

Health and Safety Executive

Areas of Research Interest

Introduction

HSE is the UK government body with responsibility for overseeing health and safety at work in Great Britain. As a regulator, HSE's goal is to prevent workplace death, injury or ill health and to protect others (mainly members of the public) who may be exposed to risks from the way work is carried out. HSE achieves this goal by working with dutyholders to help them understand the risks they create and how they can manage them.

HSE also delivers regulatory schemes intended to protect the health of people and the environment, balancing the economic and social benefits that chemicals offer to society. Science, evidence and analysis underpin HSE's risk-based, goal-setting regulatory regime. This ensures our approach to risk management is effective and proportionate so that workers are protected and the public is safeguarded *while* enabling productivity, innovation and growth.

HSE's strategic approach to science focuses on practical problem-solving, drawing on the synergies to be had from our regulatory, engagement and policy work. As the world of work changes, there is a continuing need for research on a wide range of topics to develop the evidence base for understanding and controlling current and emerging risks.

HSE's portfolio of strategic scientific work is divided into six priority 'science hubs'.¹ The hubs were identified following engagement with HSE policy, enforcement and scientific specialists. Collectively the hubs help ensure that:

- we address the scientific and analytical intelligence needed to underpin HSE's regulatory activities, including incident investigations and enforcement:
- we maximise the impact of HSE's science and evidence on the health and safety system:
and
- we address potential future changes to the world of work, and likely implications for HSE and the wider health and safety community.

In its ARI document, HSE has identified and outlined the forward-looking scientific research that would ensure it remains a modern enabling regulator, within one of the most successful health and safety systems in the world. This is a high-level summary of our wider research interests, which either HSE or other organisations – sometimes working in partnership – could usefully address.

¹ Science and Evidence Plan <http://www.hse.gov.uk/research/content/science-evidence-delivery-17-18.pdf>

The six areas are:

- The right evidence for the future:
- The impact of demographic change on the health and safety of the future workforce:
- The right intervention strategy for the British industrial asset base:
- Taking responsibility for health at work;
- Lessons learned from investigations: and
- Regulatory frameworks which are fit for the future.

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November 2017

The right evidence for the future

Overall aim:

To develop the existing system of ongoing data collection, analysis, interpretation and result dissemination so that it continues to support HSE's current priorities and prevention strategies and is flexible enough to adapt to change.

Questions arising within this area of research interest include:

- On the use of evidence to understand the future better:
 - How should we use evidence to identify the major changes in the work environment that will impact on health and safety risks - and how these changes may interact?
 - How can we use evidence better
 - to understand the nature and extent of future health risk exposures in British workplaces: and
 - to inform the reduction of new cases of work related ill health?
- On the use of evidence about interventions:
 - How do we know what is the best available evidence on what interventions have been – and will be - effective
 - to support planning, monitoring and evaluating our interventions:
 - to assess whether our interventions will work:
 - to assess the impact of our interventions in the short, medium and long term: and
 - to monitor early changes following our interventions and provide timely feedback to improve them?
- On methodology:
 - How can we make more effective use both of existing and new data and analytic methodologies to generate the intelligence to support our decision making e.g.
 - to include the right groups when developing evidence (e.g. workers and their representatives):
 - to update the reference data, processes and criteria used in risk-based decision making:
 - to ensure that hazard identification and consequence models are validated for new technologies and new ways of working: and
 - to incorporate new digital approaches?

The impact of demographic change on the health and safety of the future workforce

Overall aim:

To identify emerging health and safety hazards and risks arising from changes in the demographic profile of the UK workforce.

Questions arising within this area of research interest include:

- On extended working lives:
 - Will the health of people working for longer improve or worsen, taking into consideration that they may also be working with chronic conditions?
 - How will the future workforce be anatomically, physiologically and biochemically different from today - and what do these changes mean for the risk of musculoskeletal disorders and job design? and
 - How will obesity, cancer survivors, cardiovascular risks, differing views around physical exercise and work, change over time?
- On competency and skills:
 - How do employers know that workers have the knowledge, competency and skills for the work that they do - and the work they will need to do in the future? and
 - How competent are employers in managing safety culture and risk in multigenerational workforces and remote workers?
- On risk attitudes and behaviours:
 - How will risk attitudes and behaviours change in the future as people work for longer and types of employment change, including remote working, precarious working, and self-employment? and
 - What are employers' attitudes to adapting the workplace to accommodate older workers and those with chronic health conditions, including working practices, workplace design and using personal devices or equipment e.g. sensors?
- On working cultures:
 - What risks result from workers 'watching' or monitoring technology doing a task in contrast to the worker physically 'doing' a task themselves? and
 - What is the health impact of a 24/7 'always on' work culture and how does this impact vary by demographic group (e.g. by age and gender)?

The right intervention strategy for the British industrial asset base

Overall aim

To develop understanding of how materials and structures degrade over time and how designers and manufacturers can contribute to improvements in occupational health and safety.

Questions arising within this area of research interest include:

- On materials and structural integrity:
 - How do we ascertain how materials and structures degrade over time? and
 - How can we ensure evidence is used appropriately for completing effective safety checks, calibration and testing requirements for existing and new materials and structures;
- On technology design and manufacture:
 - How can designers and manufacturers contribute to incorporating improvements in occupational health and safety? and
 - How do we ascertain what evidence is needed about the use of new technologies - e.g. new and emerging energy technologies, use of novel materials, new manufacturing processes, etc. - to develop an appropriate, effective intervention strategy?
- On the safe operation of industrial assets:
 - What will the future industrial asset base look like?
 - How can we ensure that the asset base is robust enough to reduce the likelihood of low frequency, high impact catastrophic events?
 - How do we identify the key long-term challenges and threats to the current ageing asset base?
 - How do we know that the ageing asset base can operate safely for longer between shutdowns and beyond the original design?
 - How do we identify what role human factors play in the effective operation or failure of the asset base?
 - How can we ensure that health and safety challenges in decommissioning are appropriately addressed? and
 - How can we ensure that repair and replacement strategies and the technologies used are suitable?

Taking responsibility for health at work

Overall aim

To increase understanding of the extent, harm, costs and preventability of occupational ill-health.

Questions arising within this area of research interest include:

- On the nature of ill-health at work:
 - As workers often have multiple complicated health conditions that may interact with each other, how do we develop our understanding of what related ill-health actually looks in real workplaces?
 - How do work and non-work factors - i.e. the impact of work on health and of health on work - interact and influence chronic health conditions? How can these be optimised to enable continued work where this is needed or wished for?
 - What is the impact and consequence of work-related ill-health on the individual and society, including human costs, costs of ill-health and impacts upon productivity and employment?
 - How will the future burden of occupational disease be influenced by new ways of working, new materials and demographic changes, such as an ageing and a more sedentary workforce? and
 - How do we identify new and emerging health risks before they become health problems?
- On people's understanding about health at work:
 - What is the understanding of the prevalence and incidence of work-related ill-health conditions?
 - How do we identify and develop what evidence is needed to help people in the health and safety system take more responsibility for health at work? and
 - How do workers' attitudes and awareness of workplace health hazards influence their behaviour and affect their risk of occupational disease?
- On exposures:
 - What are current occupational exposure levels, how are these best controlled and are improvements being made?
 - How do we improve characterisation of exposure-responses and other risk factors? and
 - How can we better understand the nature of exposures that cause ill health, in comparison to those that are known to be safer?

Lessons learned from investigations

Overall aim

To equip ourselves with new insights into the reasons why particular failures in health and safety occur.

Questions arising within this area of research interest include:

- What are the best methods by which knowledge generated through our incident investigation activities (for both safety and health) are captured and recorded?
- How can we develop approaches for storing outputs from our investigation activities that will maximise the ability for re-use?
- How can we make best collective use of the stored knowledge to inform measures designed to prevent failures in health and safety from occurring?
- How do we ensure the intelligent use of the entirety of the knowledge gained (both tacit and explicit) from our investigation activities? and
- How can we improve the sharing of knowledge, insights and learning, across the wider health and safety system?

Regulatory frameworks which are fit for the future

Overall aim

To further develop understanding of the current and future world of work to ensure that our regulatory approach remains suitable and sufficient, including where our regulatory interests extend beyond preventing harm to workers, e.g. covering assessment of potential adverse impacts of chemicals on the general public, consumers and the environment.

Questions arising within this area of research interest include:

- How do we ensure that our regulatory approach can accommodate future trends in work demographics, working patterns, new technologies, health hazards and new uses for old substances?
- How we identify in the future who it is that owns the 'risk' in an increasingly complex workplace?
- What alternative regulatory models, interventions and instruments could improve encourage innovation and improve health and safety outcomes whilst minimising regulatory burdens?
- How do we know we have sufficient evidence to support an effective and efficient approach to regulatory policy and risk assessment, e.g. for the management of existing, new and emerging health risks from chemicals and to enable their safe and sustainable use? and

How do we ensure that deregulation supports safe working practices, and does not create or increase risks?

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