Occupational cancer

The Cinderella disease

Marie-Anne Mengeot
Journalist

Contributors
Tony Musu and **Laurent Vogel**, ETUI-REHS

Contents

Preface

The International Agency for Research on Cancer's most recent estimates claim 2.3 million new cases of cancer and over a million cancer deaths in the European Union in 2006. Some of these cancers are directly caused by working conditions. Others are the result of environmental exposures which, in many cases, are themselves related to firms' business activities. Even putting a conservative estimate of 8% on working conditions-related cancers, it is clear that work-related cancer mortality far outweighs the death rate from work accidents, and is probably the main cause of working conditions-related deaths in Europe.

These tens of thousands of deaths each year are not from accidents. They are preventable. Most neither stem from malfunctioning production processes, nor disrupt normal production. They are to do with technical choices about substances, processes, and work organisation.

These cancers write the stamp of labour relations into human biology. They deepen social inequalities of health. By far most affect manual workers.

The main obstacle to preventing work-related cancers is lack of control over working conditions by the workers themselves. The current level of scientific knowledge and the existence of alternative technologies make much more effective prevention possible. This brochure sets out to identify the key issues in acting against work-related cancers. It lays no claim to offer an A-to-Z analysis of all the issues. It is a contribution to reviving the trade union agenda on health and safety at work. Its main focus is chemicals. Other carcinogens – ionising radiation, biological factors, etc. – are mentioned in passing, but the specific issues of preventing them are not looked at in detail here.

We firmly believe that union action is a potent force for effectively tackling work-related cancers. What is striking about the programme for health and safety adopted by the European Commission in February 2007 is the vague and woolly nature of Community strategy on it. We believe that the new REACH regulation offers opportunities that must be grasped. That is why the trade union movement will keep up the pressure for stronger Community measures and tightening up the existing legislation.

We asked Marie-Anne Mengeot to write this brochure for us. She is one of the too few journalists who take a close interest in working conditions and their health impacts. She was a pioneering documentary-maker on Belgium's public service television. She came to prominence in the 1970s with reports on asbestos, the unequal distribution of work between men and women, occupational cancers and musculoskeletal disorders. As a journalist, she was able to put over in clear, layman's terms the knowledge needed by the main players in taking effective action against work-related cancers - workers themselves. This brochure also includes contributions by Tony Musu (chapter 4) and Laurent Vogel (chapter 5), and was coordinated by Denis Grégoire.

Other initiatives will follow. We are planning to publish books, brochures and articles that will look further into specific aspects of union action against work-related cancers. This is a long-term project that will be run in close cooperation with trade unions in different European countries. We firmly believe that as the new REACH regulation is rolled out, developing tools for analysis and action will help workers and their unions stem the rising tide of work-related cancers.

Marc Sapir
Director of the Health and Safety Department,
ETUI-REHS

1. Cancer
An unequal burden of disease

Cancer is the main killer after cardiovascular disease for all men and women in developed countries. It is responsible for a quarter of all deaths in the European Union of 25, rising to 41% among 45-64 year-olds, making cancer the leading cause of death in middle age[1]. Beyond these general findings, mortality atlases show that the incidences of death, disease and cancer differ with geographical region. They can also help identify why these differences occur. In the United States, the first cancer atlas pinpointed a surplus of mouth cancers in south-western states. Later, the cause was narrowed down to the habit of chewing tobacco. Likewise, the high lung cancer death rate found along the American coasts could be put down to the World War Two boom in shipbuilding work, where exposure to asbestos was particularly high.

Spain's mortality atlas shows that male lung cancer death rates are highest in the Estremadura, Asturias and south-west Andalusia regions. In the latter, it is 20% above the national average and double the rate found in Navarre. This part of Andalusia also has the highest rate of manual workers in Spain, up to 80% of the working population. The same pattern is repeated in Catalonia, with a highly specific geographic distribution of lung cancer. The highest rates are found in the Barcelona region and along the Catalan coastline. In Barcelona itself, they are concentrated in the old working class districts and the new outer suburbs populated by immigrant communities.

These geographic inequalities in illness and death tend to reflect social status inequalities.

Social inequality

Studies across Europe show lingering social inequalities of health and mortality, despite the spread of social security systems and better access to care. Poverty, unemployment, and poor working conditions are big contributors to these inequalities. In Seville, for example, researchers showed that well-to-do men and women had life expectancies 8 years and 4.5 years longer, respectively, than those from poor backgrounds. The researchers argued that loss of a job and unemployment materially affect life expectancy and mortality. Unemployment black spots had excess mortality rates of 15% among males and 8% among females.

[1] *Causes of death in the EU 25*, Eurostat, press release, July 2006.

Another example comes from the Nord-Pas-de-Calais region in France, which has the country's highest cancer incidence rates – 669 in every 100 000 men and 372 in every 100 000 women, against national averages of 504 per 100 000 men, and 309 per 100 000 women. These high cancer rates affect life expectancy in the Nord-Pas-de-Calais, which on average is 3.6 years shorter for men and 2.8 years for women than in the south of France[2]. But the kind of cancers found in the north are not different from those found elsewhere in France. The head of the regional health observatory attributes the regional gap to "the higher percentage of people vulnerable to poverty" in the north. "The pattern of excess cancer mortality reflects pockets of unemployment and poverty; a legacy of the collapsed industrial and mining fabric", he adds[3].

While unemployment may be a factor of social inequality in illness and death, so, too, is work. A study of the influence of social factors in cancer deaths in Cadiz shows that excess cancer mortality rises in an inverse relationship with social status. The excess cancer mortality here is due to a surplus of cancers of the larynx, lungs, bronchi and pleura. Alongside traditional factors like drinking and smoking, the authors point to occupational factors. This region of Andalusia is home to furniture, footwear, and aluminium manufacture, and shipbuilding yards, where the workers were exposed to acids, paint, chromium, arsenic and asbestos.

Men aged 25-54 living in the Nord-Pas-de-Calais have a higher death rate from cancer than in other French regions for all social status categories, but in very different proportions: 9% higher for senior managerial staff; 30% higher for technician and skilled craft occupations/self-employed skilled workers/independent retailers; 60% higher for manual/office workers[4]. Nationally, if mortality among senior managerial staff and professionals is taken as 1, the excess mortality ratio for manual/office workers is 2.9 for mortality from all causes, and 4 for cancers. The ratios are higher in the Nord-Pas-de-Calais at 4 and 5, respectively. Work-related risks obviously have an impact on the excess cancer incidence reported there. It is telling that the rate of recognised occupational cancers in the Nord-Pas-de-Calais is nearly double that of the Paris region. In the 1960s and 1970s, half the region's labour force consisted of manual workers, many working in the mining, iron and steel, and shipbuilding industries where exposure to different carcinogens – especially asbestos – was commonplace. The national institute of health and medical research (Inserm) studied laryngeal and hypopharyngeal cancers – usually associated with smoking and drinking – in 15 French hospitals. It found that manual workers have a two and a half times greater probability than non-manual workers of developing these cancers. The study's authors attributed a third of this excess risk to occupational factors.

A report by the national institute of statistics and economic research (Insee) in June 2005 reviewed nationwide social differences in mortality for France[5]. The first finding was that among both male and female workers, managerial staff and professionals have the longest life expectancy and manual workers the lowest. Over the period 1991-1999, male managerial staff and professionals had a life expectancy at age 35

[2] Espérance de vie, cancers : les deux France, *La Revue Prescrire*, January 2007, No. 279, p. 66-67.

[3] *Cancer : le Nord-Pas-de-Calais est la région française la plus affectée*, Dépêche AFP, 17 January 2007.

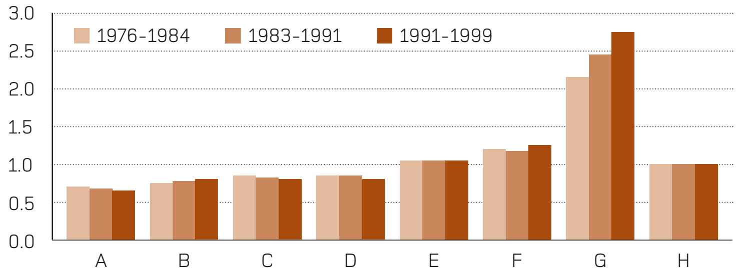
[4] Aïach, P., Marseille, M., Theis, I., Pourquoi ce lourd tribut payé au cancer ? *Le cas exemplaire du Nord-Pas-de-Calais*, éditions de l'École nationale de la santé publique, Rennes, 2004.

[5] Monteil, C., Robert-Bobée, I., Les différences sociales de mortalité : en augmentation chez les hommes, stables chez les femmes, *Insee Première*, No. 1025, June 2005.

six years longer than that of manual workers, *i.e.*, 46 years against 39. The female gap is three years, with a life expectancy of 50 years at age 35 for managerial staff and 47 years for manual workers. Their second finding was that life expectancy gains especially benefitted the higher social status categories. The Insee report found that mortality had declined between 1976-1984 and 1991-1999, but in a different way for men according to social status category. Between these two periods, the mortality gap between managerial staff and manual workers widened by approximately 15%. The report's authors argue that lifestyle and behavioural factors, but also more physically demanding working conditions and more frequent exposure to work-related risks, act against manual workers.

Table 1 Standardised mortality indicators, males aged 35-80, by period and social status category

A. Managerial staff and other professionals
B. Technician and skilled craft occupations
C. Farmers
D. Self-employed skilled workers, shopkeepers, business owner/ managers
E. Non-manual workers
F. Manual workers
G. Non-economically active, not retired
H. All



Interpretation: the age-specific death rate among non-economically active males aged 35-80 was 2.7 times higher than among all males in the period 1991-1999. It was 2.1 times higher over the period 1976-1984.

Source : Insee

This linkage between cancer, life expectancy and social status is not specific to the Nord-Pas-de-Calais, France, or Spain. Manual workers in all European countries have a death rate at ages 45-59 – i.e., a premature mortality rate – higher than non-manual workers, ranging in some case up to double.

Global inequality

The International Agency for Research on Cancer (IARC) reports a higher cancer incidence and cancer mortality in low-income groups in all industrialised countries. In the past half-century, the incidence of lung cancer has fallen in the highest-income groups, but has risen steadily among the lowest-income groups. The IARC specialists argue that this difference is not just due to different smoking habits in the social groups. They also claim that exposure to carcinogens in the working environment may account for a third of the observed difference between the cancer incidences in higher and lower income groups, rising up to a half for lung and bladder cancer.

The undoubted social differences in the incidence of smoking cannot explain all the observed cancer inequality. While smoking is about 20% more common among male manual workers than managerial staff, manual workers have an excess premature cancer mortality rate of about 200% compared to managerial staff[6].

[6] Thébaud-Mony, A., Histoires professionnelles et cancer, *Actes de la recherche en sciences sociales*, No. 163, June 2006, p. 21.

Additionally, the available data on recognised cases of work-related cancer point to a concentration among manual workers and low-income groups. This is unsurprising, given manual workers' greater exposure to carcinogens, as reported by Sumer, the large-scale French survey on exposure to work hazards.

Manual workers ten times more often exposed than managerial staff

The Sumer survey[7] measured French workers' exposure to carcinogens in 2003. Analysis of the data revealed differential exposures to carcinogens by social status categories: 30% of skilled manual workers, 22.5% of unskilled manual workers, 11% of technician and skilled craft occupations and 3% of managerial staff. Fitters, maintenance/servicing and repair workers are most affected, with nearly half exposed to carcinogens, followed by 28% of production workers, and 10.6% of handling, warehousing and transport workers.

Young people are at increased risk, with 17.5% of under-25s exposed compared to an average 13% of over-25s. The maintenance/servicing trades are the most at-risk sector, with the highest proportion of young people on apprenticeships or training contracts. White collar workers in this sector very often also have a high incidence of exposure to several carcinogens.

[7] Les expositions aux produits cancérogènes, Enquête SUMER, DARES, *Premières Synthèses*, July 2005.

SUMER (from the French acronym for Medical Surveillance of Occupational Risks) is a survey done for the third time between May 2002 and September 2003 for which 1800 occupational doctors questioned 50 000 French workers on their working conditions and exposure to the main hazards of work.

Further reading

- Benach, J., *et al., Atlas de mortalidad en areas pequeñas en España (1987-1995),* Universitat Pompeu Fabra, Barcelona, 2001, 114 p.
- Benach, J., *et al., Atles de mortalitat en àrees petites a Catalunya (1984-1998)*, Universitat Pompeu Fabra, Barcelona, 2004.
- Boffetta, P., Merler, E., Occupational cancer in Europe, *Environmental Health Perspectives*, Supplements, vol. 107, nb. S2, May 1999, 303 p. See: www.ehponline.org/docs/1999/Suppl-2/toc.html
- Leclerc, A., *et al., Les inégalités sociales de santé*, Editions La Découverte-Inserm, Paris, 2000, 448 p.
- Salem, G., Rican, S., Jougla, E., *Atlas de la santé en France, vol. 1 – Les causes de décès*, John Libbey Eurotext, Paris, 1999, 189 p.
- Thébaud-Mony, A., *Travailler peut nuire gravement à votre santé*, La Découverte, Paris, 2007, 280 p.
- Santé et travail. Déni, visibilité, mesure, *Actes de la recherche en sciences sociales*, No. 163, June 2006, 107 p.
- *Social inequalities and cancer*, IARC-Scientific publications, No. 138, International Agency for Research on Cancer, Lyons, 1997, 412 p. Downloadable from: www.iarc.en/IARCPress/pdfs/sp138/index.php

2. Occupational cancers An over-long story with no ending

Diseases that are associated with certain occupations have been described by authors from ancient times onwards, but only as isolated observations. The first systematic descriptive account of different diseases affecting craft workers and labourers is that made by Bernardino Ramazzini, Professor of Medicine at the University of Padua, in his "Treatise on the Diseases of Workers", published in 1700[8]. In the foreword, he writes, "Are we not forced to the conclusion that several trades are a source of illness to those who carry them out, and that tradesmen, finding the most serious illnesses where they hoped to find their and their family's livelihood, die hating their thankless occupation? Having in my practise had frequent occasion to observe this misfortune, I have set myself to writing about the diseases of workers."

This uncommon physician was not content merely to describe, but set about "suggesting medical precautions for the prevention and treatment of such diseases as usually affect workers". He recommended that his colleagues should add to the list of questions that Hippocrates advises doctors to ask their patients, the question "What occupation does the patient follow?"

Three centuries on, this is still a question that needs to be put. And as in Ramazzini's time, it is still today unfortunately not being asked enough.

In his work, the father of occupational medicine describes in detail the diseases to which workers in more than 50 occupations are prone, including miners, quarry-workers, chemists, textile workers, glassmakers, painters, grave-diggers, midwives, wet-nurses, and many more. He reports respiratory disorders, asthma, coughs, skin diseases, the risks of infectious and parasitic diseases, mercury, lead and antimony poisoning, but nowhere does the word "cancer" appear in his writings. It was not until nearly a century later that another doctor demonstrating the same observational bent would report the first occupational cancer.

Chimneysweep's cancer, the first identified occupational cancer

Cancer of the scrotum, known as "chimneysweep's cancer", is the first cancer attributed to work-related exposure. In 1775, an English surgeon,

[8] Ramazzini, B., *Essai sur les maladies des artisans*, translated from Latin into French by M. De Fourcroy, new edition based on the 1778 edition, Adolphe Delhays Libraire, Paris, 1855.

Percival Pott, gave an account of the incidence of scrotal cancer among men who had been chimneysweeps when young. Hitherto, it had been thought to be a purely venereal disease. In 18th century England, chimneysweeps were often children, climbing naked in sometimes narrow, blistering chimneys. Pott ascribed chimneysweep's cancer to the build-up of soot and tar in clothing and the folds of skin covering the testicles.

The disease appeared to be unknown on the Continent. English doctors crossed the Channel and found that occupational cancers could be avoided by relatively simple preventive measures. They observed that chimneysweeps on the Continent, especially in Germany, had long worn a special head-to-toe covering that was fastened tightly about the wrists and prevented soot from entering into contact with their body. They also observed that these chimneysweeps were very careful about their personal hygiene.

A century after Pott's discovery, other doctors reported cancers of the scrotum in textile workers exposed to mineral oils. A carcinogen in these oils caused a veritable epidemic of scrotal cancer among workers in the English cotton industry after 1910. But it was not until the 1930s that the carcinogen was identified as benzo[a]pyrene, along with a series of polycyclic aromatic hydrocarbons (PAH) present in coal and oil by-products. In fact, PAH are all around us. They are found in cigarette smoke, and many workplaces may be contaminated with them through fumes, gases, soot, and heat-degraded oils. Scientific knowledge about their cancer-causing properties has not stopped coking plant workers, exposed to PAH-containing fumes, from continuing to have double the death rate from bronchial cancers. PAH may cause not only skin cancers, but also cancers of the lungs, throat, larynx and oesophagus (food pipe).

The same carcinogen can be found in very different working environments. A carcinogen may normally act on one specific organ, but can easily spread to others. Even among coking plant workers, very different rates of bronchial cancer were found between factories and countries, according to the preventive measures taken or technological processes used. This shows that there is nothing inevitable about occupational cancers.

Deadly dye!

The chemical industry developed around 1860 on the back of the dye industry. Some years before, a chemist had chanced on a way to synthesise aniline mauve, an arylamine present in coal tar. Before the 19th century was out, a surgeon in Frankfurt was reporting carcinoma of the bladder among dye factory workers. Between 1895 and World War Two, hundreds of cases of bladder cancer were being reported among dyestuff and synthetic colour industry workers.

In 1938, an American researcher demonstrated the potential animal carcinogenicity of certain arylamines, especially beta-naphthylamine, which was also used as an antioxidant in the rubber industry, while rubber itself was used in other industries like cable-making, where cases of bladder cancer were also being reported.

After World War Two, the British chemical industry commissioned a workforce-wide survey[9]. It found that one in ten workers who were exposed to arylamines developed carcinoma of the bladder. The survey's authors concluded that with an average 18 year latency period, the final prevalence of bladder cancer would be 23% among workers exposed to arylamines, and 43% among workers exposed to beta-naphthylamine only. Compared to the general population, this works out at a 30-times higher probability of dying of bladder cancer for all arylamines, and 60-times higher for beta-naphthylamine only. The United Kingdom halted manufacture of beta-naphthylamine in 1949, and benzidine in 1962. And still continental Europe carried on regardless...

The trial of managers of the IPCA dye factory in 1977 caused an international outcry. Dubbed the "fabrica del cancro" (the cancer factory), 132 of its workers and ex-workers had died of bladder cancer over a 20-year period. In 1990, Belgian journalists made the stupefying discovery that workers were still dying of bladder cancer from exposure to benzidine and beta-naphthylamine in the "Les colorants de Tertre" dye works in the Mons region[10]. No-one seemed to have alerted them to the cancer risks of the chemicals they were handling.

The four most lethal aromatic amines were not outlawed across Europe until 1988 by a directive[11].

The example of aromatic amines shows how long the knowledge acquired takes to permeate all the working environments concerned, and how recalcitrant the authorities are in taking measures to protect workers.

Asbestos: a nightmare health scenario dawns

The industrial use of asbestos gradually developed from the latter half of the 19th century, with the discovery of major deposits in Quebec and South Africa. Outside the immediate big producers/users (mining, textiles, felts, paperboards, brakes, asbestos cement, asbestos flocking), a wide range of occupations were exposed to asbestos in the insulation, chemical, iron and steel and power generation industries, shipbuilding, transport, painting, joinery, decoration, etc.

In 1906, the first industrial era account of an asbestos-related pulmonary disease was given to a UK parliamentary committee. In the same year, a French occupational doctor recorded cases of pneumoconiosis, specific pulmonary tuberculosis and pulmonary tuberous sclerosis in an asbestos textile spinning and weaving factory at Condé-sur-Noireau, in Normandy[12].

In 1935, British doctors reported a case of lung cancer in a patient with asbestosis (pulmonary fibrosis caused by asbestos). In 1947, His Britannic Majesty's Chief Inspector of Factories recorded in his annual report that the autopsies of 235 people whose deaths were attributed to asbestosis revealed the presence of lung cancer in 13.2% of cases, but only 1.3% among workers who had died of silicosis.

In 1955, a British epidemiologist published what has since become a benchmark study[13], reporting that in the study population of asbestos workers, the risk of developing lung cancer was 10 times higher than in

[9] Case, R.A., *et al.*, Tumours of the urinary bladder in workmen engaged in the manufacture and use of certain dyestuff intermediates in the British chemical industry, Part 1 – The role of aniline, benzidine, alpha-naphthylamine, and beta-naphthylamine, *British Journal of Industrial Medicine*, 1954, 11, p. 75-104.

[10] Nay, S., Mengeot, M.A., *Attention à la couleur*, RTBF (French-speaking public TV station), programme broadcast on 10 June 1990.

[11] Council Directive 88/364/EEC of 9 June 1988 on the protection of workers by the banning of certain specified agents and/or certain work activities, *Official Journal of the European Communities*, 9 July 1988.

[12] Auribault, D., Note sur l'hygiène et la sécurité des ouvriers dans les filatures et tissages d'amiante, *Bulletin de l'inspection du travail*, 1906, p. 120-132.

[13] Doll, R., Mortality from lung cancer in asbestos workers, *British Journal of Industrial Medicine*, 1955, 12, p. 81-86.

the general population. This finding was to be reinforced by much other research.

1960 is another landmark date in the history of understanding of asbestos-related diseases. It was the year in which the findings of a South African pathologist were published, making a link between cases of mesothelioma – pleural carcinoma – and exposure to asbestos[14]. The connection between asbestos and mesothelioma was gradually confirmed to the point where mesothelioma has now become an epidemiological indicator of asbestos exposure.

Asbestos has been phased out of use in western Europe. It was banned in Denmark in 1986, in Italy in 1992, in France in 1997, in Belgium in 1998, and in all European Union countries in 2005. It was not before time, but too late for many workers. As the International Labour Organisation (ILO) points out, the latency of asbestos-related diseases holds the world in an "iron grip". One of its senior officials argues that "asbestos is one of the most, if not the most important single factor causing work-related fatalities, and is increasingly seen as the major health policy challenge worldwide"[15]. The ILO estimates that up to 100 000 people die each year in the world as the result of an occupational exposure to asbestos.

Asbestos was a foreseeable disaster. And yet, unbelievably, the carnage goes on. Asbestos production may have gone down, but it is still high. In 2003, at 2 080 000 tonnes, it was 60% of its 1970 level. The leading producer countries include the Russian Federation, China, Canada and Brazil.

In those countries that have outlawed asbestos, the material which has been used for a century is still found everywhere in workplaces, office buildings, blocks of flats and houses. It is also found in means of transport like railway coaches and ships. Workers will be faced with it for a long time to come. This makes it essential to enforce the safety requirements that have been set and stop treating the issue as just a footnote of history.

Wood dust: a low profile killer

Asbestos dust is not the only source of cancer. Some kinds of wood dust cause a specific kind of sinus cancer – ethmoid carcinoma. The discovery dates back to 1965, when doctors in the Oxford area began seeing an abnormally high number of sinus cancer cases. They observed that the patients were mainly carpenters and cabinetmakers. Puzzled by this, they consulted the regional cancer registry to find a concentration of nasal cavity carcinomas – mainly among woodworkers – in a small area of Buckinghamshire where many furniture factories are located. A large-scale national survey confirmed their findings[16].

On the Continent, doctors in France, Belgium and Denmark were not long in coming to the same conclusions. Ethmoid adenocarcinoma became a recognised occupational disease in England in 1969, in Belgium in 1976, France in 1981, and Germany in 1987.

The British researchers' investigations into ethmoid adenocarcinoma uncovered a higher rate of nasal cancers among leather and footwear

[14] Wagner, J.C., *et al.*, Diffuse pleural mesothelioma and asbestos exposure in the North Western Cape Province, *British Journal of Industrial Medicine*, 1960, 17, p. 260-271.

[15] *Asbestos: the iron grip of latency*, International Labour Organisation (ILO), 2006.

[16] Acheson, E.D., *et al.*, Adenocarcinoma of the nasal cavity and sinuses in England and Wales, *British Journal of Industrial Medicine*, 1972, 29, p. 21-30.

industry workers. The highest risk was found among workers in the preparation and finishing shops, where cutting, polishing and sanding operations exposed them to high concentrations of leather dust. Hotly-disputed at first, the findings were definitively confirmed in 1988 by a Danish study which drew together data from the cancer registry, central population data base and the pension fund.

This kind of joining-up of data, if extended to other European countries, could in future help bring to light as yet unidentified risks and confirm statistical associations.

Further reading

- Lehmann, P., *Cancer and the worker*, The New York Academy of Sciences, 1977.
- Nay, S., *Mortel amiante*, Editions Vie Ouvrière, Bruxelles, 1997, 160 p.
- Takala, J., *Introductory Report: Decent Work – Safe Work*, XVIIth World Congress on Safety and Health at Work, ILO, Geneva, 2005.
- Tweedale, G., *Magic mineral to killer dust: Turner & Newall and the asbestos hazard*, Oxford University Press, 2001, 342 p.
- Waldrom, H.A., A brief history of scrotal cancer, *British Journal of Industrial Medicine*, 1983, vol. 40, p. 390-401.

3. Workers and carcinogens

Set up in 1971, the International Agency for Research on Cancer (IARC) evaluates the cancer-causing potential of substances and agents (chemicals, biological and physical agents), situations where exposure occurs, and industrial processes. The IARC classifies these into 5 categories:

- group 1, carcinogenic to humans;
- group 2A, probably carcinogenic to humans;
- group 2B, possibly carcinogenic to humans;
- group 3, not classifiable as to carcinogenic to humans;
- group 4, probably not carcinogenic to humans.

The list of carcinogens is a lengthy one[17]. To date, the IARC has evaluated over 900 substances, approximately 400 of which have been identified as carcinogenic or potentially carcinogenic. Of the hundred substances classified as group 1 – *i.e.*, proven to be carcinogenic to humans – 60 are found in the working environment. Group 1 carcinogens include those cited earlier, plus arsenic, benzene, beryllium, cadmium, Chromium VI, formaldehyde, ethylene oxide, and vinyl chloride. The list of Group 1 carcinogens also includes certain mixtures, in particular tobacco products, wood dust, and tar as well as particular industrial processes like shoe manufacture and repair, rubber, iron and steel production, and so on. Also on the carcinogens list are physical agents, like ionising radiation and ultraviolet radiation, as well as biological agents, like certain viruses, and even some medicines and medical treatments.

There are too few epidemiological studies on the cancer-inducing potential of non-physical aspects of working conditions, but data are available on some factors that can contribute to cancer, like night-work (especially for breast cancer), irregular working hours and job insecurity ("bad" stress, that can weaken the immune system).

The IARC classification is established by committees of international experts in carcinogenesis. It does not have the force of regulations, but does give a "state of play" on what is known about the carcinogenicity of a particular substance.

The European Union also has its own list of carcinogens, which it classifies into three categories.

[17] See IARC website: http://monographs.iarc.fr

The EU's three categories of carcinogens

Category 1: Substances known to be carcinogenic to man. There is sufficient evidence to establish a causal association between human exposure to a substance and the development of cancer.

Category 2: Substances which should be regarded as if they are carcinogenic to man. There is sufficient evidence to provide a strong presumption that human exposure to a substance may result in the development of cancer, generally on the basis of appropriate long-term animal studies and/or other relevant information.

Category 3: Substances which cause concern for man owing to possible carcinogenic effects but in respect of which the available information is not adequate for making a satisfactory assessment. There is some evidence from appropriate animal studies, but this is insufficient to place the substance in Category 2.

While the IARC and EU classifications broadly overlap, they are not all-points identical. For example, diesel engine exhausts are classified as Group 2A by the IARC, but are not in the EU list; perchlorethylene is in IARC Group 2A, but EU Category 3. More seriously, crystalline silica (inhaled in the form of quartz or cristobalite from occupational sources) was classified as a Group 1 carcinogen by the IARC in 1996, but has not yet been classified as a dangerous substance by the EU[18], despite being used across very many sectors of industry. This makes it advisable to refer to both classifications[19].

Unlike the IARC list, the European classification is part of a regulatory framework (see chapter 4). Directive 67/548/EEC, soon to be amended and brought in line with the REACH regulation, includes an Annex 1 listing 956 chemicals classified as carcinogens: 826 in Category 1 or 2 (including 645 substances derived from oil or coal), and 130 in Category 3. All these substances must have harmonised labels affixed and accompanied by information via safety data sheets.

But how many workers are exposed, and to what carcinogens?

Estimated numbers of exposed workers

Assessing how many workers are exposed to carcinogens at their workplace is a challenging exercise. Compiling statistics is made particularly difficult by the scant data available, the piecemeal nature of what data does exist, and the shortcomings of official figures on occupational diseases. The Carex system is the main attempt to estimate occupational exposure to carcinogens EU-wide. Its figures must be read against the Sumer survey data collected by occupational doctors in France.

- CAREX: 23% of workers exposed to carcinogens

Carex – Carcinogen Exposure – is a European initiative coming out of the "Europe Against Cancer" programme. It is a database of information on occupational exposure to carcinogens in EU countries, run by the Finnish Institute of Occupational Health[20]. Carex provides data on a list of 139 carcinogens evaluated by the IARC, based on the estimated number of people exposed to them between 1990 and 1993 in 55

[18] Musu, T., Sapir, M., Will the Silica Agreement foil EU legislation?, *HESA Newsletter*, No. 30-31, October 2006, p. 4-8. Downloadable from http://hesa.etui-rehs.org > Newsletter.

[19] See: Les expositions aux produits cancérogènes, mutagènes et reprotoxiques, *Documents pour le médecin du travail*, INRS, No. 104, 4th quarter 2005, p. 471-483.

[20] See: Kauppinen, T., *et al.*, Occupational exposure to carcinogens in the European Union, *Occupational Environmental Medicine*, 2000, No. 57, p. 10-18.
Carex can be found at www.ttl.fi/Internet/English/Organization/Collaboration/Carex

industrial sectors. The estimates were supplied by the 15 EU countries of the time, and checked against data from the US and Finland, deemed to have the most comprehensive data available.

According to the Carex database, 32 million workers in the EU-15 – 23% on average – were exposed to carcinogens. The lowest figure was recorded in the Netherlands (17%), the highest in Greece (27%). The carcinogens to which workers were generally exposed were solar radiation (9.1 million people), passive smoking (7.5 million), crystalline silica (3.2 million), diesel engine exhausts (3.1 million), radon (2.7 million), wood dust (2.6 million), lead and its inorganic compounds (1.5 million), benzene (1.4 million). Below these were: asbestos, ethylene dibromide, formaldehyde, PAH, glass wool, tetrachloroethylene, Chromium VI and its compounds, sulphuric acid mists, nickel, styrene, chloromethyl and trichloroethylene.

Table 2 Carex Estimates of the number of workers exposed to the most common carcinogens *

Austria	Solar radiation: 240 000 – Passive smoking: 180 000 – Crystalline silica: 100 000 – Wood dust: 80 000 – Benzene: 50 000 – Ethylene dibromide: 50 000
Belgium	Solar radiation: 200 000 – Passive smoking: 190 000 – Radon: 90 000 – Crystalline silica: 70 000 – Diesel particles: 70 000 – Wood dust: 55 000 – Inorganic lead compounds: 30 000 – Benzene: 20 000 – Chromium VI: 19 000
Denmark	Solar radiation: 180 000 – Passive smoking: 100 000 – Formaldehyde: 90 000 – Diesel particles: 70 000 – Crystalline silica: 60 000 – Wood dust: 50 000 – Benzene: 50 000 – Styrene: 36 000 – Chromium VI: 25 000
France	Solar radiation: 1.5 million – Passive smoking: 1.2 million – Radon: 500 000 – Diesel particles: 400 000 – Sulphuric acid mists: 400 000 – Formaldehyde: 300 000 – Wood dust: 180 000 – Tetrachloroethylene: 140 000 – Asbestos: 140 000 – Inorganic lead compounds: 140 000
Germany	Solar radiation: 2.4 million – Passive smoking: 2 million – Crystalline silica: 1 000 000 – Radon: 800 000 – Diesel particles: 740 000 – Wood dust: 670 000 – Benzene: 470 000 – Inorganic lead compounds: 460 000 – Ethylene dibromide: 450 000 – Chromium VI: 250 000
United Kingdom	Passive smoking: 1.3 million – Solar radiation: 1.3 million – Crystalline silica: 600 000 – Radon: 600 000 – Diesel particles: 470 000 – Wood dust: 430 000 – Benzene: 300 000 – Ethylene dibromide: 280 000 – Lead compounds: 250 000 – Chromium VI: 130 000
Italy	Passive smoking: 800 000 – Asbestos: 700 000 – Solar radiation: 600 000 – Diesel particles: 600 000 – PAH: 400 000 – Wood dust: 300 000 – Crystalline silica: 300 000 – Inorganic lead compounds: 300 000 – Benzene: 200 000 – Tetrachloroethylene: 180 000 – Formaldehyde: 170 000
Spain	Solar radiation: 1.5 million – Crystalline silica: 1.2 million – Passive smoking: 1.2 million – Diesel particles: 586 000 – Wood dust: 500 000 – Radon: 450 000 – Chromium VI: 150 000

* Estimates based on exposure to evaluated carcinogens for 1990-1993; those for Spain are from 2004.

The economic sectors where exposure to carcinogens was highest were: forestry work (solar radiation), fishing (solar radiation), mining (silica and diesel engine exhausts), the wood and furniture industry (wood dust and formaldehyde), ores (silica), construction (silica, solar radiation and diesel engine exhausts) and air transport (passive smoking and ionising radiation). Exposure to benzene was highest in the vehicle repair sector.

The Carex estimates cover all workers and allow for exposure to environmental carcinogens – like solar radiation, radon and passive smoking – which occurs for 75% of working time. Their big advantage is to provide public policymakers with a set of data with which to drive occupational cancer prevention policies.

- ### Sumer: 13.5% of workers are exposed to carcinogens

The Sumer survey done in France in 2003 is representative of 17.5 million employees, or 80% of the French workforce. It shows that 13.5% of French employees – 2 370 000 people – are exposed to one or more carcinogens during working hours[21]. But this is an average, and the proportion may be higher in particular industries. It rises to 35% in the vehicle repair, metallurgical and metal working, wood, paper and construction industries, and to 26% in the chemical industry. Men suffer four times more exposure to carcinogens than women – 20.4% against 4.3%. The only sector where women's exposure is higher than men's is in the personal and home services.

About half of cases involve point exposures, but a quarter of cases involve more than 10 hours' exposure in a working week. While exposure intensity is judged low in 70% of cases, it was considered high or very high in 15% of cases. There is no collective protection in 39% of exposure situations. The most often cited forms of collective protection are extraction systems and general ventilation, but the latter cannot be seen as effective protection against carcinogens. Taken overall, more than a quarter of the population exposed to carcinogens are highly exposed, either from length of time, or inadequate collective protection provision.

The substances identified in the Sumer survey were IARC Groups 1 and 2A, and EU Categories 1 and 2 carcinogens, *i.e.*, substances that are definitely carcinogenic and probably carcinogenic to humans. These accounted for 28 of the 83 substances or groups of substances listed in the questionnaire. Some workers may be exposed to more than one of these carcinogens.

[21] Les expositions aux produits cancérogènes, Enquête Sumer, *Premières Synthèses*, DARES, July 2005.

Main carcinogens identified in the Sumer survey
(in descending order of total employees exposed)

Diesel engine exhausts, natural mineral oils, wood dust, crystalline silica, trichloroethylene, formaldehyde, coal tar distillates, chromium and its derivatives, asbestos, halogenated and nitro hydrocarbons, ceramic fibres, nickel, PAH, aromatic amines, various cytostatic agents, cobalt and its derivatives, benzene, perchlorethylene, formophenolic resins, vulcanization fumes, sintered tungsten carbide, acrylamide, cadmium, epichlorohydrin, arsenic, PCB and PBB, ethylene oxide, nitrosamines.

The Sumer survey singles out eight products among the carcinogens cited: mineral oils, which when heated can release PAH, three solvents (benzene, perchlorethylene, trichloroethylene), asbestos, wood dust, engine exhausts and crystalline silica. Almost all the workers exposed to carcinogens are exposed to these eight products[22]. Unlike the Carex system, the Sumer survey takes no account of environmental carcinogens (solar radiation, passive smoking, radon), which explains the significant difference between the two sources' estimates.

Disturbing deaths in a Belgian chemical factory

In December 2006, it was learned that 21 of the 70 workers in the mercury electrolysis chlorine production units at the Solvay factory in Jemeppe (Belgium) had died of cancer, either lung cancer, cerebral tumours or leukaemia. They had been exposed to mercury on a huge scale. Some had also been exposed to asbestos, chlorine, hydrazine and intensive magnetic fields. So far, the Occupational Diseases Fund, the agency that compensates victims of occupational diseases in Belgium, has refused to recognise these cancers as work-related. Mercury is toxic to the kidneys, neurological and reproductive systems, but is not regarded as a proven carcinogen. But the IARC classifies organic mercury as possibly carcinogenic. The workers and the FGTB trade union are asking questions and want an official investigation into the matter. But will it happen? The FGTB wants an atlas of occupational diseases implemented to establish a link between different occupational cancers and company activities, and for prevention policies to be implemented.

Chemical hazards still rife in Europe

Although the European working conditions survey does not specifically address exposure to carcinogens, thousands of workers in the EU-25 were questioned in 2005 about their exposure to chemicals at their workplace. There is obviously no way of saying what part of these exposures were attributable to carcinogenic chemicals. What the initial findings of this large-scale survey do show, however, is that hazardous chemicals remain part of the daily working lives of millions of European workers.

So, 20.5% of European workers report being exposed to dangerous fumes, vapours or dust for at least a quarter of their working time (3% down on 1990), while 18% handle dangerous substances for at least a quarter of their working time – 3% up on the first survey, done in 1990.

Very wide gaps exist between occupational groups. The percentage of workers exposed is 6 to 7 times higher among skilled workers than among office employees, for example. There are also wide between-industry variations, with the construction industry being particularly affected.

These facts add further to the mounting pile of work-related social inequalities of health discussed at the start of this brochure.

[22] Huit produits cancérogènes parmi les plus fréquents, Enquête Sumer, *Premières Synthèses*, DARES, July 2005.

4.8 million tonnes of CMRs used in France in 2005

In 2005, the Ministry of Labour commissioned a survey to be done in France to identify CMR – *i.e.*, carcinogenic, mutagenic or reprotoxic – chemicals, and assess the number of workers potentially exposed to them *. The data were collected from a sample of 2000 firms across 30 branches of industry. The survey findings pointed to 4.8 million tonnes of CMR chemicals being consumed on the French market in 2005. The ten most used CMR chemicals were marketed in quantities greater than 100 000 tonnes.

These ten chemicals included five carcinogens classified in IARC Group 1: vinyl chloride (1 000 000 tonnes and 1300 exposed workers), benzene (716 000 tonnes and 35 000 exposed workers), 1,3-butadiene (670 000 tonnes and 2200 exposed workers), ethylene oxide (135 000 tonnes and 1300 exposed workers), and formaldehyde (126 000 tonnes, 42 000 exposed workers including more than 12 000 in the pharmaceutical industry). The most widely-used product is 1,2-dichloroethane, with 5600 exposed workers including 3600 drug manufacturing employees. It is a Category 2 carcinogen. CMR chemicals are found in all oil refinery and petrochemical plants, with benzene being the most common. The pharmaceutical and drug manufacture industry uses a wide range of CMR chemicals in small quantities, less than 10 000 tonnes in total, but more than 100 000 workers are potentially affected.

This French survey comes at a timely juncture, just a few months ahead of the entry into force of the REACH regulation. It shows that, without a strict, binding legislative framework, industry continues to produce vast amounts of chemicals that are long-known to cause cancer.

* Vincent, R., Inventaire des agents chimiques CMR utilisés en France en 2005, Hygiène et sécurité du travail, *Cahiers de notes documentaires*, INRS, 4th quarter 2006, No. 205, p. 83-96.

Further reading

- *Risque cancérogène en milieu professionnel*, dossier de l'Institut national de recherche et de sécurité (INRS), 27 p. See: www.inrs.fr
- *Fourth European Working Conditions Survey*, European Foundation for the Improvement of Living and Working Conditions, Dublin, 2007, 139 p. See: www.eurofound.eu.int/ewco/surveys/EWCS2005

4. European legislation

Two types of legislation

European laws on carcinogens can be classed in two groups: those on marketing of such substances, and those on protecting workers exposed to them. The legal bases underlying these two types of legislation are different: articles 94 and 95 of the EC Treaty for the former, article 137 for the latter. What this means in practise is that where placing carcinogens on the market is concerned, the Member States cannot, in theory, add extra restrictions on top of the rules laid down at Community level. This is known as full harmonization. But where worker protection is concerned, the Member States can impose national rules that are more stringent than the European rules. This is known as minimum harmonization.

Both types of legislation exist in parallel, and those who produce or use cancer-causing substances have to comply with the obligations arising under both.

The Carcinogens Directive

The Carcinogens Directive, the first version of which dates from 1990, lays down the Community rules for protecting workers from the risks related to exposure to carcinogens or mutagens at work. It is one of the first individual directives adopted under the 1989 Framework Directive on health and safety at work. It covers all chemicals that "meet the criteria for classification as a category 1 or 2 'carcinogen' or 'mutagen'". This wording is important, because it covers not only substances actually classified as category 1 or 2 in the Community legislation[23], but also more broadly any substance or agent that meets these classification criteria.

This means that substances which for some reason have not been included in the Community classification, but are nevertheless known carcinogens, like crystalline silica, can be brought within the Directive's scope. The Directive also covers carcinogenic and mutagenic preparations and emissions that form in certain production processes listed in an Annex to the Directive.

The Directive, which has been carried over into the national law of all 27 EU countries, lays down an order of priority in employers' obligations to reduce the use of carcinogens in the workplace.

[23] Listed in Annex I of Directive 67/548/EEC.

First among these measures is the obligation to replace the carcinogen or mutagen by a substance which is not, or is less, dangerous. Where a safer alternative exists, the employer must use it instead, whatever the cost to the business. If replacement is not technically possible, the employer must ensure that the carcinogen or mutagen is manufactured or used in a closed system. If he cannot take this safety precaution, the employer must ensure that the level of exposure of workers is “reduced to as low a level as is technically possible”.

The Carcinogens/Mutagens Directive also provides for occupational exposure limit values (OELV) to be set. While OELVs exist for a long list of carcinogens under different national laws, exposure limits have only been set for three substances at Community level: benzene, vinyl chloride monomer and hardwood dust. A Community exposure limit has also been set for asbestos under the specific Asbestos Directive.

The European legislation also requires employers to inform their workers about the health risks from chemicals in the workplace, and to provide them with training so as to reduce these risks to the minimum.

Table 3 Labelling of carcinogens and mutagens

Categories	Pictograms	Comments, with R phrases to be used
1 or 2	 T-Toxic	Carcinogens classified as category 1 or 2 must be labelled with the symbol “Toxic” and the risk phrase “May cause cancer” (R 45) or “May cause cancer by inhalation” (R 49). Mutagens classified as category 1 or 2 must be labelled with the same symbol, but with the risk phrase “May cause heritable genetic damage” (R 46).
3	 Xn-Harmful	Carcinogens classified as category 3 must be labelled with the symbol “Harmful” and the risk phrase “Limited evidence of a carcinogenic effect” (R 40). Mutagens classified as category 3 must be labelled with the same symbol, but with the risk phrase “Possible risk of irreversible effects” (R 68).

Revision of the Directive and tentative assessment

Directive 2004/37/EC is the codified version of the original Directive (90/394/EEC), which it repealed along with all its subsequent amendments (Directive 97/42/EC and Directive 1999/38/EC). It makes no substantive changes, but just consolidates the different pieces of legislation which it replaces. In March 2004, the European Commission initiated a revision of the Directive, and unions and employers’ views were canvassed on how the gaps in the legislation should be filled. The main failing of Directive 2004/37/EC is that it does not cover substances that are toxic for reproduction (reprotoxins). Another issue is the delay bringing in European-level OELVs for substances covered by the Directive. In its reply to the Commission in the first phase of consultations launched in 2004, the European Trade Union Confederation stressed the need to improve the procedure, and to increase the number of carcinogens for which OELVs have been set[24]. Three years on, at the start of 2007, the Commission had still not set the second phase of consultations going, and any improvements to the text are still on the drawing board.

Coming up with any assessment of what effects European legislation has had on workplaces is a risky business. The fact that Member States have no obligation to report on the practical implementation of the Carcinogens Directive means that source material is scarce. However, there is evidence of wide disparities between EU states. Businesses in States with a firmly-established tradition of preventing chemical risks seem to achieve better compliance with the Directive's requirements. While these national differences must be pointed out, it nevertheless seems that practical implementation of the legislation really varies more by sector, as well as type and size of company. Broadly-speaking, big pharmaceutical and chemical companies, machinery manufacturers, hospitals and research laboratories have better safety records than small firms in the leather, furniture-making, waste collection and recycling sectors. The situation in the construction industry is alarming.

The failings in information and training for staff in the specific risks of carcinogens, and the trend towards outsourcing dangerous activities – more and more often to migrant workers – add to the "invisibility" of these substances. But tackling occupational cancers is a major public health challenge that will not easily be addressed by sidelining the issue. Hopefully, the recent adoption of the REACH regulation will drive the spread of practises that will really prevent the risks of carcinogens in workplaces of all sizes.

REACH, the new EU chemicals legislation

After several years' fierce debates and lobbying, the reform of European legislation on chemicals use and marketing, known as REACH (Registration, Evaluation and Authorisation of Chemicals), was finally adopted by the EU in December 2006. The regulation comes into effect in the 27 EU countries on 1 June 2007, and will replace the jumble of close to 40 existing pieces of legislation that were seen as no longer capable of effectively protecting human health and the environment from chemical hazards.

REACH requires chemicals manufacturers and importers to prove that the risks related to the use of their substances can be controlled before they are allowed to market them. They must do this by drawing up a registration dossier. Chemicals that are produced or imported in volumes of more than 1 tonne a year onto Community territory – approximately 30 000 substances – will have to be registered over an 11-year period with the European Chemicals Agency based in Helsinki.

REACH and carcinogens

- Registration rules for manufacture or import

In order to continue being manufactured or imported in the EU in quantities above 1 tonne a year, a class 1 or 2 carcinogen, mutagen or repro-

[24] The ETUC's full reply is on http://hesa.etui-rehs.org > Main topics > Chemicals.

toxin (CMR) will have to be accompanied by a registration dossier giving information on its properties, uses and classification, plus guidance on how to use it safely. For chemicals produced in quantities of 10 tonnes a year and more, the registration dossier will also have to include a chemical safety report describing the risk management measures necessary for adequate control for each identified use of the substance. This means that it will no longer be permitted to manufacture or import a CMR substance in Europe without a registration dossier, except in quantities of less than 1 tonne a year.

- Authorised use rules

Industrial users of class 1 or 2 CMRs will have to get European Commission authorisation for each proposed use. To get authorisation, applicants will have to demonstrate that the risks associated with the use of the chemical concerned are "adequately controlled". Even if they are not, authorisation may still be granted if it is shown that the risks are outweighed by socio-economic benefits and there are no suitable alternative substances or technologies. Authorisations will be granted for a specific period on a case-by-case basis. Authorisation must be sought for all class 1 or 2 CMRs, regardless of the quantities they are produced in. In practise, a prioritising system will be implemented, because the European Chemicals Agency will be unable to process more than twenty-odd applications for authorisation a year. As uses will not be prohibited by default (*i.e.*, where the authorities have not taken a decision), many carcinogens (especially those produced in small quantities) will continue to be used while waiting for applications for authorisation to be processed. For interest's sake, more than 800 chemicals are listed as class 1 or 2 carcinogens in the European legislation.

- Restriction rules

As well as the registration and authorisation system, REACH also provides for a system of restrictions. The marketing or use of particular dangerous substances may be prohibited or allowed only subject to conditions if the Commission considers that there are unacceptable risks to human health or the environment. Naturally, all the restrictions previously laid down in EU legislation, like the bans on asbestos, PCBs and phthalates in toys, will continue to apply after REACH comes in. All these restrictions are set out in an Annex to the regulation.

- Labelling rules

Like all substances classified as dangerous by European legislation (listed in Annex I of Directive 67/548/EEC), Category 1, 2 or 3 CMRs must be labelled in the regulation manner. They must carry a danger symbol (pictogram) and a risk phrase (see table 3, p. 22). The responsibility for classification and labelling of substances lies on the manufacturers or importers. The REACH regulation requires industrialists to submit an inventory of all their classified dangerous substances to the Agency before November 2010. These inventories should make it possible to identify different classifications for the same substance and enable the different manufacturers of the same substance to agree on a harmonised European classification. On a related note, a globally harmonised system of classification and labelling of chemicals has recently been adopted at international level[25]. The Commission is currently drafting legislation to implement it in the EU.

How the Carcinogens Directive and REACH interface

The different business concerns with obligations under REACH - *e.g.*, manufacturers and importers - are often also employers. So they have to meet both their REACH obligations and those laid down in the worker protection legislation.

If a carcinogen has to be used at a workplace, the employer must as a rule first apply the order of priority of obligations laid down in the Carcinogens Directive (elimination, replacement, control) before using it. Employers who then go on to use such carcinogens must abide by the rules laid down for authorisation under REACH.

The obligation to get authorisation for carcinogens under REACH should encourage producers to replace them by less dangerous alternatives, which will promote implementation of the substitution principle which is mandatory in the Carcinogens Directive. But the authorisation procedure finally adopted in REACH will allow some carcinogens to be authorised for use even though a safer alternative exists[26]. This will then create the perverse situation of a clash between the two pieces of legislation, with one authorising the use of a carcinogen, and the other requiring it to be replaced by the safer available alternative. When REACH comes in, the trade unions will need to ensure that the different actors – European Commission, social partners, business, etc. – implement the regulation with the guiding principles and spirit of worker protection legislation intact. Otherwise, which of the two pieces of legislation prevails could well end up being a matter for the courts.

[25] The Globally Harmonised System of Classification and Labelling of Chemicals (GHS), adopted under the aegis of the United Nations. More information on http://ec.europa.eu/enterprise/reach/ghs_en.htm

[26] Such as carcinogens for which it can be shown that there is an exposure threshold below which there is no demonstrable adverse effect on human health.

Further reading

- Jacobsen, L., Kempa, V., Vogel, L., *Finding your way in the European Union Health and Safety Policy. A trade union guide,* ETUI-REHS, 2006, 72 p.
- Musu, T., *REACHing the workplace. How workers stand to benefit from the new European policy on chemical agents*, TUTB, 2004, 36 p.
- Musu, T., REACH and worker protection legislation, *HESA Newsletter*, No. 28, p. 15-18, 2005. Downloadable from http://hesa.etui-rehs.org > Newsletter.

5. Cancer is also a power issue for the unions

At first glance, cancer touches the innermost privacy of the individual. It is a condition that people are not naturally forthcoming about. Sufferers undergo an experience which in some ways cuts them off from the world. Physical pain, mental distress, the feeling of being betrayed by one's own body where vital cell regeneration processes are warped into health-destroying ones. The way our societies see cancer adds to this isolation. It can be put down to modern forms of predestination – faulty DNA or personal fault – what are too readily accused of being unhealthy lifestyle choices. It is not easy to develop a strategy for collective defence. But nor is it impossible, as feminist lobbying on breast cancer, the opposition to nuclear weapons mounted by the Hibakusha, the Hiroshima and Nagasaki atom bomb survivors, and the exemplary fight by asbestos victims worldwide show. Each of these experiences showed how direct engagement by victims could act as the binder for collective action.

In acting on working conditions that create a cancer risk, the trade union movement has a big job on its hands. Obstacles include:

- The lack of public attention for the role played by working conditions in cancer. From deliberately organised industry manipulation to the comparative lack of interest from large swathes of medical research, a wide array of factors contribute to a lack of knowledge and social visibility.
- The trade union movement is fixated on immediate action to improve working conditions. Generally, there are long latency times between work exposure and the development of cancer. In most cases, the victims are no longer working for the same company. This makes it harder to establish the linkage between working conditions and cancer.
- Acting against cancers requires the ability to examine critically all the technical choices that make up a production system. This is no easy matter. One way or another, workers come to identify with their work. This makes it hard to stand back from it and visualize alternatives. This is compounded by an ever-present blackmail: employers have consistently responded to demands to eliminate carcinogens with threatened job losses. The union movement is also susceptible to the dominant ideologies of the society it operates in, often partaking of a belief in high productivity that imbues economic growth with virtues that it does not possess.

This chapter does not cover all the problems that trade union action faces. It merely offers some ways forward and raises questions to set a wider-ranging debate rolling.

Why take a stand against working conditions-related cancers?

We saw in preceding chapters that cancers are behind wide social inequalities of health. In the same way, the unequal distribution of cancers reflects conditions of exploitation and domination. It goes with and worsens other inequalities in the distribution of wealth, access to knowledge and information, and empowerment. This by itself is grounds for trade union action. But two other things must also be said.

Working conditions are a big factor in these social inequalities in cancer. Directly, through the large-scale exposure of workers to cancer-causing chemicals; indirectly, through production and technology choices that put large volumes of carcinogens on the market. This latter fact means that trade union strategy must not only be about addressing exposures to carcinogens at work, but also preventing exposures at home and in the environment. The issue of asbestos illustrates this relationship very clearly. With asbestos production totalling over 170 million tonnes throughout the 20th century, tens of millions of workers were directly exposed at various stages: extraction, manufacture, use or processing of asbestos-containing products, and destruction or recycling. Hundreds of millions of people were also affected by exposures in their workplaces, homes, schools, etc. The trade union movement's fight against cancers can form part of a strategic alliance with environmental protection groups, public health agencies and other actors concerned to improve cancer prevention.

Joining-up union action and engaged science
Personal account by the epidemiologist Henri Pezerat

"In research into the aetiology of cancers, a new project may often first be prompted by a finding of 'clusters' (as epidemiologists call them) of cancers which may or may not affect the same organ, but are found in the same time frames and areas. Generally, these clusters go unnoticed or, if they are reported by individuals, trade unions or voluntary groups, are dismissed by officialdom as random, what are known as 'statistical probabilities', rejected out of hand with no further inquiry into the different possible explanations.

And yet, where occupational cancers are concerned, the lesson of history is that most of the products classified as carcinogenic were classified on the basis of observed clusters! (...)

I am talking from experience here, because outside the fight waged against asbestos since 1975, I have been involved alongside trade unions and/or voluntary groups in the struggle to put a public spotlight on cancer-causing factors in various firms. The main lesson I take away from these actions is that the best way of showing up the existence of cancer clusters is an alliance between clear-headed, strong and determined trade unionism in the workplace, and one or more actors from the scientific or medical communities.

Showing that clusters exist and their most probable origin does not – initially – come about from scientific and medical research as conceived today. That research, with all its many in vitro and in vivo tests, mechanism studies, epidemiological surveys, exposure surveys, and so on, comes into play only after the first battle which is first and foremost a labour struggle".

From La lutte contre les maladies cachées, *Le Monde*, 26 April 2006.

Public health policies on cancer disregard working conditions and production processes. They tend to consider workplaces as "private spheres", and the indisputable preserve of employers. They are reluctant to call into question trade secrets and the marketing of hazardous products. Only exceptionally do they ban particularly dangerous substances and harmful production processes. Notwithstanding the public pronouncements, and probably even against the agenda, of a large section of those that run them, these public health policies remain generally powerless to tackle the growing social inequalities in health.

Tackling cancers in workplaces

The evidence is that preventing exposure to carcinogens is seldom a priority for company management. The effect of exposures is seen only after a fairly long latency period, when the victims are usually no longer working for the company. There is therefore no direct economic gain for the employer in implementing a prevention policy. This is particularly so for sectors that are bulk chemicals users, like the construction, cleaning and textile industries. This makes worker participation in setting prevention priorities a key factor. There are many barriers to such participation, not least among the workers. Exposure to cancer-causing factors is often not seen as an immediate risk. In many cases, health damage will be detected only years afterwards, and the linkage between the ill-health and working conditions will not be clearly established. Tackling work-related cancers therefore requires trade unions to work in a systematic and organised way to develop collective awareness and action.

• Mapping the lie of the land

The union will usually start by doing a survey, either because exposure to carcinogens is uncharted territory, or because management downplays it. The survey should aim to identify all possible points of exposure in a particular production cycle. It is hard to cover all situations in one go, so it can be helpful to start the survey by looking at a specific problem, and then widen it to other situations afterwards.

The trade union survey is a form of risk assessment which must be actively supported by the workers themselves in order to succeed. At the same time, management and preventive services must also be required to do their part. At the survey stage, that means they must come up with all necessary information on carcinogens and include them in their own risk assessment. But it would be over-trusting to rely on this source of information alone. So the union has a vested interest in having its own sources of expertise. It may be "in-house" to the union, such as by enlisting the experience developed in other workplaces. Or it may be external, drawing on the labour inspectorate, scientists with trade union connections, preventive services (if operating as they should), etc.

Checking the validity of the information supplied by company management is a key aspect of the trade union risk assessment, which should aim to identify all the physical and non-physical contributory factors to the development of cancers. It should also audit the practical working conditions of exposed workers, and critically assess the prevention policies pursued (or lack of prevention). Other relevant steps include assessing management and the preventive services' attitudes, and identifying what may work for and against creating a bargaining position. The appendice on p. 51 shows the key aspects to be considered.

The risk assessment is never done just for its own sake. It is only the first stage of an action that is intended to change working conditions. The union assessment is therefore logically carried through into two additional things: a trade union action plan, and negotiating a carcinogen exposure prevention plan with company management.

- Change working conditions: substitution is the non-negotiable priority

The workers' safety reps can use the trade union assessment to call the company to account. The idea is to check whether management's risk assessment is comprehensive and detailed, whether it results in a prevention plan, whether that plan follows the priorities for effective preventive activity, and whether it is put into effect with sufficient resources.

The top priority is to eliminate a carcinogen from the workplace whenever it is technically possible to do so. The concept of technical possibility is important and usually a source of conflict.

Many arguments are ranged against substitution, and it is important to knock them back:

1. **The technical argument.** Many heads of firms that use dangerous substances have only limited technical knowledge. For example, if their workers use trichloroethylene to clean metal parts, they see that as the only possible technical solution. It can be helpful to collect information on substitution practices to show that there are alternatives to using dangerous chemicals. In some cases, the carcinogen forms part of the end product, like the asbestos in asbestos cement, formaldehyde in insulating foams or furniture, for example. This will mean raising the question of an alternative production method. Other products with similar technical characteristics can generally substitute for carcinogen-containing products.
2. **The cost argument.** The prospective cost of substitution is often cited as a barrier. In some instances, the cost is heavily inflated. In others, it may be real. It is important not to give in to blackmail and to emphasize that not substituting puts human lives at risk.
3. **The controlled risk argument.** Company management will often claim that preventive measures are adequate, such that there is no need to go to the "extreme" of substitution. Regardless of how good the preventive measures may be, experience tells us that there are always critical points at which these measures fail. This may be one of the main lessons to be learned from the idea of "controlled asbestos use". Critical points may be connected with abnormal situations, such as a chemical leakage from a closed system, a fire, etc. They may be upstream (mining or primary manufacture, transport, storage, inputs to the production chain) or downstream (subsequent processing of the product, whether or not planned, deterioration or destruction, waste

recycling or processing, etc.). This product lifecycle overview is key to an effective cancer prevention policy. It joins up protection of health at work with protection of public health and the environment. It puts a workable gloss on two fundamental principles of union action: solidarity (the bottom line for us is to eliminate the risks for all workers potentially affected, whether employed in the workplace or elsewhere) and equality (we are fighting for better living and working conditions for everyone in society, which involves tackling the harm that a given product can do to public health and environment).

You should go on the attack where substitution is concerned. It is the top priority. It is also a legal obligation on the employer. If the situation cannot be resolved, you should not hesitate to call in the labour/health and safety inspectorate or exercise your right to stop work where a serious and imminent danger exists. It is not up to workers' reps to prove that substitution is possible and say exactly how it can be done. Company management must face up to its responsibilities, and is for them to prove that substitution is technically impossible.

Market rules are only a bottom limit. It is obviously illegal to use a product which has been banned from being marketed, like asbestos or some aromatic amines. But even if a carcinogen is allowed to be marketed, it is just as illegal to use it if there is an alternative. It is reasonable to infer that once REACH is implemented, the number of carcinogens put onto the market will gradually fall. But it is equally certain that some of these chemicals will continue to be produced and marketed. The important thing here is to avoid them being used at workplaces. That can be achieved through company prevention plans, but also through industry collective bargaining or national bans on their use in workplaces in each EU Member State.

Madrid trade union campaign on carcinogens

The Trade Union Confederation of Workers' Commissions (CC.OO.) estimates that about 9000 people in Spain die of cancer each year from being exposed to carcinogens during their work. Close to 600 000 workers are thought to be exposed in the Madrid region alone, and between 600 and 800 a year are likely to die of work-related cancers. Believing that too little attention is paid to toxic risks, the health and safety at work secretariat of the Madrid CC.OO ran a campaign in 2002-2003 to promote control of carcinogens in workplaces in the Autonomous Community of Madrid. 222 firms were inspected, almost half used carcinogens and 217 carcinogens or mutagens were identified in all. The most commonly used included trichloroethylene, lead chromate, potassium dichromate, dichloromethane and a long list of hydrocarbons. In most cases – even in academic laboratories - carcinogens were handled without the necessary safety precautions. Prevention reps were unaware of their presence in 68% of carcinogen-using firms, and only 13 firms provided adequate information on the toxicity of the products. Workers would routinely eat, drink or smoke in risk areas, putting them at increased risk of contamination. More than 80% of workers had received no training or information on the risks of exposure to carcinogens. The trade union campaign helped increase knowledge, leading to improved preventive measures and working conditions. Also, one in three employers decided to eliminate carcinogens, or replace them with other less toxic products.

Where substitution is technically impossible, any risk of exposure must be eliminated by collective protective measures. The priority then must be to have production carried out in a closed system. If that is not possible, preventive measures must be taken to reduce exposures to the lowest levels technically possible.

Two surveillance measures must be carried out systematically to check whether preventive measures are effective:

- Surveillance of exposures, paying particular attention to the most critical points in the production cycle. This requires intervention by competent and professionally independent preventive services, and oversight of their activity by the workers' safety reps. Meeting exposure limits is the rock-bottom minimum required. Whenever it is technically possible to reduce exposures below these limits, it must be done.
- Surveillance of workers' health by occupational doctors. The health surveillance arrangements must be spelled out in detail. Health surveillance too often stops short at a general check-up or tests not directly connected with working conditions. Health surveillance must never be turned into a means of employee selection. This is why trade unions want employment-related genetic screening made illegal. Workers who have been exposed to carcinogens must continue to get health surveillance even after the exposure is at an end. Almost no EU country has organized post-exposure health surveillance.

The results of health and exposure surveillance must be supplied to the workers' safety reps. Anonymity of health surveillance information must be guaranteed. This information can help shed light on work-related health problems and improve prevention plans. The data must be preserved and used in a broader framework than the workplace (sectoral or national) if a public policy of prevention of work-related cancers is to be pursued. Each exposed worker must be able to keep track of their exposures and the results of the health checks.

It is also important to check the quality of the information and training for workers.

If personal protective equipment (PPE) does have to be used, two questions must be asked and answered:

1. How efficient is this equipment, really? It must be assessed in light of workplace realities – what is sometimes called the ergotoxicology approach – and not make do with standardised tests;
2. Do the working conditions need to be adapted to take account of the constraints inherent in wearing certain equipment? Do regular breaks need to be provided where equipment is burdensome?

Use of PPE can never be used as an excuse for putting off or not bringing in more effective preventive measures (substitution, collective prevention).

Intervention in workplaces can be fully effective only if combined with action in broader society. Workplace exposure to carcinogens is also a major public health issue.

Paris workers get studies done

Concerted action by staff of the Paris City Council environmental health service (Smash) to get a mortality study done by the INRS research institute in 1999 brought confirmation of an above-average death rate in the service, in particular from an excess of cancers. A second study, done in 2002, supported the linkage between the excess mortality and the exposure of Smash staff to chemicals: formol, ethylene oxide, insecticides and rodenticides *. It was ultimately accepted that the mortality excesses recorded could be attributed to occupational exposures and linked to past working conditions. The wide range of products used prevented the excess mortality from being attributed to a specific chemical. Exposure to some chemicals, especially formol and ethylene oxide, has since been suppressed or reduced to negligible levels. The formulation of the other products used has changed, and the conditions of their use have improved.

* A rodenticide is an active substance or preparation lethal to rodents considered as vermin by man. Commonly "rat poison".

The trade union movement can act on several fronts here:

1. For a more effective public policy on health and safety at work. Workplace prevention depends very much on whether there is a public policy on health and safety at work. Producing detailed, independent information on chemicals, carrying out toxicological and epidemiological research, and implementing policing and enforcement systems obviously go beyond the capacity of a single company.
2. For a public health policy that incorporates working conditions. Public health policies in most EU countries do not at present act on working conditions, and have little effect on social inequalities of health.
3. To put work-related cancers in the public spotlight and labour action to put them at the top of the political agenda. Asbestos showed how far prevention depended on putting work-related health damage in the public arena. It was the result both of work done day-to-day by unions and labour action on specific issues. No avenue must be left unexplored: trade union press, mass media, lawsuits, calling political authorities to account, etc.
4. From workplaces out to society: the trade union contribution to environmental protection. Preventing cancers is a litmus test for imposing democratic control on production choices. Profit maximization and meeting human needs, including that of preserving our ecosystem, are irreconcilable opposites. By increasing workers' control over their working conditions, the trade unions can also move towards social control of production, and thereby reduce the harm it causes.

Further reading

- Boix, P., Vogel, *Risk Assessment at the Workplace. A Guide for Union Action*, Brussels, TUTB, 1999, 74 p.
- Gee, G., Jones, D., Fox, J., *Cancer and work: making sense of worker's experience*, City University Statistical Laboratory – General and Municipal Workers Union, London, 1982.
- *Preventing Cancer: A Campaign for Workers*, Canadian Labour Congress.
- *Preventing Cancer: A Campaign Plan for Workers*, Canadian Labour Congress. Downloadable from http://hesa.etui-rehs.org/uk/news-events/newsfiche.asp?pk=552

6. Under-estimating and under-reporting occupational cancers

Epidemiological studies done in the decades following World War Two demonstrated the cancer-causing effects of several substances used on a large scale in industry: aromatic amines, asbestos, benzene, vinyl chloride, wood dust, and so on. To address the concerns raised, work was done to determine what percentage of cancer cases were linked to occupational exposure.

Percentage wars

The first large-scale study, long taken as gospel in the matter, was done in the United States by two English epidemiologists, Richard Doll and Julian Peto, whose findings were presented to the US Congress in 1981[27].

Doll and Peto argued that 4% of all cancers could be regarded as work-related (8% in men, 1% in women). This figure of 4% seems on the low side compared to the large number of workers exposed to carcinogens, and has often been used to play down the impact of occupational causes in the development of cancers. In 1998, Samuel Epstein, Professor at the University of Illinois School of Public Health, highlighted a number of flaws in Doll and Peto's estimates of occupational cancers. He singled out the failure to consider the multifactorial nature of cancer and synergies between multiple carcinogens, as well as the failure to allow for the increased number of carcinogens in the working environment.

Legitimate questions are now being asked about the conflicting interests the British epidemiologists may have had, in light of the revelations made in an article published in the November 2006 issue of the *American Journal of Industrial Medicine* bringing evidence of the financial links between Richard Doll and the chemical industry multinationals Monsanto, ICI and Dow[28].

Doll and Peto argued that, over and above the overall figure of 4%, the fraction of cancers attributable to a work-related cause varies by sex and type of cancer. Among men, therefore, Doll and Peto estimated that 25% of sinus cancers, 15% of lung cancers, 10% of bladder cancers and 10% of leukaemias could be put down to work factors, falling to 5% for the same type of cancers among women.

Very comprehensive cancer mortality estimates published in 2001 by a Finnish team produced figures higher than Doll and Peto's. The

[27] Doll, R., Peto, R., *The cause of cancer: quantitative estimates of avoidable risk of cancer in the United States today*, Oxford University Press, 1981.

[28] Hardell, L., *et al.*, Secret ties to industry and conflicting interests in cancer research, *American Journal of Industrial Medicine*, 13 November 2006.

Finnish researchers claimed that the share of occupational cancers among all cancers was as high as 8% (14 % for men and 2% for women), and that in the male population, 29% of lung cancers, 18% of leukaemias, 14% of bladder cancers and 12% of pancreatic cancers were arguably work-related[29].

Behind the percentages lie a number of workers which in the Finnish study may range up to double those estimated by Doll and Peto. The number dying of occupational cancer each year in the United Kingdom is estimated at between 6000 and 12 000, and the annual number of new work-related cancers between 12 000 and 24 000[30]. In Spain, annual deaths from occupational cancers could range from 4000 to 8000, and the number of new cases of work-related cancers from 6500 to 13 000[31].

This vagueness is regrettable. The lack of information which can put figures on the share and number of diseases attributable to occupational factors is deeply damaging. It shrouds the task of setting priorities for effective prevention policies in difficulty and doubt, and leaves the impact of occupational diseases on the community and social security systems unresolved. Another major obstacle to the "social visibility" of work-related cancers is that many work-related diseases are not medically differentiated from those that are due to other factors. Cancers often develop long after the victim is first exposed to toxic products. The reason for the focus on certain cancers, like pleural and peritoneal mesothelioma or liver angiosarcoma is how few of these tumours are found in the general population compared to their frequency among workers exposed to a particular carcinogen, in this case, asbestos and vinyl chloride. Bladder and lung cancers are much more common, and can also be caused by smoking. And tobacco is often singled out for blame.

Researchers looking more specifically at lung cancer among men in 1987 reviewed the data published in the literature available at that time, and calculated that the fraction of job-related lung cancers varied from 2.4% to 40%, according to branch of industry[32]. They also concluded that smoking was not a confounding variable, *i.e.*, it does not change the relation between the disease and the occupation. Since that time, the list of substances recognized as causing lung cancer has steadily grown: ionising radiation, chromic acid, PAH, arsenic, asbestos, nickel, iron and iron oxides, cobalt and tungsten carbide, bis(chloromethyl)ether, etc. But are cancer patients asked about what products they may have handled or breathed in during their working life?

Generalized under-reporting

Whatever percentages are taken, the number of compensated occupational cancers is well below even the lowest estimates. The consensus view is that compensated diseases are only the tip of the iceberg in all EU countries.

Available data suggest that a bare 10% of occupational cancers are recognised and compensated in the main Western European countries. In Spain, the figure is thought to be even less than 1%. Only 869 of an estimated 10 000 or so occupational cancers – 8.7% – were compensated in France in 1999. Still worse, some countries have no data at all on work-related cancers.

[29] Nurminnen, M., Karjalainen, A., Epidemiologic estimate of the proportion of facilities related to occupational factors in Finland, *Scandinavian Journal of Work, Environment & Health*, 2001, 27(3), p. 161-213.

[30] Health and Safety Executive, Statistics. See: www.hse.gov.uk/statistics/index.htm

[31] Kogevinas, M., *et al.*, *Cancer laboral en Espana*, Instituto sindical de trabajo ambiente y salud, November 2005, 40 p.

[32] Simonato, L., *et al.*, Estimates of the proportion of lung cancer attributable to occupational exposure, *Carcinogenesis*, 1987, 9(7).

Where are the women?

Women die less frequently from cancer than men. The standardised cancer death rate was 255 per 100 000 for men, and 143 per 100 000 for women in the EU-25 in 2003. Might this be why women are found to be so little in evidence in the scientific literature? An American literature review of all articles on occupational cancers published between 1971 and 1990 found that only 35% included women, and only white women. In 2000, an Inserm survey of health and safety at work research published in 1997 found that 31% of articles were concerned exclusively with men against 7% with women; 51% covered both genders, but generally without distinguishing between them, even though the biological mechanisms that result in cancer may be gender-differential.

The explanations given for this situation are firstly, that men are more frequently exposed than women to serious risks in their work, and more so to carcinogens, and secondly that they more frequently work in large firms (metallurgical and chemical industry), which facilitates epidemiological research. None of these explanations is entirely satisfactory. That the gendered division of labour may produce a greater concentration of men in particular high cancer-risk jobs does not mean that women are immune from it. Women will often be found in "peripheral" jobs, like premises cleaning, final assembly or finishing operations, packaging and packing, *etc.*, for which almost no data are available. Account must also be taken of the interaction between the different carcinogens not just in paid work (where exposures linked to basic production interact with exposures linked to cleaning products) but also in unpaid house work, still overwhelmingly done by women.

It is nevertheless surprising that so little research has been done into connections between the most common cancer among women, breast cancer (more frequent even among women than lung cancer in men), and the occupation of those affected by it or the products they have handled. But female manual workers have at age 35 a life expectancy three years less than that of female managerial staff; while women manual workers have a death rate 40% higher than managerial staff between the ages of 35 and 80. In France's heavily female-dominated service and domestic staff sector, 28% of workers are exposed to carcinogens like formol and chlorinated solvents. But as neither of these are included in the regulations on recognized occupational diseases, any attempt to report an occupational disease would be doomed to failure. This hardly contributes to making female occupational cancers visible!

Further reading:

- Vogel, L., *The gender workplace health gap in Europe*, Brussels, TUTB, 2003, 342 p.
- Niedhammer, I., *et al.*, How is sex considered in recent epidemiological publication on occupational risks?, *Occupational and Environmental Medicine*, 2000, 57, p. 521-527.

Asbestos cancers – which include mesotheliomas – make up at least three-quarters of compensated occupational cancers in the European Union. But the reported cases nowhere near reflect the real scale of asbestos cancers. A French study found that one in two pleural mesotheliomas were recognised, and one in six asbestos-caused lung cancers.

Denmark has one of the highest rates of reported occupational cancers. And yet, in 1990, a study which set out to analyse the reporting of cases of pleural mesothelioma and ethmoid and sinus adenocarcinoma – two cancers associated with occupational exposure to asbestos and wood dust, respectively – estimated under-reporting at approximately 50%. An examination of the medical records of patients who had not reported their disease revealed that, in most cases, the records held too little detailed information on occupational exposures. Recommendations were made following the study. A fresh evaluation was done in 2000, in which Danish cancer registry data were compared with those from the national industrial injuries office. The comparison revealed that the cancer

Better recognition in Germany

Germany is among the EU countries with the best rate of recognition of occupational cancers, and has been keeping detailed figures on the percentage of compensated occupational cancers compared to estimated occupational cancers since 1978. That percentage was 7.3% in the period from 1978 to 2003. The situation has improved over time. In 1978, 93 cases of occupational cancers were compensated out of an estimated 13 214 cases – just 0.7%. In 1988, the share had risen to 6.2%, and by 1998 to 10.1%. In 2003, 2058 of an estimated 15 758 occupational cancers were recognised as occupational diseases, a rate of 13.1%. The 25 729 recognised cases between 1978 and 2003 included 18 487 bronchopulmonary cancers and mesotheliomas caused by asbestos (71.8%), 3531 cancers due to ionising radiation (13.7%) and 1211 cancers due to aromatic amines (4.7%).

Source: *Dokumentation des Berufskrankheiten-Geschehens in Deutschland. Beruflich verursachte Krebserkrankungen*, HVBG, July 2005, 72 p.

registry had recorded 49 cases of ethmoid carcinoma and 73 pleural mesotheliomas, while the national industrial injuries office had received only 11 recognition claims for ethmoid carcinoma and 48 for mesothelioma. New measures have since been taken to improve reporting of occupational diseases.

Attempted explanations

One obstacle to reporting could be the limited number of cancers recognised as being work-related and the chemicals apt to have caused them. Most EU countries have a schedule of occupational cancers that qualify for compensation. A comparison of these schedules shows a measure of consistency. Skin cancers are a case in point, as are bone cancers, bronchopulmonary leukaemias and cancers, where the causative chemicals – like chromium, asbestos and nickel – are universally accepted. By contrast, iron oxide, cobalt and silica are accepted in only a handful of countries. Brain tumours are listed only in the French schedule. Bladder and liver cancer tend to be recognised only in connexion with one chemical: aromatic amines for the former, vinyl chloride for the latter.

An agent will often be recognised as causing only one type of cancer. Vinyl chloride, for example, is recognised for liver angiosarcoma, but not for other cancers of the liver or the other tumours described in the medical literature. Alongside the schedule system there is also a so-called "additional" or "open" system, but this seems to be a purely marginal way of getting recognition for an occupational cancer.

The ILO considers that those countries that report the most occupational diseases are also those with the best protection systems, including occupational disease registration and compensation. The ILO approved a new schedule of occupational diseases on 3 June 2002: it lists 14 substances, groups of substances or physical agents as causes of occupational cancers. The ILO schedule is not in any sense binding; it is simply a recommendation to the Member States. Likewise the European Commission Recommendation of 19 September 2003[33], Annex I of which contains a European Schedule of Occupational Diseases, and Annex II an additional list of diseases suspected of being occupational

[33] Commission Recommendation of 19 September 2003 concerning the European schedule of occupational diseases.

in origin. The ETUC has taken issue with the composition of these lists, pointing out, for example, that asbestos-caused cancer of the larynx is on the EU's additional list when it already had recognised occupational disease status in several EU countries.

As well as the legal factors, there are other reasons in play in the under-recognition of occupational cancers, not least social and medical factors. Two French surveys on the fate of occupational asthma victims showed that a big reason for under-reporting of occupational diseases was that victims frequently failed to report their disease because of the danger of losing their job and income[34]. Another survey showed that even in a teaching hospital where exposure to well-known carcinogens was involved, cancers had not been reported as occupational diseases. Analysis of the causes revealed doctors' disinclination to look for an occupational cause of medical conditions, and attending practitioners' and employees' lack of information or misinformation about the procedure for recognition of occupational diseases.

In a recent article, the sociologist Annie Thébaud-Mony[35] highlights the problems doctors face with regard to work-related cancers. They have to identify exposure to one or more carcinogens, which involves tracing back careers, having access to an individual's work history. Patients often do not know what products or dust they have been exposed to. Anything from 10 to 40 years may elapse between the time of exposure to a carcinogen and the development of a cancer. But above all, she argues, they must get away from the overriding perception of cancer as a disease related only to risk behaviour.

Many countries have long-established oversight over working conditions and workers. Safety services take workshop air measurements, the occupational health service does urine and blood tests on workers exposed to toxic substances. The occupational doctor could play a key role in identifying occupational cancers, but is often left out of the information loop.

The impact of occupational doctors in preventing occupational cancers is uncertain. Often, their lack of independence from the employer makes it difficult for them to get involved in a risk prevention culture, especially where prevention has to compete with big industrial and economic concerns, as some particularly telling examples show.

[34] *Survey on under-reporting of occupational diseases in Europe*, Eurogip, December 2002, 28 p.

[35] Thébaud-Mony, A., *op. cit.*

Further reading

- Brugère, J., Naud, C., Recognition of occupational cancers in Europe, *TUTB Newsletter*, June 2003, No. 21, p. 38-39. Downloadable from http://hesa.etui-rehs.org > Newsletter.
- Evans, G., McElvenny, D., *Burden of occupational cancer in Great Britain. Summary report of workshop held on 22 and 23 November 2004 in Manchester*, Health and Safety Laboratory, 42 p.
- Kogevinas, M., *et al.*, *Cancer laboral en Espana*, Instituto sindical de trabajo ambiente y salud, November 2005, 40 p.
- *Overview of occupational cancers in Europe*, EUROGIP, December 2002.
- *Survey on under-reporting of occupational diseases in Europe*, EUROGIP, December 2002.

7. An economic agenda and industrial mindset that are lethal to workers

Manufacturers do not like it known that workers die of work-related cancers in their factories. If some do something by way of prevention, or replacing dangerous substances with less dangerous ones, it is often because legislation forces them to. Most would rather try to delay a ban on dangerous substances, and the need to take measures that are judged to be too costly even though they protect workers' health. The asbestos industry offers a striking example of this type of mindset.

"Controlled asbestos use"

The asbestos industry geared up very early on to secure the long-term future of their highly profitable businesses, under threat from ever more damning epidemiological surveys. Dr Irving Selikoff reported his findings of a high number of mesothelioma and lung cancer cases among the asbestos insulation workers to the New York Academy of Sciences Congress in 1964[36]. The industry was quick to mount its counter-attack, as a result of which the United States and most European countries have asbestos lobbies that are backed by the Asbestos International Association (AIA). The AIA's membership includes firms like Johns-Manville, Cape Asbestos, Turner and Newall and Eternit.

From the turn of the 1960s, the asbestos industry fashioned a strategy to enable them to continue using the material, successfully arguing for "controlled asbestos use". In 1976, the "Chambre syndicale de l'amiante" – the French asbestos industry trade association – took out a full page advertisement in newspapers, putting over the message, "the odd problems created by asbestos pale into insignificance beside the immense service it does for you each day, without you even knowing it. (…) let's learn to live with asbestos[37]."

This, even though in 1977, the International Agency for Research on Cancer (IARC) had said that it was not possible to assess an asbestos exposure level below which there would be no increased cancer risk. The IARC classifies all varieties of asbestos as carcinogens. In the same year, France set its first asbestos exposure limits, more than 45 years after the United Kingdom. Even though hardly revolutionary, they went largely unapplied. In the shipyards, for example, exposure levels were found of 100 to 1000 times above the regulation levels.

[36] In 1982, Irving Selikoff produced new findings that the reported deaths in the group of insulation workers included 45% from cancers, 20% from lung cancer alone and 10% from mesothelioma. See: Selikoff, I., *Revue générale des maladies liées à l'amiante*, in Proceedings of the World Symposium on Asbestos held on May 25, 26 and 27, 1982 in Montreal, Canadian Asbestos Information Centre, 585 p.

[37] About asbestos, advert published in the *Le Monde* daily newspaper, 17 November 1978, p. 8.

A French Senate report of 20 October 2005 described the French State as "paralysed" by the asbestos lobby. The Standing Committee on Asbestos (CPA) established in 1982 was an informal committee of business leaders, doctors, scientists, trade unionists and Ministry of Labour and Health officials. It was a particularly effective tool for the asbestos industry. In the words of the French Senate report, "By playing on scientific uncertainties, which are steadily receding over time, the CPA has succeeded in sowing doubt about the significance of the risk of exposure to asbestos, thereby delaying the banning of asbestos in France for the longest possible time"[38].

Cover-ups

In the mid-1960s, Belgian occupational doctors reported a new disease seen among workers involved in cleaning autoclaves used to polymerise vinyl chloride into polyvinyl chloride[39]. The new disease – acro-osteolysis – causes destruction of bone at the fingertips. The discovery threw the chemical industry into turmoil. It was the time of a burgeoning awareness in the United States of the risks related to the growing use of chemicals. Suspicions focused on PVC, hitherto seen as harmless. PVC is used in the manufacture of hundreds of consumer goods. Manufacturers feared that the reputation of their products would be tainted.

The University of Michigan carried out an epidemiological survey, backed by the big world chemical groups. The findings were that the disease also attacks conjunctive tissue, and is not confined to the fingers. The authors showed that workers were actually exposed to levels well above the then-accepted threshold limit value of 500ppm, and recommended that the level be reduced to one-tenth of that value to ensure workers' safety. Industry took issue with the recommendations, and when the study was published in 1971, it contained no reference to the threshold limit values, and left a question mark over whether vinyl chloride was in fact the cause of the disease.

The chemical industry was soon to receive further bad news. Animal studies done in Europe by the Italian researcher Pier-Luigi Viola showed vinyl chloride to be carcinogenic at high doses. This fuelled concerns among vinyl chloride manufacturers, as no substance which is or is suspected of being carcinogenic had been allowed in food in the United States since 1958. But PVC provided the packaging of many foodstuffs. Even so, the chemical industry did not seem minded to reduce exposure levels, arguing that vinyl chloride was dangerous only at high doses.

In 1972, the initial findings of a study commissioned by the European chemical industry from another Italian researcher, Cesare Maltoni, to check Viola's work dealt a savage blow to the chemical industry lobby. It showed that vinyl chloride does cause cancer in animals, even at low doses. European producers demanded that their American colleagues keep the findings under wraps.

The silence was broken soon afterwards by an article in an Italian newspaper written by one of Viola's former associates, speaking out against the rash of cancers thought to be caused by vinyl chloride among European workers. Industry could no longer hide the facts. In January

[38] *Le drame de l'amiante en France : comprendre, mieux réparer, en tirer des leçons pour l'avenir*, Report by the French Senate, 26 October 2005, volume I, p. 79.

[39] An autoclave is a thick-walled, hermetically-sealed pressurized vessel used either for producing industrial reactions, or steam-cooking or -sterilizing.

1974, news leaked out of the deaths of four workers at the Goodrich factory in Louisville (Kentucky) from a rare cancer – liver angiosarcoma – linked to their exposure to vinyl chloride. It was the same type of cancer as those reported in Maltoni's rat studies. Cases were then identified at all production sites. The threshold limit values for vinyl chloride were lowered in the United States to less than 1 ppm. Even so, vinyl chloride left hundreds of liver angiosarcoma victims across the world. Later studies would also implicate vinyl chloride in other cancers – of the bronchi, brain and blood cells (leukaemia).

A vitamin supplement bad for workers' health

On 2 February 2007, the manufacturer Adisseo faced a French court to answer charges of "gross negligence" towards nine employees affected by kidney cancers. Adisseo manufactures vitamins for battery hen farms. In 1982, the company started up a new workshop manufacturing vitamin A from new molecules synthesised in-house. One of these was Chloracetal C5, which was the likely cause of 25 cases of kidney cancer and two kidney tumours in workers who were employed in the same workshop or near the effluent discharged from it. When the workshop was set up, company management claimed that C5 was not a health hazard. It later refused to carry out the toxicological studies demanded by the staff representatives on the works health and safety committee (HSC). In 1990, a new management team finally acknowledged that C5 was a mutagen. The first case of kidney cancer occurred in 1994, but management refused to substitute the C5 as the occupational health service and HSC demanded. The precautionary measures demanded by the workers are long – too long – overdue.

Management is even now still claiming that there is no evidence that C5 is implicated, and arguing that it is not feasible to replace it, even though the company manufactured vitamin A before 1982 without it. The legal principle of "gross negligence" has enabled many asbestos victims in France to get compensation from the courts. In the words of the Adisseo workers' lawyer, "this is the first time that the chemical risk issue has been put in these terms. Despite being alerted to it as far back as the 1980s by the health and safety committee, management treated the matter in the most cavalier manner. But where chemicals are concerned, the employees are the public health watchdog: they are in the front line. Behind them, stand ... us".

Delaying the application of more binding standards

Benzene is an example of the crucial issue that exposure standards represent in terms of profit for some, and lost lives for others. Benzene is originally a by-product of the gas and tar recovered in coke ovens. It is an aromatic hydrocarbon. It is a solvent regarded as one of the most dangerous products that workers may encounter. Benzene is particularly toxic to blood cells and the organs that produce them, including bone marrow. The extent of the damage depends on the dose of benzene to which the worker was exposed. Exposure to benzene, even at very low but continuous exposures, can cause leukaemia. The European Carcinogens Directive now makes 1 ppm a binding occupational exposure limit. But it was a standard long – too long – in the making.

Although the first reports of blood cell damage due to benzene date from the late 19th century, benzene use continued to spread in first the rubber, then the inks, adhesives and paint industries after 1910. This commercial success was accompanied by a rise in cases of what was then called "benzene poisoning". Some victims fell ill very soon after starting work, dying within months. It was thought that poisoning occurred only at benzene levels above 200 ppm. A 1926 study done in 12 US benzene-using firms reported that 44% of their employees had abnormally low white blood cell levels. This high rate of blood ailments was found with exposures above 100 ppm. Two years later, the link between benzene and leukaemia was made[40].

By the turn of the 1930s, cases of benzene poisoning were being seen pretty much worldwide. Some analysts called for benzene to be replaced by another solvent. A 1939 study of 89 cases of benzene poisoning and three of leukaemia found that two cases had occurred after exposure below 25 ppm. From the late 1940s, the American industrial hygiene association continued to press for exposure limits to be brought down to 100 ppm, 50 ppm, 35 ppm and, in 1957, 25 ppm. But workers in many countries continued to work in exposures of hundreds, not to say thousands, of ppm. In the 1960s, several publications called attention to benzene-related diseases, especially leukaemia in the Italian and Turkish footwear industries where benzene-based adhesives were used.

The allowable concentration was reduced to 10 ppm when, in 1977, the first large-scale epidemiological study done in a plastics packing factory found that benzene-exposed workers were from 5 to 10 times more likely to develop leukaemia at exposure levels of between 10 and 100 ppm. The US Occupational Safety & Health Administration (OSHA) then decided to lower the workplace exposure limit to benzene to 1 ppm. The American Petroleum Institute took issue with this, arguing that there was no increased leukaemia risk below 10 ppm.

The dispute went to the Supreme Court, which held that before making any change to the standard, OSHA must show that a "significant risk" exists at an exposure of 10 ppm which may be reduced by lowering the exposure. The Supreme Court considered a risk to be significant where the calculated probability of harm is increased by 1 case in 1000 workers over a working life. This is a crucial decision, because this definition of significant risk is now the rule in the United States, and has lengthened the time in which OSHA can publish new standards.

It was not until 10 years later, in 1987, that the 1 ppm standard was finally promulgated as the occupational exposure limit for benzene. Researchers calculate that the delay in applying the standard in the United States probably resulted in an additional 275 deaths – 198 from leukaemia and 77 from multiple myelomas. But the probability of dying of leukaemia remains high even at 1 ppm. US oil industry internal documents show that as early as 1948, industry heads regarded the only safe level of exposure to benzene as being zero.

The exposure limit recommended today by US hygienists is 0.5 ppm. Many US firms seem able to reduce exposure down to levels of about 0.2 to 0.3 ppm. But what about elsewhere?

The 1 ppm regulatory exposure limit for benzene was set for the EU in a 1999 Directive, but unleaded petrol and diesel can still contain up to 1% (by volume) of benzene.

The OSHA's trials and tribulations show the full value of the REACH regulation's reversal of the burden of proof. Under REACH, it

[40] *Late lessons from early warnings: the precautionary principle* 1896-2000, European Environment Agency, Environmental issue report No. 22, Luxembourg, 2001, 211 p.

will manufacturers' duty to show that their products are harmless or that they have controlled the risks before placing them on the market. Which explains the ferocious industry lobbying to water REACH down.

REACH and chemical industry lobbying

The REACH regulation to try and control chemicals produced or marketed in the European Union was adopted by second reading approval in the European Parliament on 13 December 2006. It was the finishing line of an obstacle race beset by ferocious lobbying from the chemical industry both in Europe and the United States.

The report written for US Congressman Henry Waxman (Democrat) published in April 2004, shows that US chemical industry lobbying was played out at the highest level[41]. The report draws on internal documents (cables, memoranda, emails) from various US government agencies.

The Waxman report disclosed that the US chemical industry had given US$ 21 million in electoral campaign contributions between 2000 and 2004, 80% of which had gone to the Republican party. President Bush had been the top recipient, having received $900 000 between 1999 and 2004. The report also shows that several federal agencies and senior government officials, like former Secretary of State Colin Powell, intervened at the same time to thwart the proposal for a REACH regulation.

Right from coming to power, the Bush Administration canvassed the US chemical industry's views and concerns. Meetings were held in the United States and Europe between Bush administration officials, US diplomats posted to Europe, organizations representing the different sectors of the chemical industry, firms like Dupont and Dow, to build a case focused on the cost, complexity and bureaucracy of the draft regulation. That case was then to be argued to Member State governments and the European Commission. In September 2003, Jacques Chirac, Gerhard Schröder and Tony Blair wrote to the then European Commission President Romano Prodi urging the Commission to take the legitimate interests of European business into account.

The Waxman report notes the changes that were made between the White Paper as published by the European Commission in February 2001, and the proposal for a REACH regulation laid before the Parliament and European Council on 29 October 2003. Changes that enabled the American Chemistry Council's 2003 report to welcome the "significant concessions in the draft" achieved by the opposition to the Commission's preliminary draft regulation.

The European chemical industry lobby waged its own all-out assault on REACH, with employers' federations, especially the European Chemical Industry Council (CEFIC) and the Union of Industrial and Employers' Confederations of Europe (UNICE) keeping up unrelenting pressure both before and after the draft was tabled.

German chemical industry firms, especially BASF and Bayer, were the most active and influential at both national and European level. A Greenpeace special report entitled "Toxic lobby" reported that BASF had confirmed to the German press that it had 235 politicians "under contract"[42].

[41] *A special interest case study: the chemical industry, the Bush administration, and European efforts to regulate chemicals*, report prepared for Rep. Henry A. Waxman, United States House of Representatives, April 2004, 17 p.

[42] *Toxic lobby: How the chemicals industry is trying to kill REACH*, Greenpeace, May 2006, p. 15.

The environmental group even supplies examples of former BASF and Bayer employees who went on to occupy senior posts in UNICE and CEFIC and even, in some cases, the Commission or European Parliament departments in charge of REACH. But it was also a two-way traffic.

According to Inger Schörling, a Greens group MEP until June 2004, the industry lobbies campaigned towards MEPs using "seminars, workshops, meetings, lunches, dinners, letters, mailouts, phone-calls, visits to plants, media releases and any other component that could be used"[43].

Just ahead of the European Parliament's first vote on REACH in November 2005, Environment Committee rapporteur Guido Sacconi spoke of the "incredible pressure exerted on MEPs by big business"[44]. The Internal Market Committee rapporteur, Harmut Nassauer, received direct assistance from a German chemical industry employee.

On 13 December 2006, following the second reading vote, the ETUC condemned pressure from the chemical industry for having reined in the reform. The European trade union confederation lamented that information vital to protecting workers' health given in the chemical safety reports would now only be required for a third of the chemicals originally planned[45].

[43] Schörling, I., REACH – The Only Planet Guide to the Secrets of Chemicals Policy in the EU. What Happened and Why?, the Greens/EFA, Brussels, April 2004.

[44] *Bulldozing REACH – the industry offensive to crush EU chemicals regulation*, Corporate Europe Observatory, March 2005. See: www.corporateeurope.org

[45] See ETUC press release on www.etuc.org/a/3147

Further reading

- Cassou, B., *et al.*, *Les risques du travail, pour ne pas perdre sa vie à la gagner*, Éditions La Découverte, 1985, 640 p.
- Dériot, G., Godefroy, J.P., *Le drame de l'amiante en France : comprendre, mieux réparer, en tirer des leçons pour l'avenir*, French Senate Report, 26 October 2005, 333 p.
- Markowitz, G., Rosner, D., *Deceit and denial. The Deadly Politics of Industrial Pollution*, University of California Press, 2002, 408 p.

8. A global issue

The social inequalities described in this brochure are obviously magnified many-fold if the scope of analysis is extended planet-wide. The globalization of capital flows is all about maximising the return on investment. With this, human life and the environment become mere economic variables that shape the factors of competitiveness. One very simple fact is clear from an examination of the lifecycle of any product chain: the activities most harmful to health and the environment tend to concentrate in countries least resistant to exploitation. This is true for traditional sectors like agriculture and raw materials extraction, but no less so for high technology sectors like electronics and advanced chemicals. Multinationals systematically operate double standards. The European trade union movement has a responsibility here to workers in countries where European multinationals operate. It should develop ways of supporting the trade union struggle for health and safety at work in the countries affected, and fight double standards as operated by business and in the EU's international activities.

The REACH regulation bears recent witness to the pressing need for international trade union solidarity to thwart attempts to export the most dangerous industrial activities or products to developing countries.

In the discussions leading up to the adoption of REACH, industry pressed for the regulation's scope to be restricted to chemicals for the European market only[46]. Not only was this demand deeply cynical and grossly unethical, it was also unworkable.

Since Rachel Carson's book *Silent Spring* was published in 1962, there has been a general awareness that the use of chemicals, like pesticides such as DDT, has effects across the world. "For the first time in the history of the world", she writes, "every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death. In the less than two decades of their use, the synthetic pesticides have been so thoroughly distributed throughout the animate and inanimate world that they occur virtually everywhere. (...) They have entered and lodged in the bodies of fish, birds, reptiles, and domestic and wild animals so universally that scientists carrying on animal experiments find it almost impossible to locate subjects free from such

[46] Cefic document, *New proposals to improve workability of REACH*, 24 February 2005, p. 4.

contamination. They have been found in fish in remote mountain lakes, in earthworms burrowing in soil, in the eggs of birds, and in man himself. For these chemicals are now stored in the bodies of the vast majority of human beings, regardless of age. They occur in the mother's milk, and probably in the tissues of the unborn child[47]."

Global pesticides regulation is essential

Citizens in developed countries have battled to get dangerous pesticides banned only to find later that they may be present as residues in food imports from developing countries where they are still used, often by American or European multinationals. The death toll from pesticides in the world is estimated at 10 000 today. Three in four of them are in developing countries.

After a series of scandals, the United Nations Food and Agriculture Organisation adopted a code of conduct on the export and sale of pesticides in 1985. Later on, in 1987, it accepted the principle of prior informed consent (PIC), subsequently taken up and administered by the United Nations Environment Programme. It was a voluntary system. The prior informed consent procedure has since been incorporated in the Rotterdam Convention, which came into force in 2004 and is now binding on the countries that sign up to it. In theory, the Convention covers all hazardous chemicals. The European Union approved it by a Council Decision of 19 December 2002. The Convention lays down as a general principle that a chemical covered by the Convention can be exported only with the "prior informed consent" of the importing country. One big limitation of the Convention is that it does not automatically apply to all a producer country's dangerous substances. For a chemical to be subject to the prior consent procedure, it must be listed in Annex III of the Convention. At present, this only lists 39 chemicals – 24 pesticides, 11 industrial chemicals, and 4 severely hazardous pesticide formulations. The practical effect is that a State may regard a product as particularly hazardous, yet continue to export it without even informing the State that is receiving the hazard, provided the chemical is not listed in Annex III. So, Canada consumes only minute quantities of the asbestos it produces, and exports the rest to countries in Asia, Africa and Latin America. Chrysotile, which accounts for 94% of the world asbestos market, is not currently a Convention-listed chemical. A block led by Canada has twice succeeded in fending off any obligation to provide export information for this powerful carcinogen. It is a situation that deeply undermines the Rotterdam Convention's credibility.

But the developing countries are now themselves producing pesticides. India has become the foremost world producer, and its population – 56% of whom work the land – is suffering the direct consequences in the form of acute poisoning and chronic diseases like cancer. A recent survey in southern India disclosed that most of the peasants who use pesticides take no safety precautions[48].

Surely what is needed is to go further than the Rotterdam Convention, and bring in a blanket ban on using a chemical that has been outlawed in many countries, like asbestos for example?

[47] Carson, R., *Silent spring*, Penguin books, 2000, first published in the United States of America by Houghton Mifflin in 1962.

[48] Grace, A., *et al.*, Use of pesticides and its impact on health of farmers in South India, *International Journal of Occupational and Environmental Health*, 2006, vol. 12, p. 228-233.

Towards a world asbestos ban?

Asbestos has been banned throughout the EU since 2005, but the long latency of asbestos cancers means that its effects will be felt for long to come. In 1999, the English epidemiologist Julian Peto forecast approximately 250 000 deaths in Western Europe from asbestos-related cancers in the first 35 years post-ban. Asbestos consumption fell sharply in the United States from the early 1970s. Epidemiologists believe that the mesothelioma epidemic has already begun to decline and are forecasting a return to "normal" by 2055!

Notwithstanding the 100 000 deaths a year estimated by the ILO, world asbestos production remains high. It stood at 2 080 000 tonnes in 2003 – 60% of its 1970 all-time high. The biggest producer countries include the Russian Federation, China and Canada. Russia and Canada have so far managed to stop chrysotile asbestos being included on the Rotterdam Convention list of chemicals. Asia – especially India, China and Thailand – is the asbestos industry's market of choice today.

Other countries – South Africa, Australia, Argentina, Chile and Egypt, notably – have joined Europe in banning asbestos. Others, like Japan, are moving towards a ban. Nongovernmental organisations have been pressing for a world asbestos ban for several years through the International Ban Asbestos Secretariat (IBAS). In June 2005, international trade union bodies mounted a world campaign to get asbestos banned. In June 2006, the ILO's 95th Annual Conference adopted a resolution declaring that "the elimination of the future use of asbestos and the identification and proper management of asbestos currently in place are the most effective means to protect workers from asbestos exposure and to prevent future asbestos-related diseases and deaths". The risks the world faces from toxic substances are not just confined to "old-style" products and technologies, they are right at the heart of modern life.

Global risks of the E-economy

The E-economy may be hazardous for workers who, as in India, China, California or Scotland's "Silicon Glen", manufacture printed circuit boards, computers and microchips. The micro-electronics industry employs about a million workers world-wide. It is a technology that uses highly intensive complex chemical processes. When National Semiconductor UK located in the small town of Inverclyde, near Glasgow, in the early 1970s it had a guaranteed rural female labour pool still deeply imbued with a patriarchal culture and lacking a trade union tradition. In the early 1990s, after several warnings had gone ignored, a handful of Scottish trade union activists met senior officials from the UK's health and safety inspectorate, the HSE. They explained the fertility problems and miscarriages experienced by women semiconductor industry workers, especially the "clean room" workers. A post-meeting survey of five semiconductor manufacturers in seven factories across the UK concluded that clean room work posed no risk to pregnant women. But three previous US studies had found evidence of an increased number of miscarriages among women clean room workers.

By 1996, the union was hearing complaints from male workers about health problems they believed were due to the chemicals they were handling. The toll rapidly rose to 60. They were unable to name the chemicals concerned, often knowing only the product brand names. The union decided to set up a support group, called Phase Two. The issue attracted media attention, which prompted the HSE to launch the first really independent study into the semiconductor industry. During this time, Phase Two collected personal accounts from more than 200 workers. It received support from networks that had been formed two decades earlier in Silicon Valley, and from an American occupational medicine specialist. Together, they mounted the International Campaign for Responsible Technology, holding briefing meetings across Scotland. They were supported by a handful of academics who helped them puzzle out the scientific terminology. But, local health officials and GPs seemed uninterested in their actions. In 2001, the HSE finally acknowledged that the survey findings clearly pointed to an excess incidence of several types of cancers in the semiconductor industry.

The workers and their union now believe that had they not campaigned with help from the media and independent experts, the excess cancer incidence among workers in the UK semiconductor industry would have gone unremarked. The use of many carcinogens would have gone unregulated and uncontrolled. They also believe that the health and safety agency failed to fulfil its sentinel role. The industry approach focused on playing down and casting doubt on the information put out.

Risks are also present at the other end of the computer chain. These are all the more shocking for involving a particularly poor and uneducated population. 80% of the electronic waste collected in North America is "recycled" in Asia, in primitive, dangerous and polluting conditions. Despite EU directives banning this kind of export trade, 60% of European electronic waste is thought to follow the same route. Non-governmental organisations condemn the abuse of freedom of trade and the irresponsibility that allow the electronics industry to evade the social, health and ecological costs associated with its end-of-life products. They argue that consumers also need to be aware of these hidden costs. Men, women and even children work in makeshift shacks, sometimes in their own homes, trying to recover tiny amounts of a wide variety of often highly toxic materials (antimony, arsenic, cadmium, chromium, cobalt, lead, mercury, rare metals, etc.) from electronic waste.

Make toxic waste producers responsible

In the 1980s, the increased cost of processing hazardous waste in industrialised countries brought by regulations and legislation prompted a shift towards the developing countries. The 1989 Basle Convention initiated by the United Nations Environment Programme laid down the principles for controlling transfers of toxic waste, and organised a prior information system similar to that of the Rotterdam Convention. The Basle Convention came into effect in May 1992, and has been ratified by over 130 exporting and importing States as well as transit countries, including the European Union. But the signatory countries still have to observe and police what they have signed up to.

The grim legacy of PCBs

It was while trying to measure DDT in marine animals that the Swedish chemist Sören Jensen subsequently discovered that other substances – PCBs – are also pervasive in the environment. PCBs have not been produced in the European Union since 1986. Researchers have found that 25% of the total world production of PCBs (2 million tonnes) has already accumulated in our environment, and their slow degradation will pollute rivers and oceans for long to come. This is not counting the large quantities of PCBs that are still contained in many electrical appliances, transformers and condensers. Used PCBs are often contaminated by dioxin. If not destroyed in a secure and controlled manner, they can contaminate the food chain as happened in Belgium in the so-called "dioxin scare" of 1999.

In January 2007, EU Environment Commissioner Stavros Dimas spoke out against the uncontrolled discharge of toxic waste which had caused the deaths of 15 people in Abidjan and led more than 15 000 people to seek treatment at health centres and hospitals. Several European trade unions added their protests to that of the European Commissioner. In August 2006, more than 500 tonnes of highly toxic waste stored in the holds of the chemicals tanker Probo Koala were dumped at various points in the town of Abidjan. Stavros Dimas said that the Probo Koala affair was "a case of clear violation of European and international law (…) It's important ... to make sure that criminal cases like this will not go unnoticed and will not be repeated in the future". The Probo Koala was owned by a Greek shipping company, registered in Panama, and chartered by Trafigura, a company with its tax address in Amsterdam, registered office in Lucerne and operational centre in London… It was Russian-crewed and was carrying a mix of oil, hydrogen sulphide, phenols, caustic soda and organic sulphur compounds. The local Abidjan company that had offered to "process" the waste for 20 times less than that charged by a specialist company in the Port of Amsterdam was both recent and inexperienced.

Cases like that of the asbestos-laden French vessel Clemenceau, sent to India to be broken up, but recalled in the face of strong international pressure, are still too few and far between.

Further reading

- Kazan-Allen, L., *Defiance of UN Convention!*, International Ban Asbestos Secretariat, 2004.
- McCulloch, J., *Asbestos Blues: Asbestos in South Africa 1892 to 1996: Labour, Capital, Physicians and the State*, James Currey/ Indiana University Press, London, 2002, 223 p.
- Smith, T., *et al.*, *Challenging the chip: Labor rights and environmental justice in the global electronics industry*, Temple University press, Philadelphia, 2006, 357 p.
- Vogel, L., Asbestos in the world, *HESA Newsletter*, No. 27, June 2005, p. 7-21. Downloadable from http://hesa.etui-rehs.org > Newsletter.
- *End of life ships. The human cost of breaking ships*, Greenpeace/FIDH, December 2005, 64 p.

9. Conclusion

The rise in cancer deaths seen after World War Two went together with increased life expectancy, prompting the long-held belief that it was a consequence of longevity. Then, in the 1960s, epidemiological evidence implicating tobacco in the development of lung cancers put a focus on individual lifestyle causes of cancer, like smoking, drinking and poor diet. All these explanations had the political benefit of throwing responsibility for illness back onto the individual.

But examined closely, the rising cancer toll has tracked industrial development. Burning coal created the soot that caused chimneysweep's cancer. The development of carbon chemistry products – benzene, aromatic amines, polycyclic aromatic hydrocarbons – was to make exposure to carcinogens part of everyday life for industrialised country populations. Chlorine chemistry and petrochemistry would in turn lead to the creation of thousands of products, some of which are known to be mutagenic and cancer-causing. Leaving aside quibbles about percentages, occupational cancers are a reality that can no longer be denied.

Despite the publication of studies evidencing excess cancer mortality among workers exposed to certain chemicals, the understanding that these cancers are not inevitable was too long in coming, and is still not satisfactory in industrialised countries, and even less so in developing countries. Bitter struggles are waged on pay, working hours and unemployment, rallying the mass forces of workers - work-related diseases and cancers have not drawn the same response. Barring the odd event like the Turin cancer factory scandal, or the more recent protests by French asbestos victims, occupational cancers do not grab media headlines. Yet, with their attendant agonies, grief, and lives cut short, work-related cancers affect almost exclusively the most vulnerable workers. It is one of the great social injustices of our time. They should be tackled on the same basis as other inequalities, and top the policy agenda.

It can never be over-emphasized that occupational cancers are avoidable. The REACH regulation gives the opportunity for a new start. But it alone will not be a sure recipe for improved working conditions. The key, here as elsewhere in health and safety at work, is the ability of trade unions to rally workers to take ownership of this debate. The workers on every factory-floor and in every company must be positively involved in the coming identification and assessments of workplace chemicals. They must unite to demand that the most toxic products be replaced, and if this cannot be done quickly, to demand working conditions that will give them the best possible protection.

Then, too, work must be done at the European level and in each country to secure better recognition and compensation for those occupational cancers that are bound to occur. All workers should have a certificate of exposure to carcinogens. They should also have a record that sets out the dates and reports of checks on their physical condition made while working. Any anomalies related to the carcinogenic agent or process should be noted in it. Finally, it is vital that they should be given health surveillance even after their working lives are finished.

Appendice

Check-list for a trade-union assessment of workplace carcinogen hazards

Physical factors in the production cycle

- Carcinogens used.
- Carcinogens related to the processing of physical agents used in production. E.g.: respirable wood dust in the furniture industry, crystalline silica in the building trade, fumes and vapours containing carcinogens.
- Carcinogens in production processes/equipment. E.g.: use of a source of ionising radiation, filters with asbestos, use of diesel for transport, etc.
- Do not overlook "peripheral activities": maintenance and cleaning, storage, transport, etc. E.g.: cleaning metal parts with trichloroethylene.

Environmental factors and work

- *From the environment to work*. E.g.: asbestos in buildings, solar radiation on building sites, tobacco smoke in public places, contact with diesel engine exhausts, etc.
- *From work to the environment:* discharges (liquids, solids, gases) that may be cancer-causing agents in the environment.
- *From the product of work to the environment:* carcinogens in the end production or a later phase of the end cycle of the end product; carcinogens related to the use of the end product.

Work organisation factors

- Factors that may contribute to the development of some cancers: night work; contingent employment.
- Factors that undermine prevention: conflict between productivity and safety; lack of information and training.
- Problems created by use of temporary agency staff, subcontracting; other factors of insecurity.

Organisation of prevention

- Compliance with the order of priority of preventive measures; regular evaluation of the situation and review of prevention plans to include the evaluation conclusions.
- Activity of the preventive services: aptitudes (esp. toxicology, ergonomics and occupational medicine); professional independence; quality of the relations with workers' reps; quality of exposure measurements; quality of health surveillance.
- Information on cancer-triggering factors, training, proper functioning of workers' health and safety representative bodies.
- Systematically record exposures.
- Take the gender dimension into account.
- Take the health follow-up of previously-exposed workers into account.

Taking the health surveillance data into account

- Check data on currently exposed workers. In particular, assess whether the health checks carried out are appropriate to the exposures and medical conditions that may develop: are there suitable biological indicators?
- Use information from outside the company: epidemiological research, data collected by sector, occupation or exposure by trade unions, research institutes or preventive services, outside contacts to collect information on carcinogens and possibilities of substitution.
- Use data on previously exposed workers, check whether post-employment health surveillance is adequate, and its outcomes.

Incorporating cancer prevention in company policy decisions

- Production as process: how far are workers' health needs taken into account in decisions about the process?
- Production as end product: check whether the production is likely to create cancer hazards downstream of actual in-plant production. How much weight is given to the needs for health and safety at work and public health in the search for less dangerous alternatives?
- Create a bargaining position in the company and society: awareness-building campaigns; calling in the labour inspectorate; use of the right to stop work in the event of serious and imminent danger.
- Incorporate the problems found in the strategy of demands and collective bargaining.

ISBN: 978-2-87452-074-7
D/2007/10.574/04
Graphic design: Coast
Printed in Belgium
Cover photo : © Belga/AFP

The ETUI-REHS is financially supported by the European Community.
The European Community is not responsible for any use that may be made of the information contained therein.