bility of an underlying depression or dementia or an organic cause such as a brain tumour. Psychometric assessment may help if a dementing process is suspected.

Admission to hospital, rather than for special investigations, is not usually necessary. Many patients improve as their environmental stresses are avoided, only to relapse on discharge. Outpatient, or occasionally day patient, status is usually more appropriate. Liaison with the primary care team is essential to maintain a treatment plan and to prevent the occasional patient misusing benzodiazepines or other sedatives. One strategy that is being adopted increasingly is for the psychiatrist to have sessions in a primary care practice, treating patients referred from within that practice suffering from generalised anxiety disorder and panic disorder.

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Research Profile

Developing foresight: an interview with Sir Dai Rees

Richard Smith

MRC/STRAT MASTORIS

One of the centrepieces of the British government's strategy for science is a process called technology foresight. Sir Dai Rees, chief executive of the MRC, is a member of the steering group charged with developing foresight. Richard Smith asked him about the subject.

RS: What is technology foresight?

DR: It's an attempt to consider possible future relations between science and technology and the needs of society and industry. So, for example, in health we know that we will have an aging population and we fear the development of more microorganisms resistant to antibiotics. These are challenges both for health care services and for industry. We look at issues like that alongside information on how science is likely to develop and see whether science might help us with the problems. We can then plan our research activities to make it more likely that we will get the outcomes we want.

The government is interested because this may be a way of improving the industrial competitiveness of Britain.

RS: Where did the idea come from?

DR: It has a Japanese origin. The whole world looks at the Japanese economic miracle with envy and asks how they did it. There are many examples of them seeing before others what to do with science—for example, with liquid crystal displays, which were discovered in Britain. And technology foresight seems to have been

one of the things that allowed the Japanese to be so prescient and forward looking.

The Dutch and the Germans followed, but in the Thatcher years Britain was not interested. She believed that it was no job of government to try to pick winners in science and technology. While we agree we should not pick winners, we do now believe that it makes sense for those who follow social and market trends to speak to those who look to the future of science and technology.

"Technology foresight seems to have been one of the things that allowed the Japanese to be so prescient and forward looking."

This is yet another method—along with much else like interdisciplinary research centres and programmes linking science and industry—to try to make sure that we implement and profit from our discoveries in science.

Foresight is, I think, the most comprehensive and promising method that we've yet developed to tackle this problem. What we are not yet sure about is whether the value will lie purely in scientists and engineers developing networks with others to look to the future and to foster a common understanding and

"Foresight is, I think, the most comprehensive and promising method that we've developed to... make sure that we implement and profit from our discoveries in science."

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Richard Smith, editor

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"Foresight is . . . not holy writ. You can't simply apply a method and give up thinking."

purpose or whether the information will be used to make choices on where government research money should be spent. That is the controversial area.

RS: Is foresight entirely new to Britain?

DR: No. It has happened in some places for a long time. We used to do it 20 years ago when I worked for Unilever. I remember somebody then saying that there would be a large market for cut flowers. I thought that this was ridiculous, but now I hear that Marks and Spencer is doubling its sales of cut flowers every year. I also remember people predicting large sales of bottled water, which again I thought was ridiculous.

Large industries—like ocean liners—have a problem changing direction, so they have to try and look to the future. For instance, IBM's failure to see personal computers taking over from mainframe computers is one of the things making life so difficult for them now.

How will foresight work?

RS: How will foresight work now the government is becoming involved?

DR: After the proposal was announced in the science white paper last autumn, government ministers and the chief scientific adviser held a series of consultations on how the exercise should work. Some of these meetings were controversial, and the Confederation of British Industry said, for instance, that the government had it wrong because it was going to concentrate too much on what the scientists had to say about the future of science. The industrialists said that it was better to begin by looking at social trends and what people were going to need—and then go to the scientists. They got very angry at the idea that academics in ivory towers alone might be setting the future.

"The aim is to . . . get as much critical and imaginative input as possible."

RS: So were the proposals modified?

DR: Yes. The consultation exercise also identified people who had a lot to offer to the foresight exercise. A steering group was then set up, which includes me and one other head of a research council together with people from the universities, industry, and government. This group is developing the plan on how to proceed, and we have developed 15 sectors on which we want to concentrate (see box).

A panel has been set up for each sector, and we begin with a picture of the future. I am an assessor on the panel for health and the life sciences, which is chaired by Professor Mark Ferguson of Manchester University.

RS: How were the members of the panels selected?

DR: By conomination. Scientists and industrialists were asked to nominate people who might be on the panel, and we then selected the people whose names cropped up a lot. And we made sure that we reached a balance among people who understood markets, the right areas of science, the human angle, and, in our case, the pharmaceutical industry, biotechnology, hospitals, primary care, and so on. You can see how the list grows quickly.

RS: How many will you have?

DR: Twenty one.

RS: That's a lot for a free thinking group.

DR: Yes, but they will break down into smaller groups and involve other people.

RS: But isn't the worry that if you break down into ever

smaller groups you think in the way you've always thought?

DR: Yes, indeed. But we have to make sure that that doesn't happen. We also have to make sure that we watch links between the major areas: for instance, there's another group on food and drink, which clearly overlaps with health.

RS: What methodology will you use then?

DR: We are using facilitators who are skilled in encouraging people to think in this way and a technical secretary to prepare background papers and structure the meetings. The panel will then produce ideas that will be put in a questionnaire to a large group of people out in the scientific, industrial, and health community and which will be discussed in a number of workshops.

"Increasingly, to enjoy the fruits of research we have to go through industry."

From foresight to priorities

RS: What happens when the ideas come back?

DR: Reports will be written and priorities set. We will also go through a process called benchmarking, whereby we make comparisons between Britain and other countries to decide what our strengths are and what we should concentrate on.

RS: And that information will be used to make choices on which areas of science to support?

DR: This is what is controversial, but I think that the answer is probably yes.

RS: So the government might use this information to decide how much money you—the MRC—get, and you will the use it to make allocations within medical research.

DR: Yes, although we've already made some choices—for example, to support the human genome project. We exist to deliver benefits in terms of health, so we've already increased our effort in health services research. So in a "behind closed doors" sort of way we've already been trying to decide what's important. This exercise should give us a better view, and we would then use the information. But it's not holy writ. You can't simply apply a method and give up thinking.

RS: What about other players? How will they use the output from the exercise?

DR: Of course, we hope industry will see considerable benefits in taking account of the insights this exercise produces. The intention is also to identify areas where government needs to be more active—for example, in setting or lifting regulatory frameworks or removing hurdles to exploitation.

RS: How public will this exercise be?

DR: The aim is to involve as many people as possible and get as much critical and imaginative input as possible.

RS: How many of the people on your panel are medically qualified?

DR: About a quarter.

RS: And will there be ordinary people, patients?

DR: There could be, but we have other mechanisms—like the Human Nutrition Forum, which involves the Consumers' Association—where we get that sort of input. The panels will be consulting and talking to various groups, and, as I said, there will be a much wider consultation process bringing in a whole range of

Sector panels

Agriculture, natural resources, and environment
Manufacturing, production, and business processes
Defence and aerospace
Materials
Chemicals
Construction
Financial services
Food and drink
Health and life sciences
Energy
Transport
Communications
Leisure, education
Information technology and electronics
Retail and distribution

Technology foresight panel on health and life sciences

M Ferguson (chairman), Manchester University
B Ross (vice chairman), Glaxo Group Research
S Brenner FRS, scientist
A Dixon, Biorad Microscience Ltd
P Dunnill, University College London
C Evans, Chiroscience Group plc
J Fox, Imperial Cancer Research Fund
J Gabbay, Institute of Public Health Medicine, Wessex
J Gordon, British Bio-technology Ltd
P Greenaway, Department of Health
H Hale, Apax Partners and Co

S Holgate, University of Southampton
S Iverson, University of Oxford
K Luker, University of Liverpool
S Macintyre, MRC Medical Sociology Unit, Glasgow
A Marchington, Oxford Molecular Ltd
A May, Birkbeck College, London
P Nolan, Department of Trade and Industry
A Slabas, University of Durham
D U'Pritchard, Zeneca Pharmaceuticals
A Markham, University of Leeds

interests and new points of view. The government is also keen that there should be regional activities.

RS: So even before you send out the questionnaire you will consult people beyond the panel?

DR: Yes. There will be a cascade.

Reactions to foresight

RS: How do the troops of medical research feel about this?

DR: I think that they think they can afford to be bystanders.

RS: Are they wrong?

DR: Yes.

RS: I find myself wondering what Harold Himsworth, a former secretary of the MRC, would make of all this—the talk, for instance, of facilitators, benchmarking, and the search for markets?

DR: This is a national thing, and it's not just meant to serve the MRC. Increasingly, to enjoy the fruits of research we have to go through industry. For instance, if we come up with a vaccine for AIDS and no company takes it up then we might as well not have done the research. So I don't think that Harold Himsworth or anybody else should be unhappy with that.

RS: The foresight exercise is one of the centrepieces of the government's strategy for science. How is that

strategy beginning to affect the MRC? Is it changing how you think and work?

DR: The strategy is being implemented in two ways—through us taking the strategy on board and through various central initiatives. Obviously we have already begun to think about the most effective, efficient, and productive ways to do things ourselves, and we have certainly started in the bottom up mode.

So we have begun to change the way that we fund universities to take more account of career progression. We are revamping our fellowships so that they are better matched to the opportunities for doing research, particularly for clinicians and those returning to science. I've had several meetings with vice chancellors to explore ways in which our funds might be used to train and promote postdoctoral students. We need to look after this diverse group, and at the exit routes—whether people are going to become academics, industrialists, or schoolteachers.

So we are beginning to get a good portfolio of developments. Another issue is technology transfer. We at the MRC are good at that not only because we take it seriously but also because our units encompass a range of biomedical and clinical sciences and contain 4000 people, yet we work with a fairly narrow range of industries—pharmaceuticals and food. So marriage broking is feasible, whereas a typical university has a vast range of subjects and a huge range of industries. How can they put them together?

RS: Through foresight perhaps?

DR: That certainly should help forge partnerships.

A MEMORABLE PATIENT

Dangers of a daily dose

It was ankle swelling on a long haul flight that concerned him. He awoke as the aeroplane descended only to find that his shoes no longer fitted. Sure enough, he was in heart failure: the echocardiogram confirmed the reduced ejection fraction and the electrocardiogram suggested ischaemia—not such an unusual story perhaps? He was a charming and intelligent man. He was not confused, yet although apologetic he was reluctant to accept drug treatment and made it clear that he would refuse surgery, should it be offered.

He was 87, and up until this point no one had wondered why a man of such years was jetting around the world. Subconsciously he had been labelled an octogenarian. Of course, we all know how old people live their lives—he was probably visiting his grandchildren in Australia. Wrong—he was travelling on business, for he was a professional cheese taster and his experience and skill were both rare and sought after; he regularly travelled to distant parts of the world.

Unfortunately, this most desirable of jobs carried with it an occupational hazard possibly as harmful—at least for him—as asbestos or coal dust. A dietitian confirmed that he was consuming at least twice the average daily sodium requirement. Even allowing for excess

loss in the many hot climates he visited, this was a bit steep. We had a chat, and at 87 he decided to hang up his cheese knife. His heart failure improved but his life was now a quieter one and, whichever way you looked at it, his ankles would never swell again as the runway lights beckoned.

He left me musing on the value of the clinical history, the relevance of a patient's occupation, and the use of treatment that does not include drugs or surgery. More importantly at a time when agist myopia abounded, his case was a salutary reminder that everyone is an individual and should be treated as such.

The way he spent 22 years beyond the usual retirement age of 65 still strikes me as a superb model for successful aging, although one question remains: how do you get a job as a cheese taster?—PETER FLETCHER is a consultant physician in Cheltenham

An expert tells us that 100 g of most cheeses contains about 26 mmol of sodium, ranging from 8 mmol in Danish Blue to 73 mmol in Roquefort. Though the minimum recommended intake of sodium is 25 mmol a day, an average daily diet contains of the order of 130 mmol. Half a pound of cheese a day would contribute about 60 mmol. Anyway, it's a good story.—Ed.