

IN-DEPTH REVIEW

Communicating occupational and environmental issues

P. J. Nicholson

Procter & Gamble UK & Ireland, Newcastle upon Tyne, UK

Effective health risk communication is an important tool that can prevent or modify the inappropriate public reactions that often accompany occupational and environmental health issues and allegations. The public perception of the magnitude or significance of risk is influenced by factors other than scientific data. The goal of risk communication therefore is more than just imparting scientific facts. It is about ensuring that the public fully understand risk and that they are enabled to make informed decisions under conditions of uncertainty. How people perceive risk, and their values and feelings toward occupational and environmental health issues, are as important considerations for risk communication as are numerical or factual scientific data. Occupational and environmental health scares often occur because of complexities such as the multidimensionality of risk, trust or mistrust in sources of information, technological revolution, the reliance of the public on the media for health information and the public desire for information and the truth. If, as health professionals, we are to address effectively both real and perceived occupational and environmental health issues, we need to be aware of the major advances that have been made in the use of risk communication in recent years.

Key words: Credibility; health risk communication; internet; media; risk perception; trust.

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INTRODUCTION

This paper reviews the last 5 years of scientific publications relating to health risk communication and discusses some of the issues raised. Firstly, however, it is worth revisiting the definition of health risk communication. Health risk communication is an exchange of information between interested parties concerning the nature, magnitude, significance and control of risk. The significant point to remember is that it is an interactive process that involves both speaking and listening. When used effectively, health risk communication can prevent or modify the strong public emotion that often accompanies occupational and environmental health issues. Such public emotion is often disproportionate to the actual hazard and risk, since it is public perception of risk rather than real risk that drives fear reactions. As one expert put it,

phantom risks and real risks compete not only for our resources, but also for our attention. It is a shame when a mother is worried about toxic chemicals and yet her children are running around unvaccinated and without bicycle helmets.¹

Some of us will recall the public health scare linked to pertussis vaccine in the UK in 1985. Yet the risk of severe neurological illness as a side effect of the vaccine was only around 7 per million doses – substantially less than the risk from pertussis itself.² Public fear reactions to perceived hazard and risk appear more commonplace nowadays. This is in spite of advances in public health, wealth and knowledge, and in spite of the eradication of major public health risks such as contagion. People are more likely to be informed of worldwide events including occupational and environmental health issues. Perhaps also people feel they have more to lose, but there are more fundamental reasons that account for large scale occupational and environmental health scares. Not least of these are the multidimensionality of risk, trust or mistrust in sources of information,³ technological revolution, the reliance of the public on the media for health information and the public desire for information and the truth.^{3,4}

Correspondence to: Dr Paul J. Nicholson, Associate Medical Director, Procter & Gamble UK & Ireland, PO Box 1EE, Newcastle upon Tyne NE99 1EE, UK. Tel: +44 (0)191 279 2188; fax +44 (0)191 279 2626; e-mail: nicholson.pj@pg.com

THE MULTIDIMENSIONALITY OF RISK

Opinion is ultimately determined by the feelings, and not by the intellect.

(Herbert Spencer, 1820–1903)

People's perceptions of the magnitude and significance of risk are influenced by factors other than scientific data. Often there is a lack of hard evidence and definitive numerical odds. The scientific quantification of risk may be restricted by methodological constraints⁵ such as whether health effects are stochastic or non-stochastic, how much reliance can be put on animal data, biological variation or individual susceptibility, dose thresholds, latent periods and so on. Add to this the varying perceptions of risk based on uncertainty, dread, trust, catastrophic potential, controllability, risk to future generations, the population affected, etc⁶ and one can appreciate that risk communication is a potential minefield. Value judgements of perceived risk versus perceived benefit may also affect how people judge risk. Just how people perceive risk and their values and feelings toward occupational and environmental health issues are as important considerations for risk communication as are numerical or factual scientific data. One particular example where value and feelings are an issue is in relation to the uncertain effects of reprotoxic chemicals.^{7,8} In circumstances of uncertain risk, it is difficult for people to make complex decisions for themselves, let alone an unborn child^{7,9} and to determine whether risk is acceptable or tolerable. What do we mean by acceptable and tolerable risk? Acceptable risk means that for purposes of life or work, we are prepared to take the risk as it is. Tolerability is a willingness to live with a risk so as to secure certain benefits and in the confidence that risk is being controlled properly.

TRUST AND CREDIBILITY

Knowledge may give weight, but accomplishments give lustre, and many more people see than weigh.

(Earl of Chesterfield, 1694–1773)

Perceptions of trust and credibility depend on whether the communicator is perceived to demonstrate: concern and care, openness and honesty and knowledge and expertise.¹⁰ Risk communication can be effective only to the extent that not only the messenger but also the message are perceived as credible by the target audience. Thus messages need to be designed to address the audience's values, needs and interests¹¹ and scientific findings must be explained with plain, jargon free language that the public can understand.^{3,12} We must avoid 'polysyllabic profundity' and 'alphabet soup'.¹³ Trust in and credibility of the communicator is key to effective health risk communication concerning environ-

mental and occupational issues.^{10,12} So much so, that opposition to controversial technologies may have little to do with either public level of knowledge or information programmes and more to do with lack of trust in negative stereotypes such as industry and government.^{14,15} Whereas industry and government lack public trust, occupational and environmental health physicians are among the most trusted and credible sources of information relating to occupational and environmental issues.¹⁶ Consumer groups and the quality media are also trusted,¹⁷ as are academics, although in the latter such trust is in danger of being eroded by the involvement of academics in biotechnology research and by closer links with industry.^{18,19} Similarly, the credibility of environmentalists has suffered. In the case of the Brent Spar oil storage facility, environmentalists overestimated retained oil volumes and the environmental impact of deep sea disposal. An expert scientific review group regarded the environmental impact to be not only acceptably small, but also not sufficiently different from the option forced by the environmentalists.²⁰ More recently, expert scientific review groups and environmentalists arrived at very different conclusions regarding health effects reportedly attributable to endocrine disruptors (pesticides and plastic components).²¹ The outcome of the debate may depend entirely on who is viewed as having the greatest scientific credibility.

TECHNOLOGICAL REVOLUTIONS

New opinions are always suspected and usually opposed without any other reason but because they are not already common.

(John Locke, 1632–1704)

People fear unfamiliar risks more than familiar ones. This does not bode well when we are living in an era of revolutionary technological advancement. People's lives are changing dramatically by the increasing use of mobile phones, electronic banking, internet shopping, etc. At the same time the public are hearing about or becoming aware of cloned sheep, studies into the human genome and speculation as to when a human may be cloned. These perceived risks are characterized by scientific complexity, uncertainty, mistrust of technology and difference of opinion between experts. In the case of genetic engineering, risk perceptions are also underpinned by ethical concern and questions surrounding the perceived need for the technology.²² Advances in chemical engineering, genetic engineering, transport, medicine and nuclear physics have occurred simultaneously with advances in news reporting and in communication generally. But these advances do not produce equitable advancement in technology and in understanding of technology at the societal level despite a trend toward more openness and freedom of information. Effective risk communication must cope with lack of public knowledge of science, scientific complexity,

uncertainty, mistrust of technology and difference of opinion between experts.²³ Technology suffers further in that the public can not exert any control over the perceived risks, whereas they can exert control with lifestyle risks such as cigarette smoking and driving a car. Even though the risks may be much less, the result of this lack of control is that technological risks are perceived less favourably than lifestyle risks.²² The Three Mile Island Nuclear Power Station scare is a good example where risk was and still is perceived out of context, because of personal lack of control over exposure and specific fear of the effects of radiation. Even though 800,000 people benefit from this facility, apprehension and mistrust remain 20 years after a single leak of radioactive steam that presented a dose of radiation comparable to normal background exposure levels.²⁴

THE MEDIA

The newspapers ... are the most abominable, villainous, licentious, infernal – not that I ever read them.

(Richard Brinsley Sheridan, 1751 – 1816)

As a rule, the public receives health information from the media and friends rather than from doctors or evidence-based journals.¹³ Public anxiety is linked to reliance on the media as the main source of information²⁵ and risk communicators must cope with both distortion in the mass media and the resultant public outrage.²³ The media are a broad group that includes those who aim to produce high quality, objective, independent coverage of issues, to those who seek to present a particular angle on issues such as personal interest or sensational aspects.²⁶ When used effectively, the media can help ensure that the right risk communication message reaches the target audience.¹¹ However, journalists often view news as entertainment rather than information, such that reporting is not always as objective as we might wish. Even with objective reporting in broadsheet newspapers such as *The Times* (London), the use of attention-grabbing captions for a medical item such as 'CJD could become a disaster of biblical proportions' from part of a sentence used by a medical expert does little to put issues in perspective, particularly when the whole sentence started 'it may only involve hundreds, but it could ...'.²⁷ Public acceptance of risk information is also impacted by negative images in the media, such as the portrayal of the effects of radiation in terms of monsters¹⁵ and emotive terms as 'Frankenstein foods'.

The media have their needs, which are sometimes different to those of the health risk communicator. In general, the media are more interested in simplicity than complexity, i.e. yes or no/safe or unsafe answers and in danger rather than safety, i.e. bad news more than good news.²⁸ One of the greatest challenges we face is how to communicate complex issues simply, particularly when quantification of risk is not always straightforward. So we must learn to work with the media rather than against it.

This is not without challenges, as demonstrated by some of the prominent public health scares of recent decades.

In the US in 1959, cranberries were taken off supermarket shelves when the weed killer aminotriazole was found to be carcinogenic in rats. In 1989, daminozide, a growth regulator used to prevent apples dropping off trees, was described on CBS television as 'the most potent cancer-causing agent in our food supply'. The doses that promoted cancers in the animal studies were equivalent to human consumption of 15,000 pounds of cranberries a day and drinking 38,000 pints of apple juice a day for life.²⁴ Conversely, in 1977 the public response to saccharin almost being banned by the US Food & Drug Administration because of bladder cancers in rats who had been fed 'enormous doses' was that housewives stocked up ahead of any imposed ban. Although saccharin is a synthetic chemical, as are aminotriazole and daminozide, the public saw saccharin as a substance that was beneficial and so the perceived risk was not as great as pesticides or chemical regulators.²⁴

More recently, mobile phones came under the spotlight. This started when the husband of a woman who used a cellular phone extensively and who had developed a brain tumour behind her right ear appeared on the CNN programme 'Larry King Live' in 1993. Although it is not possible to prove that electromagnetic fields (EMFs) are safe, there is no convincing evidence of harm from the EMFs emitted by cellular phones. While the incidence of brain tumours has risen slightly in recent years, there has been no disproportionate increase in tumours near the ears, despite a meteoric rise in the use of cellular phones.²⁴

PUBLIC DESIRE FOR INFORMATION

Where there is much desire to learn, there of necessity will be much arguing, much writing, many opinions; for opinion in good men is but knowledge in the making.

(John Milton, 1608 – 1674)

The advent of affordable foreign travel and the growth of the media through cable and satellite television have made the public less insular and more internationally aware. As a result the public is more interested in news and information from around the world. This desire for information was never less satisfied than at the time of writing this paper. August 1999 saw a plethora of disasters and public health issues.

Initially, newsworthy natural catastrophes such as Hurricane Bret and a heatwave in the US, Tropical Storm Dennis in the Caribbean and typhoons in Asia were soon to be overshadowed by an earthquake in Turkey which killed over 12,000 people. Man-made disasters included a train crash in India, killing or injuring over 600 people, an airliner landing upside down during a storm in Hong Kong, and a toxic blaze aboard a cargo

ship that collided with a cruise liner in the English Channel. Although natural disasters are perceived more favourably than man-made disasters, even when the disaster is an 'act of God', the public and the media still look for people or officials to hold accountable. Although the Turkish earthquake could not be prevented, the standard of buildings and the preparedness of government was questioned, as was rail safety in India, reinforcing the general lack of trust in industry and government.

Other newsworthy events included the launch of a UK study into genetic factors, cancer and aspartame (Nutrasweet®), the US Environmental Protection Agency ban of the organophosphate pesticide methyl parathion, an announcement by the Association of Surgeons in Great Britain & Ireland that patient safety could be at risk from overworked surgeons, a campaign to publicize the risk of noise-induced hearing loss in nightclubbers, the lifting of the worldwide ban on British beef, and a report that thousands of UK businesses and millions of jobs were at risk because of complacency about the millennium bug. The millennium bug, combined with a concrete deadline with its unlimited ambiguity, provided a fertile breeding ground for anxiety.²⁹

All these events follow closely on other rail crashes, air crashes, activists destroying fields of genetically modified crops in the UK and 'mass sociogenic illness' in Belgium linked to fears of dioxins in Coca-Cola®.³⁰ The perceived risks to public health and safety, be they direct from the activities of scientists and industry or indirect from inadequate preventive action or contingency planning from industry and government, are more likely to be known on a much wider scale than ever before. If catastrophes are not preventable, then damage to reputations can only be limited. Risk communication is no substitute for risk assessment and risk reduction, but communication can prevent greater damage and in this context it is like an insurance policy.³¹

FUTURE THREATS AND OPPORTUNITIES

Ill news hath wings, and with the wind doth go.
(Michael Drayton, 1562–1631)

The internet was the hottest new business and technology medium of the 1990s. The world wide web represents a revolution of free speech that the veteran British Member of Parliament Tony Benn likened to: 'someone standing on a soap box and being heard around the world'. By connecting to a search engine and typing in a few words or a phrase, the public have access to a previously unimaginable collection of data and usually within a fraction of a second (Table 1). Of course not all data will be relevant, depending on how the search phrase was entered, but nonetheless the internet makes previously inaccessible information accessible. As the internet facilitates communication and knowledge shar-

Table 1. Results of search for key phrases using one web search engine

| Search phrase | Number of documents found | Search time (s) |
|------------------------------------|---------------------------|-----------------|
| bse | 99,274 | 0.356 |
| 'mad cow disease' | 21,982 | 5.623 |
| 'bovine spongiform encephalopathy' | 12,033 | 0.257 |
| pcbs | 52,812 | 0.129 |
| 'polychlorinated biphenyls' | 18,301 | 1.865 |
| 'mobile phones' & health | 10,935 | 1.8 |
| 'occupational asthma' | 3,819 | 0.2345 |
| 'electro-magnetic fields' & health | 1,354 | 0.356 |
| 'frankenstein food' | 702 | 0.121 |
| 'pleural plaque' | 131 | 0.016 |

ing on a global scale, so too can it give rise to unprecedented opportunities for misinformation, since it is difficult to control the information that is there. As yet, we are in the early days of the information age and as more and more people connect to the world wide web through computers at home, at work or in cyber cafes, there is the limitless potential for unfounded health scares. The challenges for communicators in the future therefore include how we manage this information and misinformation overload,³² and with that, how we achieve more than just imparting the scientific facts³³ and how we keep up to date with the continuous advances in risk communication techniques.³⁴

CONCLUSION

Perception of risk is a complex issue that gives rise to challenges in risk communication. The goal of risk communication therefore is more than just imparting scientific facts. It is about ensuring that the public fully understand risk and that they are enabled to make informed decisions under conditions of uncertainty. There have been major advances in the use of risk communication in recent years which need to be disseminated broadly among health professionals. This is particularly important given the phenomenal advances in science and technology and the anxiety they bring. With the coincidental advances in information technology, we must look to ways to bridge the gap between experts and journalists in the common interest of meeting the needs of the public and seek ways to use the internet effectively to address real or perceived occupational and environmental health scares.

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