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World leader in research

The UK is a world leader in science and research, according to the *International Comparative Performance of the UK Research Base 2011* report, compiled by Elsevier and published by the Department for Business, Innovation and Skills. Among the report's findings are:

- The UK is more efficient in terms of output per researcher per unit of research spend;
- The UK research base is attracting productive and internationally mobile researchers to work in the UK;
- The ability of UK researchers to move internationally and collaborate with non-UK researchers is a key driver of research efficiency;
- The UK's citation impact shows the UK performs better than the world average in all subject fields.

Professor Rick Ryland, Chair of Research Councils UK said: "The report confirms the UK as a world-leading research nation that produces excellent research of outstanding quality in most domains."

www.bis.gov.uk/policies/science/science-innovation-analysis/uk-research-base

FE strategy launched

Further reforms to Further Education will see businesses helping to develop the courses that best meet their needs for growth, increased education exports and promotion of excellence in teaching according to Skills Minister John Hayes. He was speaking at the publication of the Government's new strategy for the sector on 1 December.

Measures outlined in *New Challenges, New Chances* will give employers the power to support the design and delivery of new courses, helping create greater confidence in qualifications and equip learners with the skills they need.

It will also actively support the sector, promoting excellence in teaching and developing a package of education products aimed at global opportunities in emerging economies.

John Hayes confirmed £3.8 billion investment in the sector in 2012-13 and indicative funding for the following year. Ministers plan to give colleges more freedom from central Government control, and more responsibility for providing high quality, flexible courses for their local areas.

www.bis.gov.uk/assets/biscore/further-education-skills/docs/f/11-1380-further-education-skills-system-reform-plan.pdf

£1 million prize for engineering announced

A new £1 million prize for excellence in engineering has been launched. The biennial award, named the Queen Elizabeth Prize for Engineering, will be given to an individual or team of up to three people, of any nationality, directly responsible for advancing the application of engineering knowledge.

As well as recognising and celebrating the best, the Prize will provide an unparalleled opportunity to demonstrate how engineers and engineering are making a real difference across the world.

The Prize is the result of a growing realisation in the worlds of business, engineering and policy of the need for a pioneering initiative to focus attention on engineering worldwide. A number of major engineering companies have donated to an endowment fund, which is being managed by an independent

charitable trust, the Queen Elizabeth Prize for Engineering Foundation, chaired by Lord Browne of Madingley FEng FRS. The day-to-day running of the Prize will be handled by the Royal Academy of Engineering. Ms Anji Hunter has been appointed Director of the Prize.

As well as the search for the winner, the Prize will provide a high-profile, global communications platform to explore the breadth, creativity and impact of engineering of all kinds around the world.

Speaking at the launch event, Prime Minister David Cameron said: "I am delighted that the Queen has put her name to this prestigious prize, which I hope will carry the same stature as the Nobel Prizes and I want to thank the Royal Academy of Engineering and the prize sponsors for making this happen."

Protecting IP rights

The Government has confirmed that a new small claims service will be introduced at the Patents County Court (PCC), helping small and medium sized businesses protect their copyright, trademarks and designs.

Small firms are often put off enforcing their Intellectual Property (IP) rights by high costs. The new process will limit fixed costs and allow damages of up to £5,000 per case. Figures produced by the Intellectual Property Office (IPO) estimate that around 150 firms will benefit from the service every year, providing an annual boost to UK business of £350,000.

The recommendation for a small claims service was made in the Hargreaves Review of Intellectual Property and

Growth. Justice Minister Jonathan Djanogly said: "It is clearly much better for the economy if businesses are spending their time and money on trading and growth, rather than on unnecessarily complicated legal processes. That is why we are modernising the justice system in order to provide simpler, quicker and more cost efficient ways to resolve disputes."

Evidence presented to the recent Hargreaves Review, *Digital Opportunity: A Review of Intellectual Property and Growth*, indicated that around one in six (17 per cent) of small and medium sized businesses had given up attempting to enforce their rights due to high court costs. www.ipo.gov.uk

Migration as a response to climate change

A new international report, published by Foresight, has revealed that the major challenges associated with migration and environmental change have been underestimated. It concludes that by focusing solely on those that might leave vulnerable areas, those that will be 'trapped' – and those that will actually move towards danger – have been overlooked.

The report also shows that migration can have a transformative role in helping communities adapt to hazardous conditions. This is a critical finding for policy makers working to avert costly humanitarian disasters in the future.

The 'Migration and Global Environmental Change' project examined how profound changes in environmental conditions such as flooding, drought and

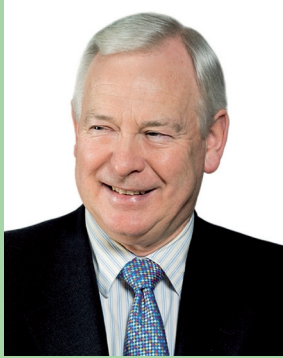
rising sea levels will influence and interact with patterns of global human migration over the next 50 years. These patterns of human movement, 75 per cent of which is internal, will present major challenges as well as potential opportunities for communities and policy makers at both a national and international level.

Professor Sir John Beddington, the Government's Chief Scientific Adviser and Head of the Foresight programme, said: "Environmental change threatens to have a profound impact on communities around the world – particularly in low income countries. The evidence is clear that under some circumstances migration, particularly in low income countries, can transform a community's ability to cope with environmental change."

www.bis.gov.uk/foresight/migration

An engineering renaissance for economic revival

John Parker



Sir John Parker FEng is President of the Royal Academy of Engineering. He is also Chairman of National Grid plc and Chairman of Anglo American plc. Sir John is a Visiting Fellow of the University of Oxford, a member of the General Committee of Lloyds Register of Shipping and Vice President of The Royal Navy and Marines Charity as well as a governor of the Royal National Lifeboat Institution. He is the recipient of honorary doctorates from a number of universities in the UK and Ireland.

The engineering profession is living through something of a renaissance in the UK. After years of commentators harking back to the Golden Age of the great Victorian engineers, suddenly contemporary engineering is raising its profile. Engineers are starting to be properly recognised for their essential contribution to society.

The Government is focusing with renewed vigour on engineering and science because they are critical both to rebalancing the economy and creating an infrastructure fit for the future. This is to be welcomed, along with the initiative which matches Ministers to companies that contribute significantly to our export effort.

Between them the engineering and manufacturing sectors generate 25 per cent of UK turnover. Britain is still amongst the world's largest manufacturers, renowned for high-value-added industries such as aerospace, life sciences and creative design. The future lies in an innovation economy, based on new industries such as green energy, nanotechnology and plastic electronics, in which many of the key advances have been made in Britain.

Skills at the centre

The Government's growth strategy places skills at the centre of economic recovery. It also emphasises the need for a rebalanced economy, but this needs people with the right technology and engineering skills in sufficient numbers. However, there is a real danger that ongoing underfunding could lead to universities scaling down or even closing their engineering courses, leaving a serious economic gap. The Academy believes a lack of suitable proposals in the recent Higher Education White Paper, compounded by a 72 per cent cut in teaching capital funding and 58 per cent cut in research capital funding, could be very damaging at this crucial time.

The Royal Academy of Engineering's vision is to bring engineering into the heartland of society, and we are working in partnership with the engineering Institutions, the Engineering Council and EngineeringUK to achieve this. We also want to work closely with The Royal Society to promote the essential linkages between science and engineering.

Engineering is central to innovation

and enterprise across a great range of the sectors capable of driving economic growth. We must build the capacity of UK entrepreneurs and UK enterprises to create innovative products and services, to increase national wealth and employment and to rebalance and strengthen the economy. The creative focus of many companies, from pharmaceuticals to aerospace, is invariably centred on the art and science of engineering.

Our aim, as a community, is to promote engineering and the role of the Professional Engineer vigorously in public life. We must also foster better education and skills so that the needs of the country are met and the aspirations of our young people are satisfied. If we are to have an economy with more 'technocratic horsepower', then we need more young people to set their sights on becoming engineers.

A collaborative profession

Engineering is – by its very nature – a collaborative profession. The Royal Academy of Engineering is working to bring our profession closer together so that our formidable collective strengths are harnessed to create maximum impact and influence on matters of importance. We are building a reputation as a cohesive profession that works well together for the national good. This is, of course, instinctive in most engineers; at every level in our careers we do just that.

Two of the alliances on which we work together – Education for Engineering (E4E) and Engineering the Future – are now becoming genuinely successful in influencing policy. When the professional engineering community speaks with a single voice, it is drawing on one of its most enduring qualities. Dealing with big issues requires a lot of collective weight – and policy makers welcome a more streamlined process for gathering the advice they need.

The Academy building is currently undergoing a £6.5 million renovation which will transform its public spaces. When we re-open in 2012, we will unveil a high quality Forum in which we will debate the issues that matter and celebrate the achievements of engineers, showing what engineering is and what it is to be an engineer today. □

www.raeng.org.uk

Can the Further Education system provide the skilled technicians needed to keep this country competitive? A meeting of the Foundation for Science and Technology on 2 March 2011 examined this question.

Delivering the skilled people the economy needs

Philip Greenish

The 2010 Data Skills Audit of the UK Commission for Employment and Skills (UKCES) identifies a substantial decline in lower-skilled jobs and a consequent need to 'up-skill' people who are currently in such roles. The audit also reported an aging workforce. Yet UKCES reported a very low incidence of skills shortages. In contrast, the Confederation of British Industry found that 45 per cent of employers have difficulty recruiting staff skilled in STEM subjects (Science, Technology, Engineering and Mathematics) and they expect that problem to increase over the next few years.

As an illustration of the situation, consider engineering: it can act as a proxy for the wider STEM landscape. In terms of the number of engineering workers employed in the UK, the country compares well against other EU member states: it comes third overall. Yet as a proportion of the total workforce, the UK is only a little above the EU average and is right at the bottom of the list as regards the proportion of female engineering workers!

Drawing upon the UKCES *Working Futures 3* report, over 580,000 new engineering workers will be needed in the UK by 2017, replacing an ageing workforce and meeting new demand. The Department for Energy and Climate Change (DECC) estimates that half a million new jobs will be required by 2020 to renew our energy infrastructure alone. By contrast, the number of 15-19 year olds entering the employment market is set to diminish considerably. UKCES estimates that 60 per cent of the UK's future skills gaps will be in STEM subjects. Employers are very clear that they need more technicians at Level 2 and particularly at Level 3. More STEM skills are needed in the workforce as a whole.

The Royal Academy of Engineering has been leading a research initiative in this area. It was funded by the



Philip Greenish CBE is Chief Executive of The Royal Academy of Engineering.

Prior to this, as a Rear Admiral in the Royal Navy's Fleet Command, he was responsible for engineering, personnel and logistic support for the front line and he led a major reorganisation of the Command. He is a former Council Member of the Science and Technology Facilities Council and a Board Member of EngineeringUK.

Department of Business, Innovation and Skills (BIS) and a large number of organisations participated, including The Royal Society, the Gatsby Foundation, the Engineering Council and many others.

The FE sector

Further Education is extremely important but has been the Cinderella of education for too long. Historically it has been unloved and under-funded; in addition it has suffered from a variety of piecemeal policy interventions.

In terms of the total of learners, Further Education dwarfs the Higher Education sector. Some 4.7 million people participated in FE in 2008-9. They studied for over 10,000 different qualifications. There are currently 5,000 registered providers, with 1,500 organisations offering some form of further education and skills learning. In the UK there are 425 FE colleges, of which 352 are in England.

The sector is incredibly complex: there are over 9,000 STEM qualifications available to learners. Once the significant amount of duplication is taken into account, the number drops to around 2,500 (the equivalent figure for HE is 1,500). However, while HE students and employers find it quite easy to navigate their way around the system, those in FE find it extremely difficult. Learners

struggle to find out what a course can do for them while employers struggle to determine whether a qualification has any value for them or their industry.

The FE sector caters for a huge range of needs. Learners range from age 14 to 80 with a significant number learning in the workplace. Qualifications range from basic literacy and numeracy right through to first degrees and postgraduate diplomas. Courses can last just a few hours or can involve a full-time commitment over several years.

Looking at the STEM qualifications on offer in England, there is a reasonable spread – 44 per cent in engineering, 15 per cent in mathematics and numeracy, 20 per cent in science, 35 per cent in technology (the numbers add up to more than 100 per cent because some qualifications fit into more than one category). Of more interest is the number of enrolments by subject area. Of the 3.2 million learners taking STEM qualifications, 34 per cent chose engineering, 27 per cent technology, 12 per cent science and 42 per cent mathematics. Broadly similar trends can be seen in Scotland, Wales and Northern Ireland.

In terms of the levels, remember that Level 2 is GCSE or equivalent, Level 3 is A level or equivalent and Level 4 is HNC or equivalent. Now, in the last two academic years, 8 per cent of enrolments were at Level 0, very basic indeed. Then 21 per cent were Level 1, 41 per cent Level 2 and 23 per cent Level 3 as well as a very, very small number, just 1 per cent, at Level 4. Adding up the figures shows that over three-quarters (76 per cent) were at Level 2 or below. This is an issue when industry is looking for an up-skilled workforce.

As one might expect, the majority of apprenticeships are in engineering, but once again half of these are at Level 2. Are apprenticeships delivering the skills that business and industry need? A further area of concern is the STEM workforce. In engineering, technology and manufacturing there has been a

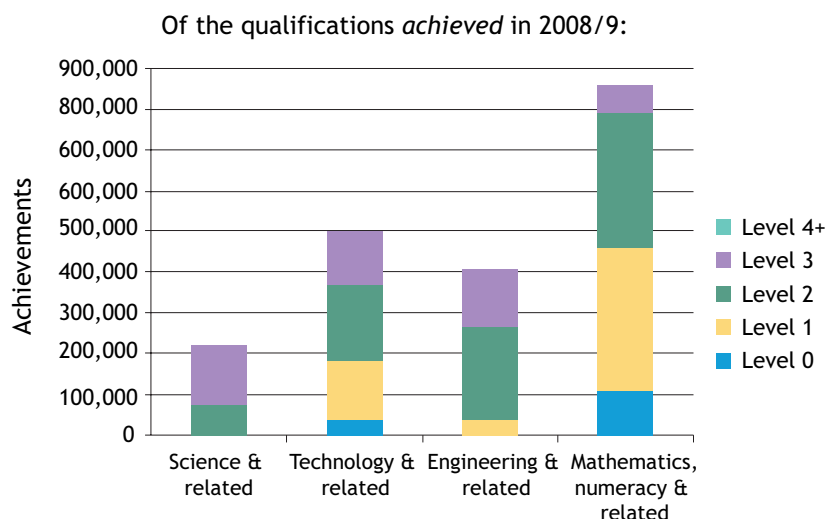


Figure 1. FE achievements in STEM 2008-9

steady decline in the engineering workforce.

In much of Europe, by contrast, there is a single range of programmes leading to a Level 3 qualification, with an option to progress to Level 4. In France, Sweden,

Austria and Denmark, Level 3 is the norm. In Germany, full time vocational programmes precede and prepare for apprenticeships and students are expected to go through to Level 4 – in the UK, just one per cent reach Level 4.

Improvement needed

There is a compelling economic case for improving the provision of skills – just look at the requirements for creating the green economy. There is not enough focus on high level qualifications within the FE sector. The UK is already behind its competitors in intermediate and lower skills levels. FE is experiencing diminishing enrolments in engineering and manufacturing subjects as well as a decline in the teaching workforce.

What needs to change? First, funding mechanisms need to incentivise Level 3 and 4 qualifications. Second, there is currently a very confusing and confused post-16 offering – we must do better. Learners need to be able identify which qualifications employers really value: it is not fair for them to embark on a course without knowing what benefit it can bring them. Third, there needs to be a particular effort to encourage a high-quality teaching workforce.

The FE sector is enormously valuable: it deserves more attention and it needs our support. □

The future of non-graduate training

John Hayes

Many people saw, and still see, Further Education as a safety net for people not clever enough to get a university place. It is curious that the nation of John Ruskin and William Morris should believe that a practical talent is a badge of failure.

Among other things, the state of today's job market exposes the falsity of that notion. A plumber with a Level 3 apprenticeship is likely to find a job more quickly than an archaeology graduate and may well have greater long-term earning potential. Virtually all analysts and employer groups agree that the skills needed to kick-start our economy and create renewed growth are predominantly at technician rather than first-degree level. It is time to bury once and for all the notion that FE is inferior to HE just because it is different.

Valuing skills

The need to reduce the financial deficit is affecting Further Education just like other areas of the public sector. Yet that does not mean that it cannot look to the future with optimism. The essence of the skills reform package that BIS has announced is the building of a nation which values learning and aspires to skills. It is about elevating



John Hayes MP is Minister for Skills in the Department for Business, Innovation and Skills and the Department for Education. He is MP for South Holland and The Deepings. Entering Parliament at the 1997 election, he held a number of shadow ministerial posts: for Schools, Agriculture, Fisheries and Food, Local and Devolved Government (Housing and Planning), Transport, Vocational Education and Lifelong Learning, Further and Higher Education.

the status of the practical. It is concerned with creating a nation where everyone has the chance to enjoy the benefits that flow from learning, such as better health, more rewarding jobs and a greater sense of self-esteem, one where those benefits are passed on from one generation to the next. It is about creating more open and inclusive communities and a society that is not just bigger, but better as well. FE and the skills system can help achieve that.

The first area of change will be in the economic role of colleges. FE colleges and other training providers are ready to deliver the skills needed for growth, but we cannot expect them to do it on their own. When Government says it wants employers to lead the skills system rather than merely advise on its direction, no one should interpret this as a vote of no confidence in training providers.

Employers are the main customers for skills training in this country and also its major funders. The closer the links between end-users and those who provide skills, the more satisfactory the system is likely to prove for everyone. Employers have to get involved, to shape the training offers and the qualifications, so that they get the most from it.

Colleges – and others, including Government – must actively seek out employers' views on what they need, and respond. Anything that hinders a college from responding to its customers detracts from the effectiveness of the whole system.

Perceptions

Another area of change concerns perceptions. The status of manual skills and those who gain them has to be raised. My

A funding dilemma?

There are major changes taking place in the funding of HE. This could have consequences for FE as well. Yet it could be an opportunity for FE to project itself as an alternative pathway for young people on the road to degree and post-degree level qualifications. The renaissance of apprenticeship schemes could assist in this by providing a good entry point to the ladder of progression.

own wish to see apprenticeships become a career path of choice for young people and adults alike is echoed by some of the country's largest employers. They recognise, as learners too increasingly recognise, that this form of training is perhaps the best way of passing on vocational skills. So when the Government says it will create an extra 75,000 adult apprenticeship places during this Parliament – and also make more places available for 16-18 year olds – it is heartening when big companies step forward to ensure that jobs will be there for those extra trainees.

Other steps to raising the profile of skills training include renaming the various levels of achievement to make them more meaningful, introducing graduation ceremonies and creating alumni networks.

I also want to make many more apprenticeships available at higher levels, because industry needs higher skills more than ever before. UKCES and the Technicians Council calculate this to be in the region of 50,000 more people. Now, the previous Government might have responded by creating an extra 50,000 training places at technician level. This administration, however, is committed to helping industry and training providers work together to meet needs locally and so, in aggregate, across the nation.

That approach should have particular

resonance for those who depend on STEM skills. For years there have been complaints about STEM skills shortages, as well as criticism from some sectors, notably pharmaceuticals, that STEM graduates do not always acquire skills relevant to business while at university. The advent of higher-level apprenticeships gives STEM employers and others the chance to do something about that for themselves, by helping to train people on the job. I hope that many will seize that opportunity.

The goal of learning

It is very easy to say that our economy needs a specified number of people qualified to this or that level. If education were really a sausage machine, we would push the right buttons and then stand back and congratulate ourselves. But learning is not mechanistic: it is as unpredictable as the hopes and dreams of millions of learners. Learning can take a huge leap forward when a person realises that a certain course or qualification is right for them, or when a learner, after much effort, finally 'gets it'. Yet it can grind to a halt when someone's hopes are disappointed or when they realise that they have reached a dead-end.

So the final and perhaps most important point to make is that learning is a continuum. When an adult completes

a literacy course and experiences not just the joy of reading but the joy of learning, there should be nothing to which they cannot aspire. There should be a clear and easily-understandable route to take them eventually wherever they want to go – to high academic honours, to professional or technical qualifications, or to a pottery evening-class in their local college.

Education is a powerful force for social and cultural, as well as economic, progress. It concerns who we are not just what we do. But an education system that caps someone's aspirations – by saying, for example, that there is no clear route to take a person from a Level 3 apprenticeship to university-level study – is the opposite of progressive. A person who realises at the end of a course that it cannot take them where it promised has had their life blighted by education, not enriched by it.

That is why there is so much effort going into improving the progression routes between the different levels and phases of learning. It is why we set so much store by the new all-age careers service's ability to guide people accurately through and between them until they reach their goals.

The further education and skills system is what creates the possibility of meaningful progression and truly lifelong learning. It can take people from basic skills to higher learning. It is one of the keys to this country's social as well as economic future. It is one of the forces that can make the depressed or disillusioned raise their heads once more and aspire to a better tomorrow. □

New Challenges, New Chances:

www.bis.gov.uk/assets/biscore/further-education-skills/docs/f/11-1380-further-education-skills-system-reform-plan.pdf

Embedding FE in the local community

Amarjit Basi

When our new campus at Walsall was created three years ago, the result of a land-swap between us and Tesco, we decided to engage with stakeholders and the wider community about the kind of college they wanted. Working with the local council, the regional development agency and business, we were determined not to repeat the mistake that Walsall had made 250-300 years ago. Then the town was the major trade centre of the Midlands but politicians and citizens did not want to embrace the new train technology. Walsall missed out on

the transport revolution and Birmingham emerged as the new centre for the region.

First of all, we redefined our mission. There are 19 secondary schools in Walsall and all of them deliver A-levels. We withdrew from A-levels in order to concentrate on vocational education. Walsall and the Black Country historically have produced the lowest proportion of graduates in the country. The region has the highest proportion of adults without any qualifications. A few years ago, half of the secondary schools were in special measures.

The college took responsibility for an

uplift in skills and employability, focussing on the Further Education field, developing the skills of tomorrow. After conducting a market intelligence exercise within the region, the college was restructured into six 'Prosperity Clusters.' Developed in partnership with employers, our courses fit within these areas: business and professional; creative industries; digital and technologies; health and public services; services to people; and a 'Foundation' cluster which includes supported learning, literacy and numeracy. This last area ensures there are no 'dead ends' for students – they can take up opportunities

again and again. In fact, the college allows people to progress through to Level 3 and even higher skills levels.

Delivering more

Our promise – what we call our ‘dowry’ to employers – is that every part of the college and the curriculum promises to deliver students who are not just technically trained, but also have important soft skills. The notion of being ‘skilled, professional and enterprising’ is embedded in everything we do.

We are a significant provider in the engineering field, particularly in utilities. We work with E.ON, National Grid, Balfour Beatty and Caterpillar, as well as others, to deliver a whole range of apprenticeship programmes starting at age 14. We will open the first University Technical College carrying that title, working in partnership with Siemens and the University of Wolverhampton [*it opened in September – Ed*].

In product design and development the college works with Roland Group in sign making – where we are a national centre of excellence – and in music technology. We work with the regional equivalent of Toni & Guy through the Francesco Group, as well as health spas. We have links to a number of football clubs and not just in sport. Aston Villa has recruited 12 apprentices from a very disadvantaged community providing, in partnership with the college, training in a commercial restaurant they are developing at their ground.

With local housing associations and other training providers, we are helping to deliver regeneration projects. In the last three years these have included a



Amarjit Basi is a former Principal and Chief Executive of Walsall College.

He previously held senior management posts at Ealing, Hammersmith & West London College, The Oldham College and North Warwickshire & Hinckley College – each of which attained beacon status or equivalent.

Ealing, Hammersmith & West London College attained a Queen's Award for Enterprise: International Trade for its programmes for overseas learners. Amarjit Basi is currently Principal and Chief Executive of New College Nottingham.

£300 million brand new hospital, a new ring road, new housing groups and a new waterfront sector – the college has provided apprenticeship training in every one of these regeneration projects.

We work with a whole range of retail companies including Morrisons, Asda, and TK Maxx, through Job Centre Plus.

The public sector

The college is engaged with the health sector on a range of programmes, from obesity and mental health to social care and fostering. We are a preferred training provider to a number of hospital groups. In a period of 18 months, we secured over 200 apprenticeships across the public sector, from the Walsall Council, the hospitals, NHS, Fire & Ambulance Service and also the education service.

The college is the meeting place for the Black Country Chamber of Commerce

and we are the Patron of British Business Parks. The local SME community is investing heavily in training in the clusters we have identified.

We have created a sixth form, even though we do not do A-levels! This has allowed us to increase the number of 16-18 year olds in the last two years by just under 1,000 and we now have one of the biggest sixth form centres in the West Midlands, with just over 4,200 students. All are working on Level 3 and Level 4 courses.

Walsall College is now central to the economic life of the West Midlands. We are leading future skills. We are working with children – sponsoring schools, including a primary school, and providing access to technical learning early on. Our overseas work has a turnover of more than £1 million a year – we are in fact one of Walsall's fastest growing exporters.

With the growth of the sixth form and the growth of adult provision, student success rates last year were in the top 10 per cent nationally.

Conclusions

There are several conclusions that I would like to draw from the Walsall College story. One is to recognise the role that FE can play within a locality, particularly in the vocational and technical training area. Second, it is important to recognise that FE is the glue between schools and the HE sector; we would, in fact, relish the opportunity to expand our provision further into both these areas. Third, colleges that inculcate flexibility can respond innovatively to requests from employers and other partners.

www.walsallcollege.ac.uk

A retailer's point of view

It is clear that delivering skills is not a tactical issue but a long term strategic agenda. The relevance of a retail view is that retailers learn very quickly the customer is always right. Customers decide which deals they prefer and they make those decisions very plain on a weekly basis. Now, while we should not be running our education system on the basis of week-by-week decisions, we do need to understand the power that we have as customers and the role we should be playing. In any good marriage each partner has a very strong part to play. For too long, the industrial sector has sat back and said ‘Well you're not delivering what we want’, rather than contributing to

the debate more actively. As a customer, I think we have to make plain what our commitment is to the FE sector.

First, there should be a commitment to the craft route. Through the craft route one can develop domain expertise and that domain expertise is pivotal to leading in any industry. A major research programme instigated by Jeff Immelt, the Chief Executive of GE, discovered that those companies setting out to be domain experts were the ones which lead in many sectors.

Second, industry needs to prioritise excellence. As Aristotle noted, ‘we are what we repeatedly do’. Excellence, then, is a habit and not an act. That habit is

developed over time. We must start, therefore, at the earliest possible stage of a person's career – at 16 or 18 – and work with those people in their pursuit of educational and practical excellence.

Partnership does not stop at the classroom door or the entrance to the supermarket or factory: it is a pathway which continues through an individual's career. That pathway needs to be managed through coaching at each level. This will help individuals progress from the shop floor to the top floor of any organisation. □

Norman Pickavance is Group HR Director at William Morrisons. He was responding to the earlier speakers.

How should expenditure be allocated between mental and physical health services, especially in the light of new and increasing demands? The question was debated at a meeting of the Foundation for Science and Technology on 4 May 2011.

The cost of managing mental health in the UK

Richard Layard

While everyone recognises dementia to be a major problem, it is not the only mental health problem facing our society. Depression and crippling anxiety affect six million adults, in addition to the smaller number of those with psychotic problems and the children with mental health problems (many of which persist into adulthood).

Everybody agrees that mental illness is a major challenge: the issue is what can be done, and that of course depends on the effectiveness of treatment. The National Institute for Health and Clinical Excellence (NICE) has guidelines on the treatment of these conditions: in a number of cases, the treatments lead to greater savings to the economy than the money spent on them. It is, however, depressing that many of these guidelines are not implemented in some parts of the country. The result is that treatments which could be changing people's lives are not available to those who need them. Surveys indicate that only a quarter of those found to have a diagnosable mental illness are in treatment – very different to the approach we take to physical illness.

The Government has now instituted a programme of improved access to psychological therapy, but even when completely rolled-out it will not cover the whole range of problems.

The scale of the problem

Using a broad definition of mental illness – depression, other psychiatric conditions such as anxiety and psychosis, as well as Alzheimer's and addictions – nearly half of all health-related disabilities are due to mental health problems. Something like 25 per cent of those attending GP surgeries are diagnosed with mental illness. Nearly a half of those on incapacity benefit are recorded as having mental illness and a significant proportion of back pain is associated with mental causes.

One very good reason for tackling this issue is an economic one. The Centre



Professor Lord Layard FBA is Emeritus Professor of Economics at the London School of Economics, where he was until 2003 the founder-director of the Centre for Economic Performance. He now heads the Centre's programme on wellbeing. Since 2000 he has been a member of the House of Lords and advises the Government on mental health policy. His book *Happiness – Lessons from a New Science* was published in 2005.

for Mental Health estimates the loss of output resulting from people not being able to work, taking sickness absence or living on reduced earnings due to mental health problems at around £30 billion a year – roughly 2 per cent of our national income. The NHS spends £11 billion on mental health annually (about 11 per cent of its total expenditure). On the other hand, other NHS services are probably being provided to people with mental problems who have not been correctly identified or properly treated – there are no accurate figures for that. Then, of course, there is the social cost of child mental illness going through into educational failure, crime, poor parenting and so on.

There are cost-effective treatments recommended by NICE. Take two examples of therapies which, on the evidence from trials and usage in the field, are paying for themselves. With Cognitive Behavioural Therapy (CBT), the recovery rate in the field for adult depression and anxiety disorders is at least 40 per cent above natural recovery. The savings on benefits and the additional tax paid by people returning to work actually balance NHS costs (although unfortunately the savings accrue to the Department for Work and Pensions and the Revenue), and there are also savings on other healthcare costs. A good deal of evidence in favour of CBT is available from the USA where there have been 28 trials. In 26 of these, the average savings made from 'other' healthcare costs exceeded the expenditure on CBT.

The second example is that of parental training in cases where children have conduct problems. Again, there is good evidence that the savings to criminal justice systems, properly discounted, pay for the training. There is also evidence to suggest that the savings to the NHS would exceed expenditure – in other words these treatments would cost nothing overall!

Not available

Unfortunately such treatments are simply not available on the required scale because NICE guidelines are not being implemented. This is a very peculiar

DISCUSSION

Tackling the stigma of mental illness

Mental suffering can be more damaging to the individual than physical trauma. So, in a reasonable world, resources should flow to mental health, at the cost of some physical treatments e.g. arthritis, which, in many cases, people could live with. However, there is danger in trying to implement such a shift before stigma has been successfully addressed. However irrationally, there is a public prejudice that physical suffering is worse than mental suffering and that many mental problems are the sufferer's own fault. Failure to win the public argument before implementing change risks a GM products type disaster where science and logic is rejected by populist outcry - to the disadvantage of individuals and the economy.

situation: the way NICE guidelines on mental health are regarded by commissioners is completely different from the case of physical health. That is why there are very low treatment rates both for adults with depression and anxiety, as well as for children – the hurdle to get a child treated is set very, very high.

In general, people with chronic physical illness are in treatment while people with chronic mental health illness are not; it is as simple as that. The reasons are a lack of facilities, a lack of commissioning, a lack of training, a lack of people who can work the facilities, as well as a lack of GP training in identifying the problem – and of course there is a lack of people coming forward because of stigma. I believe that if the facilities were available and people knew that effective treatment was being provided, then the stigma would disappear.

Fortunately change is now occurring with the ‘Improving Access to Psychology Therapy’ programme which aims to implement NICE guidelines for adult anxiety and depression by 2014. This will mean treating at least 15 per cent of diagnosable cases. To do so, some 8,000 therapists will be needed: half that number are already trained. The cost is less than £500 million. However, a large number of conditions are not covered by this programme: they are nominally

DISCUSSION

Delivering change

Early intervention and prevention are better than cure. An emphasis on social care and material conditions is surely right. Yet there are problems in delivery. Under the Localism agenda, local authorities will be given greater discretion on their budgetary spending, while at the same time they are suffering large cuts. They should be able to use the opportunity to bring services together. But will it be possible to preserve, indeed enhance, expenditure on social care in these circumstances? While everyone may agree that social care needs to be more comprehensive and, for example, address housing and poverty issues, is there any power to require authorities to do so?

included but there is no money for them. For example, some 50 per cent of cases referred to secondary acute care are for ‘medically unexplained’ symptoms and this category will not feature widely under the current programme.

Of the current expenditure on mental health of around £11 billion per year, only a small amount goes on children (around £750 million). Adult care is largely directed to people with psychotic or near-psychotic conditions (in the wards, in community mental health teams, or in outpatient clinics). As much again goes on the care of the elderly. For most people suffering from common mental disorders or from unexplained symptoms, there is no adequate allocation however.

Conclusions

There will have to be extra expenditure in order to meet both currently unmet

needs but also new ones. Since the total expenditure in the NHS in real terms is flat, some other areas will then face cuts.

The unmet need includes patients with medically unexplained symptoms, the chronically ill and children – as well as research. Mental health research only accounts for about 5 per cent of medical research budgets, which is too small if this sector represents 25 per cent of demand on NHS services and there are effective treatments available to be researched.

Among the challenges facing society is the increase of dementia within the community due to ageing. This is an area where new needs, as a fraction of existing provision, are greater in mental health than in physical health. So there is a strong case for mental health receiving a disproportionate share of any extra NHS spending – or indeed, of the existing total. □

Health in mind and body

Simon Wessely

The physical care of those with major psychiatric disorders is grossly neglected – patients have an average life expectancy at least 10 years less than the rest of the population. But likewise, so is the psychological health of those with physical disorders. It is known that if a person has a heart attack and becomes depressed they are up to three times more likely to die in the next year: that means it is more dangerous to have depression after a heart attack than it is to continue smoking. Looking at hospital attendance, 20 per cent of Accident and Emergency Department admissions are associated with alcohol abuse/dependence; 70 per cent of ‘frequent attenders’ or ‘high users’ of secondary care services have mental health disorders; and around half of all new hospital outpatients have physical

symptoms unaccounted for by physical disease.

Table 1 on page 10 sets this out. Most people hope to remain in the bottom right corner, feeling fine and not suffering from disease as defined by medical science. At some stage in life many of us will move into the top left and this is still not a problem for medicine. The patient feels ill and the doctor has found something wrong – that is what medicine exists for.

Yet it is the other two categories that cause concern. In the top right is a person who either has or is at risk of some disease of which they are not aware. That group of people will cause increasing problems in cost, ethical dilemmas and so on, but they are not the issue today.

What is of concern for today are those in the bottom left box – they feel sick or ill but the doctor cannot really find anything



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wrong according to the conventional biomedical explanations of disease.

Physical and mental symptoms

One iconic study from the USA looked at those arriving at outpatient clinics with various symptoms. Sometimes chest pain was explained by heart disease, fatigue by anaemia, or dizziness by inner ear problems, but for the majority there were no simple, clear-cut biomedical explanations for their illness or ill health. Medical education on both sides of the Atlantic teaches our medical students for six years how to manage the first group; sadly those same students spend a good part of their careers then dealing with the second.

A study in King's College Hospital in London produced very similar results. The majority of those on their first appointment in the acute cardiology clinic did not have an identifiable heart disease. The majority of those seen in gastroenterology did not have Crohn's disease, and so on. I often tell medical students that if they do not like mental illness they should go into psychiatry. The average consultant psychiatrist will see one or two new patients a week. In a busy chest or cardiology clinic, a consultant will see around 30 new patients a week. Yet between five and 10 of those will have depression, anxiety, etc. So cardiologists see more new patients with psychological disorders than psychiatrists!

Physical and psychological symptoms are closely linked. A study of 40,000 people at Camberwell measured the incidence of chronic fatigue and GHQ (a common depression or anxiety). It found a very close relationship. Further, the greater the number of symptoms, the more likely the patient was to develop a mood or anxiety disorder. These symptoms may be just non-specific markers for distress. It is well-known of course that psychological factors make an important contribution to the outcome of physical disorders. If a doctor wants to know if a patient with rheumatoid arthritis will return to work, he will learn more from inquiring about mood disorder than measuring ESR or adding up the number of swollen joints.

Unexplained symptoms

Unexplained symptoms represent a huge burden of costs within the healthcare system. Yet in order to make the case for more resources, there must be some evidence that it will make a difference. Psychiatrist Khalida Ismail led a major randomised trial at King's College Hospital in London. The study looked at the impact of psychological treatment to improve the mental health and wellbeing of those with diabetes. Those

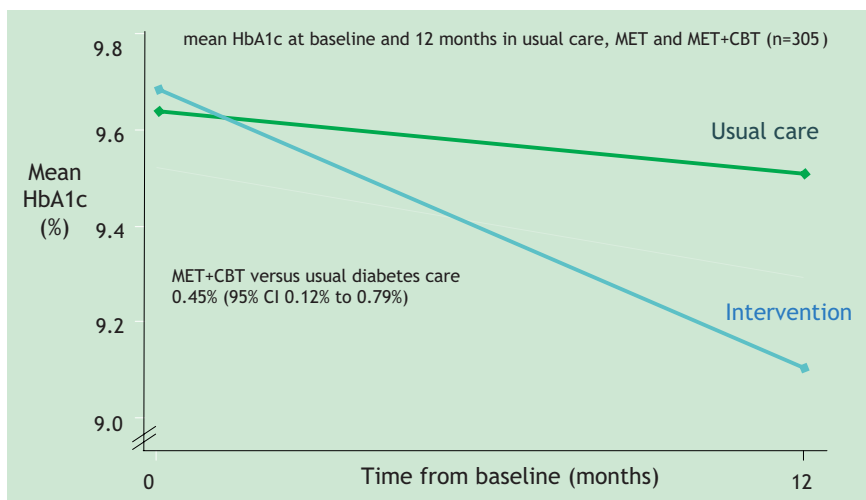


Figure 1. RCT and Type 1 diabetes (Adapted from: Ismail *et al*, *Annals Intern Med* 2008).

who received the intervention – it was motivational interviewing – did report better mental health; in fact there was a substantial impact. That is perhaps not surprising. But what caught the attention was that those who received the mental health intervention also achieved better diabetic control.

Another example, Chronic Fatigue Syndrome (CFS), illustrates the gap that lies between physical health/illness on the one hand and mental health/illness on the other. It is a condition or illness with huge morbidity, mainly because it is an illness of economically-active people.

CFS is a multi-factorial illness. A person can be at increased risk because of genetics, or because of previous depression, for example. Various infections, including the Epstein Barr virus, definitely precipitate this condition. Yet to understand why some people do not get better as the months and years go by, one has to look at behavioural and psychological factors. The illness is then a complicated mixture of predisposition, precipitation and perpetuation.

In terms of treatment we know that antidepressants, diets, vitamins, allergy treatments, etc, do not work. On the other hand, understanding what people think about their illness and how they respond to symptoms, does seem to help. A landmark trial on the management of CFS, known as the PACE Trial, was published recently in *The Lancet*. It tested four therapies:

adaptive pacing therapy (APT), cognitive behavioural therapy (CBT), graded exercise therapy (GET) and standard medical care (SMC). Two treatments, graded exercise and CBT, clearly made a difference, although they certainly were not 'magic bullets'. For those who appreciate these things, the trial is a thing of beauty, and the results confirm previous smaller studies and follow ups. We now have two treatments that we can recommend with confidence to our patients.

However, the story does not quite end there. Patient groups rejected the trial out of hand, and the internet was abuzz with abuse and allegations. The main reason for this depressing reaction was the stigma that attaches to disorders perceived (rightly or wrongly) to be psychiatric in origin, whatever that means. If one obtained identical results to the PACE trial, but this time with anti-viral drugs, the reaction would have been totally different. This is exactly what did happen when a very small trial of a drug that modulates the immune system (and which has some nasty side effects) was greeted with acclaim from the same sources that tried to discredit the PACE trial, which tested interventions with an impeccable safety record.

Bridging the gap

Policy documents now routinely emphasise the role of mental health in treating physical disorders and the role of physical health in mental wellbeing. So why is there still a

		Illness - the patient's experience	
		Sick	Well
Disease according to medical science	Present	Medically explained illness	Prodrome/ screening
	Absent	Medically unexplained	Healthy

Table 1. Illness and disease

gap? It is partly because of the systems that we have created to deliver healthcare. Separate commissioning of physical and mental health services has proved a disaster in terms of bridging that gap. We now have separate trusts for physical and mental healthcare, with little or no integration or interaction between the two. The general physician is a thing of the past, and it seems as if only the general practitioner still has the ability to bridge mind and body. Our classification systems perpetuate the divide. The separate classifications for

psychiatric and neurological disorders are rendered meaningless by the facts to hand: why for example is schizophrenia or Alzheimer's listed under psychiatry but not in neurology? The answer is simply historical, and tells us nothing about the causes of either disorder.

However, the gap is being closed. GP-led commissioning promises real improvement. GPs do not want to send patients on a merry-go-round of specialists; they want the patient with altered bowel habit to be seen on the same day by the gastroenterologist

and the psychiatrist, or the 35 year old with chest pain to be seen swiftly by cardiologist and psychologist, and not six months later when it is all too late.

Yet if we move towards a world of patient-centred outcomes, one thing is certain: if we are really interested in how people feel and in their wellbeing, that will require not only greater investment in mental health services, but also a willingness by the same services to leave their traditional boundaries and move to where they are needed, alongside their physician colleagues. □

No health without mental health

David Behan

The Government's mental health strategy aims to transform the mental health of the UK population, while also addressing their continuing mental wellbeing. Mental health should be everyone's concern; not just those who work in the health and social care sector, but employers, as well as those in education, the third sector and housing as well.

In the development of the strategy, the economic cost of mental illness was investigated. At 23 per cent of all illness in the UK, it is the largest single cause of disability. The Centre for Mental Health's 2010 estimates calculated the cost at £705 billion a year. Medical treatments are expected to double in cost over the next 20 years or so. Around 1 million (43 per cent) of the 2.6 million people with long term health-related conditions will have an associated mental health or behavioural problem.

There is a heavy personal cost to mental illness. About one-in-four people will have mental health problems at some point in their lives. Almost half of all adults will experience at least one episode of depression. People with severe mental illness die some 20 years earlier, on average, than the general population. A third of all GP consultations are mental health related and some 90 per cent of all prisoners have some diagnosable mental health issues. So the cost, not just in economic terms but in personal terms, is dramatic.

The Government strategy takes a 'life-course' approach to mental health – beginning at conception and parenting, going through the early years, childhood and teenage life, extending into working life and then into old age. Those responsible for devising the programme were clear about the need to focus more



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Health. He was the first Chief Inspector of the Commission for Social Care Inspection. From 1996 to 2003 he was Director of Social Services, London Borough of Greenwich and a member of the Greenwich Primary Care Trust Board as well as the Professional Executive Committee. In 2003 he was the President of the Association of Directors of Social Services.

on outcomes and less on processes and systems.

A critical issue was how to mainstream mental health services so they achieve parity of esteem with those services that improve and promote physical health. People receiving mental health services need real, informed choice as well as control over the way they access

treatment. The stigma attached to mental illness is an issue both for people who are unwell but also for the general population. The Department of Health worked with the Time to Change programme to address the challenge. Around the time the strategy was being devised, the White Paper on NHS reforms was being developed. The mental health strategy strives to dovetail with this.

The objectives

The Department of Health developed the specific goals of the strategy with external partners. Six objectives were identified and the delivery of the strategy is structured around these (Table 1).

Working with external partners was key to getting the strategy right – but it also provides a model for effecting change in public services in the 21st century. The Health Service is moving away from targets and ring-fenced funding so it is critical that the strategy was developed with those responsible not only for designing it, but for delivering it. A broad range of partners from across the

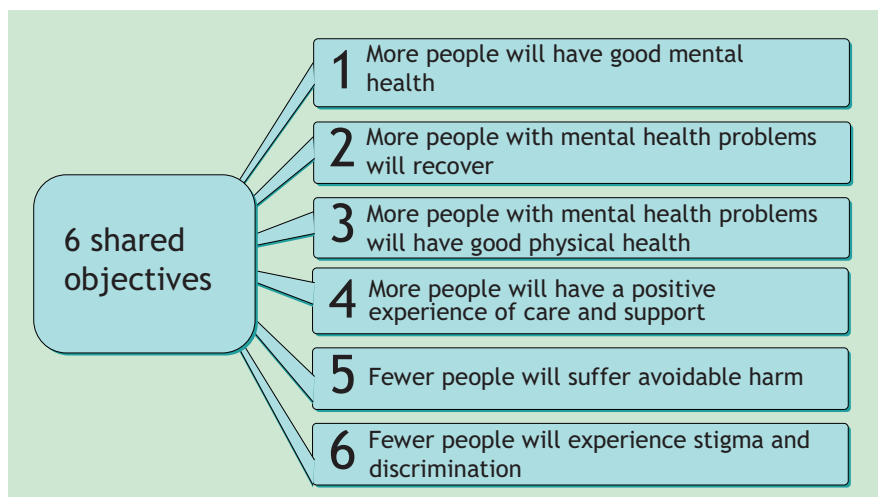


Table 1. Shared objectives of the mental health strategy.

Connect - with people around you
Be active - go for a walk or run
Take notice - be aware of the world
Keep learning - learn something new
Give - do something nice for someone else

Table 2. Five ways to well-being.

voluntary, statutory and private sectors were brought together. These included Mind, Mental Health, the Royal College of GPs, psychiatrists, Rethink, and, importantly, organisations which support children, young people and families, such as Young Minds and Youth Access.

The present Government has supported the strategy through increased investment and the Spending Review gave further resourcing to psychological therapies. The Department of Health will invest over £400 million over the next four years. The Psychological Therapies Programme will be expanded to cover the whole country and its scope will be extended to work with people that have long term conditions. The programme addresses the challenge of medically unexplained symptoms and will look at severe mental illness as well as services to older people. With additional services for children and young people it is anticipated that an extra 1.2 million people will be able to access help and treatment for depression

and anxiety. This will enable them to get back into work, take part in education, training or volunteering, producing savings of up to £700 million in healthcare, tax and welfare gains – some £270 million of savings will accrue to the NHS alone.

In the past, there has been too little focus on promoting mental wellbeing. A Foresight report identified five ways to promote mental wellbeing (Table 2) which are all concerned with how people connect to their surroundings and the world around them. The evidence underlying these conclusions is compelling and the Department of Health strategy has built on these findings.

Now, around £2 billion of the money spent on mental health services is delivered by local government. A silent revolution has taken place over the last 15 years in community mental health teams and today it can be difficult to tell at first glance who are the social workers, the psychiatrists or the healthcare staff. Professionals have become used to

working in a multi-disciplinary way over the years. This is important because people with complex conditions need help from more than one specialism, so professionals need to work together in a multi-disciplinary way as part of a team in order to achieve the best results.

Equality

The concept of equality is embedded in the strategy at a fundamental level. The strategy targets three specific areas – the inequality that contributes to poor mental health, inequalities that result from poor mental health and the issue of unequal access to services. The public sector has a duty, under the Equality Act, to eliminate discrimination and advance equality of opportunity. Tackling stigma and discrimination is critical to achieving a more equal service.

A final element in the new approach is the drive to personalise care, not just through direct payments and personal budgets (although these are currently being trialled), but also by enabling people to control their own support and care. Personalisation is also a key means of improving and promoting equality of opportunity for the users of mental health services. □

www.dh.gov.uk/health/category/policy-areas/social-care/mental-health

Foresight report: www.bis.gov.uk/foresight/our-work/projects/published-projects/mental-capital-and-wellbeing

public data

The ethical and practical issues surrounding the use of the vast quantity of data collected by publicly-funded bodies was discussed at a meeting of the Foundation for Science and Technology on 8 June 2011.

The value of routinely-collected administrative data

Paul Boyle

Within the UK, various datasets are collected about the public by Government Departments. These include medical data on hospital visits, educational data on school attendance and exam results, and labour market data on (un)employment and benefits. There is great potential from linking such datasets together to provide anonymised datasets for subsequent analysis. Unfortunately,

despite the fact that various countries make considerable use of such data, we have failed to utilise these resources adequately in the UK.

These datasets are particularly valuable because they provide large, nationally representative, longitudinal samples which contain little response bias and do not suffer from serious attrition. And, of relevance at a time when resources are stretched, they are comparatively cheap to

create and update.

Examples of the valuable uses of these data include that they:

- would underpin a wealth of scientific enquiry in various domains including medical and social science;
- can be used in policy evaluation to test ‘what works.’ Their national coverage makes them particularly useful for understanding and comparing local interventions;

- add value to medical trials, allowing participants to be followed beyond established RCTs, making these data valuable for the pharmaceutical and other medical industries;
 - provide a crucial resource for driving quality improvement as reliable data are essential for implementing and understanding service changes;
 - provide dynamic updates of population distributions which would be valuable for geographically-based resource distribution;
 - can be linked to ongoing national studies, such as our internationally recognised birth cohort or household panel studies, to provide detailed and updateable objective measures of socio-economic circumstances;
 - may offer a viable and considerably cheaper alternative option to the decennial census.
- *conditions of access.* If approved, conditions of access vary considerably across Departments, including views on the use of safe settings;
 - *resourcing requests for access and linkage.* While providing cost-effective data for research compared with survey methods, data access and linkage have to be resourced and charging models also vary;
 - *sharing of knowledge and development of 'best practice'.* The inconsistent methods used to provide access to various forms of administrative data do not facilitate the sharing of knowledge or the spread of best practice across the research community and data controllers;
 - *public awareness and engagement.* The decentralised approach to access and linkage does not help promulgate the raising of public awareness about the benefits of data linkage. The array of different attitudes and approaches to the use of administrative data may even serve to undermine public understanding of such data use;
 - *data quality issues.* While administrative data provide an exciting resource for policy and research, they are not designed for this purpose and research is required on the quality of these data.



Professor Paul Boyle FRSE is Chief Executive of the Economic and Social Research Council (ESRC) and President of Science Europe (SE). His research interests are population and health geography. Prior to joining ESRC he was Director of the Longitudinal Studies Centre – Scotland, which was responsible for establishing the Scottish Longitudinal Study, and Co-Director of the Centre for Population Change (CPC). He was also a Co-Investigator on the Scottish Health Informatics Programme (SHIP) and the Administrative Data Liaison Service (ADLS).

As such, the utilisation of routine data speaks to a number of the current Government's priorities, including the growth, transparency and open data agendas, as well as providing key insights into processes such as social mobility. The existence of these benefits raises the question of why we have yet to take advantage of such data.

What are the barriers?

The failure to make better use of routine administrative data in the UK involves both legal and cultural factors. Government Departments, agencies, and other organisations such as health care trusts who hold data about the public, will have an identified 'data controller' and established procedures through which researchers can apply for access in specific and approved research projects.

However, views vary between Departments over what represents reasonable requests for data, appropriate methods of data access, and the legal position concerning legitimate research use of anonymised data – for example, there is uncertainty over definitions of what 'personal data' consists of, and when consent for their use is required. Thus, some of the major problems faced by researchers wishing to gain access to administrative data, or to use such data for linkage to other datasets, include:

- *interpretation of the legal situation.* Various pieces of legislation¹ cover access to administrative data or have implications for the conditions of access, but this legislation is not interpreted similarly across different Government Departments;

Of course, a balance is required between the protection of people's privacy and the creation of *bona fide* valuable knowledge about population and society. These two sides are often presented as mutually exclusive, but I would argue that both can be achieved – it is possible to protect people's privacy, to keep data confidential and yet make best use of them.

There needs to be more active engagement with the public: a social contract which is based on an informed understanding of research benefits. The research community has to explain that data are reliable, valuable, and can be properly managed. Indeed, it could be argued that the failure to make better use of routinely-collected public data is a terrible waste of public resources. This is particularly so since practical, reliable and robust models for managing such datasets do exist.

Do robust systems exist?

The Scottish Longitudinal Study (SLS) is an example which demonstrates that robust systems for creating, managing and accessing routinely-collected anonymised data do exist. This study involves a strong collaboration between academics based at the University of St Andrews and the

General Register Office for Scotland². The study is a 5.3 per cent sample of the Scottish population, based on 20 birthdates, and as a result includes around 265,000 members.

The study includes data at individual (social class, ethnicity, religion, health etc) and household (housing tenure, household structure, car ownership etc) levels from the 1991 and 2001 censuses (and, shortly, the 2011 census). In addition, it includes vital events data (births, deaths, marriages, widowhood), immigration and emigration data, cancer registrations and hospital episodes. Most recently, education data from the annual school census and school exam results have also been included.

The project has very strong governance: a steering committee with representatives from Government Departments and academia, as well as a board which assesses every application to use the data to make sure it is justifiable. The researchers have been to various bodies, including the Privacy Advisory Committee, Multi-centre Research Ethics Committees and the Information Commission's office to discuss how these data are managed. The resulting system provides access to these data either remotely through the submission of statistical code (the results from which are returned to the researcher after checking) or in a safe setting which is monitored closely by staff. At any one time, over 40 projects are supported and access to these data is free for *bona fide* researchers.

Making use of the SLS

The study can be used to explore a range of demographic, socio-economic and health questions. As an example, a recent study looked at widowhood to find out whether losing a partner decreased life

expectancy. Many earlier studies seem to have demonstrated this effect, but it is difficult to determine whether this results from the emotional stress of losing a partner, the loss of the protective effects of marriage, or selection effects (the fact that the person who died is likely to have similar characteristics to the partner they lost and therefore they are more likely to die at similar times).

In this study we were able to control for a whole range of effects which we thought might feasibly influence that selection process, including a host of personal characteristics. In addition, by considering the cause of death of the partner, it was possible to compare those who lost someone due to a cause of death which is likely to be related to health-related behaviours and those deaths that were not. Selection effects may exist for the former, but would seem unlikely for the latter.

The results showed that there was around a 40 per cent increased risk of dying associated with losing a partner, that this was fairly consistent for both men and women, and that the increased risk lasts for at least 10 years after the death, showing that the 'widowhood effect' is not a short-term problem. We also showed that selection effects do not appear to explain this outcome. Studies of this type demonstrate the value that can be derived when large samples of administrative data are available, and this particular study raises questions about long-term support

for the widowed.

Where next?

As a result, the ESRC advocated that an Administrative Data Taskforce (ADT) be established to explore how we might make better progress in the utilisation of routinely-collected government data. In fact, the ADT has now been established, chaired by Sir Alan Langlands, the Chief Executive of HEFCE, and with the support of the Minister for Universities and Science. This body brings together members of the relevant Government Departments, academic experts and the funding agencies to tackle a range of issues, including:

- the development and introduction of common procedures to provide efficient access to administrative datasets;
- clarification of the legal situation governing the use of routine data;
- clarification of when consent is required and what consent procedures should be used; recommendations for new legislation (if required) to improve access to administrative data for research;
- the resource implications of increased research use of administrative data.

We await the recommendations of the ADT, but the aim is to identify a clear process for providing better access to routine data, a robust methodology for linking such datasets together, and a system for attaching such data to existing large-scale

surveys and birth cohorts. Attention will also need to be given to capacity building, and systems of data support.

To some degree, Scotland can be argued to be leading the way in this field and discussions are ongoing about extending the SLS both in size and scope. It is important that at the same time we make significant progress in England, Wales and Northern Ireland, so that we benefit from under-utilised UK-wide provision.

Routinely-collected administrative data are paid for from the public purse, but they remain under-utilised. Robust models exist for managing and providing access to such data and they could become invaluable for research and policy development and evaluation.

With appropriate academic/Government partnerships, we can make significant progress and we hope that within a year of establishment, the ADT will have developed a convincing set of recommendations which can be used to make better use of existing, routinely-collected administrative data. □

1. There are numerous pieces of UK and EU legislation affecting data access and reuse for research, including the *Data Protection Act 1998*, the *Statistics and Registration Act 2007*, the *EU Directive 95/46/EC* and the *Human Rights Act 1998*.

2. In April 2011 the General Register Office for Scotland merged with the National Archives of Scotland to form the National Records of Scotland.

Is current data protection legislation coherent?

Onora O'Neill

The UK's *Data Protection Act 1998* (DPA) seeks to regulate the use of personal information held in organised form (files, paper or electronic). It does not cover: invasions of privacy that do not use/misuse information (someone peering through your window); privacy invasions that do not use organised information (twitter); or invasions of privacy that use organised information held for domestic use (your address book). The DPA is intended to prevent the sorts of invasions of privacy that work by searching or mining files and databases. Personal information is only to be used where the data subject consents, and further use for other purposes requires new consent.

The DPA aims to regulate all action that uses specific types of information or



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content, rather than regulating specific types of action. The Act therefore requires a clear distinction between personal and

non-personal data. It defines personal data as ... *data which relate to a living individual who can be identified (a) from those data, or (b) from those data and other information which is in the possession of, or is likely to come into the possession of, the data controller.*¹

The Act prohibits what it terms the 'processing' without consent of any information that is personal, or both personal and sensitive. It then links this account of personal data to a wide definition of processing.

Interrogating the DPA

Two questions arise.

First, what are 'data that relate to a living individual'? This term is magnificently obscure. The crucial element in

the Act's definition of personal information is the idea of information that makes some living individual identifiable on the basis of 'other information' held by, or likely to be held by, the data controller, or by others. When do data and other information make an individual identifiable?

Attempts to nail this down have led to controversy, particularly in medical and social research. On one view, if data are anonymised they are non-personal. However where anonymisation is reversible, however secure the encryption and however limited access may be to the key, individuals will in principle be identifiable by some means by some persons. This leads some to conclude that no form of reversible anonymisation can satisfy data protection requirements.

Second, what sort of consent to a reuse of personal data is needed for it to be lawful? In commercial life we consent to the reuse of personal data for sundry purposes almost without noticing it. We sign forms that we do not read, we click and tick and 'accept' complex contracts and terms and conditions. This is taken to make further uses of the personal data in question lawful.

In biomedical contexts, standards for informed consent are more exacting, sometimes impossibly exacting. It is impossible to seek consent to unforeseen future research uses at the point of treatment, and often impractical to seek new consent when research projects are formulated, or new analysis undertaken. Consequently data protection requirements burden medical and social research although they are feasible for the commercial world.

If consent cannot be obtained, one alternative would be to make a case for exceptional use of data. Some forms of unconsented reuse are permitted by the DPA, for example reuse for clinical audit. However, the systems set up for further exceptions have been criticised as being "deeply confusing". One approach to reform has been the establishment of a system of 'safe havens', in which the risk of identifying

individuals would be minimised: these demand complex governance and are not feasible for all research. I think it is an open question whether any system of exemptions from the DPA could be ethically acceptable or effective as a way of dealing with access to reversibly anonymised patient information reused for research purposes.

Defective legislation

Piecemeal remedies that retain the framework of the current DPA are likely to fail. Yet, we live in a world where each patient is treated on the basis of information gained by treating others, and they would be horrified if this were not so. Any account of privacy in biomedical contexts must recognise this reality. Information sharing is not some foul disease to be avoided. It is basic to medical practice and obstructing it, even with the best of intentions, is unacceptable.

The basic problem of the DPA is that it assumes data can be partitioned into the personal and the non-personal. This is false. If the receptionist at your GP calls out your home address, she discloses personal (not sensitive) information, which the surgery holds for purposes connected with your medical care, but should not communicate to others without your prior consent. Yet, on the other side of town, there is an electoral register containing your name and address, for the public and for political parties to consult without seeking your consent. So are your name and home address personal information? Are they subject to data protection? Or does it depend on the context? If it depends on context, then the basic assumption that data can be divided into personal and non-personal fails.

Because of this fundamental failure, the Act is breached every day. Mostly, and sensibly, we overlook these breaches. Consider a doctor revisiting information about the treatment of past patients in order to refresh her knowledge before treating a current patient, without explicit consent from each past patient. This is

about the disclosure or use of information for purposes other than those for which it was first obtained in a medical setting. Is it acceptable or not? Do we really want these activities to be unlawful without renewed consent? Or do we need to find a better basis for protecting informational privacy?

Would confidentiality serve us better?

Before the days of data protection, *confidentiality* was taken as a fundamental norm for using information provided in medical contexts. Confidentiality governs types of action and does not aim to regulate all 'processing' of an inadequately specified type of information or content.

Rather than demanding that we first define and then protect all 'personal' content, confidentiality offers a way of protecting content of any type that the parties to a communicative transaction seek to protect, have agreed to protect, or are required to protect. It can be invoked for specific aspects of professional, commercial or other relationships, and can once again be waived by seeking consent from the confider.

The central difference from the current regime is that, in imparting confidential information, the recipient takes on obligations not to share the information without the recipient accepting the same obligation. But there is no absolute barrier to further uses of information.

I conclude that there are good reasons for revised data protection legislation. The redrafting of the 1995 EU *Data Protection Directive*, on which consultations are proceeding, and any subsequent legislative changes in the UK, need to be quite radical if informational privacy is to be served without damaging effects on medical research. I believe that in seeking reform it would be better to focus on regulating the acts by which content is communicated rather than the 'processing' of ill-defined types of informational content. □

1. Data Protection Act 1998, Part I, Section 1

Public trust in public data

Stephen Penneck

At the Office for National Statistics (ONS), making public data accessible is at the heart of everything we do. As the UK's recognised national statistics institute, ONS embraces the transparency agenda. We are the UK's largest producer of national statistics. In 2010, for example,

we published nearly 300 statistical bulletins and 100 news releases. We host media briefings, and organise an array of talks and specialist seminars on a range of themes, ranging from market-sensitive economic and business data to information on health and societal well-being. In addition, the ONS plays a leading role in the development

of national and international best practice, maintaining our position as a world-class provider of statistics.

From paternalism to openness

There has been a major shift in the way ONS works with users in recent years, away from narrow paternalism towards the broader

idea of what market researchers might call the 'citizen-consumer'. Once we acted as custodians, protecting public data. Now, we live in a world where our customers can ask for the publication of datasets which do not reveal individual and personal information. Putting the public at the centre of our statistical services fully supports the transparency agenda.

The first challenge in making public data public is to have a clear definition. The Transparency Board, chaired by Francis Maude, has defined 'public data' as "non-personal data on which public services are run and assessed and on which policy decisions are based".

It is important to stress that the agenda here is about non-personal data. We go to great lengths to safeguard the information provided by individuals and businesses. We do not publish anything that is likely to identify an individual, household or business. We also safeguard confidentiality and earn public trust in everything we do. So it is not just our commitment and ability to make public data public, but it is also about our commitment to keep private data private.

Census 2011

Nowhere is the duality of these obligations more pronounced than the Census: arguably the public data event of the decade. The 2011 Census questionnaire went out to 26 million households across England and Wales. Throughout the whole of the Census process, data security is a top priority.

The Census is by far the biggest snapshot of life in the UK, but ONS conducts many others. Business surveys, for instance, collect information that help measure the state of the wider economy, and help the Bank of England set interest rates. The Annual Survey of Hours and Earnings is used to make recommendations about the minimum wage.

We want to make the most of the information we hold. We know that unpublished data can be a valuable resource for academic researchers and for some time we have been making our data available to the research community via a number of routes.

Unlocking data

Access is given to approved researchers under strictly controlled conditions via the Virtual Microdata Laboratory (VML) based on ONS sites. The VML has been described by the OECD as "one of the most innovative research efforts in the public sector across the 30 OECD member countries".

The Economic and Social Research Council has recently launched the Secure Data Service (SDS) which enables safe and secure remote access by researchers to ONS data previously only available via the VML. The VML and the SDS are relatively recent developments compared with the UK Data Archive which was established over 40 years ago.

ONS data is available from the archive for the purposes of research and teaching, again with some restrictions. However, not all users need such detailed datasets nor can they all meet our restrictive conditions. There are other solutions to help these users: more than two billion statistics have been freed for public use through the Neighbourhood Statistics Service and NOMIS websites.

Last year ONS moved all its printed materials to the internet, reflecting the need to broaden the use of official statistics and balance the decline in demand for weighty printed publications. This has made data available to users more easily, whilst simultaneously reducing printing costs and offering better value for money. ONS now tweets all major releases. It has a Facebook page, and some of our analysis is on YouTube. From mobile 'apps' to software 'data mash-ups', demand for the streaming of relevant and timely statistics is growing.

The future

The latest ONS website includes a data repository for published aggregate statistics, and will also better support the dissemination of datasets and tabular and graphical outputs.

Our 'Beyond 2011: UK-wide Population Statistics Programme' could transform the way we work. This programme has been set up to establish and test models for meeting future user needs for census-type statistics, and to address the implications of a transformed population statistics system for wider socio-demographic statistics.

As we take this work forward, maintaining public trust in data security standards will be absolutely critical. Our dissemination strategy for the future is built on a number of planks, recognising the varied uses of our statistics and analysis.

The first plank recognises the importance of citizens who want to take information from us in a form they can directly use in their daily lives. So ONS is working with the Royal Statistical Society on its GetStats campaign. Another important aspect of making better use of public data is to use innovative methods of analysing and presenting existing data,



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he had responsibility for methodological advice to the ONS and to the Government Statistical Service, including advice to the National Statistician on quality, standards, best practice, surveys, administrative sources, analysis and the Census. As Director of Surveys and Administrative Sources, he had responsibility for all ONS surveys and for their outputs.

using the power of the internet. ONS has pioneered such data visualisation methods in areas such as population pyramids and the personal inflation calculator.

The second plank recognises that third parties are better placed to undertake certain types of analysis and provide some services, and that we have a duty to supply the necessary data. So we will publish on our new website in open data formats, enabling users to lift figures easily from our tables for further analysis.

We want to collaborate with a wider range of partners, including the commercial sector.

Our final plank concerns access for researchers to disclosive data. We plan to develop the service provided by the Secure Data Service, restricting the VML purely to data sets for which the SDS is not appropriate. We will continue to provide an effective service to enable Approved Researchers and other authorised users to access datasets where the appropriate permissions are in place.

Public trust

The Office for National Statistics is striving to make public data public. We are developing our IT systems, building a repository for published statistics, improving our website, and opening up sources, in a spirit of transparency. However, this will take time.

So how can we maintain public trust in this new world? We must act in people's best interests, responding to public rights and safeguarding private data. Whatever we make of public data, we must maintain confidentiality and protect their provenance. In the push for greater transparency of public data, accessibility is essential, but so is trust. □

www.statistics.gov.uk

The question of whether public procurement can be used as a means to stimulate innovation in the UK was explored at a meeting of the Foundation for Science and Technology on 22 June 2011.

Focusing Government procurement on innovation

John Krebs

The Government is the largest single customer for goods and services in the UK. In 2009-10 it spent £236 billion, or about one-seventh of our gross domestic product (GDP), on public sector procurement. This figure includes procurement by local Government and Government agencies.

The report on Government procurement by the House of Lords Select Committee looked at ways in which the Government could use its purchasing power to encourage and support innovation. Innovation in this context refers to the stimulation and exploitation of new ideas: this could be as diverse as the novel application of an existing idea, a brand-new idea applied to a process, product or system, or 'intelligent plagiarism' – taking an idea that has already been implemented in one place (such as the Oyster card in London) and using it in another.

The first stage of the inquiry investigated whether the Government currently uses its formidable purchasing power as a means of driving innovation and, if not, how it could be encouraged to do so. Innovation brings better solutions for the public sector as well as stimulating industries to develop products and services that may have a market elsewhere, thereby generating economic growth. A number of Government reports encouraging innovation in procurement were examined including, for example, *Transforming Government Procurement* and *Race to the Top* in 2007; the White Paper *Innovation Nation* in 2008, and *The Path to Strong, Sustainable and Balanced Growth* and *Technology Blueprint*, both published in 2010. However, the Committee found that, with the exception of a small number of special initiatives, most Government procurement is risk-averse and falls back on the use of tried and tested solutions.

Attempting to find out who makes the decisions on innovation and procurement, it became apparent that



The Lord Krebs Kt FRS FMedSci is Chairman of the House of Lords Science and Technology Select Committee. He is Principal of Jesus

College, Oxford and a member of the Committee on Climate Change where he chairs the Sub-Committee on Adaptation. He has served as Chief Executive of the Natural Environment Research Council (NERC) and as Chair of the Food Standards Agency. His early career was spent researching animal behaviour.

no single individual in Government has responsibility. Individual Departments make their own decisions about procurement, within an overall policy framework. The Committee recommended that there should be a Minister responsible for innovation and procurement across Government, and that within each Department there should be a Minister with accountability.

The inquiry looked specifically at the Department for Transport and the Highways Agency, both of which undertake substantial procurement. The Department for Transport has an Innovation Procurement Plan, but this lacks focus. To remedy this, the Select Committee report recommends measurable objectives for innovation procurement and a more prominent and proactive role, to include long-term

horizon scanning, for Chief Scientific Advisers in all Government Departments.

Although the inquiry did not find a specific solution to the problem of risk-aversion, it did challenge the Government to think about how to incentivise civil servants to determine appropriate levels of risk taking and, importantly, to develop strategies to manage risk. There is no point in taking a risk without an understanding of what might go wrong and what the consequences may be.

Local Government

Expectations for innovation at the level of local Government should not be unrealistic. Given the need for a good understanding of developments in science and technology, local authorities on their own, as relatively small entities, are unlikely to have the capacity to drive innovation and procurement at a local level.

One large-scale example of successful innovation in Government procurement is the variable speed limit controls introduced on the M25 London orbital motorway. This was an innovative solution to a problem of traffic management. Its development was spearheaded by the Highways Agency and it was subsequently sold overseas.

There have also been some small-scale success stories. The Forward Commitment Procurement initiative has produced recyclable mattresses and pillows for HM Prison Service and 'bio-dynamic' lighting for Rotherham NHS Trust. The Small Business Research

DISCUSSION

Risk aversion in the public sector

There is deep-seated risk aversion in the public sector, with good reason given the history of Public Accounts Committee hearings and media firestorms when things go wrong. Assessing results across sectors and portfolios of programmes rather than just project-by-project would go some way to ameliorating this. In addition, technical issues such as liability, sharing of risks and rewards as well as EU constraints need to be addressed.

Initiative, which is still in an embryonic stage, has identified a potential traffic-flow modelling system and a system for securing mobile phones. These are minuscule fractions of total procurement and as such they highlight the need to move innovative thinking to the centre of the procurement process.

Streamlining the process

The Committee was very encouraged to learn that attempts are being made to streamline the procurement process to enable small companies to bid for projects without the need to go through

a complicated process involving large amounts of paperwork. Anything that can be done to make the procurement process more transparent, straightforward and streamlined will be a step in the right direction.

Government procurement will be reviewed again in about 12–18 months to see what progress has been made against the inquiry's findings and what plans have been put in place to ensure that improvements continue.

I would like to end with a personal observation. In my life in Oxford, I chair a small spin-out company of Oxford

University. We have been involved in doing innovation work for several Government Departments. I have been very impressed by the people I have dealt with in terms of their ability and willingness to recognise where an innovative solution might work and to sponsor its development. What I have yet to see is whether these innovative solutions are actually put into practice. □

House of Lords Science and Technology Committee, 1st Report of Session 2010–11, 25 May 2011, HL Paper 148. www.publications.parliament.uk/pa/ld201012/ldselect/ldstech/148/148.pdf

Intelligent customers and appropriate suppliers

Darren James

Early engagement of an appropriate supplier by an intelligent customer will provide the best opportunity for innovation. This in turn will beneficially influence projects and result in optimum value for money.

The need for an intelligent customer is important and the definition given by Lord Bhattacharyya is particularly useful: “To be an intelligent customer you have to understand the technology and potential added-value opportunities as well as effective procurement processes and financial rigour.”

From a supplier's point of view, it is also important that the customer states clearly the output specification or purpose of the project and defines what is of value to them – identifying the relative merits of short-term cost, long-term cost and whole-life value. An intelligent customer will select an appropriate supplier and engage in the management of risk and the opportunity for innovation in ways that minimise cost and maximise value.

Lord Krebs noted that there have been a number of Government reports over the past few years that recommended early supplier involvement and collaboration in public sector procurement. Progress has been made in some areas but full implementation of this approach has yet to be achieved. One positive step in the 1990s was the arrival of the NEC (New Engineering Contract) form developed by the Institution of Civil Engineers. The Government is now mandating its use across significant areas of procurement.



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loss of Costain's undertakings in the rail, airports and highway sectors. He also has profit and loss responsibility for the delivery of major infrastructure projects and services to nuclear and energy customers, in addition to being responsible for Costain's tunnelling division which also services the water and power utilities.

Another very positive factor is that the Government reports cited by Lord Krebs are consistent in their messages – their recommendations for collaboration and the use of procurement as a tool to shape the market to better drive innovation are remarkably similar. So why is there such an inconsistent record of embedding the recommendations into practice? The reasons include issues of policy implementation, project delivery style and consistency in the drive for value.

The Select Committee's report stands out for its practicality. It provides a clear understanding of innovation – a word widely used but poorly understood. Its attitude to change is insightful. Change – and change is what the report requires from Government – is best achieved by motivating people to pursue collective objectives or, to put it another way,

persuading people to buy into the big picture and then helping them on their journey. The Committee's stated intention to check progress in 12-18 months' time is an excellent motivator for change.

Competence

It is important that competence has been placed at the top of the agenda. This recognises the importance of the intelligent customer. Responsibility for decision-making should rest with those who have the relevant knowledge and expertise. For example, the report states that the Government should “use their knowledge of the fundamental workings of Government to provide solutions”. In other words, those who know best should do the job.

This is a practical approach with a clear role for Chief Scientific Advisers to use their technical expertise where it makes the most difference. The report is clear about where responsibility lies, suggesting a number of ministerial appointments and acknowledging the importance of relationships. Clear and specific examples of good procurement innovation are identified.

Selecting the right form of procurement is not straightforward. The appetite for risk and the scope for innovation are only two of the factors that need to be considered. As a broad example, a simple project such as a repeatable, modular building – for instance, a supermarket – should be procured on a commodity basis. However, a one-off piece of complex infrastructure with interfaces,

Making innovation part of the supply chain

If the Government were to come forward early with its high-level objectives, then in a competitive marketplace the supply side would respond with innovative solutions. Opportunities for all parties to come together early would enable discussion of innovative solutions and help the customer better understand the risks and rewards involved. However, the public sector customer needs sufficient technical expertise to understand what objectives can reasonably be achieved through the application of new thinking and technology.

live operations and existing physical assets – for instance, St Pancras station – calls for a different procurement method that reflects the complexity of the project. Such a project also requires a highly intelligent customer!

Where this can all go wrong is when these simple rules are broken. In particular, if a complex project is procured on too simple a basis, the opportunity for innovation is lost and risk is overpriced. The project may be delayed, leading to expensive legal action, and it can sometimes result in the contractor going out of business.

It is worth pointing out that the bigger suppliers are able to sustain more financial exposure, which allows them to carry more risk on complex projects, while smaller suppliers are less able to sustain

financial exposure. This has a significant bearing on how small to medium enterprises (SMEs) can be engaged in innovative projects: in principle the client will need to nurture them carefully.

Early engagement

The stage at which the contractor is engaged can also have a significant impact on the scope for innovation. Take one highway scheme in South Wales, procured using an early contractor involvement method. The client thought that a 7km dual carriageway with nine bridges was needed. However, the contractor worked out that what was actually needed was a 7km single carriageway with two bridges. This solution delivered 99 per cent of the benefits of the dual carriageway at a cost

that could be afforded. The carriageway is now being used by 20,000 people every day.

Another example is the widening of the A282 at Dartford. The Highways Agency's main contractor engaged an SME early on, and they were able to develop an innovative method of traffic management that saved over £20 million. Engaging the SME within an environment where risk was shared enabled a programme that was much shorter than originally envisaged.

Similarly, early contractor involvement in a project on the A34 at Wolvercote enabled the contractor to work with the Highways Agency to develop an innovative method of construction. This involved the engagement of a specialist SME to build a viaduct in a temporary location alongside the permanent A34, thereby negating the need for permanent land-take and avoiding the need for a public inquiry. This reduced the final cost by 15 per cent.

I would like to leave you with the following thought. When risk is shared, a collaborative approach is created, allowing innovation to mitigate that risk; hence the risk does not materialise in the magnitude that was originally feared □.

Adding flexibility - and value

Sally Collier

The new Efficiency and Reform agenda within the Cabinet Office has been set up to drive efficiency and reform in central Government.

As part of its work on improving procurement policy, the first ever 'Lean' study of the Government's procurement process was undertaken ('Lean' is a production practice that works from the perspective of the customer to identify end-value and eliminate wasteful activities that do not create value. Essentially, Lean is centred on preserving value with less work).

The findings were staggering. Many stakeholders reported dramatic barriers: "It's an absolute minefield; we have lots and lots of hurdles to get over – 17 approvals processes and then we eventually might get to a contract." However, it is often not the rules that cause the procurement process to be so complex and lengthy; is it the way they are applied. Based on evidence from complex projects in the public sector, it may be possible to reduce all but the most complex procurement



Sally Collier is Executive Director of Procurement Policy and Capability in the Cabinet Office.

She is responsible for the UK's procurement policy and process and for central Government's procurement capability. She is leading negotiations on a radical rethink of the public procurement directives, streamlining the procurement process, ensuring that more SMEs participate in the government marketplace, and developing new innovative ways of raising procurement capability.

timescales by up to 40 per cent and within 120 days. This will be a powerful lever for innovation and a great incentive for firms to compete. To ensure this happens, a number of pathfinder projects have been put in place whose procurement and commercial teams are being trained in the relevant Lean techniques and new

processes.

To address the challenge of procurement capability, an accreditation programme, 'Licence to Operate', has been established which will increase the capability of procurement professionals. The components are: a licence to source, putting the emphasis on stimulating innovation; and pre-procurement dialogue.

There will also be a licence to contract-manage, because too often contract management is a forgotten skill.

In addition, a pilot 'Commercial Interchange Programme' with 15 key suppliers is facilitating two-way commercial skills and knowledge transfer between the Government and industry. A pan-Government 'Procurement Apprenticeship Scheme' is also being considered.

The role of SMEs

Encouraging small to medium enterprises (SMEs) to engage in procurement programmes is one of the Government's key priorities. The aspiration is that 25 per cent of central Government

Will procurement reform be enough?

Successful innovation often involves development effort, design work, prototyping and testing before major procurements are started. It is essential to have such preliminary work funded if innovative concepts are to be turned into results on the ground, but there is little money available. The problem is caused primarily by an inadequate business process design that does not use funds to reduce risk by assessing possible solutions before final commitment to a programme. Although good procurement processes are necessary to drive innovation, they may not in themselves be sufficient.

business will go to SMEs. To this end, an 'Innovation Launch Pad' was set up on the Number 10 website which invited SMEs to submit proposals for goods or services that would save the Government money or result in better outcomes.

Over 350 proposals were submitted. These were filtered and a shortlist drawn up. Those on the list are being invited to give a presentation at No 11 Downing Street. The SMEs with the best proposals will be offered intensive mentoring by entrepreneurial experts. This is just the start of what will be a continuing programme of SME engagement.

The new 'Contracts Finder' service

opens up Government opportunities to industry. It is a free online service for businesses, Government buyers and the public. It shows Government procurement opportunities, tender documents and resulting contracts. Not only has it proved very popular with businesses, it is also driving transparency within Government Departments by publishing their tendering activity every month on the website. The Cabinet Office is also developing new forms of contracting, such as mutuals (involving employee ownership), and new forms of joint ventures. Cabinet Office is examining how these new types of

ventures can grow before being subject to full competition. A more dynamic marketplace is also being created. Government has often been criticised for its use of 'framework agreements' whereby the parties are locked in for years.

The Government's reform agenda for procurement directly supports, and will stimulate innovation by:

- strengthening expertise, thereby leading to better outcomes and better value for money (vfm);
- making the procurement process more efficient and saving costs for suppliers;
- making contract opportunities more accessible to all potential suppliers and providing greater intelligence to those firms to be able to bid;
- providing opportunities for SMEs to put forward innovative proposals;
- creating new models of contracts including employee mutuals.

A great start has been made in achieving the procurement reform needed to generate efficiencies but also fundamental to supporting growth. □

Public procurement in practice

Brian Collins

My experience of working in Government is that there is a sad lack of the analytical skills and expertise necessary to allow value-for-money and innovation to co-exist. This is partly caused by a culture of risk aversion and partly by policy constructs and legislation. When the procurement process is reviewed again in 12-18 months time, it will be interesting to see whether the barriers have been dismantled sufficiently to allow both to be achieved.

Innovation at a small scale is taking place, but large-scale innovation remains rare. This is partly because that risk too is scaled up – large-scale innovation involves large amounts of money, political and other forms of social capital.

Do accounting officers or procurement officers always have the knowledge to choose the right method of procurement? Or should suppliers be brave enough to challenge them and say, "From our experience, we think you are choosing the wrong method to buy what we are selling"? I have spoken with many suppliers who say that such an



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approach is far too risky, because they have not yet developed a relationship of trust with the client and they are therefore unsure of the outcome. In the end, they either bid with the wrong instrument (solely because the client has asked them to use that instrument) or they walk away. In both cases the outcome is unsatisfactory.

So, although I agree that we need a hybrid set of procurement instruments, I think it is also important to look at who chooses the instrument in a given situation, and whether that choice is the correct one.

Early involvement is vitally important;

this is when the majority of the intellectual effort needs to be made in order to make a difference to the outcome in terms of innovation. I was part of an IT working party set up in 1999 to analyse why large IT projects fail. One conclusion was that all projects (not only IT projects) need to have the best team in place during the first 10 per cent of the spend. That lesson is still not applied across a range of disciplines – I am not even sure it has been learnt in IT. So I do worry that the Government's Procurement Reform Programme will be difficult to embed at any scale in the public sector.

The last point I want to make concerns the use of the Web to share information. If we can achieve transparency of knowledge and information, then a satisfactory outcome is much more likely. If everyone shares information pertinent to their role, trust will grow and collaboration become easier. We need to ensure that the mechanisms used for procurement build trust rather than destroy it. If we fail to engender that trust, our efforts to encourage innovation will also fail. □

In June, the UK published its National Ecosystem Assessment. The findings were presented at a meeting of the Foundation for Science and Technology on 13 July 2011.

Setting out the nation's natural capital

Bob Watson

The National Ecosystem Assessment reviewed changes in ecosystems over the past 60 years and looked forward to the next 50 years, focussing on economic assessment and options for response. The Assessment was structured around the following 10 questions:

What are the state and trends of UK ecosystems and services?

There has been a marked change in landscape over the last 60 years, affecting all ecosystems. Enclosed farmland has shown increased productivity, but this has been accompanied by a decline in biodiversity (birds) and soil quality. Woodland areas have increased, but coastal margins and marine diversity has deteriorated.

What were the drivers for these changes?

The main elements were the increase in farmland, the exploitation of natural resources, pollution, invasive species and (marginally) climate change. The drive to increase productivity has led to management changes; air and water quality have improved.

How do ecosystems affect human wellbeing; who is affected, and how are the effects managed?

Society in general benefits from a full range of provisioning, regulatory and cultural results. There is more food at lower cost; carbon is sequestered by woodlands; there are positive effects on physical and mental health. Yet we have insufficient evidence about links between changes in ecosystems and health. Benefits are unequally spread spatially and management is often at a local level. Human wellbeing and quality of life includes health and social collective needs.

What vital UK provisioning services are not provided by UK ecosystems?

The UK is not self-sufficient in meeting its food, fibre, water (embedded in products) and energy needs, and consequently depends significantly on non-UK ecosystem services, thus potentially



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exporting a substantial environmental footprint. Biomass flow through the UK economy is 150 million tonnes while domestic production accounts for only 100 million tonnes. Some 60 per cent of water demand is met from overseas (in terms of embodied or 'virtual' water). Policy changes and economics could well affect the current balance.

What is the public understanding of ecosystem services?

Most people do not understand the concept of ecosystem services, although this is changing. Provisioning services such as food and cultural services such as recreation are valued. The increasing membership of organisations such as the Royal Society for the Protection of Birds (RSPB), which has increased from 10,000 members in 1960 to over one million today, and the UK's 45 Wildlife Trusts with 800,000 members, illustrates an increasing appreciation and awareness of environmental issues.

Why should we encompass economic values of ecosystem services into decision making?

The economic, health and social benefits stemming from these services are central for human wellbeing. If the services are omitted from the economic framework, there will be less efficient resource allocation.

How might ecosystem services change in the future?

Six 'storylines' were considered (Table 1):

- 'green and pleasant land';

Green and pleasant land	A preservationist attitude arises because the UK can afford to look after its own backyard without diminishing the ever-increasing standards of living.
Nature at Work	This is based on the proposition that the promotion of ecosystem services through the creation of multifunctional landscapes is essential for maintaining the quality of life in the UK
Local Stewardship	This is a future where society is more concerned with the immediate surroundings and strives to maintain a sustainable focus on life within that area.
Go with the Flow	This scenario is essentially a projection based on current trends and results in a UK that is roughly based on today's ideals and targets.
National Security	Under this scenario, climate change results in increases in global energy prices forcing many countries to attempt greater self-sufficiency (and efficiency) in many of their core industries.
World Markets	High economic growth with a greater focus on removing barriers to trade is the fundamental characteristic of this scenario.

Table 1. The six scenarios of the NEA.

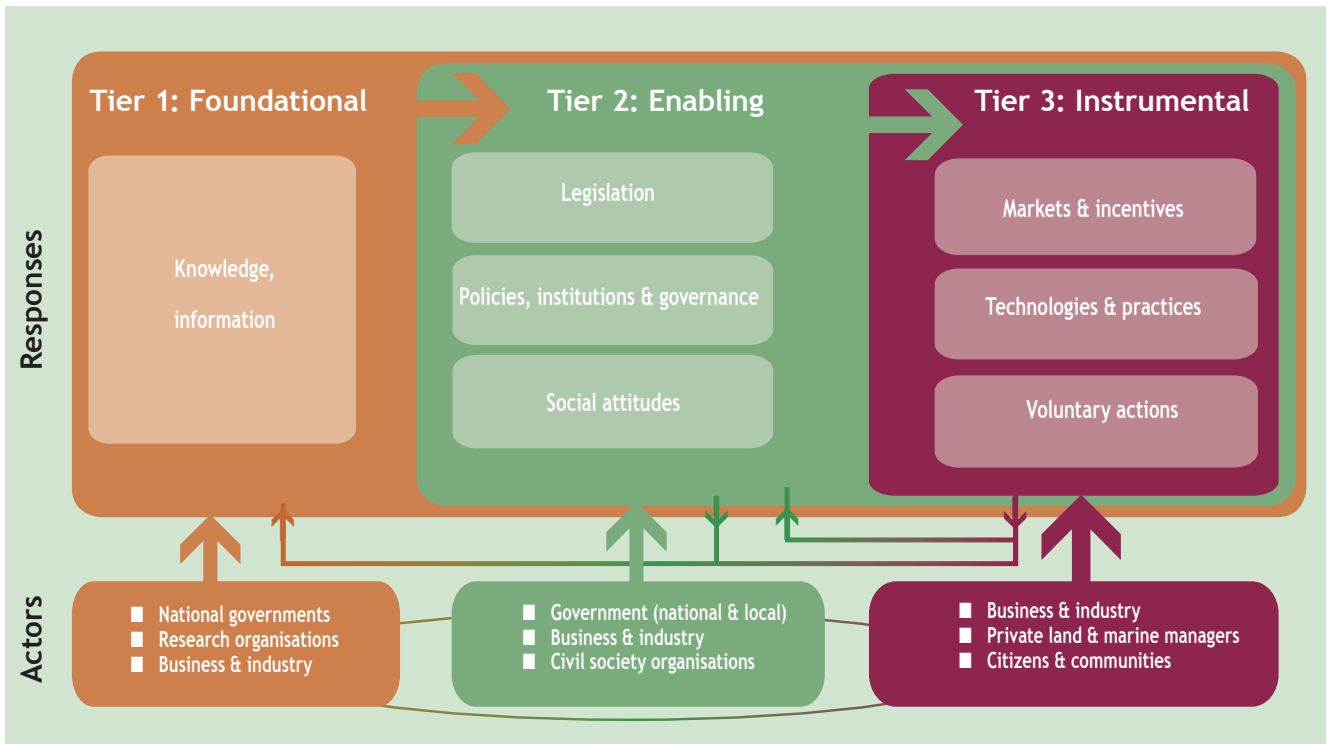


Figure 1. Knowledge (at a fundamental or ‘foundational’ level) creates the context within which governments enact legislation, adopt policies, enable institutions and Governance-based interventions, and influence social attitudes towards habitats and ecosystem services. These in turn provide the ‘enabling’ conditions within which actors undertake specific ‘instrumental’ strategies that frequently involve the use of markets and incentives for action, the deployment of specific technologies and practices, or the adoption of voluntary approaches. The figure also shows the role that key actors play in the initiation and implementation of responses in each of these three tiers.

- ‘nature at work’;
- ‘local stewardship’;
- ‘go with the flow’;
- ‘national security’;
- ‘world markets’.

Modelling the different storylines produced diverse results. Scenarios 1 and 2 produced significant gains in a broad range of ecosystem services compared with scenarios 5 and 6.

What are the implications of the different plausible futures?

Even recognising the limitations of the UK NEA analyses (e.g. not all goods and services were valued) the analyses demonstrate that simple reliance upon market prices is likely to yield an inaccurate assessment of the overall economic value of different scenarios to society. If only market values are taken into account then storylines that emphasised national self-sufficiency or economic growth resulted in the largest economic gains in the short- to medium-term due to increased agricultural production. Conversely, if all monetised values are taken into account then the storylines that

emphasised environmental awareness and ecological sustainability resulted in the largest economic gains to society, much of which is available over the short to long run.

How can we secure continued delivery of ecosystem services?

Contemporary society is less sustainable than it could be. Responding to the pressures to provide food, water and energy security, while at the same time conserving biodiversity and adapting to rapid environmental change, will require getting the economics right, creating functioning markets for ecosystem services, improving the use of our resources and adopting new ways of managing those resources.

Many of the recent improvements in ecosystem services and biodiversity conservation have happened as a result of effective regulation. These have been driven by various European Union policy directives such as the Rural Development Programme, and in particular by the European Union Common Agricultural Policy’s agri-environment schemes, complemented by the Nature Directives and an increase

in the area and condition of protected areas. Governments, the private sector, voluntary and civil society at large all have key roles to play in the transition to a more sustainable use of ecosystems.

Have we advanced in our understanding of the influence of ecosystem services on human-wellbeing; what are the knowledge constraints on decision making?

While there are uncertainties, knowledge gaps and controversies in the evidence base, there is sufficient information to manage our ecosystems, and the flows of services from them, more sustainably.

Currently we are unable comprehensively to quantify all of the relationships between UK biodiversity and the ecosystem services it supports. In particular, we need to understand better the role of microbial and fungal diversity. The lack of information on how aspects of wellbeing such as health and shared (social) values are linked to ecosystem services constrains our understanding of how we can include them in decision-making. □

<http://uknea.unep-wcmc.org>

How can scientific advice help in the formulation of a response to a sudden crisis? The question was debated at a round-table discussion organised by the Foundation for Science and Technology and held at The Royal Society on 1 November 2011 at which the UK and Irish approaches were explored.

Science advice in a crisis

Opening the discussion, Sir John Beddington, the UK Government's Chief Scientific Adviser, noted that scientists face a perennial problem of when and how best to advise governments on scientific issues at times of crisis. He cited recent examples where advisers had been able to provide crucial input into crises: the Foot and Mouth outbreak of 2001, the swine flu epidemic of 2009 and the eruption of the Icelandic volcano Eyjafjallosjökull in 2010. In 2011, there was of course the Japanese earthquake followed by the tsunami and a nuclear accident at the Fukushima power plant.

In such cases governments needed urgent, balanced and practical scientific judgments on what should be done. Of the cases he mentioned, action on foot and mouth disease and swine flu had been fast and successful. Yet, there was a lack of appropriate action and international regulation on the effects of the volcanic eruption. In the case of the Fukushima incident, the risks – so far as British interests were concerned – were very small. To address such a range of different situations effectively and promptly, we need the right mechanisms – first to assess risks and then to give the correct advice, especially to the right people. We also need to access a wider community of experts in areas specific to the issue at hand.

Sir John noted that he had made progress in this respect as Government Chief Scientific Adviser, setting up subgroups for specific purposes, developing the Foresight Programme, and cooperating with such bodies as the Parliamentary Science and Technology Select Committees.

The Irish context

Professor Patrick Cunningham, Chief Scientific Adviser for Ireland, strongly welcomed the development of scientific dialogue between the UK and Ireland. Irish investment in science had greatly increased. In fact, in both countries it amounted to around 2 per cent of GDP. The spend on science might not be as high as in Switzerland and the

Scandinavian countries, but the Irish and British systems of Chief Scientific Advisers across Government was a model for others, he argued.

There were obvious problems in conveying the salient information about scientific problems to ministers and civil servants – and indeed securing access to the right people. The crisis in Ireland in 2008 over the pig industry and dioxins was a good illustration. It highlighted what was necessary to identify a problem, track down its causes, and then take the necessary remedial action. In this case, the Government had acted quite swiftly, albeit at high cost: the cost would have been less if action had been taken even sooner.

A major current problem concerned bovine tuberculosis transmitted by

badgers, and here there were strong views on all sides. Perhaps at least part of the answer lay in vaccination.

Then there were wider issues: for example Irish dependence (around 90 per cent) on external sources of energy, the development of renewable sources, and the controversy over a pipeline between the Republic and Northern Ireland. Still wider were such global problems as human proliferation, and how to feed increasing numbers of people. Professor Cunningham concluded by saying he looked forward to further developing cooperation between the two countries in the lead up to, and during, the Euroscience Open Forum to be held in Dublin in 2012. □

DISCUSSION

In the open discussion that followed, a number of points were made:

- It is often difficult to assess risks and convey balanced advice. Alarmism does not help. Some scientists know how to connect with policy makers and others do not. Even those who do sometimes have to cope with resistance from vested interests and a sceptical media.
- Access to the right people at the right level is essential. In some cases, this access may depend on good personal relationships. Good use has to be made of mechanisms such as COBRA (in the Cabinet Office), the Met Office (now owned by the Department for Business, Innovation and Skills) and the Parliamentary Science and Technology Select Committees.
- Presentation of scientific problems in the media is a particular problem. It can be hard to avoid making statements which give the impression of greater certainty than may be justified. Even scientists can be wrong sometimes.
- Scientists have to do better in explaining themselves, and make better use of data analytics and intelligent technology. They should make themselves more available, and also be ready to take initiatives, for example over energy and its storage. This means being ready to challenge policy outside the strictly scientific field: for example over transport or security issues.
- Although scientists should improve their cooperation with their European counterparts, they have to recognise differences in approach and philosophy. There should be a stronger focus on work within European institutions, including the European Parliament.

Recent dinner/discussions organised by the Foundation for Science and Technology are listed below. Summaries of these and other events - as well as the presentations of the speakers - can be found on the Foundation website at: www.foundation.org.uk

Stimulating economic growth by increasing the contribution from research, innovation and the Higher Education sector
23 November 2011

Sir Richard Lambert, Former Director General, CBI

Dr Graham Spittle CBE, Chairman, Technology Strategy Board

Catherine Coates, Director, Business Innovation, Engineering and Physical Sciences Research Council

Rt Hon David Willetts MP, Minister for Universities and Science, Department for Business, Innovation and Skills

The impact of the development of shale and tight gas reservoirs on global energy supply
9 November 2011

Malcolm Brinded CBE FREng, Executive Director, Upstream International, Royal Dutch Shell

Professor Paul Stevens, Senior Associate (Energy), Royal Institute of International Affairs, Chatham House

Professor Mike Stephenson, Head of Science, Energy Geoscience Programme, British Geological Survey

Science advice in a crisis
1 November 2011

Sir John Beddington CMG FRSE, Government Chief Scientific Adviser, Government Office of Science

Professor Patrick Cunningham, Chief Scientific Adviser, Government for Ireland

Lifting barriers for career paths in Science, Technology, Engineering and Mathematics (STEM)
27 October 2011

Dame Jocelyn Bell Burnell DBE FRS FRSE FRAS FInstP, Chair, Women in STEM Inquiry, The Royal Society of Edinburgh

Dr Ellen Williams, Chief Scientist, BP

Sir Adrian Smith FRS, Director General, Knowledge and Innovation, Department for Business, Innovation and Skills

Developing adaptation policy and action for the UK in response to climate change
19 October 2011

Neil Thornton (represented by Dr Rupert Lewis), Director for Climate, Waste and Atmosphere, Department for Environment, Food and Rural Affairs

Sir Graham Wynne CBE, Deputy Chairman, Sub-Committee for Adaptation, Committee on Climate Change

Tom Bolt, Director, Performance Management, Lloyd's of London

The UK National Ecosystem Assessment
13 July 2011

Professor Bob Watson CMG FRS, Chief Scientific Adviser at the Department for Environment, Food and Rural Affairs

Public procurement as a tool to stimulate innovation - the House of Lords Science and Technology Select Committee Report
22 June 2011

The Lord Krebs Kt FRS FMedSci Hon DSc, Chairman, House of Lords Science and Technology Select Committee

Darren James, Managing Director Infrastructure, Costain

Sally Collier, Executive Director, Procurement Policy and Capability, Efficiency Reform Group, Cabinet Office

Professor Brian Collins CB FREng, Former Chief Scientific Adviser, Department for Business, Innovation and Skills and Department for Transport

Can better use be made of public data for example in health research?
8 June 2011

Professor Paul Boyle FRSE, Chief Executive, Economic and Social Research Council

Baroness O'Neill of Bengarve CBE FBA HonFRS FMedSci, House of Lords

Stephen Penneck, Director General, Office for National Statistics (ONS)

The Japanese earthquake, tsunami and nuclear accident - implications for the UK
18 May 2011

Sir John Beddington CMG FRS FRSE, Government Chief Scientific Adviser, Government Office for Science

Professor Nick Pidgeon, Professor of Applied Psychology, School of Applied Psychology, Cardiff University

Professor Laurence G Williams FREng, Former HM Chief Inspector of Nuclear Installations, Professor of Nuclear Safety, John Tyndall Institute, University of Central Lancashire

Dr Mike Weightman FREng, HM Chief Inspector of Nuclear Installations, Office for Nuclear Regulation, Health and Safety Executive

The future strategy for the management of mental health in the UK
4 May 2011

Professor Lord Layard FBA, Centre for Economic Performance, London School of Economics and Political Science

Professor Simon Wessely FRCP FRCPsych FMedSci, Vice Dean, Academic Psychiatry, Head, Department of Psychological Medicine, and Director, King's Centre for Military Health Research, Institute of Psychiatry, Maudsley Hospital, King's College London

David Behan CBE, Director General of Social Care, Local Government and Care Partnerships, Department of Health

Is there a viable future for biofuels in the UK?
6 April 2011

Dr Bernie Bulkin, Chair, Office for Renewable Energy Deployment (ORED), Department of Energy and Climate Change

James Primrose, Global Strategy Manager, BP Biofuels

Sam Cockerill, Business Development Manager, Ensus

Professor Douglas Kell, Chief Executive, Biotechnology and Biological Sciences Research Council

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