DEBATE SUMMARY

A framework for making policy choices: bridging the gap between scientific and value judgements

Held at The Royal Society on 20th May, 2015.

The Foundation is grateful to The Kohn Foundation, The Michael John Trust, Lloyd’s of London, Risk Solutions and the Willis Group for supporting this debate.

The hash tag for this debate is #fstpolicyframework.

Chair: The Earl of Selborne GBE FRS
Chairman, The Foundation for Science and Technology

Speakers: Sir Mark Walport FRS FRCP FRCPATH FMedSci
Government Chief Scientific Adviser, Government Office for Science
Professor Angela R McLean FRS
Co-Director, Institute for Emerging Infections, University of Oxford
John Pullinger CB
UK National Statistician, Head, Government Statistical Service and Chief Executive, UK Statistics Authority

SIR MARK WALPORT said that an understanding of risk lay at the heart of his role as the Chief Scientific Adviser to the Government – and, indeed, of the role of central government itself. Risk arose from both the national environment (earthquakes, drought, disease, for example) and from the human environment (such as pollution or terrorism).

Innovation, drawing on a rapidly developing science base had brought huge benefits – widespread electrification, improvements in healthcare, mass production systems, better transport links, reflected in a correspondingly huge growth in world population. But innovation could be seen as having introduced rather than having reduced risk. The challenge for the future was to ensure that innovation could be used to reduce the risks associated with global issues such as climate change, water security, food and agriculture and damaging demographics. Innovation had been held back by badly framed discussions about risk. A stronger framework was needed for making policy choices which addressed this.

First, more precise terminology – and a common understanding of the principles underlying terms such as hazard, exposure, vulnerability, risk, uncertainty, threat and likelihood – would raise the quality of debate. For example, hazard was often confused with risk. A kitchen was full of hazards, but the risks were manageable and could be regarded as low. Sensible people reduced exposure to the hazards and took extra protection on areas of particular vulnerability, such as the presence of children.

Second, different components of risk need to be carefully distinguished, particularly between the risks associated with scientific and value judgements (which were often confused). On some areas of innovation, such as medicines and vaccines there was wide acceptance of benefits. Questions were more likely to arise over value issues relating to payment such as fairness and equity. In other areas of innovation science and value questions could confront each other more sharply, as in the case of the debate over genetically modified crops, where the objection that this involved humans ‘fiddling with nature’ in an unacceptable way (as opposed to actively promoting ‘natural selection’ over generations to produce effectively the same result) was essentially a value judgement. There were innovations where the judgement on risk and value could differ from person to person: someone who lived close to a high speed rail link which passed someone’s back door (creating disturbance) but which was not accessible to them, would judge the risk differently from someone who was not. Moreover, judgements on innovation using the same science could differ from country to country, depending on dominant value systems: nuclear power in France and Germany; embryology in Italy and the UK.

Innovation could also give rise to unintended consequences, as in the case of the rapid advance of information technology which had given rise to new risks, often raising value questions, relating
to cyber security, privacy and social networking. Finally there would always be new challenges where risks were still being escalated, as in the case of drone technology.

In all these areas of risk, specificity was essential. For example, in relation to genetically modified crops specificity was needed on: the organism in question; the gene in question; the purpose of the modification; the specific application (not the generic technology). It was also important to explore risks through different lenses. On climate change broadly the same percentage of the public agreed, variously, that they were concerned about climate change (74%), that the UK should reduce its use of fossil fuels (79%), that the UK was becoming too dependent on energy from different countries (82%), about having no alternatives in place when fossil fuels ran out (84%) and that in the next 10-20 years electricity and gas would be unaffordable to them (82%): all valid and interesting perspectives on different aspects of the same overall area of risk.

Third, there were implications for the way regulatory decisions were taken. A systems approach to economic regulation was required, to ensure, for example, that regulatory decisions on natural monopolies took account of resilience and sustainability and were not narrowly framed. Account also had to be taken of asymmetric incentives (regulators would usually get more criticism for a wrong decision than praise for a right one) and the need to guard against ‘encrusted’ regulation. The recent free vote on mitochondrial disease in Parliament which cleared the way for a new, innovative therapy to be introduced on a regulated basis was an exemplar of what could be achieved by a regulatory authority working carefully with an evolving technology in an area where science met values. The scientific evidence was thoroughly explored and carefully presented. Debate was stimulated and the values questions widely discussed. The framework for making the policy choice was sound; and the decision was properly made through the democratic process.

Sir Mark issued a call for action, with the need to stop confusing science and values (both of which were important in making policy decisions) at its heart. We needed: aligned national priorities for investment on resilience, infrastructure and innovation with an evidence and risk based approach; co-ordination across the UK to ensure a more coherent and structured approach to assessing the impact of risk in policy, regulation and crisis management; the right governance structures and incentives put in place for regulators and regulated industries; and a science-based European Union, where the approach to policy and decision making was rooted in robust scientific evidence.

PROFESSOR ANGELA McLEAN described a new tool that had been developed to support policy makers in taking evidence based decisions. The aim of the Oxford Martin School ‘restatement’ project, was to produce papers that could be taken by both sides of any argument as an accepted statement of what was currently known, in terms of the science base, about a particular topic: in effect a baseline for further discussion. The process for producing such a paper was exacting. A starting essay was intensively scrutinised for a day by a group of selected academic experts, who subjected the paper to forensic testing, challenge and amplification. Each paragraph in the paper was classified by the same panel in terms of the type of underlying evidence it described and the entire paper then subject to a detailed re-write. This draft was circulated to a much wider group of around 50 stakeholders for what was, in effect, an equivalent number of peer reviews. They critiqued the product and pointed out evidence that had been missed. A third and final version was then produced and agreed by the authors in the form of a paper for publication in a journal.

Access to such a ‘restatement’ of the evidence should enable policy makers to get a full picture of the current scientific evidence very quickly. There had certainly been a positive response from Whitehall to the initiative thus far and requests for further papers. One example of such a paper which had been well received – and following which there had been further, illuminating developments – was on the issue of whether seed coating with neonicotinoid insecticide negatively affected bees. The paper was published a year ago. The overall conclusion had been that there were some indications that neonicotinoids could affect performance, but no conclusive evidence as there were methodological problems with the two existing field studies and it was very difficult to interpret the results.

Since then a new piece of evidence had emerged from Sweden, based on strong methodology (pollinators exposed at a relevant range of doses, eight replicates, exposed and control bees, separate metrics for bumble, solitary and honey bees) which demonstrated that neonicotinoids reduced wild bee density, reduced solitary bee nesting, reduced bumblebee colony growth but found no significant response in honeybees. This entirely new piece of strong evidence underlined a key principle: that evidence can change and that policies need to change when new evidence merits that change. The restatement paper was now being revised accordingly.

However, there was a twist to the story which pointed to variable approaches to the presentation of summaries of scientific evidence. In April 2015 – and before the publication of new Swedish evidence - the European Academies Scientific Advisory Council had produced a paper which very forcefully argued the case against...
neonicotinoids in a way which was difficult to comprehend prior to the publication of the Swedish study. Even in the light of the new study some might find the phraseology of the EASAC summary surprisingly forceful given the underlying evidence base.

Experts could make a valuable contribution to policy making by offering clear pointers on what to look out for, drawing on the available evidence. She could not claim expertise in how to recognise policies based on value judgements – and would welcome debate on that. But she was clear that policies based on scientific judgement should be have a clear audit trail of the evidence taken into account, clear reference to the level of uncertainty associated with that evidence and a recognition of the fact that evidence could change and that policy should change when the new evidence merited it.

JOHN PULLINGER said that the starting point for judgements on values and science was that they were made by people. All of us, every day, made many judgements that were based on a range of biological instincts, emotions and values, not necessarily on the basis of rational science. Scientists were no exception – and needed to keep that sense of perspective.

However, scientists did have cards that they could play in order to get a hearing on decisions that mattered – in ways which non-scientists could recognise and respect. They were, for example, well placed to spot patterns, to play odds and to present numbers (which had a seductive power – both when used properly and when used badly). They were the ultimate sceptics; and the humility that should accompany such scepticism was an attractive characteristic to the public. They could support better policy making by providing trusted interventions.

His post of National Statistician had been created by Winston Churchill in 1941 – to establish a trusted starting point for arbitrating between competing claims for the best evidence base, rather than conceding to the loudest voice. There was now even more uncertainty in the policy sphere: almost all evidence was submitted by someone with an axe to grind and therefore subject to bias; there was often too much data to take in, which led to unscientific processes for filtering the evidence; the thirst for sensation tempted commentators to leap to false conclusions (highlighting random effects, or over emphasising extreme effects) which led to common misperceptions of, for example, rates of teenage pregnancy, immigration, benefit fraud and so on. The need for trusted intermediaries had never been higher.

He had four prescriptions for improving the basis for scientific judgements in policy decisions. First, more investment was needed in the science base itself to support better evidence. Second, more support was needed for scientists who were in a position to directly influence decisions, in the form of published codes of conduct and policy of frameworks that both empowered and enabled the scientists themselves to have a voice and constrained policy makers, including Ministers and politicians, to listen to them and demonstrated that they had done so. Third, scientists needed to spend more time with decision makers, not least to give them an insight into how messy and difficult such decisions could be and into how scientists could adjust what they did to support the process better. Finally, education was vital. This was not just an issue of elevating the place of maths and science in school and undergraduate curricula, important as that was. Policy and decision makers – MPs, civil servants, special advisers, Ministers – all surely had a duty to ensure that they were properly trained in the principles of scientific, evidence-based policy making.

In the discussion there was consensus on the vital role of central government and other responsible agencies in taking decisions on complex problems where science and values met. Such decisions required resolution through the democratic process, not least in terms of mediating and weighing different propositions on values. Such decisions were often taken under considerable pressure of time, under pressures – frequently conflicting – from vested interests, under political constraints based on voter expectations, and in circumstances where the scientific evidence was genuinely uncertain. Evidence coming to Ministers – whether on science or on values – was rarely monolithic. Often the difficulty was how much weight to give to minority opinions on both sides of the equation.

These pressures needed to be understood by the scientific community. There was often a cacophony of voices on the science base. A vital job for scientists in Whitehall was to integrate and take the voices, which was why papers such as the ‘restatements’ described by Professor Maclean were so valuable. The increasing emphasis on transparency was not a magic bullet on its own. As transparency increased to the need for informed scientific analysis to turn raw data into evidence based, useable and – crucially – trustworthy knowledge was vital.

There was clear evidence that Ministers did take scientific advice seriously; that the voices of Chief Scientific Advisers were heard; and that protocols, guidelines on the use of data and evidence were all having an impact. The UK was well served in that respect. Encouragingly, too, a stronger horizon scanning function was being developed in the Cabinet Office to identify emerging technologies and in order to ensure that regulatory functions were adapted and aligned to changes in technology and in the use of evidence base. The UK was also genuinely influential in the international sphere, with a real contribution to make on issues such as disaster relief, where...
some of the issues that Sir Mark had highlighted - such as the need for adequate terminology and understanding of vulnerability and for clearer, better definitions of affected groups - were particularly pressing.

That did not mean that all Governmental decisions were always grounded in evidence, or reviewed and changed in the light of new evidence. The debate over badger culling was cited as an example. Other issues were genuinely wicked – the risk of transfer of BSE to humans for example; and in such circumstances, where there was genuine scientific uncertainty scientists should resist as far as possible the pressure to make estimates – which might be cited as having a scientific base – which could only have a speculative element, though this could in practice be extremely difficult. For scientists engaged in providing advice at a political level, there were lessons to be learned at both ends of the spectrum. On the one hand, however right you feel you are, remember and understand the context in which your advice is being given. On the other hand, if you don’t know the answer to the question you are put, don’t give one.

A number of contributors focussed on the interplay between science and values. Too often arguments that were really grounded in judgements about values were disguised as scientific arguments, or used evidence selectively to justify a values based proposition. It was galling, for example, to hear a bishop arguing against the proposed therapy for mitochondrial disease on the grounds that the science was not clear enough - when he might be cited as having a scientific base – which could only have a speculative element, though this could in practice be extremely difficult. For scientists engaged in providing advice at a political level, there were lessons to be learned at both ends of the spectrum. On the one hand, however right you feel you are, remember and understand the context in which your advice is being given. On the other hand, if you don’t know the answer to the question you are put, don’t give one.

On the other hand a number of contributors stressed the legitimacy of judgements related to values in the decision making process. The social sciences had an increasingly significant role to play in providing and analysing evidence based values. One example of a major global risk was population control, where values questions were crucial to the debate: the value we place in the future generations, for instance. The UK was a plural society; and decision making needed to take account of evidence relating to values – not least, for example, in areas as varied as radicalisation of young people and consumerism, where it could be argued that there was a crisis of values. As had been suggested, there was a science to decision making and value judgements played their part in that. The key was, as had been said, to discourage decisions based on dogma which took no account of the evidence and to persuade those arguing from a values base not to believe what was often bad science.

A related issue was the presentation of opposing scientific viewpoints, particularly in the media, in the interests of ‘balance’, when the consensus of scientific was clearly weighted to one side of the argument. It was a failure of impartiality, not a requirement of it, to give equal airtime to opposing views if that did not reflect the true balance of scientific opinion.

It was, therefore, a legitimate, indeed vital, role for scientists engaged in the policy and regulatory process to call attention to the misuse and misrepresentation of evidence. Good evidence reviews made it easier for people to make such arguments; and the scientific community needed to present its evidence, including mere analysis, clearly and well. That could disarm sensationalist reporting: ‘useful, but boring’ was a good and welcome response from a journalist, presented with well-judged evidence. Moreover, because there were, in practice insidious incentives on researchers to over claim in relation to their findings, it was important to praise and celebrate those who did not.

Examples were cited of policy issues, such as housing, where evidence could be difficult to find, or was highly contestable. There were often sources of data that could inform such debates, based on assumptions that could, of course, be challenged from different sides of an argument. The key was to make such data more accessible. But this also linked to another key theme of the discussion: the importance of education and training in developing a better informed public. Schools and universities were vital to this. But other innovative methods – such as consensus conferences - could also be used to improve the understanding of risk and to guide members of the public through difficult choices with expert support.

A smarter cadre of customers and users of scientific data – and associated systems engineering – within central government, NGOs and in devolved authorities (such as the big cities) would also lead to better decision making across a range of governmental functions from regulation to procurement. It was encouraging in this respect that the fast stream entry for scientists into the Civil Service had been revived. Equally many policy decisions were taken when the science was genuinely uncertain and the difficulty was getting the evidence. Research budgets and further investment in the science base therefore mattered.

Nor was the need for better education all on one side of the equation. There was a risk that scientists were educated too narrowly. There should, for example, be more training for scientists from an early stage on ethics and the philosophy of science. More science students and researchers should also be exposed to the policy process; and there were already welcome examples of internships and secondments of this kind which were proving beneficial to both sides.

In the concluding remarks, it was agreed that the need for a framework for decision making on key issues of risk, as proposed by Sir Mark Walport
was pressing. It had to be re-inforced by deeper understanding of and a commitment to science and the use of evidence at all levels of society. We could not keep re-solving issues which could be fixed by improved decision making. But this would also require mutual respect between scientists and those they were advising. If the scientists did not start from that position they would be less effective. But there had to be mutuality.

As the Chairman said, in bringing the session to a close, science and values were both vital in the governmental decision making process.

But there was an obligation on all sides taking part in the debate over any issue requiring a policy decision to be transparent and accountable for the evidence and arguments they brought to the table.

Sir Hugh Taylor KCB