



# Guidelines On Scientific Analysis

## In Policy Making

October 2005

## **Introduction by the Government Chief Scientific Adviser**

### **The context**

1. The environment in which Ministers must make decisions is continually changing. In recent years we have seen the level of public interest in evidence-based issues increase. These guidelines were first published in 1997 and updated in 2000 to take on board the anticipated findings of the Phillips Report into the BSE Crisis. During these past eight years, I believe the level of public confidence in government's ability to make sound decisions in this area is now beginning to recover. It is essential that we continue to build on the lessons learned from this and embed them across all areas of government policy

2. It is also essential that an effective advisory process exists which allows decision makers access to a high quality and wide ranging evidence base. This will enable them to make informed decisions, to deal effectively with crises and to ensure that all opportunities are explored to their full potential. In short, we must ensure that:

- key decision makers can be confident that evidence is robust and stands up to challenges of credibility, reliability and objectivity
- key decision makers can be confident that the advice derived from the analysis of the evidence also stands up to these challenges
- the public are aware, and are in turn confident, that such steps are being taken

3. The principles laid out within these guidelines are consistent with the current better policy making guidelines to which policy makers adhere. They aim to further highlight the importance of the role of evidence in policy making, and to increase the awareness of policy makers on how best to seek good quality evidence from the most credible sources at the most appropriate time. They also aim to support the Professional Skills in Government (PSG) agenda by facilitating the understanding of the analytical and policy making environments for all those involved in the process.

### **The guidelines**

4. The guidelines address how evidence should be sought and applied to enhance the ability of government decision makers to make better informed decisions. The key messages are that departments, and the individual policy makers within them, should:

- think ahead and identify early the issues on which they need scientific advice and early public engagement, and where the current evidence base is weak and should be strengthened
- get a wide range of advice from the best sources, particularly when there is uncertainty
- publish the evidence and analysis and all relevant papers

5. This updated version of the guidelines replaces the second edition issued in July 2000. It builds on input from, and policy making experience gained, inside government and views from a wide range of stakeholders who responded to the public consultation held between June and August 2005.

## Which areas of evidence do the guidelines cover?

6. The guidelines cover all disciplines from which policy makers may need to seek advice when formulating long-term policy objectives (including international agreements) or when reacting to another piece of established or emerging evidence.

7. These include natural and physical sciences, social sciences, economics and statistics and the arts and humanities<sup>1</sup>. The balance of disciplines required will obviously depend on the issue in question, but the potential for advice to be strengthened by harnessing evidence from all disciplines should not be discounted, particularly in areas of public concern. This is covered in more depth later.

8. The balance of research methods used to generate the data will also depend upon the issue in question. Research methods include experimental and theoretical/computational, survey and administrative, qualitative, economic evaluation, philosophical and wider social [research](#)<sup>2</sup>.

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<sup>1</sup> Further disciplines covered include medicine, dentistry and all allied subjects; engineering and technology; agriculture, fisheries, forestry and veterinary science; biological, environmental, mathematical sciences; psychology; and geography.

<sup>2</sup> Please see <http://www.policyhub.gov.uk/> for more details.

## **Identification of issues needing specialist advice**

### Early identification and horizon scanning

9. Individual departments should ensure that adequate horizon scanning procedures are in place, sourcing data across all evidential areas, to provide early indications of trends, issues, or other emerging phenomena that may create significant impacts that departments need to take account of<sup>3</sup>. Departments should ensure that their horizon scanning evidence is appropriately considered and, where necessary, acted upon. Departments should be able to draw on the information included in their Science and Innovation Strategies or their wider Evidence and Innovation Strategies.

### Cross-departmental issues

10. Many issues are likely to require evidence that cuts across departments and will therefore require close communication and collaboration between departments. Departments should ensure they have the mechanisms in place for early identification of issues which affect more than one department or agency or have an international dimension. Adequate procedures should also be in place for early provision and exchange of information.

### Robust evidence and robust advice

11. Once issues have been identified on which scientific advice is needed, departments should ensure their procedures for obtaining advice are consistent with the steps outlined below. The various stages in the process are not concurrent, and may have to be applied iteratively.

### **Obtaining specialist advice**

12. Departments should draw on a sufficiently wide range of the best expert sources, both within and outside government, ensuring that existing evidence is drawn upon. There is an extensive list of external sources that departments can engage. These include academics, eminent individuals, learned societies, advisory committees, consultants, professional bodies, public sector research establishments (including the Research Councils), lay members of advisory groups, consumer groups and other stakeholder bodies. Where appropriate, consideration should also be given to inviting experts from outside the UK, for example those from European or international advisory mechanisms, particularly in cases where the other countries have experience of, or are likely to be affected by, the issue under consideration.

### Which experts?

13. Departments should ensure that their selection of advisers matches the nature of the issue and the breadth of judgment required and is sufficiently balanced to

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<sup>3</sup> There are many ways of carrying out horizon scanning. The Office of Science and Technology Horizon Scanning Centre can provide advice, examples and, in some cases, further support. Please see <http://www.foresight.gov.uk/horizonsscanning> for further details.

reflect the diversity of opinion amongst experts. When deciding which external sources to seek advice from, departments should encourage those responsible for individual issues to cast their net wider than their traditional contacts and continually establish new networks in order to capture the full diversity of good evidence-based advice. The potential networks of organisations such as learned societies should not be underestimated. Many professional bodies have access to a wide range of specialists whose experience could usefully be brought to bear on relevant issues.

14. Departments should ask prospective experts to follow the seven principles of public life<sup>4</sup> as set out by the Committee on Standards in Public Life, which include the obligation to declare any private interests relating to their public duties. Departments should judge whether these interests could undermine the credibility or independence of the advice.

15. Where departments conclude that the potential conflicts of interest are not likely to undermine the credibility or independence of the advice, the relevant declarations of interest should, as a minimum, be made available to anyone who might rely on that advice. Departments will also need to consider whether it is appropriate to make the declarations more widely available.

#### When?

16. While advice from external and international sources should be sought regularly, departments should absolutely ensure that such advice is sought when:

- the issue raises questions that exceed the expertise of in-house staff
- responsibility for a particular issue cuts across government departments (e.g. sustainable development)
- there is considerable uncertainty and a wide range of expert opinion exists
- there are potentially significant implications for sensitive areas of public policy
- independent analyses could potentially strengthen public confidence in scientific advice from government

17. Where the issue falls within European Community competence, or is likely to affect intra-community trade, particular attention should be paid to encouraging an evidence-based approach for Community decision making. This may involve contributing to Community level scientific committees, briefing the Commission on developing expert opinion, and exchange visits by scientific experts from other Member States.

#### Asking the right questions and involving the right people

18. Departments should consider how best to frame the particular questions which the experts will be asked to address. Making the question too narrow may prejudice the result. Where issues may be sensitive, departments must ensure that questions are framed to cover the concerns of all relevant stakeholder groups, including consumers and the general public. On these occasions, public dialogue should begin as early as possible. Ideally, the public should be involved in framing the questions that experts and policy makers need to address in order to make

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<sup>4</sup> Please see [http://www.public-standards.gov.uk/about\\_us/seven\\_principles.htm](http://www.public-standards.gov.uk/about_us/seven_principles.htm) for further details.

Ministers aware of the most important issues before taking a decision. The Council for Science and Technology's recent report on public dialogue<sup>5</sup> listed a helpful set of criteria for consideration in selecting priorities for public dialogue. Although specifically aimed at science and technology, the criteria are relevant for all policy areas:

**Proposed criteria for consideration in selecting priorities for public dialogue in science and technology.**

**Core criteria**

- The envisaged development in science or technology is feasible OR there is a significant societal issue that could be addressed using potentially controversial existing technology.
- Potentially controversial ethical issues arise around the conduct of the scientific research, the use of the technology and/or the wider impacts on society. For example: the benefits and risks to different parties (e.g. individuals, society, government, industry) are inequitable; the benefits to individuals are unclear; individuals may have limited or no choice over their use of the technology; risks fall to particularly vulnerable groups.
- The timetable for the development of policy allows for a dialogue process to inform developments.

**Additional criteria**

- There is significant uncertainty over the risks to human health or the environment.
- Interested parties from science, industry and civil society hold polarised, and apparently fixed, views in the area.
- New regulatory or governance procedures may be needed.
- There are questions over the desirability of the new technology.

19. The way in which public dialogue will affect policy and decision making will be specific to each department involved in the dialogue process and each issue under consideration. It is therefore essential that departments involved in dialogue look at their own consultative arrangements and working practices to ensure public engagement is effective. For example, links into departmental horizon scanning processes are essential to ensure early identification of and preparation for issues that may be priorities for public dialogue<sup>6</sup>.

**Risk**

20. When assessing the levels of risk or establishing risk management strategies in relation to a specific policy, the use of evidence is essential. Analysts and policy makers must ensure that they include evidence of any differing perspectives of risk (including perspectives from the public) as well as scientific risk assessments as

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<sup>5</sup> 'Policy through dialogue: informing policies based on science and technology' by the Council for Science and Technology can be found at <http://www2.cst.gov.uk/cst/reports/#8>.

<sup>6</sup> Public engagement in SET guidelines is at annex b of Government response to nanotechnology report. This can be found at [http://www.ost.gov.uk/policy/issues/nanotech\\_final.pdf](http://www.ost.gov.uk/policy/issues/nanotech_final.pdf).

part of any decision making process<sup>7</sup>. Early public engagement is vital to ensure this happens.

21. Evidence in public policy making contains varying levels of uncertainty that must be assessed, communicated and managed. Departments should not press experts to come to firm conclusions that cannot be justified by the evidence available. Departments should ensure that levels of uncertainty are explicitly identified and communicated directly in plain language to decision makers. They should also be made aware of the degree to which they are critical to the analysis, and what new and emerging information might cause them to revisit their advice. There will inevitably be occasions where advice is required within a few days, or even within hours. Decision makers should therefore also be made aware of the period of notice which policy makers and specialists have had to prepare advice, and that appropriate guidance and confidence caveats are given where quality of evidence, analysis and advice is deemed to have been time limited.

22. When asking experts to identify or comment on potential policy options, it is essential that departments and decision makers distinguish between the responsibility of experts to provide advice, and the responsibility of decision makers for actions taken as a result of that advice. Experts should not be expected to take into account potential political reaction to their findings before presenting them.

### **Handling the advice**

23. The effective and efficient handling of advice is essential, particularly in a crisis. Each responsible department should have clear guidelines on how scientific advice is provided in a crisis. These should include clear designation of responsibility, the processes to be employed and the sources of advice. Those responsible for departmental and ministerial communication with the public should ensure that the evidence on which any decisions were based are included as part of any press release or communication strategy. Where decisions taken were not based on the evidence, this should also be explained.

24. In public presentations, departments should wherever possible consider giving experts (internal or external) a leading role in explaining their advice on a particular issue, with Ministers or policy officials describing how the government's policies have been framed in the light of advice received. Early communication with key interest groups should also be considered. Consideration should also be given to providing early warning of significant policy announcements to other government departments and international organisations, where there are likely to be implications for other countries. Where possible, experts from such countries or organisations should be involved in the process of consultation and [advice](#)<sup>8</sup>.

### **Openness and transparency**

25. In line with the Freedom of Information Act, there should be a presumption at every stage towards openness and transparency in the publication of expert

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<sup>7</sup> Please see HM Treasury's 'Managing risks to the public: appraisal guidance' for further details on risk management. Please also see <http://www.hse.gov.uk/aboutus/meetings/ilgra/>.

<sup>8</sup> Please see <http://www.policyhub.gov.uk/> for further details.

[advice](#)<sup>9</sup>. Departments should also ensure their procedures for obtaining advice are open and transparent. It is good practice to publish the underpinning evidence for a new policy decision, particularly as part of an accompanying press release. Where issues fall under the remit of the Environmental Information Regulations<sup>10</sup>, publication will usually be obligatory rather than just good practice. When publishing the evidence the analysis and judgment that went into it, and any important omissions in the data, should be clearly documented and identified as such. This should be done in a way that is meaningful to the non-expert.

### Timing of publication

26. Departments should ensure that data relating to an issue is made available as early as possible to the scientific community, and more widely, to enable a wide range of research groups to provide a check on advice going to government.

### **Peer review and quality assurance**

27. Quality assurance provides confidence in the evidence gathering process whilst

peer review provides expert evaluation of the evidence itself. Both are important tools in ensuring advice is as up to date and robust as possible. Methods of peer review and the applicability of quality assurance processes are likely to differ according to the discipline and research method they relate to. For example, a more formal review process is likely to be suitable for scientific and technical issues. However, departments should ensure that the appropriate peer review and quality assurance processes are carried out unless there are exceptional circumstances. Such circumstances might include evidence and analysis obtained during an on-going crisis.

28. In the case of the natural and physical sciences in particular, departments should ensure where they intend to use evidence which has not previously been peer reviewed appropriate steps are taken to ensure that it is. It may be possible to ask scientific advisory committees to comment on the findings. As stated previously, academics, learned societies and other expert contacts will also be useful here.

### Emerging findings

29. There will be occasions when new findings emerge suddenly, and sometimes with considerable publicity. It is often the case that research relating to controversial issues is leaked or sent directly to the press without being peer reviewed. In some circumstances, the results of this kind of exposure may well generate public concern. In these circumstances, it is important that the views of experts are sought without delay (see previous sections on who to contact).

30. When responding to public concerns over emerging findings, it is important that departments state clearly the level of peer review and/or quality assurance which

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<sup>9</sup> This is covered in Section 35/6 of the Act. Full guidance on the Act can be found at: <http://www.dca.gov.uk/foi/guidance/index.htm>.

<sup>10</sup> The Environmental Information Regulations establish an access regime, which allows people to request environmental information from public authorities and those bodies carrying out a public function. Please see <http://www.informationcommissioner.gov.uk/eventual.aspx?id=36> for further details.

has or has not already been carried out, whether they intend to subject the work to any further peer review processes and when this is likely to be available.

31. The level of peer review and quality assurance should be made clear by departments in any response they make to the emerging findings. In doing so it is important to explain the levels of uncertainty and corroboration of the original evidence. In circumstances where new research appears to challenge current thinking, but where the balance of evidence remains with that current thinking, it is also important for this to be stated clearly.

### **Implementation and evaluation**

32. As the guidelines are largely principle based, we would encourage departments to ensure they are woven into departmental guidance on better policy making. Chief Scientific Advisers will work in partnership with policy makers to ensure the guideline's principles are fully embedded into departmental policy procedures and to ensure appropriate scientific input into policy decisions. Although how this is done will differ from department to department in order to work with the grain of existing evaluation activity, Chief Scientific Adviser's findings will inform part of the periodic progress reports on the implementation of the Science and Innovation Framework.

## Useful references

- Cabinet Office Policy Hub, <http://www.policyhub.gov.uk/>
- Code of Practice for Scientific Advisory Committees, DTI (December 2001), <http://www.ost.gov.uk/policy/advice/copsac/index.htm>
- Code of Practice on Written Consultation, Cabinet Office <http://archive.cabinetoffice.gov.uk/servicefirst/2000/consult/code/code.htm>
- Guidance on Freedom of Information Act, <http://www.dca.gov.uk/foi/guidance/index.htm>
- Managing risks to the public: appraisal guidance, HM Treasury (June 2005) [http://www.hm-treasury.gov.uk/media/8AB/54/Managing\\_risks\\_to\\_the\\_public.pdf](http://www.hm-treasury.gov.uk/media/8AB/54/Managing_risks_to_the_public.pdf)
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- Risk Communication: A Guide To Regulatory Practice, ILGRA, (1998) <http://www.hse.gov.uk/aboutus/meetings/ilgra/>
- Science and Society, House of Lords S&T Committee Third Report, HMSO, 2000
- The BSE Inquiry: The Inquiry into BSE and variant CJD in the United Kingdom” House of Commons (October 2000), <http://www.bseinquiry.gov.uk/report/index.htm>
- The Freedom of Information Act 2000, <http://www.opsi.gov.uk/acts/acts2000/20000036.htm>

- White Paper on “Excellence and Opportunity - a science and innovation policy for the 21st century”, DTI (July 2000), <http://www.ost.gov.uk/enterprise/excellence.htm>