

Estimating occupational and environmental cancer burdens in Australia

Lin Fritschi

Western Australian Institute for Medical Research

Tim Driscoll

University of Sydney

Scotland vs Australia

	Scotland	Australia
Population	5 million	21 million
Workforce	63%	68%
% of workforce in		
▶ Farming	2%	4%
▶ Manufacturing	11%	12%
▶ Construction	8%	7%
Cancer incidence rate		
▶ Males (/100 000)	322	339
▶ Females (/100 000)	269	261

The big difference



The big difference



Occupationally-caused cancer

- ▶ Media coverage of sensational and specific issues
 - "Clusters"
 - Asbestos related cancer
- ▶ Australian National Cancer Prevention Policy 2004-06 does not mention occupational exposure to carcinogens.
- ▶ Why?

What I could do to reduce my cancer risk	% mentioning
Sun protection	67
Eat well	50
Regular checkups	44
Not smoke	35
Be active/healthy weight	32
Eat more fruit/veges/cereals	27
Limit alcohol	13
Reduce stress	8
Avoid chemicals/pesticides	7
Avoid passive smoking	2

Results from Queensland Cancer Risks Survey, 2004

Increase the profile of occupational carcinogenesis

- ▶ Population attributable risk
- ▶ % and number of cancers due to occupation
- ▶ Number of people exposed to carcinogens at work

Previous estimations

- ▶ Doll and Peto, 1981 – 4%
 - American data from 1960s and 70s
 - Very limited list of carcinogens
 - Data on relative risks 30 years old
 - American population data
 - American cancer data, only those cancers before the age of 65 years

Previous Australian studies

- ▶ All used Doll and Peto's original estimates

- ▶ Winder 1991 3.8%
- ▶ Kerr 1996 3.2%
- ▶ AIHW, 1996 2.1%

Other previous international studies

- ▶ Steenland, 2003 3%-7% males
- ▶ t'Mannetje, 2005 5%-9% males
- ▶ Leigh, 1997 6-10%
- ▶ Nurminen, 2001 14% males

- ▶ WHO, 2005 9% lung ca
- ▶ Axelson, 2002 24% lung ca
- ▶ Pearce, 2005 23% bladder ca

Methods

- ▶ Find a reasonable model for proportion of cancers caused by occupation
 - Nurminen M, Karjalainen A. Scand J Work Environ Health. 2001;27:161-213.
- ▶ Apply to Australian data

Assumptions

- ▶ List of occupational carcinogens
 - IARC probable and definite carcinogens
- ▶ The relative risk of cancer
 - High quality epidemiological studies in Scandinavia and other Western countries
- ▶ The number of people exposed at work
 - Finnish job-exposure matrix
- ▶ The number of cancers
 - Australian data

Occupationally-related cancers in Australia

- ▶ 5000 cancers each year
- ▶ 11% of incident cancers in males
- ▶ 2% of incident cancers in females

- ▶ PLUS about 34 000 Non-melanoma skin cancer (NMSC)
- ▶ 13% of NMSCs in males
- ▶ 4% of NMSCs in females

Attributable fraction – males

Cancer	Attributable fraction	Predicted number of cases
Mesothelioma	90%	352
Bronchus and lung	29%	1,530
Nasal sinuses	24%	21
Leukaemia	18%	264
Bladder	14%	304
NHL	13%	252
Pancreas	13%	122
Brain	11%	86
Stomach	10%	131

Numbers - males

Cancer	Attributable fraction	Predicted number of cases
Bronchus and lung	29%	1,530
Prostate	6%	630
Mesothelioma	90%	352
Bladder	14%	304
Colon	6%	265
Leukaemia	18%	264
NHL	13%	252
Melanoma	4%	192
Stomach	10%	131
Pancreas	13%	122

Proportion of workers exposed to carcinogens

Methods

- ▶ Find a reasonable model for proportion of workers in each industry exposed to carcinogens
 - Kogevinas M, Kauppinen T, Boffetta P. Estimation of the burden of occupational cancer in Europe. 1998
- ▶ Apply to Australian data

EU estimates

- ▶ IARC Carcinogens definite, probable and some possible.
- ▶ labour force data for 55 industrial classes
- ▶ prevalence of workers exposed to each carcinogen in each industrial class
 - Data from Finland and the United States
- ▶ adjusted for exposure to multiple carcinogens

Australian workers potentially exposed to carcinogens

- ▶ 20% of the workforce
- ▶ 1.5 million workers

Industries with high proportions of workers exposed to carcinogens

- ▶ Forestry and logging
- ▶ Furniture and fixture manufacturing
- ▶ Petroleum and coal products manufacture
- ▶ Other non-metallic mineral products manufacture
- ▶ Pottery, china and earthenware manufacture
- ▶ Fishing
- ▶ Wood and wood products manufacture
- ▶ Air transport
- ▶ Other mining

Assumptions for both calculations

- ▶ Which carcinogens?
- ▶ What is their effect?

Which carcinogens?

Proportion of occupationally-caused cancers using two different assumptions

Cancer site	A1	A2
Oesophagus	3	20
Stomach	4	14
Colon	0	3
Rectum	0	22
Pancreas	0	21
Lung	8	20
Prostate	0	10
Bladder	1	11
Kidney	0	21

Siemiatycki et al, 1995

What is their effect?

- ▶ 14% of lung cancer caused by asbestos
- ▶ 3% of colorectal cancer caused by exposure to welding fumes
- ▶ 2% of melanomas caused by occupational sun exposure

What's happening now

- ▶ Considerable press coverage for this work





What's happening now

- ▶ Considerable press coverage for this work
- ▶ Occupational cancer is now on the agenda for the national Cancer Council and govt organizations
- ▶ Unions taking up the issue more



Your Health & Safety

Rights@Work

Zero Occupational
Cancer Campaign



Key Points

- Occupational related cancer is the biggest workplace killer globally and in Australia
- Yet it has no profile and little government or industry attention
- The real level of risk is deliberately downplayed
- AMWU has joined the global unions Zero Occupational Cancer Campaign this year
- ACTU will make the ZOCC the key union campaign for 2008

What did we learn?

- ▶ Relatively easy to do a quick estimate of the burden of disease
 - Need to make a number of assumptions
 - Will be criticized by peers
 - ?is it inaccurate
- ▶ Good way of raising awareness in the general population, relevant organizations and workers



Rottneet Island with Perth in the background, from Tourism Western Australia
