Climate change: enabling a better working Britain for the next 100 years

‘Let our advance worrying become advance thinking and planning’

Winston Churchill

Climate change is one of the most pressing issues facing the global community and has the potential to impact on the environment, society and global economy. The evidence of observed increases in ambient temperatures (‘global warming’) is strong and the frequency of extreme weather events over recent decades has also increased [1].

Although there is still debate over the effects of human impact on global climate change [2], efforts to mitigate the extent of observed changes have been extensive. Despite this, it is predicted that this trend is likely to continue and the impact will be broad and complex, resulting in a need for human and environmental adaptation, which will have far reaching consequences on all facets of life and work.

While initiatives and strategies to promote effective adaptation to climate change and its associated effects are now in progress, understanding the impact of climate change on workers’ health and safety has seen little research and remains largely unknown. As a consequence, the potential impact for occupational health specialists is not clear.

To date, most of the climate change research has focused on public health as opposed to occupational health (and safety) outcomes. This is in part due to lack of useful data relevant to this relatively new component of occupational health and safety research. A framework has been devised to help identify the possible impact of climate change on the workplace and workers and consequently occupational morbidity and mortality [3]. The hazards identified were grouped into seven main categories with possible exposures and related health effects:

- Increased ambient temperature (global warming) and resultant climatic changes,
- Increased air pollution (resulting from increased temperatures, ozone levels and airborne particles),
- Ultraviolet (UV) radiation,
- Extremes of weather (resulting from global climate change),
- Vector-borne diseases and expanded habitat,
- Industrial transitions and emerging technologies,
- Changes to built environment.

As with all health risks, whether climate change related or not, there are numerous factors that may increase or decrease individual susceptibility (e.g. age, weight, pre-existing medical conditions, etc). Furthermore, socio-economic factors will also play a role in how risks and hazards will impact on population groups. Such factors should be carefully considered with respect to climate change hazards in the workplace as they have the potential to influence policy, planning and risk assessments. A good understanding of these susceptibility factors may offer opportunities for preventative actions where appropriate training, health screening and personal protective equipment (PPE) may reduce the risk of injury and disease.

The effects from climate change are likely to have relevance to occupational health and safety across all sectors of industry, and the occupational health community will need to play a leading role in understanding both the impact and the potential adaptations that could be made. The direct effects of climate change will impact on emergency services and the health care sector which will be under increasing pressure to deal with catastrophic incidents related to extreme weather events such as flood and associated rescue, trauma and injury to health. In certain regions (for example in the UK and Australia), water supply companies will be under intense pressure to meet increased demand in the face of longer drier summers [4] and also in dealing with treatment and drainage systems necessary to respond to the impact of flooding. Similarly, the agriculture sectors in some areas of the world will have to adapt to drier conditions in summer, water logging in winter and possible threats to crops by pests and less predictable growing seasons [5]. Outdoor workers will face hotter conditions and increased exposure to chemical pesticides. In addition, the predicted increase in the intensity of UV radiation may present further hazards to outdoor workers.

The energy sector will have to adapt in response to the direct effects of climate change (risks of flood affecting power stations, availability of water sources for cooling processes, etc) but also in response to pressures to reduce greenhouse gas emissions and a move to ‘greener’ renewable technologies, such as wind and solar powered energy. Transport infrastructure may be affected in terms of supply and delivery of raw materials and products. Business travel may be disrupted by more frequent severe weather events, such as extremes of cold/heat causing closure of airports, roads and disruption to rail services. Working conditions in the transport sector may become an issue as temperatures rise (for example underground public transport workers in Europe). The construction sector will be directly affected with workers, tools and materials having to cope in unfamiliar and challenging climatic conditions and extremes of weather. The food and drink
industry may have to source more flexible supply chains to cope with changing pressures on products resulting from climate change (changes to growing seasons and availability of certain fresh produce) and consider appropriate storage/transport facilities and technologies to ensure food is not spoiled in warmer conditions.

Tourism is likely to experience changes in response to seasonal adjustments, and communications industries will be under greater threat from adverse weather that may disrupt or damage communication networks. The finance sector will be influenced by the impacts on all sectors (locally and internationally) and may be under increased pressure regarding insurance, risk management and compensation claims related to events resulting directly or indirectly through climate change. Finally, climate change will have implications for government (local and central) steering policy in areas of health, environment and infrastructure. It will also be the responsibility of governments to encourage appropriate adaptive strategies and support (and penalize) organizations to make change.

Adaptation to the effects of climate change is key. The majority of well-known responses to climate change are all ‘mitigation’ strategies: reduction of greenhouse gas emissions, carbon capture, greener energy production (and usage) and green living. While this aspect is of vital importance, it must not detract from the urgent need to adapt. However, some countries, industries and organizations have a lower capacity to undergo this process (or are less focused on such strategies in the face of current economic circumstances). This may be due to specific constraints and circumstances facing the industry or organization (such as a coastal location with a high flood risk) or the availability of suitable technology or solutions to the problems faced or the finance to support those changes. Additionally, the decision-making process within a country or organization is of crucial importance, as is employee consultation, levels of education, awareness of the issues and the ability to process climate information as a tool for forming plans and initiating changes.

In light of these issues, it is of little surprise that lower income countries and small and medium-sized enterprises (SMEs) are often less able to adapt [6]. As SMEs are a vital base for most economies and communities, strategies for increasing their adaptive capacities must be addressed and technologies must be shared with countries that have poor access to effective adaptation processes.

Similarly, the nature of the hazards and health effects already identified will have an impact on specific job roles within an industry or organization. Some of the most exposed jobs (outdoor workers for example) are often the least paid. This is further compounded as lower paid workers may lack the incentives to adhere to adaptive requirements (such as the use of PPE or major process changes), which may create further challenges to existing jobs.

As a related consequence, the potential negative impact of climate change on a business may irreparably damage reputation, leading to loss of business and jobs, damage to economies and worker health and well-being [7].

Therefore, the challenge for the occupational health community is not only to think about the nature of likely physical changes but also the change in the nature of the economy, particularly those classified by Shulte as industrial transitions and emerging technologies [3]. As the economic and political environment changes, there is likely to be significant and rapid change in manufacturing, implementation and climate change mitigation activities.

A recent report by the Health and Safety Executive reviewed the occupational health hazards and risks of emerging energy technologies and sources [8]. The range of technologies and approaches described is extensive and includes approaches such as co-firing of coal and biomass, hydrogen fuel cells hydrogen storage systems, batteries and supercapacitors. What is clear is that each technology brings with it a unique set of issues but that the tried and tested approaches for assessing the risks still hold good. Therefore, these occupational health challenges are essentially manageable but only if the occupational health specialists are involved at the early stages of development and implementation to advise employers and employees. This would ensure that any potential occupational health issues can be engineered out of the solution thereby enabling effective technologies to be implemented without increasing the potential risk to health.

Research on climate change and associated occupational health issues is an urgent requirement; indeed, it has been identified as a priority in the WHO Global Plan of Action for Workers’ Health (GPA Priority 4.1) [9].

Figure 1. Conceptual model of the potential impact of climate change on workplace health and safety.
presents a simple model of the potential occupational
impacts. What is clear is that the problem exists and will
continue to grow. Without appropriate research, oppor-
tunities to prepare and adapt may present serious issues
to the health and well-being of workers at home and
abroad.

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