

Occupational Medicine Clinical Update

Dedicated to the prevention of occupational illness and injuries, and promoting the well-being of all workers

Occupational Health Clinics for Ontario Workers Inc, Samia-Lambton

Lymphoma – The global ‘epidemic’ continues

This Issue:

- The Global “epidemic” in NHL
- Low-Potency Risk Factors
- Occupation and NHL
- Next Month: Lymphoma II



“Something has changed in the world...”

- Patricia Hartge, NCI.

In 1991, a conference was convened by the U.S. National Cancer Institute (NCI) regarding the etiologic factors behind the “emerging epidemic” of non-Hodgkin’s lymphoma (NHL). Over ten years later, the mystery persists and rates continue to climb worldwide.

NHL is the fifth most common cancer in North America. It also runs a close second (to malignant melanoma) for being the most rapidly increasing cause of cancer.

Since 1950, the age-adjusted incidence of NHL has continued to climb at a rate of roughly 4% per year. Between 1973 and 1997, incidence grew in the U.S. by 81% [Garber, 2001]. Sheila Zahm, Sc.D, a deputy director of the NCI calls it, “... a phenomenal increase compared to most other cancers.”

A wide range of factors have been impli-

cated. Immunosuppression (familial and acquired), infectious agents (EBV, HIV, H. Pylori), radiation, medical conditions, hair dyes, occupational exposures (see below) and others have been shown to have varying impacts. Smoking, surprisingly, has not been shown to have much, if any, impact on NHL. Studies on diet have been similarly inconsistent and shown only weak effects [Baris and Zahm, 2000].

Some of the strongest associations are in AIDS patients, and other immunosuppressed individuals, yet these factors have not been able to explain the worldwide increase in rates. There is uncertainty about what is causing the ‘epidemic’ but there is no doubt that something significant is at play. As the deputy director of the NCI’s Epidemiology and Statistics Program, Patricia Hartge, Sc.D, stated, “Something has changed in the world to lead to the huge, huge increase in lymphoma in the general population. I’m pretty mystified” [Garber, 2001].

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Occupation and Lymphoma: Common Associations

There have been approximately 140 published epidemiological studies on the role of occupation, environment, and specific chemical and physical exposures and NHL.

The table to the right is a brief summary of the broad classes of occupations and exposures that have been more strongly and consistently associated with NHL. There are many others that have been noted (e.g. aircraft maintenance workers, rubber workers, chemists, embalmers, dry cleaners) and seem to share in common, exposures to organic solvents.

References available upon request.

Occupation	Exposures
Agricultural workers (farmers, pesticide applicators/manufacturing workers)	Pesticides (phenoxy herbicides, organochloride and organophosphate pesticides, fungicides, lead arsenate), possibly zoonotic viruses
Firefighters	Products of combustion (benzene, etc.) Chemical releases
Forestry, pulp and paper workers, lumber yard workers and carpenters	Pesticides, wood preservatives (chlorophenols), solvents, wood dust
Hairdressers	Hair dyes
Metal Workers	Metals, metal fumes, metal cutting fluids, solvents
Petrochemical Workers	Solvents (benzene, styrene, trichloroethylene, perchloroethylene, vinyl chloride, others)
Textile workers	Solvents
Welders	Welding fumes, solvents

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(“Epidemic” continued from page 1)

Currently, research to explain the global increase centres around theories of immune stimulation and depression. As Dennis Weisenberger, M.D., a pathologist and lymphoma researcher at the University of Nebraska states, “There could be agents in the environment that are causing some sort of subtle immune deficiency and when you expose the whole population to it you see an increase in cancers that’s fairly significant” [Garber, 2001].

Low-Potency Risk Factors

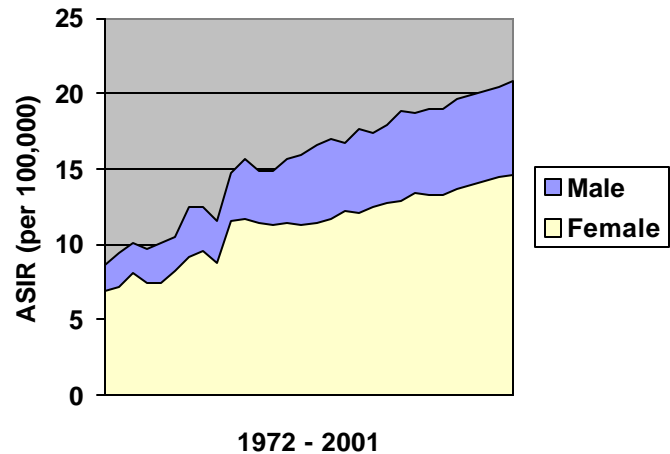
There is discussion in lymphoma research circles of ‘low-potency risk factors’. These are factors which could increase risk up to two-fold but because of the relatively weak effect, barely register with methods available in current epidemiologic studies. Yet if almost everyone was exposed, the number of cases would double. This doubling is what has happened with NHL in the last 30 years, and Canada, unfortunately, is a good example. Data showing this trend from the National Cancer Institute of Canada is graphed above.

In November 2001 [Bray et al] the International Agency for Research on Cancer (IARC) published data from nine high-quality cancer registries around the world, to predict where global NHL rates may be going. They concluded that in all regions (with the exception of males in Osaka, Japan) rates will continue to increase. They predict, over a 15 year period to 2007, average rates will increase 55% in men and 79% in women.

The conclusion of the IARC study was that this widespread increase is “...likely to be due to one or more exposures with a wide and increasing distribution.” In their conclusions they implicated increasing exposure to “...possible

The widespread increase in lymphoma is likely due to one or more exposures with a wide and increasing distribution
— IARC

Canadian Age-Standardized Incidence Rates (ASIR) for NHL



immunostimulatory agents such as solvents and pesticides.” (You may recall solvents and pesticides were the subjects of our last two newsletters).

Interestingly, the proliferation and widespread use of pesticides began in the mid-1940s. This has led to speculation from a temporal standpoint, that certain pesticides may have an important role in the current epidemic of NHL [Weisenberger, 1994]. Two current studies in the U.S. are looking more closely at pesticides and solvents, as well as other factors.

The ‘epidemic’ in lymphoma continues unabated in 2002 while the science of epidemiology struggles with a lack of tools to find a certain cause. In a sense, the outcome will be a bit like a race - a race between the incidence curve of lymphoma and the learning curve of epidemiology.

References

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Future Issues:

- Causality—Proving Associations
- Epidemiology in Crisis
- Parkinson’s Disease and Occupation/Environment
- Next Month: Case Studies in Lymphoma