

Social science insights for risk assessment:

findings of a workshop held by the Royal Society and
the Food Standards Agency on 30 September 2005

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Summary

The Royal Society organised a workshop at the request of the Food Standards Agency (FSA) to explore potential social science insights for risk assessment.

The workshop involved scientific experts and leading social scientists in developing a series of practical steps to inform risk assessment processes.

The workshop examined two case studies exploring risk assessment: the transmission of bovine spongiform encephalopathy (BSE) and the consumption of fish.

The following five principles emerged from the workshop discussions, which may enable more effective risk assessment, and related management and communications processes:

- stakeholders and the public (where appropriate) should be consulted on the framing of questions to be put to expert scientific advisory committees;
- a cyclical and iterative process to inform risk assessment, management and communication should be developed;
- assumptions and uncertainty in risk assessment should be acknowledged;
- public and stakeholder engagement should be broadened at the different stages of the process, particularly on issues of controversy or high uncertainty; and
- it is important to be clear about your audiences and communicate the things that matter to them.

1 Introduction

- 1.1 Risk assessment has become fundamental to decision-making in the UK. It enables better understanding, prediction and control of hazards to human health and the environment.
- 1.2 Dealing with risk is complex and at times controversial. Fundamentally, risk assessment needs to be underpinned by robust scientific evidence. However, the questions that the assessment focuses on, and ultimately the management and communication of risk, are embedded within broader institutional and social contexts. In addition, risk assessment may concern issues characterised by high uncertainty.
- 1.3 A workshop was organised to explore potential social science insights for risk assessment. The workshop was initiated by Professor Sir John Krebs FRS during his chairmanship of the Food Standards Agency (FSA). The FSA is the UK's independent Government department that protects public health and consumer interests in relation to food.

The Royal Society was approached to design a process to enable scientists and social scientists to reach a better understanding of different perspectives related to risk assessment.

- 1.4 The Royal Society, the UK's national academy of science, was approached by Sir John to oversee and design a process within its Science in Society programme to enable scientists and social scientists to work together and reach a better understanding of different perspectives related to risk assessment.

Through the examination of case studies, participants considered how risk assessment processes might differ if they took on board a stronger social science perspective.

- 1.5 The workshop involved the Chairs, and in one case a member, of five expert government committees on risk, and four social scientists with expertise in the psychology and sociology of risk (see Appendix 1).
- 1.6 Through the examination of case studies, participants considered how risk assessment processes might differ if they took on board a stronger social science perspective. Specifically, the participants were asked to develop practical steps to inform assessment processes.
- 1.7 The case studies and workshop findings are described below – in particular five principles to help develop more effective risk assessment, management and communications processes.

2 The case studies

- 2.1 Participants examined two case studies that described risk assessment processes that had been conducted by independent government expert committees on behalf of the FSA (for the full case studies, see www.royalsoc.ac.uk/riskworkshop). The case studies were chosen on the basis of the different risk assessment processes developed and mechanisms to take account of stakeholders and other concerns. The role of the expert committees in both processes was to examine risk assessment only, with the FSA developing management and communication responses.

2.2 The over 30 month (OTM) rule

2.2.1 The first case study was a review of the potential increase in risk from the transmission of BSE that might result from the removal of the over 30 month (OTM) rule, which banned the sale of beef in the UK of cattle aged over 30 months at slaughter. The rule was introduced in 1996, when strong evidence emerged that variant Creutzfeldt-Jakob disease (CJD) was likely to be caused by eating cattle infected with BSE. The infectivity of diseased cattle increases with age; therefore animals older than 30 months pose a greater risk than young animals. In 2002, the FSA conducted a risk assessment process that specifically examined the potential increase in risk to human health if the OTM rule were removed and replaced with the BSE testing programme used in other European Union (EU) countries.

The first case study was a review of the potential increase in risk from the transmission of BSE that might result from the removal of the over 30 month (OTM) rule.

2.2.2 A process was developed to oversee and conduct the risk assessment. First, a stakeholder group comprising a range of interests decided the requirements of the quantitative risk assessment. The risk assessment was then performed by an independent party with oversight from a risk assessment group (RAG). The RAG reported the risk assessment results for peer review to the Spongiform Encephalopathy Advisory Committee (SEAC), the government advisory committee on transmissible spongiform encephalopathies. Finally the stakeholder group considered the risk assessment results, costs and other issues of proportionality to provide a recommendation to the FSA Board on changes to the OTM rule. Information was provided to the public through the FSA website and open meetings at all stages of the process.

2.2.3 The OTM risk assessment process focused on three areas. First, the amount of infectivity from BSE that had entered the human food chain historically because of the BSE epidemic was determined. Second, the additional infectivity that might enter the food chain were the OTM rule replaced was assessed. Third, the size of additional epidemic cases of variant CJD that might arise from replacement of the OTM rule was estimated and compared with those numbers resulting from the historical exposure. In conclusion, the assessment estimated there could be about 0.5 new cases of variant CJD over a period of 60 years if the OTM rule was replaced by testing, and a worst-case scenario of a maximum of 2.5 new cases of variant CJD. The FSA Board agreed that it would be appropriate to advise government Ministers that replacing the OTM rule by testing cattle for BSE that were born after the 1996 feed ban would be justified. This was subject to the FSA advising Ministers that the arrangements were in place for a robust testing system.

2.3 The benefits and risks of fish consumption

2.3.1 The second case study was a review of the benefits and risks of fish consumption, particularly oily fish. The study was commissioned because of potentially conflicting advice about the health benefits of fish consumption: on the one hand the benefits of eating oily fish in reducing cardiovascular disease; on the other, the potential toxicity from lipophilic pollutants (such as dioxins and polychlorinated biphenyls) found in oily fish, and heavy metal pollutants (such as mercury) found in older or larger fish.

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2.3.2 Members from the Scientific Advisory Committee on Nutrition and the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment formed a Fish Inter-Committee Subgroup, which was tasked to review the evidence and come to an agreed view about the balance between the risks and benefits of increased consumption of fish. The review would also take account of the risk posed to different population groups, such as pregnant women and infants. The Committee was not asked to consider the sustainability of fish stocks in relation to the advice.

2.3.3 The Committee endorsed the long-standing advice from the Committee on Medical Aspects of Food Policy (COMA) that most of the UK population should be encouraged to increase their consumption of fish, and that people should eat at least two portions of fish per week, of which one should be oily. The Committee stated that this recommendation should also apply to pregnant and lactating women, subject to the restrictions on certain fish – marlin, swordfish, shark and, to a lesser extent, tuna – owing to potential methylmercury contamination. The Committee also set new recommendations for different population groups for maximum intakes of oily fish at which the health benefits clearly outweighed the possible risks of dioxins.

3 Five principles for risk assessment

- 3.1 The following five principles emerged from the discussion of the case studies:
- stakeholders and the public (where appropriate) should be consulted on the framing of questions to be put to expert scientific advisory committees;
 - a cyclical and iterative process to inform risk assessment, management and communication should be developed;
 - assumptions and uncertainty in risk assessment should be acknowledged;
 - public and stakeholder engagement should be broadened at the different stages of the process, particularly on issues of controversy or high uncertainty; and
 - it is important to be clear about your audiences and communicate the things that matter to them.
- 3.2 The aim of the principles is to enable more effective risk assessment, and related management and communications processes. It should be noted that the workshop participants were very encouraged that the FSA had already developed much good practice in this area: the stakeholder group in the review of the OTM rule was cited as an example. The issue was the need for a more consistent approach about when and how to engage non-specialists in risk assessment.

The aim of the principles is to enable more effective risk assessment, and related management and communications processes.

3.3 Principle 1: Stakeholders and the public (where appropriate) should be consulted on the framing of questions to be put to expert scientific advisory committees.

There should be wider consultation on the framing of the questions to be put to scientific committees to better take into account public concerns.

- 3.3.1 The role of institutions and experts in framing the risk assessment was highlighted. This approach is essential to ensure that the scope of risk assessment is underpinned by sound science. However, through reliance on these mechanisms alone, it was argued that the risk assessment might focus on issues that are academically or institutionally appropriate but of less relevance for the population as a whole.
- 3.3.2 It was felt that there should be wider consultation with stakeholders and particularly the public on the framing of the questions to be put to scientific committees: specifically, to better take into account their concerns. It was recognised that this approach would not be feasible or relevant for all risk assessment exercises. Rather, it may be useful on issues of public or media controversy, where there is a strong public interest in the assessment, or where subsequent advice aims to promote change in consumer behaviour.
- 3.3.3 It was acknowledged that public framing of issues might focus on questions beyond the scope of an institution's remit. For instance, for fish consumption, the broader sustainability of fish stocks may also be an important issue for the public. Highlighting such concerns to relevant authorities and developing better coordination in science advice across government was advocated.

- 3.3.4 On a related issue, it was also highlighted that there was a tendency to frame the advice from a perspective of hazard identification and risk assessment, as opposed to a focus on health benefits. Specifically, there were concerns that communication of risk that was ultimately derived from a hazard identification process forged a relatively defensive public stance.
- 3.3.5 Public and stakeholder engagement mechanisms that inform the basic framing of the risk assessment to ensure relevant consumer and public issues are acknowledged were recommended (mechanisms are explored in section 3.6).

3.4 Principle 2: A cyclical and iterative process to inform risk assessment, management and communication should be developed.

A cyclical and iterative process between analysis and deliberation, where stakeholder debate helps to frame the risk assessment and assessment informs the stakeholder debate, was seen to be beneficial.

- 3.4.1 A key lesson noted from the Phillips enquiry¹ into the BSE epidemic was that scientific committees should not get into policy domains and start making management decisions.
- 3.4.2 However, providing the roles and responsibilities of each stage are clear, greater interaction between those involved in the risk assessment and in management and communication was considered important.
- 3.4.3 The main benefits of this were to ensure that the ongoing framing of the assessment was meaningful to the policy context, to enable better understanding of the evidence by those who develop policy and communication strategies, and to facilitate prompt and effective advice.

¹ Lord Philips, Bridgeman, J. and Ferguson-Smith, M. (2000). *The BSE Inquiry: The Report*. The Stationery Office, London.

3.4.4 More broadly, a cyclical and iterative process between analysis and deliberation, where stakeholder debate helps to frame the risk assessment and assessment informs the stakeholder debate, was seen to be beneficial. Specifically, the analysis would provide new data to inform the issue at hand, and deliberation would bring new understanding between experts and non-specialist groups and help to reformulate the nature of the problem. It was noted that this iterative approach has been explored in some depth by the National Research Council², where a series of risk assessment and public engagement exercises were interlinked as part of the overall process of risk characterisation.

3.4.5 Importantly, inviting the comments of expert committees on whether a particular management option is consistent with the risk assessment was also seen to be beneficial and consistent with the findings and recommendations of the Phillips report.

3.5 Principle 3: Assumptions and uncertainty in risk assessment should be acknowledged.

3.5.1 How human behaviour was taken into account in risk assessment was raised. Rather than being a purely technical matter, it was noted that the conditions under which risk failures occur are often related to human and organisational practice. It was argued that social scientists on risk assessment committees could help identify behavioural assumptions that need to be taken into account in the assessment process.

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Although not directly related to this point, the advice sought from the Patrick Wall Group on arrangements that would be necessary to ensure a robust BSE testing system that minimised the risk of failures was cited in the subsequent discussion. It was welcomed that independent advice be sought on the proposed testing regime before a final decision was made to remove the OTM rule.

3.5.2 The need to consider different conceptual approaches to risk assessment in relation to specific environmental risks was highlighted. For instance, the difference that static versus dynamic risk assessment might yield; and the importance of dynamic approaches to modelling behavioural feedback.

Whether different decision-making processes needed to be developed on issues of high uncertainty was also discussed.

3.5.3 In addition, the need to have positive feedback as assumptions changed in risk assessment was discussed. In the course of the OTM review, a retrospective appendix and tonsil survey had suggested that the prevalence of infections may be higher than predictions based on the data of clinical cases alone. The importance of revisable, flexible and dynamic processes where such evidence could be factored in was stressed.

3.5.4 Whether different decision-making processes needed to be developed on issues of high uncertainty was also discussed. Uncertainty can be due to naturally stochastic systems or fundamental gaps in research. In areas of high uncertainty, what constitutes 'evidence' was noted as an area that needed to be further explored. Broader stakeholder and public engagement in such instances was thought to be important.

² National Research Council (1996). *Understanding risk: informing decisions in a democratic society*. National Academy Press, Washington DC.

3.5.5 A key issue was how to represent, analyse and communicate uncertainty meaningfully. The approach to communicating uncertainty should not be shaped by fear of provoking an 'irrational' public scare. The public do not require certainty in scientific risk assessment. Rather, the key issue is to communicate uncertainty explicitly when talking about the scientific understanding of associated risks.

3.6 Principle 4: Public and stakeholder engagement should be broadened at the different stages of the process, particularly on issues of controversy or high uncertainty.

3.6.1 Public meetings at the beginning of an assessment process could help frame the assessment process and inform the subsequent communication process. For instance, BSE was noted as an extraordinarily sensitive case. The role of public engagement is to better understand and inform public concerns, and highlight potential issues of the social amplifications of risk. This concerns how the public relates to risk, not just in terms of statistical probability but also dynamically by the portrayal of the risk through signs, images and symbols in the media.

Committees should be encouraged to consult on their draft findings before finalising their advice.

3.6.2 Committees should be encouraged to consult on their draft findings before finalising their advice. The role of the public in reviewing draft advice was highlighted, in terms of its relevance, comprehensibility and potential impact on behaviour.

3.6.3 The issue of how to develop effective public engagement processes that do not just reflect a narrow range of interests or stakeholders was discussed. It was noted that a range of social science techniques existed to support such engagement: from structured recruitment processes to engage specific socio-economic groups, to particular mechanisms of stakeholder and public dialogue. However, these were not well known by the committees, which highlighted the need for better dissemination and support from the social sciences in this area.

3.6.4 In any engagement, the public should be provided with sufficient access to balanced information, knowledge and expertise. Stakeholder and public dialogue should be supported by broader, more extensive approaches to information provision. It was felt that there was a strong demand for public debate on food safety if the right forum was provided.

3.6.5 It was noted that not all risk assessment issues would be amenable to or warrant full public engagement. Rather, a broader focus on developing transparent procedures with oversight from well-qualified individuals or agencies that were not perceived to have a strong vested interest was felt to promote legitimacy and public confidence. In addition, the objectives of and framing for the risk assessment could be informed by social scientists.

3.6.6 Public involvement was particularly recommended in areas of high uncertainty and public controversy.

3.7 Principle 5: It is important to be clear about your audiences and communicate the things that matter to them.

Communicating complex technical matters in a way that is transparent and exposes the uncertainties but is still digestible to the wider public was deemed critical.

3.7.1 The need for effective planning and interaction with the media on complex risk issues was recognised.

3.7.2 Communicating complex technical matters in a way that is transparent and exposes the uncertainties but is still digestible to the wider public was deemed critical.

3.7.3 Being clear about the primary audiences for the advice was key, and accordingly being flexible and responsive to different needs. Communication should focus on the nature of the risk, the uncertainty surrounding the risk, the context of the advice and what people should do about the risk. The broader technical information should also be available for those groups that wished to examine it.

3.7.4 The broadcast and print media were recognised as the most important channels of risk communication. Irrespective of efforts to develop public engagement, understanding how the filter of the media would impact upon communication was important.

3.7.5 Keeping a dialogue going with the media over a long period of time so that it developed its thinking alongside the important process was vital.

For further information on the workshop please see www.royalsoc.ac.uk/riskworkshop

Appendix 1: Workshop participants

The Earl of Selborne FRS (Chair), Chairman, Science and Society Committee, The Royal Society

Dr Jon Bell, Chief Executive, Food Standards Agency

Professor Sir John Krebs FRS, Principal, Jesus College, Oxford University, and former Chair of the Food Standards Agency (2000-2005)

Professor Martin Taylor FRS, Physical Secretary and Vice President, The Royal Society

Government expert committees on risk:

Professor Chris Higgins, Chair, Spongiform Encephalopathy Advisory Committee (SEAC)

Professor Paul Hunter, Member, Advisory Committee on Microbiological Safety of Food (ACMSF)

Professor Mike Gasson, Chair, Advisory Committee on Novel Foods and Processes (ACNFP)

Professor Ieuan Hughes, Chair, Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)

Professor Alan Jackson, Chair, Scientific Advisory Committee on Nutrition (SACN)

Participants from the social sciences³:

Dr Robyn Fairman, Deputy Director, King's Centre for Risk Management, King's College London

Professor Alan Irwin, Dean of Social and Environmental Studies, University of Liverpool

Professor Nick Pidgeon, CER Director and Professor of Environmental Sciences, University of East Anglia

Dr Henry Rothstein, ESRC Centre for Analysis of Risk and Regulation, London School of Economics and Political Science

In attendance:

Dr Darren Bhattachary, Senior Manager, Science Communication, The Royal Society

Dr David Boak, Director, Communications, The Royal Society

Dr Sharn Bowen, Head of Strategic Development Branch, Food Standards Agency

Dr Siobhan Campbell, Principal Research Officer, Government Social Research Unit

³ Professor Sheila Jasanoff, Pforzheimer Professor of Science and Technology Studies, Harvard University, was unable to attend on the day.

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The Royal Society has three roles: as the UK academy of science, as a learned society and as a funding agency. It responds to individual demand with selection by merit, not by field.

The objectives of the Royal Society are to:

- strengthen UK science by providing support to excellent individuals
- fund excellent research to push back the frontiers of knowledge
- attract and retain the best scientists
- ensure the UK engages with the best science around the world
- support science communication and education, and communicate and encourage dialogue with the public
- provide the best independent advice nationally and internationally
- promote scholarship and encourage research into the history of science.

The Food Standards Agency is an independent Government department set up by an Act of Parliament in 2000 to protect the public's health and consumer interests in relation to food.

The FSA's guiding principles are:

- putting the consumer first
- being open and accessible
- being an independent voice.

For more information on the Food Standards Agency's policies and activities, visit our website at www.food.gov.uk



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