDH
3	3	30	M	SDH
3	3	39	M	SDH
2	2	29	F	SDH
3	3	27	M	SDH
3	3	26	F	SDH
1	1	20	F	SDH
2	2	20	F	SDH
2	3	20	F	SDH
2	4	18	M	SDH
2	2	15	M	SDH
3	4	12	F	SDH
3	3	12	F	SDH
3	3	11	M	SDH
2	3	10	F	SDH
2	3	9	F	SDH
3	3	6	F	SDH
1	1	27	F	SDH
2	2	28	F	SDH
2	3	28	M	SDH
0	1	28	M	SDH
1	2	29	M	SDH
2	2	30	M	SDH
0	1	31	M	SDH

2	2	33	M	SDH
2	2	33	M	SDH
2	2	38	F	SDH
2	2	41	M	SDH
2	4	45	F	SDH
2	2	50	F	SDH
1	1	51	M	SDH
3	3	55	F	SDH
2	3	57	F	SDH
1	1	57	M	SDH
2	2	83	M	SDH
1	1	48	F	SDH
1	1	38	F	SDH
1	2	77	F	SDH
2	2	29	M	SDH
2	2	27	M	SDH
1	1	18	M	SDH
1	1	56	M	SDH
1	1	11	F	SDH
1	1	65	M	SDH
1	1	66	M	SDH
1	1	36	M	SDH
2	4	20	F	SDH
2	3	56	M	SDH
0	1	29	M	SDH
2	2	36	F	SDH
1	1	5	M	SDH
1	1	55	F	SDH
1	1	78	F	SDH
1	2	41	M	SDH
1	2	56	F	SDH
1	1	7	F	SDH
4	4	67	F	SDH
1	1	77	M	SDH
2	2	54	F	SDH
2	2	34	M	SDH
0	2	41	M	SDH
2	2	64	M	SDH
1	2	7	F	SDH
2	2	5	F	SDH
3	3	71	F	SDH
1	1	28	M	SDH

3	4	35	F	SDH
2	2	22	F	SDH
4	4	89	F	SDH
3	6	30	M	SDH
1	1	68	M	SDH
1	3	56	F	SDH
1	1	17	F	SDH
1	1	46	F	SDH
1	2	43	F	SDH
2	3	47	F	SDH
0	1	29	M	SDH
0	1	34	F	SDH
0	1	29	M	SDH
0	1	59	F	SDH
1	1	19	M	SDH
1	1	36	M	SDH
1	1	45	F	SDH
0	1	31	M	SDH
2	2	34	F	SDH
2	3	14	F	SDH
2	2	4	F	SDH
3	3	12	F	SDH
1	1	15	M	SDH
1	1	36	F	SDH
1	1	42	F	SDH
1	1	26	F	SDH
1	1	33	M	SDH
1	1	25	F	SDH
1	1	45	F	SDH
1	1	47	M	SDH

Appendix 5.6: Stata table- Poisson regression output

Attended[a]	**IRR**[b]	**Std. Err.**[c]	**z**[d]	**P>z**[d]	**[95% Conf. Interval]**[e]	
Age	1.001788	.0025995	0.69	0.491	.9967064	1.006896
Gender						
Female	1	(base)				
Male	1.036421	.0944328	0.39	0.695	.8669208	1.239061
Diagnosis						
MEN	1	(base)				
SDH	.9251593	.099267	-0.72	0.468	.7496956	1.14169
VHL	.8660462	.1160318	-1.07	0.283	.6660367	1.126118
_cons	.8144167	.1327152	-1.26	0.208	.5917485	1.120872
ln(possible ~p)[f]	1	(exposure)				

Appendix 6.1. COREQ checklist

Domain 1: Research team and reflexivity		Location
Personal Characteristics		
1. Interviewer/facilitator Which author/s conducted the interview or focus group?	SE	Methods
2. Credentials What were the researcher's credentials? E.g. PhD, MD	BSc MSc	-
3. Occupation What was their occupation at the time of the study?	Student researcher	Methods
4. Gender Was the researcher male or female?	Female	-
5. Experience and training What experience or training did the researcher have?	Safeguarding level 2	-
Relationship with participants?		
6. Relationship established Was a relationship established prior to study commencement?	Yes	-
7. Participant knowledge of the interviewer What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Interview participants were briefed on the purpose of the study and understood that it was a research project for Barts Charity. Ethical approval had been granted, Interview participants reviewed the participant information documentation prior to giving their written informed consent to be involved.	-
8. Interviewer characteristics What characteristics were reported about the interviewer/facilitator? e.g. Bias,	SE. Interviewer was known to	-

assumptions, reasons and interests in the research topic	the interview participants which was a potential source of bias. No other interviewer-related biases identified.	
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Constructivist theoretical approach	Methods
Participant selection		
10. Sampling How were participants selected? e.g. purposive, convenience, consecutive, snowball	Purposive	Methods
11. Method of approach How were participants approached? e.g. face-to-face, telephone, mail, email	Face-to-face	Methods
12. Sample size How many participants were in the study?	12	Results
13. Non-participation How many people refused to participate or dropped out? Reasons?	All the interview participants gave informed consent and completed the interview. There were no participants who subsequently refused to participate, withdrew consent or dropped out.	-
Setting		
14. Setting of data collection Where was the data collected? e.g. home, clinic, workplace	Data was Collected in the location most appropriate for the interview participant.	Method-

15. Presence of non-participants Was anyone else present besides the participants and researchers?	Yes, for three of the participants their parents were present.	Method
16. Description of sample What are the important characteristics of the sample? e.g. demographic data, date	Age range 10-66; 6 males, 6 females. Date was collected between 4th July 2018 to 8th September 2018.	Results
Data collection		
17. Interview guide Were questions, prompts, guides provided by the authors? Was it pilot tested?	Interviews were semi-structured using an interview topic guide which included prompts (Appendix 1).	Methods
18. Repeat interviews Were repeat interviews carried out? If yes, how many?	No	-
19. Audio/visual recording Did the research use audio or visual recording to collect the data?	The semi-structured interviews were audio recorded using a Dictaphone.	-
20. Field notes Were field notes made during and/or after the interview or focus group?	Filed notes were made after the interviews.	Appendix
21. Duration What was the duration of the interviews or focus group?	The semi-structured interview durations ranged from 04:58 to 32:18 (minutes: seconds)	Method
22. Data saturation Was data saturation discussed?	During development of themes with co-researchers	
23. Transcripts returned Were transcripts returned to participants for comment and/or correction?	No	

Domain 3: analysis and findings		
Data analysis		
24. Number of data coders How many data coders coded the data?	One	Method
25. Description of the coding tree Did authors provide a description of the coding tree?	Example of thematic tree development can be	
26. Derivation of themes Were themes identified in advance or derived from the data?	Themes were derived from the data.	
27. Software What software, if applicable, was used to manage the data?	NVivo 12	
28. Participant checking Did participants provide feedback on the findings?	No	
Reporting		
30. Data and findings consistent Was there consistency between the data presented and the findings?	Yes, specific comments were supported with direct quotes attributed to anonymised interview participant.	
31. Clarity of major themes Were major themes clearly presented in the findings?	Yes	
32. Clarity of minor themes Is there a description of diverse cases or discussion of minor themes?	Yes	

Appendix 6.2: Patient information sheets (PIS)- Adult/ Child/Parent

ADULT INTERVIEW PARTICIPANT INFORMATION SHEET

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

You are being invited to take part in a research study. There are two parts of the study; interviews and focus groups. You are being invited to be interviewed.
Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

Thank you for reading this information.

What is the purpose of this study?
The aim of this study is to improve our understanding of how patients with rare genetic endocrine disorders experience and use health services generally and, specifically, the service provided by the Bart's genetic endocrine syndrome screening programme. The new knowledge gained will be used to improve the screening service through developing a patient-led information booklet and online resource to enhance patient decision making around engagement in screening services.

Why have I been invited?
You have been invited because you are taking part in the Bart's genetic screening programme. We want to know what factors influence your decisions about participating in the screening services at Bart's and what you think is the best type of guidance needed to support patients. By understanding your experiences of the service we aim to improve it for all patients.

Do I have to take part?
It is up to you to decide whether or not to take part, and participation in this study is completely voluntary. If you do decide to take part you will be given this information sheet to keep together with a copy of the signed consent form. You are under no obligation to participate in this study, and you may withdraw at any time without it affecting your normal care in any way.

What will happen if I take part?
- You will be asked to complete a short form to provide details about yourself and then you will be interviewed once. Interviews will last for approximately 1 hour and 15 minutes including a rest break.
The information from this short form will be used to describe (anonymise) the essential characteristics of the respondents in the interviews and the focus groups participants. This information will allow us to compare the interviews and focus groups with the larger cohort in order to determine if they are representative of the clinic population or not.
- The interviews can be carried out at any place and time which is convenient for you; home visits can be arranged.
- Please note the interview will be audio recorded, transcribed and any real names or any identifying information will not be reported in the findings.
- We will need your contact details on the consent form for communication purposes and

so we can inform you of the results/outcomes of the study if you requested this.

What are the possible disadvantages and risks of taking part?
- A possible disadvantage is the slight burden of taking out extra time to participate in the study.
- In the unlikely case of distress to participants we can recommend you speak to your clinical team or the Barts' Psychological Services. Further support can also be provided by the following patient groups:
1) Patients with MEN and SDH disorders will be directed to the AMEND patient support group.
2) Patients with VHL will be directed to the VHL Alliance (VHLA) support group.

What are the possible benefits of taking part?
- There is no intended benefit to you personally from taking part in the study but we would be grateful if you could take some time to share your thoughts and opinions.
- The findings from the study may help us to develop a better service to meet the needs of those with rare genetic endocrine disorders.

What happens if there is a problem?
- If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for a legal action but you may have to pay for it.
- In case of complaints the Chairs of Brunel University and NHS REC's (Research Ethics Committees) should be contacted:
1) Brunel University London
Professor Christina Victor, Chair CREC
Email: christina.victor@brunel.ac.uk
2) NHS
Dr Mays Jawad, NHS Chair
Email: Research.submission@bartshealth.nhs.uk
- You can also get in touch with the PALS service based at Barts Health NHS trust by contacting: 0203 465 5919/ SBHpals@bartshealth.nhs.uk

Will my taking part in this study be kept confidential?
- All information which is collected during the course of the research will be kept strictly confidential and securely stored. Any information which leaves the hospital/university etc., will be anonymised so that no one will be able to identify you.
All the data will be kept securely in the Brunel research archive for 10 years post publication and then destroyed.
- Please note if there are any safeguarding issues, involving indications of harm or risk of harm to any person, this will be referred as appropriate and it would be necessary to breach confidentiality to do this.

What will happen to the results of the research study?
- Results of the study will be published in the form a PhD thesis, as well as an information booklet, website resources and possible journal and conference publications. Participants will not be identified in any report/publication.

- A summary of the interview transcription as well as the results of the study can be provided if requested.

Who is funding the research?
- Funding for the study is from the Barts Charity.

Data protection:
- Brunel University is the sponsor for this study based in the United Kingdom. We will be using information from you and your medical records in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Brunel University will keep identifiable information about you for 10 years after the study has finished.
Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information by contacting Chief Investigator.

Barts Health NHS will collect information from you and your medical records for this research study in accordance with our instructions.

Barts Health NHS will keep your name, NHS number and contact details confidential and will not pass this information to Brunel University. Barts Health NHS will use this information as needed, to contact you about the research study, and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Certain individuals from Brunel University and regulatory organisations may look at your medical and research records to check the accuracy of the research study. Brunel University will only receive information without any identifying information. The people who analyse the information will not be able to identify you and will not be able to find out your name, NHS number or contact details.

Barts Health NHS will keep identifiable information about you from this study for 10 years after the study has finished.

Who has reviewed the research?
- Both Brunel REC and NHS REC have approved the study.
- Brunel has adopted the Universities UK Concordat to support research integrity and is committed to upholding the Concordat in an effective and transparent manner.

Who can I contact to find out more about this study?
Chief investigator: Miss Samia Elyoussfi
Work phone: 07931997247
email: samia.elyoussfi@brunel.ac.uk

Academic supervisor: Professor Lorraine De Souza
email: lorraine.desouza@brunel.ac.uk

Thank you for considering taking part in this important study. We would very much appreciate it, if you were able to help us.

CHILDREN (age 6-12) INTERVIEW PARTICIPANT INFORMATION SHEET

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

Why are we doing this research? We want to know how you feel about attending the clinics at hospital. By doing this we can provide a better service to children and adults.

Why me? We are inviting you to take part because you go to the clinics at the hospital and we are interested in hearing what that's like for you.

Do I have to take part? You don't have to take part if you don't want to. Please read this sheet and talk to your mum, dad or carer before you decide. If you don't want to take part, just say no. You will still have the same care as usual at the hospital.

What will happen if I take part? We will ask you and your mum, dad or carer to write your name on a form to say you'd like to take part. We will spend some time chatting to you about what it's like for you to go to the clinic appointments at the hospital. Your Mum, Dad or carer can be with you when we are chatting with you.

How long will it take? Talking with the researcher will take about an hour. You can take breaks any time.

Will anyone know what I say in the interview? We won't use your real name in any results, so no one will know you were part of the research.

What if I don't want to do the research anymore? Just tell the researcher that you'd like to stop. Even if you've started the interview, you can still stop any time.

What happens to what the researchers find out? We will put the information in medical magazines that researchers, doctors and nurses read. We will also write a summary of your interview for you to read if you would like.

How can I find out more about the study? You can ask your parents, to ask the researcher, to answer your questions. Your mum, dad or carer may also answer your questions for you. **Thank you!**

Adolescents (age 13-15) INTERVIEW PARTICIPANT INFORMATION SHEET

Title of study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

Why are we doing this research? We want to describe and explain how you as a patient understand and use the service provided by the hospital. By doing this we can provide a better service to children and adults.

Why me? We are inviting you to take part because you go to the clinics at the hospital and we're interested in hearing what that's like for you.

Do I have to take part? No, you don't have to take part if you don't want to. You will still have the same care as usual at the hospital.

What will happen if I take part? We will ask you and your mum, dad or carer to write your name on a form to say you'd like to take part. We will spend some time chatting to you about what it's like for you to go to the clinic appointments at the hospital. Your Mum, Dad or carer can be with you when we are chatting with you. Your interview will be recorded and then analysed.

How long will it take? Talking with the researcher will take about an hour. You can take breaks any time.

Will anyone know what I say in the interview? We won't use your real name in any results, so no one will know you were part of the research.

Can I change my mind about taking part? Yes, you are free to change your mind about taking part at any time without giving a reason. Even if you have started the interview, you can still stop at any time.

What happens to what the researchers find out? We will put the information in journals that researchers and healthcare professionals read. We will also write a summary of your interview for you to read if you would like.

What if I want to complain about the study? Just tell your mum, dad or carer. They will be able to talk to people at PALS at the hospital who can help.

How can I find out more about the study? You can ask your parents, to ask the researcher, to answer any of your questions.

THANK YOU :)

INFORMATION SHEET FOR PARENTS/CARERS

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

Your child is being invited to take part in a research study; we are asking your permission to allow them to take part. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

Thank you for reading this information.

What is the purpose of this study?
The aim of this study is to improve our understanding of how patients with rare genetic endocrine disorders experience and use health services generally and, specifically, the service provided by the Bart's genetic endocrine syndrome screening programme. The new knowledge gained will be used to improve the screening service through developing a patient-led information booklet and online resource to enhance patient decision-making around engagement in screening services.

Why have my child been invited?
Your child has been invited because they are taking part in the Bart's genetic screening programme. We want to know about what factors influence their decisions about participating in the screening services at Bart's and what they think is the best type of guidance needed to support patients. By understanding your child's experiences of the service we aim to improve it for all child patients.

Does my child have to take part?
It is up to you and your child to decide whether or not to take part, and participation in this study is completely voluntary. If both of you decide to take part you will be given this information sheet to keep together with a copy of the signed assent and consent form. You are under no obligation to participate in this study, and you may withdraw your child at any time without it affecting his/her normal care in any way.

What will happen if my child takes part?
- You child will be asked to complete a short form to provide details about themselves and then they will be interviewed once.
The information from this short form will be used to describe (anonymise) the essential characteristics of the respondents in the interviews and the focus groups participants. This information will allow us to compare the interviews and focus groups with the larger cohort in order to determine if they are representative of the clinic population or not.
- Interviews will last for approximately 1 hour and 15 minutes including a rest break. You can be present at all times during the interview if you would like. The interviews can be carried out at any place and time which is convenient for you and your child; home visits can be arranged.

- Please note the interview will be audio recorded, transcribed and any information such as names will be anonymised.
- We will also need your contact details on the consent form for communication purposes so we can inform you of the results/outcomes of the study if you requested this.

What are the possible disadvantages and risks of taking part?
- A possible disadvantage is the slight burden of taking the time to participate in the study.
- In the unlikely case of distress to your child we can recommend you to speak to your clinical team or the Barts Psychological Services. Further support can also be provided by the following patient groups:
1) Patients with MEN and SDH disorders will be directed to the AMEND patient support group.
2) Patients with VHL will be directed to the VHL Alliance (VHLA) support group.

What are the possible benefits of taking part?
- There is no intended benefit to your child from taking part in the study but we would be grateful if they could take some time to share their thoughts and opinions.
- The findings from the study will help us to develop a better service to meet the needs of those with rare genetic endocrine disorders.

What happens if there is a problem?
- If your child is harmed by taking part in this research project, there are no special compensation arrangements. If they are harmed due to someone's negligence, then you may have grounds for a legal action but you may have to pay for it.
- In case of complaints the Chairs of Brunel University and NHS REC's (Research Ethics Committees) should be contacted:
1) Brunel University London-
Professor Christina Victor, Chair CREC
Email: christina.victor@brunel.ac.uk
2) NHS -
Dr Mays Jawad, NHS Chair
Email: Research.submission@bartshealth.nhs.uk
- You can also get in touch with the PALS service based at Barts Health NHS trust by contacting: 0203 465 5919/ SBHpals@bartshealth.nhs.uk

Will the fact that my child is taking part in this study be kept confidential?
- All information which is collected during the course of the research will be kept strictly confidential and securely stored. Any information which leaves the hospital/university etc., will be anonymised so that no one will be able to identify your child. All the data will be kept securely in the Brunel University London research archive for 10 years post publication and then destroyed.
- Please note if there are any safeguarding issues, involving indications of harm or risk of harm to any person, this will be referred as appropriate and it would be necessary to breach confidentiality to do this.

What will happen to the results of the research study?
- Results of the study will be published in the form a PhD thesis, as well as an information booklet, website and possible journal and conference publications. Participants will not be identified in any report/publication.
- A summary of the interview transcription as well as the results can be provided if requested.

Who is funding the research?
Funding for the study is from the Barts Charity.

Data protection:
- Brunel University is the sponsor for this study based in the United Kingdom. We will be using information from you and your medical records in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Brunel University will keep identifiable information about you for 10 years after the study has finished. Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information by contacting Chief Investigator.

Barts Health NHS will collect information from you and your medical records for this research study in accordance with our instructions.

Barts Health NHS will keep your name, NHS number and contact details confidential and will not pass this information to Brunel University. Barts Health NHS will use this information as needed, to contact you about the research study, and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Certain individuals from Brunel University and regulatory organisations may look at your medical and research records to check the accuracy of the research study. Brunel University will only receive information without any identifying information. The people who analyse the information will not be able to identify you and will not be able to find out your name, NHS number or contact details.

Barts Health NHS will keep identifiable information about you from this study for 10 years after the study has finished.

Who has reviewed the research?
- Both Brunel REC and NHS REC have approved the study.
- Brunel University London has adopted the Universities UK Concordat to support research integrity and is committed to upholding the Concordat in an effective and transparent manner.

Who can I contact to find out more about this study?
Chief investigator: Miss Samia Elyoussfi
Work phone: 07931997247
email: samia.elyoussfi@brunel.ac.uk

Academic supervisor: Professor Lorraine De Souza
email: lorraine.desouza@brunel.ac.uk

Thank you for considering taking part in this important study. We would very much appreciate it if you were able to help us.

Appendix 6.3. Consent/assent forms

CONSENT FORM FOR ADULT INTERVIEW PARTICIPANTS

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

Patient name: _____

Address: _____

Contact details: _____

Request copy of findings (please circle): **Yes / No**

Please initial box to indicate agreement

1.	I confirm that I have read and understood the latest version of the information sheet (version number …, date of version……) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.	
3.	I understand that I will be asked for information such as my age, diagnosis and attendance at Barts Health NHS Trust.	
4.	I understand that the interview will be recorded, analysed and will stored in the Brunel University research archive for 10 years and then destroyed.	
5.	I understand that if I have any complaints I can get in touch with the PALS service based at Barts Health NHS Trust by contacting: 0203 465 5919 SBHpals@bartshealth.nhs.uk	
6.	I agree to take part in the above study.	

_____	_____	_____
Name of Patient	Date	Signature
_____	_____	_____
Name of Person taking consent (if different from Chief Investigator)	Date	Signature
_____	_____	_____
Chief Investigator	Date	Signature

1 for patient; 1 for Chief Investigator

Chief Investigator: Miss Samia Elyoussfi/ samia.elyoussfi@brunel.ac.uk
Academic supervisor: Professor Lorraine De Souza/ lorraine.desouza@brunel.ac.uk

Patient Name: _____
Address: _____
_____
Contact details: _____

PATIENT age 6-12 years assent form

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

We would like you to think about taking part in this study. We would like you to allow us to talk to you about your clinic appointment experiences at the hospital.

Please tick one of the boxes below.

I want to take part in this study ☐

I don't want to take part in this study ☐

_____	_____	_____
Your name	Date	Signature
_____	_____	_____
Name of Person taking assent	Date	Signature

1 for patient; 1 for Chief Investigator

Chief Investigator: Miss Samia Elyoussfi/ samia.elyoussfi@brunel.ac.uk
Academic supervisor: Professor Lorraine De Souza/ lorraine.desouza@brunel.ac.uk

Patient Name: _____
Address: _____
_____
Contact details: _____

PATIENT age 13-15 years assent form

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

We would like you to think about if you want to take part in this study by allowing us to talk to you about your clinic appointment experiences at the hospital.

Please tick one of the boxes below.

I want to take part in this study	☐
I don't want to take part in this study	☐

_____	_____	_____
Your name	Date	Signature
_____	_____	_____
Name of person taking assent	Date	Signature

1 for patient; 1 for Chief Investigator

CONSENT FORM FOR PARENTS or CARERS of child patient

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

Child patient name:

Parent/carer:

Parent/carer address (if different from above):

Parent/carer tel no. (if different from above):

Request copy of findings (please circle): Yes / No

Please initial box to indicate agreement

1.	I confirm that I have read and understood the latest version of the patient information sheet (version number …, date of version……) for the above study regarding my child. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2.	I understand that my child's participation is voluntary and that we are free to withdraw at any time, without giving any reason, without his/her medical care or legal rights being affected.	
3.	I understand that I will be asked for information such as my child's age, diagnosis and attendance at Barts Health NHS Trust.	
4.	I understand that the interview will be recorded, analysed and will stored in the Brunel University research archive for 10 years and then destroyed.	
5.	I understand that if I have any complaints I can get in touch with the PALS service based at Barts Health NHS Trust by contacting: 0203 465 5919 SBHpals@bartshealth.nhs.uk	
6.	I agree for my child to take part in the above study.	

Name of Patient	Date	Signature
Name of Parent/carer	Date	Signature
Name of Person taking consent (if different from Chief Investigator)	Date	Signature
Chief Investigator	Date	Signature

1 for patient; 1 for Chief Investigator

Appendix 6.4. Interview topic guide

31-1-18 / Version 1/ IRAS Project ID: 244880

Patient interviews topic guide

Note on use of this topic guide:

- We wish to encourage patients to discuss their experiences and views in an open way without excluding issues that may be of importance to individual participants and the study as a whole. Therefore, the questioning will be semi-structured and will be responsive to the respondents' own circumstances, attitudes and experiences.
- The following guide does not contain pre-set questions but rather lists the key themes and sub-themes to be explored with each participant. This allows the interviewer to develop questions which are responsive to each individual participant. The topic guide does not include follow-up questions like 'why', 'how', 'when' etc. as it is assumed that participants' contributions will be sufficiently explored throughout in order to understand why and how views, experiences and behaviours.
- Even though all topics will be explored with each participant, the order in which issues are addressed, as well as the amount of time spent on different themes will differ between participants.

Introduction

- Introduce self and thank the individual for agreeing to participate.
- Introduce research (funding, research design, outputs).
- Explain: confidentiality, tape recording, length of interview, nature of discussion (specific topics will addressed, but conversational in style, in your own words, no right or wrong answers), reporting and data storage/archiving. If you don't want to discuss something I mention then just say so and we won't talk about that. If you want to stop at any time just let me know and we will stop.
- Any questions.
- Obtain consent (written).

1) Background-

Aim: to gather background contextual information which may have a bearing on experiences and can be followed up and explored during interview.

- Personal circumstances (what and how long been diagnosed with, any additional family members with same diagnosis).
- How long been involved with the screening programme and service providers.

2) Recent experience as a patient at the Barts Endocrine Screening programme-

Aim: to capture spontaneous reflections on the most recent experience and which aspects were important to participant

- Overall impression of the clinic and hospital.
- Experience (positive and negative aspects of experience).
- Satisfaction (how satisfied overall with care and treatment received).

3) Awareness of clinic services-

Aim: to discover how patients understand the screening service.

- What do they think is available.
- When/or at what stage.

1

4) Engaging with the screening programme-

Aim: in what manner do patients make decisions about using the service.

- Decision making processes (any prior research carried out?, alone?).
- What were the choices?
- How were judgements arrived at?
- What were their expectations of service provision (Prefer to meet the same health professional/ 'one stop shop', or not).

5) Utilising the service-

Aim: how do patients go about using the screening programme.

- Actions (What do you do when you come to Barts for a clinic appointment?, what happens?, any routine actions?).
- Behaviours of the patient (e.g. any planning, organising, flexibility: pre, during and post appointment).

6) Overall experiences as a patient using the service-

Aim: understanding patients with a certain endocrine disorder lived experiences.

- What impact (if any) of having the condition does it have? (any emotional difficulties, any effect on daily/ personal/ family life).
- Was it worthwhile? (feel like it adds positive/negative/nothing to life experience).
- The positive and negative dimensions to their experience (interaction with staff/ barriers/ facilitators).
- Reflection (sense of anchorage and safety or uncertainty/ affect outlook on future).

7) Suggestions for improvements-

Aim: to obtain patients' suggestions for what would improve the Barts' Endocrine Screening Programme and close interview on a positive note.

- How do you think we can improve patient experiences within these services?
- What matters most to you as a patient?
- Looking back now is there anything specifically that would have made your experience easier/better?
- Anything else you would like to add.
- Any questions you would like to ask me?

End interview and thank participant.

Ensure participant is not distressed/uncomfortable.

Appendix 6.5. Demographic data form

Demographic Patient reported Data Form

Study number : _____

Name: _____

Age (in years and months): _____

Gender: _____

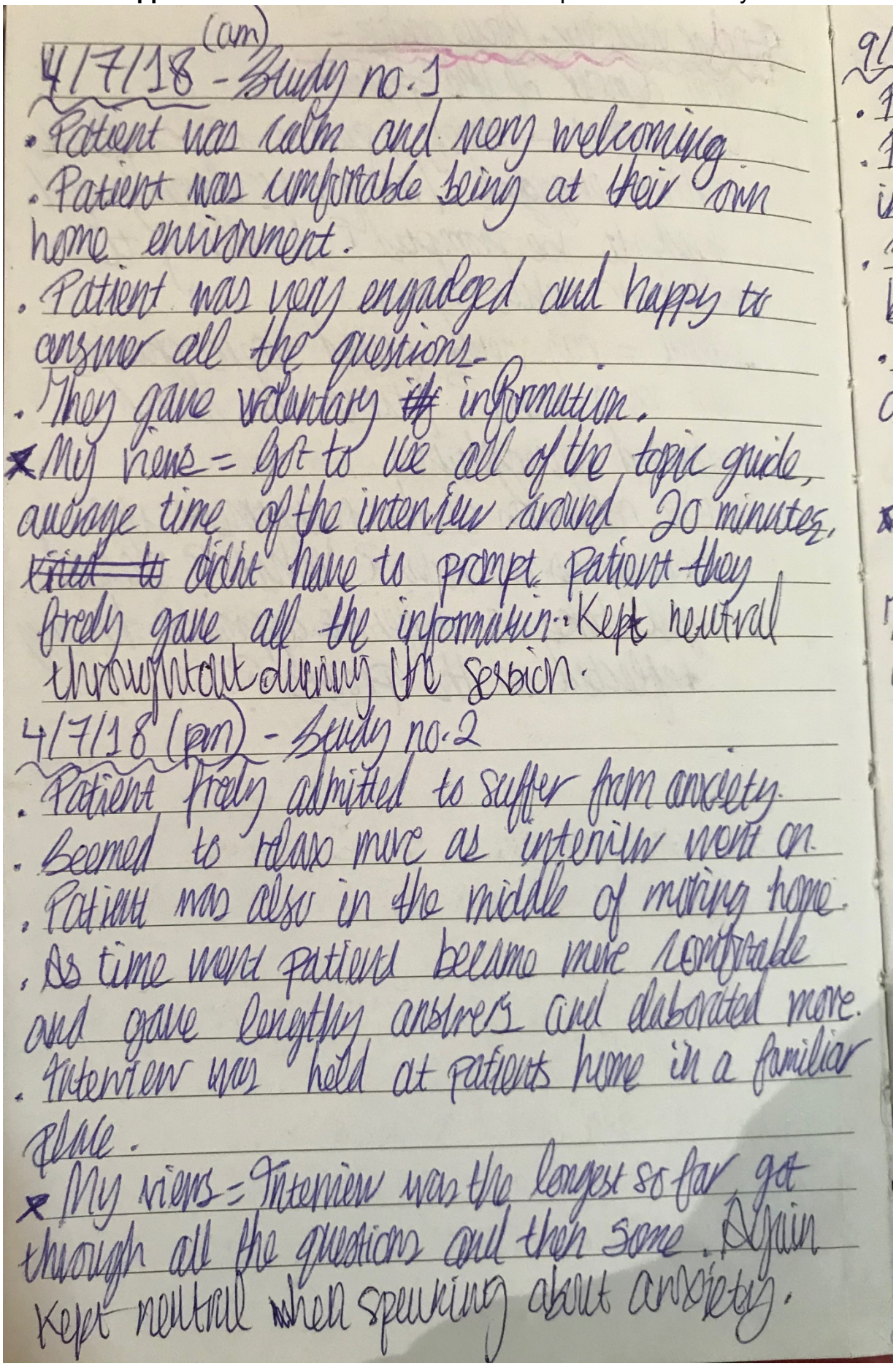
Diagnosis (please circle): VHL / MEN / SDH

Date of referral to the endocrine service (in years and months): _____

Length of time using services (in years and months): _____

Date form completed: _____

Appendix 6.6. Interviews field notes example/Reflexive diary



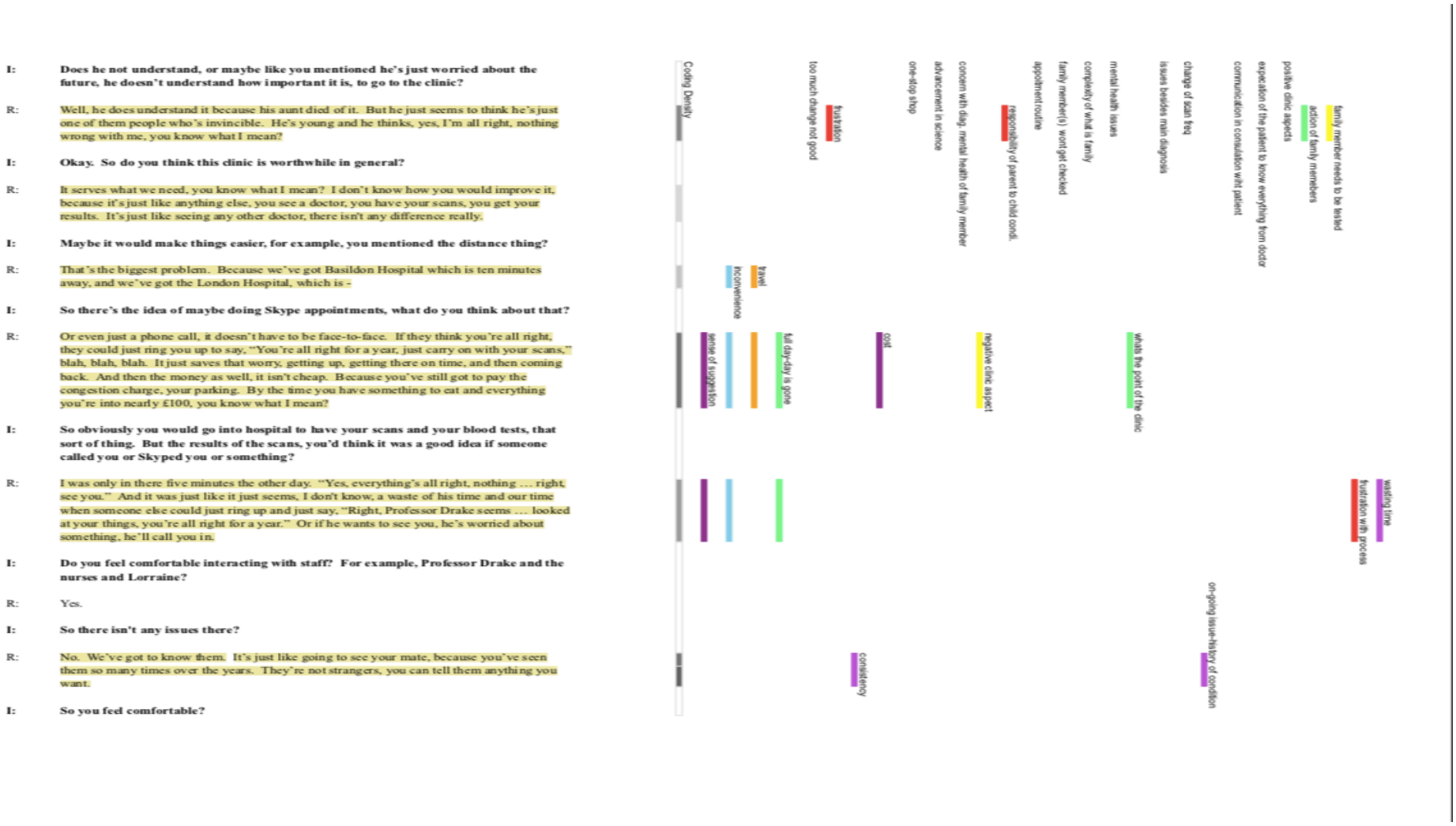
4/7/18 (am) - Study no. 1

- Patient was calm and very welcoming
- Patient was comfortable being at their own home environment.
- Patient was very engaged and happy to answer all the questions.
- They gave voluntary ~~##~~ information.
- My views = got to use all of the topic guide, average time of the interview around 20 minutes, ~~didn't~~ didn't have to prompt patient they freely gave all the information. Kept neutral throughout during the session.

4/7/18 (pm) - Study no. 2

- Patient freely admitted to suffer from anxiety.
- Seemed to relax more as interview went on.
- Patient was also in the middle of moving home.
- As time went patient became more comfortable and gave lengthy answers and elaborated more.
- Interview was held at patients home in a familiar place.
- My views = Interview was the longest so far, got through all the questions and then some. Again kept neutral when speaking about anxiety.

Appendix 6.7. Highlighted interview transcript text with corresponding codes on the right using NVivo



I: **Does he not understand, or maybe like you mentioned he's just worried about the future, he doesn't understand how important it is, to go to the clinic?**

R: Well, he does understand it because his aunt died of it. But he just seems to think he's just one of them people who's invincible. He's young and he thinks, yes, I'm all right, nothing wrong with me, you know what I mean?

I: **Okay. So do you think this clinic is worthwhile in general?**

R: It serves what we need, you know what I mean? I don't know how you would improve it, because it's just like anything else, you see a doctor, you have your scans, you get your results. It's just like seeing any other doctor, there isn't any difference really.

I: **Maybe it would make things easier, for example, you mentioned the distance thing?**

R: That's the biggest problem. Because we've got Basildon Hospital which is ten minutes away, and we've got the London Hospital, which is -

I: **So there's the idea of maybe doing Skype appointments, what do you think about that?**

R: Or even just a phone call, it doesn't have to be face-to-face. If they think you're all right, they could just ring you up to say, "You're all right for a year, just carry on with your scans," blah, blah, blah. It just saves that worry, getting up, getting there on time, and then coming back. And then the money as well, it isn't cheap. Because you've still got to pay the congestion charge, your parking. By the time you have something to eat and everything you're into nearly £100, you know what I mean?

I: **So obviously you would go into hospital to have your scans and your blood tests, that sort of thing. But the results of the scans, you'd think it was a good idea if someone called you or Skyped you or something?**

R: I was only in there five minutes the other day. "Yes, everything's all right, nothing … right, see you." And it was just like it just seems, I don't know, a waste of his time and our time when someone else could just ring up and just say, "Right, Professor Drake seems … looked at your things, you're all right for a year." Or if he wants to see you, he's worried about something, he'll call you in.

I: **Do you feel comfortable interacting with staff? For example, Professor Drake and the nurses and Lorraine?**

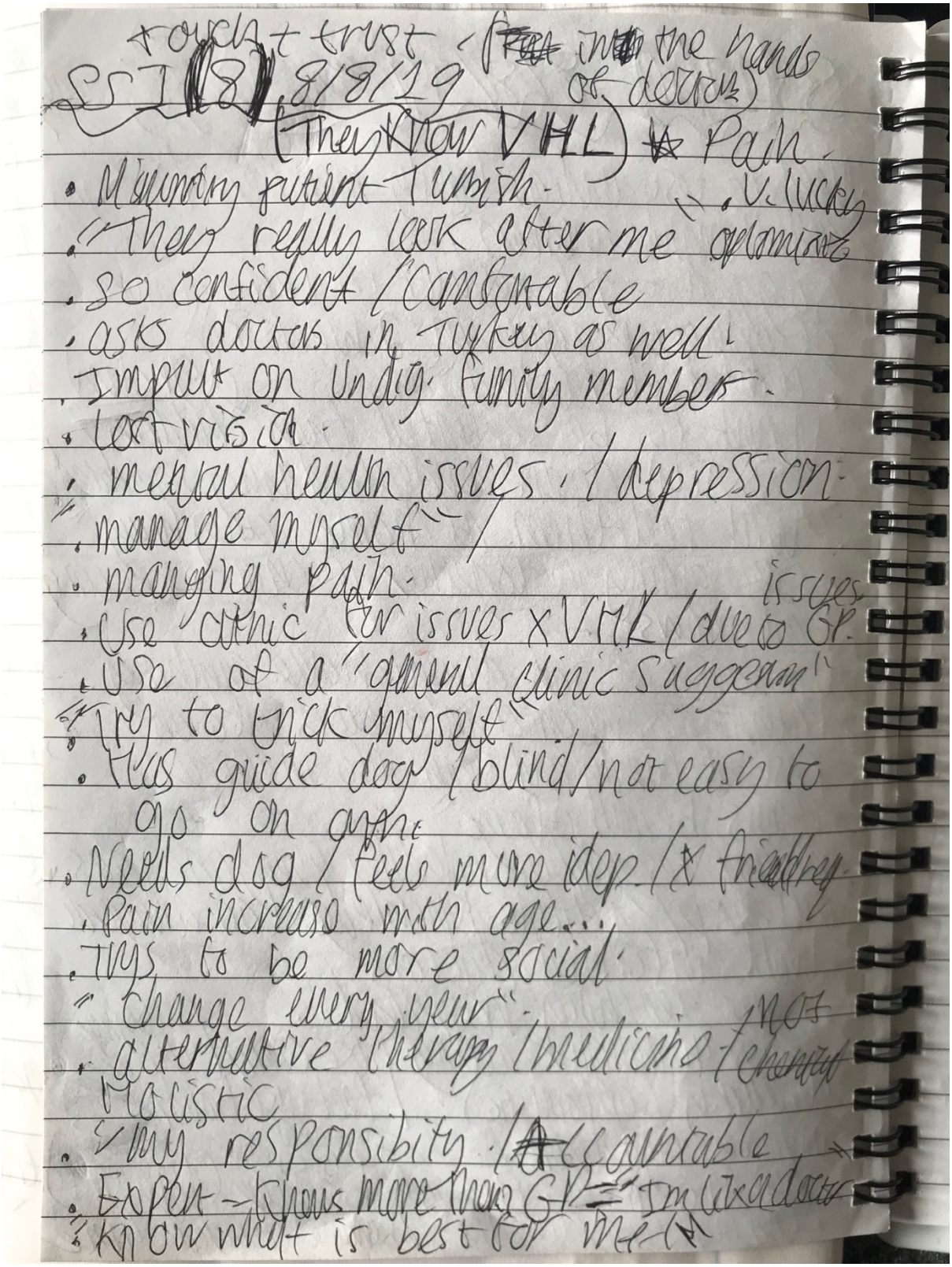
R: Yes.

I: **So there isn't any issues there?**

R: No. We've got to know them. It's just like going to see your mate, because you've seen them so many times over the years. They're not strangers, you can tell them anything you want.

I: **So you feel comfortable?**

Appendix 6.8. Interviews- Memo coding example


touch + trust - [redacted] in the hands of doctors
SS1 [redacted] 8/8/19
(They know VHL) ★ Pain.
• Mourning patient Turkish. • V. lucky
• "They really look after me" optimism
• so confident / comfortable
• asks doctors in Turkey as well.
• Input on Undiag. family members.
• lost vision.
• mental health issues. / depression.
• manage myself /
• managing pain.
• Use clinic for issues x VHL / due to GP. issues
• Use of a "general clinic surgeon"
• try to trick myself
• Has guide dog / blind / not easy to go on own.
• Needs dog / feels more dep. / & frailty.
• Pain increase with age...
• Tries to be more social.
• "change every year" not
• alternative therapy / medicine / therapy
Holistic
• "my responsibility / [redacted] counsable
• Expert - knows more than GP = I'm like a doctor
• know what is best for me (A

Appendix 6.9. Recorded thoughts/process about possible codes/themes/ Table displaying of coding to possible themes (interviews)

Codes (step 1)	**Issues Discussed**	**Sub-theme(s)**	**Themes identified (Step 2)**
-Uncertainty -MOT -Tumour surveillance/being 'studied' -Wasting time -What's the point of the clinic… -On-going history of condition -Imposter syndrome/ feels lucky -Used to it/ familiarity/ consistency/banter -Before Barts/ pre-referral. -Comparison to other trusts. -General clinic -Issues besides main	• Disease free currently, but possibility of developing in future. • Used to it, going for many years. • Analogy to car MOT/ full body check up • Feels like a 'fraud', no symptoms. • Not strangers, "they know us, know them" • Before being at Barts clinic. • "I always feel a bit safe at Barts." • Use clinic for more than usual appointment.	*"There's history there, going back years": A sense of familiarity.*	**Theme 1:** *"Out of sight out of mind": Perception is everything*

diagnosis -positive clinic aspects. -Slight issue -negative clinic aspect - avoidance -pre-appointment anxiety -Changing every year -Advancement in science -Advancement of medical tests	"Tummy issues/ bullying" • Majority positive, ***expect SSI (4) issued a formal complaint • Eg. Apart from MRI • Toilets, MRI, parking. • "Dredd"/ get "flutter" / "out of sight.." • "It has got simpler" • "Keeps changing, it's all changing" • "their research shows…" • "used to drive me nuts"		
-Avoidance of info. -Hyper-vigilance - rely on others for info. -prior research -don't want to know too much -patient support groups -clinic nurse specialist -child nurse specialist -child reliance on patient -family support - stage of life	• "Don't want to know too much" • "end up frightening myself to death" • "Oh God, I am you"/ I'm sick as well" • "Lovely"/"useless"/ "get Lorraine on it'… • Familiar face • Has child, feels responsible to get tested. • As I get older I get more anxious about it"	*Avoiding versus seeking: patient engagement behaviour.* *"I have knowledge through experience rather than research":* *Experience trumps knowledge.* *"Makes me depressed": barriers to patient engagement.*	**Theme 2:** *Love/ hate relationship: The critical role of the specialist nurse.*

-arrange child care -family appointments. -families seen together/ same time - family member won't get checked -fighting for change -frustration with process -importance of families together -want to be seen separately -when child is older - If I need to know I can ask…	• "Lucy got a bee in her bonnet" • "She's one of them" • Want to be seen together, always separated. • Can speak to family at home after. • At 18 wants to stop		*The complexity of what is family: what is a family clinic?*
- doctor-patient communication - communication in consultation with patient -assurance -awkward consultation -bedside manner -withheld	• Banter= more relaxed • "They give me reassurance" • "They know what on about"/ Professor. • Uncomfortable silences.		*"You get a bit of banter going on": the evolution of the doctor-patient relationship.*

information -consistency/ appreciated -doctor retired - distrust in doctors -giving patient time to speak -need to trust doctor -not giving full picture -Overwhelmed by info.	• Feel like not giving full information. “a load of lies”/ trust issues.		
-pre-amative action- day off work/blood test -explaining to others outside clinic. - Expert patient -Expectation of the patient to know everything. -hospital error -local hospital. -mixed feelings (about scan frequency change) - Time (travel) -Cost (travel)	• “a lot of emphasis on patient knowing already so much/ taking an exam not revised. • Explain to GP (s) • Thought she was an alcoholic/ won’t listen. • Full day off. • Aware of cheap tickets and faster routes & parking.		*“I’m like a doctor now” (the expert patient)”: The patient or doctor, who knows best?*
(Miscellaneous / unique aspects) - Loss of compete vision/ guide dog Relies on others (Turkish			

doctors) friends for assistance to Appointment. - voice loss -Age “cant handle it anymore” -Depression (trivial)			

Appendix 6.10. Lone worker policy

Box 1 Lone worker policy
Identify a 'responsible person'
Give the responsible person access to the worker's details, including:
•mobile telephone number
•home telephone number
•names, addresses and telephone numbers of patients to be visited
•approximate times of visits
•agreed time for worker to make contact after last visit
If a worker fails to make contact:
1 Telephone the mobile phone
2 If no answer, telephone the home number
3 If not there, allow the agreed period to elapse after the expected contact time then inform the police of a suspicious incident

Appendix 7.1. Focus group Patient information sheet (PIS)

ADULT FOCUS GROUPS PARTICIPANT INFORMATION SHEET

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

You are being invited to take part in a research study. There are two parts of the study; interviews and focus groups. You are being invited to be part of a focus group. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.
Thank you for reading this information.

What is the purpose of this study?
The aim of this study is to improve our understanding of how patients with rare genetic endocrine disorders experience and use health services generally and, specifically, the service provided by the Bart's genetic endocrine syndrome screening programme. The new knowledge gained will be used to improve the screening service through developing a patient-led information booklet and online resource to enhance patient decision-making around engagement in screening services.

Why have I been invited?
You have been invited because you are taking part in the Bart's genetic screening programme. We want to know what factors influence your decisions about participating in the screening services at Bart's and what you think is the best type of guidance needed to support patients. By understanding your experiences of the service we aim to improve it for all patients.

Do I have to take part?
It is up to you to decide whether or not to take part, and participation in this study is completely voluntary. If you do decide to take part you will be given this information sheet to keep together with a copy of the signed consent form. You are under no obligation to participate in this study, and you may withdraw at any time without it affecting your normal care in any way.

What will happen if I take part?
- You will be asked to complete a short form to provide details about yourself. The information from this short form will be used to describe (anonymise) the essential characteristics of the respondents in the interviews and the focus groups participants. This information will allow us to compare the interviews and focus groups with the larger cohort in order to determine if they are representative of the clinic population or not.
- You will then be asked to participate in one focus group which will last for approximately 1 hour and 30 minutes, including a rest break.
- There will be about 4 participants in the focus group including you.
- Participants will help to develop patient information resources, such as a patient information booklet or an online resource, through the focus group discussions.

- The focus groups will be carried out at a place and time which is convenient for all the participants.
- Reasonable travel costs can be reimbursed in the form of local shop vouchers to thank you for your time and to support travel costs. Please keep any travel or car parking tickets. The cost of fuel will be reimbursed at the current government mileage rate. Mileage claim fuel rates to be used can be found at: https://www.gov.uk/government/publications/advisory-fuel-rates
- Please note the focus group session will be audio recorded, transcribed and any personal information such as names will be anonymised.
- We will also need your contact details on the consent form for communication purposes and so we can inform you of the results/outcomes of the study if you requested this.

What are the possible disadvantages and risks of taking part?
- A possible disadvantage is the slight burden of taking out extra time to participate in the study.
- In the unlikely case of distress to participants we can recommend you speak to your clinical or Barts Psychological Services. Further support can also be provided by the following patient groups:
1) Patients with MEN and SDH disorders will be directed to the AMEND patient support group.
2) Patients with VHL will be directed to the VHL Alliance (VHLA) support group.

What are the possible benefits of taking part?
- There is no intended benefit to you personally from taking part in the study but we would be grateful if you could take some time to share your thoughts and opinions.
- The findings from the study will help us to develop a better service to meet the needs of those with rare genetic endocrine disorders.

What happens if there is a problem?
- If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for a legal action but you may have to pay for it.
- In case of complaints the Chairs of Brunel University and NHS REC's (Research Ethics Committees) should be contacted:
1) Brunel University London
Professor Christina Victor, Chair CREC
Email: christina.victor@brunel.ac.uk
2) NHS
Dr Mays Jawad, NHS Chair
Email: Research.submission@bartshealth.nhs.uk
- You can also get in touch with the PALS service based at Barts Health NHS Trust by contacting: 0203 465 5919/ SBHpals@bartshealth.nhs.uk

Will my taking part in this study be kept confidential?
- All information which is collected during the course of the research will be kept strictly confidential and securely stored. Any information which leaves the hospital/university etc., will be anonymised so that no one will be able to identify you.

All the data will be kept securely in the Brunel research archive for 10 years post publication and then destroyed.
- Please note if there are any safeguarding issues, involving indications of harm or risk of harm to any person, this will be referred as appropriate and it would be necessary to breach confidentiality to do this.

What will happen to the results of the research study?
- Results of the study will be published in the form a PhD thesis, as well as an information booklet, website and possible journal and conference publications. Participants will not be identified in any report/publication.
- A summary of the focus group transcription as well as the results can be provided if requested.

Who is funding the research?
Funding for the study is from the Barts Charity.

Data protection:
- Brunel University is the sponsor for this study based in the United Kingdom. We will be using information from you and your medical records in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Brunel University will keep identifiable information about you for 10 years after the study has finished. Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information by contacting Chief Investigator.

Barts Health NHS will collect information from you and your medical records for this research study in accordance with our instructions.

Barts Health NHS will keep your name, NHS number and contact details confidential and will not pass this information to Brunel University. Barts Health NHS will use this information as needed, to contact you about the research study, and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Certain individuals from Brunel University and regulatory organisations may look at your medical and research records to check the accuracy of the research study. Brunel University will only receive information without any identifying information. The people who analyse the information will not be able to identify you and will not be able to find out your name, NHS number or contact details.

Barts Health NHS will keep identifiable information about you from this study for 10 years after the study has finished.

Who has reviewed the research?
- Both Brunel REC and the NHS REC have approved the study.

- Brunel has adopted the Universities UK Concordat to support research integrity and is committed to upholding the Concordat in an effective and transparent manner.

Who can I contact to find out more about this study?
Chief investigator: Miss Samia Elyoussfi
Work phone: 07931997247
email: samia.elyoussfi@brunel.ac.uk

Academic supervisor: Professor Lorraine De Souza
email: lorraine.desouza@brunel.ac.uk

Thank you for considering taking part in this important study. We would very much appreciate it, if you were able to help us.

Appendix 7.2. Focus group consent form

b+tlc BARTS CHARITY

Brunel University London

CONSENT FORM FOR ADULT FOCUS GROUP PARTICIPANTS

Title of the study: Better health for people with rare endocrine disorders: promoting patient engagement in regular screening.

Patient name: _____

Address: _____

Telephone no: _____

Request copy of findings (please circle): Yes / No

Please initial box to indicate agreement

1.	I confirm that I have read and understood the latest version of the information sheet (version number …, date of version……) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.	
3.	I understand that I will be asked for information such as my age, diagnosis and attendance at Barts NHS Trust.	
4.	I understand that the focus group session will be recorded, analysed and stored in a secure area of the Brunel University London research archive for 10 years and then destroyed.	
5.	I understand that if I have any complaints I can get in touch with the PALS service based at Barts Health NHS Trust by contacting: 0203 465 5919 SBHpals@bartshealth.nhs.uk	
6.	I agree to take part in the above study.	

_____	_____	_____
Name of Patient	Date	Signature
_____	_____	_____
Name of Person taking consent (if different from Chief Investigator)	Date	Signature
_____	_____	_____
Chief Investigator	Date	Signature

1 for patient; 1 for Chief Investigator

Appendix 7.3. Focus group topic guides (FG1-FG2-FG3)

FOCUS GROUPS TOPIC GUIDE

Welcome/instructions & introductions to the all the focus group participants:

-Thank you for your participation in this focus group (1st, 2nd or 3rd session). You have been asked to participate as your point of view is important. I appreciate your time.

Introduction (to all of the 3 focus groups sessions):

- Aim of this study= 1) To improve our understanding of how patients with rare genetic endocrine disorders experience and use the service provided by the Bart's genetic endocrine syndrome screening programme. 2) The new knowledge gained will be used to improve the screening service through developing a patient-led information resource to enhance patient decision-making around engagement in screening services.
- Recently carried out patient interviews= This allowed the discovery and explanation of information that is important to the patient but may not have previously been thought of as relevant by the research team. Will new people to the service find this information also helpful in the same way? Or do we need a different approach?
- As mentioned reasonable travel costs can be reimbursed to focus group participants in the form of local shop vouchers to thank them for their time and to support travel costs.
- Remind patients to hand in any travel or car parking tickets.

Anonymity (to all of the 3 focus groups sessions):

- This session will be recorded but I would like to assure you that this discussion will be anonymous.
-The transcribed notes of the focus group will contain no information that would allow individual participants to be linked back to specific statements.

Ground rules (to all of 3 focus group sessions):

-You should try to answer and comment as honestly and openly as possible.
- Please try to speak one at a time (for the audio recorder) and to hear everyone's views.
- There are no right or wrong answers.
- You do not have to speak in any particular order.
- Please respect each other's opinions and diversity and experiences.
- I and the other focus group participants would appreciate it if you would refrain from discussing the comments of the other focus group participants outside the focus group.
- Does anyone have any questions? (answers).

Warm up (to all of the 3 focus groups sessions):

- First, I'd like everyone to introduce themselves. Can you tell us your name ?
- Reconfirm that everyone consents to being recorded.

[After introductions the recording device is switched on]

- OK, let's begin

Conclusion (to all of the 3 focus group sessions) :

-Thank you for participating. This has been a very successful discussion.
- Your opinions are a valuable asset to the study.
- We hope you have found it interesting to be part of the discussion.
- Before you leave, please hand in your completed consent and demographic forms
- A final draft of the patient information resources can be given to any of the focus group participants who are interested; a short deadline will be given for them to respond.

1) The first focus group

Aim of the session
-This first focus group session will scope the information for the patient information resource.

Introductory question
Where do you go when you need to find out some healthcare information?

Guiding questions/prompts
1) How do you use the information? To support an immediate decision, to reinforce what they already know about your condition or to get general information about it?
2) How have you tried to access get this information? What format do you think should be used to present information about your condition? How would you like to be able to access this information?

3) Do you ever have any issues with patient information resources (understanding, accessibility, language etc)

4) Reasons for avoiding patient information resources? (anxiety, avoidance of issue, disinterest etc)

5) What are your thoughts and feelings when reading through these existing Bart's patient information booklets?

6) Which one do you prefer and why? (please comment on text size, readability, quality etc)

7) Mini participant activity=

Using anonymised quotes on cards, from the issues that arose from patient interviews, as a group please discuss and say what your view is about the most important or least important factors.

Anxiety/ avoidance/ general clinic/hesitation/peer support/ GP/ family clinics/ travel /results.

8) Thinking back on everything we've discussed today, what would be the most important issue to you?

9) Is there anything else that you came wanting to say that you didn't get a chance to say?

2) The second focus group

Aim of the session

- This second focus group session will help to develop the content of the patient information resources.

Introductory question

What would encourage you to use a patient information resource? (booklet/ website)

Guiding questions/prompts

1) What do you like most about a patient information booklet/website?
2) What do you like least about a patient information booklet/website?
3) What type of information that should be included? (Specific to condition/general/ services?)
4) what type of information is not necessary?
5) Length of information booklet? Should be short to the point or more in depth?
6) What information should be displayed specifically on the front/back of the booklet?
7) Mini participant activity=
Using anonymised quotes on cards, from the issues that arose from patient interviews and the first focus group , as a group please discuss and decide the most important and least important factors to you.
Anxiety/ avoidance/ general clinic/hesitation/peer support/ GP/ family clinics/ travel /result (and include main points that arose from the first focus group session)
8) Thinking back on everything we've discussed today, what would be the most important issue to you?
9) Is there anything else that you came wanting to say that you didn't get a chance to say?

3) The third focus group

Aim of the session

- The third and final focus will review a mock-up of the patient information resource.

Introductory question

What do you think is the purpose of a patient information booklet/online resource?

Guiding questions/prompts

1)Target group (does the cover design and title clearly indicate for whom the information is intended?).

2) Information quality (can the focus group participants spot any glaring mistakes?/ does the content of the patient information material give the reader accurate and balanced facts?

3) Tone of voice (is it scaremongering or patronising?/ does it avoid discrimination?).

4) Clarity and comprehension (is the language simple and direct?/ are meanings clear?/ is there a summary of the most important information?).

5) Design and layout (is it a convenient size?/ does it have an eye-catching cover and title?/ is it easy to read, sensible typefaces?).

6) Ask the patients to describe the pictures and if they find these graphics helpful.

7) What are your thoughts on the format? (maybe explore different options e.g. separate sheets, information on the backside etc.)

8) What are your thoughts and feelings when reading through this patient information booklet?/ should this be give to new patients that come to the clinics?

9) What are your thoughts on the overall content? Is there anything that needs to be removed? Is there anything you feel should be included and it is not?

10) How would you make it easier to use/implement?

11) Ask the participants questions from the booklet. Tell them this is not a memory test, I want them to be able to search the document and easily find the answers to my

questions: e.g. patient support services contact email, name of patient liaison etc

12) Provide the booklet in separate sections to the patients and ask the participants to put the parts back together like a puzzle. How do they think it should be organized?

13) Mini participant activity=
Using anonymised quotes on cards, from the issues that arose from patient interviews and the first and second focus groups , as a group please discuss and sort into from most important to least important factors to you.
Anxiety/ avoidance/ general clinic/hesitation/peer support/ Gp/ family clinics/ travel /result (and include main points that arose from the first and second focus group session)

14) Thinking back on everything we've discussed today, what would be the most important issue to you?

15) Is there anything else that you came wanting to say that you didn't get a chance to say?

Appendix 7.4. Topics used for the focus groups topic guide and the rationale behind them.

Table 7.1. Topics used for the focus groups topic guide and the rationale behind them.

Topic Guide Points	**Aim**	**Rationale Behind Aim**
Welcome	- To thank participants for taking part in the focus group.	- To emphasize the importance of the participants' attendance and viewpoints. - The first few moments in a focus group are critical in establishing tone (Krueger and Casey, 2001).
Introduction	- To inform participants of the aim of this study. - To inform participants of the study's progress. - To remind participants to hand in any travel or car parking tickets.	- To introduce the discussion to the participants by providing an overview of the topic/study, as advised by Krueger and Casey (2001). - To reimburse reasonable travel expenses (Breen, 2006).
Anonymity	- To inform participants that the session will be recorded and assure them that the discussion will be anonymous. - To inform participants that the transcribed notes will be anonymised - To remind participants not to disclose any information from the group discussions. - To provide the ground rules (to all of 3 focus group sessions).	- Researchers must anonymise group data to ensure confidentiality (Gibbs, 1997). - Participants must be encouraged to keep what they hear during the focus group confidential (Gibbs, 1997). - Establishing ground rules is a necessary part of running a focus group (Krueger and Casey, 2001).
Conclusion	- To thank the participants.	- To conclude the session and ensure that all forms are completed and collected.

FG1 Topic Guide (Page 2 of topic guide)

Topic Guide Points	Aim	Rationale Behind Aim
Aim of the Session	- To convey the aim of the session to the participants; which was to gather information for the patient information resource.	- So participants are aware of purpose prior to the Cycle 2/FG1 session and to answer any queries.
Introductory Question	- Where do you find healthcare information?	-Asking open-ended questions yield significant information (Krueger and Casey, 2001).
Guiding Questions/Prompts	1) How do you use the information? 2) How have you tried to access this information? 3) Do you ever have any issues with patient information resources (understanding, accessibility, language, etc.)? 4) Are there any reasons you avoid patient information resources (anxiety, issue avoidance, disinterest, etc.)? 5) What are your thoughts and feelings after reading through these existing Barts patient information booklets? (Appendix 7.17) 6) Which one do you prefer and why (please comment on text size, readability, quality, etc.)? 7) FG1 mini participant activity (Appendix 7.18) 8) What would be the most important issue for you as a new patient? 9) Does anyone want to add anything else?	1 & 2) To understand how patients make decisions, as some argue that decisions are not only based on medical information but also on preference (Ubel, 2010). 3) Some studies have reported that patients have difficulty reading information leaflets (e.g. Gargoum and O'Keeffe, 2014). 4 & 5) Leydon et al. (2000) noted that cancer patients often avoid information, especially if it is too detailed. 6) The more clear and high-quality a leaflet appears, the more likely people are to read it (NHS, 2003). 7) To demonstrate if there are any overlapping issues that also came up in Study 2 (interviews). 8 & 9) Ending questions, as suggested by Krueger and Casey (2001).

FG2 Topic Guide (Page 3 of topic guide)

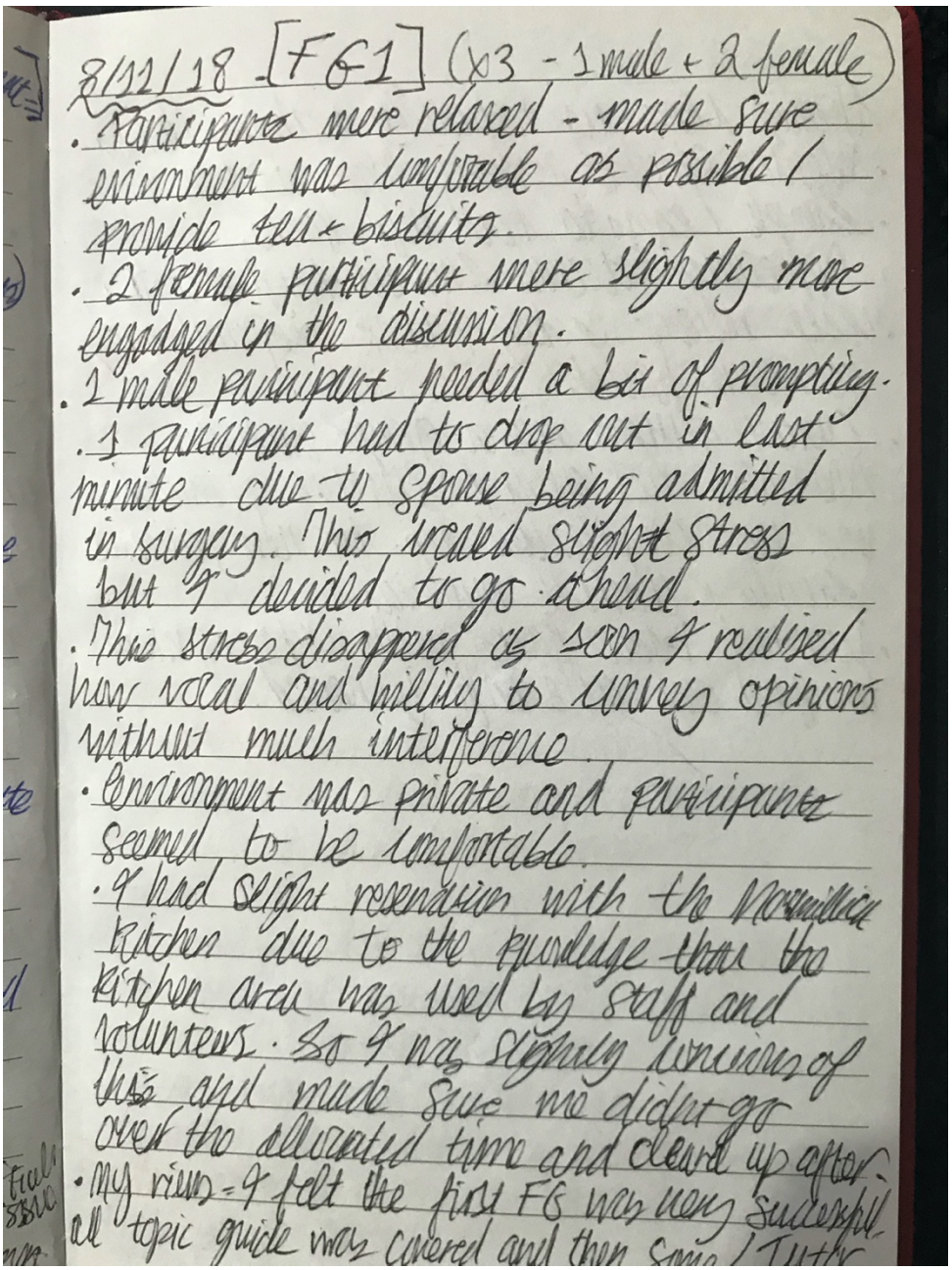
Topic Guide Points	Aim	Rationale Behind Aim
Aim of the Session	- To convey the aim of the session to participants; which was to develop the content for the patient information resource.	So participants are aware of purpose prior to the Cycle 3/FG2 session and to answer any queries.
Introductory Question	- What would encourage you to use a patient information resource (booklet/website)?	- Patient engagement promotes mutual accountability and understanding between (World Health Organization, 2016).
Guiding Questions/Prompts	1) What do you like most about patient information booklets/websites? 2) What do you like least about patient information booklets/websites?	1 & 2) Various aspects of written information must be considered to ensure effective communication (Guillot and Keenan, 2016).
	3) What type of information should be included (condition-specific/general)?	3 & 5) These considerations, including design, readability and content, must be considered (Adepu and Swamy 2012).
	4) What type of information is unnecessary? 5) How long should the resource be—short and to the point or more in-depth? 6) What information should be shown on the booklet covers?	4 & 6) Information should be relevant to individual patients (NHS, 2003).
	7) FG2 mini participant activity (Appendix 7.19)	7) To demonstrate if there are any overlapping issues that also came up in Study 2, during interviews or during FG1.
	8) Thinking back on everything we've discussed today, what would be the most important issue for you as a new patient? 9) Is there anything else that you wanted to say but haven't yet had a chance to?	8 & 9) Ending questions, as suggested by Krueger and Casey (2001).

FG3 Topic Guide (Page 4 of topic guide)

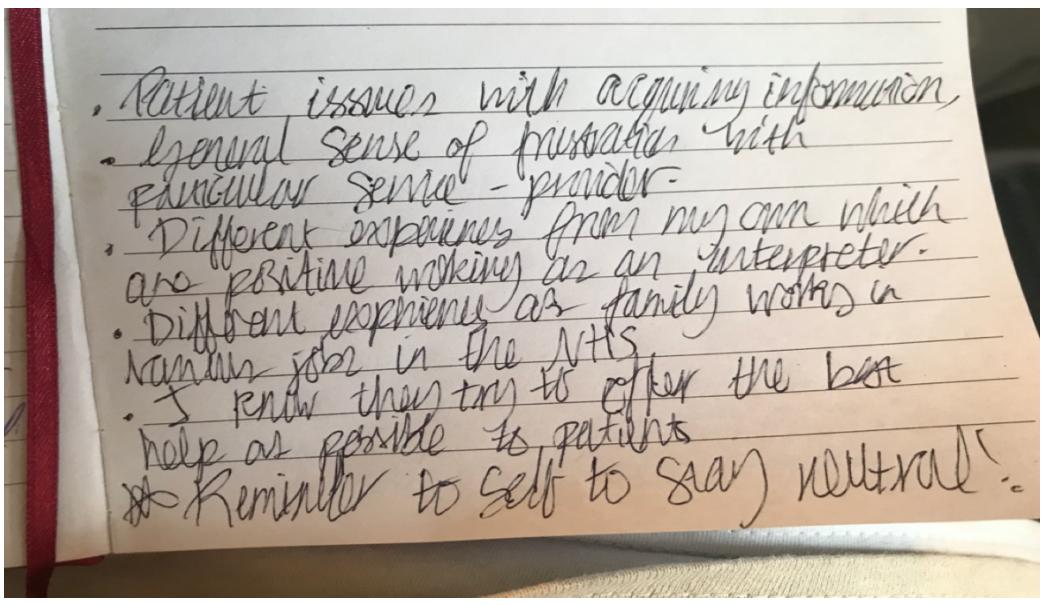
Topic Guide Points	Aim	Rationale Behind Aim
Aim of the Session	- To review a mock-up of the patient information resource.	- To inform participants of the purpose of the Cycle 5/FG3 session. - The NHS encourages asking patients to assess provided information (NHS, 2003).
Introductory Question	- What do you think is the purpose of a patient information booklet/online resource?	- Patient information booklets are an important component of health promotion (Moerenhout, 2013), so it is important to ensure that patients find them helpful.
Guiding Questions/Prompts	1) Does the cover design and title clearly indicate for whom the information is intended? 2) Can the focus group participants spot any glaring mistakes? Does the content offer the reader accurate and balanced facts?	1 & 2) as for the information leaflet to be effective it must be noticed and read by the target group (Protheroe et al., 2015).
	3) (Tone review.) 4) (Clarity and comprehension review.) 5) Design and layout. 6) Please describe the layout—do you find it helpful? 7) What are your thoughts on the format?	3 & 4) Using patient-friendly writing is recommended (NHS, 2003). 5, 6 & 7) Feedback will determine whether the layout is inviting and whether it follows the NHS toolkit for patient information (NHS, 2003).
	8) What are your thoughts and feelings when reading through this patient information booklet? Should it be given to new patients that come to the clinics?	8) Giving information to patients at the time of admission could benefit them (Guillot and Keenan, 2016).
	9) What are your overall thoughts? Should anything be removed? Should anything be added?	9, 10, 11 & 12) Patient information must be evaluated to ensure that it is readable, legible and sufficient for patients (Coleman, 2013).

	10) How would you make it easier to use/implement this resource? 11) (Ask participants questions from the booklet.) 12) (Provide the booklet in separate sections and ask the participants to put them together like a puzzle.) How do you think it should be organized? (Appendix 7.12)	
	13) FG3 Mini participant activity (Appendix 7.20)	13) To demonstrate if there are any overlapping issues that also came up in Study 2 or during interviews, FG1, or FG2.
	14) Thinking back on everything we've discussed today, what would be the most important issue for you as a new patient? 15) Is there anything else that you wanted to say but haven't yet had a chance to?	14 & 15) Ending questions, as suggested by Krueger and Casey (2001).

Appendix 7.5. Focus groups field notes/ examples from self-reflexive journal

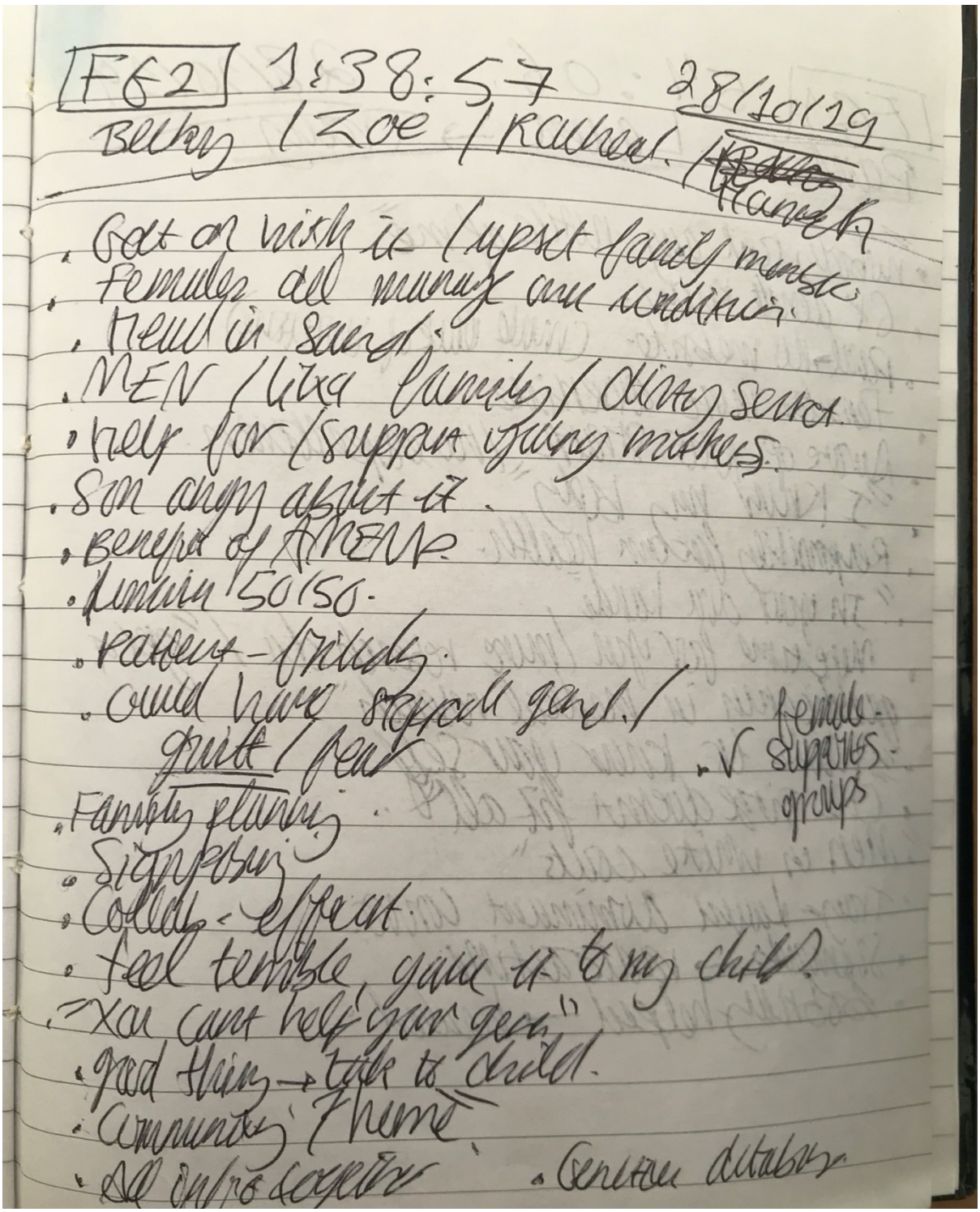


8/12/18 [FG1] (x3 - 1 male + 2 female)
- Participants more relaxed - made sure environment was comfortable as possible / provide tea + biscuits.
- 2 female participant more slightly more engaged in the discussion.
- 1 male participant needed a bit of prompting.
- 1 participant had to drop out in last minute due to spouse being admitted in surgery. This caused slight stress but I decided to go ahead.
- This stress disappeared as soon I realised how vocal and willing to convey opinions without much interference.
- Environment was private and participants seemed to be comfortable.
- I had slight reservation with the Moorfield kitchen due to the knowledge that the kitchen area was used by staff and volunteers. So I was slightly conscious of this and made sure we didn't go over the allocated time and clean up after.
- My view - I felt the first FG was very successful all topic guide was covered and then some / Further



- Patient issues with acquiring information
- General sense of frustration with particular service - provider.
- Different experience from my own which are positive working as an interpreter.
- Different experience as family worker in London just in the NHS.
- I know they try to offer the best help as possible to patients
- Reminder to self to stay neutral!.

Appendix 7.6. Focus groups- Memo coding example



Appendix 7.7 Ethics approval for the additional document of the topic guide

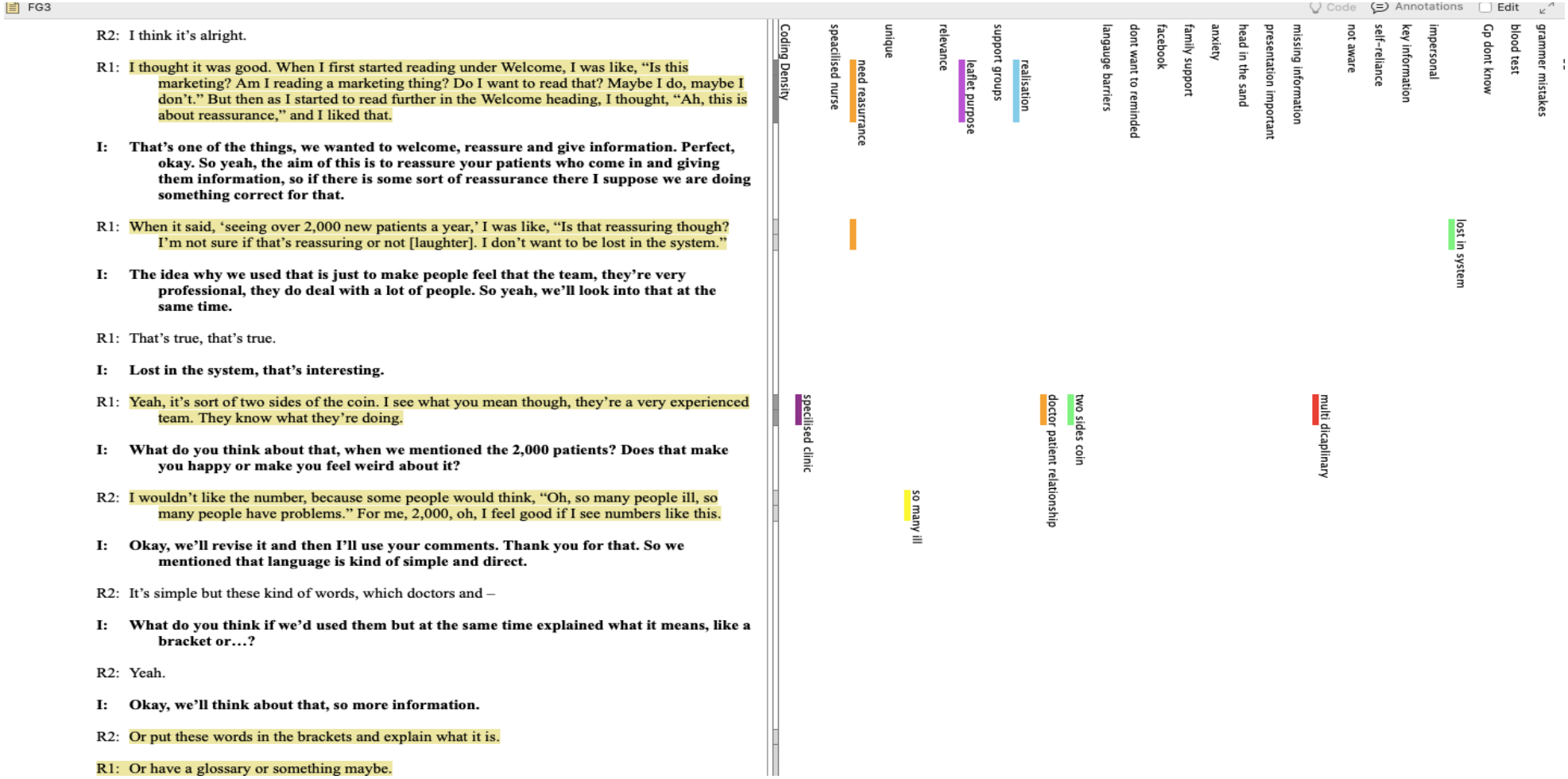
Amendment Categorisation and Implementation Information

Dear Miss Elyoussfi,

IRAS Project ID:	244880
Short Study Title:	Promoting patient engagement in regular screening.
Date complete amendment submission received:	23/10/2018
Amendment No./ Sponsor Ref:	NSA 1 - development of focus groups topic guide as an additional document to the study
Amendment Date:	23 October 2018
Amendment Type:	Non-substantial
Outcome of HRA and HCRW Assessment	**This email also constitutes HRA and HCRW Approval for the amendment,** and you should not expect anything further.
Implementation date in NHS organisations in England and Wales	35 days from date amendment information together with this email, is supplied to participating organisations **(providing conditions are met)**
For NHS/HSC R&D Office information	
Amendment Category	**A**

Thank you for submitting an amendment to your project. We have now categorised your amendment and please find this, as well as other relevant information, in the table above.

Appendix 7.8 Highlighted FG3 transcript text with corresponding codes on the right using NVivo



Appendix 7.9 Table displaying from coding to possible themes (focus groups)

FG1 Codes example	Issues discussed/example quotes	Sub-theme (s)	Themes identified
-Assertive -Autonomy -Doctor-patient relationship -Expert patient -Rely on family -Self-reliance -you have to know yourself -respect form doctor -anxiety	Yes ….but we have a duty of care to look after ourselves, we can't… (Laura, line 230) no My daughter's mother went on it. Line 85/ Paul Consequence of not being Autonomous... Are you going to get left if you don't have that operation or if you don't do a certain thing…Tracy	*Duty to self*	*Autonomous*
	Generically, sorry, I was going to say, that on the back of it as a caveat to what you were saying, and yourself, that they tend to have more time for you, the more research you go away and do. 302-304 Tracy	*Gain respect/ more time for you*	
	I'd have to put avoidance on the same level, for me, personally, avoidance on the same level as anxiety because there have been a couple of times in the past when results have come through and I did not want … especially not on a Friday, I did not want to open up the results.	*Don't deal with it: avoidance of info*	
-One size doesn't fit all -cater for everybody -need to know basics	One size doesn't fit all, so there's no point in giving me a basic information leaflet when I'm, sort of, on level 4 already because my uncle's sending		*One size doesn't fit all*

-Don't want to deal	me all these articles and he's still sending them to me, I've already got all these codes and stuff. I haven't got time to read all that…. (Laura, line 343-346) I wish I was more like Paul, I pick up everything, I have to know everything, I have to read everything. Laura 497-498 Well, like I said, I just go here find out how it's going because whatever I read, I don't think it's going to help. 428-429 Paul/ defeatist attitude	*Need to know everything* *What's the point?*	
-too much info -user friendly -Signposting - Presentation important -takeaway leaflet -too much info -want to read it -water down info	*I'd pick that up because it looks a little bit more patient-friendly (Appendix *).* (Tracy, 50s, F, MEN, lines 471–472) *Yes, just one……* *Yes, … you don't need to go too deep into (specific information)……* *…….I think you're right, I think you can go into it too much.* (All Cycle-1 participants, line 603; Laura, 40s, F, MEN, line 405; Tracy, 50s, F, MEN, line 409)	*Length, typeface* *Level of detail, signposting:*	*A need for a simple format/ simplicity is key* *Accessible and General Content*

FG2 Codes	Issues discussed/quotes	Sub-theme (s)	Themes identified
-At the beginning -Hard speak to family -I didn't get any help -I don't know what's happening/prognosis/ practical information	- it was trying to find out what the disease meant---Racheal line 49-54	*Finding what all of this means*	Encouragement: utilisation of info resources
-Kept quite (family) -Doctor-patient relationship -Dirty secret -Loss of control -Not informed about condition -There was no information	Well, I just kept quiet because whenever I discussed anything it would upset someone in the family that didn't know, have any information. Becky lines 14-15	*Don't want to upset anyone*	
	I mean, if you do know something then that's when you have to consider what you do next. *Zoe line 1016*	*As a method of taking control*	
-Denial -Didn't consider himself sick -Don't want to deal -draw him in (wont) -Forced attendance	I think communication is a bit bad. *Zoe Line 256* Nothing. No. Nothing. I didn't get anything.		Deters: what dissuades patients
-family links -family support -didn't consider himself sick	didn't consider himself to be a sick person, he really didn't, you know, didn't make anything of it at all--- *Rachael line 37* it was much more difficult to get some, my older	*I am ok/denial& anger*	

	son to come, keep his appointments and to, because he, I think he was a bit, he was angry about it, I think and he still is a bit. --- Zoe 166-170 If I look at my brother's situation, he was profoundly ill aged twelve, he then had a series of operations through his teens. He, when he became an adult, he hadn't got the slightest sense of what had happened, what, how much danger he'd been in, but he was a profoundly happy adult. He'd always felt very, you know, so had we really forced him to understand his position, would he have then had a happy 18 years that he had?	*Avoiding: but for good reason*	
-Need basic info 1 minute read -navigation path -user friendly -welcome	*Well, too much detail isn't helpful.……But new patients want to know everything.* (Rachael, 50s, F, SDH, line 122;	*welcome/reassure/provide basic information*	*Content detail*

	Hannah, 40s, F, MEN, line 700)		
-Practical info -Signposting -Someone reached out -Specialised nurse -multigenerational	*You need to talk to somebody, yes.* (Zoe, 60s, F, MEN, line 185)	*Patient-support groups, nurses, family clinics, genetic testing (antenatal), importance of appointment attendance, contact numbers.*	*Practical Clinic Information*
-Proactive title -Scary language -Multidisciplinary	*I think (the medical detailed language is) too scary.* *… (it) can be a bit scary, yes (laughter).*(Becky, 50s, F, MEN, line 356; Zoe, 60s, F, MEN, line 357)	*suitable language, title, delivery method*	*Audience*

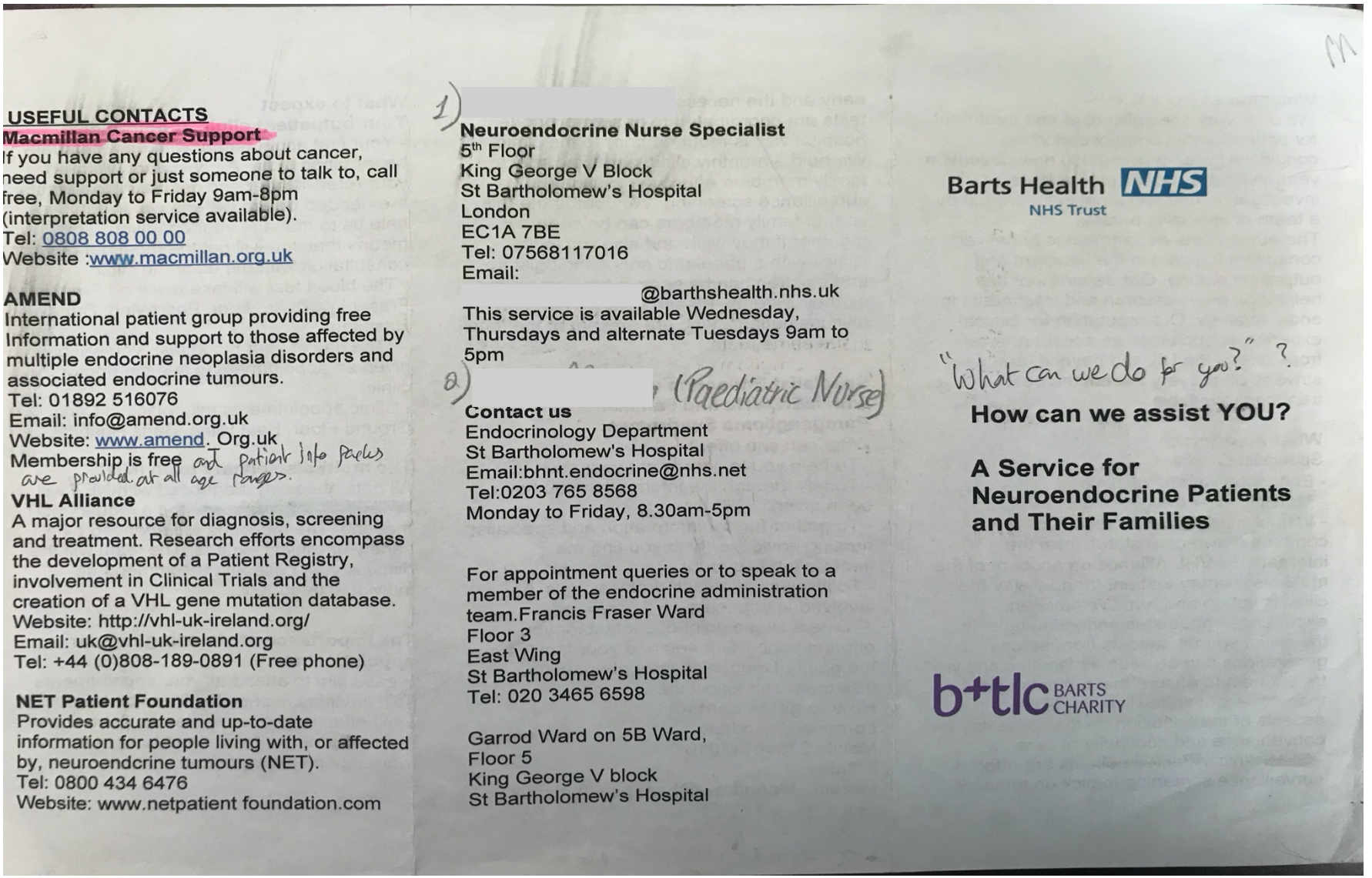
FG3 Codes	Issues discussed	Sub-theme (s)	Themes identified
-Value	To provide another means of giving you the information that the clinic or hospital can provide. Tom lines 5-6	Another means of gaining info/ to gain reassurance	*The purpose of the resource*
-Two sides of the coin -Anxiety -Head in sand	---And there's also wilful avoidance in terms of putting your condition in the hands of experts and being reassured and then not necessarily avoiding but just letting		

-Language barriers	them do some of the work because they're the experts, and that can be reassuring. So I don't know. That probably comes under the umbrella of anxiety, not this. So maybe this, yeah, isn't important. Peter line 765-771		
	im interested but, like I said, I don't understand everything because I'm Hungarian. Peter line 18	Purpose is lost if comprehension is lost	
-Need reassurance -Title more approachable -welcome	Those words, you know, like this, these types of words. It's just more the medical terms. I don't understand them because I've never used in my life, so… Peter line 140-141		*Evolution of the leaflet title*
-User friendly	*I thought it was more approachable, yeah.* (Tom, 20s, M, MEN, line 45)		
	Yeah, it aligns with how I've used the service, how the service has worked for me. So yeah, I think it was good. (Tom, 20s, M, MEN, lines 70–71)		*Affirmation of the information in the mock-up leaflet*

	… like talking about seeing a family together, and then it seemed like, well, fine, that's great, but then there's this stuff. Maybe that could be presented in a way that it's like, 'Oh, this is for VHL and SDH'. (Tom, 20s, M, MEN, lines 79–81)		*Amendment of the layout* *Validation of the leaflet's purpose* *Removal of information* *Addition of missing information* *Addressing text font/size, leaflet colour and logo confirmation* *Inclusion of abbreviations in brackets* *Amendment of grammar, spelling and sentence structure issues*

Appendix 7.10 Leaflet Examples-Extra

Appendix 7.11 Interim mock-up leaflet/ FG3 focus participant comments/review of interim leaflet



USEFUL CONTACTS

Macmillan Cancer Support
If you have any questions about cancer, need support or just someone to talk to, call free, Monday to Friday 9am-8pm (interpretation service available).
Tel: 0808 808 00 00
Website :www.macmillan.org.uk

AMEND
International patient group providing free Information and support to those affected by multiple endocrine neoplasia disorders and associated endocrine tumours.
Tel: 01892 516076
Email: info@amend.org.uk
Website: www.amend. Org.uk
Membership is free and patient info packs are provided. at all age ranges.

VHL Alliance
A major resource for diagnosis, screening and treatment. Research efforts encompass the development of a Patient Registry, involvement in Clinical Trials and the creation of a VHL gene mutation database.
Website: http://vhl-uk-ireland.org/
Email: uk@vhl-uk-ireland.org
Tel: +44 (0)808-189-0891 (Free phone)

NET Patient Foundation
Provides accurate and up-to-date information for people living with, or affected by, neuroendcrine tumours (NET).
Tel: 0800 434 6476
Website: www.netpatient foundation.com

1)

Neuroendocrine Nurse Specialist
5th Floor
King George V Block
St Bartholomew's Hospital
London
EC1A 7BE
Tel: 07568117016
Email:
@barthshealth.nhs.uk
This service is available Wednesday, Thursdays and alternate Tuesdays 9am to 5pm

2) (Paediatric Nurse)

Contact us
Endocrinology Department
St Bartholomew's Hospital
Email:bhnt.endocrine@nhs.net
Tel:0203 765 8568
Monday to Friday, 8.30am-5pm

For appointment queries or to speak to a member of the endocrine administration team.Francis Fraser Ward
Floor 3
East Wing
St Bartholomew's Hospital
Tel: 020 3465 6598

Garrod Ward on 5B Ward,
Floor 5
King George V block
St Bartholomew's Hospital

Barts Health NHS
NHS Trust

"What can we do for you?" ?

How can we assist YOU?

A Service for Neuroendocrine Patients and Their Families

b+tlc BARTS CHARITY

- marketing?

Welcome Who we are

We offer very specialist care and treatment for patients with complex endocrine conditions, seeing over 2000 new patients a year. We have a dedicated endocrine investigation unit and inpatient ward run by a team of specialist nurses.

The ethos of the department is to deliver consultant led care in the inpatient and outpatient setting. Our department has helped pioneer research and treatments in endocrinology. Our reputation for clinical expertise is such that we accept referrals from across the UK and beyond, and we strive to offer every patient the best treatment available.

- reassurance

What we offer:

Specialist Clinics

- Endocrine Antenatal clinic
- MEN clinic – why no description?
- VHL clinic: Our centre received comprehensive care status from the international VHL Alliance on account of the multi-disciplinary, patient-friendly way the clinic is set up and run. We have an experienced paediatric endocrinologist in the clinic, so that patients from across generations can be seen as families and we try our best to ensure that patients see many different specialists for different aspects of the condition on the same day for convenience and continuity of care.
- SDH clinic: Affected patients are offered surveillance screening to pick up tumours early and the necessary scans and blood tests are coordinated to ensure only one hospital visit is required prior to the clinic. We hold a monthly clinic to review affected family members after their routine surveillance screening. We coordinate this so that family members can be seen together if they wish and also run joint clinics with a paediatric endocrinologist so that children can be seen in the same clinic as their parents. Please note we can only discuss patients who are present at the time in the same room.

Some common info across VHL & SDH?

Specialist Endocrine nurse for patients with MEN, VHL and Familial Paraganglioma Syndromes:

What can she offer? she/he

- To help you to coordinate your care.
- To talk through the information you have been given.
- To gather further information and specialist nursing advice, or help you find the information you require.
- To link with all health professionals involved in your care.
- To be a single point of contact for you offering support for you and your family from the point of diagnosis throughout your treatment and follow up.

How to get in contact

[redacted]bartshealth.nhs.uk

THIS IS KEY INFO WHICH she helps keep anxiety levels low.

~~SE~~ - DEDICATED BLOOD TEST WING

What to expect

Your outpatient clinic appointment

- Your first appointment with us will usually be for blood tests. A consultant will read your referral letter and decide if blood tests are needed before we see you in clinic to help us to manage your condition. This means that you will get the most out of your consultation with the doctor in clinic.
- The blood test will take place on Francis Fraser Ward, 3rd floor, East Wing, Barts Hospital.
- The day of your blood test, you will be given an appointment to see the doctor in clinic.
- Clinic appointments take place in Clinic 6, Ground Floor, East Wing, Barts Hospital.

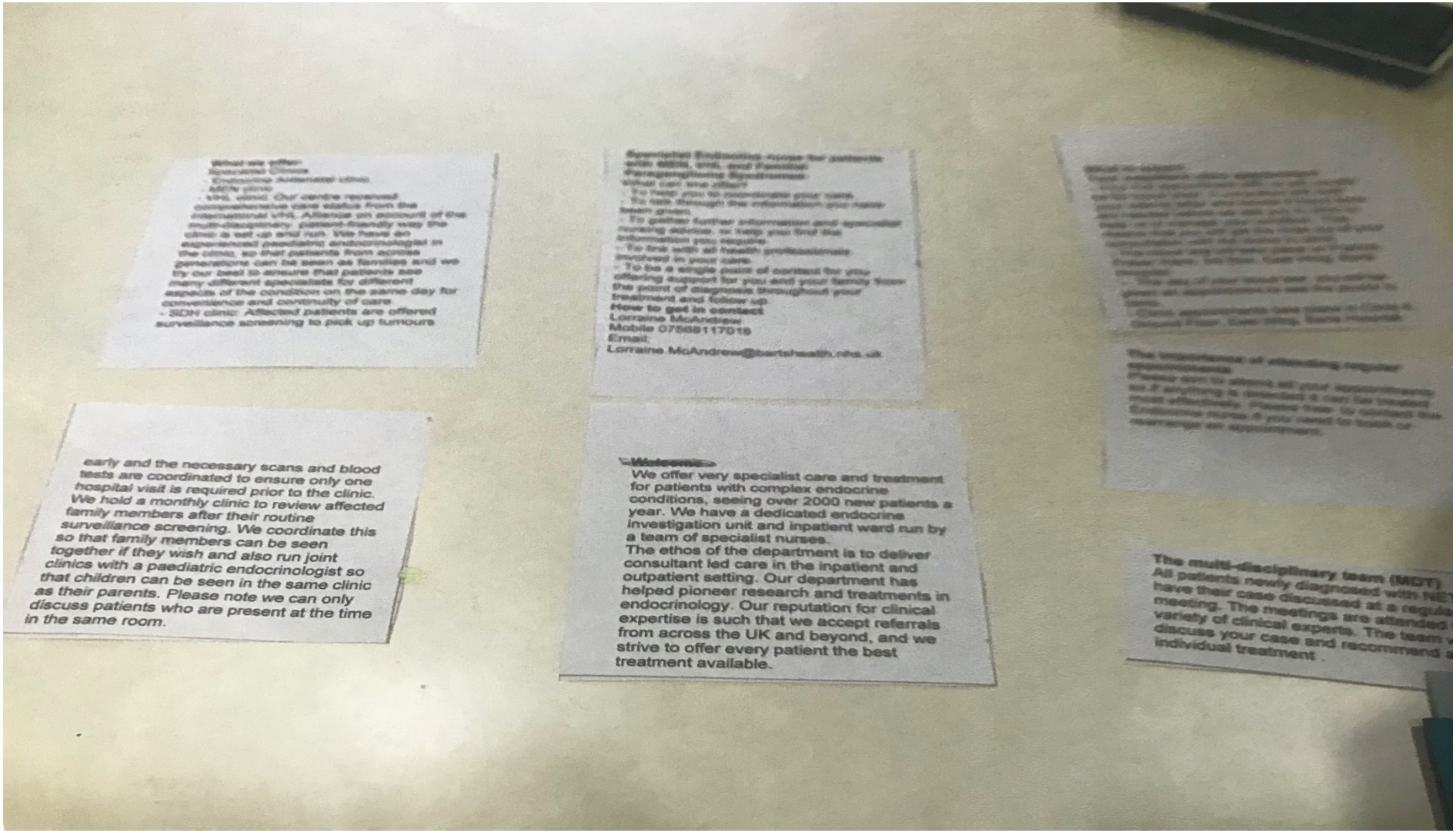
The multi-disciplinary team (MDT)

All patients newly diagnosed with NET will have their case discussed at a regular MDT meeting. The meetings are attended by a variety of clinical experts. The team will then discuss your case and recommend an individual treatment .

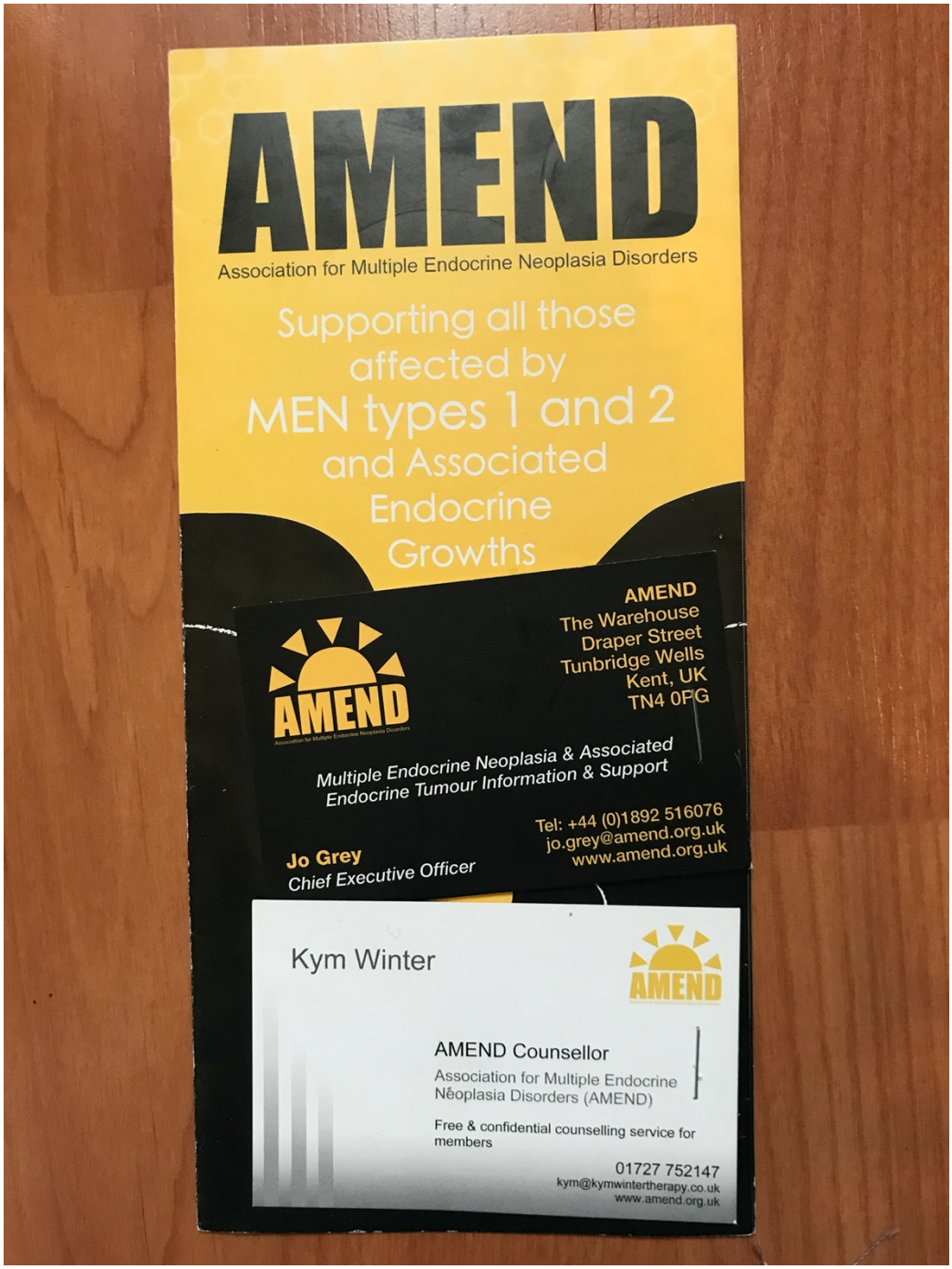
The importance of attending regular appointments

Please aim to attend all your appointments so if anything is detected it can be treated most effectively. Please feel free to contact the Endocrine nurse if you need to book or rearrange an appointment.

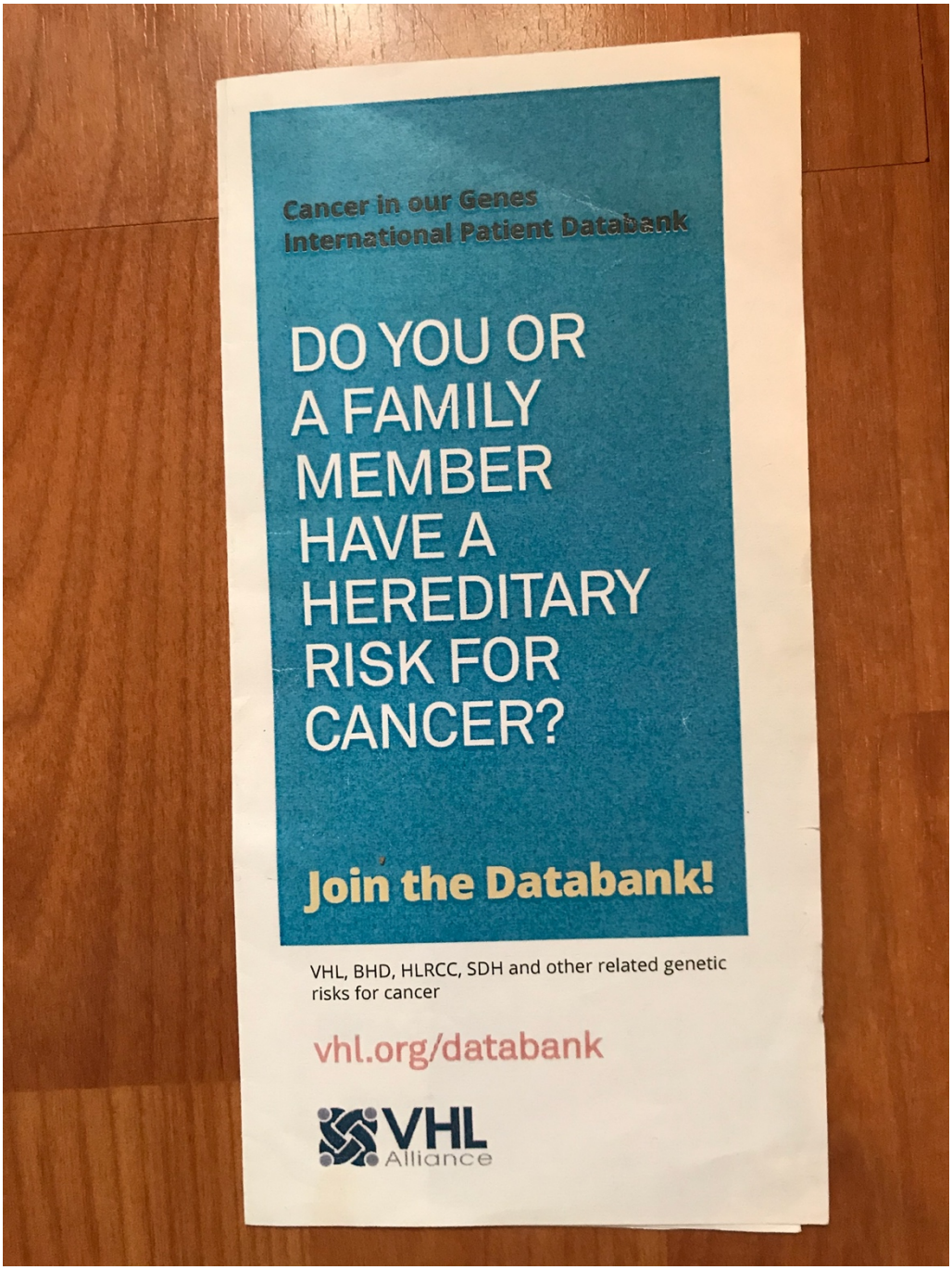
Appendix 7.12 FG3 Puzzle activity



Appendix 7.13 Leaflet Examples- Amend



Appendix 7.14 Leaflet Examples- VHL org



Appendix 7.15. The patient information leaflet

USEFUL CONTACTS:

Macmillan Cancer Support
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Website: www.macmillan.org.uk

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Email: info@amend.org.uk
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Membership is free & patient information packs are available for all age ranges.

VHL Alliance
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Website: http://vhl-uk-ireland.org/
Tel: +44 (0)808-189-0891 (Free phone)

NET Patient Foundation
Provides accurate and up-to-date information for people living with, or affected by neuroendcrine tumours (NET).
Tel: 0800 434 6476
Website: www.netpatient foundation.com

Neuroendocrine Nurse Specialist
5th Floor
King George V Block
St Bartholomew's Hospital
London
EC1A 7BE
Tel: 07568117016
Email:
@barthshealth.nhs.uk
This service is available Wednesday, Thursdays and alternate Tuesdays 9am to 5pm

Clinical Nurse Specialist
Department of Paediatric Endocrinology
Tel:020 3594 1548
E-mail: @bartshealth.nhs.uk

Contact us:
Endocrinology Department
St Bartholomew's Hospital
Email:bhnt.endocrine@nhs.net
Tel:0203 765 8568
Monday to Friday, 8.30am-5pm
For appointment queries or to speak to a member of the endocrine administration team.

Francis Fraser Ward
Floor 3
East Wing
St Bartholomew's Hospital
Tel: 020 3465 6598

Barts Health NHS
NHS Trust

What can we do for you?

A Service for Neuroendocrine Patients and Their Families

b+tlc BARTS CHARITY

Who we are:
We offer a very specialist care and treatment for patients with complex endocrine conditions. We have a dedicated endocrine investigation unit and inpatient ward run by a team of specialist nurses. The ethos of the department is to deliver consultant led care in the inpatient and outpatient setting. Our department has helped pioneer research and treatments in endocrinology. Our reputation for clinical expertise is such that we accept referrals from across the UK and beyond, and we strive to offer every patient the best treatment available.

What we offer:
- Specialist Clinics
- Endocrine Antenatal clinic
- MEN 1& MEN 2 clinic: We work very closely with our geneticist and we usually look after family groups with this condition with early monitoring of family members at risk.
- VHL clinic: Our centre received comprehensive care status from the international VHL Alliance on account of the multi-disciplinary, patient-friendly way the clinic is set up and run. We have an experienced paediatric endocrinologist in the clinic, so that patients from across generations can be seen as families and we try our best to ensure that patients see many different specialists for different aspects of their condition on the same day for convenience and continuity of care.
- SDH clinic: Affected patients are offered surveillance screening to pick up tumours early and the necessary scans and blood tests are coordinated to ensure only one hospital visit is required prior to the clinic.
-We hold a monthly clinic to review affected family members after their routine surveillance screening. We coordinate this so that family members can be seen together if they wish and also run joint clinics with a paediatric endocrinologist so that children can be seen in the same clinic as their parents. *Please note we can only discuss patients who are present at the time in the same room.

What to expect:
- Your first appointment with us will usually be for blood tests. A consultant will read your referral letter and decide if blood tests are needed before we see you in clinic to help us to manage your condition. This means that you will get the most out of your consultation with the doctor in clinic.
- The blood test will take place on in a dedicated blood wing which is the Francis Fraser Ward. This is located on the 3rd floor, East Wing, Barts Hospital.
- The day of your blood test, you will be given an appointment to see the doctor in clinic.
- Clinic appointments take place in Clinic 6, Ground Floor, East Wing, Barts Hospital.

Specialist Endocrine nurse for patients with MEN, VHL and Familial Paraganglioma Syndromes:
What can the nurse offer?
- To help you to coordinate your care.
- To talk through the information you have been given.
- To gather further information and specialist nursing advice, or help you find the information you require.
- To link with all health professionals involved in your care.
- To be a single point of contact for you offering support for you and your family from the point of diagnosis throughout your treatment and follow up.

The multi-disciplinary team (MDT)
All patients newly diagnosed with a neuroendocrine tumour (NET) will have their case discussed at a regular MDT meeting. The meetings are attended by a variety of clinical experts. The team will then discuss your case and recommend an individual treatment .

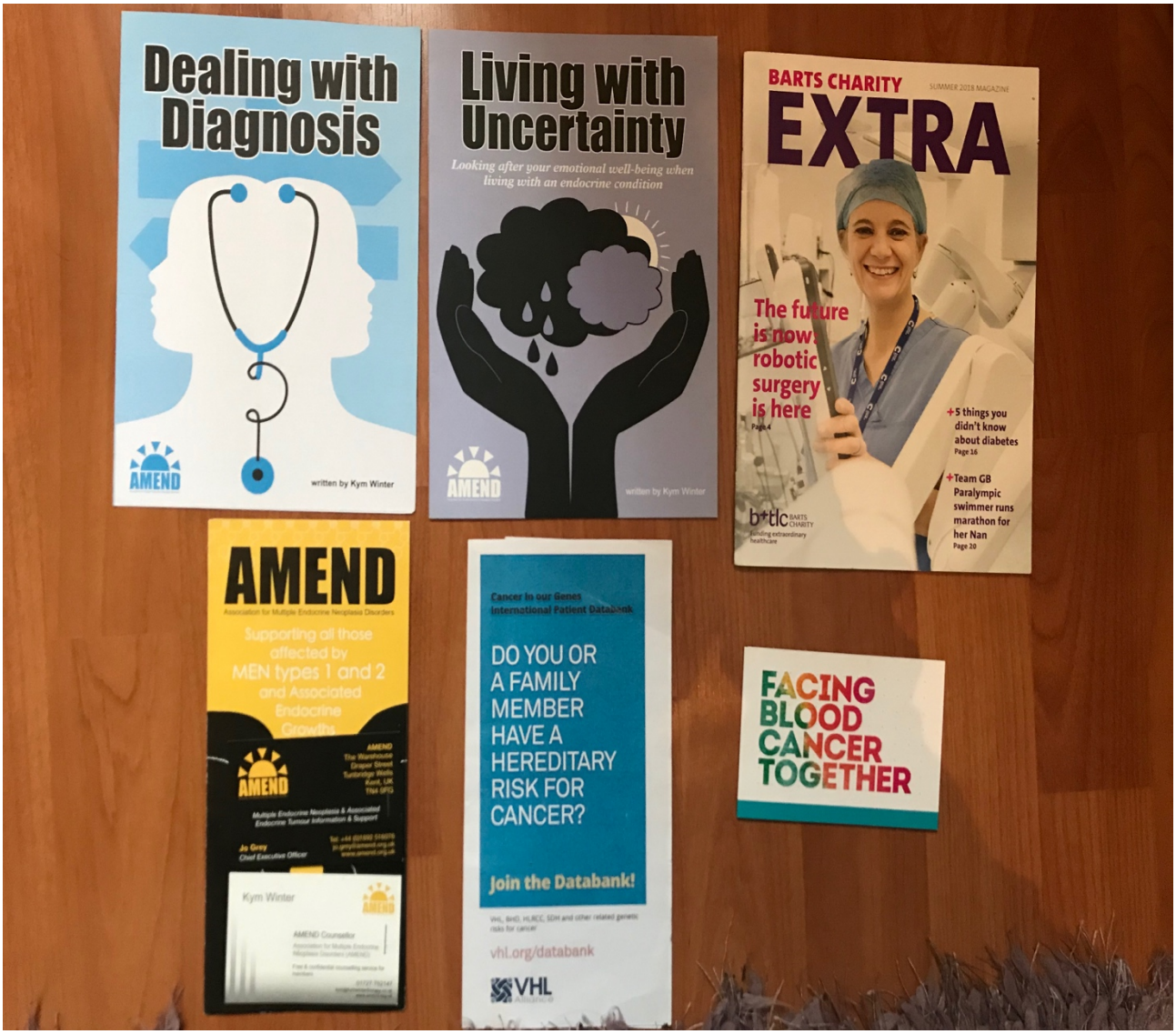
The importance of attending regular appointments:
Please aim to attend all your appointments so if anything is detected it can be treated most effectively. Please feel free to contact the Endocrine nurse if you need to book or rearrange an appointment.

Appendix 7.16. Leaflet readability and level statistics

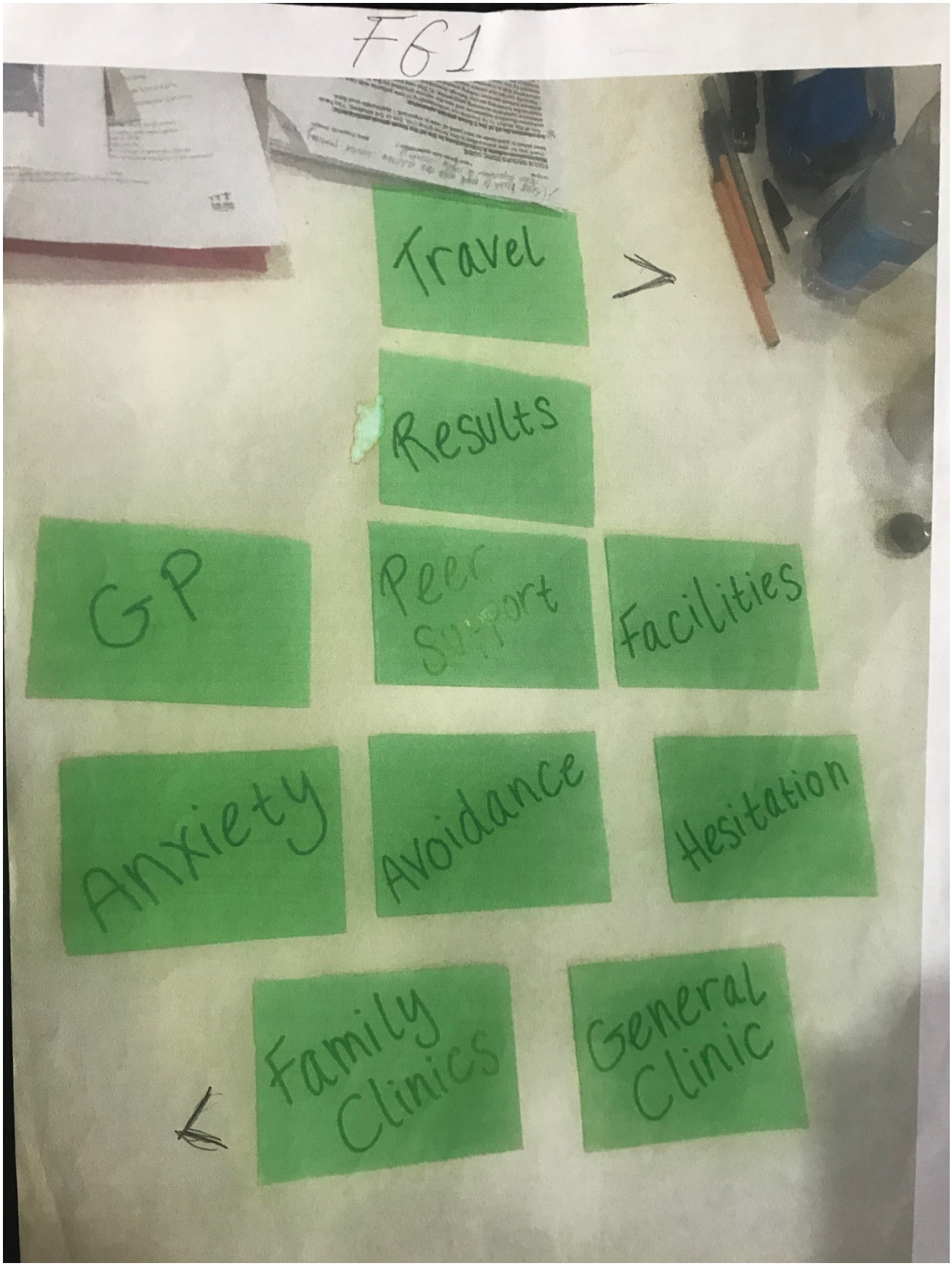
Readability Statistics

Counts	
Words	770
Characters	4,361
Paragraphs	64
Sentences	34
Averages	
Sentences per Paragraph	1.6
Words per Sentence	16.7
Characters per Word	4.9
Readability	
Flesch Reading Ease	52.3
Flesch-Kincaid Grade Level	10.1
Passive Sentences	20.5%

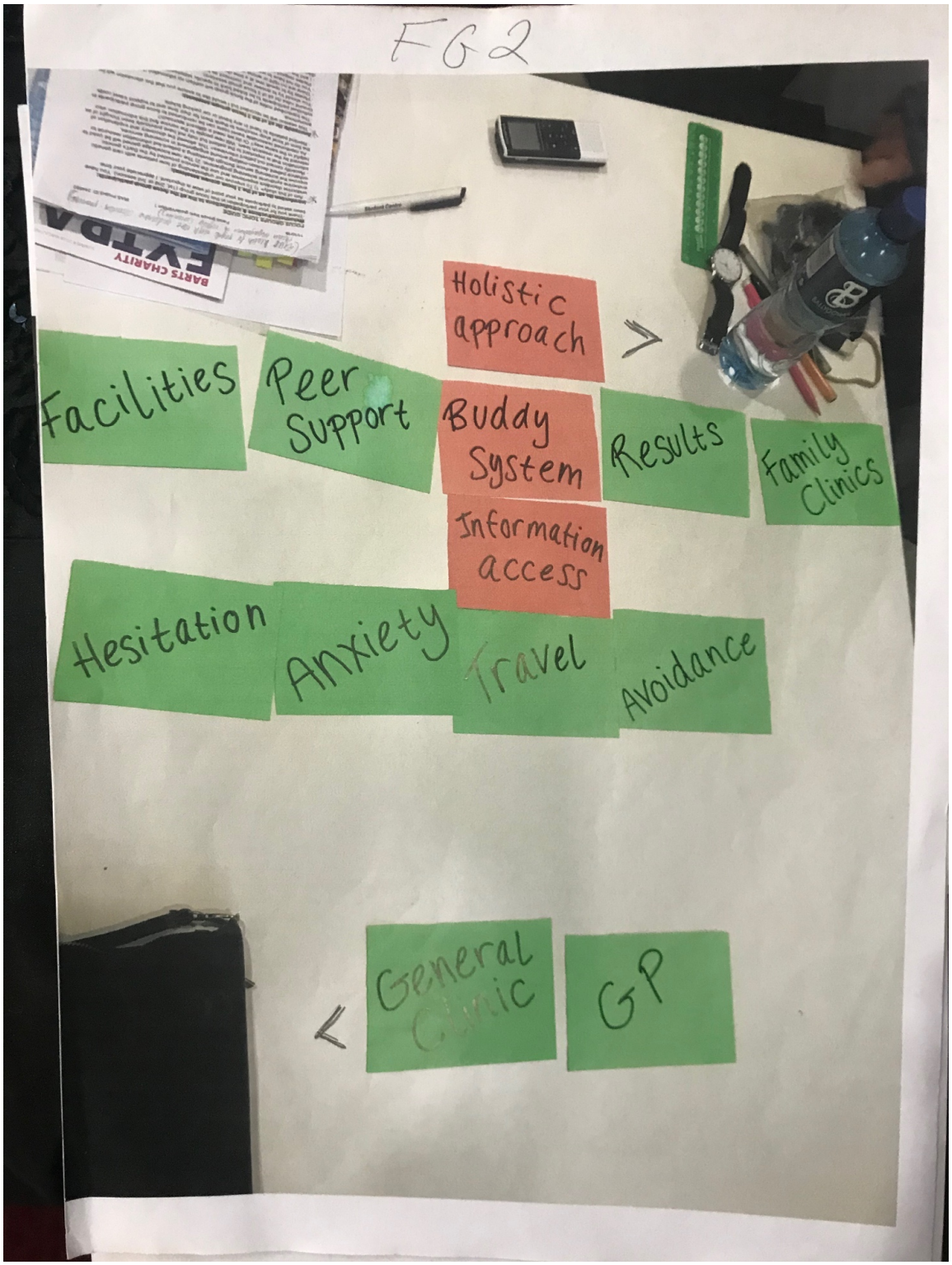
Appendix 7.17 Existing patient information leaflets



Appendix 7.18 FG1 mini participant activity



Appendix 7.19 FG2 mini participant activity



Appendix 7.20 FG3 mini participant activity