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Comparing national responses to perceived health risks from mobile phone masts

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Abstract   *This article concerns responses to health risk concerns about electromagnetic emissions from mobile phone masts. The article draws particular attention to the differential patterns of state response in the UK, USA, Italy, Ireland and Australia. It concludes that precautionary government responses have played a role in the 'social construction' of risk perceptions.*

Key words: risk, health, mobile phones, state responses

The social construction of risk and precaution

This article is concerned with the perception and reaction to health risks associated with mobile phones and now, more prominently, their supporting network of 'masts'. These masts have stimulated local protest in numerous countries, increasingly expressed in terms of their alleged risk to health. The response to the articulation of these risk concerns has taken different forms, and has been of markedly different magnitudes in different countries.

The paper is located within, and influenced by, other studies of risk perception. But it is also intended as a contribution towards an explicitly 'social constructionist' approach to environmental risk issues. More specifically it highlights the role of 'precautionary' state responses in constructing heightened reactions to risk. This paper suggests that the character of the state's response itself has had an impact upon the profile of this risk concern, and subsequently the confidence with which risk claims have been advanced by campaigners and other 'claims makers'. This factor plays an important role in explaining the very different evolution of this same issue in different societies.

The constructionist approach developed in the 1970s (Spector and Kitsuse, 1977). Analysis concerns 'claims'—the rhetoric used to define social problems and promote policy solutions for them; the 'claims makers' who advance these claims; and how 'key players' and institutions respond. These influences determine whether a problem defined by a group or individual becomes one for society more widely. It is an approach which understands that perception need not have any direct relationship to the problem that it reflects. Social

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constructionism is also an identifiable influence in approaches to risk. A clearly stated, 'strong' (Lupton, 1999: p. 28) social constructionist approach to risk proceeds from a recognition that 'Nothing is a risk in itself … But … anything can be a risk' (Ewald, 1993: p. 199). Risks are constructed through the interaction of 'claims makers' positing a risk, with other 'players' and influences. A recent contribution describes six factors that are necessary for successful social construction of environmental problems (Irwin, 2001: p. 21).

The relative independence of risk perceptions from more objective risk assessments has been central to the social science of risk since its inception. In the first widely cited article, Starr (1969) explored the disjuncture between imposed risks and those accepted voluntarily, such as smoking. Others, such as Slovic and his collaborators (see, for example, Slovic, 1987) later emphasised such factors as lack of control, and the way in which technological risks and benefits are distributed. Also influential was the cultural symbolic approach pioneered by Douglas and Wildavsky (1982). They present risk perception as culturally constructed; locating perceptions of hazards in the needs of a particular culture to maintain order and police its boundaries. Subsequent work by Wildavsky in his own right frontally challenged risk claims such as over DDT (Wildavsky, 1995). Other American work has posited the notion of 'phantom risks', including the perception of harm from electromagnetism, as in the case of mobile phone risk (Foster *et al.*, 1999). Case studies have traced the development of particular risk issues (Cole, 1993; Angell, 1997). In the UK, Bate (1997) has contested the 'reality' of influential risk perceptions from a similar perspective. Some of this largely pro-scientific literature is useful in identifying the important influences that shape concerns. However, it is concerned principally with factually challenging risk claims, rather than unravelling how they were socially and politically constructed. Other American research has proceeded from a social constructionist perspective (Johnson and Covello, 1987; Hilgartner, 1992).

Explicitly constructionist analysis is less common in Europe, the few frequently cited contributions being principally short theoretical reflections (Ewald, 1993; Fox, 1999). Socio-logical work on risk has been more concerned with the wider generation of risk from a perceived crisis of modernity, and with the reaction of communities 'at risk'. These approaches have not encouraged either an implicit or explicit constructionist perspective. The 'reflexive modernization' perspective of Beck (1992, 1999) and Giddens (1990, 1991) derived from social theory has been very influential. Risk is here 'created' only in the most general sense, as the impact of industrial modernisation upon the environment acts back upon, and has become inseparable from, society and the individual. The (environmental) risks that surround us as a consequence are largely treated as given, while the suggestion that perceptions might also be located in changing experiences of society such as greater individ-ualisation have not been developed. Indeed, there is little empirically based risk research from a sociological perspective in the UK per se (Reilly, 1998; Scott *et al.*, 1998; Eldridge, 1999).

American environmental sociology has extensively analysed many local risk controversies, such as over the siting of waste facilities. Most of this work reflects an assumption that these risks were significant, and that community reaction was justified (e.g. Brown and Mikkelsen, 1990; Couch and Kroll-Smith, 1991). The construction of claims has rarely been critically interrogated in this literature. On both sides of the Atlantic there is little sociological work on environmental risk issues from a social constructionist perspective. Recent work on the sociology of the environment (Irwin, 2001) identifies only one text as clearly social construc-tionist in its approach (Hannigan, 1995), and another that is more indirectly so (Macnaghten and Urry, 1998).

Despite the influence of social constructionist perspectives in the (non-sociological) risk literature, the role of the state has not been examined extensively. The focus of contemporary

social constructionism is upon the 'claims makers' advancing the problem, and the subsequent influence of scientific authorities, the media, and pressure groups (Best, 1995). Detailed studies of the evolution of particular risk concerns are typically also concerned with these more direct 'players'—although the very direct impact of state regulatory bodies is central to the plot of some accounts (Cole, 1993; Angell, 1997). A wider, more classificatory approach towards the role of state reaction in the social construction of risk issues is less common, however. Hood *et al.* (1999) identify variations in the form and extent of state regulation of health-related hazards, but do not consider the more active impact of state policy on the evolution of a particular issue.

The extent to which authority engages with, and thereby potentially legitimises risk concerns is rarely actively considered. This is consistent with the wider contemporary perception that scientific and political institutions are too slow to respond to public awareness of risk. However, it is implausible to suggest that the role of governments in the 'risk society' is limited to passive reaction to public concerns. Almost by definition, what is a risk 'issue' is itself determined by the extent and character of government reaction. There is also a more particular sense in which official risk responses potentially animate and cohere otherwise diffuse anxieties. More than ever, potential risk is seen to be pervasive. It is notable that new risks from different food products are regularly identified in the UK, for example. Yet it is increasingly difficult to measure, or even contextualise, these many potential hazards. Few cause demonstrable and widespread human harm. Typically, the alarm is sounded on the basis of a possible (future) threat, such as the UK Food Standards Agency's warning in May 2001 that 'cancer causing chemicals' from funeral pyres used to burn animal carcasses could infect milk on nearby farms (*The Times*, 26 May 2001). In these circumstances, it is precautionary official warnings or measures themselves that can confirm concern was warranted—largely on the 'common sense' assumption that there is 'no smoke without fire'. According to Ewald, if a risk is perceived, then it is real, and therefore even a 'phantom risk' can acquire a life of its own, and apparently justify the original precautionary response:

> Risk has an allusive, insidious potential existence … Assumed to be everywhere, it founds a politics of prevention. The term prevention does not indicate simply a practice based on the maxim that an ounce of prevention is worth a pound of cure, but also the assumption that *if prevention is necessary it is because danger exists.* (Ewald, 1993: p. 221, emphasis added)

Ewald's argument that precaution confirms the 'reality' of danger appears pertinent in the British mobile phone case.

The UK: the politics of precaution

Evidence from the mobile phones and health example suggests that an active anticipatory approach to risk issues plays a role in raising the profile of risk issues. Even if originally only intended to 'head off' potential accusations of complacency, such a response can further stimulate risk concerns. In the British case, campaigners' concerns about mobile phone masts have increased subsequent to the government's precautionary response, embodied in the initiation and findings of the Independent Expert Group on Mobile Phones (IEGMP, also commonly referred to as the Stewart inquiry). That inquiry was set up by Tessa Jowell, Minister of State for Public Health, in order for the government's response to be proactive, given, as she explained before a House of Commons Select Committee, the: 'considerable amount of media interest, media concern about the potential ill effects on health from mobile phones'. Jowell went on to make clear that in, 'an area like this … it is very important that

we … work very hard to *keep ahead of public anxiety* [my emphasis] …' (House of Commons Science and Technology Committee, 1999: p. 1). It was in this anticipatory and precautionary spirit that the IEGMP was commissioned, publishing its findings in May 2000.

In its method of operation and its conclusions, the IEGMP went a considerable way to acknowledging and accommodating mobile EMF concerns. Unusually for an inquiry expected to restrict itself to a review of the latest scientific knowledge on mobile electromagnetism, the remit was extended to the non-scientific terrain of public concerns about masts and childrens' mobile usage. The IEGMP's report then advocated a precautionary approach to these issues in particular, despite the report's own acknowledgement that: 'the balance of evidence does not suggest that mobile phone technologies put the health of the general population … at risk' (IEGMP, 2000: p. iii). This unsurprising conclusion is consistent with established assessments from other expert bodies (WHO, 2000). All acknowledged authorities in the field note, in particular, that whilst there remains a theoretical possibility of human impact from mobile handsets (as they are continuously held against the head), it is virtually inconceivable that masts can make any clear negative human impact.

Concern about masts near schools was subsequently taken up by the UK Department for Education, and precautionary safety advice leaflets were published. Yet despite local anti-mast campaigners welcoming (and surprise) at the inquiry's endorsement of their concerns, they formed a national anti-mast campaign 6 months later. Mast Action UK was launched at the House of Commons in December 2001 to campaign for the 'sensible siting of masts'. Whatever the logical curiosities of campaigning against mobile masts rather than handsets, the scope of protest has increased with the creation of the national campaign. Mast Action UK was the subject of a BBC documentary in January 2001 (*Second Sight*, BBC2, 11 January 2001), and of numerous media reports. The scope of protest was extended, with 'pickets' of an Orange call centre in early 2001, for example. In turn, further governmental concessions were announced on mast planning regulations during March 2001. In April, the Commons Trade and Industry Select Committee complained that these concessions do not go far enough, indicating that a discernible dynamic has been established around restrictions on mast erection. There is considerable concern within the mobile industry over how to erect the new network of masts necessary for the 'third generation' of mobile phones.

In the UK, campaigners' concerns have continued to 'keep ahead' of the government's response, fuelled, arguably, by the precautionary government response itself. Individual politicians and political institutions have absorbed campaign concerns, and in turn put pressure on other sections of the state. Interviews with campaigners confirm the extent to which they were encouraged by state responsiveness—both in their conviction that precaution was an appropriate, even essential, response and that campaigning activity could and should be further pursued.[1] Campaigners were particularly encouraged by the readiness of the Northern Ireland and Welsh assemblies, and the Scottish parliament, to meet them and address their concerns.[2] Meanwhile, as health concerns about mobile phone masts have acquired a political dynamic, the majority of Britons continue to use mobile phones, suggesting a pragmatic acceptance of risk in the name of utility and convenience.

Despite initiatives intended to quell anxiety, concern has not abated. Sometimes confusing precautionary advice, such as the limiting of children's exposure suggested by the Stewart inquiry, may have actually increased public anxiety. Such a consequence is consistent with earlier psychometric studies on attitudes towards electricity pylon emissions and other

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1. Open-ended interviews with 20 groups of campaigners were carried out during the summer/autumn of 2000.
2. During an interview on 1 November 2000, for example, a representative of Gower Residents Against Mobile Masts (GRAMM) indicated how encouraged she was by the readiness of a representative of the Welsh assembly to discuss and act upon their concerns.

perceived risks that have been the subject of information campaigns (MacGregor *et al.*, 1994). In these studies it was found that even balanced public information on negligible risks tends to increase anxiety, on the assumption that *there must be something to worry about if the government is taking action*. Implementing precautionary measures on the basis of 'awaiting conclusive evidence' may also be logically misconceived. Hypothetical risks, in particular, are not susceptible to categorical refutation through scientific proof. Scientific research into such risks rarely has a revelatory character, but is concerned with the progressive shifting in the balance of probabilities. What's more, contemporary 'risk consciousness' as reflected by the media appears uninterested in further confirmations of (relative) safety. Major American research recently found again that there is no relationship between EMF and cancer, but it was scarcely reported in the UK (Muscat *et al.*, 2000; Inskip, 2001).

American containment of mobile mast health issues

'Microwave concerns' comparable to those over mobiles began earlier in the USA (Steneck, 1984), driven by journalistic revelation.[3] Health fears specific to mobile phones were triggered by a lawsuit in 1990. A man, David Reynard, alleged that his wife's cancer was the result of exposure to mobile radiation. The case was covered extensively by the media. A poll found that half of all Americans knew about the case (*Microwave News*, January/February 1993), and shares in mobile phone companies plummeted. A federal advisory committee on mobile phones was announced. Many other lawsuits have followed and failed, and the American mobile industry (rather than the state) has committed substantial funds for research into health effects.

Opposition to masts began around the time of the Reynard case and, by 1993, local opposition groups were being reported in regional news. At the state level, the issue centred on towers situated near schools. San Francisco became the first major city to ban towers from school property in late 1993. The decision was based on the view that there was no need to expose children to something that 'was not yet thoroughly studied' (*Microwave News*, November/December 1993). By May 1999 there were estimated to be at least 70 community groups across the USA. US campaigners do not restrict themselves to EMF emissions from mobile base stations, however, but express concern about a wider range of facilities such as radar and television.

The mobile phone industry became frustrated at local attempts to prevent or slow down the roll out of its infrastructure. They complained that some localities were setting exposure standards more stringent than official guidelines, and were preventing towers being erected near schools. They petitioned Congress and won a tactical victory in 1995 when President Clinton ordered federal facilities to be made available for mobile masts. Industry pressure eventually led to the Telecommunications Act of 1996, which sought to establish a standard over all zoning jurisdictions in the USA. It explicitly sought to: 'encourage the rapid deployment of new telecommunications technologies' and minimise potential hindrances (Tuesley, 1999: p. 892). The federal pre-emption of safety issues made it possible for contested antennae to be erected in a number of cities, and local bodies were forbidden from establishing safety standards below federal limits.

Despite legal challenges to the legislation and initial stalling measures by city councils, federal regulation of the mobile tower issue prevented the setting of local standards, and effectively contained the issue within debates about local versus national control. This seems to have been instrumental in preventing health from emerging as the dominant campaigning

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3. Paul Brodeur (1977) almost single-handedly established modern microwave concerns in America.

focus, and health claims were rendered marginal. Despite the numerous lawsuits related to handsets, health concerns are comparatively undeveloped, and have not been successfully generalised to masts. Local control and aesthetic issues have instead been to the fore. After the Telecommunications Act 1996, aesthetic objections became one of the few bases upon which local government could block mast erection. The most influential protests are in areas of natural beauty such as Lookout Mountain in Colorado, and much of the (limited) campaign political influence in Congress and the House of Representatives comes from the scenic state of Vermont. In the USA, health-based campaigners such as the Council on Wireless Technology Impacts are now quite reliant upon the diffusion of reports from abroad, particularly the UK, to sustain their momentum. The Stewart inquiry has proved to be an important reference point. Nevertheless, they remain far more marginalised than in Britain. Unlike in the USA, by contrast, health risk campaigners in Australia are neither marginal nor politically isolated.

Australia—precautionary accommodation of risk activism

The context for widespread reaction against mobile phone masts in urban Australian centres, which so suddenly appeared in the early 1990s, was earlier activity against powerlines. Concern developed from the mid-1980s, becoming a public issue around 1989. The power-line experience also provided a model for an accommodatory industry response.[4] Anti-pylon campaigns led to numerous government inquiries, all suggesting concern could not simply be dismissed, and created the possibility for an institutionalised precautionary response. A number of organised activist groupings emerged, and their complaints have been consistently based on health worries about electromagnetism.

The mobile phone mast issue was ignited by a confrontation in Sydney in 1994, when protestors against a bank of transmitters chained themselves to a fence, some with their children. Within 2 weeks of media pressure the transmitter was switched off. Television reports hailed 'people's power'. An MP described the event as showing: 'that battlers, the little people, mums and dads, can win' (Chapman and Wutzke, 1998: p. 619). Soon after, similar battles erupted in another suburb, and then elsewhere, continuing into 1996. The ElectroMagnetic Radiation Alliance Australia (EMRAA) was formed, and activists began addressing local meetings. Health effects were a 'hot issue' in Australia throughout 1997 (*Microwave News*, July/August 1997). Concern did not subsequently recede as it had in the USA. The issue was reignited in 1999 by the 'catch up' roll out of a mobile infrastructure by a new company. Early in 2000, in just 5 weeks, some 16 action groups were established in Brisbane alone, generating widespread media exposure.

The absorption of mobile health concerns in Australia has become more systematic at the institutional level than in the USA. Political backing is not confined to a few individuals. The Australian Democrats advocated: the transfer of authority over policy decisions to the Department of Health; requirements that health complaints related to mobile use be recorded; restrictions on marketing to young people; and a ban on masts near school property. Funding for research has not been confined to industry. In an implicit statement that this is a national problem, the government announced a 5 year $3.5 million project on health effects in 1996, and more funding in 1998. A major Senate inquiry was initiated, which reported in May 2001.

State accommodation to EMF health concerns in Australia began locally. One Sydney council proposed low exposure limits in 1996, and the Queensland Democrats passed a

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4. An industry seminar was held in the mid-1990s with risk communication guru Peter Sandman.

motion opposing antennae on schools. When a Sydney council established the first local restriction policy on masts, several others followed. At the national level, the Ministry of Education declared in 1996 that towers would not be allowed near state schools, and advocated 'prudent avoidance' with regard to children's exposure. The Telecommunications Act of 1997 removed from carriers erecting towers immunity from state and local regulations.

A tripartite relationship has emerged between carriers, government and activists. Confronted by determinedly non-scientific, even anti-scientific, public attitudes from the beginning, representatives of science and industry made an early assessment that such attitudes had to be appeased rather than confronted. Local, and then national, government followed suit and, with the second wave of reaction against masts in 1999, the structures of this tripartite relationship took shape. EMRAA has been brought into a consultative role by the state. In late 1999, the Australian Communications Authority suggested a precautionary code of practice, and that a numerical exposure standard be set by regulatory bodies that included representatives from EMRAA. The new code of practice is explicitly precautionary in its approach to the siting, design and operation of all telecommunications radio equipment: suppliers must provide information, document decisions and minimise emissions. They are bound to agree with councils on a community-wide consultation process involving a wide range of measures. Suppliers must make the public aware of health issues, not simply that a mast is to be erected. They have to provide information about compliance of the facility with radio frequency (RF) limits, emission levels and other sources of information. Suppliers are also bound to operate at the lowest possible power levels. In 1999, the EME Reference Group was established under the Ministry of Health to provide a national forum for addressing concerns about EMF. This body has two representatives from EMRAA. In 2000, the Australian Senate also held its own inquiry into EMF. There were also educational 'road shows' touring major cities as part of this process in early 2001.

With such a high level of state involvement in public initiatives, profile of this risk issue has, unsurprisingly, increased. The Senate Committee inquiring into health concerns is chaired by the leading political supporter of the idea of mobile risk, Senator Lyn Allison. She made a considerable impact with her protests against the marketing of mobiles to children in late 1999, for example. It is not only the Democrats who have politicised health concerns. At the state level, the Greens have played an important role, and the Shadow (Labour) Minister has demanded legislative changes. Unions and state council bodies have similarly embraced the issue. Health risks receive widespread attention in the media and shielding devices appear to be more routinely promoted than in any other country. The conclusions of the Senate inquiry have ensured further controversy and profile for the issue. Irreconcilable conflicts among the senators led to profound and open disagreement over the interpretation of evidence, with the official government representative on the inquiry denouncing it as a 'complete waste of time'.[5]

Ireland—economic imperatives prevent politicisation?

Ireland figured prominently from 1996 until 1998 as a centre of opposition to base stations. There was a ready-made framework for campaigning resulting from the reaction (from around 1994) to the impact of electricity pylons on the rural landscape. The siting of mobile phone masts began to be contested by residents following local meetings in response to planning issues. Many of the masts were erected on police property, others on the land of local farmers. Latent hostility to these groups meant that confrontations were often highly

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5. The full report is available at < http://www.aph.gov.au/senate/committee/ecitacttee/Emr/index.htm >.

charged. In 1998 it was felt necessary to bring in 120 riot police to seal off the village of Kerrykeel in Donegal for the erection of an antenna. Judging by the force of early protest, Ireland was set to become an important focus for international mobile EMF concern. Yet only 2 years later the issue has largely faded from view.

By 1998, industry and government alike felt compelled to respond to the growing tide of disapproval. Irish Telecom firm Eircell released a report insisting that families had nothing to fear from masts. At the state level, three government departments sponsored a conference eventually held at Dublin Castle in March 1998. Initially intended for local authorities and health boards, members of the public were also allowed to attend. The conference was addressed by leading scientific authorities and was widely regarded as a balanced consideration of the issues. Beyond the Dublin Castle meeting, the issue was not politicised, however. None of the main political parties, or even individual politicians, prominently identified themselves with the issue. There appears to be a widespread recognition among government and politicians that Ireland is too small a country to afford a fundamental questioning of the economic opportunities associated with the expansion of the mobile phone network.

Without the engagement of national politicians, localised protest has not acquired a wider profile in Ireland. Although there are local forums for discussing planning applications, there is no regional authority making it possible for local rulings to define national policy. Increasingly, in 1999 and 2000, local 'environmental' protest centred on opposition to land-fill sites rather than mobile masts, although new operator Digifone is experiencing some local resistance.

Italy—'non-scientific precaution'

Italians have enthusiastically embraced the mobile phone, with levels of usage comparable to Scandinavian and British populations. Yet in Italy a decree on exposure of the public to RF fields was enforced in January 1999, which was substantially at odds with international guidelines—as low as one-hundredth of recognised exposure levels. Italy has found itself isolated in the EU as a consequence of its extreme precautionary position. At a Council meeting in 1999, it was the only country to vote against the EU's recommendation that international guidelines be followed, and a common standard thereby endorsed. A further law for protection from 'electromagnetic pollution' was passed in Italy in 2001, endorsing its almost unique position of 'non-scientific precaution' (Foster et al., 2000). In April 2001, the issue became politically dominant with a high-profile row over radio broadcast towers operated by the Vatican. The new laws concerning mobile phone towers cover all EMF emissions, including radio, and Vatican officials faced criminal charges. There have already been other 'electrosmog' prosecutions and it remains a high-profile media issue. Responding to such heightened sensitivities, an Italian mobile operator is offering an Internet service indicating daily levels of emissions from masts. The issue's distinctively high profile in regulation is the combined result of the influence of the Green Party in Italian national politics, the role and power of (local) judges, and differing attitudes taken by different parts of the state regulatory machine. Together they have produced a unique sensitivity towards EMF.

The Italian approach to mobile telephony originated in, and remains bound up with, controversy over pylons, as it has elsewhere. Italian opposition to powerline erection began in the early 1980s. The involvement of environmental groups, most importantly the Green Party, which was then an opposition force in parliament, transformed sporadic local protests into a campaign for exposure limits that had no basis in scientific data. An early turning point for such precautionary measures came in Tuscany in 1985, when the state electricity

company ENEL was prevented by a local judge from installing a powerline because of 'uncertainties' rather than identifiable health risks. A new environmental association emerged—Legambiente (League for the Environment)—as well as numerous citizens' groups. Opposition to powerlines multiplied, to the extent that the state electricity provider found local legal decisions made routine construction increasingly difficult, and was forced to abandon some projects. In 1996, the Green Party assumed control of the Ministry of the Environment, thereby becoming responsible for regulations on EMF exposure. Even as part of the government, the Greens have continued their oppositional campaigning activity, contesting international exposure limits. Green Party anti-EMF sentiments effectively became official government policy.

One institution within the state regulatory apparatus has gone even further beyond the consensus established among other bodies in the field. The National Institute for Prevention and Safety at Work (ISPESL) has argued for a differently derived EMF safety standard from other Italian and international authorities. Moving beyond occupational exposure to EMF, the Institute has increasingly been concerned with the exposure of the public. Like the Greens, it takes an oppositional stance at the same time as being formally bound up with the state. In November 1999 it organised an international symposium with the Minister of the Environment and vociferous international anti-EMF campaigners. ISPESL insisted that the government implement stricter guidelines, in opposition to the EU consensus. The curious consequence is that, while Italian representatives on the EU scientific steering committee concurred with the established scientific approach, there was national rejection of this position, driven by ISPESL and the Greens.

Distinctive national developments have interacted with regional influence. Italian regions are permitted local laws in areas such as health. At the same time, they are subject to the influence and encouragement of state decrees. The national decree in 1999 encouraged regional authorities to implement ever more restrictive standards on all sources of EMF emissions. In January 2000, Veneto set an exposure limit even lower than the precautionary national level. This restrictive standard appears to have increased opposition to powerlines in the region and similar laws have been proposed in other regions. The functioning of the law is also distinctive. Judges dealing with specialised matters choose their own technical adviser—judgment can therefore be based upon individual opinion rather than the views of the scientific community. Despite the ultra-low permitted emission levels, court rulings preventing the operation of transmitters can nonetheless be interpreted as proof of danger. Local restrictions also form the basis for more restrictive national laws. Following a lawsuit in February 2000 over a powerline near a school in Veneto, parents withdrew their children from school. The Ministry of the Environment subsequently recommended that Italian regulations fall in line with the restrictive Veneto law, and the court has given notice that ENEL is under investigation.

Even greater concern has now emerged around mobile masts. The campaign against base stations has intensified since the 1998 decree on exposure to weak EMF fields. The two appear to be related; the non-science-based precautionary policy seems to have fuelled anxiety about EMF more widely, as restrictive limits appear to the public to indicate official recognition of hazardous risk. After the Veneto case, the judge urged citizens from all around the country to report suspected cases of health problems associated with EMF exposure. Over 10,000 reports were collected in less than 1 month, the majority of complaints relating to mobile base stations. Several local rulings have limited base station operation until health fears are 'proven' to be unfounded. In late 2000, regional authorities were taking it upon themselves to educate the public about EMF dangers. The authority in Emilia Romagna began a 'communication campaign' in March 2000 in all the cities of the region. Later, it

initiated a more intensive effort with provincial seminars, an exhibition, a regional confer-
ence, and a school environmental education programme.

A dynamic was evidently created by the combination of factors in the Italian situation. Limits, established by regional authorities and local judges, are perceived as hazard thresholds suggesting danger levels, rather than an essentially arbitrary level determined by political and legal considerations. Once such a limit is set in one region or at one level of the state, it implies that higher levels in existence elsewhere are putting the population at risk. Institutions are bound to respond, for fear of being branded irresponsible, thus creating an escalating cycle of precaution. This process has been encouraged at the level of centralised state authority. The Italian state has isolated itself internationally on the issue. But, as at the local level, the fact that it has created differential EMF safety standards internationally now invites the accusation that those not following the Italian precautionary stance are paying insufficient regard to the health of their citizens (Foster *et al.*, 2000).

Understanding patterns of reaction to mobile EMF risk

It would appear to be a complex combination of factors that determines in each case whether health concerns become an issue within society. There are no straightforward relationships between the advance of health claims and phenomena such as mobile phone ownership levels, although the existence of an extensive mobile network is a prerequisite for any popularisation of concerns. In Scandinavian countries, the high levels of mobile usage and number of masts seems at odds with their lack of health concerns. Mobiles became culturally established as a necessity at an early stage of their development in the early 1980s. In Finland, Nokia, which manufactures mobiles, is a major employer and virtually a national institution. Such factors would appear to direct politicians and influential individuals away from accom-
modating minority fears.

Neither is the extent of reaction within different societies and institutions simply a function of the number of people adversely affected by mobile phone EMF. There are not significant numbers of people claiming personal experience of adverse health effects in any society. One factor that does appear to have a bearing on the development of mobile health claims is the extent of comparable anxieties and campaigning over other risk issues that might provide a vehicle for demands for increased regulation. There appears to have been a ready transfer-
ence of anxieties about electrical powerlines to mobile masts. On the other hand, there are several potential risk competitors to mobile phone EMF that could otherwise animate and engage individuals and institutions. This seems to be a particularly important factor in the USA, where there are innumerable 'citizens'' lobby groups promoting rival 'claims', and a highly developed system through which their influence is brought to bear.

Reactions reflect, and are absorbed into, existing cultural, social and political patterns. The American response has been articulated and pursued through the law, reflecting the elevated position of jurisprudence in the regulation of that society. The issue has been confined to individual legal claims, and the discussion about how the government should respond to public fears is muted. The importance of existing social and political patterns is also evident in the Italian case, where concerns have been absorbed through diffuse state authority and focused on regional policing of EMF emissions.

In all of the societies discussed, mobile masts seem unwelcome when they are close to individuals' homes and children's schools. Unlike the presence of a nuclear power plant, for example, which can overshadow a whole community, mobile phone and mast fears rarely have any wider, unassisted local or regional impact. Whether such reactions combine to gain a wider profile is usually in the first instance most dependent upon the

receptivity of the media. The responsiveness of the media itself reflects dominant cultural concerns. British and Italian media have readily responded to the issue, arguably reflecting a wider resonance for health threats. The national media in Scandinavian countries have proved less receptive.

The different responses of state institutions and representatives to the articulation of public concerns through the media are important in determining the subsequent pattern of the issue's development. It is through being taken seriously by state bodies that allegations about hypothetical risks have been able to command authority and acquire momentum beyond the immediate reactions of some individuals in each locality. In Australia, national politicians immediately seized upon the first significant confrontation over a mast siting to align themselves with 'the people'. This was an important early moment in establishing a route for absorbing EMF activists into a policy-making role with the state, and thereby ensuring a sustained profile for the issue. In Ireland, by contrast, politicians and state bodies remained aloof, despite heated confrontations over mast siting.

In the absence of demonstrable effects, health concerns require external confirmation and validation. Such confirmation can come about through a variety of means. The Italian case of local judges unilaterally declaring masts unsafe, regional authorities setting their own non-scientific standards, and national political parties and authoritative institutions encouraging safety doubts, demonstrate the process most clearly. The combination of these different elements resulted in heightened safety concern and a standard of 'public protection' from EMF at odds with the rest of the EU. On the other hand, where the state has either not systematically engaged with EMF concern, or acted to ostensibly contain responses, claims have been less successful in agenda forming. Alongside a combination of other factors, the US Federal Communication Act marginalised health concerns. The Irish government provided one national forum for discussion on potential health impacts but steered clear of raising the issue any further. More generally, in countries such as Japan, where 'post-political' concerns such as health have not yet entered the political realm, economic imperatives appear to marginalise such claims. Elsewhere, such as in Germany, the government resolved simply to provide research funds and postpone further response until cause for concern has been substantiated.

Other conjunctural factors have been important. Most striking is the 'post-BSE' climate of caution determining policy towards public risk issues. The reaction to the experience of 'mad cow disease' in the UK during the 1990s has been to establish a rejection of contextualising, or playing down, of potential risks throughout Europe (Durodie, 1999). Instead, it is understood to be essential that even small or potential risks are brought to the public's attention as early as possible, an approach institutionalised with the embracing of the 'precautionary principle' by the EU (Durodie, 1999).

It is widely recognised that the fear of being accused of neglecting public safety in the shadow of the BSE experience has been a determining factor in the British government's response to mobile phone EMF risk. It is unlikely that the IEGMP would have been established were it not for the legacy of BSE. The speed, character and conclusions of the Stewart inquiry explicitly addressed public concern, separately from the issue of a scientific basis to dangers from low-level EMF. The government's recommendation that use by children be even more restricted than suggested by the IEGMP suggests that a precautionary impulse internal to the state continues to propel the EMF issue. That the inquiry was engaging with fears that might only loosely be considered 'public'—illustrated by the poor attendance of the public meetings held by the inquiry—is perhaps confirmation that the precautionary state response has acquired a life of its own, independent of the pragmatism with regard to mobile phones evident among the majority of the public.

This is not to suggest that more conventional democratic pressures did not also play a role in instigating the IEGMP. In so far as any single issue dominated MPs' postbags during 1999, it was from constituents angry at the siting of mobile masts. The Stewart report detailed some 600 letters to ministers from members of the public on health issues relating to mobile phone technology, and over 500 to other government departments (IEGMP, 2000: p. 2). However, it is important to note that the relationship is far from direct between this more conventional public pressure and a major government-sponsored inquiry that embraced the spirit of health precaution from the outset. In their own terms these letters of complaint principally concern issues of planning, location and environment—not only health concerns about electromagnetism. It is only through interaction with the intensive media health problematisation of mobiles that the health factor came to prominence. Mast complainants were invariably directly influenced by the media's elevation of health issues. In other words, more apparently conventional democratic public pressure cannot be separated from the highly effective media campaign to which the government responded.

A relationship can also be suggested between the extent of legitimacy that state authority enjoys and the alacrity with which claims-makers' concerns are entertained. This appears to be an important factor in the rapid response and accommodation to EMF fears in Northern Ireland, Scotland and Wales. The IEGMP report noted that: ' ... the devolved assemblies and parliaments have played a key role in raising public awareness regarding the potential health impact of mobile phone technology' (IEGMP, 2000: p. 37). The report specifically welcomed a Scottish Parliamentary Committee report that had proved important in encouraging health claims. The context for the new Scottish parliament's receptivity to the issue was, arguably, its own very recent creation. Embracing anti-mast campaigners' concerns appears to have played the role of distinctively and rapidly demonstrating the responsiveness of the Scottish parliament to 'the people'. A similar process is evident in the Welsh and Northern Irish cases. Campaigners indicate that Welsh assembly members have been especially encouraging. In Northern Ireland, campaigners were invited to present their claims at the New Northern Ireland assembly in December 1998, with very little lobbying on their own part. Arguably, the Welsh and Northern Irish assemblies have a more limited mandate and lack the credibility even of their Scottish equivalent. Their responsiveness to marginal concerns appears proportional to their need to demonstrate that they are able to effectively address local issues.

In contemporary society it is not viable for public authorities simply to ignore risk perception and concerns, no matter how groundless they might prove to be. State institutions and corporations evidently need to engage persuasively and effectively with 'everyday' fears in the public domain. The media and advocacy groups can present lack of government intervention as indicating active disregard for public welfare. With the decline of more traditional democratic mechanisms and impulses, these can be the principal pressures to which institutions feel bound to respond.

At the same time, it is important to recognise that precautionary state responses themselves play an active, even determining, role in the social construction of health risks. This raises questions about the application of precautionary approaches *on principle*. Balanced risk assessments need to consider the likely, often longer term, impact of politicising every possible hazard.

Even in the UK, let alone other countries such as Ireland and the USA, the mobile phone health 'panic' ultimately did not grip the public imagination like the reaction to 'mad cow disease' and other subsequent risk issues. The utility and convenience of the mobile phone appear to have ultimately determined a pragmatic attitude towards their use—despite government warnings to limit usage. Evidently, precautionary state policies do not exercise a

decisive influence in the social construction of risk. They are, however, an important influence that demand further investigation.

Acknowledgements

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