We can eliminate occupational cancer from chemicals

We no longer send children to work crawling up chimneys sweeping out soot, nor do we allow men to rip out asbestos insulation in shipyards without any controls. However, there are still chimney sweeps and asbestos workers and there are still cancer risks associated with their work. Well over a million men and women in Great Britain are exposed to carcinogens at work today and many will die as a consequence.

In 1981, Richard Doll and Richard Peto undertook an analysis of the causes of cancer for the US Congress. They concluded that 4% of all cancers were probably caused by work. This was a fairly rudimentary estimate, but the authors considered that they would not be out by more than a factor of two times, i.e. the true proportion was between 2 and 8%. The Health & Safety Executive (HSE) have used these estimates for a number of years to justify their strategy for chemicals and other agents that may cause occupational cancers. Over the last 2 years, the HSE have sponsored a project to update the Doll and Peto estimate for Britain in the 21st century. Lesley Rush- ton from Imperial College and her colleagues have led this study, and the results from the first phase of the work have been recently published [1].

The current assessment is provided for six cancers: cancer of the lung, sinonasal cancer, cancer of the bladder, non-melanoma skin cancer, leukaemia and mesothelioma. It was estimated that ~8% of deaths from these cancers in men and 1.6% in women were attributable to work, which corresponds to >7000 deaths each year. The main contributors were exposure to asbestos, crystalline silica, diesel exhaust and radon. To put these figures in context, there were 212 people killed at work because of accidents in 2005/06, >30 times less than the estimated cancer deaths. Rushton also estimated there are >13 000 occupational cancer registrations, with non-melanoma skin cancer making the largest contribution to non-fatal cases. The occupational cancer burden estimates are similar to those from Doll and Peto and the main cause of this has been the enormous rise in asbestos-related mesothelioma and lung cancer—mesothelioma up from just >400 in 1981 to almost 2000 in 2004.

There are also newer occupations or exposure circumstances where there may be a risk of cancer that to date have not been considered by Rushton’s team. For example, the International Agency for Research on Cancer (IARC) has recently reviewed the evidence for cancer risks associated with shift work involving night work and concluded that ‘shift-work that involves circadian disruption is probably carcinogenic to humans’ (Group 2a) [2]. There is about 15–20% of the workforce employed in shift work involving night work that could disrupt circadian rhythm. However, the main problem with this IARC evaluation is that it is not clear what aspect of shift work causes the risk and it is impracticable to stop all types of shift work to control the risk. Further research is needed to enable practical interventions to be identified, but this should not stop us taking action where there are clear interventions available, i.e. for hazardous substances.

We must take ownership of the cancer burden from workplace chemicals and make sure that in another 20 years from now, occupational cancer does not continue to be a problem waiting for a solution. The key is to ensure that exposures to the main contributing carcinogens are being adequately controlled and that the level of control is increasingly being tightened in the future. This will need the support of all stakeholders, particularly the HSE, but the occupational health and hygiene community should accept the main responsibility in trying to promote reduction of these risks. Particularly important are exposures to diesel exhaust and radon, where the available evidence suggests that there has been little reduction in the levels and prevalence of exposures in recent years. Other key exposures that need to be controlled are typically found in the construction industry, e.g. silica, asbestos and diesel exhaust. The highest priorities for action must be the following:

Diesel exhaust emissions: HSE has only limited objective data on the level of exposure to diesel exhaust in Great Britain or how many people are exposed. There is no clear comprehensive guidance from HSE about how to reduce the cancer risk from diesel exhaust emissions. There are no HSE enforcement initiatives in this area. In 2004, HSE acknowledged the link between exposure to diesel exhaust and cancer, but considered that the risk was ‘very slight’ and did not merit being regulated as a carcinogen [3]. However, Rushton estimated that 566 lung cancer deaths per annum are caused by diesel exhaust exposure at work and this number is almost certainly rising each year. The largest numbers exposed to diesel exhaust are in land transport and in the construction industry, although there are many diverse situations where exposure to diesel exhaust can occur.
Radon: Although there is a good understanding of the regions of Great Britain where radon is a problem in workplaces and what should be done to remediate these buildings, there is little evidence that sufficient efforts have been made to encourage building owners to make these changes. In 2006, HSE reported that it was ‘aware that the vast majority of employers with workplaces located in radon-affected areas have not assessed the radon hazard in relation to the protection of their employees’ [4]. Radon is estimated to cause 370 lung cancer deaths each year and it is doubtful whether current exposures are very different from those 20 years ago.

Crystalline silica: Exposure to crystalline silica is almost certainly lower than it was 20 years ago. However, it is disappointing that in a recent HSE-sponsored survey, about a third of exposures monitored in stonemasonry and brick making were >0.1 mg/m³, the current workplace exposure limit [5]. Crystalline silica was judged to produce ~800 lung cancers each year. There is an urgent need for HSE to take steps to ensure average silica exposures are reduced as well as focussing on the industries and sectors where there is currently unacceptably high exposure.

There is already extensive effort put into controlling the risks from asbestos exposure and further effort seems unnecessary for the moment.

It is possible that in the future we could eliminate occupational cancer from hazardous substances as a public health concern. Over the last year, we have seen the elimination of environmental tobacco smoke from workplaces in Britain, which will probably reduce the future occupational cancer deaths by ~160/year [6]. In most other situations, we would typically expect to see a fairly steady reduction of average exposure level and prevalence, typically between 5 and 10% lower exposure per annum [7]. A crude projection of the current occupational cancer burden based on a reduction in exposure for many of the relevant carcinogens of 8% per annum over the last 20 years suggests that the future burden from current exposures could be about a quarter of Rushton’s estimate [6]. If we can make a real difference in reducing workplace chemical exposures in the next 20 years, then it is possible that the future burden from exposures in 2025 could be <500 deaths per year, which if total cancer incidence remains similar to today would correspond to much <1% of total cancer deaths. This would be a major achievement and could be seen as the target that would indicate we had ‘eliminated’ occupational cancer as a public health issue.

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References