

# Occupational causes of Cancers of the Trachea, Bronchus and Lung

»» A distillation of best practice reflecting ACC's current position

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- Cancer of the trachea, bronchus and lung is the leading cause of cancer death in New Zealand males and the second leading cause for females.
- As smoking prevalence declines, the relative importance of occupational factors in lung cancer will increase.
- Even using conservative estimates, about 8.5% of lung cancer deaths (i.e. about 122 deaths per annum) in New Zealand, are attributable to exposure to occupational carcinogens.
- Where lung cancer patients have been smokers, it is not valid to assume that their smoking habit is the sole cause of their cancer.
- Where there is a plausible occupational history of exposure to an agent or occupation associated with lung cancer, a claim should be lodged with ACC.

## Introduction

Cancer of the trachea, bronchus and lung is the leading cause of cancer death in New Zealand males (21%) and the second leading cause for females (16.5%)<sup>(1)</sup>. The total number of lung cancer deaths in 2002 was 1471. While the strongest association is with smoking, a significant proportion of lung cancer cases can also be attributed to occupational exposures. As smoking prevalence declines, the relative importance of occupational factors in lung cancer will increase.

## Epidemiology

Smoking plays a role in more than 90% of cases, so trends in lung cancer mortality largely reflect historical smoking patterns. Lung cancer incidence has declined in the last 25 years, although not in both genders. Registrations in males have decreased by 21% since 1995, and increased by 8.4% in females<sup>(2)</sup>. It is also the leading cause of cancer death for Māori, with an incidence over three times than that of non-Māori. Although smoking rates differ by ethnicity and socio-economic status, this does not account for all the differences in incidence evident between these groups.

While the proportion of deaths from cancer in the general population attributable to occupational exposures is relatively small (about 5%)<sup>(3)</sup>, exposure to occupational carcinogens occurs almost exclusively in blue collar workers in forestry, agriculture, mining and manufacturing where the attributable risk is closer to 25%<sup>(4)</sup>. Even using conservative estimates, about 8.5% of lung cancer deaths (i.e. about 122 deaths per annum) in New Zealand are attributable to exposure to well established occupational carcinogens<sup>(5)</sup>.

It is difficult to determine whether an individual case of lung cancer has an occupational cause because of the strong association with smoking, the latency of 20-25 years between first exposure and disease onset, and the lack of any distinguishing histological features. Where a lung cancer patient has been a smoker, however, it is not valid to assume that their smoking is the sole cause of their cancer.

Exposure to asbestos (and other lung carcinogens) increases the risk of lung cancer in both smokers and non-smokers, so it is invalid to dismiss a possible role of an occupational exposure simply because the worker was also a smoker<sup>(6)</sup>.

## Exposures known to cause lung cancer

It has been estimated that 23% of the European Union workforce is currently exposed to one or more agents in their workplace listed by the International Agency for Research on Cancer (IARC) as recognised or probable occupational carcinogens – mostly lung carcinogens<sup>(7)</sup>. Also, while 46 million US citizens are smokers, 20 million US workers are estimated to be exposed to recognised occupational lung carcinogens<sup>(8)</sup>. While the types of industry may differ in New Zealand, it is unlikely that our workplace conditions differ markedly from those in other developed countries.

For IARC Group 1 (or recognised) lung carcinogens see <http://monographs.iarc.fr/>. Other strong associations that have been observed include diesel fume, polycyclic aromatic hydrocarbons and chlorinated toluenes. Specific industries classified as lung carcinogens include aluminium production, coal gasification and coke production, iron and steel foundries and painting in the construction industry<sup>(9)</sup>. New Zealand studies have observed excess risk in meat workers, machine tool operators, sawmillers, welders, pulp and paper mill workers, hospitality industry workers, hairdressers, hunters, and the fishing industry<sup>(10)</sup>. The table opposite denotes New Zealand occupations with most exposures to recognised lung carcinogens.

| Lung carcinogen                                       | Potential exposures  |
|---|--|
| Arsenic   | timber preservation, sheep and cattle dips, horticultural pesticides, glass manufacture and some metal alloys  |
| Asbestos  | plumbers, fitters and ladders, carpenters, builders, clutch and brake repairers, electricians, watersiders, asbestos cement producers, asbestos insulation sprayers and asbestos removal contractors |
| Chromium VI   | timber preservation, chromium plating and welding stainless steel  |
| Coal tars/pitches                                     | coal gasification and coke production, foundries, road paving  |
| Environmental tobacco smoke                           | bars, restaurants  |
| Silica  | sand blasting, mines, quarries, foundries, stone work  |
| Soots   | chimney sweeps, building demolition workers, firefighters, any work involving burning of organic materials   |
| Strong inorganic-acid mists containing sulphuric acid | phosphate acid fertiliser manufacturing  |

## Diagnosis, treatment and management

Potential occupational causes should be considered in all presenting cases of lung cancer, particularly in blue collar workers or those from lower socioeconomic backgrounds who have a work history involving any of the above occupations/exposures. Deciding whether a case has an occupational cause obviously requires the taking of a detailed occupational history.

Where there is a plausible occupational history of exposure to an agent or occupation associated with lung cancer, a claim should be lodged. The merits of the case can then be reviewed by occupational medicine specialists. In order to consider whether or not an occupational factor is likely to be a causal factor for a person's cancer, it must be reasonably established that the occupational exposure was both relevant and sufficient to contribute to the cause of the disease. Such considerations relate to the duration, intensity, and timing of the occupational exposure as well as to epidemiological studies.

## References

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