- 1 -

Managing the Possible Health Risks of Mobile Telecommunications: Public Understandings of Precautionary Action and Advice

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- 2 -

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ABSTRACT

It has been suggested that precautionary approaches to managing possible health risks mobile telecommunications (MT) technology may cause or exacerbate public concerns. In contrast, precautionary approaches to managing such risks in the UK have been framed as a way of reducing public concerns. This article presents evidence from a series of focus groups about publics' understandings of the actions taken and advice given about potential MT health risks by the UK government. Eight focus groups were conducted with members of the public that varied in their age, their awareness and concern about mast siting, and the self-reported level of mobile phone use. From the analyses a complex picture emerged in which publics' understandings were not primarily framed in terms of precautionary action and advice either provoking concern or providing reassurance. People made sense of precaution by drawing upon a range of evidence from their understandings of costs and benefits of the technology, as well as the institutional context in which MT health risks were managed. For some of those involved in protesting against mast siting, precaution was seen as confirming existing concern.   Further systematic exploration of the contexts within which different responses to precaution emerge is thus likely to be instructive.

INTRODUCTION

There has been little research in the UK that has addressed the impact of precautionary approaches to risk management on the public's appreciation of the technology itself, its possible risks and benefits, and on their attitudes to those responsible for risk management. We explore this here in relation to precautionary approaches to the management of the potential health risks of mobile telecommunications (MT) in the UK.

The report by the UK Independent Expert Group on Mobile Phones chaired by Sir William Stewart (2000) reviewed current scientific evidence of possible health risks associated with MT that are linked to thermal effects of radio frequency (RF) exposure. Human laboratory studies have explored the possibility of deleterious effects of mobile phone signals upon memory, attention and concentration as well as effects on heart and blood pressure. Other studies have explored the possibility of links between acute RF exposure and cancer, effects on the cardiovascular, endocrine and immune systems. The Stewart Report concluded that the current evidence of detrimental health effects of MT is inconsistent and inconclusive, recommending the adoption of a precautionary approach to the management of potential MT health risks.

Subsequent adoption by the UK government of a precautionary approach as a way of managing MT health risks has initiated a widespread academic and policy debate about the impact of this upon public perceptions of MT health risks. Burgess' (2004) analysis from the sociological perspective, focuses on the institutional and cultural contexts underpinning governments' reactions to possible mobile telecommunications health risks. Focusing upon activists, he suggests that the government's promulgation of precaution has the effect of raising public concern and intensifying perceptions of risk. There has been little empirical investigation within the UK for this contention, and accordingly the paper presented here was designed to address and explore this issue. It does so by using the data from a series of focus groups to explore the way in which people make sense of precautionary advice and action and, more specifically, how, if at all, evidence of precaution is linked to expressions of concern.

This introduction will therefore unfold as follows: a brief introduction to the relationship between precautionary approaches and public concerns; an evaluation of the evidence found so far for the effect that precautionary action and advice has upon public appreciations of the risks; and finally a brief rationale for the chosen methodology.

Precautionary approaches – a risk regulation paradigm

The precautionary principle emerged in the 1970's in response to concerns about the extent to which complex and uncertain risks could be addressed within existing science and policy structures (Tickner, 2003). By 1992 it formed the basis of European environmental law (Foster, Vecchia and Repacholi, 2000). Perhaps surprisingly, considering that it now underpins a range of international treaties, there is no clear or universally accepted definition of this principle (Foster *et al.*2000, Stirling, 2002). One of the more commonly cited stems from The Rio Declaration on Environment and Development (1992):

> "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." (Principle 15)

The definition of the Precautionary Principle provided by the European Environmental Agency makes it clear that in addition to an appropriate level of scientific evidence, it is also important to take into account 'the likely pros and cons of action and inaction' (WHO, 2004a:7). Discussion of such pros and cons and how they should be taken into account has often focused upon the role of lay publics in instigating precautionary approaches. The focus of this paper is on one dimension of this, that is, the relationship between public concerns and precautionary

action and advice. The following review of the literature therefore considers instances where it is public concern that has seemingly been instrumental around decisions about whether to adopt a precautionary approach.

This relationship has been a focus of international attention to the extent that public concern is recognised as important in informing the boundaries of trade decisions. Goldstein and Carruth (2004) document the way in which the World Trade Organisation Appellate body upheld a decision that France could exclude asbestos products from Canada. They ruled that 'evidence of risk must be examined not only in the context of the physical properties of the products but also *in the context of consumer perception and behaviour'* (p. 495, our italics). Thus, the Appellate Body introduced public concern about a risk as a legitimate reason for invoking a precautionary approach, which was seen as being an acceptable basis for a trade barrier. The grounds for precautionary approaches are also the subject of ongoing consideration by the World Health Organisation. Early drafts of their position suggested that a precautionary approach was indicated when there is scientific and/or public concern about exposure to an agent whose health impact cannot be fully assessed (WHO, 2004b).

Turning specifically to the possible health risks associated with MT, Kheifets *et al* (2000) note the mix of motivations for considering precautionary approaches:

> *"In the face of uncertainty, public concern about EMF, as well as the ubiquity of EMF exposure and thus the potential for an appreciable public health impact associated with even a small risk, has led to suggestions that the precautionary principle be adopted."* (p.117)

Precautionary approaches to MT in the UK

Within the UK, the legacy of the previous government risk management (e.g. the BSE crisis), the particularities of institutional relationships and cultural influences have sensitised risk regulators to the opinions of the "distrustful" public (Walls *et al*, in press). Public concern has become a relevant parameter in deciding whether or not to apply the precautionary principle (Select Committee on Science and Technology, 2001).

The role of public concern in leading to the adoption of a precautionary approach in relation to MT technology can be traced to a statement made by Tessa Jowell, the Minister for Public Health in April 1999. She instructed the National Radiological Protection Board to set up an independent expert working group to assess the current state of research into mobile phones. Announcing this she said,

> *"In recent years research interest in the effects of mobile phones has increased. To date there has been no consistent evidence suggesting risk to health but there is continuing public concern about the possibility. It would be wrong to ignore that concern. That is why, as champion of the public health, I believe we need a definitive and rigorous assessment of existing research and clear identification of areas where further research may be needed so that the public can receive clear advice about the use of mobile phones and a clear risk assessment from independent experts."* (House of Commons, 1999).

The Science and Technology Third Report (House of Commons, 1999) referred to the role of public concern in setting up the Independent Expert Group on Mobile Phones (IEGMP) set up under the chairmanship of Sir William Stewart, as did the terms of reference of the IEGMP itself (IEGMP, 2000). It seems clear then that 'public concern' was explicitly part of the rationale for

setting up the IEGMP, the group that was later to recommend that the UK government should take a precautionary approach to managing the possible health risks of MT. Examination of the IEGMP report itself and the subsequent government response to it makes it clear that it was not just the case that public concern was an important rationale for adopting a precautionary approach. It is clear that precautionary approaches were seen to be a way of addressing and reducing public concern.

The IEGMP prefaced their recommended series of precautionary measures by saying,

> " *We recommend that national and local government, industry and the consumer, should all be actively involved in addressing concerns about possible health effects of mobile phones.*" (para 6.40).

In accepting the recommended precautionary approach, the government response to the IEGMP report was more explicit in anticipating the expected effects of a precautionary approach (Department of Health, 2004):

> "*The report makes helpful recommendations on measures to reduce public concern about the health impacts of MT technologies.*" (para 1.2)

There were five dimensions to the recommended precautionary approach. Advice to government was that the exposure levels in the UK were brought in line with the more stringent guidelines of the International Committee of Non-Iodising Radiation Protection rather than those of the National Radiological Protection Board (NRPB). There were further recommendations about changes to planning legislation and protocols, the auditing of base stations and their emissions, public involvement and the public availability of base station and emissions information. Advice to industry was that an international system for the assessment of Specific Absorption Rate values should be developed and this information readily available to

consumers. In the light of the greater vulnerability of children to possible adverse health effects the report recommended that widespread use of mobile phones by children should be discouraged and that industry should not promote phones to children. The IEGMP Committee also recommended there should be a substantial research programme to address the gaps in scientific knowledge about the health impacts of mobile phone technologies. The main recommendation relating to public information was that Stewart recommended that a leaflet providing clearly understandable information on mobile phone technology and related health aspects should be widely circulated and available at the point of sale. Finally, the NRPB was charged with being more open, proactive and sensitive in their dealings with the public.

Subsequent reports (AGNIR, 2003, NRPB, 2004) have supported the continuation of precautionary approaches

> *"The NRPB board believes that the main conclusions reached in the Stewart Report in 2000 still apply today and that a precautionary approach to the use of mobile phone technologies should continue to be adopted."* (NRPB, 2004, para 19)

Thus far then we have briefly outlined the way in which public concerns have been relevant to the development of a precautionary approach to managing the possible health risks of MT. We can now explore what the effect of precautionary advice or action might be upon public concern. This is particularly important given that a primary motivation for taking public concern into account appears to be to attenuate these concerns and to provide reassurance.

Public understandings of precaution

There is currently little empirical work that has addressed the question of if, under what circumstances, and how, the introduction of precautionary actions and advice affects public appreciations of the risks, and of those managing those risks.

The most extensive exploration of this issue has been by Burgess (2004) who maintains that precautionary actions and advice do not reduce concern but rather exacerbate it, acting to increase protest activity and intensify media presentations of risk. He argues in relation to MT – considered to be a 'phantom risk', that is, one that has no basis in scientific reality - that "precautionary advice and activity itself can animate risk perceptions" (2004:90). For Burgess, precautionary advice is believed to confirm and cohere the individual's initially diffuse anxieties, as they follow the "inexorable" logic that there is "no smoke without fire"; in other words, it is government advice of precaution that signals to the public the existence of risk, which in turn instigates and intensifies concern. Drawing upon a mast action group case study and business and market research data, this work provides a societal level of analysis; it does not, however, explore the process by which people make sense of precautionary advice or actions.

The work of Burgess around MT is attuned to a wider perspective articulated by Durodie (2003) and Furedi (1997), which suggests that precaution can promote a culture of fear and that official responses to 'perceived problems' can become the driver of 'real problems'. Of course, there are a range of arguments and reservations around the use of precaution that are more commonly expressed, for example that it may lead to scientific evidence being undermined (e.g. Foster *et al.* 2000; Sunstein, 2003). These are not considered here as their objections to precaution are not central to our focus here, that is, on the way precaution may intensify public concerns.

How the adoption of precautionary approaches to risk management influences public concern was specifically addressed in a recent essay by Sandman (2004). He notes the lack of existing research and, focusing upon the "attentive public" (i.e. those expressing concern about the

risk), he discusses a range of possible mechanisms that might be expected to increase concern and reassurance. He concludes on balance, that government adoption of precaution would be more likely to exacerbate worry although there is likely to be important variation between people and between responses to different contents of precautionary action or advice.

Weidemann and Schütz (2005) used an experimental design to explore the effects of precautionary advice and scientific uncertainty about the sufficiency of health protection, upon perceptions of risk, the sufficiency of scientific knowledge about the risk and trust in those managing the risk. In the first experiment participants (n = 246) were recruited and randomly presented with a short scenario. This informed participants about which health related precautionary measures had been taken (including a no precaution condition) and, in a second manipulation, also varied the presence or absence of scientific uncertainty (4x2 between subjects factorial design). The results showed that in the "no precaution" condition participants reported significantly lower perceived risk of electrosmog than in any of the three precautionary advice conditions. The second experiment (2x2 factorial design, n=84) used public participation as the precautionary measure and compared this with a no precaution condition (and had a similar uncertainty condition as the first experiment). Here there was no main effect of precautionary advice for risk perception and perceived quality of scientific knowledge, though a precautionary approach was found to be associated with decreased trust that the health protection of the public was assured. As noted by Weidemann and Schütz, in both experiments it is perhaps surprising that there was no effect of the uncertainty manipulation on any of the outcome variables.

This study certainly provides further support for the stance that a precautionary approach increases public concern although, bearing in mind Burgess' contention that concern was most clearly intensified for those that had high levels of pre-existing concern, it might be useful for further experimental work to consider the effect of initial levels of concern upon risk and trust judgements.

In considering the potential impact of precaution upon public perceptions it is also helpful to situate this in the context of work that has looked at evidence of the effect of uncertainty upon risk perception. There has been increased interest in this area following widespread diffusion of the view that concealing uncertainty is one of the main ways in which public trust in regulators is undermined (House of Lords, 2000; POST, 2004). The evidence for the effects of communicating uncertainty is somewhat mixed. There is a substantial body of evidence demonstrating that risk communication causes increased concern (Morgan, Slovic, Nair *et al.* 1985, McGregor, Slovic and Morgan, 1994). It has also been suggested that uncertainty negatively affects intention to get the problem solved, can be used to discount the seriousness of the threat, to excuse complacency, can easily be misinterpreted and lead to confusion (Kuhn, 2000, Roth 1990). However, other work does not find this relationship between uncertainty and increased concern (e.g. Bord and O'Connor, 1992) and Johnston and Slovic (1995, 1998) note that communication of uncertainty will increase information source credibility, the public's trust of regulatory institutions and their ability to make informed decisions which in turn is likely to affect the behavioural response to the risk information. Similarly, others draw attention to the ways in which it is claims of safety, rather than the admission of uncertainty that is mistrusted (Grove –White, Macnaughton, Mayer and Wynne, 1997).

In summary then, it would seem that there is some evidence to suggest that precautionary measures – and the communication of uncertainty - can have the effect of *increasing* public concerns. This might be considered at variance with the notion, implicit within recent policy, that precautionary action and advice will *reduce* public concerns.

The way in which the relationship between concern and precaution has been framed thus far is in many ways resonant of the perspective provided by the Social Amplification of Risk Framework (SARF; Kasperson et al. 1988, 1992). A simplistic application of SARF might

suggest that the communication of a piece of precautionary advice or action, constitutes a signal which is then responded to in terms of intensified or attenuated concern. Recent examinations of the value of SARF (Pidgeon et al. 2004, Petts et al., 2001) have rather noted the way in which people develop their appreciation of risks by drawing on multiple information sources, actively making sense of information and negotiating meanings.

In order to broaden the way in which we intend to consider the relationship between public concern and precaution, an interpretive perspective will be adopted. Recent risk research within this perspective (Horlick-Jones *et al*, 2004) emphasises the importance of accessing the active ways in which people make sense and meaning of risk 'objects'. Taking this perspective facilitates a much broader consideration of lay understandings of precautionary action and advice. Whilst giving particular attention to the ways in which precaution might increase concern or reassure, the full range of meanings that are given to precautionary advice will be explored and, importantly, the evidence that people draw upon to make these meanings will be noted.

Working within an interpretive framework, the aim of the present study therefore was to explore public understandings of the precautionary approach to risk management, in the context of MT health risks.

Method

The ways in which people make sense of precautionary advice and action were explored in a series of focus groups. Focus groups are increasingly recognised as an important tool that enable exploration of how people make sense of risk related issues by drawing on every day understandings (Morgan, 1997, Barbour and Kitzinger, 1999). They have proved a useful way of exploring risk related issues and of deriving insights relevant to risk managers (Petts *et al*,

2001; Philo, 1999, Horlick-Jones *et al*, 2004). Particularly relevant here is the notion that focus groups are a way of 'staging social microcosms in order to produce talk about risk issues which (draws) on patterns of everyday understandings' (Horlick-Jones *et al*, 2004). However alongside these strengths of focus groups it is important to note a number of possible drawbacks associated with their use (Morgan, 1997), for example, that focus group findings cannot be considered to be 'representative' in the way in which quantitative survey research is. Additionally the focus group leader has considerable influence upon determining the course that a focus group discussion takes. We endeavoured to address this primarily by the use of the clear three stage structure outlined in the Procedure below.

Nine focus groups were organised in two areas – London (Richmond) and Brighton. Five of the groups were recruited in a London Borough characterised by a high profile media debate and public protest about the siting of a mobile phone base station. The other four groups were recruited and carried out in Brighton. Groups were primarily defined by what were considered relevant similarities of experiences in relation to base-stations and mobile phones:

- In relation to base-stations, groups were defined by the level of concern prospective participants expressed in relation to the risks associated with base-stations sitings in their area and whether they have taken part in action against the sitings of base-stations. Further two groups consisted of parents of young children (aged 7-13) who protested against base-station siting and those who did not protest. These groups were recruited in London area.

- In relation to mobile phones, groups were defined by age of the participants. A further group of parents of children aged 7-13 was also recruited. They were recruited in Brighton area.

Diversity of views between and within the groups was also enabled by recruiting participants with a range of socio-demographic characteristics and varied self-reported levels of mobile phone usage (Table 1). This recruitment strategy was adopted in order to access a broad range of evaluations of precautionary approaches that related to both use of mobile phones and understandings of the possible health risks around base stations/masts.   It was not the aim in this study to attempt to explore the differences between parents and non parents or between different locations.

--Insert Table 1 about here--

The 3 parents groups were recruited through local schools. The remaining 6 groups were recruited using the services of a recruitment agency based in London. In both instances the participants were provided with a standard cover letter explaining that the study was funded through the Department of Health in order to understand perceptions of potential health risks of mobile phones and base stations. A small screening questionnaire was developed for the recruitment of the participants, to identify participants' positions on the dimensions noted in the table above.

The groups were conducted in local community centres in both London and Brighton. Discussions lasted for about one hour, and the respondents were paid a standard rate of £30 (£35 in London area) for their participation.

Procedure

In order not to make assumptions about the nature of the participants' appreciation of possible health risks or precautionary approaches, the schedule was developed to cover the material in

the three stages described below. This enabled the data to be generated systematically. The resulting conversations were recorded and fully transcribed.

(i) General discussion of the benefits, risks and regulation of mobile phones and masts. The group facilitators made no mention of precautionary approaches.

(ii) Notion of a precautionary approach to MT in the UK was introduced.

(iii) Introduction of the nature of precautionary advice (i.e. reduction of length of phone-calls, reduction of nonessential phone-calls for children, consideration of Specific Absorption Rate when purchasing mobile phone use, greater openness and involvement with publics when siting base-stations).

Group facilitators did not seek to resolve instances where lay perspectives differed from that of experts.

Analysis

The transcribed material provided a rich, detailed source of information for analysis. The analysis was carried out with the aid of qualitative analysis software (NVivo), using first, within-group analysis to develop a coding system, and then, cross-group analysis of the data, to discover regularities within the data. The software enabled the latter, by classifying the data by codes and the group, which allowed not only a clear categorisation of complex data, but also the discerning of patterns within the data. Interpretations of the patterns were developed looking at both converging and diverging views within the themes.

Results

The results of the analysis here are reported in relation to the focus group structure noted above.

Little awareness of precautionary approach to MT risk management in the UK

The first stage of all the groups consisted of a general discussion of MT in the UK. Participants were asked what they thought about the role of mobile phones in society, about their benefits to individuals and society and then about their views about possible adverse health effects associated with phones and masts. For many of the focus group participants the benefits of MT were more salient than any potential health risks. The role that they have in relation to enhancing personal security and safety was generally seen to prevail over radiation related health risks. Mobile phones have undoubtedly a ubiquitous presence in modern life. The benefits of mobile phones (particularly in relation to personal safety), were perceived as far outweighing potential health costs.

In the talk of all the groups, whether relating to either mobile phones or masts, although there was a clear recognition of the existence of scientific uncertainty, it was rarely noted that this uncertainty had been recognised by the government. Where participants were aware of particular regulatory actions, such as efforts to consult the public on the issues of mast siting, there was similarly almost no recognition that these were borne of 'taking care' or precaution in the face of uncertainty. It is not surprising, and nor was it expected of course, that precaution would be identified 'by name'. We were more particularly interested in, and sensitive to, any

evidence of talk that embodied or contained some recognition of the notion of regulatory care and its relationship with uncertainty.

Apart from the 'concerned and active protest' group (where two participants were aware of the Stewart report and specifically, were familiar with the concept of precaution), although it was widely believed that there was considerable uncertainty about whether or not there were any health risks attached to phones or base stations, there was no recognition of there being a government stance that was matched to this. On the contrary, given that they did not know what the government position was, they deduced that the likely approach was to 'wait and see' with no change of approach in the meantime.

IV   Do you know if the government has a position on the issues related to health risks of mobile telecommunications?

F   No.

[General agreement]

M   Probably wait and see.

(Brighton, 18-30 age group)

IV   Do you know what the government's strategy or position is in relation to mobile telecommunications?

F1   Probably what they usually do - listen to everybody and then ignore their views and get on with it.

F2   I don't know what their ideas are on anything, actually.

F3   It doesn't make any difference, does it?

> *F1   Probably in Tony Blair's case, as long as the mast is not affecting his children, go*
>
> *ahead and do it.*

(London, Protest group)

Precaution was discussed insofar as they felt that it would be extremely unlikely that the government would adopt such a position. One of the reasons given as to why it was unlikely was that (if the risk was indeed proven to be real) it would amount to the acceptance of liability - an unlikely strategy of any government. The argument was also made that the government would be reluctant to manage the risk partly *because* of the degree of scientific uncertainty associated with it. Here the idea of communicating uncertain health risks was seen as being irresponsible.

> *"I think they can't write stuff in case it does cause illness or tumours. What are you*
>
> *going to say? Here's a leaflet just in case this does happen in the future. This is what*
>
> *we think* might *happen*."

(London, Not concerned, not active group, male respondent)

A further argument explaining what was believed to be the absence of a regulatory response to uncertainty was seen to stem from considerable influence that mobile telecom industry wielded over the government. Alluding to the influence that industry interests were believed to have, was a strong theme across all the groups. A perceived lack of independence from industry acted as a filter for assessing the motives of regulatory action.

> *"I would have said their position must be that there's no conclusive evidence that mobile*
>
> *phones cause any sort of long term brain damage in people using them and I would*
>
> *imagine their lobbyists are Eriksson, Sony, all these people".*

(Brighton, 30-50 age group, male respondent)

"I've no knowledge of the government's strategy at all. The only thing I can think of to do with the government and mobile phones is them selling the rights to 3G airwave for £18 billion but I'm not sure why they did it that way round, but they made lots of money. But why didn't they just tax it forever, or have some way that they can still dip into this pot forever, rather than just saying, right, it's yours now; take it away and do what you want with it for the next 25 years. It seems cavalier and financially motivated and short term."

(Bighton, 18-30 age group, male respondent)

A precautionary approach was also seen as contradictory – if there was no evidence that there was anything wrong, it would then be at variance with this if precaution was to be recommended.

"It's quite contradictory to say that there are none [no evidence of risk] and then to recommend caution."

(Brighton, 18-30 age group, male respondent)

Although for all these reasons it was considered that precaution was unlikely in the current constellation of governance, it was nevertheless held by some to be welcome as people felt that it would be an evidence and demonstration of government responsibility and its willingness to respond to public concern.

"They are government. You'd hope they would run a campaign warning people, you would hope that when people bought a new phone that when they sign their contract it

was clearly stated that there is a risk involved. Just basically anywhere that's got

potential to warn people, that's what they should do."

(London, Not concerned, not active group, male respondent)

Introduction of the precautionary approach to risk management in the UK

In the second stage of the focus groups the group facilitator introduced the notion that the government *had* adopted a precautionary approach in the light of current uncertainty. The way in which this was put to the groups was that this meant that care was taken in the face of some uncertainty. The facilitator explained that there were some uncertainties in relation to health risks of MT and that some advice was issued about the areas in which precaution would be wise. Within all of the groups the main theme in response to this was that this was not the case.

"Where is the caution coming from? What is the government's response to the urging of caution that was put into this document as a conclusion to the somewhat mixed scientific results on the studies on microwaves in the human body? Where is the caution? I don't see it."

(London, Parents protest group, female respondent)

A range of evidence was cited by the participants to support their contention that the precautionary approach was *not* the approach of the government. Examination of these reasons for this contention reveals a very different conception of precaution to that outlined in the Stewart Report - one that is grounded in broader concepts of trust and independence.

Primarily, the extensive and continuing siting of masts was seen as running counter to any admission of scientific uncertainty about possible health risks associated with MT.

> *"It's a bit like bolting the stable door, really. That's the impression I'm getting. Why are they saying that now when I don't know how many masts are up?"*

(London, Protest group, female respondent)

> *"And yet they're still allowing everybody to put these masts up in the middle of the night, secretly, when there's been a great big thing going on with the people that live around it saying they don't want it. And they sneak in at four o'clock in the morning*."

(Brighton, 50+ age group, female respondent)

For this participant, the manner in which masts are reportedly erected seems to buttress her incredulity that the Government exercises particular regulatory care in the face of uncertainty.

The second theme here, alluded to above, was that the notion of precaution in the face of some uncertainty was not consistent with the perceived undue industry influence over government. This was in part inferred from the sale of licences to develop phone networks, as well as the role of industry in creating jobs.

> *"The phone companies have not shown caution because the government accepted all this money and in turn has basically given them free rein to put (masts) up wherever they want."*

(London, Parents, protest group, female respondent)

"They have to have set rules and regulations but at the end of the day they're not going to start blurting out that if you use this phone it's going to do this, this and this to you because they'd lose their money."

(London, Not concerned and not active group, female respondent)

"They're interested in wherever they can get revenue, and by having phone masts that automatically creates jobs. And then that makes the figures look better - not that the figures aren't complete rubbish as well- but that's another side issue. And it makes them look good."

(London, Protest group, male respondent)

A lack of responsive public engagement on the issue of mast planning was sometimes seen as being indicative of lack of care and concern about possible health risks. Where there had been some sort of consultation, and there was no visible evidence that this had made any difference to the outcome of the decision process, this was taken to be a substantiation of the belief that the government had an overriding agenda which remained untouched by both the legitimate concerns of interest groups and by the evidence base of scientific uncertainty.

Finally, and paradoxically, participants recognised that their initial assumptions and beliefs about the way in which MT risks are regulated did not match the new perspective of 'care in the face of uncertainty' that had been introduced into the discussion and reflexively cited *this discrepancy itself* as evidence of the implausibility of a precautionary stance. Implicit in this argument was an expectation of government openness about its risk management policies.

"Well if that was the information, we didn't know about it. They would have let us know, wouldn't they?"

(Brighton, 50+ age group, female respondent)

 "They're not doing a good job though if they've made these leaflets and no-one knows about it. It's a waste of money."

(Brighton, 18-30 age group, male respondent)

Making sense of precautionary actions and advice

In the final phase of the focus groups, the facilitator provided more detail about the precautionary approach adopted in the UK as outlined in the DoH leaflets (DH, 2000a; DH 2000b). Specifically, the group facilitator drew attention to the recommendations about mast siting near schools , recommendations around phone use for children being limited, and details of SAR values being provided with phones. This part of the discussion gave us the opportunity to explore the ways in which people made sense of this and thus to explore how, if at all, this led to expressions of concern or rather whether there was evidence that concern was assuaged and reassurance provided. It became clear that there was no simple or single type of response here. There were certainly instances of information being used to validate existing concern and of the provision of information about precautionary actions providing reassurance as well as the reassurance contingent upon the provision of information *per se*. Perhaps unsurprisingly, in the light of the results of the preceding two stages of the focus groups, one of the clearest ways in which people made sense of the details of precautionary advice was to be sceptical.

In the quote below from the young adults group in Brighton, there is a mix of responses that acknowledge what is unknown both by 'us' and government, an appreciation of the limits on what can be said or done, as well as a more direct expression of concern and some doubt about motives. There is also specific mention of the precautionary principle at work.

"IV   How does it make you feel that the government is taking this stance?

F1   Are they really?

F2   It's probably all they can say. What else can they say?

F3   I would say it's a bit worrying really.

F1   I think they just think of the money.

F2   I don't think they know any more than we do so they have to say be careful just in case there are risks that come along later.

F3   That's not only what I'm worried about though.

F2   There's plenty of other things to think about, isn't there.

F1   There's lots of things that go on in this country that the public never get to find out about anyway. So I'm sure they know more than they're letting on."

(Brighton, 18-30 age group)

There were very few expressions of concern upon learning some of the details of precautionary actions and advice around MT.   There was some evidence that hearing about precautionary advice or actions was cited as instrumental in confirming the validity of existing concern. There was no suggestion that hearing about precautionary action/advice in general was seen as initiating concern (though interestingly, there was an acknowledgement that the very fact of the existence of the focus group was grounds for the initiation of concern).

"IV   How does it make you feel that they have adopted..this strategy?

F1   It makes me think that we're right, then, with our concerns. If there were no concerns they would be presenting the evidence.

F2   We probably wouldn't be sitting here either.

M1   It's quite a harsh statement as well. It implies that something is actually wrong.

M2   But then it doesn't sit, does it? So, once again they say we won't do that, and all the figures are massaged. I do take your point about it being all governments, but I wouldn't believe anything this government says. If they said something was black I'd immediately believe it was white."

(London, Protest group)

It was clear what sorts of things *did* cause concern, for example the text below suggests that concern would be generated by the factors that might compromise a cautious course of action

F1   How do you go about being cautious? I mean that's easy words, isn't it? They can say they're being cautious but how are they going to actually put that into practice?

M1   Does that mean that if they get an application for a mast that is within a certain radius of a school or whatever, they will automatically say, no, you can't have it? It's all right being cautious and err on the side of caution but you still need to know about… the amount of radiation that they will allow or whatever. I don't know how it's measured. If the mast comes close to that level then it might be allowed, regardless of the financial implications or anything else. But I think that people don't trust the fact that a phone company that can make £20 billion per year from this will allow it to go one or two degrees over, that they won't make that decision. Obviously they're not going to allow a mast to be erected if it's quite clearly a health hazard. I don't know how it's measured but if the safety of it is ten and we say, right, we won't allow anything that goes above five and then one comes in at six, are they going to say, well, you know, it's still under ten so that's all right. Or, no. How strictly are they going to enforce it?

M2   The problem is that the governments change don't they? So this government may say, no, you can't have that and then two years down the line you might have a different government in and they say, yeah, it's all right. So that's the problem as well.

> F2   And also the relationship between the government and industry is a changeable one too."

(London, Concerned, not active group)

For other participants, understanding that the government had issued precautionary advice made no difference to what they thought about possible health risks, which they understood in terms of voluntary risks they were already taking.

> F1   I'm pregnant now and I've got a seven year old daughter. I'll worry in the future and for the next generation but not myself. I'll leave this room tonight after we've talked about this and it will go out of my head. I'm never going to worry about it.
>
> IV   What about the rest of you?
>
> F2   I'm the same. It's not something that I'm worried about. I'm quite happy using my phone. But even if they did prove something I still don't think I'd stop it. It's not like they're going to come up tomorrow and prove something so I'm not bothered.
>
> F3   It is the same with smoking really. You sort of think I don't smoke that much so I'm not going to get cancer. I don't use my phone that much so I'll be all right.
>
> F4   But you don't know genetically whether you're pre-disposed. You might be fine or you might not. You don't know.
>
> F5   But I didn't know the government had made these leaflets but it doesn't change my position. It doesn't change what I think about mobile phones, the fact that they've done a "be careful" leaflet. It doesn't really help anybody, does it?"

(Brighton, 18-30 age group)

In this context, awareness of preventative advice and actions in response to possible risks of the technology seemed problematic and caused concerns – although these were not concerns about the technology itself.

Even when faced with the concrete recommendations about ways to take precaution against the potential MT health risks, people were reluctant to take on board the government's advice. This may partly be because of the perceived control over the technology and the voluntary nature of risk exposure, and also partly due to other personal factors such as habit, personal finance and convenience. This is potently demonstrated in the context of discussing SAR values. This participant quoted below had read about SAR values in a London newspaper.

> *"The [handset] I had at the time was actually incredibly high [in SAR values]. But I'd only just got it so I didn't change it. I thought, mm, that's not good but it didn't force me to change it because I'd just got it and once you've got them you're stuck with them for 12 months unless you pay 300 quid or something. And with that knowledge I didn't use it that much. I wasn't concerned. Obviously if I'd been a business user… I would have been more concerned about it. But I am just your average user…"*
>
> (London, Not concerned, not active group, male respondent)

In the light of the benefits of mobile phones, it was claimed that even a certain warning as opposed to precautionary advice would not result in lower usage.

> *"I am sure if they said tomorrow you're guaranteed to die within five years if you use your mobile phone heavily, I doubt if you'd see a huge amount of people stop using their mobile phones. It's part of life now."*
>
> (London, Concerned, not active group, female respondent)

There was therefore only limited support from the focus groups for the suggestion that raising awareness of the government's precautionary approach to MT health risk management increases public concern: precautionary advice was apparently only related to increased concern about the technology when people were seeking to justify existing concern.

Reassurance

Some participants claimed that precautionary action or advice was the correct way of proceeding in the light of a lack of scientific certainty about MT-related health risks, especially in the long term.

> *"No, I think as the time goes on, with more and more years having gone by, and so many people have used them, perhaps then there might be something. But perhaps it's a in its infancy really at the moment. So maybe not enough time has come out. But I certainly think that for children, that is important, to give them a few guidelines. I really do think that is important. I think that's a good idea about the schools."*
>
> (Brighton, 50+ age group, female respondent)

The following extract illustrates the way in which participants made sense of the details of the precautionary approach and specifically how the notions of reassurance and negligence were discussed. To some extent openness *per se* was seen as reassuring. One participant was more sceptical about precautionary advice and saw it as the government hedging their bets. Others though claimed that assuming that there was uncertainty, issuing precautionary advice was reasonable and fitted in with the common sense attitude that excess is bad and moderation good.

IV   What do you think now that you've heard [the details of government advice]? How does it make you feel?

M1   They're not sure so they're saying, don't overuse this device or don't put it near a kid's playground. We aren't sure so be careful.

F1   It's quite reassuring I suppose, the fact that they are actually even saying anything.

IV   It is?

F2   I think it's quite negligent really because they're not sure about this but go ahead and use it anyway.

M1   They're hedging their bets.

IV   Does anyone else agree with that?

M2   I don't know. I mean, if they don't know, they don't know. So they can't say it's fine to use them because they're acknowledging there's a potential.

F1   At least they're acknowledging that there's a potential so I don't think it's that negligent.…

M2   … everything in moderation, kind of thing. Too much of anything can often be bad. Too much alcohol is bad for you but having some alcohol is not bad for you, it can be quite good for you. So, from that point of view, it fits in with the cautionary approach to things that you might do a lot. So I think that's okay.

(London, Not concerned, not active group)

Where an understanding of precautionary advice and actions were seen as reassuring this was largely expressed by participants who did not hold a clear position on the issue prior to the discussion, who did not feel concerned about the MT health risks, and who had not engaged in

actions against siting of masts. This might suggest that precaution may be reassuring in circumstances when the publics have not already positioned themselves on the issue as a result of their prior experience of the risk and the perceived (in)competence of the government's risk management, and where their self professed level of knowledge and interest in the matter is relatively low.

However, it might also be suggested here that where people were reassured this was less in relation to the technology and more in relation to the perceived capability of the government to manage risk effectively. For some it seemed a pleasant surprise that government action could be cautious and responsive in the face of uncertainty.

Scepticism

Thus far we have partly framed the content of the focus groups in line with the debate of this area to date: do precautionary approaches increase concern or reassure? We certainly found some evidence for both of these reactions and have suggested firstly that the way in which precautionary advice is understood depends both upon an initial positioning on the issue and secondly, that conclusions drawn from precautionary advice are broader than those simply relating to the risks of the technology itself and tend to expand into areas to do with the perception of integrity in those responsible for managing the risks.

However, moving away from a simple consideration of concern and reassurance, these data suggest that the participants in the focus groups often interpreted information about precautionary action and advice in a sceptical or even cynical way. In the extract below for example, people made sense of some of the details of a precautionary approach by using them to validate/warrant existing beliefs about the trustworthiness of government.

F1   Again, it's commercial gain over human health because unless something is very black and white, the government will err on the side of taking the money. They did it with Heathrow Airport. They're doing it now, and the whole mad cow thing, that was a massive cover up.

F2   That was a big cover up, I know a doctor who's a haematologist and that's her speciality.

F1   We have a precedent for not trusting them. It isn't just 'airy fairy, oh, my intuitions tell me this isn't right'. There has been a precedent for the reason why we are not trusting anything we hear from the government.

IV   What about you?

F3   I feel the same, you'll probably find in 20 years' time that the NHS is spending all this money on the risks that have come to fruition, then what happens? Do the mobile mast companies pay the NHS? Who knows? I think it's all been going on in the background and yet now you're telling us about the funding, I think it should have been a lot sooner. It's grown so quickly.

F2   In the future will mobile phones carry a health warning like cigarettes?

(London, Parents protest group)

Precautionary advice and actions were seen to confirm the perceived inability of institutions to manage risks. They were seen as a way of enabling government to cover their backs in the event of any eventuality. The rhetoric of precaution was thus seen to prepare the way for a government justification of 'well, we told you so', at a later date should fears about possible health risks of MT prove to be justified.

M   They're trying to cover themselves for later on.

> *F   But that's just their response to everything, isn't it? Yes and maybe, perhaps,*
>
> *depends on what happens. We'll see. We don't know.*

(Brighton, 18-30 age group)

The details of the precautionary approach reintroduced and highlighted the question of trust. People made sense of this new information about precaution in the light of what they believed about the proponents of the position. In order for a precautionary approach to be effective, there was an expectation of the more stringent and centrally managed regulation and control of industry. In relation to base stations it was argued that health risk regulation was subsumed under planning laws. This was perceived to be a piecemeal approach to the uncertain risk, and thus the government was perceived to contradict its own discourse of precaution. Such an argument was used to cement the general distrust of the government.

The evidence people cited against precautionary approach to MT risk management in the UK pointed to the divergence between the publics' understandings of precaution and the precautionary advice given by government.   The discourse of precaution was undermined where it was believed that there was little control over the developments in MT industry and little responsiveness to public involvement.

Discussion

The current paper has explored the impact of a precautionary approach upon people's appreciations of the potential risks of MT and of those managing them. Drawing on evidence from focus group discussions, a complex picture emerged in which publics' understandings were not primarily framed in terms of either concern or reassurance.

People made sense of precaution by drawing on a range of evidence from their understanding and experience of the costs *and* benefits of the technology as well as their often sceptical understandings of the regulatory context in which MT health risks are managed and communicated. In line with the arguments of Burgess (2004) concern about precaution was more likely to be expressed by people that said that they were *already* concerned. In this instance people used precaution to confirm their concerns about emissions from base stations and their dissatisfaction with those managing the risks. Thus the presence of a precautionary approach provided a resource to warrant existing scepticism about the regulator and relevant stakeholders. The relevance or validity of the content of the advice was often dismissed. It was more common however for those that expressed concern to react sceptically to the notion of precaution, suggesting that it was simply a strategy to minimise accountability and maximise the legitimacy of saying 'we told you so' at some future date. For those people less attentive to the possible health risks associated with the technology precaution did seem to provide some reassurance. This was not necessarily reassurance about minimising risk but rather that it was reassuring to see evidence that the government could be responsive to uncertainty.

By and large there was a consistent awareness across the groups that there was some uncertainty about whether there may be health risks associated with MT. There was almost no awareness of there being an accompanying precautionary stance, indeed for many participants – even those who expressed some concern - this was simply one of those things that would be

resolved in time and there was no necessity for precaution in the meantime. There was certainly no evidence that people thought that precaution was a response to public concern, or indeed that this would be credible. Finally, there was a considerable discrepancy between what people believed to constitute a credible precautionary approach and the details of the existing approach. When some of the content of the current precautionary approach was discussed, people drew upon a range of evidence, most of it relating to the relationship between government and industry, to suggest that precautionary actions and advice were not credible. Scepticism as to the motives of the regulator often lay at the heart of these alternative interpretations of precaution.

In accordance with other work that has used an interpretive framework for exploring the ways in which people make sense of risks, it was thus clear that people make sense of government risk management strategies in diverse ways. Framing the primary research question in terms of whether precaution led to increased concern or reassurance in many ways has proved to be an inadequate way of conceptualising the issue – even where there was evidence of concern being cemented or reassurance being grasped, this was articulated for different reasons and warranted in different ways. This further suggests the value of the interpretative framework of risk perceptions that explores the situated nature of risk responses, the active processes of making sense of risks and "informal practical modes of reasoning" (Horlick-Jones, 2005:266) that people deploy. In order to understand how notifications of hazard (Barnett and Breakwell, 2003) are interpreted, it is necessary to take account of the broader psycho-social context in which such evaluations are situated (Walls et al, 2004; (Petts, Horlick- Jones and Murdock, 2001).

It is useful here to consider the notion of 'hazard negotiations' (Breakwell and Barnett, 2001). This was developed in the context of an exploration and critique of Social Amplification Risk Framework (SARF). Rather than the more static notion of certain events triggering intensification of risk perceptions, the concept of hazard negotiations recognises that people

may often focus on different dimensions of a hazard in order to achieve particular aims at different points in time. Communication of a precautionary approach constitutes a hazard notification and this affords some opportunity for stakeholders and publics to further negotiate the nature of the hazard. The work of Stilgoe (2005) around the possible health risks of mobile phones is also relevant here as he suggests that the way in which experts define the hazard will then constrain the range of negotiations that can occur between experts and publics. He illustrates this in relation to what he terms a 'discourse of compliance' noting that the way in which the government frames the issue renders some questions that publics may have not only unanswerable but also 'unaskable'. Taking this argument one stage further it might be suggested that constraining legitimate questions in this way may have the effect of energising concerned publics to negotiate a focus on particular aspects of the hazard or to present concerns in particular ways. For example, Irwin (1995) and Burningham (2000) explore how the form of local decision making processes may encourage responses that can be easily characterised as NIMBY ('not in my back yard'). For example, planning regulations encourage concerned publics to cite private concerns relating to aesthetics or noise as reasons for their disquiet. These arguments also allow us to consider the possibility that public responses that are labelled by experts as concern ostensibly about one thing, may be a reflection of much broader areas of disquiet (Horlick-Jones, 2005). It would thus not be surprising that such concerns cannot be assuaged with precautionary actions and advice. Colloquially, these may be scratching where people are not itching.

Consideration of how people make sense of precaution against a range of personal and social contexts also draws attention to the importance of being sensitive to how understandings of precaution change over time and how they vary in relation to different technologies.   In the focus groups, although people were familiar with such maxims as 'better safe than sorry' which can serve to make sense of precaution, it was clearly an inconspicuous concept in relation to risk regulation. Established and well known precautionary practices will be made sense of in possibly quite different ways.

Different methods, different findings?

In addressing the relationships between the current findings and the previous evidence that precautionary approaches to risk management raise concern (e.g. Burgess, 2004; Weidemann and Schütz, 2005) it is important to raise the question of the potential impact of the methods used upon the conclusions reached (Horlick-Jones *et al*., 2004). The structure of the focus groups in this work allowed participants to consider notions of precaution within a broad context, part of which consisted of a focus on the benefits that mobile phones afford.

In contrast, the experimental work of Weidemann and Schütz, (2005) was largely devoid of such context and little detail was included in their manipulations of uncertainty and precaution. The constrained response options of the outcome measures inherent in questionnaire designs also limits the extent to which individual interpretations can be brought to bear upon answering the questions (Fowler and Mangione, 1990; Schwartz, 1999). Under these circumstances it is possible that precaution and risk are conflated such that precaution signalled heightened risk. Participants are sensitive to the presence or absence of cues provided by the research environment itself (Schwartz and Sudman, 1992; Houtkoop-Steenstra, 2000) and certainly predetermined and constrained response options provides quite a different sense making context than the wide ranging discussion of both the benefits and the possible risks (health and otherwise) of MT than is possible in focus groups.

Implications

As noted earlier, the current precautionary approach to managing the potential health risks of MTs has been framed as a response to public concern. The IEGMP Committee was set up in response to public concern and the recommendations of the report itself and the subsequent

government response made it clear that precaution was presumed to have the effect of reducing public concern. The focus groups certainly provided little evidence that people interpreted the measures as providing reassurance. If precautionary measures are advocated in order to reduce concern and they do not do this, what is the implication of this?

As noted above some have strongly argued that responding to public concern by introducing precaution is unwarranted (Morris, 2000; Durodie, 2003). This paper has suggested that there is little evidence that within the current constellation of governance precautionary approaches attenuate public concerns. The work of Stirling (2002, 2004) provides an alternative model of lay involvement in the social appraisal of risk and the development of precautionary approaches. Within this, the focus is not upon developing a new set of decision rules in order to respond to or reduce public concern.   He rather suggests that precaution is best understood as a process of engaging lay perspectives in dealing with uncertainties. This is a much more proactive model of lay involvement, contrasting with the more reactive notion of experts taking public concern into account. The core of this perspective is that 'the social appraisal process be as open to the perspectives of those who stand to be affected by a course of action, as those proposing it' (Stirling, 2002). Stirling suggests that a precautionary approach involves the adoption of 'more long term, holistic, integrated and inclusive social processes for the governance of risk than are typically embodied in conventional risk assessment' (p.22). Arguably this approach largely renders the question of whether precaution heightens or reduces public concern redundant. Instead, precaution is seen as enabling a new paradigm of decision-making in regulating science and technology that seeks to actively engage the public, thus creating new conditions for risk management.

In conclusion, the data reported here have suggested the value of exploring public understandings of precaution more broadly than simply in relation to the role that they may have in intensifying or attenuating concerns. In developing this within an interpretive framework a variety of understandings of precaution have been evident that are based on appreciations of possible risks and benefits of MT. More broadly, the nature and validity of

precautionary approaches to managing MT risks are understood in the context of the institutions

considered responsible for managing these.

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Table 1: Summary of focus groups

Group	Number of participants	Gender mix	Other recruitment characteristics
Brighton, 18-30 age group	7	M & F	High, medium, low and non-mobile phone users
Brighton, 30-50 age group	8	M & F	High, medium, low and non-mobile phone users
Brighton, 50+	7	M & F	High, medium, low and non-mobile phone users
Brighton, parents (children 7-13)	6	M & F	High, medium, low and non-mobile phone users
London, Not concerned, not active group	7	M & F	Age spread
London, Concerned, not active group	7	M & F	Age spread
London, Protest group	7	M & F	Age spread
London, Protesting parents (children 7-13)	4	F	Age spread
London, Non-protesting parents (children 7-13)	6	M & F	Age spread