OCCUPATIONAL CANCER PREVENTION IN SCOTLAND”

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August 2016
Setting the scene and identifying key issues

types of carcinogens and cancers
- estimates of cancers and where and to whom they occur
- resources for dealing with such cancers (eg Hazards magazine, Hazards Campaign, SHG, TUC, STUC, ECHA, IARC, NIOSH, EPA, TURI data bases, Toxline, Medline, HSE

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A team of 44 scientists in 10 countries commissioned by the World Health Organization’s International Agency on Cancer Research (IARC) issued a report in 2007/8, according to which shift workers have a higher risk of cancer than the general population.

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Hueper’s occupational and environmental cancers - some substance and site concerns 1942

- Asbestos
- Benzidine
- Diesel
- Dyes, coal tar
- Endocrine disruptors linked to breast cancer
- Metal Dust

- ‘Blood’ cancers
- Brain cancers
- Breast cancer (endocrine)
- Lung cancers
- Naso-pharyngeal cancers
- Prostate cancer (Oppenheimer 1926; Henry et al 1931 6 of 46 occupations
- Testicular cancer (Shimkin 1941 stilbestrol)

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Cancer Table: Estimate of the proportion of cancer deaths that will be found to be attributable to various factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Best Estimate</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>30</td>
<td>25-40</td>
</tr>
<tr>
<td>Alcohol</td>
<td>3</td>
<td>2-4</td>
</tr>
<tr>
<td>Diet</td>
<td>35</td>
<td>10-70</td>
</tr>
<tr>
<td>Food additives</td>
<td>&lt;1</td>
<td>5-2</td>
</tr>
<tr>
<td>Sexual behaviour</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yet to be discovered hormonal analogies of reproductive factors</td>
<td>Up to 6</td>
<td>0-12</td>
</tr>
<tr>
<td>Occupation</td>
<td>4</td>
<td>2-8</td>
</tr>
<tr>
<td>Pollution</td>
<td>2</td>
<td>1-5</td>
</tr>
<tr>
<td>Industrial products</td>
<td>&lt;1</td>
<td>&lt;1-2</td>
</tr>
<tr>
<td>Medicines and procedures</td>
<td>1</td>
<td>0.5-3</td>
</tr>
<tr>
<td>Geographical factors</td>
<td>3</td>
<td>2-4</td>
</tr>
<tr>
<td>Infective processes</td>
<td>10</td>
<td>1-?</td>
</tr>
</tbody>
</table>


Beware the problem with attributable fractions
OCUPATIONAL CANCER PREVENTION IN SCOTLAND

- WHO estimate that globally 7-19% of all cancers are due to toxic environmental exposures. 2009
  - EU estimates 8-16% of cancers are due to work exposures 2004 EU Carcinogens and Mutagens Directive sets standards for 3
- The ETUC want 50 binding standards includes diesel engine exhaust, leather dust, formaldehyde, refractory ceramic fibres, respiratory crystalline silica, cadmium and cadmium compounds, benzo(a)pyrene, chromium VI compounds, ethylene oxide, trichloroethylene (TRI).

- 15,764 people died from cancer in Scotland in 2013 but not evenly distributed by occupation, gender, socio-economic groupings or geography
- If 13% of cancer deaths are work and environmentally-related, an estimated 2049 deaths are work-related = cost to Scotland of £5,020,050,000 (estimate of £2.45 million per cancer death DEFRA 2006)
- approximately 530,000 workers (210,000 women) in Scotland estimated to be exposed to occupational carcinogens
- We are all exposed to environmental carcinogens
Policy problems
- how we prioritise such cancers in public health
- what regulations exist and where
- how and why we compound failures to act?

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Occupational and environmental cancer prevention?

- Ban/Remove carcinogens on the basis of evidence and precaution
- Reduce exposure to carcinogens and measure them
- Wear PPE
- Detect those exposed to carcinogens
- Screen workers for carcinogens
- Recognise, compensate and support those affected by such cancers
- Treat people with occupational and environmental cancers and use data on cases to focus on prevention strategies in the future

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Scotland and some occupational and environmental issues studies, missed policy opportunities and developments

1875 The first case of paraffin cancer in GB was described by Bell in Scottish shale oil plants - ‘a well known fact among the local physicians’ (Hueper 1942:156)

1922. Scott described 19 cases of paraffin cancer in the Scottish industry. No effective action had apparently followed Bell’s report


- Road traffic fatalities: 2014 = 203 (incl work)
- Suicides: 2015 = 672
- Occupational cancer: 2014 = 630 (4%) = 1260 (8%) = 1889 (12%)
- Environmental cancers = ?

Bases on 15746 deaths in Scotland from cancer in 2014

(HSE estimate for GB occ disease 13,000 deaths each year in 2014/15 = 8,000 cancer deaths (including 2535 meso deaths) and 13,500 new cases each year. As Scotland has c 8% of workforce = 1040)

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Fairburn et al findings on environmental justice. 2005 Scotland & Northern Ireland Forum for Environmental Research (SNIFFER) on Scotland

- People in the most deprived areas are far more likely to be living near to pollution sources of potential negative environmental impact than people in less deprived areas.

- People living in the most deprived areas are more likely to experience the poorest air quality than those living in less deprived areas for four pollutants (nitrogen dioxide, PM10, benzene and carbon monoxide) out of the five pollutants examined (the exception being sulphur dioxide). Exceedences of the nitrogen dioxide objective (annual mean) are strongly concentrated in the most deprived areas.
Alberta firefighters recognised diseases = 14. UK = 0?

The ‘top’ occupational (and environmental) carcinogens & related estimated cancers (HSE 2012 and DWP): relative risk issues?

<table>
<thead>
<tr>
<th>Substance and related Cancers</th>
<th>Related cancers</th>
<th>Prescribed industrial disease status</th>
</tr>
</thead>
<tbody>
<tr>
<td>and estimated occupational exposures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asbestos</td>
<td>Mesothelioma</td>
<td>Yes</td>
</tr>
<tr>
<td>3909 deaths</td>
<td>Lung</td>
<td>Yes</td>
</tr>
<tr>
<td>1.8 million exposed</td>
<td>Larynx</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Stomach</td>
<td>No – rejected in 2008</td>
</tr>
<tr>
<td>Silica</td>
<td>Lung</td>
<td>Yes</td>
</tr>
<tr>
<td>789 deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1 million exposed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shift work</td>
<td>Breast</td>
<td>No</td>
</tr>
<tr>
<td>550 deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-6 million exposed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>Lung</td>
<td>No</td>
</tr>
<tr>
<td>Primary site lung cancer in non-smokers</td>
<td>Lung</td>
<td>No</td>
</tr>
<tr>
<td>Primary site testicular cancer</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>20 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary site esophageal cancer</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>25 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel exhaust emissions</td>
<td>Lung</td>
<td>No</td>
</tr>
<tr>
<td>652 deaths</td>
<td>Bladder</td>
<td>No</td>
</tr>
<tr>
<td>&gt;100,000 exposed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar radiation</td>
<td>Non melanoma skin cancer</td>
<td>No</td>
</tr>
<tr>
<td>12 deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radon</td>
<td>Lung</td>
<td>No</td>
</tr>
<tr>
<td>184 deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Watterson 2015
UK influences on occupational and environmental cancer prevention: the vicious square and lack of precaution?

National tunnel vision? re decades of international research and global initiatives suffering costs – WHO, Asturias, Canada, France, USA Government, regulators, employers and TUs

Government and regulators - change legal and related compensation laws to make it harder to obtain recognition for these cancers. Reduce reporting of diseases.

Occupational and environmental cancer cases

The Politics of cancer prevention. Government with regulators?

1. Better regulation and deregulation -
2. Run down and cut professionals in key agencies and cut budgets
3. Evidence-based policy making or policy-based evidence collection?

The economics of cancer prevention – don’t count costs and don’t identify who pays most. GB occupational and environmental cancer costs estimated annually at over £2 billion

BisCME
Asbestos
Diesel
Silica
Shift work &
Two case studies of carcinogens that affect or may affect workers and communities

- diesel
- benzene
Old but continuing hazards - Diesel in the workplace – media and others missing the workers?

Lyon, France, June 12, 2012 — After a week-long meeting of international experts, the International Agency for Research on Cancer (IARC), which is part of the World Health Organization (WHO), today classified diesel engine exhaust as carcinogenic to humans (Group 1), based on sufficient evidence that exposure is associated with an increased risk for lung cancer.

Air pollution at Edinburgh Waverley 7 times higher than safety limits. Sunday Herald. December 2012
Benzene -doubt has been their product?

1948 – American Petroleum Institute discussed ‘reasonably well documented instances of the development of leukemia as the result of chronic exposure to benzene’ and further noted ‘it is generally accepted that the only absolutely safe concentration of benzene is zero’ (Michaels 2008:70)

1970s, 1980s, 1990s, 2000s. American industry opposed reductions in benzene exposure standards using diluted and under-powered oil industry studies. They also tried to discredit research studies indicating the need to lower benzene standards.

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1. 1980s onwards HSE criticized Peter Infante’s concerns about benzene and thought no need to lower benzene TLV below **10ppm**. (OSHA in 1977 proposed 1ppm: adopted in 1987)
2. HSE benzene level in 1992 was 5ppm and in 2014 is 1ppm
3. APHA 2005 policy on benzene
   - More recent evidence suggests that carcinogenic and toxic effects, including genotoxicity and immunotoxicity, occur among workers exposed to levels below OSHA's permissible exposure limit (1 ppm, 8-hour time weighted average)
   - Benzene risk assessment models, which attempt to extrapolate risk from high exposure to low exposure scenarios, may under-estimate the level of true risk at low level exposures
   - Benzene crosses the human placenta and is found in human breast milk
   - Children and infants may be more susceptible to substances like benzene than adults.
   - A possible relation exists between parental occupational and environmental exposure to benzene and elevated risk of leukemia and birth defects among their offspring exists
   - NIOSH US researchers called for lower exposure limit of **0.1 ppm** (Mehlman, 2004; OSHA, 2004; The Collegium Ramazzini, 2005).
Solutions?

Bob Sass, Canadian health and safety researcher – “Knowledge isn’t power, power is power”.

Go for the three R’s – the right to know, the right to participate, the right to act

International
UK
National
Sector or industry
TU/STUC
Workplace

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Simple solutions? The law on carcinogens

COSHH and related EU Management directives

REACH

EU Carcinogen Directive 2004

ECHA And EFSA

IARC

Protect “workers against risks to their health and safety, including the prevention of such risks, arising or likely to arise from exposure to carcinogens or mutagens at work” (Art. 1).

CLP Regulations 2010-2015 Hazard category – carcinogen is a substance or mixture that induces or increases cancer incidence with mechanisms relevant to humans
1A known human carcinogen – largely human evidence H350 eg-i
1B presumed human carcinogen – largely animal evidence H351
2. Suspect human carcinogen – evidence but not yet sufficiently strong CMR, toxicity, respiratory sensitiser

Specific regulations such as:
- Control of Asbestos Regulations 2012

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### Reductions TURI (1990 - 2005)

<table>
<thead>
<tr>
<th>Carcinogen</th>
<th>Reduction in Use</th>
<th>Reduction in Byproduct Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE</td>
<td>77%</td>
<td>97%</td>
</tr>
<tr>
<td>Cadmium</td>
<td>73%</td>
<td>70%</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>63%</td>
<td>29%</td>
</tr>
<tr>
<td>Chromium</td>
<td>83%</td>
<td>82%</td>
</tr>
</tbody>
</table>

**Massachusetts Toxics Use Reduction Act 1989**

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Scottish specific strategies and opportunities – a more Nordic and Canadian model?

- Scottish Government discussion and focus, along with cross-party initiatives, on occupational and environmental diseases including cancer using precautionary principles
- Prevention through recognition, regulation, monitoring and enforcement, sunsetting, toxics used reduction, compensation, public health action and social and environmental justice. The role of Scottish Government Health Ministers (Linking NHS policy, plans and practice and enforcement and regulation issues through HSE – reserved and SEPA) supported by clear recognition in documents such as the Scottish Government Better Cancer Care and Action Plans
- Prevention through incentives. Scottish Government benefits for enterprises that adopt toxics use reduction/sunsetting strategies on carcinogens?
- Prevention through economic penalties. Scottish parliamentary action to recover costs of occupational and environmental diseases, including cancer, from employers?
- Continued and expanded governmental support for victims of cancer through better recording, welfare rights and social services
- Greater support, advice and information for communities exposed to carcinogens and for employers and employees using carcinogens