Mad cows, bats and baby milk

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The intrinsic conflict between the mandated need to inform the public of potential health hazards and the need of the media for sensational headlines is threatening to compromise the scientific process.

PRELIMINARY findings of potential significance to human health are increasingly used by the media to cause alarm and controversy. After a day or two it is usually concluded that politically sensitive data are being withheld by incompetent authorities. In the United Kingdom, there is at present no shortage of examples — bovine spongiform encephalopathy (BSE) in cattle, phthalate esters in baby-milk formulae and the appearance of a rabies-infected bat.

Common to these examples is the publication of preliminary research findings. Two separate problems are evident. The first is that the media, in general, have no interest in equivocal conclusions based on preliminary data. They either ignore such reports, or transform them into firm indications of a problem. The second problem is that fear of the media charge of suppression of data is leading to the dissemination of ever-more preliminary data. These two trends feed on each other with potentially serious consequences for the scientific process.

Because conclusions can never be absolutely certain in a developing scientific study, communication to the media of interim conclusions relating to a matter of public health seems doomed to misinterpretation and subsequent confusion. For example, the media and the general public do not know how to respond to the hypothetical possibility that prion proteins may be transferred from BSE-infected cows to humans. Preliminary discussions of this hypothesis therefore rapidly degenerated into calls to name the cow, or to name the human — such certainty being the required prelude to the apportioning of blame. A related danger is that, as the media pressure mounts, cautious preliminary conclusions may be defended by scientists not directly involved. This can lead both to the transformation of preliminary conclusions into confirmed conclusions and to the neglect of alternative hypotheses (as is suggested¹ to have happened with Purdey's speculative chemical explanation for BSE).

Unfortunately, this developing 'yob culture' in media handling of scientific data could compromise the processes of data generation and dissemination. The main components of the scientific process are as follows. First, hypothesis, thesis and fact form a hierarchy, the steps between them being scaled by observations. When observations undermine an hypothesis, they

should be published by the media with the same enthusiasm as accompanies the announcement of confirmatory results. In practice, failed hypotheses usually die a lingering and obscure death. Second, observations should be confirmed before they are published. In matters of public health, however, preliminary results that would probably be unacceptable for publication by a scientific journal are often mandated to be communicated. Third, confirmed observations may be open to several possible interpretations, leading to the need for systematic studies of the sources of their variability. These often take some time to conduct, and their necessary absence from preliminary communications lies at the source of most health scares. Fourth, appropriate control observations should accompany each step of a scientific study in order to eliminate artefacts — again, such controls are often absent when preliminary results are announced. The neglect of these basic principles of good scientific practice can transform preliminary findings into a sequence of passing health scares.

The most recent example of this trend was the announcement that a single bat, probably blown across the Channel from France, was harbouring a variant of the rabies virus when it bit two women in England. The qualifications in that statement were made clear from the start, and essentially removed the incident from the realm of a public health alert. Experts interviewed on a domestic radio station a few hours after the initial announcement said that there was no need for general concern, and that the primary test result might have been caused by an interfering virus. These warnings should have been sufficient to ensure that the official statement was seen as the communication of preliminary data to an informed public by diligent health authorities. In fact, the media handled the incident as if a major outbreak of rabies had occurred.

The potential hazard posed to babies by low-level contamination of infant milk formulae with phthalate esters was recently recognized by the UK Ministry of Agriculture, Fisheries and Food (MAFF). A detailed exploratory study was mounted involving the collection of 59 samples of formulae and their analysis for the presence of 12 phthalate esters. The results of the initial survey were communicated to around 3,000 interested parties through the

MAFF *Food Safety Bulletin* and its more detailed surveillance information sheet². It was concluded that "these initial surveillance data and the limited biological studies available so far do not suggest that the concentrations of phthalates found in infant formulae would have any effect in humans". This conclusion was derived in the light of the cautious preliminary observation by R. M. Sharpe *et al.*³ that a small effect on testes size and sperm production was produced in young rats exposed to one of these phthalates *in utero*. The surveillance document went on to recommend steps to reduce further, *as a matter of principle*, phthalate levels in formulae, and follow-on studies to confirm and extend the results of the initial survey. The media reaction to this preliminary report was that a problem did in fact exist and that the most affected brands of formulae should be identified so that consumers could boycott them. Being a pilot study, the MAFF investigation had not studied batch-to-batch variations within each brand, so the questions posed by the media could not be answered. Yet again, the media were unable to respond in a balanced way to preliminary data that in fact pointed to the safety of a product.

Given the perceived need for the communication of preliminary data on matters of public health, the scientific process cannot be strictly adhered to by those responsible for the generation and communication of such data. This then leads to the vicious circle of an implication by the media of either incompetence or cover-up. So there seems to be an intrinsic conflict between the mandated need to inform the public of potential health hazards and the need of the media for headlines. The solution lies with general education in the scientific process and concerted efforts to inform the public about relative risks. Curiously, it is the tobacco industry that has taken the initiative in the latter, observing that the hazard of passive cigarette smoking equates to consuming three hamburgers a day. □

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1. Booker, C. & North, R. *Daily Telegraph* (14 June 1996).
2. Food Safety Directorate *Food Surveillance Information Sheet*, March 1996 (MAFF, London 1996).
3. Sharpe, R. M. *et al. Envir. Hlth Perspect.* **103**, 1136-1143 (1995).