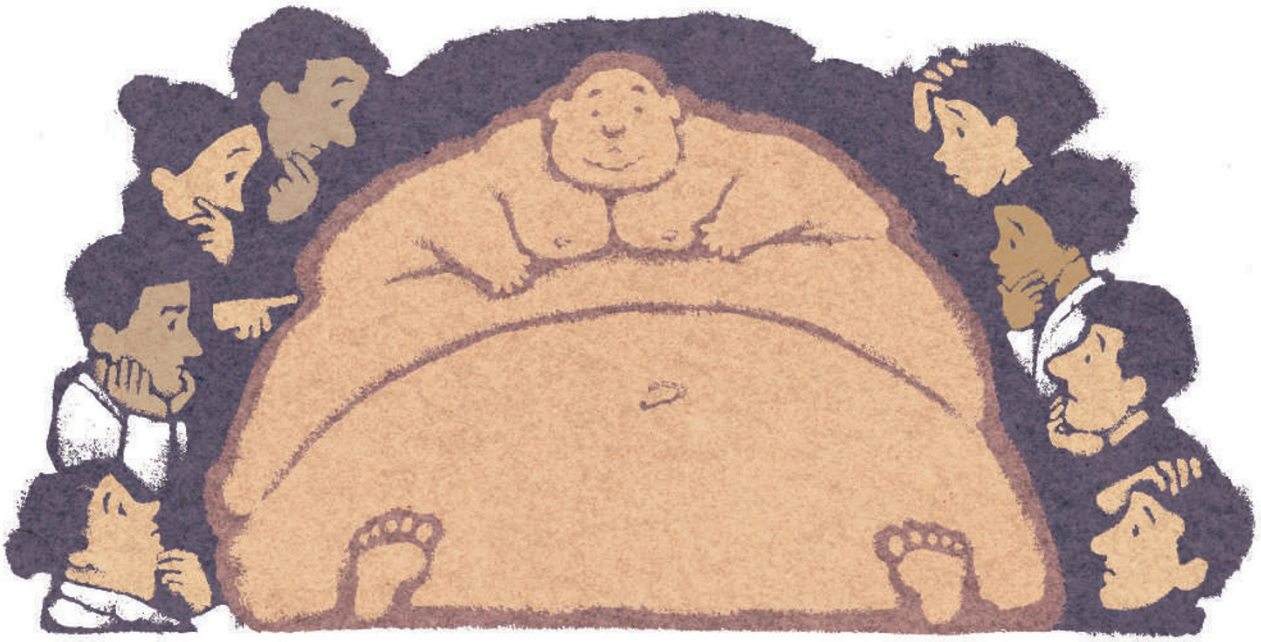
Big lessons for a healthy future

This week's report on obesity policy in the United Kingdom highlights three challenges for scientists and politicians working together.



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David A. King and Sandy M. Thomas

Science today is both a driver of technological innovation and an important resource for shaping public policy. In the United Kingdom, growing recognition of how science can contribute to health, wellbeing and the economy, has led to the appointment of six departmental chief scientific advisers in seven years, and improvements in the way that government departments use scientific analysis in policy-making. Countries such as Canada, France and Germany have taken similar steps.

Problems remain, though, in the relationship between science and governance. These are illustrated by the latest report from the UK government's new Foresight programme, which was established by David King (www.foresight.gov.uk). Published this week, the results from the two-year study of obesity improve our understanding of the causes of the worldwide epidemic. They also highlight three key areas of potential conflict between the worlds of science and policy-making.

First, individual government departments struggle with multi-faceted problems; second, political lifetimes are short compared with interventions that need several decades to have an impact; and third, problems bedevilled by uncertainty can be marginalized by policy-makers eager for certainty. Our experiences with the project suggest that strategic cross-department policy tools are needed to improve coordination between scientists and policy-makers.

The Foresight programme was born out of the success of the scientific contribution to tackling the country's 2001 foot-and-mouth epidemic. To provide long-term strategic advice, Foresight projects draw together research to study a range of possible futures with different social, economic and political contexts. They are designed to help policy-makers anticipate risks and opportunities, test possible interventions and foresee possible outcomes.

"Ministers want straight-forward solutions, but our analysis shows that no one policy will fix the obesity problem."

One of the most important findings of the Foresight obesity project is that individuals have much less choice in the matter of their weight than we may often assume. Our analysis shows that the current epidemic of obesity does not arise from individual over-indulgence or laziness. Instead, human biology has become out of step with the structure of society.

We evolved to respond to hunger by eating; we are only weakly able to notice, and stop when we have had enough. This was an effective survival strategy in prehistoric times when food was scarce. Now high-energy, cheap foods abound, as do labour-saving devices, motorized transport, sedentary work and the association of eating with indulgence. These conspire to create an 'obesogenic' environment. The increasing prevalence of obesity is a consequence of modern life.

To stay trim, most people would need to pay an overwhelming amount of attention to overriding their instincts, habits, conflicting aspirations, upbringing, peers and the environmental cues in their day-to-day lives. Hence fewer and fewer people manage it. Our study suggests that by 2050, in the United Kingdom about 60% of men, 50% of women and 25% of children will be obese. The associated chronic health problems are projected to cost society an additional £45.5 billion (US$93 million) a year.

Politicians and the public would like to avoid this alarming scenario. The causes of obesity are relatively well understood — the challenge lies in how to develop effective, evidence-based policy interventions.

Many hands make light work

The first problem is that ministers want straight-forward solutions. Our analysis shows that no one policy will fix the obesity problem. We modelled how physiological, technological, economic and cultural factors fit together and how a range of changes would affect this complex system. Lone interventions such as a new appetite-suppressing drug could well worsen the matter.

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Any response has to be multifaceted, or it will almost certainly fail. We need policies aimed at different life stages, in particular early on to establish appropriate child growth, healthy eating and activity habits. We also need to increase everyday activity levels through the design of the built environment and transport systems, and to work out how to shift consumer purchasing patterns to favour healthy options. The promise of community-level interventions is hinted at by the Fleurbaix-Laventie City Health study in France.

Dealing with obesity will require intense cooperation across many government departments. The UK government, like many others, operates through a strongly vertical management structure of separate ministries, with few mechanisms or incentives for horizontal collaboration. For a problem such as obesity, this can result in a 'policy cacophony' of conflicting approaches.

To reduce such problems, the Foresight project involved, from the start, ministers from the Departments of Health, Culture, Media and Sport, and Children, Schools and Families, alongside food retailers, local government and sports associations, and other stakeholders who will be responsible for implementing the resulting policy initiatives.

In managing complex issues, structured comprehensive collaboration such as this must become the norm. A useful example is the UK Office of Climate Change, which involves six government departments. It was established because global warming was high on the agenda of the prime minister, the treasury and parliament, and there was wide recognition of the need for collaboration across normal departmental boundaries.

Indeed there are strong parallels between climate change and obesity. Companies in the energy and food sectors generally encourage people to consume more. In both domains, failure to agree and act now will lead to serious adverse consequences in just a few decades — because reversal of the trends may cease to be an option in both cases. And, as for climate change, communication is central to changing the obesity landscape. Our 'system map' for the different drivers of obesity is so intricate that the clearest possible explanations are needed for policy-makers and society. For scientific advice to underpin government action, communications skills must be a much bigger part of scientific training and culture.

The long view

The second problem for science policy-making is timescale. Brief political lifetimes mean policy-makers attach great value to rapid results. But in the case of obesity, solutions will need to be implemented over several decades to have any impact.

For such problems, it might be necessary to change the way that policy is made. For instance, the Ministry of Defence has traditionally not been subjected to the shorter-term goals given to other departments, since it is widely acknowledged that national security transcends day-to-day politics. The Committee on Climate Change is another useful example, as proposed in the United Kingdom's forthcoming climate-change bill. The committee will operate at arms length from the government, akin to the Bank of England, with access to levers that can drive policy over decades, with considerably more power and responsibility to parliament than a conventional government task force.

The third friction illustrated by our obesity work concerns attitudes to uncertainty. Ministers want clear messages but scientists are uncomfortable speculating. And analysis of complex problems often reveals high levels of uncertainty. Unfortunately, nobody yet knows exactly which policy levers will slim the nation. Most research into obesity has focused on its causes, rather than on the effectiveness of potential interventions. More cross-disciplinary research over long time periods is needed.

The Foresight project was designed to help both scientists and policy-makers embrace this uncertainty. Through a combination of systems modelling and scenarios work, its outputs can help to devise an initial strategy. This strategy will then need to be monitored over different timescales, and modified as it becomes clearer which actions are the most effective.

This approach, which we term 'practice-based evidence', is revolutionary. It means that scientists can no longer simply hand over the results of their research and leave the rest to politicians. They must be fully engaged in the assessment and refocusing of strategies. They must also understand the constraints on politicians, for instance the importance that any course of action is acceptable to the public. Politicians should encourage scientists to be involved in ongoing policy processes, and accept that one can learn even from initiatives that fail.

Mutual understanding, such as that fostered by the new Foresight programme, is the foundation of all the best relationships. Both sides learn to appreciate their respective abilities and constraints. For instance, to be effective advisers rather than simply commentators, scientists have to take more responsibility for the wider implications of their research. To make good use of that advice, politicians have to realize that although science will not necessarily give the answers they want, it can give the best available analysis for moving forward. ■

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For more essays and information see http://nature.com/nature/focus/scipol/index.html.

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A timely harvest

The public should be consulted on contentious research and development early enough for their opinions to influence the course of science and policy-making.

Pierre-Benoit Joly and Arie Rip

Public engagement in emerging science and technology is thriving, particularly in the United Kingdom. Recent initiatives such as 'Nanodialogues', organized by the think-tank Demos, suggest that citizen juries, dialogue exercises and interactive public understanding projects can be fruitful for scientists and members of the public. Over two years, the Nanodialogues series allowed members of the public to join scientists in discussions on regulation, research funding, development and corporate innovation of nanotechnologies. Such enterprises may foster mutual understanding, but they can struggle to make a difference to research or to policy-making.

Governments and research institutions generally fail to respond to the outcomes of public engagement exercises, perhaps because the outcomes are often too late and too vague on concrete strategies to move forward. We've learnt that it is better to engage the public 'midstream', at a point in the research process when it is possible to incorporate their opinions into research orientation and policy-making.

The French National Institute of Agronomic Research (INRA) used such an approach to focus on research into and field trials of genetically modified vines. In 2001, INRA had to decide whether to run field trials of a genetically modified vine that is potentially resistant to a disease-causing virus. INRA's research director for plant sciences, Guy Riba, voiced the opinion of most researchers: "Surely scientists have a responsibility to carry out these experiments with a view to the future, even in the face of current public opposition?"

INRA met strong opposition to the trials because of the cultural significance of wine in France. A group of wine producers, including some prestigious châteaux, had signed a petition in June 2000 calling for a moratorium on the use of genetic modification techniques in wine production, and joined forces to create the non-governmental organization Terre et Vin du Monde (Land and Wine of the World).

In response, INRA asked a group of social scientists who specialize in science and technology studies to organize a public consultation, in which we took leading roles. Our goal was to produce a public report to be taken into account in decision-making at INRA.

Our working group comprised 14 people, including members of the public, wine growers and researchers. It had seven days of intensive discussions over a six-month period in 2002. The set of recommendations it produced was made freely available on the web. The INRA directorate prepared a public response explaining the decisions it intended to make and how these would accommodate the group's recommendations.

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One outcome of the discussions was the creation of a local steering committee to follow up and give feedback on the field experiments taking place in Colmar, a town in the Alsace region of France. This committee has since grown into a forum for debate on various research options to fight vine viruses.

The experiment was highly productive. It yielded some unexpected recommendations that could be worked into the decision-making process. Some of the participants opposed the field trial at all costs, but most supported it under strict conditions, including: that INRA guaranteed that the trials would be used only for research, not for commercial purposes; that a local committee would be in charge of monitoring the experiment; and that INRA would commit to exploring alternative ways to fight viruses. Appropriately, it was not a smooth process, either during deliberation within the group, or in implementing the agreement.

Researchers at INRA criticized the public consultation process for its power to reduce the freedom of research. Non-governmental organizations claimed that INRA was manipulating public opinion through the exercise. These tensions are an unavoidable part of the process.

Three important lessons emerged from the exercise. First, midstream engagement is not a recipe for wide social agreement and acceptance. Rather, it improves the robustness of decisions by taking into account the diversity of world views and interests. Second, it stimulates institutional learning. Third, the process can produce research and development options not previously considered. This is of particular value if directors of public research are truly committed to generating beneficial sociotechnical innovation.

Public consultations in science and technology should be undertaken at a point early enough in the development process when it is still feasible to change course. The nanotechnology world often refers to 'the lessons to be learned from genetic modification' — the main one is timely, considered public engagement. ■

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For more essays and information see http://nature.com/nature/focus/scipol/index.html.

Correction
In the Essay 'Big lessons for a healthy future' (*Nature* **449,** 791–792; 2007) the conversion of £45.5 billion should have read US$93 billion, not million.

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