The challenge is to embrace different forms of expertise, to view them as a resource rather than a burden …

The Received Wisdom

Opening up expert advice

Jack Stilgoe
Alan Irwin
Kevin Jones

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December 2006

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Foreword

Bill Stow

From climate change, through sustainable consumption and production, to chemicals regulation, we find experts at every corner of Defra's efforts to protect the environment: eco-toxicologists advising on the risks posed by mercury; economists considering the best way to design emissions trading schemes; civil society organisations dissecting co-existence proposals for genetically modified crops; policy-makers drawing on their knowledge of EU institutions and processes to negotiate new directives; lawyers debating the meaning of words in legal texts. Government without experts is unimaginable.

Equally varied are the mechanisms through which experts play their role. The list is again a long one, but may include regular meetings of independent advisory committees, civil servants recruited for a specific expertise and embedded in policy teams, commissioned research projects, consultation processes, or even casual conversations over lunch at expert conferences. The point is that understanding and evaluating the role of experts in the process of government is far from straightforward.

But we have learnt from our past experiences that consideration of these complexities cannot be neglected. Whatever the context, we need continually to question what experts are appropriate at what time; how they can be organised to provide the best possible advice; and how that advice, including the process through which it was

derived and its relationship with policy decisions, can be made as transparent as possible. This includes paying full and critical attention to the uncertainties and value judgements present in expert advice.

Some six years after Lord Phillip's forensic evaluation of these issues in the context of the government's handling of BSE, this pamphlet, the result of a collaboration between Demos and the University of Liverpool, serves as an eloquent and important reminder of the challenges that government faces in this respect.

Perhaps most notable is the discussion of the role of experts and the legitimacy of expert advice in relation to a continuing trend towards the appointment of 'lay' members to government scientific advisory committees. Here, we have some much needed critical analysis of how this area has evolved over recent years, and I am confident that it will spark a most fruitful debate across Defra and wider government, particularly when the full results are published early in 2007.

I believe that this pamphlet provides a further contribution helping government and its stakeholders to challenge existing ways of practice with a view to ensuring the best possible policies for delivering environmental protection.

Bill Stow is Director General, Environment, at the Department for Environment, Food and Rural Affairs.

Upon this gifted age, in its dark hour,
Rains from the sky a meteoric shower
Of facts . . . they lie unquestioned, uncombined.
Wisdom enough to leech us of our ill
Is daily spun; but there exists no loom
To weave it into fabric.

Edna St Vincent Millay
from 'Upon this age that never speaks its mind'[1]

1. Speaking truth to power

In July 2006, the government announced that, having listened to expert advice, it was not going to change its pesticide regulations.[2] To most people, this didn't count as news. But behind the government's matter-of-fact announcement sat a set of discussions that point to a growing unease about science and its place in policy.

A million people in Britain live next to fields, and onto Britain's fields over 30 million kilograms of pesticides are sprayed every year. So while it may seem like an obscure area of debate, the spray drift of pesticides is certainly not trivial to the public. The Royal Commission for Environmental Pollution (RCEP), a group of independent experts, took a closer look. Reflecting on the available science, they said it was 'plausible that there could be a link between pesticide exposure and ill health'. They recommended that the margins at the edges of fields should be made wider as a precaution.[3]

The government asked its own independent Advisory Committee on Pesticides (ACP) to have a go.[4] And though the science was the same, the conclusion was very different. The committee argued that the Royal Commission's recommendations were overly cautious, based on 'an incomplete consideration of the relevant evidence'.[5] Which is not to say that they were unanimous. Three ACP members, including both of its new 'lay members', agreed with the Royal Commission that precautions would be sensible.

The RCEP and the ACP, both full of eminent, independent experts,

and both tasked with giving government expert advice, looked at the same problem and told the government different things. Science, traditionally relied on to tidy up policy, was making a mess.

The ubiquitous expert

The modern world needs experts. Our everyday lives are played out through a series of technological and expert relationships. In a recent book, philosopher, critic and medic Raymond Tallis describes a modern medicine:

> *The manufacture, packaging and transport of the pills engage many kinds of expertise, each of which incorporates and presupposes other forms of expertise . . . proton pump inhibitors . . . active transport . . . semi-permeable membrane . . . hydrochloric acid . . . reflux oesophagitis. Each of these terms is a node in a web of countless concepts, and the product of discussion spread over vast numbers of papers and presented in numerous scientific meetings and letters and corridor conversations . . .*[6]

. . . and so on. Expertise is everywhere. And its influence is growing within government. The esteemed American physicist and policy scholar Harvey Brooks said that 'much of the history of social progress in the twentieth century can be described in terms of the transfer of wider and wider areas of public policy from politics to expertise'.[7] The twenty-first century is not likely to show any let up.

The civil service has seen the growth of an army of experts who advise on its policy questions – How much fruit should people eat? Are mobile phones safe? Which drugs are cost-effective? What should we do about bird flu? Sheila Jasanoff refers to these experts as a 'fifth branch' of government. 'What they are doing is not "science" in any ordinary sense, but a hybrid activity that combines elements of scientific evidence with large doses of social and political judgement.'[8] Science remains the pre-eminent form of expert legitimacy for government decisions. But experts can also be found offering their

thoughts on culture (why is art important?), social policy (what is a liveable minimum wage?), economics (what should interest rates be?) and security (how long will it take a rogue dictator to launch his weapons of mass destruction?).

Increasingly, this expertise is found outside government, recruited as and when it is required. Networks of independent experts in universities and other research centres have taken the place of government boffins. And in the last five years, the science within and around Whitehall has been overseen by newly appointed departmental chief scientific advisers.

Since 1997, there has been a flowering in bodies such as the Health Protection Agency, the Food Standards Agency and the National Institute for Health and Clinical Excellence (NICE) that turn science into policy. At the same time we have seen more and more ad hoc expert groups pop into existence, tell the government what to think about public issues such as mobile phone risks or radioactive waste disposal, and fade into the background. All feed the growing need for evidence-based policy.

Experts are woven into the fabric of government. But they tend to be talked about only when things go wrong. They are a resource, we are told – 'on tap, not on top', according to Churchill. Behind the veneer of their advice, they are normally portrayed as neutral. And yet their authority is codified in the legislative process. They are often asked to speak beyond their immediate area of specialist knowledge, but their status as scientists – usually independent university scientists – gives them rhetorical power. Like expert witnesses in court, their evidence resists challenge because of their status.

In the last 20 years, however, the politics of expertise have been exposed all too dramatically. Rather than making the best use of expert knowledge, politicians were seen relying on expert authority, shedding their own responsibility for making decisions. In 1990, the Conservative environment minister John Gummer famously swept aside uncertainties over the safety of beef with the help of his daughter. Seeking to reassure the public, he gave Cordelia a burger made from British beef, claiming that science had shown it to be safe. (She wisely

spat out her mouthful, claiming it was too hot.) The chair of the BSE expert advisory committee had previously been bounced into the role of government mouthpiece. In its death throes, the Tory government admitted its mistake. Stephen Dorrell and Douglas Hogg told the House of Commons that there was a link between bovine spongiform encephalopathy (BSE) and Creutzfeldt–Jakob disease (CJD).

New Labour saw how easily science could get politics into trouble. Worried by the emerging controversy over genetically modified (GM) foods, they tried to put their house in order. Within months of being handed their ministerial boxes, Frank Dobson and Jack Cunningham promised that they would work out what went wrong with BSE. The Phillips Inquiry lifted the lid on expert advice, speaking to scientists, civil servants and anyone else connected with BSE. The more the inquiry found, the more there was to uncover. In more than 4000 pages of excruciating analysis, Lord Phillips argued that things had to change.[9] No longer could the government obscure unpleasant scientific uncertainties. The British public should never again be patronised with false reassurances. And we would have to stop assuming that science had all the answers.

Erik Millstone from Sussex University describes BSE as 'the most serious failure of UK public policy since the Suez invasion of 1956'.[10] It demonstrated that the relationship between experts and politics was more complicated than the comfortable image of 'speaking truth to power'.[11] But since BSE, experts and the rest of society have not yet found a new way of living together. Controversies over the Measles, Mumps and Rubella (MMR) vaccine and Foot and Mouth disease have highlighted a misunderstanding between expertise and citizens that will take time to resolve.

Opening up

The policy response to BSE has been to open up. Where Whitehall once spoke to its scientific advisers away from the public gaze, discussions are increasingly taking place in the open. 'Transparency' and 'openness' are the new buzzwords. Committees of experts now have websites full of minutes and agendas. Some allow members of

the public to sit in on meetings. New institutions such as the Food Standards Agency and the Health Protection Agency have been designed to be transparent from top to bottom. Evidence is published for all to see and, from time to time, lay members are allowed to join previously expert-only groups.

The presumption of transparency is a bold move in the right direction. As Robert Merton has argued, the value of knowledge is realised when it is distributed.[12] Science, with its emphasis on peer review, publication and argument, embodies openness. The importance of experts in democracies demands that their discussions take place in the open. But are we making the most of openness? Are we opening up expertise to new questions and perspectives, or are we just letting people see the experts at work?

The political instinct is to see the problem as one of trust. Many of the changes to expert advice are justified in terms of 'winning public confidence' and 'building trust' in science. Tony Blair spoke to the Royal Society in 2002 and argued that:

> *We need to continue our improvements in government handling of science, where public trust is particularly low. . . . Scientific information and advice to government should be freely available and accessible. Open and informed public debate on key scientific issues will be an integral part of our approach.*[13]

In November 2006, he returned to the theme and the audience. He reflected on a litany of arguments involving science during his tenure – from BSE's hangover and GM foods, through MMR and experiments on animals, to climate change and nuclear power. But rather than question the traditional model of expertise, he told the Royal Society that:

> *We need, first, to ensure we hear scientific truth told to power in government. That was one of the reasons why, following the Phillips report into BSE in 2000, we appointed chief scientific advisers in all major departments. We opened up scientific*

> *advisory committees to greater scrutiny. We created an independent Food Standards Agency to ensure we transfer the best scientific knowledge to matters of obvious sensitivity to the public.*[14]

Anthony Giddens explains that one of the things that make us modern is our reliance on expert systems. They are the hidden bits behind our technologies and our policies that we'd rather not think about.[15] Even Ray Tallis can't worry about or understand everything that goes into producing his dyspepsia pills. We want to take such things for granted. This means that our relationship with expertise will always be one of trust.

But we know that experts can no longer rely on deference. People are more willing than ever to question experts and challenge decisions that are based on expertise. Individual controversies have revealed a 'crisis of trust', we are told.[16] At the same time, survey statistics tell us that trust in scientists in general may actually be on the rise.[17] But they don't tell us what that might mean, and they don't get us closer to a solution. We may in general trust scientists or doctors to tell us the truth. But when scientists and politicians are brought together, we may well not trust that the quality of science will remain intact.

Because we cannot worry about or understand everything, we are forced to behave, and respond to surveys, *as if* we trust experts. In isolation, statistics about trusting scientists tell us very little. As demonstrated most dramatically with the recent controversy over the MMR vaccine, when personal decisions have to be made, people are all too willing to question orthodox science.

Talking about building trust is like talking about building communities. Most of what needs to happen is beyond the government's control. We can't ask people to trust any more than we can ask them to get on with their neighbours. A focus on trust turns the problem into one of communication. And the deliberate attempt to manufacture trust can look deeply untrustworthy. Past experience tells us that there are deeper issues to be resolved. We must instead

focus on what goes into building *trustworthiness*. Rebuilding expert advice for the twenty-first century means going beyond trust to questions of knowledge and governance.

Beyond trust

James Surowiecki, a financial journalist from *The New Yorker*, has tried to get under the skin of our increasing reliance on experts. In certain cases, he argues, instead of just heeding the advice of individuals or small groups of experts, we should listen to the wisdom of crowds.[18]

His book starts with a story in which the Victorian scientist Francis Galton stumbles on a guess-the-weight-of-the-ox competition at an agricultural show. Galton was a prolific scientist, but unashamedly elitist. He is remembered as much for his association with eugenics as for his scientific achievements. He was keen to demonstrate that ordinary folk weren't good at tasks that seemed to demand expert knowledge. So he was surprised to find, when he averaged the crowd's guesses, that the figure was less than 0.1 per cent away from the correct weight.

What does this tell us, if anything, about experts? Some of the guessers at the show were experts – farmers, scientists, vets – and some weren't. But the combination of their perspectives made them collectively wiser than their wisest member. Surowiecki's conclusion is that diversity is a good thing when it comes to tackling such problems. A range of perspectives gives us better answers. However, in this example both the question and the answer were well defined (although the answer was kept hidden until the competition was over). The sorts of challenges that confront policy are those in which there isn't a pre-ordained correct answer, and it probably isn't clear what the question is.

Realising that the world has more pressing challenges than the weights of livestock, Surowiecki turns his pen to examples in which experts are relied on to offer advice to decision-makers. Here too he concludes that it is important to have a diverse range of perspectives. He focuses on the scientists behind the doomed Columbia space

shuttle. As with Challenger 17 years earlier, there was no shortage of expertise to advise on the safety of the launch. But in both cases the wrong decision was made. Surowiecki diagnoses NASA as suffering from 'groupthink'. The small group of experts looking at the issue were unaware of their own blind spots. In addition, the constraints imposed on the experts by their organisation meant that they were unable to challenge their remit or ask new questions. Echoing BSE in the UK, the experts ended up telling the decision-makers what they wanted to hear – a message of reassurance.

The old joke about experts is that they know more and more about less and less until they know everything about nothing. Science has become sufficiently complicated that everyone is forced to specialise. A recent biography of the scientist Thomas Young, who died in 1829, gives him the title of 'The last man who knew everything'.[19] Now, the polymath is dead. And expertise is, going back to Surowiecki, 'spectacularly narrow'.[20] Governments rely on committees of experts rather than individuals because the committee will have a collectively wider range of knowledge and the committee's discussion will strengthen their advice. However, we need to ensure that these committees do not fall into the trap of groupthink. When a new disease is discovered or a new technology brings a new set of concerns, it may not be clear what sorts of expertise are relevant. Experts in any particular area will ask certain questions. But other questions will remain unanswered and unasked. New issues demand cognitive diversity – different ways of looking at things. Opening-up needs to mean more than showing people how expert advice works. Opening-up needs to mean open-mindedness, it needs to mean asking new questions and it needs to mean listening to a much wider range of perspectives.

Everyday technocracy

Since 1997, political rhetoric across all sorts of policies points towards more participation – more voice, more choice. And since the wake-up call of BSE, this is reflected in the way that politicians talk about science. But this tendency towards democracy has its opponents.

Beneath the rhetoric, there are plenty of policy-makers who quietly think that, in these irrational times, we should not devolve matters of science to the people. They see technocracy – government by facts – as a way of saving policy from public opinion, media manipulation and political whim. Technocracy is manifest in the everyday practices of government, and it bridges political divides. Seeing a public that doesn't know what's good for it, technocrats on the left have traditionally advocated expert control for reasons of social justice. Those on the right have done so for the sake of efficiency.

In New Labour we have a government which has enthusiastically endorsed the managerial advantages of evidence-based policy. Even moments which appear to critique the linear transformation of knowledge into decisions have been reconstituted to fit the model. According to a paper from the Prime Minister's Strategy Unit, the BSE fiasco was nothing more complicated than an 'imprecise use of evidence'.[21]

In November 2006, a report from the Commons Select Committee on Science held a mirror to the fashion for evidence-based policy. In some areas, the committee argued, 'evidence-based' has become a way to justify policy rather than a way to make policy – the evidence is found to suit the decision. Evan Harris, a committee member and Liberal Democrat science spokesman, said that the way some policies claimed to be evidence-based was a 'fraud which corrupts the whole use of science in government'.[22]

Unfortunately for civil servants, far from providing easy answers, the rise of evidence-based policy forces more questions to the surface. As we have seen in the last few years, controversies involving expertise frequently involve questions such as: What counts as evidence? Whose evidence? Evidence of what? Evidence for whom? What do we still not know? As Arie Rip puts it: 'There are deep problems, with "evidence", with "-based", and with "policy".' The inescapable paradox is that 'policy is about the future, and evidence is about the past'.[23] As BSE reminded us, by accentuating the positive – what is known – evidence-based policy often overlooks the uncertainties that come to define our problems.

The Select Committee sees the need to put politics back into policy. There are moments when we don't have evidence and there are moments when decisions fly in the face of evidence. We need to be honest about these. But we also need to acknowledge that even at the best of times, when evidence seems clear, there is no simple way of turning it into policy.

Rethinking expertise

The reality of policy is that evidence is seldom tidy, facts can rarely be separated from values and decisions are needed quickly. So how does expertise fit into this picture? What should we expect of our experts in the twenty-first century?

It is clear that expert advice is more open than it was. It is also clear that there are steps that need to be taken towards further openness. But openness brings new questions. David Miliband recently tried an experiment in participation. He put his 'environmental contract' on a Department for Environment, Food and Rural Affairs (Defra) wiki to be edited and, it was hoped, improved by the public. For political bloggers, however, it was simply waiting to be defaced. The site was closed and a philosophical Miliband reflected: 'We have demonstrated the extreme openness of the wiki by playing host to some practical jokes plus a swastika. Strange how some people get their kicks. But the experiment will continue.'[24]

Our argument is not that we should reject the received wisdom in favour of the wisdom of crowds. Specialist knowledge is vital and arguments for more democracy do not on their own get us very far. It would be foolish to ask society at large whether the MMR vaccine causes autism, or whether BSE is transmissible across species. Expertise and evidence are necessary for these questions. But they are not sufficient to give us complete answers or policy decisions. The wisdom of crowds can still teach us something.

The 'evidence-based' turn in policy sees experts as providers of information, giving answers to policy questions. But expertise has always been about more than evidence. Expertise is also about judgement, about wisdom, about asking new questions and

challenging convention. The physicist Werner Heisenberg defined an expert as 'someone who knows some of the worst mistakes that can be made in their subject and who manages to avoid them'.[25] Expert wisdom is about navigating uncertainty, reminding people in power what we still might not know, in addition to what we think we know, and cautioning against complacency.

Far from taking power away from experts, we are suggesting that they contribute more, in a role that extends beyond evidence to wisdom. Experts should be encouraged to speak up, to contribute to debate and challenge its terms. We are taking the first steps towards a new social contract between experts and society. This means rethinking science – as a process rather than as a body of facts. It means looking at 'the public' more respectfully. And it means appreciating the complexity of policy-making.

Pamphlet outline

Previous Demos science pamphlets have argued that as science becomes more important to our everyday lives, a broader and richer conversation needs to take place about its means and ends. These arguments have looked towards more constructive engagement between scientists and the public around new technologies.[26] This pamphlet has a different aim. It is targeted more directly at policy, where discussions must take place in a tangle of evidence, judgement and politics. We hope that our analysis helps government and others navigate this tangle more effectively.

This pamphlet does its job in two ways. First, we reflect on a body of understanding within social science about experts and risk. Recent experience has made vivid the insights of this research, but it has also challenged social scientists to deepen their analysis. Second, we report on a study, prompted and supported by Defra, of the role of lay members in expert advisory committees. This has revealed the realities of expertise in policy. Working with Defra, we have seen both the progress that has already been made within some parts of government and the challenges that remain.

The next chapter looks back on what's changed and what hasn't.

We ask what the BSE story tells us about old and new models of expertise and, by looking at subsequent issues, what we have still got to learn from it. Chapter 3 looks at the public context of expertise and describes how, with the decline of deference, people are finding new ways to engage with expertise and asking some difficult but important questions.

Chapter 4 connects the rhetoric to the practice. With a focus on the recent inclusion of lay members on expert panels, we conclude that we need to rethink simple notions of expertise. Who is 'lay' and who is 'expert' is less important than the roles that different people are allowed to play in expert advice. Chapter 5 wraps up the argument and recommends some steps towards a new model of expertise.

2. The new shape of expert advice

Lord Phillips's inquiry into the BSE crisis would not turn out to be, as the *Independent* suggested at the time, 'the crowning achievement of his career in the law'.[27] Nicholas Phillips would go on to become Lord Chief Justice, the UK's top judge, a job that now finds him at the everyday interface of evidence, wisdom and politics. His experience with BSE has no doubt been valuable.

His report's gestation was twice as long as expected. When it emerged, its 16 volumes weighed as much as a newborn calf. Thankfully, one needed only to look at the introduction to see how difficult it would be to dismiss. Drawing strands together from politics, policy and arcane parts of science, Phillips looked back on the short history of a new disease. By the time of its launch, nothing would have pleased the *Sun*'s leader writers: 'The BSE report doesn't tell us anything we didn't know already. So the last Tory government wasn't up to the job? Big Deal. Civil servants kept vital information from us? Big news!'[28] For everyone else, it was a watershed.

The inquiry heard and retold many stories. One was of the scientist who discovered the link between cannibalism and kuru, a close relation of CJD. Daniel Carleton Gajdusek won a Nobel Prize in Medicine but, on returning from a Swiss BSE conference, found the FBI raiding his house. He went into exile after a conviction for sex offences. Another story featured Clare Tomkins, a young woman who had been a vegetarian since she was 13. She became ill suddenly and

was given every psychiatric diagnosis and treatment possible. Meanwhile her brain was being perforated with holes, texturing it like a sponge. She was suffering from a new variant of CJD, always fatal but previously found only in old people. According to one source, she had contracted the disease from eating infected meat within days of John Gummer's burger stunt. Then there was the story of Richard Lacey, the dissenting scientist who was drawn to BSE by a cat called Max – inevitably dubbed 'Mad Max' – that improbably caught the disease in 1990. Lacey had pointed out in public that the uncertain incubation periods of BSE and its human counterpart meant that we would not know for decades how many people had been affected.[29]

In March this year, the EU's ban on British beef exports was finally lifted. But the shadow of the controversy will remain for decades. The political fallout from BSE has been widespread. In 1996, the Conservatives, already holed beneath the waterline by accusations of sleaze and economic incompetence, had also to admit their failure to manage the risk of BSE. The old Ministry for Agriculture, Fisheries and Food (MAFF) was dismantled and Defra created from its rubble. MAFF's responsibility for food safety had already been transferred to the sparkling new Food Standards Agency. BSE redrew the UK's policy map.

Something significant has changed in the British approach to scientific governance. Once, the language of public engagement, openness and building trust was spoken only by a small number of social scientists and activists. Now, it has become commonplace within government departments and other organisations – often tiresomely so. But beneath this transition, there lurk crucial elements of continuity, contradiction and even confusion. Rather than just embracing this new rhetoric, we need to ask deeper questions about the political culture of scientific governance.

A British disease

In the late 1980s and early 1990s, when MAFF found itself confronting a new category of risk, it responded in conventional fashion. The risk in question was to consumers from British beef.

Concerned not to panic an anxious public, reassurances were offered by a variety of government and industry groups. All tried to get across the message that the risks were minimal and that consumers should continue to buy British beef (or 'eat British beef with confidence' as government representatives often put it). One public notice from the Meat and Livestock Commission left no room for argument:

> *Eating British beef is completely safe. There is no evidence of any threat to human health caused by this animal health problem (BSE). . . . This is the view of independent British and European scientists and not just the meat industry. This view has been endorsed by the Department of Health.*[30]

Such public reassurances were in stark contrast to the private uncertainties and concerns of those closest to the disease. Privately, scientists knew that the absence of evidence of danger could not be taken as evidence of absence of danger. The head of MAFF's Animal Health Group sent a memo to his boss in 1988:

> *We do not know where this disease came from, we do not know how it is spread and we do not know whether it can be passed to humans. The last point seems to me the most worrying aspect of the problem. There is no evidence that people can be infected but we cannot say there is no risk.*[31]

The expert committee originally assigned to look at BSE contained no experts in spongiform encephalopathies. The uncertainties and disagreements of those closest to the disease were airbrushed out. Lord Phillips asked Sir Richard Southwood, the chair of this committee, to explain: 'We agreed that we should avoid those who were involved in the controversy surrounding the nature of the agent.'[32] One commentator reflected:

> *Lord Phillips might also have asked why we still tie ourselves so complacently to the establishment. The committee that met*

> *under Sir Richard Southwood in 1988 to assess the unfolding of BSE was learned, eminent and well intentioned. Yet it left stones unturned. Thousands of ordinary, intelligent people, who were neither learned nor eminent, would have done a much better job. . . . They would have asked awkward questions such as 'how do you know?' and 'why not?'*[33]

BSE drew public attention to such questions. But the approach to both scientific uncertainty and the public was not unusual at the time. Whether with nuclear power or the control of workplace chemicals, the prevailing assumption in the British government was that the admission of uncertainty would confuse The Public and only The Experts could handle The Facts in a suitably rational fashion. Expert evidence was often kept confidential since to do otherwise would invite unhelpful and uninformed interventions. Confidentiality could also allow a flexible policy response without protracted discussions should new information emerge. By keeping the general public at a distance, a more consensual and collegial style could prevail among insiders: a style which sought legitimacy in independence, objectivity and 'sound science'.

Precautionary tales

Throughout the 1970s, the National Union of Agricultural and Allied Workers were involved in a sometimes angry dispute with expert advisers over the risks of 2,4,5-T. This weedkiller had gained notoriety as the active ingredient of Agent Orange, the defoliant used during the Vietnam War. The union was part of an international campaign to ban the substance on the basis of its alleged risks (including cancer, birth defects, miscarriage and environmental damage). They had compiled their own dossier, containing case histories of health problems among union members who had been exposed. But the Advisory Committee on Pesticides could see no reason to move from its own position that the substance was safe to use as the instructions recommended. The experts conducted several inquiries and issued eight separate reassurances that the chemical was safe.

The committee saw itself as operating on the basis of scientific independence and the best available expertise. The union meanwhile thought the committee was operating an unreasonably high burden of proof and playing down doubts over the pesticide's safety. They were, it seemed, completely out of touch with the real world of farming practice. The union pointed to the committee's wildly unrealistic assumptions about the everyday use of herbicides. One farmworker said it was 'like working in a laundry and being told to keep out of the steam!' Throughout, evidence from farmworkers was dismissed by the experts as 'unscientific and largely anecdotal'.[34]

The result was a breakdown in trust between key stakeholders and a collapse in credibility. But the lessons go deeper than communication. The case raised fundamental questions about the structure of decision-making (the farmworkers argued for a more 'representative' process), the burden of proof to be applied when making decisions ('beyond reasonable doubt' or 'balance of probabilities'?) and the kinds of expertise that are considered relevant. The farmworkers argued for the replacement of the expert committee with a body that could include farmworkers' representatives and operate in a more open, and more precautionary, fashion. Scientific advice to policy is often represented as subdued and narrowly technical. But cases like 2,4,5-T suggest just how lively, and how important, these issues can be.

In the 1980s and 1990s, UK activists looked across to the United States, whose Freedom of Information Act seemed a world away from the British emphasis on Official Secrets. At the same time, social scientists began analysing the conversations taking place between experts and non-experts. Qualitative work in science and technology studies, medical sociology and social anthropology built up rich illustrations of science–public relations.[35] Themes of risk and uncertainty featured prominently. Characteristic of such work was an emphasis on the knowledgeability of public groups and their resourcefulness in acquiring information about practical problems and challenges. This more symmetrical account showed that 'experts' also needed education and that 'situated' forms of knowledge could

be useful in dealing with everyday problems. The point of this approach was not to deny the potential relevance or significance of scientific explanation, but to suggest that an open relationship with different 'publics' might encourage a more robust, informed and credible basis for personal and social decision-making.

One study that captured this fresh approach was published by a group from the University of Leeds in 1993.[36] The conventional picture represented public groups as uninformed, irrational and passive. Instead, the authors of *Inarticulate Science* explored the problematic boundaries around what counts as 'science', and the relationship between knowledge and the context of its development and application – what they called 'the grain of everyday life'.

In a compelling case study, the authors drew a contrast between the standardised knowledge offered by the medical profession and the personal, individual understandings developed by parents of children with Down syndrome. Parents could provide emotional and practical support in a manner that the medical system could not, from the design of drinking cups to the provision of special swimming classes. Parents also developed a deep knowledge and understanding of the diversity of children with this condition. From their perspective, this sense of difference between children was profoundly important.

The most important resource available to these parents was their own experience and expertise. However, as the authors concluded with regard to 'expert' guidance: 'Knowledge was offered in the wrong form, reflecting priorities different from those of practical action: in the wrong way, discounting understandings which parents had wrought from experience; and often at the wrong time.'[37] The implication of such studies was that scientific evidence could be of some value within everyday life, but that it was unlikely to provide all the answers. When it came to practical situations, social and experiential forms of understanding could be highly relevant.

By the mid-1990s, therefore, a number of criticisms of the scientific policy process were converging – along with a sense of new opportunities. Cases such as BSE and 2,4,5-T revealed just how difficult it had become to defend a closed, consensual system in the

face of public pressures. As BSE revealed, there was also a blunt practical difficulty with this style: it simply didn't provide the reassurance to which it aspired. Rather than pacifying members of the public, the argument that only government-approved experts could provide a rational basis for policy served to provoke, annoy and alienate critics. Meanwhile, and as the work of various social scientists was emphasising, it was possible to view members of the public as also knowledgeable in their own right. A more transparent and open policy process was now required – a process that would build legitimacy through external scrutiny and deliberation.

Something changed: the new scientific governance

Despite the long build-up of critical pressures, the change in the climate of scientific governance in Britain was still a surprise when it did arrive in the late 1990s. The insights of social scientists played a part, as did the public reaction to GM foods, the rising importance of environmental concerns among voters and the appointment of a New Labour government committed to greater openness and dialogue. Public trust in expert judgement could no longer be taken for granted. And the existence of scientific uncertainty over issues like BSE could no longer be denied.

The Phillips Inquiry is the most influential example of this 'new' approach. Reflecting emerging concerns with risk, uncertainty and public trust, the Phillips report was highly critical of the culture of governance within MAFF:

> *The Government did not lie to the public about BSE. It believed that the risks posed by BSE to humans were remote. The Government was pre-occupied with preventing an alarmist over-reaction to BSE because it believed that the risk was remote. It is now clear that this campaign of reassurance was a mistake. When on 20 March 1996 the Government announced that BSE had probably been transmitted to humans, the public felt that they had been betrayed. Confidence in government pronouncements about risk was a further casualty of BSE.*[38]

Terms such as 'unwarranted reassurance' and 'culture of secrecy' pepper the Phillips report. As one civil servant told the inquiry: 'One was aware of slightly leaning into the wind . . . we tended to make more reassuring sounding statements than might ideally have been said.'[39] According to a quip attributed to Bismarck, there are two things that it is better not to see in the making – laws and sausages. The assumption at the time of BSE was that expert advice should be a third. The then chief scientific adviser described the instinct 'to hold the facts close' so that a 'simple message can be taken out into the market place'. But BSE had taught him that 'the full messy process whereby scientific understanding is arrived at, with all its problems, has to be spilled out into the open'.[40]

The Phillips report stressed several points that, in the wake of BSE, have become central to the UK policy mantra when dealing with matters of risk and science:

- *Trust can only be generated by openness.*
- *Openness requires recognition of uncertainty, where it exists.*
- *The public should be trusted to respond rationally to openness.*
- *Scientific investigation of risk should be open and transparent.*
- *The advice and reasoning of advisory committees should be made public.*[41]

Back in 1980, for a policy outsider, even the agenda of certain advisory bodies was kept officially secret. By 2000 there was a presumption of openness. Alongside such changes came an acceptance that policy-making must take account of ethical questions. Scientific experts would no longer be the arbiters of what was acceptable to the British population.

The story of BSE in the United Kingdom is therefore also the story of a change in thinking about expertise and the relationship between scientific evidence and public policy. The public stance adopted by MAFF was a textbook display of the old model of expertise. By 2000,

the official inquiry could unpick this model in order to advocate greater transparency and openness – especially in terms of acknowledging uncertainty and respecting public expectations and questions. Although not especially emphasised within the report itself, the abolition of MAFF and its replacement with Defra symbolised a greater willingness to engage in a two-way relationship with different public groups.

Other reports since the late 1990s have reinforced the new style of deliberative governance.[42] The landmark 2000 report from the House of Lords Select Committee on Science and Technology told us that 'policy makers will find it hard to win public support on any issue with a science component, unless the public's attitudes and values are recognised, respected and weighed along with the scientific and other factors'.[43]

Prominent among these changes has been the development by the government's chief scientific adviser of a set of guidelines on the relationship between scientific advice and policy-making. First issued by Sir Robert May in 1997, and refined by Sir David King in 2000 and 2005, the key messages were that government departments should publish whatever advice they offered and science they used, obtain a wide range of advice from 'the best sources' (particularly when there is scientific uncertainty) and identify the issues early. The guidelines emphasise the need for procedures to be open and transparent but also the importance of 'bringing together the right people'. This might include 'lay members of advisory groups, consumer groups and other stakeholder bodies'.[44] For policy-makers and experts, these guidelines provided the first set of instructions for rebuilding the governance of science.

The move to a 'new' scientific governance is certainly not restricted to the UK. The experience of other countries – especially the Netherlands and Denmark – has been another important stimulus to change.[45] A 2001 European white paper discusses issues of building public confidence 'in the way policy makers use expert advice'.[46] The European Commission's 2002 action plan on science and society offers a blend of praise for science, public concern over the pace of

scientific change, and the perceived need to instil 'a sense of trust'.[47] Across Europe, however, the UK's transition has been uniquely rapid. In less than a decade, we have moved from a very orthodox reliance on insider experts, closed procedures and narrow science to a system that in many policy areas is genuinely new. Experience since BSE tells us that we are still getting to grips with these changes.

Testing the new scientific governance

In 1999, when a storm began brewing about the risks of mobile phones, Sir William Stewart seemed like the perfect expert for the job. He had been the government's chief scientific adviser during the early 1990s. Asked by a Commons Select Committee about the importance of BSE, he was blunt: 'Never again will any scientific committee say that there is no risk.'[48]

In the mid-1990s, when mobile phones became the focus of a new health scare, the National Radiological Protection Board (NRPB) was taken by surprise. Its job had been to turn the best available science into authoritative advice about safe levels of exposure to electromagnetic fields. It did science. It certainly didn't do politics.

When the NRPB began receiving calls from worried members of the public, it responded with reassurance that mobile phones safely complied with its guidelines, which were based on what science knew about the effects of electromagnetic fields. What it didn't realise, however, was that people were not asking about compliance. Prompted by coverage of science purporting to show danger, most people were asking about the basis for the guidelines in the first place: did the NRPB really know as much about the effects of mobile phones as it claimed? Such questions had no immediate scientific answer – scientists had done little work on long-term exposure or on the possible existence of vulnerable groups of the population. The NRPB was giving expert answers to questions that no one was asking. And its lack of engagement with the real debate – on the extent of scientific uncertainty – undermined its public credibility.

As public interest grew, Tessa Jowell, then Minister for Public Health, asked Sir William to form a group to take a fresh look at the

issue. His group began listening – to scientific evidence and scientific uncertainty, to NGOs and to members of the public. It sought out uncertainty and dissent. Stewart made clear his departure from the NRPB's 'sound science' approach. His group asserted its role in the first major advisory report since the BSE debacle. It was no longer adequate to assume that science had all the answers. A more inclusive approach was required.

In the glare of public controversy, the Stewart report saw that scientific uncertainty was important for a credible, robust policy on mobile phone risks. The uncertainties that the NRPB had taken as an unproblematic task for scientists were brought to the fore. One of the Stewart group said: 'It was simply when we started analysing the results that the uncertainty became more apparent.'[49] The report recommended a precautionary approach to the use of mobile phones and the expansion of networks.

A few of the Stewart's recommendations directly criticised the NRPB's aloof approach. And his report controversially recommended that:

> *In a rapidly emerging field such as mobile phone technology where there is little peer-reviewed evidence on which to base advice, the totality of the information available, including non-peer-reviewed data and anecdotal evidence, be taken into account when advice is proffered.*[50]

Phillips's commandment to open up seemed to be changing expert advice for good.

Plus ça change?

The post-BSE creation of the Food Standards Agency was accompanied by two other new bodies tasked with doing things differently. The Human Genetics Commission would provide advice weaving social and ethical questions into the emerging understandings of and interventions in genetics. And the Agricultural and Environmental Biotechnology Commission (AEBC) would take a fresh look at the

GM issue. Both bodies mixed scientific and non-scientific perspectives.

From 2002, AEBC oversaw 'GM Nation', the most visible British experiment in expert–public dialogue. The idea was that a public debate would provide broader insights into the already-contentious issue of GM crops. But the experiment revealed some deep tensions. The 'public' strand of the debate ran alongside a review of the science and an economic assessment of the costs and benefits of GM crops. But these three separate strands inhibited the possibility of transparent public engagement with the economic or 'technical' analyses.[51]

Both AEBC and GM Nation were experimental. They were intended to provide the GM issue with a new 'framing'. But they revealed that the old frames of reference were hard to shake off. Robin Grove-White, in a personal account of his experience as AEBC's vice chair, describes discussions that were fraught with difficulties. But he concludes that, as a forum for advice and an experiment in a new form of advice, the AEBC constructed 'friendships and new patterns of understanding in a sensitive and difficult field'.[52] AEBC and GM Nation were important steps in working through the challenges of the new governance of science.[53]

Sir William Stewart's attempt to do things differently ran into similar problems. His precautionary recommendation that children should cut down on their use of mobiles was seen as a mixed message, at least by the press. The *Daily Mirror*, despite having spent the previous year demanding that experts woke up to uncertainty, screamed: 'Parents confused at shambolic phone report.'[54] Talking about uncertainty is important, but we should not pretend that it is easy.

The new rhetoric of open expertise has been widely heard. But there is a real question of how and to what extent such messages can be translated into governance practice. How do we spill 'the full messy process' of scientific practice 'out into the open' while continuing to make effective decisions about science, technology and society? As Sir William discovered, while it is important to talk about uncertainty,

judgements must be made about how much uncertainty to acknowledge and in what form. And there is a risk that the acknowledgement of uncertainty is seen as a collapse of leadership and responsibility.

In the last decade, something has indeed changed, but an awful lot has stayed the same. It would be naïve to expect the whole culture of UK scientific governance to be transformed by a lively flourish of new rhetoric. The current situation is one of uneasy co-existence and occasional contradiction rather than 'out with the old, in with the new'. Transparency and openness sit nervously next to managerialism and the need for evidence. One effect of this is that civil servants and politicians are open to the accusation that this is all just talk about talk: 'full of sound and fury, signifying nothing', as Shakespeare would have it. It would be wrong either to dismiss all that has been said and done as empty rhetoric or uncritically to greet the new dawn of scientific governance. We find ourselves in a much more interesting situation, where new possibilities are emerging but new challenges need to be acknowledged.

Transparent challenges

These new opportunities and challenges are especially evident when it comes to making the relationship between experts and decisions more transparent. At a very practical level, it just isn't possible (or necessarily desirable) to make every discussion, every judgement and every corridor exchange totally transparent. (In any case, absolute transparency requires both omniscience and omnipresence.) The aspiration of transparency is essential but we also need to consider how all this will work out in practice.

Transparency is not an end in itself but a way to help revitalise expert advice. We must not expect too much, nor should we dismiss the efforts of experts and civil servants every time they fail to attain the unattainable. Instead, we need to consider how the principle of transparency can be converted into policy. An open and transparent policy culture can encourage clear lines of accountability and responsibility and a self-critical evidence base. Rather than using

expertise as political body armour or retreating behind bureaucratic barriers, transparency should encourage government to trust the public.

Enriching expertise

One response to all this is a weary assumption that yet again experts and civil servants are coming under attack. Why can't they simply be left to get on with their jobs rather than having yet more hurdles to clear? Isn't the task of evaluating the evidence and giving advice to government already complicated enough?

The search for better scientific governance is not an assault on the notion of expertise. It is the opposite. Rather than aiming to tie down or restrict the manner in which matters for expert scrutiny are identified and dealt with, the intention is to enrich such processes. Acknowledging that parents of children with Down syndrome may have expertise to offer does not undermine experts. It is simply a move to embrace a wider diversity of expert opinion.

Opening this up draws attention to what gets defined as the problem. The 'problem' of Down syndrome can appear very different from the perspective of different 'expert' groups. Is it about restricted life expectancy or restricted quality of life? Is it about lower educational achievement or inadequate educational provision? Is it about the 'population' of affected groups or the diversity of individuals? These different ways to look at issues provide a more rounded sort of expertise. Rather than getting trapped in an unproductive 'expert vs public' debate, the challenge is to embrace the different forms of expertise on offer, to view these as a resource rather than a burden.

3. Imagining 'the public'

Doctors throughout the UK are reporting the rise of a worrying new disease. Where patients once visited their GP with problems looking for solutions, they are now arriving with the results of their own research, their own explanations and suggestions, courtesy of the internet's assorted experts. *Cyberchondria*, or *Patient Printout Syndrome* to give it its full name, is challenging the way doctors think about their expert authority.[55]

But many GPs aren't worried. They see it as an opportunity rather than a threat, a valuable addition to the conversation that has always taken place between medicine and the public. Dr Adrian Midgley is a GP running a small practice in Exeter. Many of his patients are old, and few of them use the internet to find out about their health. But he reckons that almost all of the young ones do and, while seeing its downside, he welcomes it:

> *It's great, it's much better dealing with smart, informed people. . . . A single page downloaded from a website is the equivalent to a rumour heard in the hairdressers. But most people go further. They read the Wikipedia article on something or they find a support group.*

He now has an internet terminal in his waiting room. Some people use it to check their email. But, with bookmarks and pointers

supplied by the surgery, most use it to explore. What they find might be unreliable but, as Midgley points out, 'the antidote to bad information is good information'. On the whole, people will leave his surgery carrying more pages from the internet than they arrived with. He has helped set up a collaborative medical website, www.ganfyd.org ('Get A Note From Your Doctor') based on the Wikipedia model, but edited just by those within medicine. At the same time, he sees that this is all part of a conversation. He is willing to have his knowledge challenged. It goes back to bedside manner, putting information in context:

> *As a GP, I'd much rather be valued for that than for being an encyclopaedia. . . . I do have a degree of knowledge, but I'm perfectly willing to dive into the encyclopaedia and tear some pages out.*[56]

The doctor–patient encounter has always been an exchange, requiring a degree of expert humility. As GPs' conversations slowly change, we can draw out some important lessons for expert advice. Expertise is reaching further and further into aspects of our lives. Expert advice is constructed in a public context, with some imagined sense of who the public are and what they think. At the same time, people are finding new ways of reaching into previously expert debates. The challenge to expertise from beneath is growing. Far from being passive consumers of science, people are becoming more active and more sceptical. They now expect more of expertise. Across a range of areas, the challenge for experts is to make the most of new interactions. This means seeing 'the public' differently and reflecting on the limits of expert knowledge.

The politics of knowledge

The patient who comes to the GP with armfuls of internet is just one symptom of the new politics of knowledge. In the 1960s, optimistic sociologists looked to the future and saw an age when society would know enough to answer any question it set itself. The onward march

of expert knowledge would lead, it was thought, to an 'end of ideology'.[57] What we now call evidence-based policy would take the politics out of difficult decisions. Yet as with so many 'end of . . .' prophecies, events have not been kind to this school of thought. As Ulrich Beck would later realise, the rising value of knowledge and its seepage into new aspects of our lives created new fault lines for politics.[58] Far from being the answer to our troubles, making us all smarter, the rising currency of knowledge makes it *the* new political battleground. Common sense suggests that more knowledge might reduce the number of things to worry about. But, as Anthony Giddens described in a pre-millennial lecture:

> *The world at the end of the twentieth century doesn't look like this at all. The world in which we live, the feel of the world in which we live, rather than being a world of increasing certainty, is much more one of increasing uncertainty.*[59]

In this world, questions of who has knowledge and what knowledge is relevant are central. Social science research over the last few decades has shown that non-experts can possess highly relevant knowledge. The previous chapter's story of farmworkers engaging with the risk assessment of 2,4,5-T is one example. In medical contexts, sufferers of illness know more about their symptoms than doctors ever will – even if they aren't sure what causes them.[60] The quality of the conversation patients and doctors engage in is vital to determining treatment. And with chronic illness and disability, as the Down syndrome example tells us, expert knowledge will never give a complete picture. In some cases, as with AIDS activists in the 1980s, lay people can be empowered to contribute directly to the science of finding out about and treating new diseases.[61]

In the past, institutions have found it hard to accommodate this knowledge and experience. The testimony of ordinary people is frequently rejected as 'anecdotal evidence', without consideration of what else it might be. But some policy-makers are starting to realise the power of active non-experts. The NHS Expert Patients

Programme (EPP) grew out of research from Stanford University in California which showed that people with chronic illness do not have to be passive recipients of medical knowledge. If they are sufficiently empowered, they can contribute to the management and treatment of their illness. Patients, by joining groups that provide information and support, are encouraged to take a more active role in managing their illnesses. The EPP is seen as an important step towards the 'fully engaged' NHS demanded by the Wanless report of 2002.[62]

Across these examples, ordinary people encounter experts because of circumstance – they are ill, they are parents of children with disabilities or they happen to live nearby. But their encounters remind us how experts can be faced with some very difficult questions when they venture into the open. With the arrival of the internet, these questions have become more visible and more challenging.

Needles from haystacks

At its most prosaic, the internet is a library of the world's knowledge. The availability and spread of online information begs the question of quality control. Online democracy puts NHS Direct in a pretty flat market alongside crystal therapy for public attention. But this is only part of the internet story, and on its own it is likely to make some only want to shore up the walls to the citadels of expertise. The internet also allows connections – between people and between different areas of knowledge. New tools to help people research their health also give them new ways to find others with similar interests.

Paradoxically, the bigger the internet's haystack grows, the easier it is to find the needle within. The emergence of an organised internet has wiped out the search costs of knowledge. We can now find out about something, no matter how obscure, in an instant. Take Wikipedia, a growing resource written and edited for the masses by the masses (or at least some of the masses – more than 50,000 contributors at last count). In their quest to democratise knowledge, Wikipedia's authors are more interested in information than credentials. So they are challenging the top-down authority of experts.

Wikipedia has attracted a new set of arguments about partici-

pation and expertise. In late 2005, one of the world's most respected certifiers of scientific knowledge took a brave step into the debate. An editorial in *Nature* caused controversy by claiming that, on matters of science, Wikipedia was almost as accurate as the expert-led *Enyclopaedia Britannica*.[63] Britannica's former editor had previously referred to Wikipedia as 'the faith-based encyclopaedia' – an insult designed to uproot the website from its enlightenment foundations. The *Nature* editorial revealed that 10 per cent of authors of papers in the journal help to edit Wikipedia. Presumably, the reason scientists are doing this is that they think Wikipedia is a useful thing, which in turn suggests that they use it for their own research.

This doesn't mean that is useful for everything, or for everyone. In October 2006, one of Wikipedia's co-founders announced the birth of a rival. Jerry Sanger's Citizendium – a 'citizens' compendium of everything' – aims to use the wiki model but build in expert editors to ensure quality control.[64] By 2007, the hope is that there will be a wide-ranging, up-to-date and certified encyclopaedia available to the public. Around resources like Wikipedia, we are starting to see a renegotiation of the role and meaning of expertise. We are also starting to see a reassertion of wisdom and the role of the author. Wikipedia has no editorial voice, and is often plain confusing. In an essay about online participation, journalist Jaron Lanier criticises the level of ideological fervour that the internet attracts. He sees that crowds may be wise in certain situations, but 'the collective . . . is bad when taste and judgment matter'.[65]

Resources such as Wikipedia provide an entry point into an otherwise impenetrable body of knowledge. But they also remind us of the importance of ongoing conversation. Information does not constitute knowledge. Many of the most important constituents of knowledge and wisdom are 'tacit' – silent but understood by those in the know. Digital information has succeeded in codifying only some of this. There is still a need to go deeper. Ask exasperated university lecturers and they will tell you that Wikipedia works best as the start of a research journey rather than the end. People looking up their illness online still want and need to see an expert doctor.

Nevertheless, these online arguments about participation and expertise are pointing to a change, a new complexity in people's relationship with information. Experts or the government can no longer assume that the public are homogenous. And they can no longer assume that difficult questions will come just from NGOs and interest groups. People who were once seen as passive can now contribute to the fashioning of public debate about science. A resident campaigning against a mobile phone mast can now look to readily available information telling her that there have been important studies, endorsed by independent experts, indicating uncertainties about the long-term exposure of low-level electromagnetic fields. For a local authority, used to people complaining that a mast would spoil their view, this is a difficult conversation to have. The credibility of science is tested by the questions that are asked of it.[66] These questions are becoming more challenging, but they can help policy-makers do their job.

Needle politics

The controversy over the combined MMR vaccine began at a scientific press conference. Within weeks, from the furious noise that was created, it was impossible to make out which arguments were about science and which were about politics. On one side of the MMR parade ground, lest we should forget, stood a lone scientific study of a new bowel disease. Its most controversial author, Andrew Wakefield, had publicly recommended giving children individual vaccines rather than the triple jab. Next to Wakefield had gathered a motley crew of tabloids (the *Daily Mail* published over 700 MMR stories in one year), magazines, pundits and parents.

On the other side stood the massed ranks of the medical and public health establishment, armed with a weight of evidence pointing towards efficacy and safety. They had been taken by surprise by the questions that had been asked of their gold standard vaccine but were holding firm.

And in the middle stood the parents who would have to make a decision about their child's health, which would in turn contribute to

the population's health. Should they give their children a degree of protection, while contributing to the 'herd immunity' public good? Should they take seriously the wobbling of the science base and the stories of parents whose children had developed autism? Could they take a free ride on the population's vaccinated strength to keep measles at bay? Would they be the ones who, once they had found a GP willing to give them separate vaccines, would stay the course?

There has been a huge amount written about MMR, most of it either bemoaning public irrationality or railing against the arrogance of orthodoxy. A recent book by Richard Horton has given us welcome relief. Horton is the editor of *The Lancet*, the esteemed medical journal that housed the original paper by Wakefield and his colleagues. His account is coloured by his stance – at the eye of the storm. But his take on MMR is measured, wide ranging and optimistic.

Horton has an inside view of the realpolitik of science, and it is not pretty. He talks of his surprise at the treatment of the dissenting scientist at the hands of the establishment.

> *Despite my strong misgivings about Andrew Wakefield's judgement during this whole episode, there was something deeply unpleasant about how his public humiliation had unfolded. . . . One protagonist in the affair had said openly and publicly that his intention was to 'rub out' Wakefield. A senior doctor who had played a part in shaping the debate around MMR sat in a North London bar with a glass of red wine in front of him boasting that he was 'drinking the blood of Andrew Wakefield'.*[67]

In an interview with *New Scientist* in November 2006, Tony Blair reflected on dealing with Wakefield's hypothesis: 'My worry was that if we gave it even a prima facie credibility, before you knew where you were people would have assumed it was credible.'[68] The political reflex was to suppress rather than discuss. But people didn't stop people talking. And for parents of autistic children, Wakefield was doing

something that wasn't being done elsewhere. He was listening. He was cast not just as a scientist but also as, in the words of one journalist, 'a champion of parents who feel that their fears have been ignored'.[69]

When the Department of Health looked out on the controversy around the MMR vaccine in 1998, it saw a rogue scientist, an aggressive tabloid media campaign and a seemingly irrational, gullible public. What it did not see was the network of active conversations going on about the vaccine, in GP's surgeries, chatrooms and living rooms. In places like Brighton, where MMR vaccination rates fell as low as anywhere, parents came together in local support groups, supported by national networks, to compare experiences and build their own 'citizen science'.[70] As with BSE, a state of 'civic dislocation'[71] between scientific advice and citizens led to people forming their own connections.

Kay Richardson is a sociolinguist at the University of Liverpool. She is interested in how people are using the internet to interact with expert debates. In her book, she looks at how people used Usenet groups, a precursor to blogs and chatrooms, to talk about issues involving science – SARS, mobile phone risks and MMR. Rather than imagining the public as passive dupes, she observed people online and found that the internet was allowing people to engage in what seemed like a real conversation. People were able to use their voice in a way that they couldn't in public. They were discussing science, politics and the trustworthiness of the various players in these debates. One message that Richardson took from a newsgroup is telling:

> *I would dearly love to trust the government experts who say MMR is safe, that CJD is not related to BSE, that there are weapons of mass destruction in Iraq all set to destroy us in 45 minutes, that genetically modified crops can be safely tested with only 20 metres separating them from commercial crops. Really, I would, but there is plenty of evidence to suggest that we're told whatever is expedient to be told.*[72]

The MMR controversy was a symptom of people's dislocation with orthodox expert advice. This crossed political and class boundaries. Writing in the *Observer*, political commentator Andrew Rawnsley reflected a confusion that was rife among the middle classes. (It won't have helped Rawnsley that his daughter shares a name with John Gummer's):

> *Cordelia will not get the triple jab if my wife prevails. Jane is a rational and highly intelligent woman. She is contemptuous of the frenzy frothed up by some newspapers. She is no less disdainful of Whitehall's efforts to counter press panic with government scaremongering. . . . Patronising bullying isn't going to work. . . . Modern, sophisticated, sceptical citizens are no longer prepared to be spoonfed with cod-liver oil because nanny knows best, not least because nanny has so often been shown to know worst. . . . I can cite the scientific reassurance, I can quote the British Medical Association, the World Health Organization, the Royal College of This, the Royal College of That, I can list all those heavy authorities in favour of the triple jab until I sound like a looped recording of Yvette Cooper. Jane counters my impersonations of the Health Minister by listing back the great failures of expert opinion, from mad-cow disease to thalidomide.*[73]

A survey from Durham University tells us that 20 per cent of parents thought that MMR would still not be withdrawn if it was found to be harmful.[74] In the wake of BSE, it was an extremely hard issue for policy-makers to deal with. The Department of Health was caught in the position of both advocating and providing information about a new technology. Its credibility suffered. Almost any approach short of forced injections would be likely to lead to a drop in vaccination rates. There were no easy answers. But there were better and worse ways to make use of science in policy and better and worse ways to listen to the concerns and values of the public. Hindsight suggests that policy failed to engage with the complexity of the questions that people were asking of experts.

The first lesson we can learn from MMR is that evidence does not speak for itself. The controversy was about more than knowledge. It was about credibility, uncertainty and the space that had been allocated for public debate. The emphasis on evidence shut concerned parents out of important conversations with doctors and the government. As ordinary people asked difficult questions, features of this debate that had previously been cordoned off as scientific were revealed as vitally political. While the experts and the government were noisily talking about the facts, parents were quietly asking about uncertainty.

A second lesson is that we need to understand the new sorts of interaction and exploration that people engage in around such issues. Where people would once talk only to their friends and families, they can now also tap into networks that cross borders, feeding this new information back into everyday discussions. 'Local' knowledge can become global in an instant, and vice versa. A sceptical member of the public has access to a host of questions that experts will find very hard to answer. These questions will cross disciplinary borders. Experts and policy-makers need to find new ways of listening to these questions. They will contribute to a richer understanding of the context and limits of knowledge. Richard Horton reflects on this at the end of his book:

> *No matter how strenuously we hold a particular point of view, this common bond of engagement is our safeguard in preventing passion from descending into tyranny and reason from mutating into arrogance. . . . [The MMR debate] has reiterated the need to strip away the mystique from science, throwing open its doors to public scrutiny.*[75]

Learning to listen

We can no longer think about knowledge being produced in one place and consumed in another. The new organisation of information is allowing people to find out about issues almost as soon as science becomes aware of them. In debates involving science, the public are

breaking out of the mould that has been cast for them. A new model of expertise requires a new model of the public. We need to move from paternalism, in which the public are imagined to be passive, to a relationship of interested partnership. This means trusting that people will be able to navigate uncertainty and competing interests. And it means responding to their questions.

As part of the move to a new governance of science, the last decade has seen a growing interest in the idea of public dialogue with experts. Following the GM debate there has been a softening of the treatment of public groups and an expressed desire to start listening. The emerging debate around nanotechnologies has been seen as a test case. A report from the Royal Society and the Royal Academy of Engineering in 2004[76] has initiated a series of processes within and around government designed to inject public values into nanoscience and nanopolicy. This is a genuine change. Both Demos and the University of Liverpool have been involved.[77] But as with other changes in governance, there is a lingering suspicion that this form of openness is more about communication and trust than the core business of policy.

Tony Blair now accepts that, when it comes to science, 'we need to engage the public at a very early stage'. But his aim is 'a more rational public discourse about science and risk . . . standing up for science and rejecting an irrational public debate around it'. In his view, past debates have been controlled by what he calls 'the anti-science brigade'. This suggests that, for all the talk of dialogue and giving his 'trust to the good judgement of the public', his model of expertise is solidly outdated.[78] He casts experts and non-experts in opposition and demands that debates take place in the language of science.

The old model of expertise – truth to power – talks to the public. It does not listen. The new model of expertise needs to listen and learn to listen differently. In this new model, calling people 'anti-science' is as unhelpful as labelling people 'anti-education' when they ask questions about how best to teach our children.[79] Such terms close down debate and suggest that, beneath the veneer of engagement of dialogue, old assumptions persist.

Blair describes himself as 'evangelical' when it comes to science.[80] The last thing experts need is moral certainty. The spirit of science is sceptical, exploratory and uncertain. The place of political leadership is not 'standing up for science'[81] – a model of science that few scientists would recognise. Science is not one thing. And it does not need defending; it needs debating. In the last ten years, with a move towards public dialogue about science, we have seen how vibrant such debates can be. Scientists who get involved are often surprised and enthused by the questions that people ask.[82] These new questions are not a threat. They can help us build better scientific advice.

There can be many reasons why technical experts and policy-makers struggle to hear the voices of outsiders. Science is comfortable with universal statements expressed without obvious emotion or personality. 'Non-experts' can shout too loudly, ignore professional codes of behaviour and make it clear that they care very deeply about the issues. Public groups will define the issues in their own way: what's at stake can appear very different from varying social standpoints. The exchange of expertise and experience may not be straightforward. It is all too easy for insiders to become dismissive, to think that the public is failing to recognise the real issues or that the quality of debate is too low, that we knew all this already and so on.

Learning to listen means suspending the tendency to dismiss what appears irrelevant, anecdotal or ill-informed until a real effort has been made to hear how the issues appear from a different point of view and to see what lessons might be learnt. This will also involve a willingness to acknowledge critical messages about how scientific institutions currently operate and not to become defensive in the face of criticism. Rather than trying to fit other voices into already established ways of thinking and acting, it means seeing things through different eyes.

Engaging with engagement

Practical experiments in public engagement with science have revealed the same tensions that exist, but remain unacknowledged, in the Prime Minister's speech. Experience has suggested that there is no

easy route to consensus and that consensus should not be the aim. Instead, talk typically creates the demand for more talk. Public engagement is not a stage of governance that can be completed, tidied up and filed away. It raises more troublesome questions about how to take into account a greater diversity of voices, how these relate to scientific forms of expertise, and how decisions should be made in conditions of social and technical uncertainty. Public engagement is only the start of a discussion.[83]

To its credit, government has picked up arguments about public engagement and been willing to experiment with them. For policy-makers, it has been a struggle. The outcomes of engagement processes have not always been as straightforward and applicable as they had hoped. And in opening a conversation between government and the public, policy-makers have been surprised by growing social and political argument. This discomfort has led some in government to become frustrated with public engagement. There are undoubtedly some who will read this pamphlet, shrug and say 'we've heard it all before and where has it got us?'

Our response is to ask why policy-makers have thought this was going to be easy. They may have wished to see engagement as a means of tidying up policy – taking account of public attitudes so that they could be bundled up and put to the side. But engagement is about precisely the opposite. It is about opening up policy, exposing it to criticism, challenging its assumptions (including those about knowledge and expertise) and forcing governments to make difficult decisions out in the open. Civil servants are making progress in finding ways to invite the public into governance. But they need to develop new skills, and learn patience, in working with uncertainty and disruption. They need to think about how they can develop a more open policy culture. They should stop expecting a simple solution to public scepticism, as if public scepticism is a social problem rather than a legitimate stance.

Brian Wynne has argued that policy-makers are 'hitting the notes but missing the music',[84] failing to acknowledge the deeper challenges of opening up their institutions and assumptions to critical debate.

Nor are they questioning the way they talk about science-led progress – Tony Blair's speech ends with a bow to the 'brilliant light of science'. For policy-makers, social scientists and think tanks alike, talk of 'engagement', 'openness' and 'democracy' is rhetorically appealing, but it is slippery. We now need a practical discussion, in the context of policy, of where we go from here. In the next chapter, we ask this question with regard to one of the key recent innovations: the involvement of 'lay members' on expert advisory bodies.

4. Lay members and open expertise

This pamphlet has explored changes in the way that expertise is talked about in politics and changes in the way that expertise is challenged by non-experts. From above, there has been a call to open up and from beneath there is a growing pressure to answer new questions. We have set out a challenge to government – to rethink how it opens up. But what does this mean for the practice of expert advice? How are calls for openness, appreciation of uncertainty and listening to new groups reflected in the way that expert committees work?

In early 2006, we were asked by Defra to take a look at some of these questions in the context of one recent initiative – the appointment of lay members to previously expert-only committees. Over nine months we have interviewed experts and civil servants. We have held group discussions and sat in on expert meetings, trying to keep track of both the scientific content and the social context of conversations. At the time of writing, this research is still under way. But we can begin to chart some emerging themes.

Asking people to reflect on their role as experts or users of expert advice, we have heard a range of opinions, some of which were firmly held and easily articulated, some of which had just crossed people's minds. We have tried to get under the skin of some taken-for-granted assumptions about the way experts, policy-makers and the public interact. And we have asked people what they think of the way that lay members have been grafted onto committees. To most people, the

idea of lay members is new. Some have taken it in their stride. For others, the move has disrupted the way that they think about science.

Ripples of disagreement about the role of lay members point to deeper debates about the way scientific advice works. Controversies over BSE, mobile phone safety and GM foods have been about more than just good or bad science. They have also been about the role of expertise in making decisions.[85] But it is not yet clear how the practice of experts can reflect new demands for openness and diversity. Nor is it clear how augmenting committees with lay members can help. Lay membership is in its early stages in government. It would be unfair to propose a definitive evaluation of its successes or failures. But we can ask how it is currently being talked about, and how its full potential might be imagined.[86]

Advice as absolute, advice as contingent

Drawing out the potential contribution of lay members to expert committees is not easy. The organisation and shape of committees vary as much as the subjects they cover. Some committees meet regularly and are asked to provide targeted scientific advice. Some come together as required, to deal with specific policy questions. Others are tasked with scanning the horizon for future challenges rather than providing evidence for current ones. What they share is a basic aim to assist government to 'collect scientific information and make judgements about it'.[87] Unsurprisingly, committees and policy-makers talk about lay members and their roles in a range of ways.

To make sense of this variety, we can turn to what sociologist Max Weber called the 'ideal type'[88] – an abstraction allowing comparisons of social phenomena across different contexts. We can imagine two contrasting ways in which scientific advice might operate (see box 1). The first type is technocratic. The second type is open and diverse.

Box 1 The role of scientific advice: ideal types

Type 1: Advice as absolute	Type 2: Advice as contingent
○ Advice is valued as objective and absolute.	○ Advice is valued as offering a range of perspectives and options.
○ Scientific advisers lend both advice and authority to policy.	○ Advisers are conduits to accessing information and debate.
○ Advice is separate and unaffected by politics.	○ Advice is diverse and conditional.

In Type 1, there is a tendency for scientific advice to be presented as absolute and certain, or for policy-makers to treat it in this way. The expert authority of scientific advice means that it resists challenge. One senior policy official described it as a 'major decision' to go against the advice of a committee of independent scientists. Beyond the quality of advice, it has value in providing closure to difficult policy issues.[89] Questions about the limitations of evidence are disguised; legitimate social and political questions are downgraded as unscientific. Policy-making becomes a relatively direct process of 'translating the best scientific advice into regulation', as one policy-maker put it.[90]

This type stresses the impartiality of the advisory process. The objectivity of laboratory science is translated into the objectivity of the committee's advice. The emphasis is on independence – from government, industry and NGOs. 'Being unattached', as one committee chair described it, is seen as a vital attribute when appointing people to the committee. The scientific purity of advice – keeping out the social and political – becomes the paramount concern.

Type 2 sees advisory bodies offering a diverse range of advice at multiple levels. Instead of presenting unquestionable evidence,

committees are asked to give a range of scientific opinion, to put advice in context and to identify uncertainties and shortcomings. Scientific advice is valued less for the authority it wields than for the options it gives policy-makers. Good scientific advice is seen as tapping into a wide range of scientific discussions, emphasising diversity. Scientific advisers in this model are challenged to open up policy questions. Policy-makers can be presented with scientific knowledge informed by a wider range of social experience, highlighting areas of potential political argument.

Advisory committees may be asked to consider the risks of releasing a chemical into the environment. Will it cause cancer, for example? Responding to this question means marshalling and making sense of a range of scientific evidence. But absolute definitions of risk are hard to come by. Committees may compare a chemical to some sort of threshold. 'Will it cause cancer in one out of 100,000 people?' 'Is it found in the atmosphere in quantities greater than 10 micrograms per cubic meter?' One committee we spoke to worried that these thresholds can be imprecise and pointed out that they tell us little, if anything, about the acceptability of risk. If we take a Type 2 view of advice, cancer rates can be made more meaningful if accompanied by questions such as 'how safe is safe enough?' and 'what is the social need for this chemical?'[91] One advantage of the Type 2 model is that it can be open to alternative definitions of policy questions.

Being 'lay'

The ways in which advisory committees operate are unlikely to map entirely onto either of the two ideal types. In our research so far, we have talked to committees that may lean more towards one type, but which often embody characteristics of both. The benefit of these models isn't that they describe the way things are, but that through identifying some key characteristics of the advisory process they enable us to look at how lay member roles may evolve in different situations.

Most of our conversations about lay membership have begun with

committee members and policy-makers challenging the use of the word 'lay'. Should we see a lay member like a lay preacher – one who proclaims to speak the word of God, but who might be seen to have limited authority to do so? Is a lay member nothing more than a 'layman', someone who is defined by what they are not – an expert? Most people thought that being a lay member meant more than this. They imagined lay members bringing something to the table, but often couldn't put their finger on what. Going deeper, we can draw out two ways in which lay members are being seen to help – building legitimacy and building better advice.

Legitimising advice

Searching for the contribution of lay members to scientific advice, most of the people who have spoken to us have focused on issues of trust. Lay members, it is thought, will help make expert advice more legitimate and encourage greater public confidence in the decisions of government. Announcing the inclusion of a lay member on one Defra committee, one minister saw it as part of a commitment

> *to greater openness and engagement with stakeholders. The appointment of a lay member will increase the openness and transparency of the Committee which will further improve the credibility of Defra policy making.*[92]

Lay members are often asked to help make difficult scientific discussions accessible to the public and to policy-makers, providing a bridge between experts and non-experts. Some committees we spoke to gave their lay members responsibility for producing their annual report. It was thought that they would be able to draw the public into important discussions. And while it is often hard to see how esoteric scientific discussions relate to our everyday lives, lay members were seen as a way to make them more meaningful:

> *[Lay members can] make sure anything we do is accessible to the wider public. . . . Unless people understand what we're doing,*

> *and why it's relevant and significant, it follows that the information is not accessible to people. By flagging up issues such as 'what is this chemical used for?', people would see the relevance. Without that you just have a chemical with this very long name. . . . I think that's very important.*

Alongside communication to the public, interviewees spoke of lay members as representatives of the public. The lay member is cast as a 'public witness' to the committee. They may be neutral or explicitly representative, speaking on behalf of certain public interests. 'Lay', in this sense, does not refer to their qualities as an expert, or non-expert, but whom they speak for – 'the man on the street', as one participant put it. Either way, the lay member is seen as a conduit through which the public can ensure that the committee is acting in an appropriate manner:

> *People have seen the BSE situation as a watershed in trust between the public and government, and I think that having [a lay member] on this committee means that you can't have a perception, rightly or wrongly, that you've got a group of experts just carving up some research area between themselves according to their own political spin. . . . You've got somebody here who'll wave a red flag if they think they're doing that, which hopefully should help public confidence in any committee.*

Our interviewees were not always so optimistic. Rather than focusing on what lay members could achieve, some pointed to potential pitfalls. Would non-scientists be able to cope with the complexity of the science? Would they divert attention away from scientific evidence towards politics? Would their participation diminish the authority of advice? Tellingly, the chair of one committee said that lay members were welcome so long as they didn't change 'what we do' – the business of expertise, which was, in his terms, 'hard, rigorous and technically competent'.

Building better advice

Beneath talk of legitimacy, some people sketched out more active, and possibly more influential, roles for lay members. As part of expert discussions, lay members could help build better scientific advice. Their contribution, it was thought, would be some form of alternative expertise. This is something more than just being public, being 'lay'.

Rather than use the word 'lay', people told us about new perspectives that would complement the expertise already on the committee. At Defra, the Advisory Committee on Hazardous Substances has an academic with an interest in environmental law and policy as its lay member. The Advisory Committee on Releases to the Environment (ACRE) has two farmers, although they have not been labelled 'lay members'. Talking about these new sorts of members – somewhere between lay and expert – made some experts rethink their own role. Given the breadth of issues a committee is expected to deal with, it is unlikely that any one member will have specialist expertise on everything. Certain conversations will take members of the committee out of their scientific depth. One advisory scientist told us that during committee discussions she sometimes feels profoundly 'lay'. Scientists themselves, can sometimes play lay roles:

> *You should actually look round the table; there are many subjects on which I would be very wise to keep my mouth shut. . . . And so I'm an expert on some things and non-expert on many things. . . . I hesitate to use the word 'lay' because I'm also a lay person, the minute I walk onto the street I'm a lay person. If I attach myself onto a committee as a lay member, I happen to have the expertise although I'm still called a lay member. . . . So I don't think that should be the distinction. [She] may just happen to have a non-scientific background, but she might have had a chemistry, biology or engineering background.*

These 'lay experts' were seen as working with scientists to improve the quality of the advice produced for policy-makers. The new members

would play what was usually described as a 'challenge role', helping bring discussions away from esoteric science, back to the 'real world'. It was suggested that 'lay experts' might be able to help scientists situate their advice in a policy context. The emphasis is not on countering, or diminishing the impact of, scientific advice, but on building its value. One lay member we spoke to talked about her own contribution:

> *A lay member should bring a different perspective and be able to articulate that perspective. . . . My job is to ask awkward questions, questions that experts can't. I can ask the 'why' questions. . . . Experts are often afraid to reveal their lack of knowledge. . . . I'm allowed to be ignorant.*

Sir John Krebs, the former chair of the Food Standards Agency, put it like this:

> *A good lay member challenges the implicit assumptions that scientists make; to ask the questions that scientists never ask, because they're part of their normal code of behaviour. . . . Also, I think a good lay member would be rigorous in making sure the committees had answered the questions [asked of them] because in my experience, you put a question to an advisory committee and it's a bit like what undergraduates typically do. You put a question on the exam and they answer their own question, rather than the one you asked; or they answer it in terms which avoid the crucial difficult bits. . . . I'm setting pretty high standards for lay members, and I wouldn't expect all of them to press all of those buttons all the time, but my dream member would have those sorts of things in their minds.*[93]

Evolving lay roles

Lay membership in scientific governance is at an early stage. Lay members, the committees they sit on, and policy-makers have an important responsibility to direct its evolution. They will need to

negotiate what roles lay members might play depending on the issues facing committees. They will need to make important decisions about the type of scientific advice in which lay members are taking part. Lay roles, and the wider potential of lay members, depend on the expectations policy-makers have of scientific advice.

If we view lay membership within a context where the value of advice comes from its certainty and authority (Type 1), then lay members can be given only partial roles. Seen as 'non-experts', lay members have little potential to affect the advice produced by the committee. Their contributions are separated from the core business of the committee. Lay members can be seen only as potential sources of public confidence and legitimacy. The issue is how the committee is perceived and how its advice is understood, not 'what we do', to recall the words of the committee chair above. They are bolted on, valued more for the seats they fill than the contributions they make.

Legitimacy and trust are clearly essential for governance. Given the lack of transparency in the past, attempts to open up scientific advisory committees are welcome. However, the ability of lay members to build legitimacy is not as clear cut as sometimes presented.

Lay membership is one of a series of initiatives aimed at opening up and developing public confidence in public policy. Defra has several other initiatives in public and stakeholder engagement. The Advisory Committee on Hazardous Substances (ACHS), the body we followed most closely in our research, is linked to the UK Chemical Stakeholder Forum (UKCSF), which has members from science, industry and civil society. The forum represents 'public concerns about chemicals in the environment'[94] and offers advice on managing their hazards. Much of the ACHS's work responds to calls for scientific advice and technical clarification from the UKCSF. This is an innovative relationship, enabling the discussion of science alongside social and political issues, ranging from animal welfare to industrial development. We might ask if this is a more effective way of exposing the ACHS's advice to public scrutiny than having a single lay person join its quarterly meetings. Then again, can't we expect

scientists and committee secretariats to communicate advice clearly? Don't committees already open meetings to publics and publish minutes online?

We don't want to preclude the possibility that lay members can play important roles in opening up and legitimating scientific advice. Policy-makers will need to make important decisions about how open is open enough and what the best methods of achieving legitimacy are. However, in raising such questions we are also drawing attention to the fundamental limitations of Type 1 thinking. Going back to John Krebs's words, we can see he is asking a lot more from lay members. He is also asking government to rethink what it should expect from advice. The potential for lay members to improve expertise largely depends on the sorts of expert advice policy-makers and experts want.

If government values scientific advice for its diversity, as in Type 2, lay members can potentially play more meaningful roles and become full and active members of the advisory process. There is a far greater potential for lay members if they are situated within a culture of expertise based not on the black and white of scientific absolutes, but on offering a comprehensive range of advice. This is expert advice in shades of grey.

The challenge to government

A useful analogy for imagining a more active lay role for lay members is that of non-executive directors of companies. Following the revelation that Enron was a house of cards, there has been a surge of interest in corporate governance. A more effective role for non-executive directors, coming from outside a company to sit on its board, is seen as one way of avoiding a repeat of past mistakes. In a recent *Economist* report, Sir Adrian Cadbury describes a board discussion within Shell, over a decision to dispose of an oil platform: 'They all saw things the same way . . . you only need one person to ask the right question.'[95] In the corporate world, the person asking the important questions of the company directors is likely not to work for the company.

In 2003, the Higgs review told the DTI that non-executive directors had real potential to make a difference, but that there was a need for greater clarity about their role. Higgs's argument linked accountability and a 'culture of openness' with good governance.[96] A follow-up report looked specifically at how companies can benefit from diverse perspectives. Current policy says that a good non-executive director plays a real challenge role, similar to that imagined, but less often enacted, for lay members.

Our research has let us look behind the curtains to the backstage of expert advice. We have tried to look beyond what lay members can do to ask what this means for our understanding of expert advice in governance. The introduction of lay membership has prompted some important questions about how government perceives advice and what expert committees do.

We cannot think about lay members in isolation. We need to link the practice of expert advice with the expectations of expert advice. Lay membership can be an important way of opening up the inputs of expertise, broadening the questions that get asked and the voices that get heard. However, to build better advice, we need to open up the outputs of expertise, expecting judgement, uncertainty and context as well as evidence.

One witness to the Commons Science Select Committee told the MPs that 'increasingly, committees examining complex scientific issues are being populated by lay members, elevating public opinion over professional expertise and subordinating science to prejudice'.[97] Others were more open-minded, and demonstrated a more sophisticated understanding of the nature of expertise. But the Select Committee recommended that we should rethink the current approach to appointing lay members:

> *Clearly, where a committee has been tasked with providing purely technical advice, it would be inappropriate to give the views of lay members equal weight to advice from experts: scientific advice must be based on science. . . . In view of the many potential problems identified above in having lay*

> *membership of scientific advisory committees (as opposed to policy commissions where they play a vital role), we recommend that scientific advisory committees dealing with technical advice to government should not routinely have lay membership.*[98]

Our research has revealed that this is far from clear, as is the distinction between what goes on in advisory committees and what goes on in policy commissions. The select committee is making some unwarranted assumptions about expert advice. Lay members can indeed contribute to technical committees, but only if we stop assuming that it is a simple job to turn science into scientific advice. The reality is more complex, and new perspectives can help navigate this complexity.

The ultimate success of lay membership will depend on policy-makers, lay members and experts themselves. They need to be allowed to challenge orthodoxy and move towards more diverse and conditional forms of advice. We have seen that there is value to broader membership of committees in challenging expertise. In advisory committees, countless questions go unasked. A lay member can ask some difficult questions, which may be important but may not be obvious. If policy-makers are willing to stretch the boundaries of advisory committees, and they are willing to rethink what they expect from experts, advice to government will benefit.

5. Putting the politics back into policy

Facts alone are wanted in life. Plant nothing else, and root out everything else.

Thomas Gradgrind in *Hard Times* (Charles Dickens, 1854)[99]

Dickensian London was a pretty unsavoury place. Economic growth in the first half of the nineteenth century had brought thousands of new people to Soho, but the sewers for which we now thank the Victorians had not yet arrived. Cholera flowed freely through the city. Bodies were regularly carted down the narrow streets. In 1854, one epidemic was particularly virulent, posing a challenge both to experts and to families struggling to escape the disease.

London's men of science disagreed bitterly about the cause of cholera. The prevailing theory was that it was spread in the 'miasma' – the foul-smelling cloud of smog that blanketed the city. Others, including a young doctor called John Snow, disagreed. Snow reckoned that it was a waterborne disease. When the 1854 epidemic began, Snow began finding out about the disease and the social context in which it was spreading. In a pioneering example of 'shoe-leather epidemiology', he teamed up with a local vicar and began building a picture of the problem by knocking on doors and speaking to Soho residents. He mapped the cases of illness and worked back to a single water source – a water pump.

The pump is still there today on what is now Broadwick Street,

outside a pub that has been renamed The John Snow. It is a monument to a particular sort of expertise – a tireless combination of knowledge, detective work and willingness to challenge the received wisdom. In a new book, Steven Johnson retells the story:

> *Snow himself was a kind of one man coffeeshop: one of the primary reasons he was able to cut through the fog of miasma was his multidisciplinary approach, as a practising physician, mapmaker, inventor, chemist, demographer and medical detective. But even with that polymath background, he still needed to draw upon an entirely different set of skills – more social than intellectual – in his affiliation with Reverend Whitehead.*[100]

In *Hard Times*, published in the same year, the hard-headed Gradgrind places his trust in the power of isolated 'facts and calculations'. In contrast, Snow and Whitehead's story is one of expertise-in-context. It is about exploring uncertainty, questioning authority and mixing different sorts of knowledge. And it can teach us plenty about modern expertise. In 1850s London, complexity and chaos were visible in the streets. We now take clean water for granted. But we should not pretend that our problems have disappeared. Johnson draws a direct connection from John Snow to bird flu. As London was coming to terms with being a global city, it was taken by surprise by new epidemics. Now, diseases born continents away can appear on our doorstep within hours. And we don't yet know what it would take to make them dangerous.

Presented with a new threat, it is clear that certain sorts of expertise will be necessary. Understanding bird flu will require the knowledge and wisdom of epidemiologists, geneticists and pathologists. But it is not clear which sorts of expertise will be sufficient. Nor is it clear how we should make the best use of this expertise. In this pamphlet, we have narrated the first steps towards an open model of expertise that should make us more resilient to such surprises.

We cannot offer a blueprint for this new model. A new social contract between experts and society will be the product of ongoing discussions between individuals, cultures and institutions. But we can offer some pointers to the issues that will become more relevant as this new model is debated and retooled. Box 2 below gives a sense of what this model needs to look like and what our new expectations of experts should be.

Box 2 Models of expertise

Old model of expertise	New model of expertise
○ Closed	○ Open
○ Homogenous	○ Diverse
○ Hubristic	○ Humble
○ Demanding public trust	○ Trusting the public
○ Expecting expert consensus and prescription	○ Expecting plural and conditional advice
○ Managerial control	○ Distributed control

We have seen that government is taking steps towards this new model. Newer organisations such as the Food Standards Agency are further along this road than most. But even the stubborn culture of central government is changing. At Defra a senior official told us that, in its journey to a more open approach, 'the ship has turned 75 per cent in the right direction'. In other departments, the words have changed, but the body language has remained much the same. And some new bodies, such as NICE, are finding it hard to reconcile their public desire to listen with their backstage machinery of cost–benefit analysis.

This pamphlet has asked what still needs to be done. Responsibility for the necessary changes to expert advice cannot just be placed at the door of experts, nor just at the door of policy-makers. Instead, we

must change the way that expertise and policy talk to one another. The relationships in the system are as important as the individuals. To embed a new model of expert advice, we now need to extend our thinking towards some areas that ten years ago would have been unimaginable, and may still seem counterintuitive and uncomfortable.

Provisional expertise

Issues involving science do not arrive with a script. And they do not bring with them a body of relevant evidence. Knowledge and wisdom must be marshalled to make sense of new challenges. Hard decisions will have to be made on the basis of pretty soft science. Facts will be hard to come by and uncertainty is likely to be rife.[101] In such cases, experts and policy-makers need to be open-minded and intellectually humble. As they make sense of issues, they need to explore rather than assume. We have learnt from experience that, as well as shedding light on problems, expertise can blind us to our ignorance. We still need to learn how to take decisions openly in these situations.

This exploratory, adaptive mode of expertise involves, as the Chief Scientific Adviser suggests, listening to new voices and seeking out diverse areas of expertise. And it also involves changing how we see science in policy. We cannot expect that science has all the answers. Theoretical models and predictions therefore need to be augmented by monitoring and research focused on answering specific questions.

This provisional mode casts experts differently. It asks them to broaden their remits, to question, challenge and apply their wisdom. Policy-makers should expect what Andy Stirling calls 'plural and conditional advice' as opposed to recommendations that are 'monolithic and prescriptive'.[102] Minority reports from committees should be considered part of the process of making robust decisions rather than a dangerous break from unanimity. Scientific uncertainty does not mean that 'anything goes'. But recent debates do tell us that we need to find new ways to talk about uncertainty, as part of a richer conversation about expertise.

Cosmopolitan expertise

Issues that demand expertise often fall across disciplinary, organisational and national borders. And the questions that policy and the public are likely to ask will not fit neatly into certain schools of thought. Policy has come unstuck in the past by assuming that useful advice will come from narrow perspectives. But as Ulrich Beck and Anthony Giddens argue, 'from a cosmopolitan point of view, diversity is not the problem; it is the solution'.[103] This diversity requires new forms of collaboration between cultures, whether local cultures or disciplinary cultures of expertise.

Expert advice needs to blend different people and perspectives. As government experts become less important and external experts fill their role, government must assume a different role, one of network-building and cross-cultural diplomacy. A combination of perspectives and disciplines in expert advice, though necessary, brings problems of communication. Elements of discussion are likely at first to get lost in translation. But translation is an integral part of expert advice. Finding ways for different experts to speak to one another is a crucial part of working towards a new model of expertise.

Increasing diversity is far from straightforward and runs counter to many of the institutional structures and regulations which shape policy. In recent years, we have seen international bodies such as the World Trade Organization casting their decisions as scientific, preventing discussion both within and between countries of the broader politics of new technologies. This stifles diversity and challenges the legitimacy of national governments.

However, just as expertise can close down discussions if used narrowly, it can open them up if used wisely. With the recent Stern report on the economics of climate change the UK has, by drawing on expert wisdom, created a new space for political leadership in tackling a global problem.[104] As more and more of these discussions take place globally, we need to ensure that we are able to engage in a richer conversation about expertise, its benefits and its limits.

Finding space for politics

The politics of expertise are becoming more important and more visible. This pamphlet has narrated some recent examples in which the attempt to portray issues as just about science or evidence has been resisted by a sceptical public. Like squashing a balloon, the attempt to push the politics out of certain questions is likely only to mean that dissent will bulge up somewhere else.[105] As issues play out in public, the small 'p' politics emerge through the questions that people ask of experts.

But we are also starting to see an uneasy simmering in politics more generally. The MMR clash reminded us that talk of gold standard evidence and best practice sits uncomfortably alongside that of choice in healthcare. Evidence-based policy seems on the surface like a straightforwardly good idea. But in practice it can be anti-political; it can narrow the space for debate. A recent essay by Will Davies reflects on this:

> *In an evidence-obsessed world, both politicians and public are able to renounce their responsibilities to the political process. Politicians are able to duck the normative question of how they believe society ought to be, while the public no longer needs to engage with the mechanisms of democracy in order to convey where its interest or demands lie.*[106]

Evidence can support policies and it can challenge them. But it does not on its own tell us what to do. The political legitimacy of policy does not increase with more evidence or more expertise. Political judgements must still be made, in a web of uncertainties, interests and public concerns. Recent statements from Defra suggest the evolution of a model that accepts the limits of evidence.[107] In the sorts of areas in which expert wisdom is useful – unbounded, uncertain, complex – policy is not a line from evidence to execution, it is a complex system.

A regular complaint from experts is that politicians and the public expect too much from them – to have all the answers, to understand

everything and to express this with confidence. As we move further away from experts knowing all that could be known, we need to move away from technocracy. Government needs a modest and self-aware sense of the strengths and limitations of expert knowledge: a culture of humility. Social scientists have suggested a shift from talk of 'evidence-based' policy to 'evidence-bound' policy.[108] The phrase is less important than the sentiment, which is a reassertion of the space for political decision-making.

Expert uncertainty does not have to sit uneasily with policy-making. Governance is a process of negotiating ambiguity, a messy business consisting of compromises, partial decisions and continuous renegotiation. But the problem with facts is that they are easy to hide behind. Complexities are obscured by discussions of evidence and knowledge. Uncertainty isn't just about the limits of knowledge. It is also about the untidiness of policy. Buzzwords like openness and transparency need to be extended to the ways in which advice is used, or disregarded, in policy.

Putting the politics back into policy means politicians and policy-makers taking greater responsibility for decisions. It means restoring legitimacy to the decision-making powers of government. It means being honest with the public about why decisions were made. And it means being open to criticism and conflict.

We end with a few specific recommendations, designed to help expert bodies and policy-makers work towards this new model of expertise.

A role for social science

For all the talk of expertise in policy, there is one form of expertise that is still neglected within the everyday business of scientific advice. Social scientific skills are highly relevant to processes of understanding and embedding the knowledge of diverse groups in the policy process. Social scientists are increasingly working within and around government on issues of science and policy. They can help experts and policy-makers listen to different voices and see things differently. They can also play an active challenge function, questioning how policy issues get defined and framed. Social

scientists need to exercise the same humility as other experts and they need to reflect on how engaging with policy can push them to ask new questions. But within a new climate of diverse expertise social science needs to play a bigger part.

Innovating practice

In 1964, following the late discovery of thalidomide's side effects, the Yellow Card scheme was set up to allow doctors to report suspicious drug side effects as soon as they occurred. In the last decade, the scheme has been extended to pharmacists and nurses. In 2005 the Medicines and Healthcare products Regulatory Agency opened up an online version, allowing members of the public to contribute. Since it began, the 400,000 reports received have acted as an early warning system, asking questions about safety that would otherwise have remained silent. The scheme provides a useful guide for others to follow. Though it may seem like a small step, the recognition that new groups can contribute to the definition and solution of problems is a vital part of a new model of expertise.

Expert organisations need to find new ways to operate that acknowledge the limits of prediction and control.[109] They need to aim at widening the range of knowledge they can tap into. Like the Yellow Card scheme, the impact of these practices will rely on the ability of organisations to shift away from technocracy and change the way they think about their work. Social scientists may have a role to play, but it is up to organisations themselves to innovate with policy and use it to reflect on their own cultures.

Support for secretariats

Expert committees are supported by policy-makers who manage the provision of advice. These secretariats must rethink what they expect to get out of committees and what can be done with this advice. If we are to move from a relationship between science and policy based on absolutes to one based on contingency and uncertainty as well as evidence, then we need to see a cultural shift among policy-makers. Embedding a new, more robust model of expertise depends on

secretariats. They are the ones who ask the questions to which a committee works and provide a sense of committee identity. If the practice of expert advice is to suit its new context, secretariats need training and support to manage committees in a new way.

Lay to rest

We have described in this pamphlet how simplistic notions of expertise need to be broadened to enable the transition to a new model of expertise. We have also seen a degree of confusion around the use of the term 'lay' in discussing new members of expert committees. The Commons Science Select Committee argued that lay members should not be appointed to committees as a matter of routine. Their worry was that non-experts would complicate technical discussions.[110]

We support their call for rethinking the appointment of lay members, but disagree with their rationale. We see real value in adding new perspectives to expert committees, across a range of technical areas. But the word 'lay' is an unhelpful one to use when describing the contributions, or potential contributions, that new members can make. It presupposes two classes of committee member. Instead, we suggest that committees actively seek to broaden and diversify their expertise (broadly defined), but scrap the term 'lay'. Committees should contain a range of equal but diverse experts. New members may be academics or experts in other fields. They may in some cases be interested members of the public. Or they may be scientists.

Secretariats and advisory committees must allow this broader membership to evolve. There is room to experiment with roles. There is nothing stopping people who might once have been called 'lay' from chairing certain expert committees. It could be a fruitful way of helping committees live up to the full complexity of their advisory roles.

A review of the practice of expert advice in policy

As expert advice to government opens up, the next site of analysis needs to be the practice of policy-making. Attempts to make science

more transparent have revealed how opaque many parts of policy remain. Departments and expert bodies need to reflect on how they are growing into a new way of thinking. This will be enabled through the new conversations that openness allows. It will require thoughtful leadership. And it will be aided by more thorough research into organisational processes.

The time seems right to review how policy that uses expert advice has changed since the Phillips Inquiry, not just in the departments and organisations that were immediately affected, but across government, in health, in economics and in social policy. Much of our pamphlet has reflected on what happens when things go wrong. We need to look harder for things that are going right in the new model of expertise. The Commons Select Committee has contributed a useful report. But its focus was more on the products of expertise – how evidence does or doesn't become policy – than the practice. Now, we need to examine expert advice in the making across government. This task should begin with a cross-departmental review.

Making the most of openness

The call for 'openness' in the advisory process and in decision-making has been a necessary counter to an era of opacity and secrecy. But it is not a panacea. There will be times when openness is not beneficial or desirable – perhaps in matters of national security and personal confidentiality. Less obviously, there are times when it may be beneficial to think the unthinkable, to speculate wildly, to challenge the received wisdom and to play devil's advocate out of public view. A presumption of openness needs to be able to accommodate occasional closedness, openly and honestly.

We have described the recent opening up of expert advice, and suggested that it is only the start of a wider discussion that goes well beyond transparency and well beyond trust. This is ultimately a debate about the culture and politics of expertise. And it is too important to be left to experts.

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