

Feature  
**Root and branch review  
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Future of driving

Joining forces to fight Ebola

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Civil Service Quarterly opens up the Civil Service to greater collaboration and challenge, showcases excellence, and invites discussion. If the Civil Service is to be truly world-leading it needs to collaborate more, learn from experts outside the Civil Service, listen more to the public and front-line staff and respond to new challenges with innovation and boldness.

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# Editorial

## » Civil Service Quarterly: open, consistent, professional



Chris Wormald

Welcome to the eighth edition of Civil Service Quarterly.

A key theme running through this issue is that technological advancements are changing the way we live and work: 'A revolution on our roads' explores a future in which cars drive themselves; the power of Cabinet Office's Technology Transformation programme is documented in 'Using technology to change the way we work'; whilst 'Public Dialogue – solving an ethical dilemma' shows how public engagement has led to the legalisation of new techniques to treat mitochondrial disease.

Clearly, civil servants need the skills to keep pace with this rapidly changing world. Articles such as 'Fighting crime with better data', which explores HMRC's new approach to analysing and linking data, and

'A 10 point plan for growth: two years on', which outlines Defra's strategic approach to promoting economic growth, showcase some of the cutting-edge techniques and new approaches being used in departments.

But this edition also opens up the challenge more widely: how can government ensure the UK's entire workforce is equipped with the skills needed to compete with the rest of the world? 'Partnering with business to Make Things Do Stuff' and 'A root and branch review of STEM' explore two approaches to developing vital STEM skills, particularly amongst young people.

But one of the most urgent and pressing challenges facing governments worldwide is the most recent Ebola outbreak. As DFID works with a range of departments to develop a vaccine, diagnose and treat patients, and contain the spread of the disease, the need for new techniques, cross-departmental collaboration and an international perspective couldn't be clearer. Meanwhile, in 'Bridging the Divide' Sir Jonathan Stephens provides a fascinating insight into the role played by civil servants in securing cross-party agreement – proof, if any were needed, of why exactly objectivity and impartiality are so important within the civil service.

The period around an election is an always interesting and sometimes uncertain time. But, we hope that this issue makes clear, that rigorous evaluation and continuous improvement is central to creating a world-leading civil service capable of responding to any future challenge. We hope that you enjoy the articles; please do comment and share your views, or use #csquarterly on social media. We look forward to hearing from you.

**Chris Wormald**  
Permanent Secretary,  
Department for Education

**Cover photo:** Rachel Riley, presenter of Countdown and BBC presenter Katie Derham talking at the launch of Your Life maths and science campaign.

Let us know what you think by email ([csq@cabinetoffice.gov.uk](mailto:csq@cabinetoffice.gov.uk)) or on twitter [#CSQuarterly](https://twitter.com/CSQuarterly).

# A ten-point plan for growth: two years on

» The Prime Minister's challenge to departments to demonstrate their contribution to economic growth saw Defra draw up a 10-point plan of actions. Two years later, Katherine Riggs, Head of Strategy Unit, Graham Symons, Senior Economist, and Will Pryer, Strategy and Policy Adviser at Defra explain how the plan has boosted the economy, improved the lives of communities and individuals, and brought about a culture shift.

## In the department

Achieving strong and sustainable economic growth has been a key priority for the current UK government. In 2012 the Prime Minister challenged departments to demonstrate their contribution. But how could the Department for Environment, Food and Rural Affairs (Defra), not traditionally viewed as a growth-supporting department, respond to this challenge?

Defra realised the most significant boost to the recovery it could deliver would come from focusing on three key areas – growing food and farming and their exports, investing in infrastructure and removing barriers to growth. A 10-point plan of actions, clustered around these headings and deliverable by 2015, was put together and presented to Cabinet in January 2013.

Two years later, the successes are clear. Rooted in solid analysis, a clear strategy and an increase in the capability of staff, the plan has helped boost the value of UK food and drink exports by £700m between 2012 and 2013, reduced regulation

for businesses and helped create thousands of extra jobs in rural areas. The plan was instrumental in changing the way Defra staff thought about the department's contribution to growth alongside improving the environment and other important objectives.

## Identifying the priorities

Identifying the priorities was an initial challenge: the department's diverse activities held a range of possible areas to highlight, from remediating contaminated land to reform of the Common Fisheries Policy.

A firm analytical basis was essential. An economic framework was developed to identify how different measures – some 48 in total – might contribute to growth in terms of their impacts on: demand in the economy; levels of different 'factors' of production (like land, labour and physical capital); and the productivity of these factors. To assess the latter, Defra explored how activities might affect key drivers of productivity such as investment, innovation, skills, competition and enterprise. Defra used a five-star scoring system to rate

each potential measure in terms of the scale of its expected impacts, how likely these were to be delivered within 24 months, and the degree to which impacts would be measurable. Ministerial priorities were important as were distributional impacts of activities and trade-offs with other policy objectives.

This process enabled Defra to prioritise its contribution into ten actions, and three broader areas, of the '10-point growth plan'.

## Growing our sectors and their exports

Defra has responsibility for promoting sectors (food and drink, water, waste) that form a substantial part of the UK economy. The food chain, for instance, contributes over £100bn, or around 7%, to the UK's Gross Value Added (GVA) and employs one in eight working people. Food manufacturing is the UK's largest manufacturing sector, bigger than automotive and aerospace combined.

Defra has led high-level visits that have helped open up overseas markets for UK exports. In January 2015, Defra's Secretary of State,





Tunnel boring machine at Lee Tunnel



## A ten-point plan for growth: two years on

### Summary of Defra's 10-Point Growth Plan

- **Growing our sectors and their exports**
  - 1 Increase exports and competitiveness in the food chain
  - 2 Set the conditions to ensure that GM and nanotechnology can play a part in contributing to economic growth
  - 3 Improve rural competitiveness and skills, invest in tourism and support micro-enterprises
  - 4 Proactively safeguard animal and plant health
  - 5 Reduce waste and inefficiency
- **Investing in infrastructure**
  - 6 Improve broadband and mobile phone access in rural areas
  - 7 Invest in flood and coastal protection
  - 8 Thames Tideway Tunnel
- **Removing regulatory and other barriers to growth**
  - 9 Unblock growth potential by removing red tape and improving environmental challenge
  - 10 Make it simpler and quicker to comply with the Habitats and Wild Birds Directives

Liz Truss, led a trade mission to China that created market access for UK animal products worth up to £200 million per year.

The £160 million 'agri-tech' strategy, developed by Defra, BIS and DFID is now funding 52 projects worth £43 million, and leading directly to innovation in the fields and on the shelves. Defra also helps protect farmers and industry (and the wider public) from animal and plant diseases – the 2001 foot and mouth outbreak cost the UK economy over £3 billion.

### Investing in infrastructure

Defra's investment in infrastructure helps unlock growth and protect against the natural forces that can derail it. Working with the Department for Culture Media and Sport (DCMS) and Broadband Delivery UK (BDUK), Defra helps to improve access to broadband and mobile communications in rural areas.

Alongside measures to support rural skills and businesses, this enhances economic opportunities for around a fifth of England's population and strengthens the economic contribution that rural areas can make, currently around £210 billion of England's GVA.<sup>1</sup>

Investment in flood defences helps to avoid substantial economic damages (estimated to have exceeded £3bn following the 2007 floods), and Defra's role in enabling £4 billion of investment in the Thames Tideway Tunnel will improve the efficiency of the capital's waste management and create over 9,000 jobs through the construction process.

### Removing regulatory and other barriers to growth

The current government has made creating the right conditions for business development a priority. Defra is implementing the largest

programme of reforms within the government's 'Red Tape Challenge' programme, being responsible for over 30% of all legislative reforms.

### What has been achieved?

Two years since the 10-point growth plan was launched a number of significant outcomes have been achieved, including:

- **Boosting exports:** over 200 new markets for animals and animal products have been opened. Exports from this sector to non-EU markets increased by £179 million in 2013.
- **Protecting against animal and plant disease:** a UK plant health risk register, identifying risks and prioritising action on plant pests and diseases, was launched in January 2014.
- **Expanding superfast broadband coverage (with DCMS and BDUK):** over 2 million additional premises had been given access by February 2015.
- **Protecting against floods:** 150,000 additional homes are now better protected.
- **Reducing regulatory burden:** Defra is on track to reduce the volume of environmental guidance by 80%, creating expected savings for businesses of £1.5 billion over the next five years.
- **Rural business development:** Five pilot 'Rural Growth Networks' assisted over 2,000 businesses, gave advice to over 800 individuals interested in starting a business and helped create around 400 new ones.

Below the high level numbers, Defra's activities are opening up new opportunities for businesses, communities and people.

1 See Defra's policy note, 'How Increased Connectivity is Boosting Economic Prospects in Rural Areas', December 27 2014.



Businesses such as Elmgrove Foods have seized new export opportunities. One hundred percent of this company's £25m turnover is generated by exporting offal products with little value in the home market but considered delicacies in the Far East and Africa. Managing Director, Stuart Dobson believes that "Defra and the Animal and Plant Health Agency are critical to [Elmgrove's] success".

Shepherds Walks, a walking holiday business in Rothbury, is among businesses benefiting from superfast broadband provided by the joint Defra-BDUK Rural Community Broadband Fund. Jon Monks, the founder of the company, said: "We have seen a 25–30% increase in both our productivity and in customer numbers since superfast broadband was made available ... I expect this to increase. It has been truly life changing for me and my team and revolutionised the way we work."

A flood protection scheme in Lower Dove, Derbyshire has

protected 1,619 households, a sewage treatment works, local roads and the Nestlé site at Hatton. It has safeguarded 400 jobs and enabled Nestlé to create 400 new jobs.

### Changed the way this department thinks

A key benefit of the growth plan has been a shift in departmental culture, as recognised by a number of stakeholders inside and outside of Defra. Thinking about economic growth has become more embedded in policy and project development, and in the department's messaging. As the Cabinet Secretary put it, the plan has "changed the way this department thinks".

Developing and implementing the plan as a shared agenda has not always been easy. Targeted seminars and training events were used to equip staff with the required understanding of the concepts of growth, to ensure they could capture the

economic benefits of delivering their policies, and to increase acceptance that achieving growth and improving the environment could go hand-in-hand.

### What next?

There is scope to go further to develop Defra's role on growth. A potentially important area is to strengthen understanding of the significance of the natural environment, or our 'natural capital', in underpinning growth. According to the Natural Capital Committee, improving commercial fish populations could be worth £1.4 billion per year.<sup>2</sup> There are also further opportunities to remove barriers to innovation across Defra's sectors to help drive productivity improvements.

But Defra's 10-Point Growth Plan has put the department in a strong position to deliver a real contribution to growth in the years ahead.



2 Third State of Natural Capital report of the Natural Capital Committee (NCC), January 2015. The NCC is an independent advisory body that reports to the Economic Affairs Committee. The Committee is supported by a secretariat based in Defra.

# The future of driving

» **Driverless vehicles are about to take to UK roads, thanks to work led by the International Vehicle Standards Team at the Department for Transport. The team's recent regulatory review suggests that automated cars could make our roads safer, quieter and cleaner. Lydia Fitzpatrick, strategic communication manager, explains what the government is doing to make this happen.**

A revolution is about to take place on our roads. A review just published by the International Vehicle Standards Team at the Department for Transport (DfT) is paving the way for the testing of driverless vehicles on UK roads, taking us a step nearer to fully automated cars.

Many of us already enjoy driver assist technologies that have been steadily introduced as standard by vehicle manufacturers. Things like cruise control and anti-lock braking make driving easier and safer – but the driver still needs to concentrate on driving 100% of the time.

But imagine surfing the web, reading a book or turning to chat to your passengers face to face as you travel to work or take one of your many routine journeys.

The average driver spends 235 hours behind the wheel every year – that's the equivalent of six working weeks. Automated cars mean that, for the first time since the invention of the motor vehicle, the 'driver' will be able to choose whether to control their car or hand over to the vehicle itself.

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## Safer, cheaper, greener

Imagine life with fewer traffic jams and collisions. As well as making driving easier and freeing up time to do other

**“ The average driver spends 235 hours behind the wheel every year – that's the equivalent of six working weeks. Automated cars mean that, for the first time since the invention of the motor vehicle, the 'driver' will be able to choose whether to control their car or hand over to the vehicle itself. ”**

things, the other important benefit is improving road safety. Human error is a factor in more than 90% of crashes – whilst, on the other hand, UK research found that vehicles fitted with just one advanced safety technology, Electronic Stability Control, are 25% less likely to be involved in a fatal collision.

Highly and fully automated vehicles are a natural progression from today's automated safety technologies, such as advanced emergency braking, traffic jam assist and lane keeping assist. These are already fitted to many high-end cars and are gradually filtering down to more mainstream vehicles.

Automated driving avoids

the problems of drivers being distracted, misjudging other road users' movements, failing to look, or being careless or in too much of a hurry. A range of sensors to monitor surroundings mean that automated cars will not make these mistakes. Required to respect all road traffic laws and the Highway Code, they will not break the speed limit, not tail-gate or run red traffic lights. This is expected to substantially reduce collisions, deaths and injuries on roads.

It could also help reduce our driving costs. The insurance industry is already working to encourage the fitting of advanced emergency braking systems to all new vehicles – and a reduction in insurance claims could lead to lower premiums.

More consistent driving will reduce emissions and ease congestion. Driverless vehicles are expected to be able to communicate with each other and their surroundings to identify the optimum route, helping to spread demand for scarce road space, reduce congestion and give more consistent journey times.

Vehicles can also communicate with traffic lights and other roadside infrastructure and use this information to minimise fuel consumption and emissions.





### Mobility for all

Most of us take driving for granted and cannot imagine life without our car. However there are many people who do not have a driving licence and even more who do not have access to a vehicle. Disabled people may be unable to drive. Elderly people may be judged unfit to drive. Others may simply not want to drive or be concerned about their ability to do so.

Fully automated vehicles, which don't require a driver at all, could dramatically

improve the mobility and quality of life of people unable or unwilling to take the wheel.

### The National Infrastructure Plan

The UK is already a world leading centre for vehicle research and technology. We have some of the best innovators, engineers, facilities and opportunities for automotive investment in the world.

Recognising the benefits of driverless or autonomous

cars, government is keen to support their development in the country. Chancellor George Osborne paved the way in his 2013 Autumn Statement, when he announced the regulatory review in the National Infrastructure Plan to enable the trialling of driverless cars on UK roads. He also announced the prize fund for cities or towns to test the technology. As manufacturers have been carrying out extensive testing on private test tracks, the next logical step is carefully controlled



## The future of driving

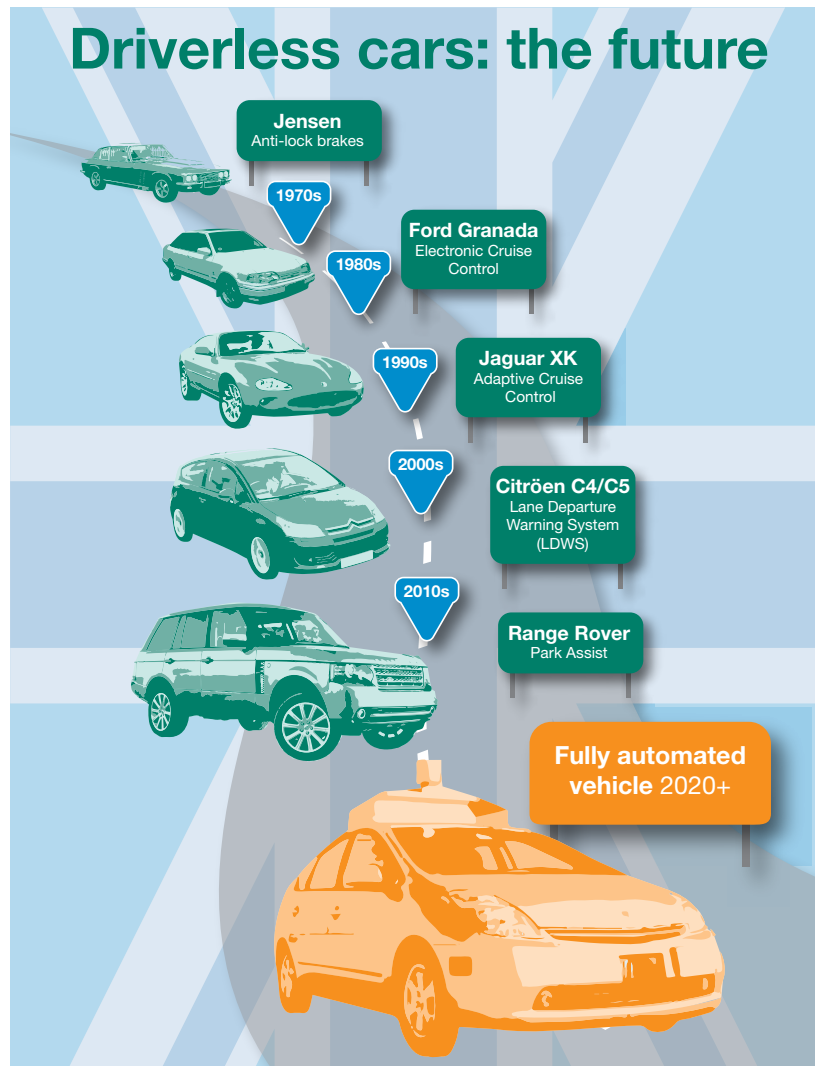
testing on public roads.

The Department for Transport's regulatory review was published on February 11 giving the legal clarity to support these trials of automated vehicles on UK roads. The review allows for real-world testing of automated technologies, providing a test driver is present and takes responsibility for the safe operation of the vehicle and that the vehicle complies with road traffic law.

It is a significant milestone as it marks the government's initial stage in developing a strategy to ensure we capture these potential benefits while maintaining our excellent road safety record.

While the review confirms the way ahead is clear for testing of these vehicles, there are still challenges for vehicle developers to overcome before driverless cars are an everyday sight on our roads. For example, the sensor systems need to be developed to improve performance in rain and snow, ensuring that objects can reliably be distinguished from weather conditions.

The review also sets out the actions the government will need to take before these vehicles can come to market. This includes providing clarity on how liability passes between the driver and the vehicle manufacturer according to mode of operation, and working with the insurance industry to develop requirements governing insurance of highly and fully automated vehicles. Liability and insurance issues are closely connected and the government will work closely



with stakeholders to ensure the complexity of these areas is carefully considered. Information and learning from real-world testing will help inform this work.

### National testing

The Department for Transport is working jointly with the Department for Business, Innovation and Skills on the £19 million competition funding for trials now underway in Greenwich, Bristol, Coventry and Milton Keynes. Innovate UK is overseeing consortia made up of representatives from cities, business and

research organisations testing automated vehicle technology.

In Coventry, futuristic self-driving pods will ferry people from the railway station to the town centre, while Bristol will be testing technologies such as car-to-car communication and advanced sensor systems for buses. Greenwich will see an innovative driverless shuttle vehicle used to transport people to the O2 arena as well as autonomous valet parking. All three consortia are also proposing to include road trials of highly automated cars.

This is possible because testing conditions in the UK offer the best possible framework to encourage



the largest global businesses to come to the UK to develop and test their technologies.

Unlike other countries, we do not limit trialling to the test track or certain geographical areas. We don't require certificates or permits, or the need for a surety bond (provided insurance has been arranged). Instead, a Code of Practice, currently being developed with the input of stakeholders and due to be published in the spring, will include specific requirements to promote safety and maintain our excellent road safety record. Working with the devolved administrations, DfT will review and amend domestic regulations to accommodate driverless vehicle technology

by summer 2017. In parallel the government will liaise at an international level with an aim to amend international regulations on the use of driverless car technologies by the end of 2018.

### The future's bright

Supported by the investment from Government and others, we can create the perfect environment in the UK for building the automotive technologies of the future. We believe the UK is uniquely positioned to become a premium location globally for the development of these technologies.

Already multi-national

companies such as Ford, Shell and Jaguar Land Rover are working alongside UK based experts and innovators in this field such as Oxbotica, Gobotix and Williams Advanced Engineering as part of the three consortia receiving the Government's grant funded driverless car trials.

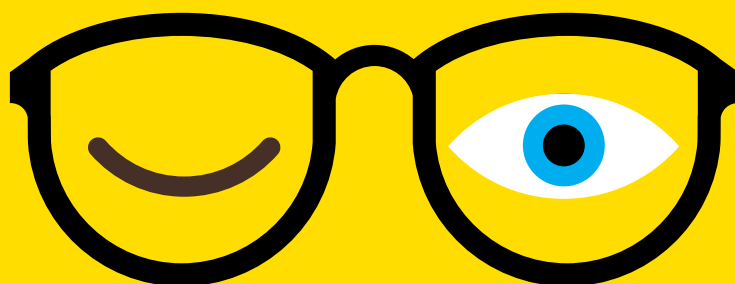
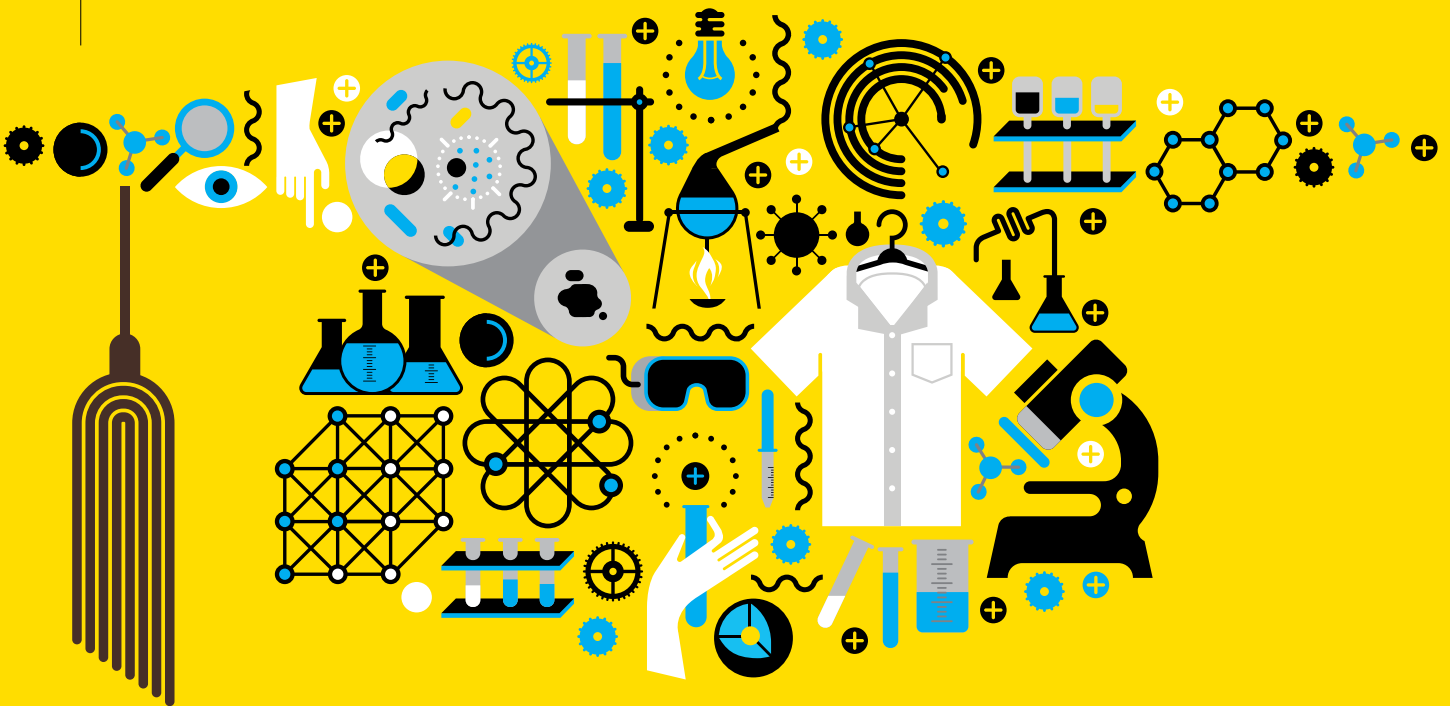
Government expects driverless vehicles to provide significant economic, environmental and social benefits. It creates a tremendous opportunity for the whole country to share in shaping the future of these exciting developments and the government, working with the devolved administrations, wants to play its part in making that happen.



Mira Co-operative Vehicle

# A root and branch review of STEM

» Evidence suggests that the demand for individuals trained in science, technology, engineering and maths (STEM) will continue to rise. A recent review commissioned by No. 10 and the Treasury explored the current skills base in the UK, and possible policy solutions to build STEM capability in the country. Alex Morris, from the Strategy and Growth Directorate in the Department for Business, Innovation and Skills (BIS), explains how BIS and the Department for Education are planning for the future.



The challenge of training enough people with science, technology, engineering and maths (STEM) skills has been a concern in Britain for many years.<sup>1</sup> We need graduates, postgraduates and technicians to fill key jobs in STEM-specific roles (as scientists, engineers, technicians, teachers etc.), and people qualified with these skills to degree level (and at A-level and GCSE) also bring important skills to non-STEM roles: in finance, the civil service and other professions, for example. Moreover, a distinction between STEM and non-STEM roles is increasingly blurred: the large computer games industry, for instance, draws extensively on creative and technical skills.

So, increasing the numbers of STEM-trained individuals entering the labour market is good news in terms of

increasing the UK's capacity in science, and by bringing increased productivity to other sectors.

That's why in summer 2014 No.10 and the Treasury commissioned the Department for Business, Innovation and Skills (BIS) and the Department for Education (DfE) to pull together a small, joint team to undertake a rapid review of the evidence and potential policy solutions for encouraging greater take-up of STEM at school, further and higher education, and in the workplace.

### The challenge

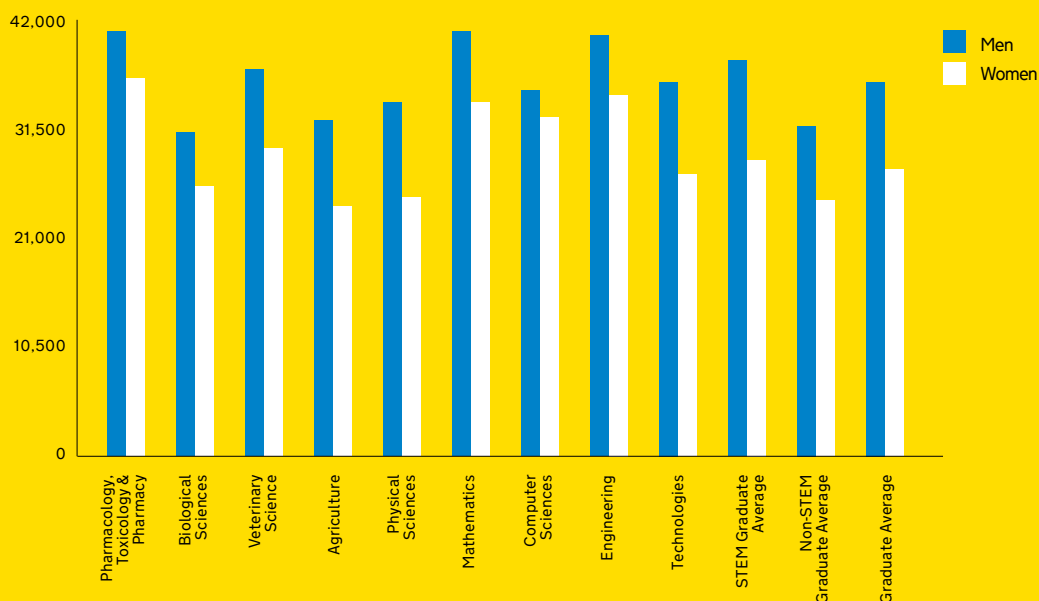
Setting any sort of figure on the scale of desired increase is riddled with difficulty. However, analysis of the various work by IPPR, UKCES and others suggested an

appropriate exam question: "What would we need to do to get 1 million people into 'STEM jobs' over the next ten years?" This implies around 100,000 a year (an increase in the order of about 30,000 on current levels), which was a reasonable estimate of scale, but also set a stretching ambition. This provided a basis for discussion, and something to test policy proposals against.

### Evidence

The first task for the review team was to analyse the substantial evidence base that exists in published reports, previous reviews and government datasets. The review revealed that the numbers participating and qualifying in STEM subjects at school and at higher levels have actually increased over

**Figure 1:** Median earnings for individuals aged 18–64 by subject of study at higher education (weighted estimates, 2008 £)



<sup>1</sup> As long ago as 1870 The Royal Commission on Scientific Instruction headed by the Duke of Devonshire was set up to address this issue and the fear expressed by Professor Tyndall FRS that "The facilities for scientific education are far greater on the Continent than in England, and, where such differences exist, England is sure to fall behind as regards those industries into which the scientific element enters."

## A root and branch review of STEM

the last decade:

- GCSEs at grades A\*-C in Maths have risen by 23% and in all science by 16%;
- Participation in STEM A-levels has increased, for example in maths 72% and chemistry by 42%
- University participation in maths (+55%), physics (+40%) and engineering (+20%) has increased

However, a range of recent studies (from UKCES, IPPR

and the CBI, amongst others) indicate that a growing economy will need even more individuals trained with STEM skills.

### Future opportunities for a better A&E

The demand for STEM skills in the labour market is most clearly evidenced by the wage premium associated with these skills. Using surveys,

and increasingly through matching datasets, we are establishing a much better picture of the work people enter following education, and how much they earn. This shows that those with STEM qualifications are found to earn £4–6k more per annum than those with non-STEM qualifications, on top of the existing wage premia associated with each higher level of study.

So even with increases over recent year there is still demand from the labour market for greater numbers with STEM skills. And looking below the headline figures there are specific challenges.

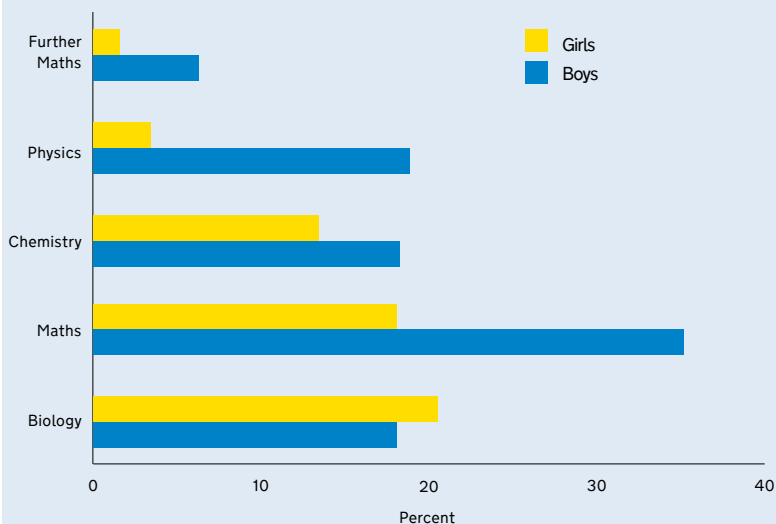
At school age, a particular issue is that many fewer girls choose to continue studying maths and science. This is not a question of aptitude. Similar numbers of boys and girls get an A\*, A or B in physics GCSE. However, whilst 49% of boys with an A\* at GCSE go on to choose physics A level, only 19% of girls do.

This gender difference is not new, and not unique to the UK. However, a wealth of recent research is helping to explain this, and highlight what actions need to be taken to reverse it. This includes communicating to students how valuable STEM skills are to a wide range of careers.

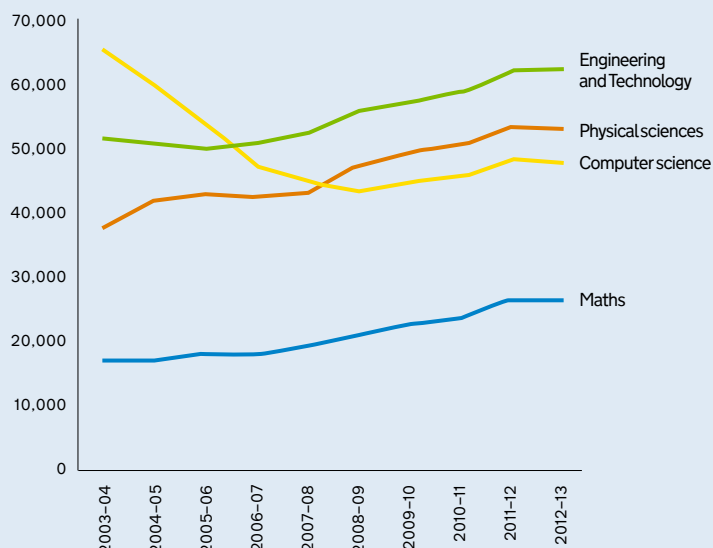
In further education, employers report difficulties recruiting individuals at 'technician level', i.e. those with vocational qualifications at a higher level than secondary education. Evidence from the OECD suggests the UK lags behind its peers in providing vocational education at this level.

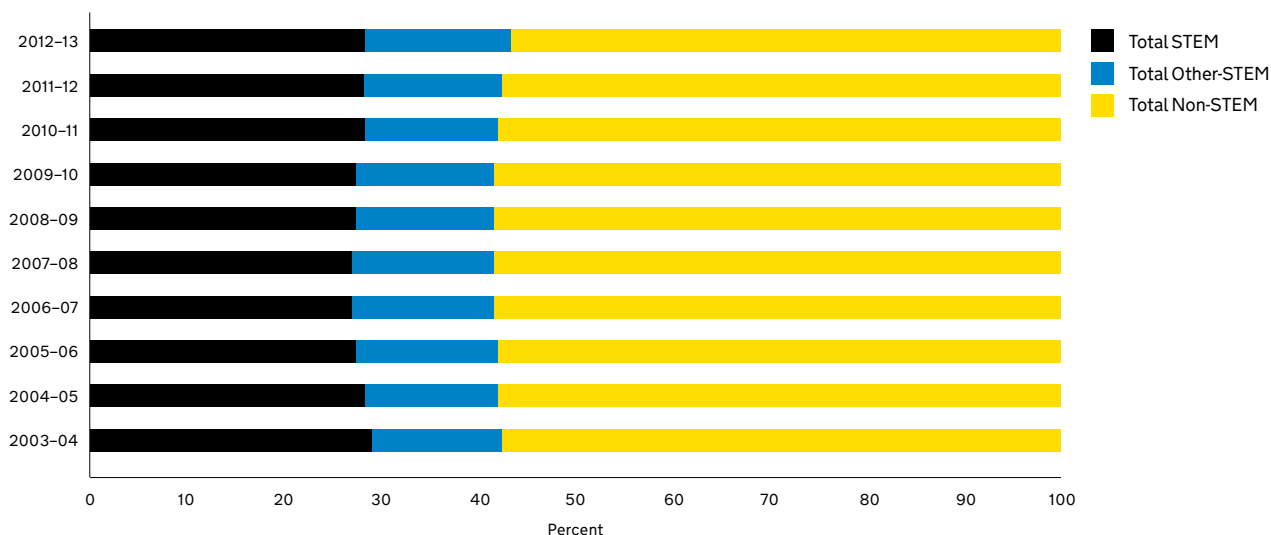
This is partly explained by funding: unlike

**Figure 2: Percentage of A-levels by subject and gender**



**Figure 3: Numbers of UK-domiciled first degree entrants**



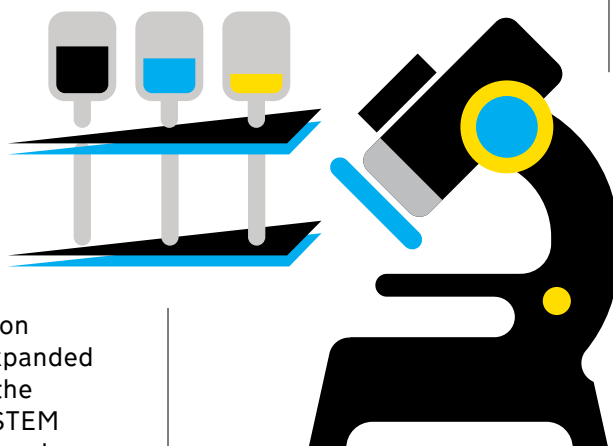
**Figure 4:** Proportion of students studying STEM, Other-STEM and Non-STEM

students undertaking higher education courses, who are eligible for loans to support tuition and maintenance, students studying higher vocational education do not qualify for financial support. This has understandably acted as a disincentive for taking up these types of courses, and therefore colleges and providers from running them.

In higher education universities have expanded STEM provision as the numbers studying STEM A-levels have increased, but overall only at the same rate as non-STEM numbers. And, although numbers have increased, we need more engineers and physicists particularly.

In addition to the issue of qualified applicants, these shortages are also linked to the fact that STEM subjects cost more to teach than social sciences, arts

and humanities. The Higher Education Funding Council for England provides grant funding per STEM student and capital funding on top of tuition fees to meet some of this extra cost.



But universities still need to cross-subsidise STEM teaching from arts subjects. Finally, the graduates from some STEM subjects, like Computer Science, have relatively high unemployment rates, despite there being significant demand from employers for computer scientists: the relatively low employment rate may

account for a decline in people choosing to study computer sciences since a peak in the early 2000s.

The workplace has changed and it is no longer the case that decisions made pre-21 will take individuals through to retirement. This is particularly true for STEM subjects – where fast moving technologies mean that skills need to be regularly updated and it is difficult for individuals to return to a STEM career, for example, after maternity or paternity leave. The review highlighted the levels of participation of female STEM graduates in the workplace as being of particular concern – in 2010 it was estimated that nearly 100,000 female STEM graduates were either unemployed or economically inactive.

### Proposals

The review suggested a package of proposals to help tackle the challenges



## A root and branch review of STEM

highlighted above.

Both the low numbers of girls going on to STEM subjects at A-level and degree level, and the lack of young people choosing vocational pathways highlight the importance of high quality careers advice – including communicating the value of these subjects to a wider range of careers. Last year, the Secretary of State for Education launched the Your Life campaign which is working with a range of employers to do exactly this.

High quality teaching in maths, science and the new computing curriculum is also key. However, it can be challenging to recruit to teaching high quality graduates with passion for their subject, given that STEM graduates can command high earnings elsewhere. Following the review, the Prime Minister announced a package of measures which will transform STEM teaching in England by retraining 15,000 existing teachers, and recruiting up to 2,500 additional specialist maths and physics teachers over the next Parliament, on top of existing plans.

In vocational education,

ministers announced in December a wave of new national colleges in key STEM sectors (Digital, Wind Energy and Advanced Manufacturing) to provide high-level training. Importantly £5m has been allocated for maintenance scholarships that will enable the strongest candidates from across the country to attend national colleges in 2016/17. This trial recognises the need for a package that allows young people to travel to study technical skills at the highest level, but government is keen to work towards introducing maintenance loans in the longer term. Higher apprenticeships are another important area. BIS is working with STEM sector businesses to develop more Higher Apprenticeships in the areas businesses say are a priority. Employers will be able to apply for funding from the Gatsby Foundation, a charitable foundation with a focus on technician level education, to develop new higher apprenticeships in STEM areas.

In higher education government is responding to the challenges set out above by providing £185m of additional teaching grant over the next

four years for STEM subjects, and £200m of capital funding in 2015-16 to increase capacity to teach STEM. In December, ministers announced that a postgraduate conversion course in engineering will be piloted to enable graduates in other disciplines to become engineers. Finally, two independent reviews led by sector experts are looking at how to help graduates to succeed in the workplace: one is examining how to improve outcomes for computer science graduates, and the other is looking more broadly at accreditation arrangements to ensure all degrees contain the right mix of academic and practical learning, and work experience.

Finally, in the workplace as a result of the review findings, the government is now setting up a dedicated platform to match STEM trained women graduates to jobs in industry and provide them with advice and support about returning to the workplace.

### Conclusions

The range of policy proposals which came out of this analysis of STEM skills and are discussed in this article, were announced at the end of 2014 and are now being taken forward by government and partners. A group within BIS will continue to monitor progress in increasing STEM take-up and achievement. This is a challenging issue which has troubled successive governments and there are no easy wins, however, taken together the proposals here should see a significant increase in numbers of STEM students and workers over the next decade.





# Using technology to change the way we work

» The Cabinet Office Technology Transformation programme (COTT) has replaced the old, inflexible system with new technology that has opened up new ways of working. Stefan Czerniawski, Head of Corporate Strategy in Cabinet Office, explains how a user-centered approach is behind the successes of the programme.

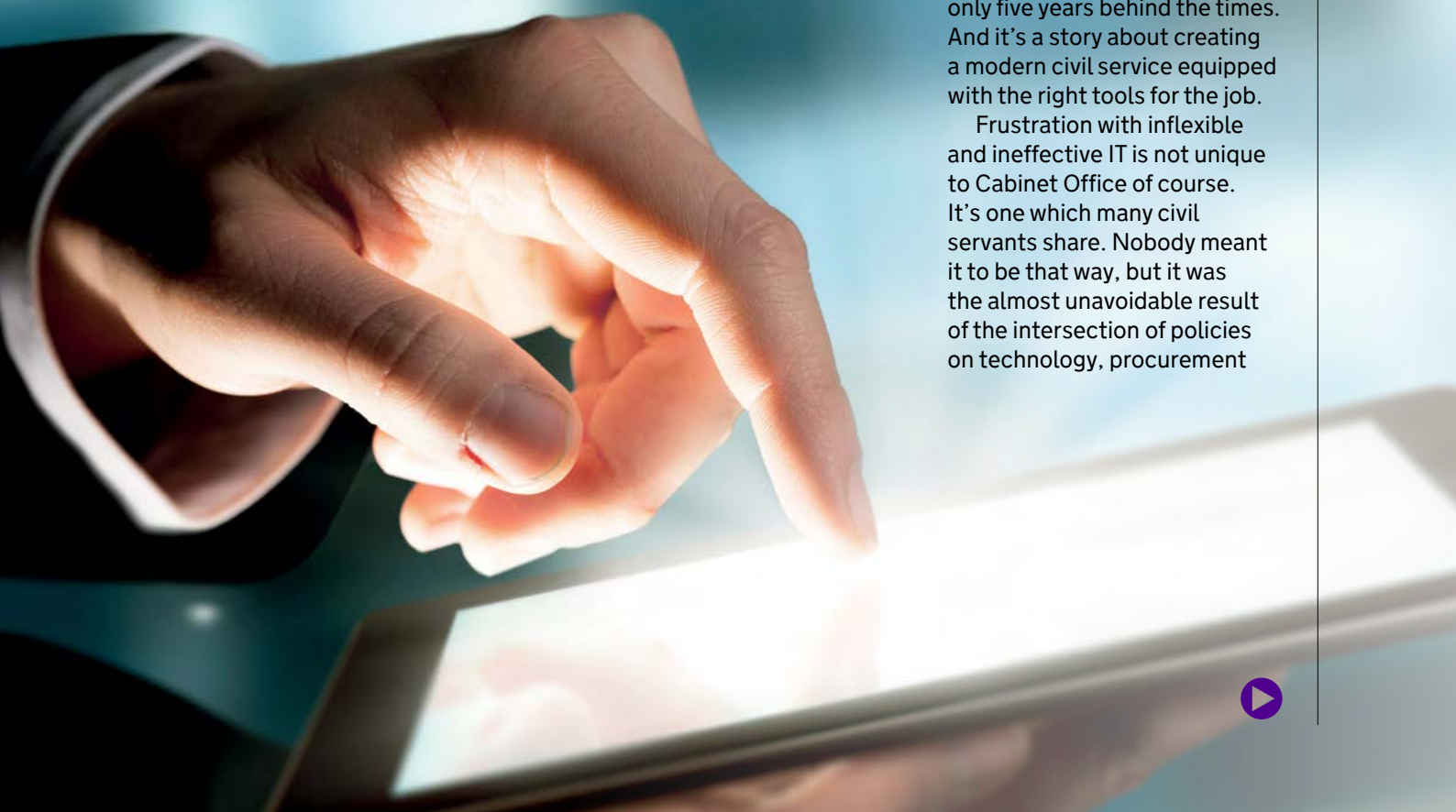
I wrote this article on my work laptop linked to the Cabinet Office's wifi without a network cable in sight. It connects to the network instantly and automatically wherever I am in any Cabinet Office building. And I didn't need to be at work – it works just as well wherever I am, connected to the network pretty much wherever there is wifi (and if there isn't any wifi, my phone can link the laptop with the mobile data network).

I can choose to share this – or any other document – with people I want to work on it with me and collaborate in real time, not sending comments back and forth, but watching the text change instantly on the screen in front of me.

A few years ago, it would have been unimaginable for most civil servants to write that paragraph about the IT they had to support their work. Now it's rapidly becoming unimaginable

for many of us to work any other way. This is the story of how we have introduced new – and radically better – IT to the Cabinet Office over the last few months. But it's not really a story about IT. It's a story about an ambition to work differently and better. It's a story about using the explosive pace of change of IT to help us keep improving, breaking away once and for all from the cycle of expensive projects to replace technology that's ten years out of date with technology that's only five years behind the times. And it's a story about creating a modern civil service equipped with the right tools for the job.

Frustration with inflexible and ineffective IT is not unique to Cabinet Office of course. It's one which many civil servants share. Nobody meant it to be that way, but it was the almost unavoidable result of the intersection of policies on technology, procurement



## Using technology to change the way we work

and security. Attempting to define what we needed for years ahead, seeing security as the application of a set of rules rather than an outcome to be achieved, and focusing more on cost than on value, all contributed to a world in which the IT usually just about worked, but rarely seemed to work well enough.

Eighteen months ago, the end of the Cabinet Office outsourcing contract was in sight. There was a fundamental decision to make. We could go through another version of the process which had led to such dissatisfaction last time round. That was safe and relatively simple. Or we could start from the other end of the problem, by working out what people needed and building that in a way which allowed us to adapt quickly to changing requirements and the changing technology landscape. That was more complicated and required the reawakening of skills and capabilities which we had lost – but with the potential for being both cheaper and better in what it delivered.

It turned out that we were lucky in our timing. We were in the right place at the right time to do things differently. The work of GDS on public-facing services, bringing service design based on user needs, developed iteratively through agile techniques had created precedents we could expand and build on. The changes to the security classification system in April 2014 shifted the focus from detailed compliance with restrictive technical standards to understanding risks and threats and ensuring that we had the right level of security to defend against them. And we had strong and sustained personal leadership and commitment from

**“ We wanted to be treated as adults, not trapped in a locked down world where useful tools and sites were blocked. And we wanted to be ready for the unknown: ways of working are changing fast, and we need our IT to keep up with us, not hold us back. ”**

Richard Heaton as permanent secretary.


The starting point wasn't the technology at all. Instead we began by talking to users and understanding their needs. What work did they do? Where and how did they want to do it? What sort of things did they actually want to do with technology? What sort of devices would suit them?

The frustrations about the old systems came through loud and clear. But more positively – and more importantly – there were clear messages about what we all wanted to be different. We wanted much more flexibility in where and how we worked, both within the office and well beyond it. We wanted to collaborate much more effectively, sharing documents, conversations and information seamlessly and instantly. We wanted to be treated as adults, not trapped in a locked down world where useful tools and sites were blocked. And we wanted to be ready for the unknown: ways of working are changing fast, and we need our IT to keep up with us, not hold us back.

We set out to turn those ambitions into reality. We needed technical expertise and

a deep commitment to meeting users' needs, but crucially we needed to restore our long-lost ability to manage and develop our own working environment. So with the encouragement and strong support of our colleagues at GDS, we set up the Cabinet Office Technology Transformation project – rapidly becoming known as COTT. We started with a single focus on Cabinet Office itself, but soon realised that our close neighbours DCMS and the Crown Commercial Service had very similar needs and that we would all be better off if we worked together on a single solution. Across the three organisations, over three thousand users have moved onto our new system since October last year.

From the outset, we established a series of principles for the project. We would favour short contracts, transparency and flexibility. We would strike the right balance between security and usability. We would never forget that the point of better IT is to help us work better and that we were planning for a future where digital skills are at the heart of the organisation.

Making things simple is hard. We were building not just a system from scratch, but the teams to build and then support and operate it as well. We brought in people who combined deep expertise and experience with boundless enthusiasm and energy to form the core of the project team, and got to work. There were seemingly endless challenges to overcome, big and small. It's not easy to put pervasive wifi into listed buildings. It's harder to keep track of dozens of small procurement exercises than one big one. It's tough to ensure that authentication 

and security (to say nothing of legality) are robust when using a cloud-based provider (in our case Google Apps for Work) for applications and data. And so it went on.

But the payoff for persevering is huge. We have a system which is much more flexible and much more responsive to people's different needs. We can choose the laptop which best fits our preferred working style – with the choices running roughly half and half between Macs and Windows. We can choose where to work without worrying about network cables – or being in the office at all. We can work with others, not through soul-destroying trails of emails stretching over days but through immediate shared focus on producing work together in real time. We can

talk to each other in all the old ways, but just as easily by immediate videoconferencing. Less obviously to users, but at least as importantly, we have designed and built the new system to be flexible and modular. We can change one element or one supplier without changing everything – which means that over time we can change and update the whole without ever needing another big disruptive project to do it.

The journey wasn't always smooth. Rolling out new technology for thousands of busy people is no easy task, and there will always be problems to iron out, as we discovered. But the alternative is to fall further behind and to be trapped in ways of working which just don't let people work

efficiently. There are real costs in not changing – and there are some very hard savings from making the switch. We're expecting to see a 40% saving in the cost for each user. Ours will be one of the cheapest IT systems in Whitehall.

Like so many other digital projects around government at the moment, this one boils down to a very simple approach: understand your users, understand their needs, then build something that meets those needs.

Our users happen to be civil servants who want to do their work. Our job was to give them the tools to make that as straightforward and as hassle-free as possible. The old IT was a barrier; the new technology is a toolkit. I'm really excited about what it will help us do.



# Bridging the Divide

**» The Scottish Referendum preoccupied Whitehall over the autumn. But civil servants in the Northern Ireland Office and Northern Ireland Executive were engaged in supporting talks in Northern Ireland to avert a growing crisis in devolution there. Sir Jonathan Stephens, the Permanent Secretary of the Northern Ireland Office describes how these culminated in the Stormont House Agreement, reached on the eve of Christmas.**

Today Northern Ireland has largely put the horrors of the 30 years of “The Troubles” – in which over 3,500 died – behind. But politics remains deeply divided on religious grounds and sectarian tensions over issues such as flags and parades have erupted into riots and disorder over the last couple of years.

The 1998 Good Friday (or Belfast) Agreement, the 2006 St Andrews Agreement, the 2010 Hillsborough Castle Agreement all played their part in ending conflict and developing Northern Ireland’s unique and wide-ranging devolution settlement. This requires all five main parties across the unionist and nationalist spectrum to work together in coalition government – the equivalent at Westminster might be a coalition of Conservative, Labour, Liberal Democrats, UKIP and Greens. To function effectively, parties who were bitter enemies have to work together.

The restoration of devolution in 2007 began the longest period of devolved government in Northern Ireland since the old Stormont Parliament was dissolved in 1972. But, by the summer of

2014, severe stresses were showing and devolution was under threat. Key decisions were gridlocked and Northern Ireland Ministers seemed unable to find a way forward.

The Northern Ireland parties had been trying, as yet unsuccessfully, to make progress on long-standing “legacy” issues. The flying of flags, regulation of parades, and how to come to terms with Northern Ireland’s past of conflict were unresolved, but had become the source of tension and sometimes disorder. Added to these, were an urgent budget problem and significant political differences over the introduction of welfare changes. An overspend in 2014 and no agreed budget for 2015 threatened chaos and collapse of the devolved institutions.

In September, the First Minister, Peter Robinson, called for fresh comprehensive talks involving the main parties and the British and Irish Governments. So on 28 September, the Secretary of State for Northern Ireland, the Rt Hon Theresa Villiers MP, announced such talks would be convened, to start a couple of weeks later.

Having shed most of its responsibilities and many of its staff on devolution, the Northern Ireland Office faced the immediate challenge of how to support such talks. Expectations, after previous failures, were low but a lot was at stake.

It was clear the Northern Ireland Office could not work in isolation – success could only be achieved in close co-operation with the devolved Executive, and the members of the Northern Ireland Civil Service (NICS) who work for it. So Malcolm McKibbin, Head of the Northern Ireland Civil Service, and I agreed that it was essential that we should work closely together to support the talks. NICS officials were present in the talks to advise the Executive parties, alongside NIO officials supporting the Secretary of State for Northern Ireland.

Making the most of the experience of UK and NI civil servants who had worked on past talks was important. Their advice was to work towards getting all the parties in one place, and then working together on one text. But even finding the right place was not easy.

In wealthier times,

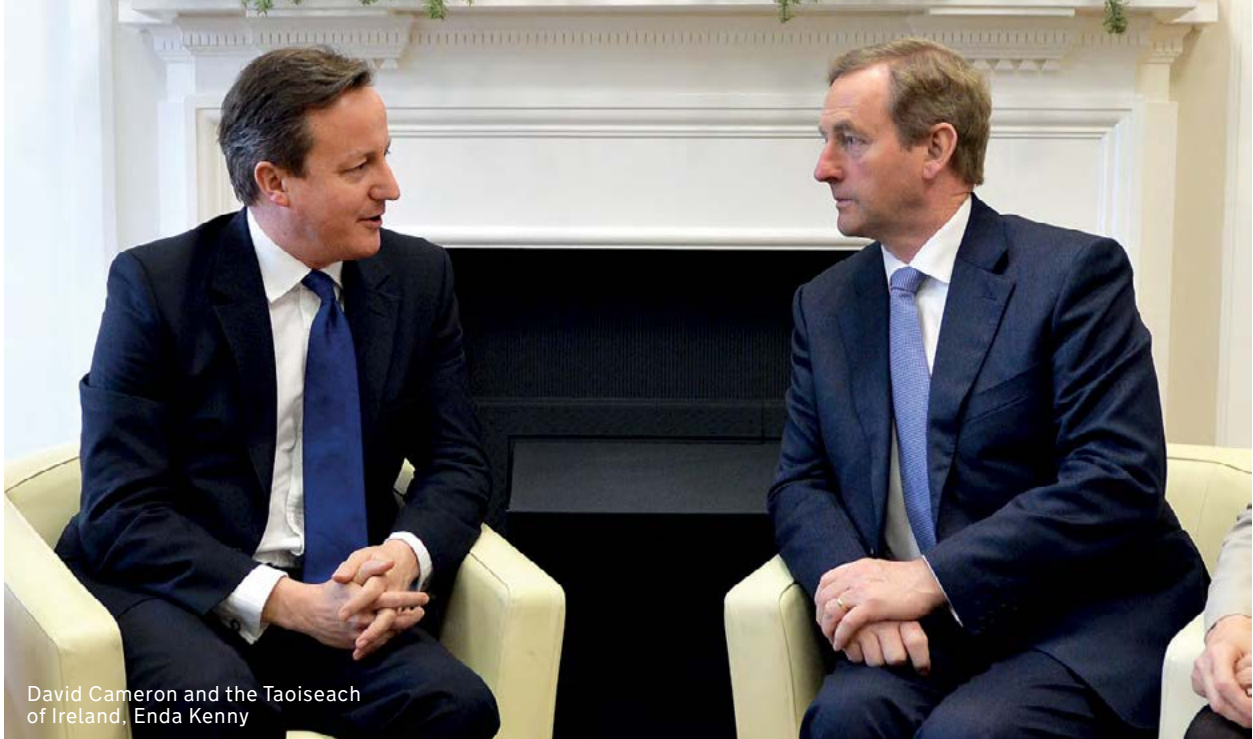




View of Stormont Parliament Buildings



## Bridging the divide



David Cameron and the Taoiseach of Ireland, Enda Kenny

previous talks had enjoyed country houses or hotels. Those were either not available or affordable. Other locations were not acceptable to one or other parties. So the Northern Ireland Office decided to use its own base and offices in Belfast, at Stormont House on the Stormont Estate. Even with staff reductions, finding accommodation for five parties plus the Irish Government delegation was not easy – rooms were cleared, the canteen emptied of its tables and chairs, and staff re-located. The result was spartan, but with everyone crammed in close quarters together there was plenty of opportunity for informal contact.

If the tension inside the talks was often high, civil servants worked hard to create a pleasant, relaxed, even friendly, atmosphere outside the conference room. Crucial to this were junior civil servants who had volunteered from across the Northern Ireland Office to be “floor walkers” – greeting

parties on arrival, helping them get settled, keeping them informed of what was happening and encouraging them to get to meetings on time.

It can sound trivial, but a welcoming helpful, friendly – but still impartial – face can help create the right atmosphere in which genuinely difficult issues can be discussed.

Even with the parties all in one place, there were still issues over who should attend which meetings, and in which format. Understanding these sensitivities – and accessing some of the solutions used in the past, such as the “three strands” first suggested by Peter Brooke in 1991 – required civil servants to know the details of the devolution settlement, the parties’ positions and the talks processes of the last 30 years.

Talks started on 16 October with some scepticism – one delegate said “Don’t give me a pass, I won’t be staying long”. But this early scepticism turned to deeper engagement.

The Government was led by the Secretary of State for Northern Ireland who ultimately participated in more than 150 hours of talks. There was a small core team of officials who supported her in handling the talks, supported in turn by a wider group of policy officials dealing with the different issues. The arduous task of note-taking was shared out – virtually every part of the NIO played some role.

The approach was to explore and understand each party’s position on the key issues – mostly in bilateral meetings at first, between the party and the UK Government. But the parties then asked for more intense engagement – so they were invited to base themselves in Stormont House on talks days to encourage more meetings both between the parties themselves, and with the British and Irish Governments. As engagement built, the parties increasingly discussed the key issues across the table in round table meetings with all parties



**“ Final agreement could only be achieved by the democratically-elected politicians of Northern Ireland and the UK and Irish Governments working together. Civil servants on all sides played their part in making this possible. ”**

and one or both Governments present.

But agreement was always going to require parties to move from restating established positions, to exploring if compromise could be found. With divisions still running deep, parties wanted to be sure that a compromise offered by one party would be matched by a reciprocal move by others. They also needed to know the overall shape of a possible agreement if they were to have the confidence to make individual compromises.

The parties asked the British and Irish Governments to work together on what might be the basis for an agreement. Never easy, officials used their knowledge of the party's positions, compromises that had been floated in earlier talks, and informal suggestions often floated in the margins, to put together a first draft heads of agreement. It pleased no-one: parties insisted on it being made clear that it had been agreed with none of them. But it became the basis for the final stage of negotiations.

By this point, getting the parties into negotiations seemed easy but bringing them to agreement very difficult. As one said, “Give us a deadline, and we'll bust it”.

So the Prime Minister and

Irish Taoiseach came to Belfast to join the negotiations for a hectic 18 hours. More rooms were cleared and Ministers doubled up accommodation.

With sleeves rolled up, the Prime Ministers had meetings with the parties into the early hours. But they also set out the limits of what was possible – there could be a limited, focussed, financial package but it required the Northern Ireland parties first to reach agreement among themselves. Without that, the Prime Ministers left and gloom was widespread.

But those with experience of previous talks had seen the parties come close to the brink of failure before, and then pull back. The credibility of devolution was at stake. Institutions that local politicians had worked hard over decades to establish could collapse. The public mood was unforgiving of another failure.

So no party wanted to walk away, and all wanted to keep working to see if agreement could be forged.

In the end, the final agreement came in stages. First, an agreement among the parties themselves on the welfare changes and budgetary measures they would implement. Here, Northern Ireland civil servants played a crucial part. They provided objective information and analysis to enable the parties to understand and evaluate the costs of the different options. Their work helped the parties realise they might not be so far apart after all. The final agreement implemented the UK welfare changes, but with some Northern Ireland variations paid for from the NI budget.

Next, there was an emerging consensus on how to approach the sensitive issues around coming to terms with Northern Ireland's violent past, and responding to the needs of

victims and survivors. Individual words mattered, as civil servants in the NIO worked through 36 different internal drafts of heads of agreement. They had to balance the positions of all the participants and the sensitivities of victims and survivors. And they had to produce proposals which were workable, which meant working across other government departments, with legal advisers, and in close co-operation with colleagues in the Irish Government as well as the Northern Ireland civil service.

Finally came a marathon 30-hour negotiating session with parties staying all night in Stormont House. Civil servants on all sides worked back and forth to translate emerging consensus into written agreement. Everyone waited, exhausted and bleary-eyed, for a final draft of the agreement, sustained by bacon butties and coffee.

The Stormont House Agreement was finally concluded and announced on 23 December. It has not resolved all the issues. But it does provide a strong basis from which the devolved Executive can move forward – with an agreed budget, a focussed financial package from the UK Government, institutional reforms, and, for the first time, an agreed framework for dealing with the past.

Final agreement could only be achieved by the democratically-elected politicians of Northern Ireland and the UK and Irish Governments working together. Civil servants on all sides played their part in making this possible. Their contribution – making the practical arrangements, providing objective and impartial advice, acting as trusted intermediaries – is all the more vital when political divisions run so deep. The challenge now for civil servants is to implement what the politicians have agreed.

# Public Dialogue – solving an ethical dilemma

» On 24 February 2015 Parliament passed regulations to make the UK the first country in the world in which treatment involving DNA from three people can be used to prevent the transmission of serious mitochondrial disease from mother to child. Alexandra Humphris-Bach from Sciencewise outlines the importance of the public voice in guiding this process.

Good public dialogue can help government to make better policy decisions. Scientific, political and economic evidence is obviously essential – but connecting with public views and values can open up potential for movement on controversial areas of policy, deliver significant overall cost savings, and increase the responsiveness and accountability of the policy.

For members of the public, participating in a dialogue offers the chance to learn from written information, experts and each other; develop their views; reach carefully considered conclusions; and communicate these to those making decisions in government.

However, consulting with the public can seem daunting and it isn't right for every situation. Policy makers have to consider:

- **Why** is engagement with the public the right thing to do? Will it help to avoid later conflicts? Will it be valuable for economic growth?
- **What** type of engagement with the public is appropriate? Is it best to have a dialogue or is the need more to communicate an existing policy?
- **Who** are the public in this instance? How many people need to be involved? What

is the best way to have the conversation? What locations are appropriate?

- **How** to make sure the engagement is adding value? What are the questions to ask the public? How will you ensure the dialogue is balanced and not biased?
- **When** should you have the dialogue? What aspects of your decisions or policy are open for consideration and what has already been decided? Are you open to being influenced by the views of the public?

Nevertheless, it can bring huge insights and benefits to policy makers, and effect real change – as the recent project conducted by the HFEA and Sciencewise made clear.

## The HFEA project

HFEA licenses and inspects UK fertility clinics and UK research involving human embryos. HFEA was asked by the Secretary of State for Health, and the Secretary of State for Business, Innovation and Skills to undertake a dialogue project to establish the public's views on mitochondrial donation: emerging IVF-based techniques to prevent the transmission of serious mitochondrial disease. The public dialogue fed

into HFEA's advice to the Department of Health (DH), which published, consulted upon and laid before Parliament draft regulations for the use of new techniques to prevent the transmission of mitochondrial diseases from a mother to child. A draft impact assessment estimates monetary benefit of implementing the regulations at £318 million over 10 years.

MPs and Lords voted in favour of a change in genetics law to allow mitochondrial donation – an emotive and contentious topic which prompted news headlines such as 'MPs say yes to three-person babies' (BBC) and 'A dad and two mums' (The Economist). Public views gathered by Sciencewise on behalf of HFEA were crucial in supporting this policy amendment.

## How did the public contribute?

The engagement process aimed to assist HFEA in understanding:

- ethical issues around licensing techniques to avoid mitochondrial disease
- how people understand ethical issues involved in the techniques
- the deliberative process people go through





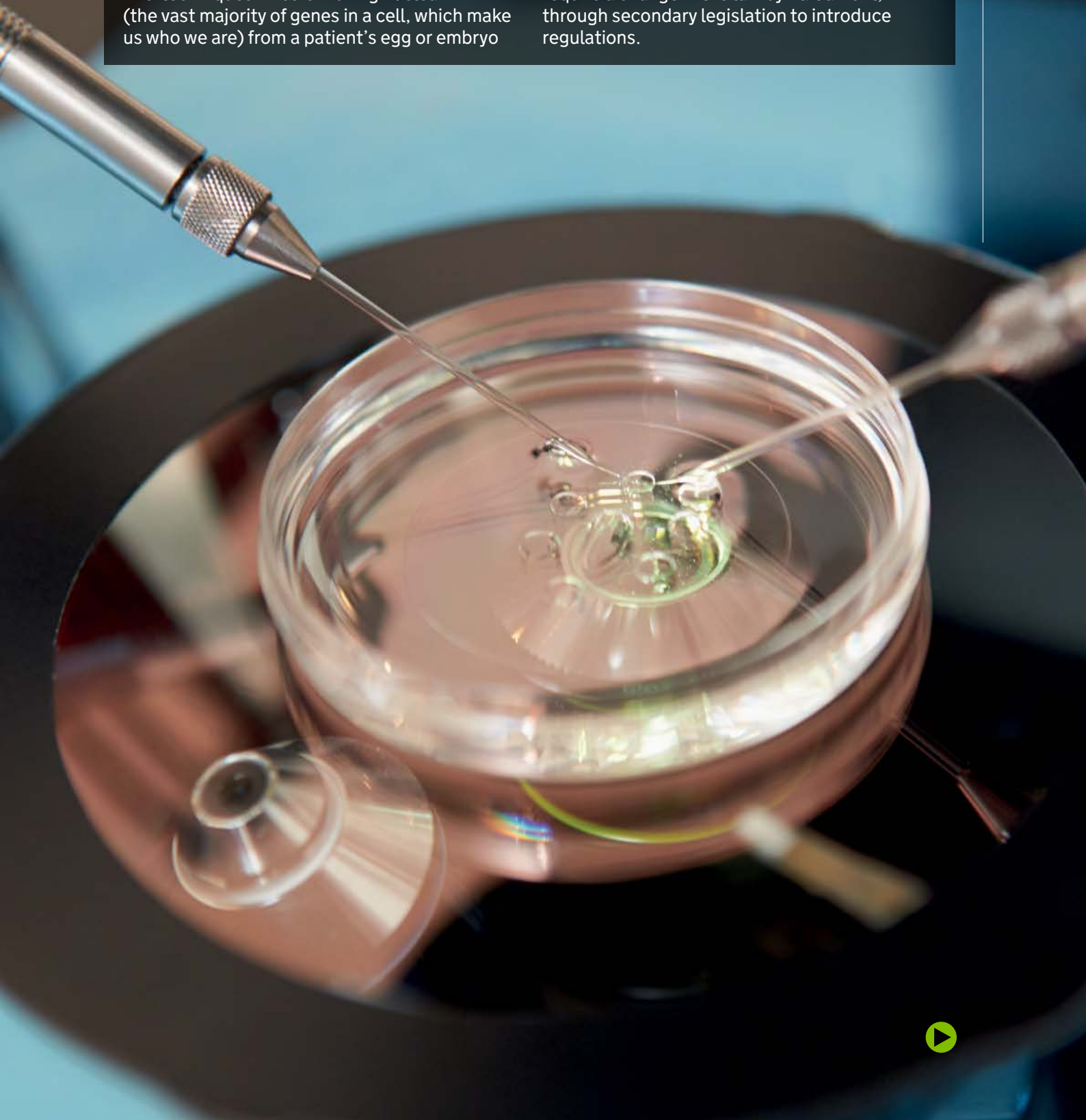
### What is mitochondria donation?

Mitochondria are present in almost all human cells. However, DNA faults in mitochondria can lead to genetic disorders, known as mitochondrial disease, which have no known cure and limited treatment options. These conditions, ranging from mild to life threatening, can be transmitted from a mother to her children.

New medical techniques, applied as part of an IVF cycle, could prevent mothers passing on genetically-inherited mitochondrial diseases. The techniques involve moving nuclear DNA (the vast majority of genes in a cell, which make us who we are) from a patient's egg or embryo

containing unhealthy mitochondria to a donor's egg or embryo containing healthy mitochondria, which has had its nuclear DNA removed. A resulting child would inherit nuclear DNA from both parents, and mitochondrial DNA from a donor.

These techniques are currently illegal in the UK for treatment purposes under the Human Fertilisation and Embryo Act 1990. Permitting mitochondrial replacement in treatment would require a change in the law by Parliament, through secondary legislation to introduce regulations.



## Public Dialogue – solving an ethical dilemma

to form views on the techniques

- the difference between uninformed and informed views
- interested stakeholders' arguments for and against the techniques.

The dialogue encompassed a variety of engagement activities and a wide range of people, with varying levels of knowledge about mitochondrial diseases and the associated concepts, to ensure a full representation of public opinion.

There were five separate strands to the public dialogue:

**Deliberative public workshops:** 30 participants, representing a broad spectrum of age, gender, socio-economic status and family circumstances, met twice at workshops held in three cities. These workshops aimed to explore public attitudes in-depth, and understand participant viewpoints as they become increasingly engaged with and knowledgeable about mitochondrial disease and mitochondria donation.

**Public representative survey:** Across 175 locations, almost 1,000 face-to-face interviews were conducted with members of the public, selected using demographic quotas. These aimed to benchmark public opinion on attitudes towards medical research and genetic treatments generally, as well as those specifically relating to mitochondrial disease.

**Open consultation meetings:** Two public meetings, in London (53 attendees) and Manchester (39 attendees), were open to everyone. A panel of speakers, reflecting different perspectives and areas of expertise, discussed their views and shared their

“ The representative public survey showed over half are ‘very’ or ‘fairly’ positive about mitochondria donation – despite about half feeling that ‘the application of medical research leads to unforeseen negative side effects’ ”

knowledge with audience members, who took part in small group discussions and whole group debates.

**Patient focus group:** A focus group (and telephone interview) for six participants affected by mitochondrial disease, either directly or indirectly, to harvest their in-depth views.

**Open consultation questionnaire:** 1,836 people – including stakeholder organisations, individuals with personal experience of mitochondrial disease, and many members of the public – responded to a range of information presented on the consultation website by completing seven questions on an the online questionnaire.

An independent group, comprising a diverse range of experts with different perspectives, oversaw the process; and advised and checked materials.

### And the public said...

Views varied in the different strands of the consultation, but overall there was general support for permitting mitochondrial replacement in the UK – if safe and is

conducted within a regulatory framework. The principal reason given was that the techniques enabled parents to have healthy children who are genetically their own. Views were largely dependent on the risks involved, and safety and success rates of the techniques.

The representative public survey showed over half are ‘very’ or ‘fairly’ positive about mitochondria donation – despite about half feeling that ‘the application of medical research leads to unforeseen negative side effects’. Some felt that, if the techniques were possible, there is a clear ethical obligation to implement them (views echoed strongly at one of the open consultation meetings and the patient focus group). Patients stressed that individual parents and families should have the choice about whether to use these techniques, whilst also being aware that this may involve some risks.

The open consultation questionnaire, completed by a self-selected sample, was unique in showing slightly more people opposing than supporting the techniques.

### Stakeholder participant view

“As ever, the balance has to be struck between the likely risk and the benefit to those affected. Overall, the public was in favour. When randomly selected people looked at the evidence they didn’t think this a slippery slope to ‘designer babies’ or that it amounted to ‘three-parent-IVF’, as there is no genetic effect on identity.”  
Polly Toynbee, Project Oversight Group member (published in The Guardian, 11 February 2014)



## Outcomes and impacts

“HFEA and the Government have been exemplary in their balanced public engagement on this important issue.”  
Written evidence submitted by Wellcome Trust to Science & Technology Committee, October 2014

In a letter to The Guardian, eminent scientists and nobel prize winners from across the world applauded the consultative process behind this historic decision: the UK has run an exemplary and internationally admired process for considering the benefits, risks, ethical issues and public consent, which must properly precede a change in the law.

On 28 June 2013 the Chief Medical Officer (Dame Sally Davies) specifically referenced the public consultation and its conclusion of support “subject to strict safeguards and careful regulation” when announcing the DH decision to make “innovative IVF-based techniques... available to patients to help prevent serious mitochondrial disease in the UK.” Draft regulations (following further consultation) were laid before Parliament on 17 December 2014.

This dialogue project has directly contributed to policy development, and to a change in the law being considered. Joe Public clearly does have a voice, it has been heard to great effect, and it should continue to be heard as a part of government policy making processes.



## Sciencewise

Sciencewise works with and co-funds government departments and agencies to enable them to consider, develop and commission public dialogue activities. Amongst its many public dialogue projects to date are:

### Ways to Wellbeing:

exploring what gets in the way of taking action to promote well-being, and how bodies such as the Department of Health can implement strategies.

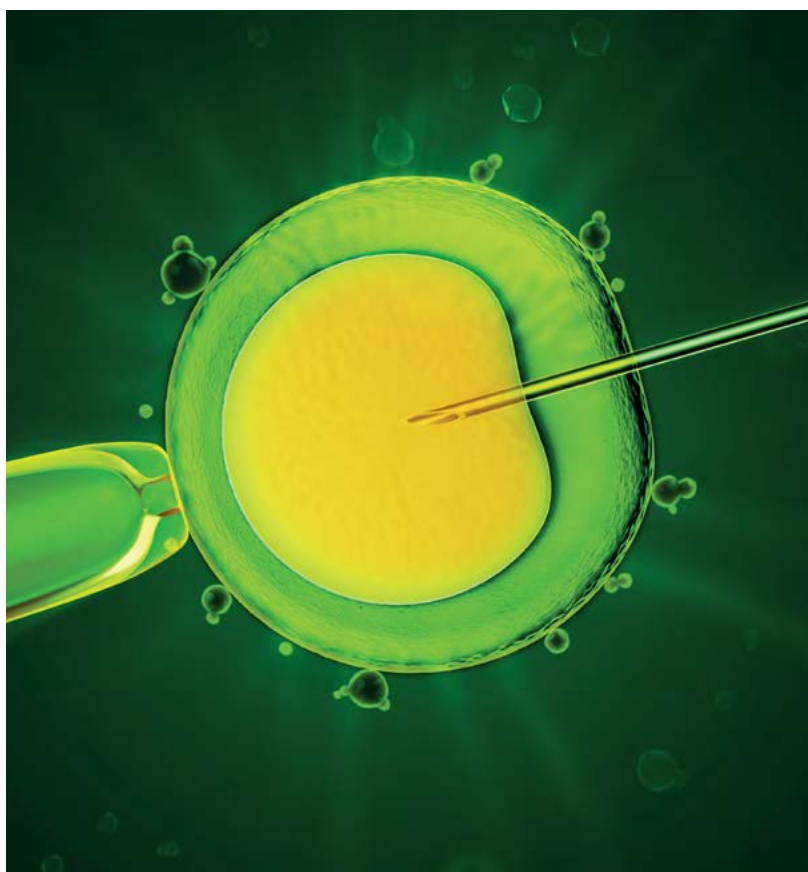
### Geo-engineering:

Natural Environment Research Council (NERC) to explore views on geoengineering, raise awareness and identify areas of concern to inform NERC's geoengineering research activity and strategy.

### Synthetic Biology:

Highlighted the diverse perspectives of UK residents on this new area of research, to ensure these are reflected in future policies.

Find free support and information about getting project funding at [www.sciencewise-erc.org.uk](http://www.sciencewise-erc.org.uk).



# Fighting crime with better data

» Good data analysis allows organisations to discover useful information about its customers, but is also helping the Civil Service make more informed choices about how it delivers government priorities. Vicky Ranson explains how increasingly hi-tech data analysis in HM Revenue and Customs is helping the department collect record amounts of tax revenue, and shaping the way the organisation will work in the future.



Data. It's all around us, and is generated by virtually everything we do. From using an Oyster card on the way to work to using a debit card in the local supermarket, data provides a unique insight into how we go about our daily lives.

Clever technology – and clever people using the technology – means the insight gained from the wealth of data individuals and businesses generate on a daily basis is being used by HMRC to ensure they are paying what they legitimately owe in taxes. For the minority who try and bend or break the tax rules, or for organised criminals intent on harming the UK, cutting-edge data analysis is providing a detailed picture of their activities that is rapidly becoming invaluable to those charged with stopping them.

### Merchant Acquirers

For the first time, HMRC can now access all credit and debit card payments made to UK businesses via Merchant Acquirers<sup>1</sup> – the companies that process card payment transactions – to find out the number and value of transactions completed by a specific trader. The amount of information that arrived at HMRC in January 2014 was breathtaking. In just a single month there were more than 800 million individual transactions, representing about £40 billion in credit and debit card spending – a goldmine for HMRC's army of data analysts.

No personal data identifying the card owners or their numbers is obtained by HMRC. Instead, the information is used to compare the amount of card sales a business makes each month with the taxes it pays – and action is taken if there appears to be inconsistencies.

### 'Game-changing' enforcement activity

That action is taken by HMRC's Risk and Intelligence Service, whose job is to match and analyse the huge volumes of new and complex card data. Its enforcement activity, guided by this data analysis, has been 'game-changing' according to one of its senior officials – especially in the fight against what's known as the Hidden Economy – which refers to income, or multiple incomes not declared for tax purposes.

**“Clever technology – and clever people using the technology – means the insight gained from the wealth of data individuals and businesses generate on a daily basis is being used by HMRC to ensure they are paying what they legitimately owe in taxes.”**

Some of the activities good data analysis by HMRC has uncovered have been more colourful than others. One such example was a private London residence that had significant card transactions and monetary sums associated with it. The property was worth millions of pounds and owned outright by someone with no tax history and a state pension as their only source of visible income. A routine internet search found an escort agency advertising at the address and after an HMRC investigation the owner admitted trading there for at least six years, with takings of more than £100,000 a year. The owner is now working with HMRC's Hidden Economy team to settle their tax liabilities.

In another case a large restaurant was found to have declared sales that didn't tally with its expected cash, credit and debit card transactions – pointing towards large scale evasion. After an enquiry led by one of HMRC's local fraud enquiry teams this case is heading towards a tax settlement in excess of £4 million.

John Groves, who works in the Hidden Economy team, explained how better data analysis was helping them identify 'ghosts' who completely evade paying tax and 'moonlighters' who don't declare all their income.

He said: "Historically it's proven difficult for our compliance teams to identify initial dates and levels of trading for ghost businesses. However,



<sup>1</sup> <https://www.gov.uk/government/news/data-payment-crackdown>

## Fighting crime with better data



Sir Jeremy Heywood with Jennie Granger, HMRC's director general of enforcement and compliance

by working closely with data analyst colleagues from the outset and explaining what we need to get an 'in', they have been able to help us really understand what the Merchant Acquirers data is telling us and how we can track down 'ghosts' and 'moonlighters'".

It used to take HMRC analysts weeks of painstaking work to piece together complex jigsaw puzzles of data. Now it can be done with the click of a mouse using a highly sophisticated risk analysis system called Connect. It allows HMRC to identify suspicious individuals, businesses and transactions in literally minutes. Connect works by making it easier to see patterns, links and networks that would be impossible for the human eye to see among the mass of data arriving at HMRC each month. It can find anomalies between such things as bank interest, property income and other lifestyle indicators and tax

liabilities. Once it's identified something suspect, Connect allows HMRC to find more links and networks that look the same. Using sophisticated analytical techniques, HMRC can then build a profile for people and businesses who look like they are failing to pay the right tax.

### Fighting serious crime

HMRC's data analysts don't just focus on tax compliance. They're working across government on two fronts – sharing best practice techniques and directly helping the Home Office and National Crime Agency crack down on serious criminal activity.

HMRC has helped in the fight against child sexual exploitation by highlighting to the police suspects employed in positions of trust or with direct access to children.

It also helps compile a register containing details of people belonging to organised

criminal groups. Using data at HMRC's disposal, intelligence officers have carried out a number of operations against some of the biggest threats to UK national security from serious and organised crime. This includes analysing the tax liabilities and hidden wealth of convicted criminals in prison, criminals working within the banking, legal and accountancy professions, as well as identifying opportunities to disrupt some of the UK's most notorious organised crime groups.

Working closely with Home Office colleagues, HMRC compared more than 200,000 foreign student visa details with its own records and discovered 80,000 were breaching their visa conditions by registering for work. This revelation contributed to the withdrawal of 'trusted status' from 54 UK foreign student colleges and the suspension of the 'migrant entrepreneur' visa because of widespread abuse.





## What next?

With cutting-edge data analysis constantly improving HMRC's compliance work and other activities, it's no surprise they've unveiled a new digital strategy that will bring data into one place alongside powerful new analytical tools.<sup>2</sup>

The strategy centres on using digital ways of working to make it easier for the compliant majority of people and businesses to deal with HMRC, enabling them to focus more resources on the minority who are not. Plans include using new, 'intelligent data' to further enhance its analytical systems and expertise, such as prompts for customers to review information where errors have been identified. There's also the potential for data to be collected and analysed daily, or even hourly, allowing almost instant analysis of the information HMRC receives.

HMRC's director general of enforcement and compliance is Jennie Granger. She said:

**“ Data-led compliance has proven itself to be invaluable and will be at the very centre of how HMRC operates. In the future, instead of responding after people and businesses get it wrong, will we be able to give businesses their data back when they log on to file and prompt them to get it right. ”**

<sup>2</sup> HMRC Digital Strategy 2014: <https://www.gov.uk/government/publications/hmrc-digital-strategy-2014/hmrc-digital-strategy-2014>

# Partnering with business to 'Make Things do Stuff'

» Effective collaboration between the Partnerships Team and a range of digital organisations gave over 150,000 young people the chance to learn important digital skills through the 'Make Things Do Stuff' project. Tim Scott, Head of Sector, Technology, Telecoms and Media in the Partnerships Team, explains how collaboration with business can add value to government initiatives.



Young people learning about digital technology at the launch of the Make Things Do Stuff campaign





In a world that has become exponentially reliant on technology, learning to code is the difference between learning to read and learning to write. It has moved from being a marginal skill to a powerful enabler of innovation and creativity. From making games, to fighting cybercrime, to designing a jet propulsion engine, computing is essential knowledge.

The Partnerships Team in the Cabinet Office was established in 2011 to improve the strategic collaboration of Cabinet Office and No. 10 with big business, in order to deliver innovative solutions to priority policy challenges.

Since 2011, it has developed strong relationships with over 80 leading employers across four sectors covering: retail; food and drink; manufacturing, infrastructure and energy; financial and professional services; and tech, telecoms and media.

It acts as a trusted point of contact between Ministers, Special Advisers and Senior Government Officials and Senior Executives in business. These relationships are used to provide business intelligence and advice to Number 10, the Prime Minister (PM), Deputy Prime Minister (DPM) and Cabinet Office, and to drive PM and DPM policy initiatives.

Digital making covers all forms of creating using digital technology, from learning and writing code to making and mixing a music video online. Teaching these skills to children will help them to become creators, not just consumers, of digital technology – equipping them with the skills to become problem-solvers and

digital-makers for jobs that don't yet exist.

In November 2012, No. 10 commissioned a new project of the Partnerships Team; to scope the potential for government to run a summer campaign to promote coding and computer science skills for young people. Ultimately, this led to government involvement in the 'Make Things Do Stuff' Campaign – which gave over 150,000 young people the opportunity get involved in digital making.

### Collaboration, not competition

Research undertaken throughout the scoping exercise revealed a considerable amount of activity already underway by businesses and social enterprises. However, no single organisation was delivering a solution at scale. One initiative emerged as an ideal opportunity to achieve the goals of the original commission: Make Things Do Stuff (MTDS), which focussed on digital making of all kinds, and was being developed by Mozilla, Nesta and the Nominet Trust.

"Make Things Do Stuff has allowed me to connect with other digital making initiatives across the country. I enjoy seeing what other companies and groups have been working on. I feel the Make Things Do Stuff campaign has brought together the most exciting organisations in digital making."  
Craig Steele, CoderDojo

So rather than create a competing Government led initiative, Partnerships Team agreed with No 10 that it would focus its efforts in supporting

MTDS. Government's engagement in the project introduced an element of accountability and a greater expectation of outcome, raising the ambitions of the ground game delivery organisations. Critically, it provided backing and support that helped establish partnerships with big businesses that would otherwise have taken far longer to secure, if at all.

### Connecting with experts

Government is many things but it is not a coding organisation, a global browser company or a manager of funds it doesn't own. Connecting with delivery partners meant that work was taken forward by those expert at it.

There were four key parties to the policy delivery: Nesta, Nominet Trust, Mozilla and Cabinet Office. Individual organisations, with support from others, delivered the various elements of the project: managing the Digital Makers Fund, brokering partnerships, running the website, compiling and monitoring the statistics, external communications. Actual delivery of the digital making opportunities came from the ground through game operators such as CodeClub, Young Rewired State, Apps 4 Good, and Freeformers.

### A joined-up approach

What the Cabinet Office could provide, however, was the co-ordination of cross government engagement, the backing of Cabinet-level ministerial support and the convening power of Government.

The Partnerships Team secured the backing of



## Partnering with business to ‘Make Things to Stuff’

the Chancellor as campaign champion. This indicated buy-in at the very highest level of government and enabled the team to obtain additional support and resources from big business. In addition to those already engaged, the team brought in existing initiatives (eg Microsoft and the Kodu Cup) and secured new partnerships and in-kind support from related initiatives, such as the National Citizen Service and plotr.

In three set piece events over ‘The Summer of Making’, MTDS was tied to key Government messages on open data, transparency, the digital economy, curriculum changes. The events (a launch at the Roundhouse with the Chancellor and young digital makers; a G8 Tax, Trade and Transparency event at Lancaster House with Francis Maude and; a five-day presence at Campus Party at the O2, involving a panel discussion between the Chancellor and Jimmy Wales) also brought coverage in national press and digital media. This generated more interest in the MTDS activities and encouraged other brands to get involved.

By linking MTDS to other related government policies and a cross-government coordination roll (growth of the digital economy, Tech City, computer science curriculum, National Citizen Service), the team ensured a coherent approach from government, and demonstrated that industry involvement in these initiatives were not isolated interventions.

By September, the original target of reaching approximately 150,000 young people through a range of opportunities had been surpassed.

### Key achievements of the Partnerships Team

- Reached over 150,000 young people over the summer.
- Secured government backing - this gave the mandate to secure big ticket partnerships and link MTDS into existing government initiatives.
- Gave government a more credible voice when speaking to young people about digital skills, by speaking through industry partners and youth facing organisations
- Used business links and partners across the campaign, and successfully brokered partnerships from O2 / Telefonica, Facebook, Microsoft, Virgin Media, Caffe Nero, Blackberry and Samsung
- Introduced new delivery partners such as KANO, Jagex, Codecademy
- Helped to raise ambition of, and likelihood of attracting investment in, small businesses by giving them a platform to deliver MTDS
- Secured a legacy for Make Things Do Stuff through the ongoing engagement of the BBC

### Lessons learned

The best way to think about MTDS and its journey is by thinking of a start-up business. The Partnerships Team relied on small contributions from several individuals and organisations to help get it off the ground. However, as the campaign grew, the message changed, audiences shifted and requirements of partners competed. This brought some practical challenges.

#### 1 Competing objectives

The number of organisations involved in the project resulted in some competing objectives. For Government, the campaign’s aim was to deliver the Government message at scale and bring big business in to support the delivery of the commitments. For Nesta, Mozilla and Nominet Trust, it was also about testing approaches and outcomes for young people, supporting digital making organisations to grow and proving concepts.

The role of the Partnerships Team was to keep the campaign united and on track. Being visible and contactable, often by getting out of the office, was key and regular phone calls followed an intensive period of face-to-face meetings. Variable success in using technology to collaborate (for example, through etherpads and google docs), highlighted the need for the Civil Service to keep apace with technological opportunities. At the time our IT systems were not set up to work in the open, collaborative, multi-agency way.

#### 2 Collecting statistics

Government’s commitment to delivering 100,000 digital making opportunities to young people by September needed to be met and evidenced. But the broad range of partners delivering those opportunities in many different ways made it difficult to get accurate and timely data on progress. There needed to be greater clarity about goals, targets, accounting and whose



responsibility it was to collect this data from the outset.

### 3 Communications

Whilst there was a dedicated press officer at Nesta, initially, the project lacked the support of a dedicated communications lead within Government. The number of different organisations sometimes muddled the clarity of the campaign's message. Was it about inspiring a generation of digital makers, was it only about coding or was it about innovation in the way digital skills could be delivered? This lack of clarity on an agreed central message made it difficult to seize opportunities to promote new commitments or encourage further commitments from the private sector.

By the time O2/Telefonica's Campus Party arrived in September, however, the Cabinet Office and Treasury communications and press teams had been engaged, and the Latimer group had engaged a team of young, tech savvy talent to create new content, particularly for the website. This central, strategic comms team needed to be there from the beginning, however.

Nevertheless, whilst the large number of partners, and the lack of a "fixed" message from the outset brought challenges, it was one of the drivers of the programme's overall success. Had its scope been too narrowly defined, the programme would almost certainly not have achieved what it did. Clearly,

**“ Samsung was glad to have the opportunity to be involved in the Make Things do Stuff Campaign, which brings together organisations working hard to bridge the technology skills gap for young people in the UK. Bringing these together on one platform has helped begin the process of providing consistency and scale. It's important that this continues and maintains momentum. ”**

Nicola Dykes, Government Relations Manager

there is a need for a careful balance between keeping opportunities open, without overly muddying the clarity of a message.

### Adding value, not duplicating

The legacy of the Make Things Do Stuff Campaign is evident with a continuing focus on digital making being seen across the country. The partnerships developed around the campaign have continued to flourish, taking on new directions and involving more and more people. The BBC have now launched their Make It Digital season which develops the partnerships created through MTDS and delivers at a true scale.

In conclusion, delivering the project through a collaborative partnership, and adding value to an existing campaign rather than duplicating efforts had significant benefits. It was an effective use of resource and enabled the individual organisations to focus their efforts where they were most effective, whilst boosting the overall impact of the collective efforts.

### Top tips for open policy development with business

- Have a clear message and idea but be willing to listen and change
- Be flexible on ask – business can support in lots of ways not just cash
- Think about strategic fit with Government and business priorities
- Be aware of Initiative fatigue – make it sustainable and strategic
- Do your homework and target relevant companies – are they doing anything relevant you can build on?
- Think about the business benefit

# Joining forces to fight Ebola

» Tackling the most recent Ebola outbreak has been an international effort. The Department for International Development (DFID) is leading the UK response to the crisis in Sierra Leone, working with a range of other departments to fight the virus abroad and on home soil. Jennie Barugh, Head of the Ebola Crisis Unit at DFID explains why cross-departmental collaboration is crucial in stopping the spread of the disease.

This current outbreak of Ebola is entirely unprecedented. In September 2014 the World Health Organization (WHO) reported that, of almost 5,000 people infected by the virus, about 2,500 had died. The virus was spreading exponentially; half of all cases had been recorded in just the previous three weeks. The international effort had to mobilise quickly to avert a disaster with the potential to affect many countries.

The UK has led the international Ebola response in Sierra Leone, a country with historic ties to Britain and where we have an existing bilateral development assistance programme (the US has led the response in Liberia, and France in Guinea).

## UK action in Sierra Leone

The Department for International Development (DFID) is leading the UK response to Ebola in Sierra Leone. DFID began funding hygiene and sanitation activities from April, followed by surveillance and community mobilisation in July. When it was clear this was an unprecedented outbreak, DFID led a huge government effort to scale up the response. Ten Whitehall departments, as well as four arms-length bodies, became involved, with the Prime Minister

“ Ten Whitehall departments, as well as four arms-length bodies, became involved, with the Prime Minister and Foreign Secretary chairing at least 16 ministerial COBRs. ”

and Foreign Secretary chairing at least 16 ministerial COBRs. Civil and public servants across the UK and internationally have been working in partnership as one team to provide significant and urgent support – a prime example of One HMG Overseas in action.

In addition to a surge of DFID staff working on the response in Freetown & London, over 800 British military personnel arrived in Sierra Leone to provide command and control, logistic and medical support. Public Health England (PHE) offered clinical expertise and prepared to staff the labs needed to increase the testing capacity of the country. UK-Med, who run the International Emergency Medical Register, led a massive recruitment drive, working with DFID, NHS England, the Department of Health (DH) and NHS Trusts to encourage NHS staff to join the response.

The Foreign and

Commonwealth Office (FCO) and DFID encouraged countries from around the world to join the response. Australia, New Zealand, Canada, the Republic of Ireland, the Republic of Korea, Norway, Denmark and Cuba all sent healthcare workers or military personnel to work at the UK-built treatment centres, whilst Estonia and the Netherlands sent vital supplies.

Working with non-governmental organisations has also been key, for example, the UK is working through SMAC – the Social Mobilisation Action Consortium (GOAL, CDC, Restless Development, BBC Media Action, Focus 1000), providing over £3million for the community-based ‘Action Against Ebola’ project. This approach is about promoting prevention, safe burials, reintegration of survivors back into communities, and awareness of Ebola through accurate media coverage.

With DFID working closely with the Government of Sierra Leone to set strategy and policy direction, the immediate approach to stemming the crisis there focused on faster diagnosis and isolation of Ebola cases, quickly increasing the number of treatment beds, supporting burial teams and an intensive effort to mobilise communities and change behaviour to reduce transmission.



Coordinating this effort is a command and control structure at national and district levels set up with DFID and military help.

The UK government has (at the time of writing) committed £325 million from the UK aid budget administered by DFID to combat the virus in Sierra Leone. This money has enabled:

- British Armed Forces to oversee the construction of six UK funded treatment centres from scratch and train over 4,000 Sierra Leonean and international healthcare workers;
- RFA Argus and three Merlin helicopters to provide transport and logistic support for medical teams and aid experts working in the country;

- Over 175 NHS clinicians to work in Sierra Leone on the frontline caring for the sick in highly challenging conditions with over 1,600 NHS staff volunteering since October.
- Over 100 PHE staff to run three new laboratories, testing over a third of all samples across the country, greatly speeding up the diagnosis of people with Ebola-like symptoms;
- The support of over 1,400 treatment and isolation beds – more than half of all the beds available for Ebola patients in the country;
- The logistical effort so more than 100 burial teams can provide safe and dignified burials. Burying bodies is one

of the most common ways the disease can be spread; and

- Over one million PPE suits and 150 vehicles to be supplied to Sierra Leone.

### Fighting Ebola on home soil

Whilst a handful of cases are expected in the UK, Chief Medical Officer Dame Sally Davies has said she is confident that the NHS and wider health protection system is very well prepared for this. People travelling to the UK from the affected countries continue to be screened before they depart and on arrival in the UK, and told who to contact if they develop any symptoms.



Ebola is a rare viral haemorrhagic fever. In the early stages the symptoms can be similar to those of more common infections like malaria; such as fever, intense weakness, muscle pain, headache and sore throat. Its incubation period ranges from 2 to 21 days.



## Joining forces to fight Ebola

DH, PHE and NHS England have worked across the health service to ensure healthcare staff have the training and equipment they need to respond to an outbreak in the UK, and to reassure the public that the UK has well-developed and well-tested systems for managing infectious diseases

such as Ebola

The UK led Europe in implementing proactive screening measures at four major airports and the Eurostar train terminal at London St Pancras, together with risk-based screening for shipping. PHE worked closely with the

Department for Transport and transport operators to put these measures in place quickly and efficiently at short notice, a training and recruitment exercise was arranged, and Home Office and Border Force officials devised a system to identify direct-ticketed passengers from the affected countries so that they could be referred for screening.

The Cabinet Office coordinated work with departments and the devolved administrations to ensure common understanding of processes and protocols in the event of a first positive case of Ebola in the UK. A four-nations training exercise focused on a fictitious case in Scotland, just two weeks before the first UK diagnosed case actually occurred there.

The Department for Communities and Local Government acted as the key coordinating body to ensure local authorities and others had contingency plans prepared. At the same time, communications teams across all departments reassured domestic and overseas audiences, often using innovative digital techniques (such as the Medics Behind the Mask campaign). They also supported multiple media outlets to visit Sierra Leone, providing story ideas and briefing to ensure the British public were kept informed.



### Research/Vaccines

The UK is driving international action to accelerate the development and testing of Ebola vaccines. HMG has co-funded early clinical trials of some of the possible vaccines, working with partners, including the Wellcome Trust, Oxford University and the Medical Research Council; and is working closely with the US Centers for Disease Control



British Army medics applaud healthcare worker and Ebola survivor, Sewa Mansaray, 21, from the DFID-funded Ebola treatment facility for health workers at Kerry Town, Sierra Leone.

and Prevention to support trials in West Africa amongst at-risk populations.

The PHE laboratories in Sierra Leone testing blood samples from possible Ebola patients, also provide facilities for vital field research into Ebola.

### Progress so far

It is clear this strategy is working and that the infection rate is falling in Sierra Leone. This is real progress and cause for cautious optimism that this disease can be beaten.

But there is no room for complacency and efforts continue to eliminate the virus from the Region. The road to elimination will be bumpy, with small, localised uplifts in infection that will need to be swiftly and firmly addressed. Until this outbreak is completely defeated there is always the potential for the infection rate to rise again.

### Lessons for the future

Professor Dame Sally Davies, the Chief Medical Officer has praised the work of the Civil Service and

wider public sector as “incredibly well coordinated”, adding that it has “not only kept people in the UK safe from Ebola, but is also helping Sierra Leone to get on top of the outbreak.”

Supported by colleagues from FCO, DH and DFID, Dame Sally attended the WHO’s Executive Board in January. The UK identified three main lessons from this: the need to equip WHO with the right tools to respond quickly and effectively to global health emergencies and disease outbreak; the necessity of working with international partners, regulators, industry and academics to develop new vaccines for infectious diseases with epidemic potential; and the importance of recognising that “all health is global.”

Dame Sally commented that, the interconnected nature of today’s world “should empower the WHO to coordinate the international response, work closely with partner nations from across the world to respond to outbreaks, and be prepared, as we have done with Ebola, to send our healthcare workers to the epicentre of the outbreak, so they can tackle it at source, where they will have most impact.”

The Executive Board agreed that the WHO should put in place rapid response teams that can be deployed quickly anywhere in the world to tackle outbreaks as soon as they begin (PHE, DFID and DH are already working together on the UK’s role and contribution).

### A very close run thing

Professor Christopher Whitty, DFID’s Chief Scientific Advisor, called the recent outbreak “a very close run thing.” He said: “If there had not been swift, decisive and coordinated actions by several UK government departments there is a high chance that by this stage this epidemic would have accelerated out of control in Sierra Leone and spread elsewhere in West Africa. It would certainly have claimed many more lives. We must learn from this epidemic and make sure this is the last one on this scale.”

The Prime Minister recently hosted a No 10 reception to acknowledge the contributions of British and international aid workers in emergencies. Among others, this was attended by major NGOs, NHS staff on the UK-Med register who had volunteered overseas and armed forces personnel who have served in Sierra Leone. The Prime Minister said “The range of what is done by British people and NGOs, often backed by DFID and the great work it does, is absolutely staggering.”

Further, in recognition of the bravery of those from the UK who are delivering the humanitarian response to Ebola, the Prime Minister intends to recommend to Her Majesty the Queen, through the Honours and Decorations Committee, a new medal to pay tribute to their efforts.

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