

NATIONAL ASBESTOS REGISTERS

Annual Report 1995-96



DEPARTMENT OF
L|A|B|O|U|R
TE TARI MAHI

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SUMMARY

This report reviews notifications made to the National Asbestos Medical Panel for the period March 1992 - October 1996. A total of 535 cases were reviewed, which included:

- 90 cases of mesothelioma
- 47 cases of lung cancer
- 112 cases of asbestosis
- 286 cases of pleural abnormalities

Once again it is noted that the number of lung cancer cases is relatively small compared with mesothelioma cases. This suggests that lung cancer history taking is dominated by the smoking factor and occupation — whether that of the asbestos-exposed worker, the welder, or the timber treatment worker — is ignored.

The transfer of asbestos from the workplace to the home is another emerging feature of asbestos-related disease in New Zealand. Family members are presenting with pleural changes or, rarely and tragically, mesothelioma.

In 1996 Registrar, Nicola Holden spent 8 weeks at McGill University in Montreal, completing a postgraduate programme in epidemiology. This provided her with the opportunity to meet with epidemiologists and other experts in the field of occupational health. It will also allow her to develop research protocols based around the asbestos registers, in consultation with recognised international authorities in this area.

The first research paper to emerge from the registers will be published during 1997. This paper asks the question:

Is exposure to asbestos dust in the New Zealand context an independent cause of respiratory symptoms (cough, phlegm, shortness of breath, and wheeze), taking into account other relevant factors such as age and smoking?

The paper was based on 2,257 of the 13,000 self-referred individuals on the exposure register, a group that included carpenters and builders.

BACKGROUND TO THE REGISTERS

The National Asbestos Registers were established in March 1992 in line with the recommendations made to the Minister of Labour, by the Asbestos Advisory Committee.

Formation of the Asbestos Advisory Committee

The Asbestos Advisory Committee was established in October 1990 as an ad hoc body to report to the Minister of Labour on issues relating to the health effects and use of asbestos in New Zealand, adequacy of controls and legislation, and clarification of the legal entitlements available for affected workers. This followed increasing public concern about the past and present effects of asbestos on workers, former workers and their families.

Establishment of the National Asbestos Registers

Recommendation 4 of the Report of the Asbestos Advisory Committee⁴ to the Minister of Labour advised:

That an asbestos medical register be established for people who have been significantly exposed to asbestos. OSH should be the organisation responsible for establishing, maintaining and funding the medical register.

The medical register should be in two parts:

Part 1 - Those notified as having been exposed to asbestos;

Part 2 - Those notified as having an asbestos-related disease.

The system should allow movement of the name of a registered person from part 1 to part 2 of the register when indicated.

Notifications to part 1 of the medical register were to be made by those who felt that they had been exposed to asbestos, or by people acting on their behalf (and following consultation) such as an employer, union official, relative or friend.

Notification to part 2 of the medical register would be done by medical practitioners.

A Notifiable Occupational Disease System (NODS) was established in 1992 and asbestos registers have been incorporated in that scheme. This was in accordance with recommendation 5 of the Asbestos Advisory Committee.

THE ASBESTOS EXPOSURE REGISTER

The Occupational Safety and Health Service of the Department of Labour (OSH), in association with Electricorp Production, undertook an extensive advertising campaign in March and April 1992. Advertisements were published in all of the major newspapers, and several trade magazines.

The interest generated as a result of this campaign has ensured a high response rate for the exposure register. Notifications have been made by individuals, trade unions, occupational health nurses, doctors, the Asbestos Diseases Association of New Zealand and by some larger companies.

Notifications are directed either to branch offices of OSH or directly to the Registrar.

In recommendation 4, the committee had envisaged that people wishing to be recorded on the asbestos exposure register would have their exposure assessed at an OSH branch. Only those people who were judged as having had “significant exposure” would then be recorded on this register. However, the huge response from those individuals who had been exposed made it impractical to screen registrants in this fashion.

Once a person has notified OSH that they have been exposed to asbestos, an asbestos exposure registration form is sent. The registration form collects information about the individual, their work exposure to asbestos and the state of their respiratory health.

When the form has been completed and returned to the Registrar the details are recorded on a database. The individual is then sent a copy of a special edition of OSH's magazine *Safeguard*, which is dedicated to asbestos and its associated health problems. If the person indicates that they have a family doctor, the doctor is informed that their patient has been included on the asbestos exposure register, and is sent a copy of OSH's booklet *Asbestos Exposure and Disease: Notes for Medical Practitioners*.

The register provides a database of the numbers of people exposed to asbestos through their occupation in New Zealand. OSH is providing information to the people recorded on this register and to their doctors. Through the operation of this register OSH is hoping to raise the awareness of the possible health effects of asbestos exposure among the general public and the medical profession.

THE DISEASE REGISTER

A register for those people notified to OSH as having an asbestos-related disease was also established and is operated under the auspices of the National Asbestos Medical Panel.

The establishment of both this register and the panel has been carried out in accordance with recommendations 4, 5, 6 and 7 of the Asbestos Advisory Committee's Report to the Minister of Labour.

Tenders for the National Asbestos Medical Panel were called for in 1991. A tender was accepted on 31 October 1991. The successful tender came from the group listed below:

- W. Glass MBChB DIH FFOM FAFOM (Convenor)
- R. Armstrong MBChB (Hons) FRCP FRACP
- *R. Beasley MBChB FRACP DM
- *J. Crane MBBS FRACP
- D. Jones MBBS MRCP FRACP
- N. Pearce BSc PhD (Epidemiology)

*Dr Beasley retired upon his appointment as Professor of Medicine at the Wellington Clinical School. Dr Crane joined the National Occupational Asthma Panel. The first meeting of the panel was held in February 1992.

Professor Glass was nominated as the panel's convenor.

The following members were appointed to the National Asbestos Radiological Panel:

- Dr Paul White
- Dr George Foote
- *Dr Graeme Anderson

*Dr Anderson has since retired.

The National Asbestos Medical Panel is responsible for verifying all cases of asbestos-related disease. Once a case has been verified by the panel the personal and medical details of the individual are recorded on a database.

All personal information is stored under conditions of strict confidentiality.

Processes for registering people

Notifications for the register come from two major sources. The first is from doctors whose patients have been diagnosed, or are suspected of having, an asbestos-related disease. The second source of notification is from the individuals themselves.

As this register has been included as part of the Notifiable Occupational Disease System, most of the notifications from doctors have come on the NODS cards which have been distributed to doctors and occupational health nurses by OSH. Other notifications from doctors have come in the form of letters.

Once a notification has been made to the Registrar, and consent has been gained from the person concerned, relevant medical records and a full occupational history are obtained.

Over the three years since the register began it has already become clear that it is serving many of the functions predicted. It has raised the awareness of asbestos-related diseases among patients and the health professionals. It has improved the diagnosis of asbestos-related disease at all levels of professional speciality. There has developed a growing awareness by general practitioners, in particular, of work as an important determinant of disease. The result has been an upsurge in voluntary notifications of occupationally-related diseases generally to the National Registration Centre at the Occupational Safety and Health Service of the Department of Labour (OSH).

Data collection

The data collected includes a medical history, an occupational history, chest x-ray, CT scan where available, lung function tests, and pathology reports. The procedure is as follows.

On notification being received by the registrar:

- (a) An occupational health nurse visits the patient and carries out a health interview, a detailed occupational and social (including smoking) history.
- (b) Relevant medical reports are obtained from general practitioners and physicians.
- (c) A recent PA chest x-ray is obtained, and in all cases is read by a radiologist according to ILO (1980) guidelines. CTs are used where available, and on occasions requested.
- (d) Lung function data is obtained from physicians' reports or requested from respiratory laboratories. Where this is not possible, results are obtained from a test carried out by an occupational health nurse, using a portable spirometer.
- (e) Pathology and post mortem reports are reviewed where available.

Data assessment

The National Asbestos Medical Panel reviews the information obtained, calculates an exposure index (see below) and correlates the medical data.

(a) Exposure index

An exposure index (D) is calculated from the product of years of asbestos **exposure** (A); **intensity** of exposure (according to job category), using a 1-5 grading (B); and **frequency** of exposure, using a 1-3 grading (C).

Guidelines for calculating this index are shown below.

A = Total years of exposure in any one job.

B = Job category as follows:

Mining, milling and processing = 5

Boiler/lagging, rail carriages, shipyard, spraying insulation = 4

Asbestos cement products, construction, demolition, removal = 3

Electrical, friction products = 2

Loading, driving, environmental = 1

C = Degree of exposure (unprotected):

Continuous (>50% of work) = 5

Intermittent (20-50% of work) = 2

Minimal (<20% or occasional) = 1

D = A x B x C for each job

Exposure index = sum of all Ds

(b) Medical data

Relevant respiratory symptoms and signs are noted from the medical histories, and lung function data is classified into restrictive, obstructive, mixed or normal. Pathology reports are used to confirm mesotheliomas and classify lung cancers.

Classification of diagnostic categories

On the basis of the foregoing, the cases are placed into a primary diagnostic category of:

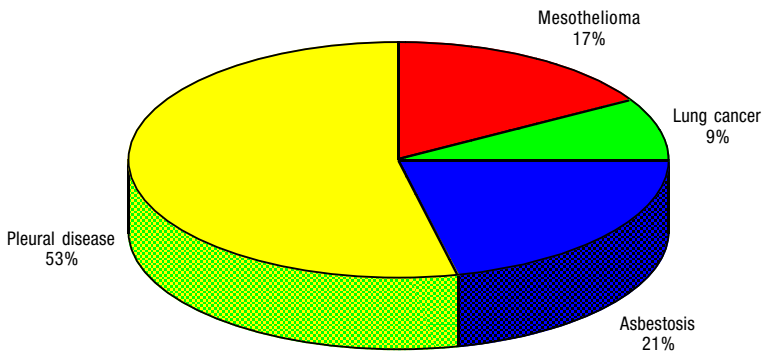
- Mesothelioma
- Lung cancer
- Asbestosis
- Pleural abnormalities (plaques, diffuse bilateral pleural thickening and effusions).
- Other cancers
- Obstructive lung disease without x-ray changes.

SUMMARY OF REGISTRATIONS

The following summary is based on the 535 cases reviewed over the period March 1992 to October 1996, and included 90 cases of mesothelioma, 47 cases of lung cancer, 112 cases of asbestosis, and 286 cases of pleural abnormalities.

This report contains a review of the four main diagnostic categories: mesothelioma, lung cancer, asbestosis and pleural disease.

Figure 1: Asbestos-related disease reviewed and confirmed by panel 1992-96

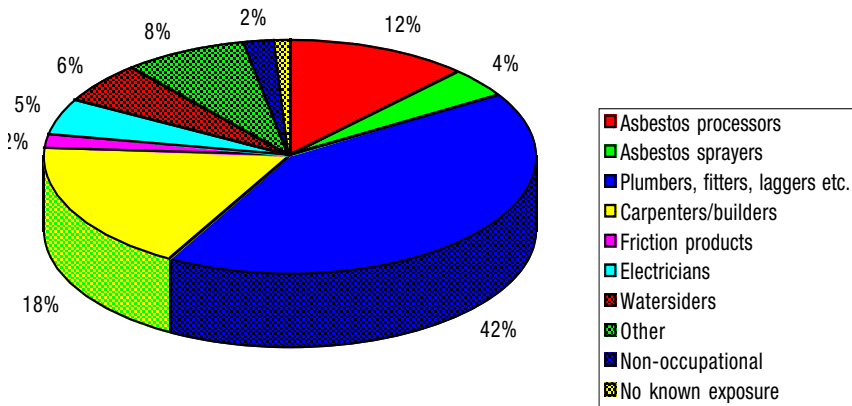


Occupation

Figure 2 looks at occupation for the four diagnostic categories discussed. It is clear that carpenters, plumbers, etc. are together responsible for more than 60% of all cases. These “all purpose” construction workers are an occupational category at risk, and particularly so because, unlike asbestos-cement workers, they are not always seen as an obvious risk group.

The non-occupational category refers to cases where an individual's exposure was not work-related. This includes all cases resulting from secondary or environmental exposure. The “no known exposure” category refers to mesothelioma cases where conclusive exposure histories have not been available.

Figure 2: Occupations — all disease categories

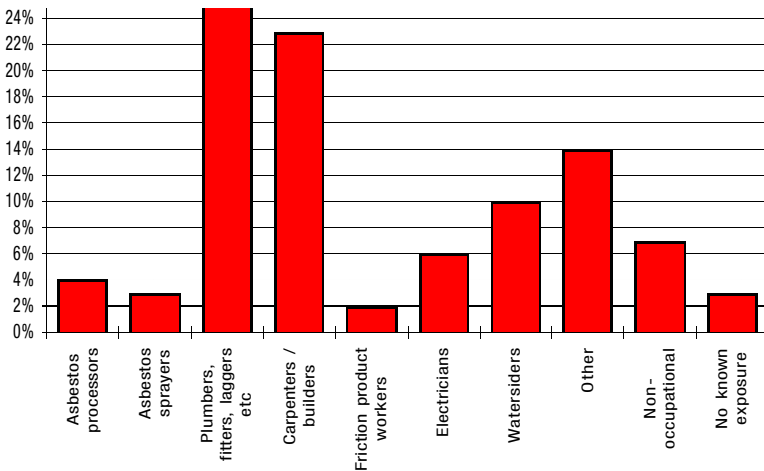


Mesothelioma

90 cases were reviewed, 87 being Caucasian, 2 Maori and 1 other. 81 males and 9 females. The mean age at diagnosis was 63 years (range 35-89). The mean years since first exposure was 42 (range 12-74). The mean exposure index was 152 (range 8 - 780).

The occupational classification is shown in figure 3.

Figure 3: Occupations — mesothelioma



There were 9 current smokers, 49 ex-smokers and 22 non-smokers (information was not available for 10 cases).

The three categories: Asbestos processors, plumbers/fitters/laggers, and carpenters/builders, comprised 60% of all registered cases.

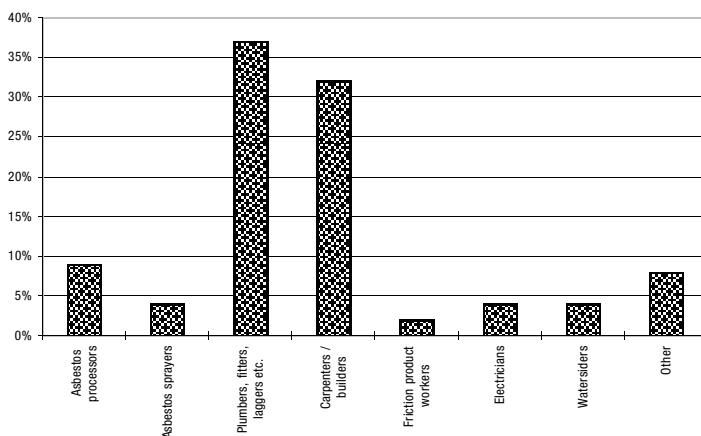
It has been noted² that an asbestos exposure history may be lacking with mesothelioma cases. Our experience suggests that with patience and a recognition of the range of likely exposures, it is often possible to obtain evidence of asbestos exposure. In one case the disease developed in a middle-aged woman living in a small rural town. It was revealed that as a teenage girl she had washed the clothes of her older brother who was an apprentice in a railway workshop. Asbestos lagging was used in the repair and maintenance of the boilers, and apprentices frequently had “snowball fights” with the asbestos.

Lung cancer

47 cases were reviewed, 43 being Caucasian, 2 Maori, 1 Pacific Islander, and 1 other. 45 were males, 2 females. The mean age at diagnosis was 64 (range 42-76), the mean years since first exposure was 39 (range 17-62). The mean exposure index was 163 (range 13-565).

Occupational classification is shown in figure 4.

Figure 4: Occupations — lung cancer



There were 11 current smokers, 33 ex-smokers, 1 non-smoker, and 2 unknown.

Radiological changes showed 2 with parenchymal changes, 9 with pleural plaques alone, 3 with diffuse pleural thickening alone and 2 with pleural plaques and thickening.

Histological classification revealed 24 squamous cell, 14 adeno, 4 oat cell, 2 undifferentiated, 1 bronchiolo-alveolar, 1 large cell, 1 not stated.

Tumour site was as follows: 22 upper lobe (12 squamous, 4 adeno, 3 oat, 1 large cell and 2 undifferentiated), 14 lower lobe (5 squamous, 8 adeno, 1 oat), 5 middle lobe (all squamous), and 6 not stated.

That we have registered twice as many mesothelioma cases as lung cancer illustrates how doctors probably, by and large, overlook the association between lung cancer and occupational exposure. Cigarette smoking is the persistent confounder in lung cancer cases occurring in asbestos exposed workers.

Hyers³, in a review of the areas of controversy in asbestos-related diseases noted that for non-asbestos workers who smoke, the risk of lung cancer returns to that of a never smoking individual in approximately 15 years after smoking cessation and “it is widely accepted that this slow regression of risk also holds in asbestos-exposed individuals who stop smoking”.

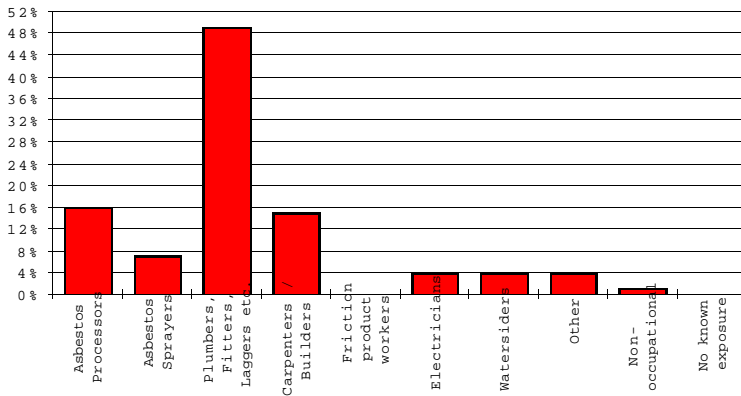
A number of issues of concern exist in recognising lung cancer as asbestos-related. Some authorities require the concurrent presence of asbestosis visible on radiography, while others require either radiological asbestosis or microscopic evidence of fibrosis. With the public health nature of this register neither of these viewpoints have been accepted. All cases of lung cancer occurring to asbestos exposed workers have been included.

Asbestosis

112 cases were reviewed, 111 were Caucasian and there was 1 Pacific Islander, 110 were males. The mean age at diagnosis was 61 (range 40-85), the mean years since first exposure was 39 (range 15-71). The mean exposure index was 199 (range 14-720).

Occupational classifications are shown in figure 5.

Figure 5: Occupations — asbestosis



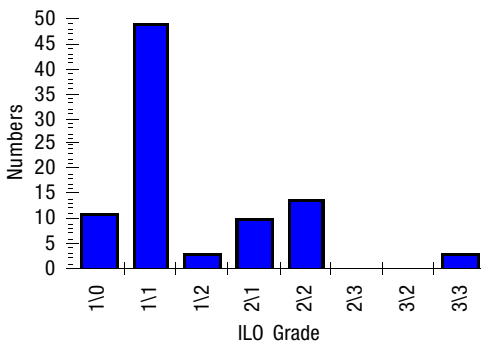
There were 13 current smokers, 76 ex-smokers and 21 non-smokers. (Accurate smoking histories were not available in 2 cases.)

Radiological changes showed 69 with pleural plaques, 14 with pleural thickening and 22 with both.

Of the 112 asbestosis cases, 90 were categorised by ILO classification, others were categorised on the basis of CT, HRCT or pathology where available.

The profusion score for the 90 cases so graded is shown in figure 6 below.

Figure 6: ILO grading of asbestosis cases (n=70)



An important issue with this disease is “What criteria constitute a diagnosis of asbestosis?”. This issue is dealt with in some detail in appendix B. The main point of discussion is the difference between a clinical diagnosis of asbestosis and a diagnosis

suitable for use in a national database where the inclusion of patients with early disease is desirable.

The definition of JC Gilson⁴ in his review of asbestos-related lung conditions in the ILO encyclopaedia has been chosen by the panel for the reason stated above and is as follows.

- (a) A history of significant exposure to asbestos dust rarely starting less than 10 years before examination;
- (b) Radiological features consistent with basal fibrosis (1/0 and over, ILO 1980);
- (c) Characteristic bilateral crepitations;
- (d) Lung function changes consistent with at least some features of the restrictive syndrome.

Gilson notes that not all criteria need to be met in all cases but that (a) is essential, (b) should be given greater weight than (c) or (d). However, occasionally (c) may be the sole sign. Further he notes that although the restrictive syndrome is the commonest pattern (about 40%), in about 10% of cases airway obstruction is the main feature and in the remainder a mixed pattern is seen. This is thought to be largely due to the confounding effects of cigarette smoking.

In the 113 asbestosis cases:

- All had a significant exposure history with a mean exposure index of 194 (range 40-720).
- Mean latency was 39 years, with a range of 15-71 years.
- All cases were classified as ILO 1/0 or greater by the panel's radiological consultant. (The majority being 1/1 or greater.)
- Detailed clinical examination results were not always available from the records, thus the presence of crackles was not measurable.

Lung function changes are recorded in the register based on the availability of data either from respiratory laboratories, respiratory physicians, or occupational health nurses.

The numbers in our report are small but confirm that the classical restrictive picture does not dominate, with obstructive, mixed, and normal patterns all occurring.

Pleural abnormality

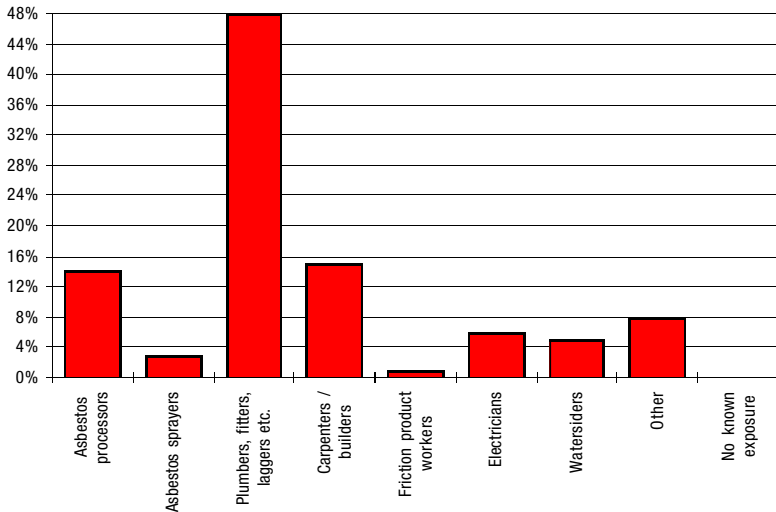
This category includes pleural plaques, diffuse pleural thickening, chronic fibrosing

pleuritis and pleural effusions. It does not include pleural disease occurring together with mesothelioma, lung cancer or asbestosis.

286 cases were reviewed. 277 were Caucasian, 5 Maori, and 4 Pacific Island. All but 1 were males. The mean exposure index was 174, with a range of 6 - 704. Occupational classifications are shown in figure 7.

There were 28 smokers, 169 ex-smokers and 78 non-smokers. (Accurate smoking histories were not available in 7 cases.)

Figure 7: Occupations — pleural abnormalities



Appendix A: Case studies involving the transfer of workplace asbestos to the home

The following cases illustrate this form of childhood exposure.

Case 1

Female aged 52 who as a young girl helped her mother by washing her father's work overalls. Her father was employed in an asbestos-cement manufacturing plant.

Some three years ago she developed marked shortness of breath. Investigation revealed some mild gas trapping RV/TLV 45% (predicted less than 35%), normal diffusing capacity.

Chest x-ray and CT showed pleural plaques, some with calcification on the lateral chest wall and diaphragm bilaterally, fine interstitial shadowing in the mid and lower zones bilaterally, suggesting interstitial fibrosis. ILO code, s/s, 1/1 RL mid and lower zones calcified plaques RL a2 chest wall and diaphragm. She had also smoked since the age of 20, 60 cigarettes a day for 26 years.

Case 2

Female aged 43, who as a young girl lived in a house where her father and older brother worked in an asbestos-cement manufacturing plant.

She presented with increasing shortness of breath associated with a right pleural effusion which on investigation was confirmed as a mesothelioma.

Case 3

Female aged 42, who as a young girl lived in a house where her father worked in an asbestos-cement manufacturing plant.

In the course of a routine surveillance programme, a chest x-ray revealed calcified pleural plaques on both hemidiaphragms and on the chest wall. The radiologist noted "I don't think I have ever seen such extensive calcified pleural plaque formation in a female patient before." Her father had been diagnosed as suffering from asbestosis.

Commentary

These examples of "secondary" cases arising from the transfer of the work hazard to the home will continue to occur as an ongoing legacy of asbestos exposure in the 1940s through to the late 1970s.

Appendix B: Criteria for the diagnosis of asbestosis

An important issue with this disease is “What criteria constitute a diagnosis of asbestosis?” Hyers³ points out at one extreme it includes:-

1. An exposure history;
2. Latency;
3. Interstitial changes (ILO 1/1 at least together with pleural changes);
4. Restrictive lung function changes;
5. Reduced diffusion capacity;
6. Crackles on auscultation.

As Hyers again notes “this constellation of details defines only a small sub-group with far advanced asbestosis and excludes the great majority of affected individuals with early or milder disease” .

Browne⁶ puts forward the following criteria for the diagnosis of clinical asbestosis in a live subject. In general such a diagnosis requires:

- I. An adequate history of exposure to asbestos.
- II. Symptoms of effort dyspnoea together with appropriate abnormalities in at least two of the following ;
- III. Abnormal physical signs (persistent bilateral basal late-inspiratory crackles of high to medium frequency which occur early in the evolution of the disease);
- IV. Abnormalities of lung function (significant reduction in TLC, VC, FVC, TLCO., with or without slightly increased RV);
- V. Radiographic abnormalities.

These two approaches are not entirely incompatible but indicate Browne’s emphasis on clinical asbestosis as against Hyers view of the natural history of the disease.

Appendix B: Members of the National Asbestos Medical Panel

W. Glass MBChB, DPH, DIH, FFOM, FAFOM, FAFOM(Hon.), FFOM(I) (Convenor)

R. Armstrong MBChB (Hons), FRCP, FRACP

D. Jones MBBS, MRCP (UK), FRACP

*T. Christmas MD, FRACP

N. Pearce BSc, PhD (Epidemiology)

D. Fishwick MD, MRCP

* Resigned August 1996.

OSH publications on asbestos

Asbestos Exposure and Disease: Notes for medical practitioners. Booklet, 1995

Audit of Floor Sanders and Work Practices Involving Asbestos-backed Vinyl Sheeting in the Christchurch Area. Occasional Paper Series No. 4, 1992

A Deadly Dust: 50 years of asbestos use in New Zealand. Reprint from *Safeguard* magazine, December 1991.

Guidelines for the Management and Removal of Asbestos. Booklet, 1995

Safe Work on Asbestos-based Floor Coverings. Leaflet, 1991

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² Lanphear B. P, Buncher C.R. Latent period for malignant mesothelioma of occupational origin. *J O M*, 34, pp 718-21.

³ Hyers P.M, Ohar J. M, Crim C. Clinical controversies in asbestos-induced lung diseases. *Seminars in Diagnostic Pathology*, pp 97-101.

⁴ Gilson J.C. Asbestosis. *Encyclopedia of Occupational Health and Safety*, 1983. 3rd edition, vol 1, pp 187-191.

⁶ Browne K. *Asbestos-related Disorders, Occupational Lung Disorders.* W Raymond Parkes, 3rd edition, 1994, pp 438-439.