



## **Scientific Advice, Risk and Evidence: How Government Handles Them**

**Submission to the House of Commons Select Committee on Science and Technology**

**by**

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### **Summary**

1. This response to the Select Committee's inquiry into scientific advice to government has been prepared by Professor Robin Williams, Professor Joyce Tait and Dr Catherine Lyall in consultation with other colleagues at the University of Edinburgh's Institute for the Study of Science, Technology and Innovation (ISSTI)<sup>1,2</sup>.
2. The response is structured according to the Inquiry's five main topics. Given the breadth of expertise represented by ISSTI we have chosen to focus on some generic issues that are germane to the use of scientific advice and, in particular, the application of social science knowledge and expertise in policy-making. However, a number of researchers within ISSTI are expert in issues such as the dependability of computer-based systems and information policy including privacy protection and public access to information which would be relevant to the Committee's case study on the technologies supporting the Government's proposals for identity cards should the Committee wish to pursue this with the individuals concerned.
3. In summary, we would wish to emphasise the need to foster cultural change within Government policy-making which embeds dialogue, learning and effective co-ordination of cross-cutting issues within the policy-making process, as the issues generated by the governance of science and technology are too complex to use a simple, 'one size fits all' approach to evidence-based policy.

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<sup>1</sup> ISSTI was established to carry forward and consolidate the interdisciplinary network of research in science and technology studies at the University of Edinburgh, coordinated by the Research Centre for Social Sciences under the directorship of Professor Robin Williams. It involves a range of other specialist centres and groups across the College of Humanities & Social Sciences (including the ESRC Innogen Centre of which Professor Tait is director) and has extensive links with colleagues in the College of Science & Engineering, especially Informatics, and the College of Medicine & Veterinary Medicine. Together these constitute a vital and vibrant field of activity: promoting, undertaking and disseminating high-quality research as well as engaging with policy and practice.

<sup>2</sup> Professor Tait and Dr Lyall have previously submitted advice on behalf of the ESRC Innogen Centre to the Office of Science and Technology on the use of scientific advice in policy-making.

## Sources and handling of advice

4. In practice, several models for the use of science in policy-making appear to be used by government and hence the extent to which policy-making is “evidence-based” varies considerably. There will be some issues around which research and policy options are rather well-established, where there is ample information, and where policy could be evidence-based (education policy is perhaps an example); in other areas, where the phenomenon is changing (especially in fields of scientific and technical change), discussion will focus upon how to frame issues/debates and there will be a dearth of information/evidence.
5. There is an argument that, in some spheres, focusing on gold starred sources of scientific evidence (e.g. randomised control trials) may neglect important evidence of other types: this may be a particular problem in areas that are not well researched. There are clearly major areas where evidence is not being effectively used to inform policy, either because the culture of politicians and the civil service is such that research is considered less important than action, academics are regarded with suspicion and there is no expectation that research will be consulted, or because no convincing evidence exists to guide policy and practice (e-Health being one example, although recently research has been commissioned to address this).
6. One can also envisage a continuum from more to less evidence-based (and bias prone): at one end of this continuum are clearly evidence-based decision-making groups (e.g. those used for developing NICE guidelines) while at the other are selective steering committees composed of invited ‘experts’ who may share similar views. When selecting which ‘experts’ to involve, government should be alert to the range of commitments and biases that advisers may bring. Among both social and natural scientists are many individuals who have strong personal commitments and potential biases arising from a career in, membership of, or sympathies with various pressure groups and interests. Their research may be funded by an independent research council or charity but the research outcomes may still be biased by the opinions and motivations of the researchers. In general, bias arising from people’s membership of pressure groups is less likely to be remarked upon than the potential for bias amongst industry stakeholders or those funded by them. However, the research in question often contributes to decision-making in the same political arenas as that funded by industry. These issues highlight the benefits of having a diversity of views and backgrounds within advisory groups.
7. Bias is inevitable, whether it arises from career-based motivations, financial considerations or personal value systems, or as is more usual, a combination of all three<sup>3</sup>. These points have been strongly emphasised by social scientists working on the social construction of science and knowledge. The challenges that we now face in using research as a basis for evidence informed decision-making are to develop strategies, procedures and criteria to evaluate the quality of the available evidence from both social and natural sciences, particularly where there are conflicts of interests or values.

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<sup>3</sup> It is reasonable to assume that, in the same vein, the backgrounds of Government Chief Scientific Advisers may influence the type of research that is commissioned and the way that different types of research evidence are brought to bear in informing policy advice.

## Relationship between scientific advice and policy development

8. Mechanisms to ensure early identification of appropriate research need to be fostered. Too often there is an illusion that applied, policy-oriented research is like turning on or turning off the tap from which all knowledge flows but, in reality, research cannot just be turned on at will to provide solutions to policy-makers. We would therefore endorse many of the recommendations made in the Council for Science and Technology's (CST's) report, *Policy through Dialogue*<sup>4</sup>. In particular, we support the need to foster a culture change within government where *continuous* dialogue – rather than *ad hoc* consultation – is seen as a normal part of government's policy development processes on science- and technology-related issues. Such an ongoing relationship with relevant experts, the public and their representative groups should be an integral part of departmental 'Horizon Scanning' thereby ensuring that policy-makers are much less likely to be taken unawares by upcoming issues.
9. The effective handling of scientific issues that cross departmental boundaries is vital. Nasty surprises can often occur in the cracks between departments. Cross departmental issues are becoming more difficult to manage as the complexity of multi-actor, multi-level policy-making in science and technology increases which necessitates more creative methodologies (possibly involving new computing solutions) for tracking related policy developments across departmental boundaries, in order to avoid duplication of effort or conflicting activities.

## Treatment of risk

10. The use of evidence in risk-related decision-making is changing. While often crucial to decision-making, scientific evidence has, itself, become contentious in a number of different policy arenas, particularly in disputes around technology that concern questions about people's values and belief systems (such as, for example, the use of embryos in life sciences research). Current policy processes do not readily accommodate such value positions and those who attempt to take policy decisions solely on the basis of evidence are finding that science and technology are becoming increasingly ungovernable as the evidence base for decisions is challenged and eroded. Recognising this, and finding more transparent mechanisms to allow values-based factors to be adequately expressed as part of the evidence-based policy process, may help to resolve some of the current impasses affecting policies involving science.
11. Scientific debates in the policy realm increasingly take place in a context of confusion about the facts behind the science (because it is at the cutting-edge of knowledge) and in an atmosphere of growing mistrust in the sources of the available information. Scientific evidence has thus become more open to challenge, not just on the basis of the quality of the science that led to it but also on the basis of the motivations of the scientists involved. Thus it can be difficult today to get uncritical acceptance of evidence that comes from industry (for example, data produced in support of new pharmaceutical products seeking registration). On the other hand, the motivations of scientists working 'in the public good' are much less likely to be challenged and indeed their evidence is often weighed in the balance as being of greater value because it is presumed to be 'unbiased'.
12. The Precautionary Principle can be understood to consist of a risk/value calculation (where the precaution is proportionate to the risk) or it can be used as a tool to indicate a value-based position that tells us which risks are acceptable and which are not. The

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<sup>4</sup> Council for Science and Technology (2005), *Policy through dialogue: informing policies based on science and technology*.

Precautionary Principle allows the use of precaution in advance of evidence of harm (unlike the reactive/preventative approach where evidence of harm is used as a basis for legislating to prevent future harm from happening). The problem with this is that 'evidence' now becomes hypothetical and the degree of precaution which is appropriate in a situation becomes contested<sup>5</sup>. While the Precautionary Principle is open to including value positions within a risk regulation framework, it has some inadequacies as a policy instrument because there is no mechanism for negotiating between different value positions and it has not necessarily moved decision-makers towards more robust evidence-based policies.

### **Transparency, communication and public engagement**

13. The 'public' is not a homogeneous group. It is therefore important to ensure that consultation/engagement methods are tailored both to the particular issue at hand and to the relevant stakeholder groups, in order to avoid wasted effort and generating consumer apathy. This is one area where ISSTI researchers are currently making a contribution by identifying better methodologies for involving members of the public in policy-making and agenda-setting. Policy-makers must be aware of the difficulty in reaching consensus when lay members are consulted on decisions related to science and technology. Lay members may also need to be briefed about technical issues and policy choices and this introduces the risk of imposing other people's agendas (for example, it may encourage a tendency to look at a new technology as something that is automatically risky). We must therefore be very careful about what expectations we raise about public engagement. Moreover, there is a clear need for effective feedback so that those consulted can understand how their input is analysed in order to demonstrate how external contributions influence policy. Again, we would warn of the dangers of raising expectations about public engagement without subsequent feedback and the consequent 'consultation fatigue' and disenchantment that this can engender.
14. Viable governance systems depend on dialogue, the involvement of a variety of institutions and the prevention of institutional polarisation. In the current trend towards public engagement there is a risk that policy-makers might downplay the significance of maintaining a dialogue with other important stakeholder groups, such as those from industry and technical specialist communities, in issues to do with science and technology. However, dialogue should not become a delaying tactic or a substitute for clear decision-making by government departments.
15. While new modes of governance are being developed to ensure greater stakeholder involvement in policy decisions and, at the same time, a sounder evidence base for such decisions<sup>6</sup>, reconciling these twin aims can pose some challenges. In complex, often poorly characterised areas, there may be no consensus on the relevance of particular areas of scientific expertise and various scientific disciplines may compete for a voice and an influence on decision-making. This clearly necessitates greater transparency on the part of policy-makers on how they have discriminated among these competing demands. It also highlights why important methodological work of the type being undertaken by ISSTI researchers on appropriate stakeholder involvement is worthwhile. Using expert consumers, as opposed to lay individuals is one method that has shown some promise, as in the Expert Patient programme. This ensures that

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<sup>5</sup> Although use of appropriate simulations and consultation with experts and stakeholders using scenario-based methods may help to identify risks before they are detected in practice and make these debates less hypothetical.

<sup>6</sup> Lyall, C. and Tait, J. (eds.) (2005), *New Modes of Governance. Developing an Integrated Policy Approach to Science, Technology, Risk and the Environment*, Aldershot, Ashgate.

evidence and consumer opinions are considered together and avoids great disparities between the agendas of expert and consumer groups. Conversely, sometimes public debate – within policy circles and amongst wider publics – may overlook important technical issues. One example is the emphasis in recent discussions of identity cards upon the data carried upon the card: this overlooks one of the key implications of such a card, namely that it would facilitate cross-referencing across a number of existing public sector databases.

### **Evaluation and follow up**

16. One way forward would be to place more emphasis within government on creating mechanisms that enable the development of a corporate or institutional memory based on formal and informal evaluations of dialogue processes that have been used to inform science and technology policy (what we, as academics, would term “policy learning”). As CST notes (footnote 4), this would require sharing of information across government and its non-departmental public bodies and a central resource that draws together evaluations and case studies, and makes this information easily available to others. We would go further and recommend (i) that such lesson learning should not be limited to UK experience but include international perspectives and experience<sup>7</sup>; and (ii) that policy-makers undertake a thorough de-briefing after significant science and technology related policy debates. These exercises should be facilitated by a range of external, independent advisers (not advocates who have been involved in the debate) who are expert in such lesson drawing. A number of academic colleagues within ISSTI are well-placed to contribute to such a process and, indeed, have done so in the past (for example, for the *GM Nation?* study).
17. Finally, the desire to demonstrate that a particular policy has been successful may often motivate a search for evidence that confirms this in a rather narrow way. As colleagues within ISSTI have demonstrated<sup>8</sup>, this can result in the suppression of important lessons learned from difficulties encountered. These researchers have analysed examples of social learning and emphasise that, for learning to be successful, it is beneficial to develop different modes of evaluation geared towards project guidance and steering as opposed to the more traditional approach of *post hoc* evaluation.

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<sup>7</sup> With the caveat that wholesale adoption of policies developed overseas, which have not been specifically tailored to the UK context, are rarely successful.

<sup>8</sup> Robin Williams, James Stewart and Roger Slack (2005) *Social Learning in Technological Innovation: Experimenting with Information and Communication Technologies*, Edward Elgar.

**Contact**

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