

### Post-Print

This is a pre-copyedited, author-produced PDF of an article accepted for publication in *Health* following peer review. The definitive publisher-authenticated version [Hooker, C. (2010), 'Health scares: professional priorities', *Health: An interdisciplinary journal of health and society* 14, 1, 3-21] is available online at <http://hea.sagepub.com/content/14/1/3.short>

## Health Scares: Professional priorities

### AUTHOR:

Dr Claire Hooker, Senior Lecturer, Medical Humanities, Centre for Values, Ethics and Law in Medicine, University of Sydney NSW, Australia 2006  
email: [claireh@med.usyd.edu.au](mailto:claireh@med.usyd.edu.au)

### Abstract

Currently, many health scholars are concerned about health scares. But what do they mean by the term 'health scare' – are health scares an identifiable phenomenon, and how do we currently understand their causation and consequences? By collecting and analyzing published articles about events considered to be health scares, this paper maps the current views of scholars on their characteristics and causes. Results show that health scares are generally understood as events characterized by fears of catastrophic consequences but little actual mortality. However, the social and economic impacts of these events have often been severe. This survey shows that health scares can be usefully sorted into 6 categories, each with identifiable internal dynamics, suggesting different communications strategies to achieve resolution in each category. Using the social amplification of risk framework, the conditions under which risk signals were amplified were traced in general terms among major stakeholders. Simple causes for health scare events could not be identified, though some triggers did emerge. Importantly, public ignorance of real risk, media scaremongering, and political inaction could be dismissed as primary explanations, though they were sometimes factors in scare events. Implications for risk communication and for future research on risk and public health are discussed.

### Keywords:

Health scare, Social amplification of risk, Expert, Media, Risk controversy

In the age of SARS and 'mad cow' (BSE – bovine spongiform encephalitis) disease, many health professionals in both government and academe worry about what they refer to as 'health scares'. Exactly what these are is, however, unclear. Are they small risks falsely judged as large, as were fluoride additives to water - or alternatively a form of 'health panic' (Moynihan, Heath, and Henry, 2002; Rail and Beausoleil, 2003) or moral panic (Ungar, 2001, McRobbie and Thornton, 1995)? The colloquialism seems often to be an umbrella term for a raft of different concerns: sometimes of governments meeting public demands to spend vast sums on protections against negligible risks, and yet at other times of government failure to commit

sufficient resources to protect against others risks; of panicky public reactions to media beat-ups, and yet also of public ignorance of highly damaging risks; of the failure to identify and control the pandemic of influenza feared to be coming, and simultaneously that planning for it will end up costing more than we wish it to in terms of lost revenue, or public mistrust or complacency, or the shunning of particular cultural groups. In particular there are concerns about the enormous political and economic costs of certain scare situations, so disproportionate do they seem when compared to the actual mortality attributable to, for example, SARS or anthrax or 'new variant' Creutzfeld-Jakob disease (nvCJD) (Skinner, 2004).

The first aim of this paper is to use the extant literature to work out what scholars mean by the term 'health scare'. Because there are inconsistencies and contradictions in the hopes and views expressed by health professionals and policymakers in informal conversation, it seems useful to map out clearly what sorts of events are generally intended by the term and what sets of concerns are raised with respect to them. By so doing we may be able to compare across events and usefully find ways of categorizing them or of identifying any features or properties common to them. This may ultimately suggest ways of more effectively resolving them or of minimizing their negative impacts.

However, there is a lack of connection between how fear is treated in different parts of public health: concerns over health scares in some quarters yet repeated warnings of catastrophic health events from others, not to mention the steady stream of fear appeals issued annually by health promoters in any western nation. This lack of coherence raises questions concerning the assumptions public health scholars make about the causes and consequences of health scares. At this point, therefore, a second aim emerges: to treat 'health scares' as a constructed category, in line with recent sociological approaches to understanding risk (Beck, 1999, Lupton, 1999, Douglas, 1992), and to outline present scholarly and professional thinking about them, for general inspection and discussion. What assumptions are we making about why events occur or why they generate high economic and social costs? To whom do we currently attribute responsibility for causing or managing health scares? What exactly is it that we want to change?

The variety and inconsistencies of the concerns denoted by the colloquial use of the term 'health scares' are indicative of public health encountering the arena of risk – of decision making under conditions of uncertainty, of the possibilities and pitfalls of communicating about risks to various stakeholder audiences. Risk has attracted an extensive scholarship amongst those in research and public policy concerned chiefly with environmental and industrial risks (Pidgeon, Kasperson, and Slovic, 2003; Slovic, 2000), which has demonstrated, among other things, how differently risk is defined and understood by different disciplines and stakeholders. For example, the most common definitions of risk in professional public health are derived from the technical instrumentalities of epidemiology (Lupton, 1999), but these cannot define an individual's risk, which may well be defined by that individual by values (Slovic, 2000), narrative or the perceived consequences *for them* (Hoffmaster, 1991). Concepts of risk among different stakeholders may thus become incommensurable.

Similarly, 'health scares' may also be an expression of contemporary social anxieties, as predicted by recent sociological approaches to risk. 'Risk society' theorists such as (most famously) Ulrich Beck (1992) and Antony Giddens (1999) suggest that insecurity and uncertainty are hallmark characteristics of late modern society, as people become increasingly concerned

about the potentially catastrophic consequences of the conditions of late modernity itself. Reflexivity and ontological insecurity have shifted social anxieties from moral panics towards an increasing preoccupation with emergencies and disasters (Ungar, 2001). This study speaks to ongoing debates about the extent, qualities and impacts of 'risk society' (Adamson et al, 2000; Mythen and Walklate, 2006). An alternative perspective, the Foucauldian or 'governmentality' approach to risk, sees concepts of risk as central to government instrumentalities, especially in the field of public health (Burchell, 1991; Lupton and Petersen, 1996; Petersen and Wilkinson, 2008). These authors articulate how the knowledges, practices and technologies of risk become central ways of producing and managing social identities and social problems (Petersen and Wilkinson, 2008; Petersen, 1997). 'Health scares' may represent disruptions or new configurations of these governmental modalities.

This scholarship has hitherto experienced a remarkably low take-up in public health (Alaszewski and Horlick-Jones, 2003), although there are signs this is changing, for example in the use of risk communication principles in health communication (Covello, Peters, Wojteki, and Hyde, 2001). Many health professionals' concerns about 'health scares' – for example, frustration with dramatic public responses to relatively 'tiny' risks (eg, the intentional distribution of anthrax) versus their tolerance for comparatively large risks (eg, smoking) ('tiny' and 'large' here being defined by occurrence in a population) – are, of course, perfectly explicable in terms of our knowledge of how risk is cognitively processed (Slovic, 2000) or experienced (Lupton, 1999).

Rather than a definition of risk, in this study I use the concepts of risk amplification and attenuation as developed in the social amplification of risk framework (SAR framework) (Horlick-Jones, Sime, and Pidgeon, 2003; Pidgeon et al., 2003). In the framework, risk events / hazards can only be given meaning by being *communicated*. Communication occurs by means of *signals* (words, signs, symbols, images) that may be *amplified* (the risk seems larger or scarier) or *attenuated* (the risk seems lessened). The framework shows that amplification or attenuation of risk signals will occur as they are processed and responded to by different social actors (termed 'social stations' in the original theory) – individuals, stakeholder organizations, the mass media, and so forth. For example, the risk signals of aircraft travel may be amplified by news media coverage of a recent jet crash. We can use existing sociological theories and tools to identify how and why risk signal amplification occurs in any given social station. This framework thus allows us to track how a risk is defined and perceived at any given point during a health scare event.

This conceptual approach obviates the distinction between 'real' and 'false' risks since no matter what their objective value, in our understanding of them, risks are always only as great as their signal value at any given time, and this signal value will be significantly affected by physical consequences such as high mortality (which will naturally have an amplifying effect!). Risks are therefore always, necessarily, socially constructed, since at the very least their 'real' magnitude is influenced by social perceptions of and responses to them. In fact this framework indicates that in most cases the 'realness' of a risk is measured by the outcome of a risk event: if the outcomes are bad, the risk is judged as 'real' in retrospect. Understanding this is important if we are to analyse risk events that have real, physical causes and consequences but whose structure and progress are typically influenced by public perception and social responses. The SAR framework has already been profitably applied to particular health scares such as bovine

spongiform encephalopathy (BSE or 'mad cow disease') (Barnett and Breakwell, 2003; Pidgeon et al., 2003).

This paper is not an evaluation or extension of SARF, but in it I ask what social groups, or stakeholders, are identified in studies of health scares as the source of risk signal amplification, and why. We might expect that the primary explanation most health professionals would offer for the cause of health scares would be in terms of public ignorance or lack of knowledge, the absence of appropriate government regulation, or, especially, of media sensationalizing (Gwyn, 2002). But are causes really perceived so simply? It is time to take stock of exactly how public health scholars have perceived the issues of causes and consequences in their reflections on health scare situations. Identifying which groups have are considered by current scholarship to have generated risk signal amplification, and at what point and for what reason, is the third aim of this paper.

## Methods

Because of the varieties and inconsistencies expressed conversationally about health scares (and which may in the future be worth their own investigation through interview or focus group research), this study sought to capture a snapshot of the spectrum of professional opinion by examining published works. Here publications are treated *both* as a primary resource – texts to be analysed – and a secondary resource – a source of concepts and analysis that may be applied to the subject itself (Bentley, 1999).

This research used a two-phase strategy. First, in mid 2004 four electronic databases – Medline, PubHealth, and PAIS International, representing the fields of medicine and public health, and Sociofile (now 'Sociological Abstracts'), representing sociology (where I hypothesized research articles on social reactions to health risk events might be published) - were searched using the words 'health' and 'scare' as key- and text-words, along with 'fear', 'anxiety' and 'panic'. The search was limited to matches that contained both 'health' and 'scare'. These words were also all searched in combination with 'media' specifically, but their combination with 'disorder' was excluded because it produced too many irrelevant matches. To ensure that the search was as comprehensive as possible, searches were also conducted across all three databases on individual topics that were at that time known to have aroused public anxiety: SARS, Escherichia coli, hamburger, Tylenol, anthrax, bovine spongiform encephalopathy, mad cow, mobile and cellular telephones, contraceptives, the Pill, dioxin and powerlines (there was no specific search focus on avian influenza, which was receiving comparatively little public attention at the time of the search, probably a result of the then strong media focus on SARS and West Nile virus in North America). Out of the resulting list of 199 articles only those works published in scholarly and professional journals, and only those that included discussion of particular events and/or social (broadly defined for this purpose as 'non technical') aspects of the issue, were retained for review. The sample did not contain references to individual experience (eg, the fears an individual entertains for themselves in relation to a threatening diagnosis) or to cases of mass hysterical illness (eg (Mohr and Bond, 1982).

The resulting collection of 158 published retrospectives, investigations, polemics and hypotheticals concerning health scare events was by no means exhaustive (as the absence of avian influenza indicates!). Many of the issues that were raised by authors have large literatures

devoted to them that found no representation in it (examples would include decision making theory (Chapman and Sonnenberg, 2000; Cohen and Anglo-German Foundation for the Study of Industrial Society., 2000) and ‘risk society’ theory (Beck, 1999; Beck and Ritter, 1992)). Discussion of scare events are often embedded in papers on other topics (such as terrorism preparedness or environmental issues). Brief internet searches on a selection of the topics raised in the resulting 158 publications – examples are meningitis, cryptosporidium, and food poisoning – showed that more such events had occurred and been discussed by health professionals in professional forums as well as in peer reviewed journals. Similarly this approach could not hope to comprehensively represent the complexity and range of opinion among health scholars and professionals on all these topics. However, reaching saturation for many major themes and problematisations in the sample, added to cross checking using internet searches, indicated that the search methods had captured an extensive and representative literature about health scares.

In phase two, the sample of 158 publications were classified by topic and (main) disciplinary background. Analysis was emergent and iterative, in the interpretivist tradition (Creswell, 2007). A coding scheme was developed to identify firstly, types and qualities of events, and secondly, (through keywords and then questions and statements), how problematisation was constructed by the author, and how solutions were formulated, and related to disciplinary outlook. Articles were coded for factors that amplified or attenuated risk, drawn from the categories within the ‘social stations’ described by the SAR framework. The main focus of analysis then became the role played by different stakeholders (an equivalent for ‘social stations’, meaning social groups or arenas, in the original SAR framework) as represented in each publication. These were tabulated to demonstrate both how different stakeholders were *represented* within this sample and to map out how and when risk signal amplification occurred, as identified by commentators and those involved.

## Results

### The sample

158 publications were collected, including 9 books. As shown in Table I, only 3 explicitly addressed the concept ‘health scare’ directly (Gwyn, 1999, 2002; Whelan, 1985). However, 14 discussed or compared more than one case (Covello et al., 2001; Ferreira, 2004; Gwyn, 1999, 2002; Klapp, 1992; Maxwell, 2003; Powell and Leiss, 1997; Rosner and Markowitz, 2002; Shickle, 2000; Stoto, 2002; Whelan, 1985; Leiss, 2001; Leiss and Chociolko, 1994), implying these cases were representative of a wider phenomenon, ‘health scares’. In all, the publications offered 180 individual discussions of 49 health scares topics.

**Table I : Focus of publications collected**

|                     | Number discussing ‘health scares’ | Number discussing a single case | Number discussing more than one case | Number not focused on case study |
|---------------------|-----------------------------------|---------------------------------|--------------------------------------|----------------------------------|
|                     | 3                                 | 104                             | 14                                   | 35                               |
| Percentage of total | 2%                                | 67%                             | 9%                                   | 22%                              |

Some events had attracted considerable attention, suggesting that what constitutes a ‘health scare’ emerges from common understandings and concerns that cluster around specific events. By numbers of publications, the top three in this sample were an advisory about ‘third generation’ oral contraceptives in the UK in 1995 (see eg Balasch, 1997; Spitzer, 1997, 1999), bovine spongiform encephalopathy (BSE) / prion diseases and HIV/AIDS. To a significant degree this result must be regarded as an artifact of the search strategy, dependent on the genre and structure of the academic discussion on these subjects; other topics (eg, MMR vaccine and autism) have almost certainly engendered at least as many publications. But some of these concentrations, such as those relating to BSE and HIV/AIDS, and to a lesser degree anthrax and SARS, reflect shared perceptions of these high profile diseases.

**Table II: Most common health scare topics by number of publications\***

| <i>Health scare topic</i>  | <i>Number of publications</i>          |
|--|--|
| Oral contraceptives  | 33                                     |
| BSE/prion diseases   | 16 articles, 3 book chapters, 2 books  |
| HIV/AIDS   | 13 articles, 1 book                    |
| Anthrax  | 8 articles, 1 special issue, 1 report  |
| SARS   | 3 articles, 4 reports, 1 special issue |
| HRT  | 7 articles                             |
| Hazardous wastes   | 4 articles, 3 book chapters            |
| Vaccines   | 6 articles                             |
| Dioxin   | 4 articles, 2 book chapter             |
| Powerlines/ mobile phones  | 4 articles, 2 book chapters            |
| GM foods   | 2 articles, 3 chapter                  |
| E coli   | 1 article, 2 book chapters, 1 book     |
| Tylenol tampering  | 4 articles                             |
| Radiation /nuclear disaster  | 2 articles, 2 book chapters            |
| Breast implants  | 1 article, 1 book chapter, 1 book      |
| PCBs   | 1 article, 2 book chapters             |
| Fluoride in water, radon gas, West Nile virus, bioterror excluding anthrax, alar, air contamination,   | 2 articles                             |
| X rays, flesh eating disease, faulty condoms, toxoplasmosis, blood products contamination, cholera, breast cancer, oil spills, channel blockers, cancer mortality, tampons, cryptosporidium in water, radium, tuberculosis, irradiated food, acrylamide, chloesterol (in eggs), Ebola, phthalates, lead, silica, swine influenza, meningitis, interferon, poisoning, rBST, mystery illness | 1 article or chapter                   |
| <i>Total</i>   | 180 discussions, 49 topics             |

\* of these 180 discussions (as opposed to the 158 publications) only 7 (4%) discussed more than one topic

The majority of publications in the sample as a whole (115 or 73%), were written by health professionals or came from health and science journals and can be taken to represent this group. Of the remaining 42 studies, 10 explicitly brought (at least) two disciplinary perspectives together. Social scientists, particularly those from a constructionist perspective, were interested in media and regulatory policy issues, and were particularly attracted to the

high profile subjects of BSE, GM foods and HIV/AIDS, (eg Brookes, 1999; Cummins, 2002; de Vries, van den Berg, and de Jong-van den Berg, 1998; European Parliament, 1998; Goodman and Du Puis, 2002; Jones, 1992; Lupton, 1994; Powell and Leiss, 1997; Tacke, 2001; Whiteside, 2003).

**Table III: Articles by discipline / perspective**

|                                  | <i>Number</i> | <i>Percentage of total no. publications</i> |
|----------------------------------|---------------|---|
| <b>Health studies</b>            | 115           | 73%   |
| <i>Policy studies</i>            | 16            | 10%   |
| <i>Media studies</i>             | 12            | 8%  |
| <i>Risk studies</i>              | 11            | 7%  |
| <i>Market/consumer studies</i>   | 5             | 3%  |
| <i>Social/cultural studies</i>   | 5             | 3%  |
| <i>More than one perspective</i> | 10            | 6%  |

### **Defining and classifying ‘health scares’**

*Use of term* 72 articles (44%) used the term ‘scare’ to describe a public-level health risk event, implying a common understanding of ‘health scare’ as a social phenomenon quite differentiated from any private, individual experience of a severe threat to health (but see (Calnan, Dale, and de Fonseca, 1976). The use of the word in this proportion of publications suggests that colloquially ‘health scares’ recognizably denotes a family of health risk events.

*‘Realness’ of health scares* This study raised the question of whether ‘health scares’ were definable simply as events in which people perceive risks that are not really there. To answer this, fears of *possible* consequences in the early stages of an event were identified and compared with actual outcomes as far as these were known and identified in the sample. Due to variations between papers in how anticipations and outcomes were described, the process necessarily led to some oversimplifications. I followed the majority of articles in using an epidemiological definition of risk as the basis for the comparison. However, outcomes were quantified in only some cases, and fears were never quantified, only indicated by general reference to the potential effects on an indicated population or more frequently in the subjective terms of epidemiological incidence (large, moderate etc). Moreover, scientific controversy continues to some degree in many cases. Both fears and outcomes were therefore placed simply in one of three very broad categories of high, moderate or low incidence, to which I have assigned the descriptive labels ‘catastrophe’, ‘crisis’ and ‘false alarm’.

The results are summarized in Table IV, which shows that ‘health scares’ are indeed mostly events in which the outcomes *turn out to be* not nearly as large as was feared (however they were feared), after all, ie, they mostly turn out to be ‘false alarms’. In many, often high-profile, cases, for example BSE, anthrax, or necrotizing fasciitis, the mismatch between fear and outcome was the largest possible, with catastrophe envisioned but only very tiny numbers for mortality/ morbidity eventuating (but let us remember the consequence for those unfortunate individuals was indeed catastrophic). I would suggest this definition: health scares are events in which the health of a population or large subpopulation is at risk to an uncertain and potentially devastating degree.

**Table IV: Fears/ Outcomes as described in articles**

*This table compares what experts feared at the beginning of a health scare event ('anticipation'), with what actually occurred ('outcomes') in terms of mortality and morbidity*

|                 |                      | ANTICIPATION AT OUTSET   |  |   |
|-----------------|----------------------|--|--|---|
|                 |                      | Fear of catastrophe (high incidence)   | Fear of crisis (moderate incidence)                              | 'False alarm' (low incidence)   |
| <b>OUTCOMES</b> | <b>Catastrophe</b>   | A<br>HIV/AIDS (developing world)   | B<br>--  | C<br>--   |
|                 | <b>Crisis</b>        | D<br>HIV/AIDS (first world)  | E<br>Cholera, e coli, cryptosporidium in water, lead, meningitis | F<br>--   |
|                 | <b>'False alarm'</b> | BSE, anthrax, SARS, Tylenol tampering, dioxin, GM foods, flesh eating disease, radiation, breast implants, terrorism, cholesterol in eggs, Ebola, Alar, PCBs, swine influenza, rBST, HRT, X rays, phthalates | Radon, West Nile virus   | Acrylamide, fluoride in water, Oral contraceptives, interferon, channel blockers, powerlines / mobile phones, vaccines, |

\*this table excludes cases where fears/outcomes data was unable to be determined

Two points about this result deserve discussion. Firstly, this finding largely, if imprecisely, reflects fears held by the authors of the sample, ie by health professionals, especially in articles that explicitly (and unfavourably) contrasted 'high' public fears with expert consensus of low incidence. The second point, and it is of immense importance, is that in this sample of retrospectives *outcomes were typically treated as the chief measure of risk* and how risk was perceived was a function of when it was considered. If mortality, or other physical consequence such as cessation of medication, was high, the risk was perceived to have been 'real' after all – and vice versa. But in fact social responses to any given risk event modified the outcome. For example, the low mortality from SARS in Canada (which was considered by many *after the event* to be a 'false alarm' (see Skinner 2003)) was dependent on, inter alia, quarantines and hospital closures arising from initial high perceptions of risk.

*Types of scare* Central themes were identified in the representation of each health scare event. Clustering these allowed health scares to be usefully classified according to 6 major domains. Some health scares fitted more than one domain: nvCJD, for example, was represented as both a disease and as an outcome of late industrial agribusiness practices (Miller, 1999; Ratzan, 1998). This sample suggested that particular social dynamics are identifiable and may predict the overall trajectory of events within each domain.



**Table V: Domains of social concern in framing of health scares**

| <i>Domain</i>  | <i>Health scares</i>   |
|--|--|
| Disease  | BSE, HIV/AIDS, Anthrax, SARS, West Nile virus, meningitis, flesh eating disease, toxoplasmosis, cholera, tuberculosis, swine influenza |
| Contaminants of air, food, water                             | E coli, cryptosporidium, dioxins, fluoride in water, air pollution, irradiated food, acrylamide  |
| Environmental pollution & chemicals                          | Dioxins, radon gas, radiation, oil spills, lead, alar, silica, PCBs, rBST, hazardous wastes  |
| Side effects of treatments                                   | Oral contraceptives, HRT, vaccines, blood products, breast cancer, channel blockers, interferon, radium, phthalates                    |
| Intentional Harm   | Anthrax, Tylenol tampering, terror   |
| Unintended consequences of production, industry, agriculture | BSE, Dioxins, GM foods, powerlines /mobile phones, breast implants, acrylamide, PCBs, tampons  |

\*\* excludes those unclassifiable (poisoning, cancer mortality, faulty condoms)

*Geography* Health scares were overwhelmingly reported from the developed world – from North America, the United Kingdom, western Europe and Australia. The exceptions were: reports on SARS from China (2 articles); reports of condom failure and HIV/AIDS concerns from Africa and India (3 articles); and two reports of politically suppressed scares (radiation and HIV/AIDS) from Russia. Aside from one report of a disastrously handled outbreak of cholera in Italy in 1973 (Allum, 1973), the search found no reports of devastating epidemic disease in the developing world described as ‘health scares’.

*Temporal aspects* Whilst being in some sense identifiable events, health scares were not necessarily bounded in time; in many cases, controversy continues at some level. The best proxy for defining the ‘life’ of a health scare was the media, but anxiety about an issue or dissent from expert or policy opinion of course can and does persist in the absence of media attention (Kitzinger and Reilly, 1997). All the health scares in the sample occurred in the period after 1970, though a few of the issues, such as the contraceptive Pill and some industrial chemicals (see eg (Rosner and Markowitz, 2002) had longer histories.

No doubt both geographical and temporal aspects of the sample were largely an artifact of the search criteria; searches in other languages or specific to other countries or to past times (articles published prior to the 1970s are less likely to have been indexed in the databases searched) may have identified similar issues and preoccupations. However the unevenness of these results could also be understood as further evidence of the well-identified recent escalation of perceptions of insecurity and interest in disasters and disaster planning in the developed world (Beck and Ritter, 1992), and/or for the increasing perceptions of risk in public health (Skolbekken 1995).

*Social Impacts* Negative social and economic impacts, from high costs to tourism (SARS), agribusiness (BSE) or industry (acrylamide) to the stigmatization of vulnerable social groups (SARS, HIV/AIDS), were the central focus of most retrospectives, because it is these impacts that authors hoped could be avoided or minimized by better communication and risk management in the future. In this sense the risks posed by health scares are as much social and economic as

they are physical, and responses to health scare events implicitly or explicitly attempted to balance perceived biological with perceived social risks.

**Table VI: Selected impacts of significant health scares**

| <i>Scare</i>                 | <i>Outcomes</i>  |
|------------------------------|--|
| Oral contraceptives          | Cessation of use mid cycle; unwanted pregnancies; abortions; change in prescriptions   |
| BSE                          | Enormous economic impact on farmers in UK and Canada; trade bans; restrictions on blood donations; mortality in those treated with growth hormone  |
| HIV/AIDS                     | Severe mortality; protest; social change; economic devastation in third world; trade disagreements over pharmaceuticals  |
| Anthrax                      | Public demand for particular antibiotic (cipro), demand on health services; security measures  |
| SARS                         | Enormous economic devastation and impact on health services in affected countries; travel restrictions; quarantine; some mortality; reappraisal of some epidemic preparedness plans and reporting measures |
| HRT                          | Cessation mid cycle with attendant health issues; drops and changes in prescriptions   |
| Tylenol tampering            | Economic loss; new products manufactured; growth in risk communication techniques  |
| GM foods                     | Protest; economic pressure   |
| Powerlines / mobile phones   | In some countries, expensive resiting of phone lines or restrictions on mobile phone masts; public protest; political impacts  |
| Blood products contamination | Expensive callbacks and recalls; restrictions on donors; some affected recipients  |
| Breast implants              | Enormous economic impacts from litigation  |
| Terror                       | Enormous political and economic impacts; travel restrictions   |
| Radiation                    | NIMBY phenomenon; growth in risk studies; accidents causing mortality  |
| Hazardous wastes             | Economic impacts; litigation; political controversy  |
| Swine influenza              | Large impact on US health services; vaccine side effects   |

*Causation / non-causation* Causation of health scares were complex, as discussed in the analysis of risk signal amplifiers below. Usefully, however, this sample clearly showed that causation cannot be considered simply in terms of inappropriate public anxiety about small or non-existent risks (though this could be factors on occasion). Only 8 publications covering just three topics – powerlines/mobile telephone masts, vaccines and fluoridation of drinking water (Ackermann, Chapman, and Leask, 2004; Brown, 2000; Burgess, 2002; Fisher, 1983; Johnston, 1987; Anon., 1975; Park, 1996; Sullivan, 1998) - addressed situations in which a clear expert consensus of minimal or no risk differed markedly from public response to that risk. The authors in this sample took a complicated and ambivalent approach when attributing causality or responsibility for health scares. They sometimes rejected and sometimes embraced models that blame health scares solely on failures by the public, media or government to appropriately (ie, scientifically) understand risks, suggesting that while at times experts become frustrated with social groups who acted in ways that were considerably out of step from expert risk assessment, they nevertheless appreciate that health scares are generated out of complex interactions and perceptions between different social groups.

## The social construction of health scares: amplifications and issues

The studies in this sample raised a very broad array of social, philosophical, policy-related, and ethical issues, most of which could be, and some have been, the subject of extensive literatures themselves. This study focused on identifying where and how risk signal amplification occurred among four major stakeholder groups: experts, policymakers, journalists and the mass media, and the general public.

### *Experts and evidence*

Thirty publications in the sample primarily discussed issues relating to experts and evidence. Of these, a clear majority (26 publications) were simply concerned with getting the data right, on the assumption, commonly attributed to experts (Fischhoff, 1995; Lupton, 1999), that the appropriate course of action will emerge logically and be followed (eg Balasch, 1997; Benagiano and Primiero, 1999; Furedi, 1999; Urwin, 1999). In these publications, unsurprisingly, the scare event was attributed to the failure of the public and media to perceive and represent the risk accurately ('accurately' being defined by expert assessment), eg Campion, 1997; Johnston, 1987. However, 11 articles from the subset (n = 30) addressed situations in which it was at the expert level that risk signal amplification occurred (with results that may or may not be judged as undesirable).

Firstly, *uncertainty* greatly amplified risk signals among experts, who tended to react according to worst case scenarios, perhaps at the cost of other less catastrophic risk assessments (Moore, 1982; Naylor, 2003; Stoto, 2002). Examples include the early period of the Tylenol poisonings, the first weeks of SARS in Toronto, and the appearance of a new strain of influenza in 1976. In the case of swine influenza and SARS, preventive actions were taken without formal parameters for what kind of evidence would justify their cessation (Naylor, 2003) (Neustadt and Fineberg, 1983).

Secondly, *lack of resources* amplified risk signals among experts under great pressure. In cases such as the anthrax letters (Bond, 2002; Kennedy, 2003; United States General Accounting Office, 2003), SARS and the Tylenol poisonings the burdens of stress, overwork, lack of sleep and anxiety among experts responding to the crisis was very high.

Thirdly, experts and scientific institutions were often identified as *inexperienced, untrained communicators* (Blumenthal, 2002; Fewsmith, 2003; Granot, 1999; Scowen, 1996). Examples include the 1995 oral contraceptive scare in the UK, anthrax in the US, and SARS in Toronto (Naylor, 2003; Spitzer, 1997). In these cases amplification was especially associated with information broadcast in the media before GPs had official, detailed knowledge of it. It is noteworthy that only 4 publications from the entire sample, none of which were written by health experts, mentioned or referenced relevant work by risk communication scholars or specialists, suggesting a knowledge translation gap between health and risk communication expertise.

Fourthly, *inconclusive research* (or, more precisely, research made public at too inconclusive a stage to justify public or policy action) could amplify risk signals. In several cases experts misjudges the appropriate timing for the public release of information. Examples include the 1995 oral contraceptives scare in Britain, concerns about hormone replacement therapy

from the Million Women study, and the link between acrylamide and cancer (Lofstedt, 2003; Panay, 2004; Spitzer, 1997, 1999; Williams, Kelly, Carvalho, and Feely, 1998)). Some writers argued that exhaustive scientific debate should be required before political and public judgments are formed (Benagiano and Primiero, 1999), but others pointed out that experts may feel caught between accusations of cover-up or collusion if they do not publicise information, and accusations of scare-mongering if they do (Shickle, 2000).

Fifthly, the *technical content* of communication could amplify risk signals (14 articles from the sample). Describing risk in relative rather than absolute terms was frequently a problem in health scares related to pharmaceutical products (Baum, 2000; Hunter and Leyden, 1995; Lilford and Braunholtz, 1996; Skouby, 1998; Spitzer, 1997). Failure to relate incidence rates to longer epidemiological patterns amplified concern (Calnan et al., 1976; Chiaze, Silverman, and Levin, 1976; Stuart, 1996). One commentator identified the scientific advisory committee's focus on cumulative case numbers rather than on daily incidence rates as an amplifying factor in the outbreak of SARS in Toronto (Naylor, 2003).

#### *Journalists and the mass media*

Mass media attention was an important feature of each risk event. This was because the mass media, as the primary mechanism for information dissemination in all but closed communities of experts, was the factor that gave each health scare its public dimension. Authors in the sample overwhelmingly indicated that they considered health scares to be the result, at least in part, of media misrepresentations (eg, Anonymous, 2002; Bedford, 1998; Sullivan, 1998). However, the media's importance and utility in disseminating information was also recognised (Griffin, Dunwoody, and Zabala, 1998; Naylor, 2003; Robarts Centre for Canadian Studies, 2003). It should be noted that the term 'media' as used in the sample overwhelmingly denoted newspaper and television coverage, although the internet (Eysenbach, 2003; Kittler, Hobbs, Volk, Kreps, and Bates, 2004), movies (Gwyn, 2002) and press conferences were also mentioned.

Even when without bias or misinformation, the *existence* of media attention amplified risk signals and was associated with undesired public responses, such as people who ceased to use or altered their medication, falls in the sales of beef, or demands for particular treatments (DeSalvo and Block, 2002). *Which* health risks received coverage was most strongly related to the subjective criterion 'newsworthiness', where having events to report on, sources of information, and the subsequent effects of 'momentum' were, *inter alia*, crucial factors in obtaining media attention (Kitzinger and Reilly, 1997; Maxwell, 2003). Risk issues that no longer received media coverage returned to public attention when there was an alteration in the 'hazard template' (the collective mental image of the hazard), as when a previously trusted medication - say, hormone replacement therapy - was newly seen as risky (Barnett and Breakwell, 2003). Alterations in the way a risk is framed could similarly lead to amplification or attenuation effects (at least within the media itself) (Ackermann et al., 2004).

Once selected for coverage, general traits in the media tended to amplify health scares, including: the preference for anecdotal or rhetorical rather than statistical evidence; similarly, reliance on expert testimony rather than on published works; emphasis on controversy rather than consensus; and a related tendency to represent issues in terms of polarities rather than complexities (Martinez, 1997; Meara, 2002; Nelkin, 1994). Health professionals were particularly

frustrated about decontextualisation, where media reports of adverse side effects of vaccines and other medical products did not contain discussions of absolute risk, which was typically tiny (low incidence), or of overall efficacy (eg Brown, 2000).

The sample demonstrated differences and tensions between the values and goals of health professionals and those of journalists. For example, what health professionals viewed as unwarranted and decontextualised reporting of negative events, for example reporting vaccine risks but not efficacy, journalists saw as the requirements of 'newsworthiness' (Meara, 2002). Health professionals have criticised journalists' lack of knowledge and understanding of scientific issues (Anonymous, 2002), but in other cases their own lack of experience with, and understanding of, the requirements of the media encouraged confusion, speculation and the escalation of a scare situation (Lofstedt, 2003). In crisis situations particularly, experts and expert institutions were challenged by facing enormous media demand and by juggling the different needs of local, national and international media (Naylor, 2003; United States General Accounting Office, 2003). Journalists viewed criticisms of their practice by experts - for example over their reporting on vaccine risks - as the persuasive talk of biased advocates, not as statements by disinterested scientists (Brown, 2000). Only four articles paid attention to journalists' own struggles with balancing their perceived duty to represent dissenting viewpoints with their concern about over-amplifying risk (Barnett and Breakwell, 2003; Kitzinger and Reilly, 1997; Wilson, Code, Dornan, Ahmad, Hebert, and Graham, 2004). These articles also noted the use – and occasional suspension – of journalistic codes of conduct in covering particular scares.

#### *Policymakers, government and industry*

53 publications were predominantly concerned with issues of government and policy, and of these the overwhelming majority explicitly located the cause or exacerbation of health scare events in government mishandling (eg Ratzan, 1998), willful ignorance (eg, HIV/AIDS in Africa or India (Gilada, 1996; Ingram, 1996) or unethical behaviour (Callahan, 1989; Gibbs and Lester, 1996; Rosner and Markowitz, 2002; Ryder, 1999). Across the sample the clear consensus was that greater honesty, openness, and transparency from government, and consequent gains in public trust, were required to most effectively and efficiently manage risk communication (Leiss and Chociolko, 1994; Powell and Leiss, 1997; Stoto, 2002).

Government risk communication specifically, or lack thereof or mistakes therein, was the chief subject of analyses in 23 of the subset (n = 53) publications. Across a range of issues the main criticisms concerned government unwillingness to admit the existence of risks and hence the responsibility for managing them. Risk communication and policy commentators saw government failure to understand that public risk perceptions are strongly shaped by common values or 'cognitive biases', not expert evidence, as the cause of overly paternalistic communications downplaying risks and invalidating public concerns (Sandman and Lanard, May 2003). Government actions (such as regulation or legislation), or the absence of them, were singled out for criticism, and occasionally praise (Zavestoski, 2002), as essential components of effective risk communication that more efficiently acted to amplify or attenuate risk signals than could mere words (eg Burgess, 2002).

The consequences of poor risk communication, including lack of action on risks, were to foment anxiety. Loss of trust in government was associated with non-compliant self-protective behaviour (such as ceasing to eat beef) or growing protest (Beamish, 2001). Government

tardiness in responding to risk issues generated risk information vacuums that were often filled by special interest groups who could then 'capture' how a risk was defined, and hence establish a policy agenda for responding to them. For example, government failure to effectively communicate about dioxins has allowed Greenpeace to effectively control how they are perceived (bad) and hence, what should be done about them (industry bans) (Leiss, 2001).

Seventeen of the subset raised concerns about policy formation for health risk issues. In general governments were seen as slow to act when facing conditions of uncertainty (Telfer, 1999). They tended to have an all-or-nothing approach, intervening either too late or too much, as for example when the United States attempted to vaccinate all citizens against a possible epidemic of influenza that never in fact occurred (Powell and Leiss, 1997; Stoto, 2002). Recent experiences with SARS and anthrax indicated that diminishing public health funding would only further limit government flexibility in responding to scare situations (DeSalvo and Block, 2002; Naylor, 2003). Policymaking was further constrained by the international aspect of scares like BSE, such that government response can be directed primarily by trade negotiations (Ratzan, 1998), and requires negotiating standards (Williams et al., 1998) and borders (Aaltola, 1999) (European Parliament, 1998).

Interestingly, differences in political institutions, policy styles, past experiences, media receptivity and national cultures resulted in highly divergent policy responses to the same risks. For example, the very different, but substantial and extensive, regulations that surround powerline and mobile phone mast placement in Australia, Italy, and the UK, put in place despite scientific skepticism and opposing industry interests, can be ascribed to (inter alia) alliances between activists and politicians, media tolerance for the issue, and easy integration of emissions regulations into existing regulatory environments. (The significant regulatory action taken in these three countries in fact further amplified risk signals and gave the controversy more life, but may have also minimized distrust in government and hence public opposition to the masts (Burgess, 2002).

### *The general public*

Virtually throughout the sample the public was represented as the arena where the impacts and consequences of health scare events were observed – not as the cause or location of risk signal amplification. In other words, none of the articles in this sample blamed public ignorance or irrationality as a cause of, or chief factor in, health scares, except where information was deliberately withheld, though it was telling that two had titles asking whether or not it was 'worth it' to communicate risk information to the public (Meara, 2002; Shickle, 2000) (and see (Kaferstein and Moy, 1993). The image of health professionals as experts impatient with a public that 'gets it wrong' or as not understanding lay perceptions of risk was not borne out by the sample.

The primary measures of public response were market-based – changes in filled prescriptions (Brunt, Murray, Hui, Kesterson, Perkins, and Tierney, 2003), demands for medication, declines in the sale of beef (Ratzan, 1998). There was insufficient information in the sample to indicate how extensive, and how long lasting, these behavioural changes were, what they signified, or what concerns they expressed. There was some evidence that public choices were pragmatic – people returned to buying beef when prices fell sufficiently, and continued to use mobile phones even when concerns about their possible association with cancer were at

their height (Burgess, 2002). Stigmatisation of particular groups (people with HIV/AIDS, the homeless, drug users and Asians during the SARS outbreak) was discussed in 7 studies as one of the most destructive – and recurring – social responses to scares of communicable disease (Brock, 1989; Cullinan, 1991; Goldin, 1994; Jimenez, 2003; Jones, 1992; Leung, 2004; Lupton, 1994).

Twelve publications in the sample directly investigated public perceptions of, and / or reactions to, a health scare event, of which only 3 (Goldin, 1994; Leung, 2004; Schwarz, 1995) discussed the response of non-white people. The major paradigm for understanding public responses to health scare situations, used very successfully by 13 of studies in the sample, was psychometric studies of risk perception (Slovic, 2000). Several case studies in the sample also showed that public perceptions are strongly affected by context, such as past experience (Hunter and Leyden, 1995).

Nine articles offered sociological explanations for public response in health scares, suggesting cultural context was of prime importance. For example, the French public's opposition to genetically modified foods, despite their strict regulation and long established use (factors that usually predict enhanced trust and lowered perceptions of risk) was attributed to a common culture of humanism applied to new technology and a collective commitment to particular aesthetic values (Whiteside, 2003). Some of these studies suggest that health scares may be the product of deep cultural anxieties (such as between self and other, the clean and unclean) expressed symbolically (Lupton, 1994; McIntosh, 2000).

Fifteen of the articles offered prescriptive advice for how authorities should communicate with the public in health scare situations, or provided practical data on those communications. The consensus of experiences, from rebuilding trust in Tylenol to communicating during SARS, was that the chief components of good communication were recognizing risks, validating public fears even if they seem frustratingly unreasonable (eg Sandman and Lanard, May 2003), and clearly communicating useful information that relate to those fears (Moore, 1982). It was important to use variations in the form of communication, such as using narrative, cultural and technical appeals when communicating health risks (Golding, Krimsky, and Plough, 1992; Hamilton, 2003) and multiple information channels, including existing community based groups, in health scares (Griffin et al., 1998; Maxwell, 2003; United States General Accounting Office, 2003).

In line with current risk communication recommendations, studies in this sample also advocated that risk communication in health scares be conceptualized not as the transfer of information to a passive public, but as an active dialogue between the public and experts/policymakers, but how this was to be achieved was not discussed.

## **Conclusions**

This study suggests that health scares are events in which significant fears are entertained for the health of a population or large sub-population in the early stages. It also demonstrates that risk is typically defined epidemiologically in terms of mortality and morbidity, and that judged on these terms, the typical profile of a health scare is one in which fears prove in the end to be more or less groundless. In general (but not always) mortality has not, in fact, occurred in catastrophic or crisis dimensions. Because of this, risks have appeared in retrospect to be not-

real or grossly overestimated, and the legitimate grounds for those fears in the initial stages of the event are forgotten.

What makes a risk a risk – or rather, the magnitude of a risk - is often understood retrospectively, in terms of the outcomes. But as the cases in this study demonstrate, outcomes are influenced by reactions along the way. Risk signal amplification is often increased by different social actors' various responses to perceptions of risk in the early stages of a health scare event. Trade embargoes, changes in leisure travel or cessation of medication have often amplified perceptions of risk and generated significant negative economic, political or social impacts. Thus, as predicted by the SAR framework, the risks posed by health scares turn out to be as much social and economic as biological, if we judge them by their consequences. This study suggests therefore that policymakers who manage health scare events need to balance the 'goods' produced by initial strong responses to a risk against the 'bads' of those same responses.

Can responses to health scare events be improved so that their negative impacts can be avoided or minimized? This study has sought the beginnings of the answer to this question by broadly identifying where and why risk signal amplification has taken place. At the outset of any risk event there are no easy answers because of the level of uncertainty - a factor that amplifies risk signals anyway, especially among responding experts. The sample did serve to emphasise that the simple answers - such as public 'panic' or media scaremongering – that may be prompted by the frustrations of observing vast expenditures on (what turn out to be) small risks in fact explain very little. Fortunately it also demonstrated that the image of responding experts as condescending and ignorant of factors that influence lay reactions to risk is inaccurate. Instead, this survey suggests that it will be useful to closely examine the dynamics that drive risk signal amplification in different *categories* of health scare, and tabulates the major factors that have been claimed to do so in past scares among different stakeholder groups.

Certain features that caused or exacerbated health scares did emerge: expert inexperience with, or lack of resources for, risk communication; the biases in representation generated by the imperatives of 'newsworthiness' in the media; reluctance to take (open, honest) action on the part of governments; and cataclysmic consumer reactions by parts of the general public. But these retrospectively easy-to-identify factors might better be expressed as a series of dilemmas: over when and how experts should make research results public; how journalists might represent health risks such that both the concerns of health professionals and their own professional requirements are maximally satisfied; when and how policymakers might propose interventions to attenuate, not prolong, the life of a risk issue; and what the public really wants to know and has a right to expect as a result of that knowledge. No firm criteria for how to respond best to any of these dilemmas could be derived from the sample, and it seems inappropriate to make general recommendations for action based on these results. Instead, further research into the precise dynamics of each different domain or category of health scare is likely to yield highly useful results.

This study also suggests that research into health scares will confront significant knowledge translation gaps. Scholars know why people reacted strongly to anthrax or BSE – because of cognitive biases that make unknown, uncontrolled and imposed risks so much scarier – and they know many of the limitations of the mass media and how to maximize its utility and minimize its biases. Yet the sample also showed that such knowledge is often limited in different



disciplinary groups (publications from public health journals showed little or no familiarity with social studies of risk, for example). The results suggests we need, not simply more research into (for example) the imaginative power exercised by worst-case scenarios in health expert's decision making, but the means to invite these experts and other stakeholders to reflect more self-critically on their own amplifying roles. Above all there is need for further study of the ethical implications of decisions made under conditions of uncertainty, and of interventions into existing scare situations. The basic questions of precisely *who* is scared and for what reason in different health scare situations, what the outcomes of that fear are, and whether or not these outcomes are good or bad, still demand critical attention in the future.

*Acknowledgment: This research was funded by the Sidney Sax Travelling Postdoctoral Research Fellowship in Public Health, National Health and Medical Research Council, Australia.*

## References

- Aaltola, M. (1999). International relations and epidemics: A short expedition to places inhabited by states and mad cows. *Medicine, Conflict and Survival*, 15, 3, 235-254.
- Ackermann, D., Chapman, S., and Leask, J. (2004). Media coverage of anthrax vaccination refusal by Australian Defence Force personnel. *Journal of Vaccination*, 1667, 1-7.
- Adamson, B., Beck, U. and van Loon, J. eds (2000) *Risk Society and Beyond: Critical issues for social theory*. London: sage.
- Alaszewski, A., and Horlick-Jones, T. (2003). How can doctors communicate information about risk more effectively? *British Medical Journal*, 327, 7417, 728-731.
- Allum, P. A. (1973). The Politics of Disease: Italy's Cholera Crisis. *New Society*, 26, 575, 76-78.
- Anonymous (2002). A health scare in the mass media. *Lancet*, 359, 9312, 1079.
- Anonymous (1975). National Health Federation cancer scare refuted; no fluoridation-cancer link, claims government. *Bulletin of the Cincinnati Dental Society*, 44, 7, 6.
- Balasz, J. (1997). The 'pill scare II' two years later. *European Journal of Contraception and Reproductive Health Care*, 2, 3, 149-159.
- Barnett, J., and Breakwell, G. M. (2003). The Social Amplification of Risk and the Hazard Sequence: The October 1995 Oral Contraceptive Pill Scare. *Health, Risk & Society*, 5, 3, 301-313.
- Baum, M. (2000). Epidemiology Versus Scare Mongering: The Case for the Humane Interpretation of Statistics and Breast Cancer. *Breast Journal*, 6, 5, 331-334.
- Beamish, T. D. (2001). Environmental Hazard and Institutional Betrayal: Lay-Public Perceptions of Risk in the San Luis Obispo County Oil Spill. *Organization & Environment*, 14, 1, 5-33.
- Beck, U. (1999). *World risk society*. Cambridge, UK; Malden, Mass: Polity Press.
- Beck, U., and Ritter, M. (1992). *Risk Society: Towards a New Modernity*. London: Sage Publications.

- Bedford, H. (1998). The reporting of medical findings needs to be overhauled to prevent the media's obsession with health scare stories. *Nursing Times*, 94, 10, 41.
- Benagiano, G., & Primiero, F. M. (1999). Safety of modern oral contraception: The options for women: lessons to be learned. *Human Reproductive Update*, 5, 6, 633-638.
- Bentley, M. (1999). *Modern Historiography: An Introduction*. London: Routledge.
- Blumenthal, P. D. (2002). Reflections on the WHI findings: Avoiding a pill scare and taking sensible steps forward. *Medscape Womens Health eJournal*, 7, 4, 6.
- Bond, G. F., Jr. (2002). Anthrax scare in Buncombe County. A lesson in the basics of bioterrorism preparedness. *North Carolina Medical Journal*, 63, 5, 271-273.
- Brock, D. (1989). Prostitutes Are Scapegoats in the AIDS Panic. *Resources for Feminist Research/Documentation sur la Recherche Feministe*, 18, 2, 13-17.
- Brookes, R. (1999). Newspapers and National Identity: The BSE/CJD Crisis and the British Press. *Media Culture & Society*, 21, 2, 247-263.
- Brown, P. (2000). A view from the media on vaccine safety. *Bulletin of the World Health Organisation*, 78, 2, 216-218.
- Brunt, M. E., Murray, M. D., Hui, S. L., Kesterson, J., Perkins, A. J., and Tierney, W. M. (2003). Mass media release of medical research results: An analysis of antihypertensive drug prescribing in the aftermath of the calcium channel blocker scare of March 1995. *Journal of General and Internal Medicine*, 18, 2, 84-94.
- Burchell, G., Gordon, C. and Miller, P. eds (1991). *The Foucault Effect: Studies in governmentality*. Chicago: University of Chicago Press.
- Burgess, A. (2002). Comparing National Responses to Perceived Health Risks from mobile phone masts. *Health, Risk and Society*, 4, 1, 175 - 188.
- Callahan, M. A. (1989). Dioxin pathways: Judging risk to people. *EPA Journal*, 15, 29-31.
- Calnan, M. W., Dale, J. W., and de Fonseca, C. P. (1976). Suspected poisoning in children. Study of the incidence of true poisoning and poisoning scare in a defined population in North East Bristol. *Archive of Diseases in Childhood*, 51, 3, 180-185.
- Campion, E. (1997). Powerlines, Cancer and Fear. *New England Journal of Medicine*, 337, 44-46.
- Chapman, G. B., and Sonnenberg, F. A. (2000). *Decision making in health care: Theory, psychology, and applications*. Cambridge, UK; New York: Cambridge University Press.
- Chiazze, L., Jr., Silverman, D. T., and Levin, D. L. (1976). The cancer mortality scare. Problems of estimation using monthly data. *Journal of the American Medical Association*, 236, 20, 2310-2312.
- Cohen, M. J., and Anglo-German Foundation for the Study of Industrial Society. (2000). *Risk in the modern age: Social theory, science, and environmental decision-making*. Houndmills, Basingstoke, HampshireNew York: Macmillan Press; St. Martin's Press.
- Covello, V. T., Peters, R. G., Wojteki, J. G., and Hyde, R. C. (2001). *Risk Communication, West Nile Virus Epidemic and Bio-Terrorism: Responding to the communications challenges posed*

- by the intentional or non-intentional release of a pathogen into an urban setting. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 78, 2, 382-391.
- Creswell, J. (2007) *Qualitative Inquiry and Research Design: Choosing among five approaches*. Thousand Oaks, CA: Sage.
- Cullinan, A. (1991). AIDS and the Challenge of a Plague. *Sociological Practice*, 9, 71-79.
- Cummins, E. (2002). BSE: Risk, uncertainty, and policy change. *Risk: Health, Safety & Environment*, 13, 95-113.
- de Vries, C. S., van den Berg, P. B., and de Jong-van den Berg, L. T. (1998). Oral contraceptive use before and after the latest pill scare in The Netherlands. Changes in oral contraceptive use and how users change. *Contraception*, 57, 4, 247-49.
- DeSalvo, K. B., and Block, J. P. (2002). The anthrax scare: US healthcare as usual. *Medscape General Medicine*, 4, 1, 3.
- Douglas, M. (1992). *Risk and Blame: Essays in cultural theory*. New York: Routledge.
- European Parliament. (1998). *The European Parliament and the mad cow crisis: From a major disaster, to a consumer health policy*. Luxembourg: the Parliament.
- Eysenbach, G. (2003). SARS and population health technology. *Journal of Medical Internet Research*, 5, 2, e14.
- Ferreira, C. (2004). Risk, transparency and cover up: media narratives and cultural resonance. *Journal of Risk Research*, 7, 2, 199-211.
- Fewsmith, J. (2003). China and the politics of SARS. *Current History*, 102, 665, 250-55.
- Fischhoff, B. (1995). Risk perception and risk communication unplugged: twenty years of process. *Risk Analysis*, 15, 2, 137-145.
- Fisher, E. (1983). Scare prevention: When dentistry had bite. *Dentistry Studies*, 61, 6, 27-28.
- Furedi, A. (1999). The public health implications of the 1995 'pill scare'. *Human Reproductive Update*, 5, 6, 621-26.
- Gibbs, L. M., and Lester, S. U. (1996). The politics of dioxin. *New Solutions*, 7, 26-37.
- Giddens, A. (1999) *Runaway World: How globalisation is shaping our lives*. London: Profile.
- Gilada, I. S. (1996). The AIDS scare in India could be aid-induced. Editorial comments. *AIDS Asia*, 3, 6, 7.
- Goldin, C. S. (1994). Stigmatization and AIDS: Critical Issues in Public Health. *Social Science and Medicine*, 39, 9, 1359-66.
- Golding, D., Krimsky, S., & Plough, A. (1992). Evaluating risk communication: Narrative vs. technical presentations of information about radon. *Risk Analysis*, 12, 1, 27-35.
- Goodman, D., and DuPuis, E. M. (2002). Knowing Food and Growing Food: Beyond the Production-Consumption Debate in the Sociology of Agriculture. *Sociologia Ruralis*, 42, 1, 5-22.
- Granot, H. (1999). Facing Catastrophe: Mad Cows and Emergency Policy-Making. *International Journal of Mass Emergencies and Disasters*, 17, 2, 161-184.

- Griffin, R. J., Dunwoody, S., and Zabala, F. (1998). Public reliance on risk communication channels in the wake of a *Cyptosporidium* outbreak. *Risk Analysis*, 18, 4, 367-375.
- Gwyn, R. (1999). 'Killer Bugs', 'Silly Buggers' and 'Politically Correct Pals': Competing Discourses in Health Scare Reporting. *Health*, 3, 3, 335-45.
- Gwyn, R. (2002). *Communicating health and illness*. London; Thousand Oaks: SAGE.
- Hamilton, J. D. (2003). Exploring Technical and Cultural Appeals in Strategic Risk Communication: The Fernald Radium Case. *Risk Analysis*, 23, 2, 291-302.
- Hoffmaster, C. B. (1991). The theory and practice of applied ethics. *Dialogue: Canadian Philosophical Review*, 30, 3, 213-234
- Horlick-Jones, T., Sime, J., and Pidgeon, N. F. (2003). The social dynamics of environmental risk perception: implications for risk communication research and practice. In N. F. Pidgeon, R. E. Kasperson and P. Slovic (Eds.), pp. 286-304, *The Social Amplification of Risk*. Cambridge: Cambridge University Press.
- Hunter, S., and Leyden, K. M. (1995). Beyond NIMBY: Explaining opposition to hazardous waste facilities. *Policy Studies Journal*, 23, 601-619.
- Ingram, M. (1996). Russia is on brink of AIDS epidemic. *British Medical Journal*, 313, 7052, 252.
- Jimenez, A. D. (2003). Playing the Blame Game: Casting Guilt and Avoiding Stigma during a Tuberculosis Health Crisis. *International Journal of Sociology and Social Policy*, 23, 6-7, 80-114.
- Johnston, K. (1987). WHO derides vaccine scare. *Nature*, 327, 6118, 95.
- Jones, J. W. (1992). Discourses on and of AIDS in West Germany, 1986-90. *Journal of the History of Sexuality*, 2, 3, 439-68.
- Kaferstein, F. K., and Moy, G. G. (1993). Public health aspects of food irradiation. *Journal of Public Health Policy*. 14, 149-63.
- Kennedy, M. (2003). Special Edition on Anthrax. *Journal of Health Communication*, 8 (Supplement 1).
- Kittler, A. F., Hobbs, J., Volk, L. A., Kreps, G. L., and Bates, D. W. (2004). The Internet as a vehicle to communicate health information during a public health emergency: A survey analysis involving the anthrax scare of 2001. *Journal of Medical Internet Research*, 6, 1, e8.
- Kitzinger, J., and Reilly, J. (1997). The Rise and Fall of Risk Reporting: Media Coverage of Human Genetics Research, 'False Memory Syndrome' and 'Mad Cow Disease'. *European Journal of Communication*, 12, 3, 319-350.
- Klapp, M. G. (1992). *Bargaining with uncertainty: Decision-making in public health, technological safety, and environmental quality*. New York: Auburn House.
- Leiss, W. (2001). *In the chamber of risks: Understanding risk controversies*. Montreal: McGill-Queen's University Press.
- Leiss, W., and Chociolko, C. (1994). *Risk and responsibility*. Montreal: McGill-Queen's University Press.
- Leung, C. (2004). *Yellow Peril Revisited: Impact of SARS on the Chinese and Southeast Asian Canadian Communities*. Toronto: Chinese Canadian National Council.

- Lilford, R. J., and Braunholtz, D. (1996). For Debate: The statistical basis of public policy: a paradigm shift is overdue. *British Medical Journal*, 313, 7057, 603-607.
- Lofstedt, R. E. (2003). Science communication and the Swedish acrylamide "alarm". *Journal of Health Communication*, 8, 5, 407-32.
- Lupton, D. (1994). *Moral threats and dangerous desires : AIDS in the news media*. London; Washington, DC: Falmer Press.
- Lupton, D. (1999). *Risk*. London; New York: Routledge.
- Lupton, D. and Petersen, A. (1996). *The New Public Health: Health and self in the age of risk*. Sydney: Allen and Unwin.
- Martinez, F. (1997). Responsibility of health providers and the media in response to scientific information. *European Journal of Contraception and Reproductive Health Care*, 2, 1, 25-30.
- Maxwell, T. A. (2003). The public need to know: Emergencies, government organizations, and public information policies. *Government Information Quarterly*, 20, 3, 233-258.
- McIntosh, W. A. (2000). The symbolization of eggs in American culture: A sociologic analysis. *Journal of American College Nutrition*, 19, 5 (Suppl), 532S-539S.
- McRobbie, A. and Thornton, S. (1995). Rethinking moral panic for multi-mediated worlds. *British Journal of Sociology*, 46, 4, 559-574.
- Meara, J. (2002). Getting the message across: Is communicating risk to the public worth it? *Journal of Radiological Protection*, 22, 1, 79-85.
- Miller, D. (1999). Risk, Science and Policy: Definitional Struggles, Information Management, the Media and BSE. *Social Science and Medicine*, 49, 9, 1239-55.
- Mohr, P. D., and Bond, M. J. (1982). A chronic epidemic of hysterical blackouts in a comprehensive school. *British Medical Journal*, 284, 6320, 961-962.
- Moore, T. (1982). The fight to save Tylenol: The inside story of Johnson & Johnson's struggle to revive its most important product. *Fortune*, 106, 44-49.
- Moynihan, R. I., Heath, and Henry, D. I. (2002). Selling Sickness: The pharmaceutical industry and disease mongering. *British Medical Journal*, 324, 7342, 886-91.
- Mythen, G. and Walklate, S., eds (2006). *Beyond the Risk Society: Critical reflections on risk and human security*. Maidenhead, UK: Open University Press.
- Naylor, D. (2003). *Learning from SARS: Renewal of public health in Canada: A report of the National Advisory Committee on SARS and Public Health*. Ottawa: Health Canada.
- Nelkin, D. (1994). Reporting risk: The case of silicone breast implants. *Risk: Health Safety, Environment*, 5, 2, 233-240.
- Neustadt, R. E., and Fineberg, H. V. (1983). *The epidemic that never was: Policy-making and the swine flu scare*. New York: Vintage Books, 1983.
- United States General Accounting Office. (2003). *Bioterrorism: Public health response to anthrax incidents of 2001: Report to the Honorable Bill Frist, majority leader, U.S. Senate*. Washington, DC: United States General Accounting Office.

- Panay, N. (2004). Hormone replacement therapy: The way forward.. *Journal of Family Planning & Reproductive Health Care*, 30, 1, 21-24.
- Park, R. L. (1996). The great power-line scare. *Alternative Therapies in Health and Medicine*, 2, 2, 46-51.
- Petersen, A. and Wilkinson, I., eds (2008) *Health, Risk and Vulnerability*. New York: Routledge.
- Petersen, A. and Bunton, R. eds (1997). *Foucault, Health and Medicine*. New York: Routledge.
- Pidgeon, N. F., Kasperson, R. E., and Slovic, P. (2003). *The social amplification of risk*. Cambridge: Cambridge University Press.
- Powell, D. A., and Leiss, W. (1997). *Mad cows and mother's milk: The perils of poor risk communication*. Montreal: McGill-Queen's University Press.
- Rail, G., and Beausoleil, N. (2003). Introduction to 'Health Panic and Women's Health'. *Atlantis*, 27, 2, 1-5.
- Ratzan, S. C. (1998). *The mad cow crisis: Health and the public good*. London: UCL Press.
- Rosner, D., and Markowitz, G. (2002). Industry challenges to the principle of prevention in public health: The precautionary principle in historical perspective. *Public health reports*, 117, 6, 501-512.
- Ryder, R. (1999). "No-one ever died from dioxin": The dioxin problem in Britain. *Ecologist*, 29, 6, 369-374.
- Sandman, P. M., and Lanard, J. (May 2003). *SARS Communication: What Singapore is doing right*.
- Schwarz, M. T. (1995). The Explanatory and Predictive Power of History: Coping with the "Mystery Illness", 1993. *Ethnohistory*, 42, 3, 375-401.
- Scowen, P. (1996). The facts about the phthalates scare. *Professional Care for Mother and Child*, 6, 5, 126-127.
- Shickle, D. (2000). "On a supposed right to lie [to the public] from benevolent motives": Communicating health risks to the public. *Medical and Health Care Philosophy*, 3, 3, 241-249.
- Skinner, H. (2004). *Fog of SARS*. Presentation to the School of Public Health Sciences. Toronto: [www.healthbehaviorchange.org](http://www.healthbehaviorchange.org).
- Skolbekken, J. (1995) The risk epidemic in medical journals. *Social Science and Medicine*, 40, 291-305
- Skouby, S. O. (1998). Oral contraceptives and venous thrombosis: End of the debate? *European Journal of Contraception and Reproductive Health Care*, 3, 2, 59-64.
- Slovic, P. (2000). *The perception of risk*. London ; Sterling, Va.: Earthscan Publications.
- Spitzer, W. O. (1997). The 1995 pill scare revisited: Anatomy of a non-epidemic. *Human Reproduction*, 12, 11, 2347-2357.
- Spitzer, W. O. (1999). The aftermath of a pill scare: Regression to reassurance. *Human Reproduction Update*, 5, 6, 736-745.
- Stoto, M. A. (2002). The Precautionary Principle and Emerging Biological Risks: Lessons from Swine Flu and HIV in Blood Products. *Public health reports*, 117, 6, 546-52.

- Stuart, J. M. (1996). The meningitis scare in perspective. *Practitioner*, 240, 1564, 421-22, 426.
- Robarts Centre for Canadian Studies (2003). *Media Coverage of the 2003 Toronto SARS Outbreak*. Toronto: York University.
- Sullivan, L. W. (1998). Maintaining the public's trust in immunization. *EPI News*, 20, 6, 5.
- Tacke, V. (2001). BSE as an Organizational Construction: A Case Study on the Globalization of Risk. *The British Journal of Sociology*, 52, 2, 293-312.
- Telfer, J. (1999). Apocalypse cow: Policy-making in conditions of uncertainty--lessons from the BSE epidemic in the United Kingdom. *Journal of Public and International Affairs*, 10, 162-81.
- Ungar, S. (2001). Moral panic versus the risk society: The implications of the changing sites of social anxiety. *British Journal of Sociology*, 52, 2, 271-91.
- Ungar, S. (1998). Hot Crises and Media Reassurance: A comparison of emerging diseases and Ebola Zaire. *British Journal of Sociology*, 49, 1, 36-56.
- Urwin, J. (1999). Facts behind the pill scare. *Nursing Standard*, 13, 31, 22-23.
- Whelan, E. M. (1985). Toxic terror.
- Whiteside, K. (2003). Humanisme et Terroir: The Culture of Genetically Modified Crops in France. *French Politics, Culture & Society*, 21, 3, 73-90.
- Williams, D., Kelly, A., Carvalho, M., and Feely, J. (1998). Effect of the British warning on contraceptive use in the General Medical Service in Ireland. *Irish Medical Journal*, 91, 6, 202-203.
- Wilson, K., Code, C., Dornan, C., Ahmad, N., Hebert, P., and Graham, I. (2004). The reporting of theoretical health risks by the media: Canadian newspaper reporting of potential blood transmission of Creutzfeldt-Jakob disease. *BMC Public Health*, 4, 1, 1.
- Zavestoski, S. (2002). Toxicity and complicity: Explaining consensual community response to a chronic technological disaster. *Sociological Quarterly*, 43, 3, 385-406.