A payroll tax for occupational health research?

Britain has a proud tradition of research into the influence of occupational and environmental factors on health. From the early studies of Pott on chimney sweep's cancer through investigations of cancer in oil shale workers, nickel refiners, and asbestos workers to the more recent studies of the relation between noise exposure and deafness, chemicals and asthma, and dusts and chronic airways disease the objective of this research has been to prevent unnecessary disease. It is easy to quote many examples of the success of such research—for example, the dramatic reduction in coal-worker's pneumoconiosis and the elimination of many of the classical occupational cancers and poisonings.

Nevertheless, in most British medical schools occupational health is given scant attention and in some it is not taught at all. Thus the academic base for research into the subject has almost disappeared. Perhaps this is because occupational factors in disease are no longer thought important in an era that allows the human genome to be decoded, but industrial accidents still kill some 700 people annually in Britain¹ and about a fifth of the mortality of men of working age is conservatively estimated to be related to occupational factors.² As the classic occupational diseases decline so new problems are recognised: asthma epidemics have occurred in the electronics industry; repetitive strain injuries have been associated with work on keyboards; infectious diseases continue to be a concern to the health industry; and there are now worries that organic solvents may produce long term neurobehavioural changes. Many hazards old and new still lurk in the biotechnology, microchip, plastics, and chemical industries, and the real toll of occupational death and disease is probably underestimated in British figures by a factor of two or three.³

As research and the education of doctors in occupational health have declined so the public perception of safety and health in the workplace has increased. Dramatic reminders of workplace hazards have occurred at Seveso, Bhopal, Chernobyl, Zeebrugge, and King's Cross—the workplace and the general environment cannot be separated in their effects on life and health. Who is available and trained to advise the public and government on these hazards? The traditional and effective environmental job of the public health specialist has been largely lost in the institution of community medicine. And who is to carry out the research into hazards and their prevention? Or is rational decision making to be replaced by responses to active pressure groups—as, for example, has been the case with asbestos.

An important step is being taken by the Health and Safety Executive in response to a recommendation by a House of Lords select committee that priorities for research in occupational health be determined.⁴ But the topics for research are many while the researchers are few. Only two universities and one research institute in Britain provide facilities for independent research across a broad base including epidemiology, toxicology, environmental measurement, and ergonomics. Funding precludes expansion, and, indeed, these three organisations are all in serious financial difficulties. It is perhaps unrealistic in the present political climate to expect more money from the government, though we should like to think that such funds as the government does provide for research were distributed on the basis of decisions about social and economic priorities.⁵

Ultimately, however, all money to be spent on improving the quality of life by activities such as preventive medicine comes from the profits of a thriving industry and from the taxes paid by those who benefit from it. The harmful consequences on health of that same industry are preventable, and many responsible industries spend money to prevent ill health and accidents by employing doctors, hygienists, safety officers, and nurses. Some industries also sponsor research, but most do not, although they may benefit from the actions of those who do.

Is it not time to consider new ways of raising money for research into occupational health. A small, across the board, payroll tax has been used in Sweden to provide a fund to support research and training in occupational health and safety. Very small amounts spread evenly would go a long way to put Britain back at the forefront of preventive medicine in the workplace. And that would benefit not only the public health but also the health of industry itself.

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Airway obstruction and sleep disruption in Down's syndrome

The senior doctor who habitually dozes in clinical meetings; the schoolchild who wets his bed at night and who tends to nod off in class; and the 2 year old who snores, is restless at night, and has signs of heart failure may all be suffering from obstructive sleep apnoea. The condition has received much attention over the past few years since it seems to cause much upset. The recognition of obstructive sleep apnoea, which is especially common in children with Down's syndrome, is vital because treatment is usually effective.

Two factors are important in maintaining airway patency during sleep: the structure of the upper airway, and the function of the pharyngeal musculature. Together they prevent the collapse of the upper airway during inspiration. In childhood the commonest anatomical cause of upper airway obstruction is enlarged tonsils and adenoids. Less often, congenital anomalies such as mandibular hypoplasia and choanal stenosis may be responsible. Functional abnormalities of neuromuscular control of the upper airway are much rarer. Congenital myopathies and other conditions causing severe hypotonia may cause obstructive sleep apnoea in children. Several associated factors may precipitate symptomatic obstructive sleep apnoea in children with longstanding upper airway anomalies, including additional

upper airway obstruction (such as a cold), sedative drugs at night, and obesity.

A wide range of symptoms and signs has been associated with obstructive sleep apnoea. Direct effects during sleep include restlessness, unusual postures, snoring, apnoeic pauses, and bedwetting, and symptoms during the day include difficulty in waking, somnolence, and bad behaviour. Important indirect features include failure to thrive, developmental delay, and pulmonary hypertension and congestive heart failure because of repeated episodes of hypoxaemia.

In Down's syndrome several factors predispose to obstructive sleep apnoea, including crowding of the pharynx by the large, posteriorly placed tongue and by lymphoid hyperplasia and the presumed reduction in pharyngeal muscle tone that is part of a generalised hypotonia. In addition, children with Down's syndrome are often snuffly or overweight or both. Recognition of obstructive sleep apnoea in Down's syndrome is complicated by coexisting congenital heart disease, which provides a ready explanation for pulmonary hypertension, and by intellectual impairment, which may mask the adverse developmental effects of recurrent nocturnal hypoxaemia. Nevertheless, several groups have recognised the predisposition to obstructive sleep apnoea of children with Down's syndrome,^{1,4} and the association has been recorded in an excellent book summarising the current approaches.⁵

In a recent report on the subject Southall and his colleagues made polygraphic recordings overnight in hospital on 12 children with Down's syndrome and compared the findings with observations made at home on 20 healthy children.⁶ Six of the 12 patients had episodes of hypoxaemia, hypercapnia, or an abnormal breathing pattern. Upper airway obstruction was confirmed by fibreoptic endoscopy under light anaesthesia. Five of the six children with sleep disruption had symptoms, but we are not told the prevalence of symptoms in the six children without obstructive sleep apnoea or in the reference population.

The management of obstructive sleep disturbance in Down's syndrome is uncertain. In the study by Southall and others tonsillectomy and adenoidectomy were effective in only one child and marginally beneficial in two. Choanal dilatation (for choanal stenosis) and tracheostomy (after failure to respond to tonsillectomy and adenoidectomy) were effective in two others. Other possible treatments which have been successful in obstructive sleep apnoea include treatment with protryptiline or aminophylline, continuous positive airway pressure at night, and reconstructive surgery of the oropharynx.

There are three important aspects to the paper by Southall and colleagues.⁶ Firstly, it helps to raise general awareness of the importance of obstructive sleep disruption. Secondly, it shows that diagnostic monitoring need not be complex: overnight oxygen monitoring, preferably in the child's own home, may be adequate for most children with suspected obstructive sleep disruption. Thirdly, it shows the recent more positive attitude towards children with Down's syndrome. No longer should we accept developmental delay or pulmonary hypertension as inevitable consequences of Down's syndrome; both may be secondary to obstructive sleep apnoea, and treatment can improve the quality of life for children with Down's syndrome.

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Towards bloodless liver surgery

After the detailed description of the segmental anatomy of the liver by French surgeons in the 1950s hepatobiliary surgery developed rapidly.¹ Twenty years ago operations on the liver were uncommon and regarded as dangerous, but now they are commonplace. In experienced hands the mortality after even the most major resections has fallen below 5%. These advances have been helped by applying a wide range of technologies to diagnosing and assessing hepatic conditions, and a recent exciting development has been the ultrasonic dissector.²

Preoperative ultrasonography can show focal lesions in the liver as small as 1 cm in diameter. It shows their relation to adjacent vascular structures and provides a means of guiding biopsy needles. Intraoperative ultrasonography has provided the surgeon with an even more accurate technique of hepatic imaging.³ The relation of a tumour, for example, to both portal and hepatic venous channels can be clearly visualised; using this technique the surgeon may achieve segmental and subsegmental resection with satisfactory margins of normal hepatic parenchyma. And placing the ultrasonic probe on the liver surface is particularly useful in identifying metastases and detecting small hepatocellular carcinomas in patients with cirrhosis.⁴

Selective angiography of the liver shows the anatomical arrangement of the arterial supply (which is variable), and the arterial pattern of some lesions—for example, haemangiomas—is diagnostic. Studies of the venous phase outline the portal system and render splenoportography unnecessary in most patients. Therapeutic embolisation of the hepatic artery to control bleeding may be life saving in some patients with, for example, liver trauma. Complete assessment of liver lesions usually requires computed tomography as well as radionuclide scanning. The biliary tree is now readily assessed by retrograde and percutaneous cholangiography, and bile duct strictures and tumours can sometimes be dilated by balloon catheters and permanent stents placed to relieve the obstructed bile flow.

The ultrasonic surgical dissector (CUSA, Cavitron Surgical Systems, Sigmacon, Middlesex) now allows accurate liver resection with reduced blood loss.² It was developed initially for neurosurgical procedures from the phacoemulsifier aspirator used for cataract operations. The instrument consists of a vibrating suction device which oscillates with a frequency of 23 kHz. It fragments tissue in a radius of 1-2 mm, preferentially destroying parenchymal cells. The collagen and elastic tissue in vessels is preserved, and fragmented tissue is removed by coaxial irrigation, which allows clean dissection of the blood vessels before