Science and Evidence Plan
2016 - 2017
Foreword

Professor Andrew Curran, HSE Chief Scientific Adviser and Director of Research

Great Britain’s record on work-related health and safety is one of the best in the world. High-quality science, evidence and analysis underpin Great Britain’s risk-based, goal-setting regulatory regime and are vital for ensuring effective and proportionate risk management that protects workers and safeguards the public while enabling productivity, innovation and growth. For over a hundred years, HSE (and its forerunners) have invested in research to understand why things fail so that controls can be designed to minimise safety and workplace health risks and thereby reduce unplanned downtime of both people and plant. HSE’s credibility depends in no small part on the authoritative way it conducts research and analysis and uses the results to inform its interventions with the people who are responsible for health and safety at work.

Over the last twelve months we have been developing a more forward-looking and long-term approach to planning. We held a series of internal workshops with representatives from around the organisation, which considered where our priority areas for investment in research should be made in the context of a changing world of work. We identified a small number of priority research hubs, to be led by senior technical leads. The priority areas identified are:

- Ensuring regulatory frameworks are fit for the future;
- Developing an appropriate evidence strategy for the future;
- Managing the impact of demographic change on the health and safety of the future workforce;
- Developing the right intervention strategy for the British industrial asset base;
- Taking responsibility for health at work; and
- Technical support for investigations, inspections and enforcement.
Our Science Plan will facilitate continuity and support for longer term strategic research programmes, including foresight activities - this will be important to ensure that we are prepared for future changes in the workplace that might give rise to new risks.

The plan links to the main aims in HSE’s Business Plan 2016/17 and will be updated as circumstances dictate. In line with ‘Helping Great Britain work well’, we will use our extensive scientific expertise, knowledge and capability to have a positive impact on the working world.

The six strategic themes including icons have been used to show the link between priority research and Helping Great Britain work well.

### Helping Great Britain Work Well

| **Acting together:** promoting broader ownership of health and safety in Great Britain |
| **Tackling ill health:** highlighting and tackling the costs of work-related ill health |
| **Managing risk well:** simplifying risk management and helping businesses to grow |
| **Supporting small employers:** giving SMEs simple advice so they know what they have to do |
| **Keeping pace with change:** anticipating and tackling new health and safety changes |
| **Sharing our success:** promoting the benefits of Great Britain’s world-class health and safety |
Ensuring regulatory frameworks are fit for the future

Background

In recent years HSE has undertaken an extensive review of health and safety regulations and has simplified the regulatory framework, making legislation easier to understand. We will continue with this work, ensuring science, engineering and research underpins and makes a significant contribution to the de-regulatory agenda.

Research in this priority area will be developed to understand how well current regulatory frameworks can accommodate expected trends in work demographics, working patterns, technologies, health hazards, new uses for old substances and how regulatory frameworks may need to change. It will also provide the evidence base to target effective de-regulation where required. We will develop further our understanding of risk control, risk perception and risk communication to underpin regulatory frameworks.

Work in this research priority area links to the following key action in HSE’s Business Plan:

➢ Provide an effective regulatory framework

Our priorities for 2016/17

- Review the benefits and costs of legislative requirements for plant and equipment inspection and associated administrative arrangements to report on the proportionality of current requirements and possible options for improvement.
- Identify research priorities for chemicals, lead and dangerous substances to support the simplification of associated regulations.

Key projects for delivery 16/17 and beyond

<table>
<thead>
<tr>
<th>Impact &amp; analysis</th>
<th>Making best use of statistical evidence, economic and social analyses</th>
<th>on-going</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection</td>
<td>Principles for the assessment of initial integrity in chemical and petrochemical plant</td>
<td>Q4</td>
</tr>
<tr>
<td>Legislative requirements</td>
<td>Identify and conduct research to support a review of costs/benefits for plant and equipment inspection</td>
<td>Q4</td>
</tr>
<tr>
<td>Unregulated products</td>
<td>Identify currently unregulated biocidal products to inform future authorisation processes</td>
<td>2018</td>
</tr>
</tbody>
</table>

2 The dates given for delivery are based on the latest information and therefore subject to change.
Links to *Helping GB Work Well*
Developing an appropriate evidence strategy for the future

Background

Research in this priority area will ensure we have the appropriate evidence to improve and update our understanding of industry issues, workforce targeting, demographic change, cost benefit analyses, prioritisation of inspections, interactions between work and non-work factors.

We will have a measurement strategy which helps make best use of new data collection, modelling and analytical techniques to provide insight for our decisions and we will provide appropriate access to this data in forms which provide enforcement and policy intelligence.

Our statisticians will develop statistical sources and analyse and interpret statistical data to provide up to date information on the incidence of work-related injuries and ill-health. Statisticians will also seek to use data from external sources where it can complement our internally collected statistics. These analyses will help us to target and design interventions by identifying sectors and occupations where there is a relatively higher risk of injury and occupational ill-health.

Work in this research priority area links to the following key actions in HSE’s Business Plan:

- Lead and engage with others to improve workplace health and safety
- Sustaining regulatory excellence
- Provide an effective regulatory framework

Our priorities for 2016/17

- Publish a suite of health and safety statistics.
- Produce a foresight report based on systematic horizon scanning to identify future workplace challenges and prioritise investments.
- Agree the 2017/18 science investment programme.
- Support the refresh of HSE’s Sector Strategies.

Key projects for delivery 16/17 and beyond

**Data analysis** Improving the hand-arm vibration dataset on-going

**COPD** Large scale epidemiological study to establish the principle causes of Chronic Obstructive Pulmonary Disease (COPD) Q1

**FIND-IT** Further develop the ‘FIND IT’ tool linked with external stakeholder data to inform sector priorities – commencing Q1

**Costs of cancer** Valuation of costs of occupational cancer associated with past work conditions Q2
| **Big data** | Understanding the impact of using big data in occupational health and safety | Q2 |
| **Offshore** | Create database on models/modelling dispersion, explosion and fire for offshore safety, for use by inspectors | Q2 |
| **Social economic methodologies** | Map and evaluate decision support tools used in risk management agencies – **commencing Q3** | |
| **Land use planning** | Development of common oxidisers league table | Q3 |
| **Asbestos** | Undertake further analysis of asbestos lung burdens in young adults | Q4 |
| **Ill health in construction** | Exposure data related to paint and diesel engine exhaust emissions | Q4 |
| **Subjective well-being** | Validating data sources on a broader range of injury and ill-health conditions | Q4 |
| **MAC** | Updating the Manual Handling Assessment Charts tool | 2017 |
| **Wood dust** | Updating the evidence base for wood dust exposure | 2017 |
| **Agriculture** | Updating the evidence base for organic dust and bioaerosol exposure in the agricultural industry | 2018 |

**Links to Helping GB Work Well**
Managing the impact of demographic changes on the health and safety of the future workforce

Background

We will undertake research to understand future behaviours and attitudes to risk at work so Great Britain sustains positive health and safety performance. Work will include understanding the impact of multigenerational working, migration and other social trends on workforce skills, capabilities, safety culture and behaviour. It will also include how increased working lifetimes affect people’s physical and mental health in particularly where their work is safety critical.

Work in this research priority area will link to the following actions in HSE’s Business Plan:

- Provide an effective regulatory framework
- Reduce the likelihood of low-frequency, high-impact catastrophic incidents
- Lead and engage with others to improve workplace health and safety

Our priorities for 2016/17

During this year the research in this priority area will be developed; typical research questions we will seek to address include the following:

- Will the change in workforce demographics have an impact on how we communicate our messages and guidance?
- How can we manage the occupational health and safety of remote workers (e.g. home workers and peripatetic workers)?
- How will the safety culture change with changing demographics?
- Do we understand the impact of ageing on workforce skills and capability?
- Are attitudes/behaviours to risk influenced by worker demographics?
- Does our current understanding of attitudes/behaviours to risk apply to the future world of work?
- Does our approach to behaviour change work long-term?

Links to Helping GB Work Well
Developing the right intervention strategy for the British industrial asset base

Background

Great Britain has many highly specialised industries which are strategically important to the country’s economy and social infrastructure e.g. oil and gas, chemicals, explosives, bio-economy. Research in this priority area will focus on our understanding of how materials and structures degrade over time and on ensuring Great Britain has effective, evidence-based safety checks, calibration and testing requirements for existing and new technologies. It will include how designers and manufacturers contribute to improvements in occupational health and safety and whether the current machinery design and supply regulations are relevant or appropriate for new technologies. HSE’s current Strategic Research Programme covering advanced materials and manufacturing will continue to take forward work within this research area.

Work in this research priority area links to the following key actions in HSE’s Business Plan:

- Reduce the likelihood of low-frequency, high-impact catastrophic incidents
- Provide an effective regulatory framework

Our priorities for 2016/17

- Through research we will support the key elements of leadership, worker involvement, competence and asset integrity across all major hazards sectors.
- Contribute to building on the work of other government departments to assess the potential changes to the risk profile of the major hazard sector from an increased cyber-threat.

Key projects for delivery 16/17 and beyond

<p>| Pipework | An investigation of degradation of underground polyethylene pipework for LPG conveyance | Q2 |
| Fire and explosion | Flammable oil mist detection for offshore fire and prevention | Q3 |
| Offshore | Managing risks to offshore installations from extreme load events - commencing Q1; and offshore valve degradation | Q4 |
| Tower cranes | Assessment of tower crane slewing brakes to inform update of relevant standard | Q4 |
| Bolting corrosion | Conduct an integrity assessment of bolts used for flanged joints on offshore installations | 2017 |</p>
<table>
<thead>
<tr>
<th>Institution</th>
<th>Project Description</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCE</td>
<td>Undertake review of historical uncontrolled vapour cloud explosions (VCE)</td>
<td>2017</td>
</tr>
<tr>
<td>Stress corrosion</td>
<td>Investigating stainless steel corrosion cracking in offshore assets</td>
<td>2019</td>
</tr>
</tbody>
</table>

**Links to Helping GB Work Well**
Taking responsibility for health at work

Background

We will commission work under this priority area to identify and develop the evidence that is needed to help people in the health and safety system take greater responsibility for health at work.

We will use health surveillance data to identify current and future health trends and issues. How new materials, technologies and ways of working will affect health exposures or impact on stress/physical strain will also be a focus of this research area. Much of the work in this hub will take forward and enhance the work previously delivered by HSE’s health surveillance and health impact assessment Strategic Research Programme.

Work in this research priority area links to the following key actions in HSE’s Annual Plan:

- Lead and engage with others to improve workplace health and safety
- Provide an effective regulatory framework
- Sustaining regulatory excellence

Our priorities for 2016/17

- Bring together existing evidence and research on work related ill health including consideration of the future world of world to prioritise future activities by HSE.
- Provide technical support for inspection activity including the sustained focus on major health risks e.g. occupational cancer, asthma, musculo-skeletal disorders (MSD).

Key projects for delivery 16/17 and beyond

**Asthma**

A review of occupational asthma in cleaners; and exposure control in fish and shellfish processing

**Stress**

Use and effectiveness of the Management Standards approach

**MSD**

Examine risk of MSD to ambulance and patient transport workers; and understand barriers to reducing MSD in the food and drink industry

**Silica dust**

Examine efficiency of controls in stone working

**Asbestos**

Examine current exposures and work practices in licensed asbestos removal industry; and examine removal of asbestos in restricted access spaces

**Waste & recycling**

Occupational exposures, ill health and effective procedures to manage risks
Links to *Helping GB Work Well*
Technical support for investigations, inspections and enforcement

Background

HSE’s main focus is on the health and safety of workers, but our regulatory interest extends to cover the impact on the general public, consumers and the environment. Of the inspections and investigations undertaken each year, a significant proportion require particular science or engineering knowledge to identify the causes of problems and to identify solutions which meet the key criteria of being reasonable and practicable.

We have specialists from over 20 disciplines that provide expert technical knowledge in support of investigations. This corporate expertise and knowledge, and the facilities available within our Science Directorate, are unparalleled and means that our inspectors can call on immediate support at any time.

Work in this priority area links to the following key actions in HSE’s Annual Plan:

- Provide an effective regulatory framework
- Secure effective management and control of risks

Our on-going priorities

- Maintain and develop capability (equipment and facilities) and staff expertise for our core scientific disciplines to support incident investigation and other mandatory activity associated with all industries and sectors regulated by HSE (and Local Authorities) and invest in capabilities required to meet new regulatory responsibilities.
- Sustain improvement in the provision of timely/immediate technical support to investigate incident investigations, anywhere in the UK.
- Learn and disseminate the technical lessons learned from incident investigation to the health and safety system.
- Ensure our science is undertaken to support incident investigations, including development and deployment of appropriate new techniques and technologies that improve the effectiveness and efficiency of the enforcement process.
- Provide specific investigation support and any subsequent enforcement activity resulting including management of evidence and subsequent expert witness input.
- To identify outline lessons learnt from incident work for development into ideas for other science programmes

Links to Helping GB Work Well
Work with strategic stakeholders and key partners

We will continue to develop and seek to implement an approach to identify and grow commercial opportunities and to work in partnership with others through a programme of shared research. This work will support duty holders through the provision of research on a commercial basis, providing a mechanism for them to deliver improved occupational health and safety performance.

This work links to the following key actions in HSE’s Business Plan:

- Lead and engage with others to improve workplace health and safety
- Growing commercial activities

Key projects for delivery 2016/17

**Shared research**

Develop proposals and offerings and sign up partners for work on:
- composite wraps; escalator safety; asbestos and stored energy.

**Research hub**

Launch the International Regulatory Institute with the University of Manchester

Performance

We will publish [Science Reviews](#) in which case studies will demonstrate the benefit and impact of our science.

Research findings are published in HSE’s freely available [Research Report](#) series and in open access journals.

The Science and Evidence Plan is subject to scrutiny by HSE’s Science and Engineering Assurance Committee, a panel of independent external experts.