

Occupational cancer: the main challenge for the new Community Strategy

About 2.5 million new cancer cases are diagnosed each year in the EU. Their distribution in the population is a function of various factors, and working conditions are a big contributor.

Laurent Vogel

*Director, Working Conditions,
Health and Safety Department, ETUI*

Recent epidemiological data point to a raised risk of skin cancer among male farmers and thyroid cancer among women farmers.

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Cancer causes around 1.2 million deaths a year despite advances in treatment. It is second only to cardiovascular diseases as a cause of death, accounting for 29% of male deaths (about 700 000 cases a year) and 23% of female deaths (over 500 000 cases a year). Most cancers reflect big social inequalities. For more than two centuries, most carcinogens have been identified from recorded excess mortality among exposed workers.

There is no EU system for actively investigating occupational cancers. Studies in many countries have in recent years highlighted the key role of working conditions in cancer inequality. They throw into question the traditional view that working conditions play only a borderline role in women's cancers.

Consistent new data

The Nocca (Nordic Occupational Cancer) project processes a common database for the five Nordic countries (Iceland, Norway, Sweden, Finland and Denmark). It is a particularly powerful statistical tool, recording 2.8 million cancer cases in occupations pursued by

15 million people over four decades (from the early 1960s to the late 1990s). In some cases, it further substantiates established links like skin cancer among outdoor working fishermen and farmers, cancers of the nasal cavities among woodworkers, a variety of cancers in the construction industry where workers are exposed to many carcinogens. But the project has also made new findings, identifying, for instance, a higher prevalence of oral and vaginal cancers among women chemical industry workers; skin, breast (both female and male) and ovarian cancers among printworkers; and thyroid cancer among women farm-workers.

The Occam (Occupational Cancer Monitoring) project was started in 2001 in Italy's most heavily-industrialized region, Lombardy, and has since been extended to other regions and cities (Umbria, Genoa, Venice). The 35 000-plus cases covered identify companies in which cancer sufferers have worked. A fairly detailed description of actual working conditions can be had. The analysis is immensely valuable for prevention. All cases of cancer in patients between the ages of 35 and 69 are reported by hospitals. Older

individuals were excluded due to the problems in getting detailed information about their entire working lives. A statistical comparison can then be made of the frequency of each cancer site in the population of a firm and industries in a province compared to the general population of that region. The Occam project has also reviewed the literature on the cancer-work link to produce working interpretations of the findings. The database provides an overview of more than 900 articles and is prompting active investigation into the occupational origin of cancers by both public health authorities and trade unions. Querying the database for dry cleaning, for example, turns up 25 references to around a dozen cancer sites.

The Giscop 93 project which appeared in 2001 used an original methodology in an industrial *département* of the Paris suburb of Seine-Saint-Denis. It came about as the result of collaboration between academic researchers and three hospitals, and received strong support from the *département* local authorities and the trade unions. Patients with cancer reconstitute their working lives with help from a team of investigators, which helps identify possible exposures to carcinogens. Of 1043 cancer sufferers every stage of whose working lives was analyzed, 873 had been exposed for at least one period of their life to a carcinogen in their work, in proportions of 88% of males and 63% of females. Among the women for whom an occupational exposure was identified, only a quarter had been given a medical certificate as to a possible occupational origin of their disease versus just over 60% of men. The Giscop project affords a detailed analysis

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of exposure conditions and gives a basis to highly critical conclusions about the real state of prevention provision. It pinpoints "black spot" areas like outsourcing, and contingent employment that results in multiple exposures and denies access to effective prevention provision. Giscop peers into the grey areas of work, retracing countless stories of exploitation, denial of rights, and endangerment of health in order to maximize profits.

Looking beyond the "attributable fraction"

One epidemiological approach has been to try and calculate a fraction attributable to working conditions for different cancer sites. It has produced varying estimates. In the past thirty years, the fraction of cancers attributable to working conditions has been

regularly revised upwards. The epidemiologists Doll and Peto produced a reductive calculation in 1981 attributing 4% of all cancers in the United States to exposures at work. Doll's financial links to the chemical industry have been widely brought into focus in recent years, leading to a critical re-evaluation of these estimates. Most recent studies consider an estimate of about 8-12% would be more reasonable. This gives an order of magnitude that could range from 100 000 to 150 000 preventable deaths per year in the European Union (EU).

The traditional "attributable fractions" approach must be viewed with caution for several reasons.

The data on women's work is patchy. Epidemiological study has neglected female-dominated occupations and sectors, and the most common female cancers. Breast cancer,

the leading cause of cancer death among women, has received far less study in terms of occupational hazards than lung or bladder cancer in male populations.

Many collaborative epidemiological studies have been done with industry in order to access sample populations. A critical review of the literature shows that the partnership between research and industry has often been associated with biases that result in the role of working conditions being underestimated.

The "attributable fraction" concept is based on shaky foundations. Cancers are multi-causal diseases to which different factors may contribute at different times of life. There is no single model that can account for these interactions. In some cases, the synergistic effect comes more from a multiplication than a simple addition of factors. Most epidemiological studies take too little account of multiple exposures throughout working life. The calculation of "attributable fractions" seeks to exclude lifestyle causes. But such causes (smoking, drinking, diet, etc.) are anything but purely individual variables. They may themselves be linked to working conditions. Job insecurity, fear of danger, stress, and night work can influence such behaviours.

The "attributable fraction" approach considers that some populations are exposed to a risk factor while others are not. The reality is often more complex. Industrial pollution tends to spread risks. A detailed analysis of actual work activities shows that they do not fit apparently well-established exposure scenarios. An excess cancer incidence may even be found in the base population presumed not to be at risk of a given exposure. As a result, the relative risk for exposed workers is underestimated.

Calculations of "attributable fractions" therefore can only be approximations. Their effect is to underestimate the role of working conditions in cancers, and they frequently prevent prompt action being taken by public authorities when bringing in new rules has to wait on cost-benefit assessments.

How many workers are exposed in Europe?

The only comprehensive research on the proportion of workers occupationally exposed to carcinogens in the European Union dates from twenty years ago – the Carex (Carcinogen Exposure Database) project, based on estimated percentages of exposed workers in

Many different risks

Cancers are diseases that affect cell reproduction. An uncontrolled growth of abnormal cells eventually destroys the organ in which they are located. They may migrate to other sites (metastasis). A cancer goes through different stages, sometimes over many years. Many factors may be implicated in its development, and the weakening of the immune system. Cancer sites are unequally distributed by occupational group. This underscores the importance of working conditions.

Chemical hazards are the most common. They can result from the use of carcinogens, but can also be associated with the conversion of different substances during production. The European classification of chemicals is lagging behind scientific knowledge. Many carcinogens and mutagens are not correctly classified. Cases in point are crystalline silica and formaldehyde, which affect millions of workers in Europe.

Endocrine disrupters are chemicals that affect the production and action of hormones. They are found in a wide range of industrial production processes: pesticides, plastics, medicines, electronic components, cosmetics, solvents, cleaning products, etc. Endocrine disrupters are plausibly linked to the marked rise in the incidence of breast and prostate cancer over the last twenty years. Generally, they are not classified as carcinogens. Their adverse health effects appear to

be relatively independent of the exposure dose. Exposures to very low doses at critical stages can cause serious illnesses.

Among physical risks, ionizing radiation has long been known to possess carcinogenic activity. Ultraviolet radiation, which can result from exposure to sunlight or artificial sources, is another area of concern. Electromagnetic fields are linked to the disruption of melatonin production (a hormone that regulates circadian rhythms). This may explain the excess breast cancers among seamstresses using electric sewing machines that emit electromagnetic fields. In May 2011, the International Agency for Research on Cancer classified extremely low frequency electromagnetic fields as possibly carcinogenic to humans.

The main biological risks are from agents of infectious diseases like the hepatitis virus which are implicated in some cancers. Other risks are work organization-related. Night work in particular disrupts hormone production and contributes to breast cancer.

There is an interactive effect between occupational health and reproductive health. Some children's cancers can be linked to their parents' occupational exposures. A higher incidence of leukaemia has been found among children whose mothers had been exposed to solvents during pregnancy or whose fathers had been exposed to pesticides, for instance.

The lack of overall data for the EU reflects the Community authorities' failure to address cancers caused by working.

Working with cancer

For most people battling cancer – both those undergoing treatment and survivors – the trial of the illness is made worse by losing or suffering a deterioration in the quality of their job. A 2011 survey by the Institute Curie in France found that re-entering the job market is by far the biggest problem for cancer survivors. Half of those who have found jobs have problems from the consequences of the illness (fatigue, pain, anxiety, etc.), but also from disadvantageous working conditions and the stigma of the disease.

The difficulty of adapting working conditions to the situation resulting from the disease causes direct job discrimination. Chemotherapy often involves alternating between periods of extreme fatigue which interfere with work and spells of relative normalcy. Many women operated on for breast cancer find repetitive arm movements acutely painful. This makes it virtually impossible to continue working on an assembly line or shop check-out. Physical challenges are often made worse by prejudices and rejection that can lead to isolation. A former patient says: "The day I started back, when I got in, I was greeted with: What the hell are you doing here?"

The Share European survey (Survey of health, aging and retirement) is looking at the health impact on the employment of workers aged between 50 and 65. The 2004 data contributed

by 10 EU countries indicates that cancer reduces men's employment rate from 63 to 43%, and women's from 43 to 34%. The percentage of women concerned is higher: 2.8% of the male population in this age group against 4.9% of the female population. The reduction in employment rates differs between countries. This shows that going beyond the objective problems posed by the disease, respect for social/employment rights is a core issue.

A French survey has found that among people aged 57 or under, 83% were in employment when their cancer was diagnosed. Two years later, that rate was down to 59% of men and 56% of women. Cessation due to illness does not explain this difference: it concerned 14% of men and 11% of women. The percentage of registered unemployed had increased by 60% while that of "other causes of economic inactivity" had doubled. Social inequalities are very wide. Two years after being diagnosed with cancer, barely 45% of farmers and 54% of manual workers were still in work compared to 73% of craft-workers and independent retailers and 74% of those in professional posts.

On 7 and 8 September 2011, the Association of European Cancer Leagues held a conference on this issue in the European Parliament building in Brussels. It is calling for EU rules to guarantee the right to a job for cancer patients and to facilitate adjustments to their working conditions.

Finland and the United States. Generally, the Finnish estimates were lower than the U.S. estimates because they excluded workers exposed to lower doses. One limitation of Carex was its failure to make gender-differentiated estimates. For each country, experts assessed the distribution of employment across economic sectors, from which they calculated the percentage of workers exposed to different risks. These estimates were based on the American and Finnish databases adjusted for their own assessment of actual conditions in their country. The overall result for the period 1990-1993 was for the fifteen countries in the EU in 1995. The percentage of workers exposed to carcinogens was 23%, ranging from 27% in Greece at the top down to 17% in the Netherlands at the bottom, and representing a total of 32 million workers. After 1995, the Carex project was extended to the three Baltic republics and the Czech Republic, with findings of around 28% of the workers in these countries. The project was never implemented for the other eight EU countries.

The lack of overall data for the EU reflects the Community authorities' failure to address cancers caused by working. Businesses have been required to collect and communicate data to their national authorities since a 1990 Directive. This legislation notwithstanding, the Commission has never developed the means for collecting and processing EU-wide data. The Commission is stopping knowledge being produced and that is turning into an excuse for not improving the existing legislation. Looked at the other way round, a lack of data simply reflects a lack of prevention, and this means new legislative initiatives are required.

Since Carex, a series of changes have occurred that pull in opposite directions. The percentage of workers exposed to second-hand smoke and asbestos has decreased due to stricter legislation. But the number of known carcinogens has increased. Any update of the estimates would have to extend the 139 carcinogens listed by Carex in Europe – an application of Carex currently underway in Canada is looking at 229 carcinogens. The declining share of industry and agriculture in total employment is probably partly behind the decreased percentage of exposed workers. However, some service sectors (cleaning, health care, transport) may pose cancer risks that have traditionally been ignored. Contingent employment increases the probability of exposure during part of working life and the probability of exposures at different periods. All told, it is unclear whether the percentages calculated twenty years ago should be adjusted up or down.

Five ways forward for the new Community Strategy

1. A strategy to prevent occupational cancers must ensure both that REACH works properly and that workplace prevention is improved. Each of REACH's three procedural strands can help improve action against occupational cancers. Registration of chemicals must be backed up by the generation of information on the characteristics of each chemical and, from a production volume of 10 tonnes per year, by a chemical safety report containing rules for safe use. The information supplied for registration absolutely must be made widely available to the public. Evaluation serves to control the quality of information supplied by producers. It requires clear priorities to be set, of which occupational health should be a key one. It must be done by competent public agencies that are independent of industrial interests. Authorization must be sought for the most dangerous substances. A candidate list is drawn up at EU level, after which some of these chemicals are subject to authorization and must be withdrawn from the market by the deadline set if industry has not secured the necessary authorizations for the specific uses. Only 53 substances have been put on the candidate list, and just six chemicals have been subjected to authorization since February 2011. The European Trade Union Confederation has published a list of 334 chemicals for the REACH authorization procedure. Authorization should be the exception so as to promote innovation through the development of less hazardous substances.

2. The classification of carcinogens, mutagens and reprotoxins should be speeded up and done on the basis of consistent scientific criteria without interference from industry's commercial interests.

3. The revision of the directive to protect workers against carcinogens was announced almost ten years ago, and was already programmed into the Community Strategy for 2002-2006. The Directive's scope must be expanded to include substances toxic to reproduction. A number of chemicals should be expressly included in the Directive. The order of priority of preventive measures must be complied with: replace, avoid all exposure if replacement is not possible by working in closed systems, reduce exposure to levels as low as is technically possible. This is where exposure limit values come in. They must serve to reduce existing exposures and not be construed as "licenses to kill". Only three limit values have been set in the current Directive. Two other binding limit values (asbestos and lead) have been set in other directives. Revision should improve the existing limit values and set limit values for 22 substances. It should also include health surveillance for workers who have been exposed to carcinogens even after they have left their jobs.

4. The protection of workers from asbestos must be improved. It needs to be ensured that only authorized contractors can strip asbestos from buildings. The limit values set should be revised downwards to allow for short and thin fibres.

5. Better recognition of cancers as occupational diseases must be ensured. Situations vary widely between countries. The vast majority of work-related cancers are not recognized as occupational diseases, and for women, almost none ever are.

With the signal exception of asbestos, there has been no significant progress on replacement of carcinogens. The number of chemicals banned by the EU falls well short of what the scientific evidence and production alternatives would allow. And the historical trend shows the total production volumes of carcinogens growing at a faster rate than overall economic growth. Our economic development model remains dangerously dependent on the production of harmful substances.

REACH – the European chemicals legislation – required producers or importers to register carcinogens or mutagens that reach a threshold of one tonne per year per producer. This goes both for substances that are already correctly classified and those self-classified by the producer on the basis of available information. Some 400 substances classified as carcinogenic, mutagenic or toxic to reproduction are known to have been registered. It is unclear as yet how many other chemicals have been evaluated as carcinogenic by producers. Evaluation of the quality of the information supplied will be decisive for REACH to work properly, but this has yet to be scheduled by the European Chemicals Agency.

While the percentage of workers at risk of occupational cancer cannot be estimated precisely, there is no question about the employment-related structure of exposures. Manual workers are much more exposed than office workers, and top managers come off best.

Prevention missing the boat

The record of prevention practices in companies is mixed. Several trends can be seen. Exposure to carcinogens interacts with broader determinants of occupational health like the labour relations system (collective agreements and workers' representative bodies) and the prevention set-up.

Factors of insecurity tend to increase the risks. For any given activity, it is usually more dangerous to work in a small firm or outsourcing situation.

There is better control of carcinogens identified as such that are used in production processes than carcinogens produced by

conversion processes like combustion of diesel fuel, thermal degradation of oils, or wood and leather dust.

There is more systematic prevention in the chemical industry, where carcinogens are produced or processed, than user and service industries. More protection is apt to be given to production activities clearly identified as involving exposure to hazardous substances than to what are deemed peripheral activities (cleaning, maintenance, transport, waste processing and recycling, etc.). There is next to no collective prevention in agriculture and little more in the construction industry.

European policy lagging behind

EU policy on work-related cancer is one of the weakest links in the health and safety at work strategy. The data on work-related cancer deaths more than warrants it being made

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a top priority. The links between prevention, production choices and chemicals marketing underscore the added value of an EU policy. An effective policy against occupational cancer cannot easily be run on purely national bases. Having common rules for the EU would enable prompt and more effective action to be taken. Databases on carcinogen replacement could add a big net benefit if created at Community level.

The obstacles are not new, but have been worsened by the policy steer given by Commission President José Manuel Barroso from the start of his first term in July 2004. One factor is the reluctance to develop common social/employment legislation. Most proposed new health at work legislation has been blocked over the last decade. The few directives adopted have been on much less important matters than occupational cancers. The adoption of REACH, however, which regulates the production and marketing of chemicals, is a big opportunity. The most advanced principles of REACH were defined at the end of the 1990s in a more favourable political context. REACH was adopted at the end of 2006, to be gradually implemented over 11 years from 2007 to 2018. In principle, all carcinogenic substances produced or marketed in Europe in production volumes of at least one tonne per year should have been registered by 1 December 2010. The new rules could significantly improve the situation. But there has to be the political will to use them! Two things will be decisive in the coming years: making occupational health a core criterion of REACH implementation; and supplementing REACH with more ambitious health and safety at work legislation.

Where cancers are concerned, the current European Commission's distaste for proposing new social/employment legislation is compounded by intensive lobbying from the chemical industry which is dead-set against any public or labour oversight of its production choices.

The current strategy for health and safety at work was set for the period 2007-2012. It seems likely to run out with a near blank score card on preventing occupational cancers, on which no significant progress

has been made. Every excuse has been found not to overhaul the legislation. It is a huge failure that cannot be hidden behind the rosy picture of falling work accident numbers. Each year, at least 15 times as many people die in Europe from cancers caused by poor working conditions as are killed in work accidents. And as scientist and leading opponent of the asbestos lobby Dr. Irving Selikoff says "statistics are people with the tears wiped away".

A new European strategy for health and safety at work will soon be set for the period 2013-2020. There is no shortage of proposals for concrete initiatives. The gradual implementation of REACH offers exceptional opportunities for improving prevention at the workplace. In the final analysis, work-related cancers will be a main criterion for judging the consistency and point of that strategy. ●

Further reading

- Clapp, R., Jacobs, M., Loechler, E. (2007) *Environmental and Occupational Causes of Cancer. New Evidence, 2005-2007*, University of Massachusetts Lowell.
- Crosignani, P., et al. (2009) La ricerca attiva dei tumori di origine professionale, *Epidemiologia e Prevenzione*, vol. 33, suppl. 2.
- Demers, P., Peters, C., Nicol, A.M. (2008) *Priority Occupational Carcinogens for Surveillance in Canada: Preliminary Priority List*, University of British Columbia.
- Kauppinen, T., et al. (1998) *Occupational exposure to carcinogens in the European Union in 1990-1993*, Helsinki.
- Leconte, B., Thébaud-Mony, A. (November 2010) Mémoire du travail et des expositions professionnelles aux cancérogènes. Enquête en Seine-Saint-Denis (France), *Pistes*, vol. 12, n° 3.
- Mengeot, M.A. (2007) *Occupational cancer. The Cinderella disease*, ETUI, Brussels.
- Musu, T. (2010) *REACH: an opportunity for trade unions. Putting knowledge to work in the workplace*, ETUI, Brussels.
- Pukkala, E., et al. (2009) Occupation and cancer – follow-up of 15 million people in five Nordic countries, *Acta Oncologica*, vol. 48, p. 646-790.
- Schneider, E., Kosk-Bienko, J. (ed.), (2010) *Exploratory Survey of OELs for CMR substances*, EU-OSHA.