

Occupational causes of malignant neoplasms of lymphatic and haematopoietic tissue



PREVENTION. CARE. RECOVERY.

Te Kaporeihana Āwhina Hunga Whara

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

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- The aetiology of these disorders is largely unexplained, with only a relatively small proportion of cases able to be attributed to known risk factors.
- Few well established occupational causes are recognised, but numerous strong associations with occupations or specific exposures have been observed.
- It has been estimated that about 10% of cases of both leukaemia and non-Hodgkin's lymphoma (NHL) are directly attributable to occupational exposures.
- Potential occupational causes should be considered in all presenting adult cases of these diseases, and detailed occupational histories should be taken.



Introduction

The aetiology of malignant neoplasms of lymphatic and haematopoietic tissue is largely unexplained, with only a relatively small proportion of cases attributable to known hereditary or environmental risk factors⁽¹⁻³⁾. Few well established occupational causes are recognised, but numerous strong associations with occupations or specific exposures have been observed. It has been estimated that up to 10% of incident cases of both leukaemia and non-Hodgkin's lymphoma (NHL) are directly attributable to occupational exposures^(4, 5).

Epidemiology

There are about 1700 incident cases of Hodgkin's disease (HD), NHL, multiple myeloma (MM) and leukaemia registered in New Zealand each year, accounting for almost 10% of all cancer registrations⁽⁶⁾. Both NHL and leukaemia are considerably more common in developed countries, with New Zealand's age-adjusted rates amongst the highest in the world. In New Zealand the age-adjusted incidence of leukaemia in males (15.5/100,000) is higher than that in females (10.2/100,000), with the incidence in both genders increasing by more than 30% since 1995. The incidence of NHL has risen dramatically in recent decades in Western Europe, North America and Australasia, with changes in disease classification schemes and diagnostic practices, and increases in immunosuppressive conditions induced by the HIV virus. These changes are thought to contribute to an increase in incidence, but this explains only a part of the increase. It is thought that chemical and physical environmental exposures, particularly in the workplace, may have a role in the increasing incidence⁽²⁾.

The table below lists occupations and exposures implicated as potential causes.

Exposures	Disease types	Industries and occupations
Ionising radiation	Leukaemia NHL	Radiologists, nuclear industry.
Benzene	Leukaemia	Petrochemical industry, motor mechanics, rubber industry, plastics industry, shoe and leather workers.
Organic solvents	Leukaemia NHL MM	Rubber industry, plastic industry, drycleaners and laundry workers, printers, aircraft maintenance workers, painters, metal workers and toolmakers, welders, petrochemical workers.
Electromagnetic fields	Leukaemia	Welders/flare cutters, solderers, electrical utility workers, electricians, telephone line workers, radio/television repairers.
Agricultural work	Leukaemia NHL HD MM	Any work involving exposure to livestock, pesticides, slaughter of animals.
Infectious agents	Leukaemia NHL HD	Meat workers, child care workers and teachers, farmers, health care workers.
Pesticides	NHL Leukaemia	Farming, horticulture, nursery workers, orchard workers.
Phenoxy herbicides	NHL	Phenoxy herbicide production and spraying.
Ethylene oxide	Leukaemia	Hospital and health care workers.
Antineoplastic drugs	Leukaemia	Hospital and health care workers.
Wood or wood products	HD NHL	Timber processors, wood workers.

Although numerous epidemiological studies have investigated risk factors for these disorders, and many associations with occupational exposures have been observed, the results have been inconsistent. The inability to identify occupational causes is probably due to the difficulties inherent in studying relatively rare cancers with such histological diversity and long latency periods. Many studies fail to differentiate between subtypes, with many simply combining all lymphohaematopoietic cancers because of small sample sizes, and this may obscure relationships between specific exposures and disease entities⁽⁷⁾.

Diagnosis, treatment and management

As with most diseases of occupational origin, the diagnosis, treatment and management of haematological cancers are no different from those with other causes. The one key difference is that all occupational diseases can be prevented, provided that exposure to causal agents is identified and controlled. The recognition and notification of cases of occupational disease helps prevent exposure of other workers.

Given the estimates of risk attributable to occupational exposures, it is likely that between 60 and 70 incident cases of leukaemia and NHL per annum are due to work. It has also been estimated that each year in New Zealand 28 deaths from NHL and 30 from leukaemia are attributable to occupational exposures⁽⁵⁾. Unless providers ask questions about occupational exposure when presented with this group of malignancies, the number of claims that are submitted and those that may then warrant entitlements will be small. ACC has received approximately 11 cases since 1998, which highlights the possible extent of under-diagnosis of the occupational origins of these diseases.

Potential occupational causes should be considered in all presenting adult cases of these diseases, and detailed occupational histories should be taken to determine whether there has been plausible exposure to an agent or occupation associated with the diseases. If this is the case, a claim should be lodged with ACC and the relevance of the exposure can then be reviewed by occupational medicine specialists.

References

1. Zeeb H & Blettner M. Adult leukaemia: what is the role of currently known risk factors? *Radiat Environ Biophys* 1998; 36: 217-218.
2. Descatha A, Jenabian A, Conso F, et al. Occupational exposures and haematological malignancies: overview on human recent data. *Cancer Causes and Control* 2005; 16: 939-953.
3. Boffetta P & de Vocht F. Occupation and the Risk of Non-Hodgkins Lymphoma. *Cancer Epidemiol Biomarkers Prev* 2007; 16(3): 369-372.
4. Doll R, Peto R. The causes of cancer: quantitative estimates of avoidable risks of cancer in the & United States today. *J Natl Cancer Inst* 1981; 66: 1191-1308.
5. t' Mannetje A & Pearce N. Quantitative estimates of work-related death, disease and injury in New Zealand. *Scand J Work Environ Health* 2005; 31(4): 266-276.
6. Ministry of Health. 2006. Cancer: New registrations and deaths 2002. New Zealand Health Information Service.
7. Stewart B W & Kleihues P (eds): *World Cancer Report*. IARC Press. Lyon 2003.