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Occupational cancer prevention in Scotland: a missing public health priority

Prevenzione dei tumori professionali in Scozia, Gran Bretagna: una priorità trascurata della sanità pubblica

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Summary

Aims. To explore and explain the significance of occupationally-related cancers in Scotland in the context of new estimates of the toll taken by such cancers when compared with other public health priorities such as road traffic fatalities and murders. *Materials and methods.* The paper examined the evidence base for the estimates through a range of databases, including employment, cancer mortality and morbidity statistics, records of government and other agencies, media databases and data on road traffic fatalities and murders. The paper analyses occupational cancers in the wider public health context. *Results.* The view that significant occupational cancer threats relate only to past exposures and that many cancers can be explained solely by socio-economic factors and deprivation without reference to work and wider physical environments is misconceived. Recent research indicates that occupationally-related cancer deaths may be running at 12% or more of all cancer deaths. Applying such estimates to Scottish cancer morbidity and mortality figures indicates a much neglected occupational cancer threat to Scotland's public health. Figures that are available

Riassunto

Finalità. Esplorare e spiegare l'importanza dei tumori professionali in Scozia nel contesto delle nuove stime sul numero delle vittime per tali patologie quando confrontato con altre priorità di salute pubblica come incidenti stradali ed omicidi. *Materiali e metodi.* Il documento esamina il fondamento di tale stima attraverso una serie di *data base*, tra cui occupazione, mortalità per cancro e statistiche sulle percentuali dei malati, archivi del governo ed altre agenzie, banche dati dei media e dati su incidenti stradali ed omicidi. Il documento analizza i tumori professionali in un più ampio contesto di salute pubblica. *Risultati.* L'opinione che la minaccia significativa di tumori professionali riguardi solo esposizioni passate e che molti tumori possano essere spiegati semplicemente da fattori socio-economici e privazioni, senza riferimenti al lavoro e più in generale all'ambiente fisico, è un fraintendimento. Recenti ricerche indicano che le morti per tumori professionali possono raggiungere il 12% o più di tutte le morti per tumore. L'applicazione di tali stime agli andamenti di morbilità e di mortalità per cancro in Scozia indica una minaccia molto sottovalutata riguardo ai tumori professionali per la salute pubblica scozze-

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suggest higher levels of occupational ill-health overall in the Scottish workplace. *Conclusions.* Where high cancer mortality and morbidity exist, it has been argued in Scotland and elsewhere that this simply reflects age and lifestyle factors such as smoking, diet, exercise, sunbathing and factors other than work. This is incorrect. Some solutions are proposed that could readily be adopted in Scotland now and would relocate occupational cancer as a major strand in the public health agenda instead of being irrelevant to it. Eur. J. Oncol., 13 (3), 161-169, 2008

se. I dati disponibili indicano maggiori livelli complessivi di malattie professionali nei luoghi di lavoro scozzesi. *Conclusioni.* Dove esistono alta morbilità e alta mortalità per cancro, è stato sostenuto, in Scozia ed altrove, che questo sia semplicemente legato all'età e a stili di vita come fumo, dieta, esercizio fisico, esposizione al sole o altri fattori al di fuori del lavoro. Questo è inesatto. Sono state proposte alcune soluzioni che potrebbero essere adottate in Scozia immediatamente, e che ricollocherebbero i tumori professionali come una priorità nel programma di salute pubblica piuttosto che considerarli irrilevanti. Eur. J. Oncol., 13 (3), 161-169, 2008

Key words: **occupational cancer, prevention, Scotland**

Parole chiave: **tumori professionali, prevenzione, Scozia**

Introduction

This paper has been written with the intention of: examining recent and current thinking on occupational cancer prevention in Scotland; exploring data that estimate and record risks to public health in Scotland from occupational cancer, road traffic fatalities and murders; and identifying workable and effective strategies to tackle occupational cancer in Scotland.

The paper draws on the published and grey literature on occupational cancers in Scotland, the statistics available on estimates of cancer morbidity and mortality for Scotland, occupational cancer, road traffic fatalities and murders in Scotland and an analysis of the policies and practices of major occupational health and safety agencies operating in Scotland during the last ten years. In Scotland, health and safety at work regulation and enforcement is still a matter reserved for the United Kingdom (UK) parliament in London; health matters are dealt with by the Scottish parliament and this would include treatment of occupational cancers; transport and police matters are controlled by the Scottish Parliament as are environmental pollution matters and certain aspects of enterprise and economic development.

Workers in Scotland may be entitled to UK state-prescribed industrial disease benefits for some occupational cancers, although claims recorded under this scheme grossly under-record such cancers. Those with occupational cancer may also be entitled to certain social security payments. In addition, it is possible but time-consuming and difficult to take civil court actions to gain compensation for work-related cancers.

The history of occupational cancers in Scotland

Scotland's relatively recent industrial history, especially relating to heavy engineering, ship building and coal mining, has left the country with substantial de-industrialisation in these sectors, a legacy of occupational cancers and an unenviable record of having some of the UK's highest mesothelioma death rates in the early 2000s[1]. Within Scotland, towns such as Clydebank and local authorities such as West Dunbartonshire are at the top of the UK's table of mesothelioma cases (Table 1).

Occupational cancer risks from 'historic carcinogens' such as asbestos remain[3]. However, carcinogens including diesel, mineral oils and heavy metals, wood dust, pesticides, silica, formaldehyde and many solvents remain a threat to substantial numbers of Scottish workers not only in engineering but also in the service industries, agriculture and forestry, petrochemicals, the defence industry, transport, the public

Table 1 - Mesothelioma. Age standardised death rates per million by region, time period and sex. Scotland, Wales and GB figures, with ranking for Scotland out of 11 HSE geographical regions in brackets[a,b]

Country	Males			Females		
	1992-4	1995-7	1998-2000	1992-4	1995-7	1998-2000
Scotland	45.84 (2)	49.90 (2)	50.52 (3)	6.85 (2)	6.74 (5)	8.98 (2)
Wales	26.34	30.46	28.92	5.11	2.71	4.75
GB	36.49	40.59	46.27	5.08	5.94	7.63

[a] From HSE Statistics 2003[2]

[b] The HSE regions consist in England of the North East, the North West, Yorkshire and Humberside, East Midlands, West Midlands, East of England, London, the South East, the South West. There are two other HSE regions: one for Wales and one for Scotland. These 11 HSE regions combine to make 'Great Britain'

sector including the health service and construction (Table 2). Also although Scotland's manufacturing base may have shrunk, new industries such as electronics have brought with them new as well as long-established carcinogens and processes[5-7]. The overall size of the workforce and vastly increased productivity suggest that more workers are using larger volumes of carcinogens than ever before (Table 3).

Table 2 - Breakdown of employment in Scotland by sector June - August 2003[a]

Occupation	%
Agriculture, forestry, fishing	1.4
Energy and water	1.9
Manufacture	12.0
Construction	5.6
Distribution, hotels	23.2
Transport	5.7
Public administration, health, education	27.6
Banking, finance, insurance	16.9
Other	5.7

[a] From Scottish Executive Fact Sheet 2003[4]

Table 3 - Breakdown of employment in Scotland by numbers of employees in some sectors 2001[a,b]

Sector	N. employees
Agriculture, forestry, fisheries	62,020
Mines	46,440
Manufacture	307,980
Construction	142,120
Retail and trade	241,600
Hotels and restaurants	177,630

[a] From Scottish Economic Statistics 2006[8]

[b] These are selected employment sectors and the list does not cover all employment sectors in Scotland

Occupational cancer in Scotland has only spasmodically attracted the attention of researchers who have published their results from the 19th Century onwards. In 1875 the first case of paraffin (skin) cancer in Great Britain (GB) was described by Bell in Scottish shale oil plants: "*a well known fact among the local physicians*"[9]. In 1922, Scott described a further 19 cases of paraffin cancer in the Scottish industry. The problem still persisted, with reports of excesses of skin cancers in the oil shale industry in Scotland continuing into the 1980s, and workers continue to be exposed in the industry[10].

Many studies of Scottish workers fell within larger studies of workers across the UK.

Several of these epidemiological studies produced positive results – cancer associations not negative studies – typically reported as having weak statistical associations or limited numbers, perhaps illustrating some of the fundamental weaknesses of epidemiology to shape public health policy on carcinogens, in order to protect workers exposed to known carcinogens at those times. Between 1946 and 1990, Scottish Steel workers showed "limited" evidence of excesses of lung cancer[11]. In 1997 Scottish paper mill workers showed an "*unexpected excess of lymphatic and haematopoietic cancer*" in some departments and "*may be a chance occurrence*"[12]. Between 1955 and 1995, among Scottish nuclear workers, a "*statistically significant association*" was noted between deaths from prostatic cancer and radiation workers. "*The association is unlikely to be causal*"[13]. In a 1993 study that included Scottish oil refinery workers, raised mortality for all cancers in labourers and especially oesophagus, stomach and lung cancer was noted as was raised

mortality for colorectal, larynx and prostate cancer "*but these tended to be isolated and not consistent across refineries and sub-groups*"[14]. These cancers never appear in official records of occupationally-caused cancers in Scotland whereas several would be reported, recorded and result in compensation in other countries.

Occupational cancer statistics and other public health threats in Scotland

Based on a review of published research completed in 2005, Clapp considers that the Peto/Doll estimates of 4% of all cancer deaths being work-caused or related should be revised upwards with 8% as the lowest estimate, 12% the median and 16% the maximum[15-19]. Using Clapp's figures, these estimates were applied to Scotland. Scottish cancer mortality data were collected by the General Records Office (Scotland) and the Scottish Information and Statistics Division (ISD). In 2006 they totalled 15,025 cancer deaths[20]. New cases of cancer diagnosed in 2004 totalled approximately 27,000[21]. We recognise that cancer mortality is not necessarily the most sensitive measure of the impact that occupational carcinogens may have on the total cancer burden. However, cancer mortality data are the most easily accessible and are necessary for comparisons with road traffic and homicide deaths.

It is predicted that, in Scotland, diagnosis of some cancer types are expected to increase by 50% compared to levels experienced in the 1990s. A recent report suggests that by 2011 there will be over 31,000 cases of cancer diagnosed each year compared with over 26,000 per year between 1996 and 2000[22].

In November 2005 the Scottish workforce numbered 2.45 million[8]. The profile of Scottish employment patterns may differ from the UK generally and a large percentage of employment lies within the small and medium sized enterprise sector in the country. However, the type of Scottish employment activities is similar to that in the rest of the UK, with the exception of the whisky industry. Yet Scotland, according to the Health and Safety Executive's (HSE) own statistics, tops a number of tables for poor occupational health, and the Scottish figures have sometimes been diluted because they have not been compared directly with the English/Welsh workforce figures. If approximately 1 in 8 workers are routinely exposed at work to carcinogens (French estimate of workplace exposures to carcinogens 2005) approximately 306,000 Scottish workers would be exposed to carcinogens at work. Using the European cancer exposure estimate (CAREX 2000 estimate for early 1990s), of 22% of all GB workers being exposed to carcinogens, approximately 539,172 Scottish workers would be exposed to workplace carcinogens. Thus these workers run an occupational cancer risk and such workers are often disproportionately in the skilled, semi-skilled and unskilled categories, with far fewer "professional" workers exposed to carcinogens.

If occupational cancer causes 12% of all cancer deaths[16-19] this would mean that approximately 1,803 estimated occupational cancer deaths occurred in Scotland in the year 2006. If a figure of 16% were used[18-19], Scottish occupational cancer deaths in 2006 would be estimated, at 2,404. HSE estimates, using a 4% figure which grossly under-estimates such cancers, would still produce a figure of 601 occupational cancer deaths in Scotland in 2006. Recent work by bodies such as the International Labour Organization (ILO) and European Union (EU) agencies now indicate that the attributable fraction of occupational cancer deaths may total over 13% of all male cancer deaths in the EU and 9.6% of all global cancers for men and women[19].

If morbidity is considered, and this provides a different perspective on the problem that in the future will need greater public health attention, some 27,000 new cancer cases were diagnosed in Scotland in 2004. Using that year, and the estimate that 12% of all cancers are related to work, approximately 3,240 new occupational cancer cases each year would occur in Scotland. If the figure of 16% is used, then there would be an estimated 4,320 new occupational cancer cases in Scotland each year. Using the HSE low figure of 4%, then 1,080 new occupational cancer cases would occur in Scotland, but recent research commissioned by the HSE itself indicates that this figure is much higher.

If the estimate for occupational cancer deaths in Scotland is compared with some other public health

threats in a similar period, it is clear that they pose the most serious threat. Mesothelioma deaths in Scotland have not peaked nor will they for several years and they will reflect exposures to a carcinogen in the 1970s and 1980s and one that is still widely present in many workplaces.

Even using the Doll/Peto low 4% estimate, more than a third more people die in the country of occupationally-related cancers than die in road traffic fatalities and murders combined.

In 2004 there were 307 road deaths in Scotland[23]. In 2003 there were 108 homicides in Scotland[24]. If the 12% figure is used, and this is increasingly accepted worldwide, then four and a half times more people will die in Scotland from occupationally-related cancers than the other two categories combined. It may be argued that preventing cancer is more complicated than preventing murders and road fatalities. This is not the case because, as the World Health Organization (WHO) has observed[25], occupational cancers are wholly preventable, whereas factors that cause either road deaths or murders can be highly complex and may rely on individual behaviour that cannot be removed or engineered out as carcinogens in the workplace can.

Paradoxically the number of police officers – who play key enforcement and regulation rôles on roads and in dealing with violence – is increasing in Scotland, whereas the number of HSE inspectors, and subsequently their ability to maintain even the current limited number of workplace inspection visits carried out, has been declining. This is due to reduced expenditure on HSE, the main government health and safety enforcement agency which is controlled by the Westminster Parliament, as this activity (Health & Safety at Work) is a power reserved to the UK Government in London.

The perception of threat may be shaped by scientists, civil servants and politicians but it may also be media driven, as evidenced by content analysis of news coverage in Scotland. Such perceptions often also drive and reflect some public health professional priorities and attract large amounts of government funding to address the perceived threats. Deaths from the great number of occupational cancer deaths are viewed as far less newsworthy than the relatively small number of deaths from violent crime (Table 4).

Table 4 - Major public health threats in Scotland as evidenced by reported news coverage in Lexis Nexis database search of major newspapers on topics in 2006

Topic	Hits
Occupational cancer Scotland	0
Scotland cancer	677
Road deaths Scotland	18
Asbestos deaths Scotland	1
Scotland murders	618

Governmental and agency responses in Scotland to occupational cancer

The former Scottish Executive under the previous Labour administration (now termed the Scottish National Party Government) produced a report in 2001 on the primary prevention of cancer that listed six main ways of reducing cancer risks. The first five priorities related to lifestyle factors and individual responsibility and the sixth covered occupational cancer in a remarkably Panglossian way:

> *"Great progress has been made in reducing workplace exposure to known carcinogens. There are still some carcinogenic exposures. First of all, all carcinogenic exposures should be identified. Employers should take every step to eliminate exposure of their workforce to such exposures. Individual workers should follow all Health and Safety instructions in the workplace"*[26].

Evidence does not support this wildly optimistic view of occupational cancer prevention in Scotland. The HSE covers the whole of the UK in its enforcement activities. Occupational health and safety at work is a reserved matter dealt with by the London Parliament and not the Scottish Parliament at Holyrood in Edinburgh. The principal HSE Scotland activity on occupational cancer, other than asbestos-related cancers, has been minimal and came about because of pressure from a small non-governmental organisation (NGO) and ex-workers at a semiconductor plant in Silicon Glen in the 1990s and early 2000s[5-7]. Workers' abilities to protect themselves are limited, as HSE publishes no accessible on line or print guidance on the causes and prevention of occupational cancers. It does not even publish a straightforward listing of the top workplace cancer

threats and practical measures to reduce those threats. Some of its guidance on specific substances omits all mention of known occupational cancer association.

With knowledge of the multi-causality of cancer increasing, there are additional arguments for a greater focus on workplace carcinogens. If there are populations vulnerable to cancers based on socio-economic criteria, workplace carcinogens could play an even bigger part in cancer causation. This is because of the treble or quadruple jeopardy of such groups: exposed to more carcinogens in food and water, more hazardous life circumstances linked to tobacco and alcohol, for instance, in their wider environments often in the most polluted geographical areas and in their workplaces. Yet the opposite approach appears to be developing.

The Scottish Centre for Healthy Working Lives, another body funded by the Labour-run Scottish Executive in the mid-2000s and still functioning, offers information and advice on occupational health and safety. Its website in 2006 had 16 references to cancer. The first three were to the sun, oral health and breastfeeding; number 4 related to the Control of Substances Hazardous to Health. Also in 2006, the resources website contained, as its top three resources: a quarterly newsletter aimed at encouraging employees to lead Healthy Working Lives and reviewing recent activities in the North, East and West regions; a guide to workplace drug and alcohol policies; and a guide to workplace drug and alcohol testing, to help employers to understand more fully the complex, legal, social and ethical issues[27].

In 2006, the only policy document on the Centre's website was the Scottish Executive Policy to take forward the Workplace strand of the Health Improvement Challenge policy published in August 2004. The only reference in the whole of the policy document to cancer was as follows:

> *"Scotland has poor health by UK and European standards and high levels of inequality in terms of health outcomes for different socio-economic groups. The health of working-age people, that period of life in which men and women are considered to be available, but not necessarily involved in, paid employment is of particular concern. We have higher rates of smoking, higher levels of heroin use, and higher levels of problem drinking than the rest of the United Kingdom. 2.2 million working days are lost every year through ill-health and we know that amongst men and women aged 15-74 we have one of the worst records in Europe for both overall mortality and specific conditions such as lung cancer, oesophageal cancer and ischaemic heart disease"*[28].

The position in 2008 on the Centre website is exactly the same as 2006. The Centre appears to be dominated by health promotion and support for those with cancer rather than mainstream occupational health and safety matters. One member of the Centre staff now has a specific interest in and small allocation of time to spend on occupational cancer in Scotland[29].

The Scottish Action Plan on Health and Safety (SAPHS) produced in March 2007 contains just one reference to occupational cancer and cites the HSE view that they (HSE) were working on *"improving knowledge of the incidence of occupational cancer and significant causes of exposure in the workplace"*, yet still cites the outdated Doll/Peto estimates giving, for GB as a whole, a very approximate estimate of 6,000 occupational cancer deaths per year[30].

The Partnership for Health and Safety in Scotland also appears to have neglected occupational cancer in its plans, and especially its forward plan for health and safety in Scotland in 2007[31].

Discussion

A Scottish anomaly in safety at work was described by Woolfson and Beck in 2000[32], with a worse health and safety record detected in Scotland than elsewhere in the UK. This is especially the case with regard to workplace fatalities but also applies in several areas of injury and enforcement activity[33]. In 2006/7 there was also a statistically significant increase in the Scottish estimated incidence rate of work-related illness: 2,200 per 100,000[34].

Occupational cancer has been neglected in Scotland as it has been elsewhere in the UK. If all other occupational causes of cancer were discarded, the toll taken by just two types of asbestos-related

cancers in Scotland in 2004 would alone be higher than all road traffic fatalities in that year, and would be three and half times higher than Scottish murder. Official HSE mesothelioma figures for Scotland in 2004 totalled 179. If there is at least one lung cancer death for each mesothelioma death, then 358 people would have died from these two asbestos-related cancers[35]. In that year the HSE also noted, for instance, that cancer of the larynx due to asbestos exposure was recorded, recognised and compensated for in other countries as an occupational disease but not in the UK.

Until relatively recently, London effectively determined the health, workplace health and safety and public health policies and resources of Scotland. That position has changed in some respects on health and public health but remains unaltered on occupational health and safety. Where studies have indicated occupational cancer problems or revealed a lack of data, little or no action has been taken. Agencies responsible or apparently responsible for occupational cancer have done little or nothing to develop campaigns and upstream policies on the subject, with the exception of public health action on passive smoking in the workplace. This is in contrast to governmental, agency and media responses to and resourcing of some much less serious threats to public health in Scotland.

Various responses are possible to these threats: some upstream, some downstream and some running the gamut from prevention to information and education and support. Table 5 shows how a range of public health issues have been tackled in Scotland. Occupational cancer prevention has to be an upstream activity.

The Scottish Government has adopted upstream policies to address smoking with step 3 (solutions shown in Table 5). Action on occupational carcinogens, in so far as this could be dealt with by the Scottish Government under public health, enterprise and economic development heads, has not yet followed on 3. The economic costs of occupational cancers are also considerable: £2.46 million for each case according to UK government estimates and the health costs would fall on the Scottish health services alone[19,36].

Conclusions

A warped set of public health priorities exists in Scotland and, beyond that, do not reflect the data. It

Table 5 - Interventions: upstream and downstream

The hazard	The source	The problem	The solutions
Tobacco	Tobacco companies	Supply of carcinogen	1. Reduce exposure 2. Blame smoker 3. Ban smoking in public places 4. Ban sale of carcinogen and make tobacco a prescription only drug
PM 10s	Road transport companies	Exposure to traffic fumes	1. Ignore 2. Deny 3. Tax 4. Set tough exposure limit
Fatty, salty, sugary food	Food companies	Sale or consumption or both	1. Control advertising 2. Argue for voluntary industry codes blame consumers and parents and deregulate
Occupational carcinogens	Chemical and other companies and organisations using and producing carcinogens in workplaces	Use and exposure	1. Ignore and deny 2. Argue impact is unimportant compared to 'lifestyle' carcinogens 3. Toxics use reduction and sunsetting

is not the case that road traffic fatalities and murders should be neglected in Scotland, but occupational cancer deaths clearly do far more damage to public health. Occupational cancer prevention should be recognised by the Scottish government as an important public health priority and should be allocated resources accordingly as it is in Canada[37]. An effective national occupational cancer and carcinogens awareness campaign should be launched as a matter of urgency, that engages with parties in ways that have hitherto not happened through existing agencies. Wherever possible, IARC Group 1 and Group 2A carcinogens should be targeted for "sunsetting": a phase-out within a designated time frame, to be replaced by safer alternatives.

Scottish-specific strategies and opportunities exist. The opportunity for the Scottish Government Health Department to link occupational health effectively to public health is enormous. There should be no shading out of occupational cancer as appears to be happening, nor should it be drowned out by workplace drug and alcohol activities. Prevention through economic incentives could work, as for example with Scottish Enterprise benefits for companies that demonstrate good occupational carcinogen removal, and toxics reduction policies, through toxics use reduction legislation. Such approaches have been tried and tested in the USA for almost twenty years and they benefit employers, employees, the environment and communities. Prevention through economic penalties is also a possibility. Scottish parliamentary action to recover costs of occupational diseases, including occupational cancer, from employers is a reasonable objective and should be feasible. Greater governmental and council support for the health and well-being of victims of occupational cancer through welfare rights and social services is also needed along with greater environmental monitoring of industries and workplaces using and emitting carcinogens.

Wider global policies promoting 'green jobs' are now finding favour with agencies and organisations including the ILO and the G8 group of countries at their summit in Japan[38]. Embracing the green jobs agenda should be a key public health priority and should include new and socially useful jobs that also see the volume and number of carcinogens reduced at work. The Scottish Government has the opportunity to be at the forefront of the move towards green jobs and to combine that development with a major public health initiative on occupational and related environmental cancer prevention.

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