

Making the UK safer: a five year review

In 2004 the Royal Society published *Making the UK safer: detecting and decontaminating chemical and biological agents* (Royal Society 2004), which provided recommendations for improving the UK's capability to respond to a chemical or biological incident and minimise its impact.

Five years on the UK is better prepared to detect and respond to the malicious use of chemical and biological agents against the civilian population. However, it is necessary to avoid complacency by continually reviewing the risks faced and the sustainability of the UK's response capability.

This statement reviews UK Government progress against some of the Royal Society's major recommendations in 2004, and highlights several outstanding issues requiring further attention. The 2004 report addressed: organisation and procedure; detection; decontamination; medical issues relating to detection and decontamination; and mathematical modelling. The primary focus of this review is on the top-level issues of organisation and procedure.

1 Improving central coordination and direction of the UK programme

The major recommendation of the 2004 Royal Society report was: "The UK Government should establish a new centre to coordinate and direct the work required to improve the UK's capability and to minimise the impact of any civilian chemical or biological incident."

While significant progress has been made in the past five years, concerns remain over the central coordination and direction of the work required to improve the UK's capability for detection and response to chemical and biological incidents.

The government rejected the recommendation of a new Centre and the Home Office has continued to coordinate activities in this area. Nevertheless the government recognised the need to improve the UK's capability and the associated organisational structure has changed in the intervening years. In 2004 the government established a chemical, biological, radiological, and nuclear (CBRN) science and technology programme at the Home Office. Subsequently the Home Office team has been expanded under the Office for Security and Counter Terrorism (OSCT), established in 2007, which has cross-government responsibility for civilian counter terrorism encompassing chemical and biological threats, and including related science and technology.

In 2006 the Ministry of Defence (MoD) established its Counter-Terrorism Science and Technology Centre (CT Centre) with a view to improving cross-government science and technology to support counter-terrorism including chemical and biological detection and decontamination. However, while the CT Centre is available as a resource for other government departments, it remains focused on military priorities and wider counter-terrorism interests, such as countering improvised explosive devices (IEDs).

OSCT is responsible for science and technology requirements on chemical and biological detection and decontamination in support of the UK Government CONTEST counter-terrorism strategy. It commissions research that addresses these requirements where they span several government departments or where they fall outside the existing remit of government departments.

Where a particular requirement falls within the remit of a single government department OSCT can recommend research to be undertaken, but decisions on whether the research is supported are made by individual departments. Despite information sharing between relevant groups across government, this is an area where the existing approach to central coordination appears to break down. UK capabilities are dispersed over several institutions and organisations making fully coordinated and cross-cutting scientific research difficult. Concerns that OSCT is under-staffed with respect to CBRN issues, and that there is a lack of continuity of expertise, reflect the need to consolidate efforts across government.

2 Maximising efficiency and maintaining capacity across government

Historically the majority of research and development (R&D) funding for counter-terrorism was allocated to CBRN research. However, there are now broader needs for counter-terrorism R&D across the UK Government CONTEST strategy (UK Government 2009). As a result resources for chemical and biological detection and decontamination are even more stretched. In this context, there is a need to maintain sufficient provision and continuity of expertise within government on CBRN issues, which is already in short supply, and for it to be supported by training programmes.

With pressure on existing budgets it is important to gain greater clarity of where civilian and military requirements for chemical and biological detection and decontamination converge and where they do not, in order to make best use of available resources and avoid duplication of research efforts. In the past five years there has been a convergence of civilian and military counter-terrorism requirements in many areas, for example in countering improvised explosive devices (IEDs). In the chemical and biological area convergence is greatest for underlying research (as opposed to equipment) and, although MoD and OSCT are aiming to coordinate their research efforts, the case could be made for tighter joint management of the corresponding research budgets, particularly given current financial constraints.

Amongst the other issues demanding budget attention, and highlighted in the UK National Security Strategy (Cabinet Office 2009) and the National Risk Register (Cabinet Office 2009), are naturally occurring and accidental 'hazards', such as pandemics or hazardous materials (HAZMAT) incidents. For increased efficiency it makes sense to link up efforts in preparing and responding to chemical and biological 'hazards' with those aimed at the 'threats' of deliberate release of chemical and biological agents. While there are clear differences between 'hazards' and deliberate attacks, such as unpredictability and the nature of the agents involved, responses can be mutually reinforcing and lessons can be drawn from one another. For example the lessons learnt from the current flu pandemic can help inform preparedness and response to a deliberate biological release (Royal Society 2009). A similar approach might be taken in relation to the spectrum of chemical 'hazards' and 'threats'; from HAZMAT to chemical weapons.

Whilst it may be necessary to identify where best to focus attention and limited R&D resources, there is a need to maintain both short term and long term - higher risk - research projects. It is important that longer term assessments of the implications of advances in science and technology for chemical and biological 'hazards' and 'threats' are not lost to a focus on short term preparedness (Home Office 2009a).

At the international level the Organisation for the Prohibition of Chemical Weapons (OPCW) Scientific Advisory Board considers implications of advances in science and technology relevant to the Chemical Weapons Convention (OPCW 2008). And at meetings of States Parties to the Biological Weapons Convention there has been recognition of the need to keep abreast of relevant scientific and technological developments (United Nations 2006).

3 Getting the right equipment in place and ensuring interoperability

There is an overall need for operational analysis to assess whether the UK has the right equipment and processes in place for civilian chemical and biological detection and decontamination, and highlight any gaps in current capabilities.

Home Office acquisition of equipment is complicated because there is no single customer base for over 40 different police departments. A resulting problem is that there is no commercial driver for particular pieces of equipment. Moreover, the fragmented customer base means there is some lack of interoperability of equipment between different police forces and other emergency services, and associated problems for emergency response. A possible solution could be to set up a proxy customer to ensure central procurement.

There are clear differences in equipment requirements between the military and civil sectors due to different needs for detection (eg greater tolerance of false positives) and decontamination (eg availability of personal protective equipment), as well as availability of medical countermeasures. However, a better national solution for detection and decontamination might be attained through identification of any similarities. A key issue is the need for more interoperability between the armed forces and the civil police, on detection and decontamination equipment and associated concepts of operations, so that the former can easily assist in a crisis.

4 Information sharing and articulating equipment requirements

The 2004 Royal Society report highlighted the need to “Ensure information is shared effectively between different Government Departments and agencies, the academic community, industry and other interested parties, including the public.”

While there are legitimate sensitivities around revealing the limits of current detection capabilities, there are concerns that requirements for new chemical and biological detection equipment have not been clearly articulated to inform R&D of new equipment. In part, this is related to the lack of a single procurement route for the police and emergency services, and differing ‘customer’ requirements.

The Home Office has endorsed certain chemical and radiological detection equipment, and has emphasised research efforts on detection of biological agents where capabilities are limited. It should be noted that the limits of biological detection systems present an international problem and associated technical challenge, rather than one unique to the UK.

The Home Office has also issued guidance on ‘tolerable levels’ of chemical agents after which it is safe to return to the contaminated area, and interim guidance for biological agents. However, there are concerns that the levels are too risk averse and so, in addition to more data collection, judgements are needed to inform the necessary sensitivities for detection equipment.

It is important that the Home Office continue to engage and liaise with academia and industry, and groups such as the Resilience Industry Suppliers' Community (RISC), to articulate requirements and support research and development to improve the UK's chemical and biological detection and decontamination capabilities. In August 2009 the Home Office published a new 'Science and Technology Strategy for Countering International Terrorism' (Home Office 2009a) together with an accompanying brochure entitled 'Countering the terrorist threat: ideas and innovation – how industry and academia can play their part' (Home Office 2009b). However, CBRN issues are not covered in the brochure. On 2 November 2009 the Home Office announced a call for research proposals against CBRN requirements for the financial year 2010/11 (Home Office 2009c).

5 International cooperation and funding for R&D

The 2004 Royal Society report recommended that the UK "...seek to make full use of developments and potential funding in the US, Europe and elsewhere."

There is close cooperation between UK and US government departments in a number of chemical and biological detection and decontamination research areas. Significant funding is also being provided by US funders for research in UK universities, the Health Protection Agency, and the Defence science and technology laboratory (Dstl). However, it is worth noting that these funders often liaise directly with universities not via the Home Office. The large amount of funding from the US does raise a potential weakness if this source of funding was to decrease in the future.

As regards Europe, more effort might be made by the government to assist UK universities in securing European funding for research on chemical and biological detection and decontamination through the European Commission's Seventh Framework Programme (FP7) (European Commission 2009). The Home Office is responsible for coordinating the UK Government's involvement with European security research and has appointed a National Contact Point at the Home Office to provide advice to those seeking funding under the FP7 Programme (Home Office 2009d).

6 Concerns over decontamination

Significant concerns have been raised in recent years over the science capability of the Government Decontamination Service (GDS), which operates as broker for contractors rather than providing a decontamination capability. In April 2009 GDS became part of the Food and Environment Research Agency (FERA), itself established at the beginning of 2009 as a means of consolidating science capability across the Department for Environment, Food and Rural Affairs (Defra).

On decontamination the 2004 Royal Society report recommended that government: "Undertake a detailed review of the various options for the decontamination of people, buildings, vehicles and the wider environment; Assess the efficacy of decontamination procedures and technologies; Assess contact hazards from contaminated surfaces; and Develop and implement techniques for avoiding secondary contamination in hospitals and ambulances."

Progress against these recommendations has been limited. Sampling protocols and standards for decontamination are a long way from being fully mature, and there is still a problem of a lack of evidence base for decontamination. Analytical procedures such as trace analysis are needed to assess whether decontamination and clean-up has been effective. The activities of GDS also need to be fully coordinated with the overall programme on chemical and biological detection and decontamination led by OSCT.

A long running international research and development project led by Environment Canada – in partnership with other Canadian government departments, the US Environmental Protection Agency, the University of Leeds, and the Russian Research Institute of Hygiene, Toxicology and Occupational Pathology – has been developing standards for deciding on decontamination measures following a chemical or biological incident and will report in 2010 (Volchek et al 2009).

7 Risk communication

The 2004 Royal Society report argued that “Dialogue between scientists, psychologists, politicians and the general public should be encouraged to improve the communication and public understanding of hazard and risk issues in relation to terrorist incidents, and any insights should be proactively incorporated into decision support.”

The issue of advising the public of what to do in the case of a chemical or biological incident and associated research on risk communication would benefit from more emphasis. It is possible to mitigate panic and influence behaviour if reliable information is provided in advance of an incident, and if clear messages can be provided during an incident.

8 Exercises to test the UK response

The 2004 Royal Society report recommended that “Realistic exercises should be undertaken involving first responders, emergency planners and some civilians in order to test and develop the correct reactions to an incident.”

Concerns have been raised over the realism of past exercises carried out to test the UK response to chemical and biological threats. There is a need for more scenario based exercises to underpin an ‘all risks’ generic response, which can be refined in a given situation, as recognised by OSCT. The GDS is a particular concern having only conducted desktop exercises.

One major issue is that current exercises stop at the door of the accident and emergency (A&E) department and therefore do not test the entire medical response. This is a particular problem given that hospitals are at full capacity and in the case of an emergency there will be the additional burden of the ‘worried well’.

9 Disease surveillance and medical reporting

Noting that the occurrence of any chemical and biological incident may first become apparent through those affected reporting medical symptoms, the 2004 Royal Society report recommended: “Increasing training of clinicians in CBRN related subjects...”; and “Using medical intelligence analysis ... to improve recognition of a chemical or biological event at the level of the population...”.

There has been significant progress in the area of disease surveillance and medical reporting through the Department of Health’s Medical Intelligence Unit and the Security Service (MI5) Joint Terrorism Analysis Centre (JTAC) now has a medical intelligence staff.

However, there is a need to educate more medical professionals on the effects of chemical and biological agents that might be used deliberately as weapons because of current scarcity of expertise, which is very limited in some areas. This is compounded by a problem of skill degradation as existing experts retire. The

Doctors.net.uk online learning programme has not been sufficient to remedy this situation. In September 2008 the Health Protection Agency (HPA) launched a replacement online learning portal called *eHealth* (HPA 2009).

References

Cabinet Office (2008) *National Risk Register*. Available at:

http://www.cabinetoffice.gov.uk/reports/national_risk_register.aspx

Cabinet Office (2009) *The National Security Strategy of the United Kingdom: Update 2009. Security for the Next Generation*. Available at: http://www.cabinetoffice.gov.uk/reports/national_security.aspx

European Commission (2009) *Security Research Homepage*: <http://cordis.europa.eu/fp7/security/>

Home Office (2009a) *The United Kingdom's Science and Technology Strategy for Countering International Terrorism*. Available at: <http://security.homeoffice.gov.uk/news-publications/publication-search/general/Science-Technology-strategy>

Home Office (2009b) *Countering the terrorist threat - Ideas and innovation*. Available at:

<http://security.homeoffice.gov.uk/news-publications/publication-search/general/Science-Tech-Booklet>

Home Office (2009c) *Research requirements for the CONTEST Science and Technology Research call 2010*.

Available at: <http://security.homeoffice.gov.uk/news-publications/publication-search/cbrn-guidance/technolog-research-call1/>

Home Office (2009d) *Office for Security and Counter Terrorism - Science and innovation website*:

<http://security.homeoffice.gov.uk/science-innovation/science-innovation-strategy/?version=4>

Health Protection Agency (2009) *eHealth*: <http://ehealthlearning.org.uk/>

Organisation for the Prohibition of Chemical Weapons (2008) *Report of the Scientific Advisory Board on*

Developments in Science and Technology. RC-2/DG.1. Available at: <http://www.opcw.org/about-opcw/subsidiary-bodies/scientific-advisory-board/related-documents/>

Royal Society (2004) *Making the UK safer: detecting and decontaminating chemical and biological agents*.

RS policy document 06/04. Available at: <http://royalsociety.org/Making-the-UK-safer-detecting-and-decontaminating-chemical-and-biological-agents/>

Royal Society (2009) *New approaches to biological risk assessment*. RS policy document 08/09. Available

at: <http://royalsociety.org/New-approaches-to-biological-risk-assessment/>

UK Government (2009) *The United Kingdom's Strategy for Countering International Terrorism*. Available at:

<http://security.homeoffice.gov.uk/counter-terrorism-strategy/>

United Nations (2006) *Background Information Document on New Scientific and Technological Developments Relevant to the Convention*. BWC/CONF.VI/INF.4. Available at: <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G06/643/31/PDF/G0664331.pdf?OpenElement>

Volchek K, Fingas M, and Sattar S (2009) Standardising the clean sweep. *CBRNe World*, Autumn 2009.

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