Department of Labour
TE TARI MAHI

Report on the Notifiable Occupational Disease System

July 2000 to June 2005

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CONTENTS

WHAT IS THE NOTIFIABLE OCCUPATIONAL DISEASE SYSTEM?

The Notifiable Occupational Disease System (NODS), was established in March 1992, it is a voluntary system, whereby occupational physicians, specialists, general practitioners, occupational health nurses, health professionals, and individuals can notify a health-related condition suspected to have arisen from work.

WHY HAVE A DISEASE NOTIFICATION SYSTEM?

The Notifiable Occupational Disease System has several objectives:

- It enables the Department of Labour to become aware of work-related health problems. In this way the sick worker acts as an indicator of a sick workplace.
- At the national level, it assists the Department of Labour to plan and implement health promotional and intervention strategies.
- Also at the national level it allows the Department of Labour to monitor trends in occupational disease patterns. In time, this will permit an evaluation of the effectiveness of promotional and intervention strategies.
- It raises awareness among health professionals about an individual's occupation being an important determinant of disease.
- It assists workers and managers to recognise more clearly harmful or dangerous work situations or work practices.
- It provides a database for the development of applied research.

HOW DOES THE NOTIFIABLE OCCUPATIONAL DISEASE SYSTEM WORK?

The Notifiable Occupational Disease System process involves the following four stages:

- Notification of a possible work-related condition.
- Assessment and/or investigation of the individual worker, their work and their workplace by the Department of Labour.
- Verification of the notification by departmental medical practitioners, who can request further assistance from specialist medical panels.
- Entry of the confirmed cases on the national database; WORKBENCH.

Notification

A notification comes either to the Notifiable Occupational Disease System registrar or directly to a Department of Labour branch office on a standard notification form. If it is received by the Notifiable Occupational Disease System registrar, it is forwarded to the local branch office. When the Notifiable Occupational Disease System notification form reaches the branch office, an assessment of the case is made and, if appropriate, an investigation is initiated.

The Department of Labour recognises that general practitioners are increasingly inundated with paper work. In order to minimise the workload, the notification card has been designed so practice nurses can enter the individual's personal information and the doctor simply records the diagnosis.

Investigation

A team approach to the investigation of occupational disease, and the consequent intervention in the workplace, is now practical because the Department of Labour is the primary authority responsible for health and safety at work. Investigating teams may include: a departmental medical practitioner, an occupational health nurse, an industrial

hygienist, an accident prevention consultant and health and safety inspectors.

An occupational health nurse, who could be assisted by the industrial hygienist or one of the inspectors, usually carries out the first stage in an investigation. This first stage may involve the individual notifier filling out a standard questionnaire form with the help of the occupational health nurse, monitoring of the workplace, and visiting the workplace. Once the investigatory process has been completed (and on occasions this may require other medical specialist inputs), the details are referred to the departmental medical practitioner.

Verification

The Department of Labour medical practitioner verifies the notification, and this is entered on the branch office database. If, on completion of the investigation, the Department of Labour medical practitioner still has some concerns about diagnosis or causation, specialist panels have been established to which the case can be referred. Verification is carried out to ensure that, as far as possible, only cases with well-established causation are included in the database. This means that the database will contain good quality material for research and statistical purposes. Where a case is not accepted it will usually mean that another cause has been established. There will always be borderline cases where there is some doubt. Such cases, even if not accepted, will still have the benefit of workplace inspections and workplace improvements where necessary. A decision not to accept a case does not imply rejection of an individual's claim for accident compensation, which has different criteria for acceptance.

Information recorded regarding an individual's case is stored under strict confidentiality.

Intervention

It is important to emphasise that the notification is an indicator of a workplace hazard. A 'sick' worker alerts the Department of Labour to the existence of a 'sick' workplace. Intervention with effect must be the ultimate end point of the process of notification in order to prevent

other workers from suffering the same consequences resulting from these work circumstances.

Specialist panels

The Department of Labour has several specialist panels to review notifications. These panels comprise medical and non-medical specialists, and include Department and non-Department members. The panels are the chemical, solvent, asbestos and occupational respiratory diseases, and cancer panels.

CHANGES TO THE NOTIFIABLE OCCUPATIONAL DISEASE SYSTEM

In June 1998, the stand-alone Notifiable Occupational Disease System (NODS) database was incorporated into the Health and Safety Accident Recording Database (HASARD). In 2005 HASARD was replaced by WORKBENCH.

At the time it was decided to align the Notifiable Occupational Disease System notifiable conditions with international classifications to allow comparison with international figures. As a result, a new set of classifications was designed. These classifications incorporated all the old Notifiable Occupational Disease System classifications, but also allowed for a wider range of occupational diseases to be recognised.

In 2005 WORKBENCH completely replaced HASARD.

The new disease classifications are set out below.

- Disease affecting any part of the digestive system, e.g. gastrointestinal disease.
- Disease affecting the heart of blood vessels, e.g. cardiovascular disease.
- Disease or injury affecting the brain, spinal cord or peripheral nerves (chronic solvent-induced neurotoxicity).
- Diseases affecting the lungs (asbestos-related disease; occupational asthma).
- Occupationally-acquired non-viral infectious disease (occupational illness due to infection), e.g. zoonoses
- Occupationally-acquired noise-induced hearing loss.
- Occupationally-acquired viral infectious disease including HIV, e.g. hepatitis B and C.
- Occupationally-caused cancer.
- Poisoning or toxic effects related to workplace exposure (occupational disease due to chemical exposure), e.g. lead, organophosphates.

- Psychological disorders or psychiatric disease, e.g. occupational stress.
- Trauma.
- Trauma leading to an injury of the muscles, tendons, joints (musculoskeletal injury) e.g. OOS, back injury.
- Work-related skin conditions including burns (occupational skin disease), e.g. dermatitis.
- Unspecified events of external causes, e.g. heat radiation or energy, barotrauma.
- Other.

NOTIFIABLE CONDITIONS

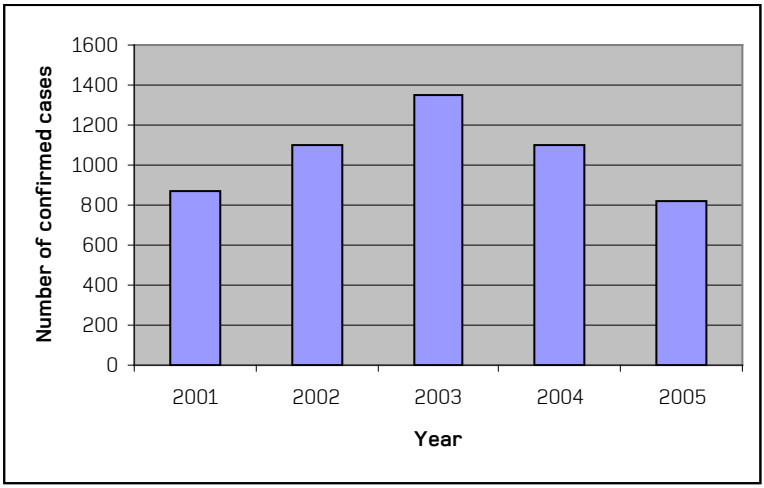


Figure 1: Confirmed Notifiable Occupational Diseases 2001 to 2005.

Figure 1 shows the pattern of confirmed notifiable occupational diseases over the five-year period 2001 to 2005. When compared with the *Notifiable Occupational Disease System Report to June 2000* the total numbers have not changed markedly, in that in the year ending 2000 there were 797 confirmed cases compared with 866 in 2001, 1100 in 2002, 1349 in 2003, 1119 in 2004, and 824 in 2005.[1]

The tables 1, 2, 3 and 4 which follow show the pattern of notifiable conditions by industry, primary agency, occupation and injury type, over the same five-year period. Manufacturing and construction, with 47% of the total, contribute the greatest number of notifications, with machinery, chemicals and materials and substances the predominant agencies at 65%. Important occupations include labouring, assemblers and machine operators, machine trades, industrial plant operators and building trade workers, 49%.

[1] *Report on the Notifiable Disease System to the end of June 2000,* Department of Labour, Wellington

With regard to injury type, noise-induced hearing loss was the major reported condition at 48% followed by occupational cancer, diseases affecting the lung, chemical poisonings, musculoskeletal conditions and disease acquired from infectious agents. The increase in occupational cancer notifications which had previously largely been the result of exposure to asbestos has resulted from the proactive activities of the cancer panel. It is noted that 60 bladder cancer cases were investigated and 57 cases of leukemia.[2]

Tables 5, 6 and 7 report notifications by age, ethnicity and gender.

Table 8 contains further detail on the primary agencies associated with types of injury, table 9, the mechanism of injury, and tables 10 and 11 cover details of chemical agents, chemical products and dust where specified.

[2] *The Cancer Panel Project*, Issue 2, December 2005

Table 1: Notifications received by industry July 2000 to June 2005

Industry	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
Manufacturing	1994	358	369	633	382	252
Construction	498	102	135	132	92	37
Transport and storage	256	58	47	111	16	24
Health and community services	216	47	77	56	15	21
Retail trade	208	38	85	44	26	15
Agriculture, forestry and fishing	189	30	54	62	32	11
Government administration and defence	164	42	37	43	30	12
Wholesale trade	150	17	24	39	51	19
Communication services	109	26	17	29	18	19
Personal and other services	85	20	17	21	11	16
Education	67	13	11	14	17	12
Accommodation, cafes and restaurants	65	2	17	15	14	17
Cultural and recreational services	53	10	8	13	15	7
Mining	51	8	20	10	8	5
Electricity, gas and water supply	31	5	9	1	11	5
Not recorded	1122	90	173	126	381	352
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 2: Notifications received by primary agency July 2000 to June 2005

Agency	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
Machinery and (mainly) fixed plant	1873	324	334	622	391	202
Chemicals and chemical products	1062	103	247	176	279	257
Materials and substances	507	102	104	139	83	79
Animal human biological agencies	455	75	135	119	79	47
Mobile plant and transport)	373	70	86	123	47	47
Powered non-fixed equipment, tools and appliances	369	104	78	105	59	23
Environment	194	37	52	21	36	48
Non-powered hand tools, appliances and equipment	69	20	20	15	9	5
Other	356	31	44	29	136	116
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 3: Notifications received by occupation July 2000 to June 2005

Occupation	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
Labourers and related elementary service workers	752	152	191	208	132	69
Stationary machine operators and assemblers	590	93	106	173	134	84
Metal and machinery trades workers	487	73	100	149	93	72
Building trades workers	399	73	90	91	82	63
Industrial plant operators	397	98	81	128	59	31
Market oriented agricultural and fishery workers	310	47	73	92	47	51
Drivers and mobile machinery operators	243	31	59	73	41	39
Physical science and engineering associate professionals	231	25	58	79	41	28
Office clerks	202	47	34	54	38	29
Other associate professionals	159	23	37	23	48	28
Physical, mathematical and engineering science professionals	157	29	35	28	46	19
Corporate managers	141	23	27	36	37	18
Personal and protective services workers	134	18	22	37	28	29
Building and related workers	117	30	37	17	14	19

Other craft and related trades workers	97	16	16	23	27	15
Teaching professionals	78	7	12	15	23	21
Life science and health professionals	56	8	9	4	20	15
Precision trades workers	53	10	13	6	14	10
Salespersons, demonstrators and models	40	8	8	11	9	4
Customer services clerks	38	12	7	12	2	5
Other professionals	33	5	9	3	10	6
Life science and health associate	33	4	7	5	6	11
Professionals						
Legislators and administrators	4	0	0	2	1	1
Not stated or unknown	507	34	69	80	167	157
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 4: Notifications received by injury type July 2000 to June 2005

Injury type	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
Occupationally-acquired noise-induced hearing loss	2581	441	521	860	475	284
Occupationally-caused cancer	833	29	205	120	254	225
Diseases affecting the lungs	462	109	101	100	72	80
Poisoning and toxic effects	264	70	58	63	40	33
Injury of the muscles, tendons or joints including back injury but not including bony fracture	251	81	60	66	20	24
Occupational-acquired infectious diseases	231	41	64	56	47	23
Neurological disease or injury including spinal cord injury and concussion	105	17	13	29	32	14
Work-related skin condition including burns	104	27	27	22	16	12
Psychological disorders or psychiatric disease	66	18	6	4	20	18
Other	361	33	45	29	143	111
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 5: Notifications received by age range July 2000 to June 2005

Age	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
10 to 19	43	22	7	8	1	5
20 to 29	315	70	67	85	55	38
30 to 39	684	136	171	159	131	87
40 to 49	1181	215	250	348	224	144
50 to 59	1646	246	308	461	381	250
60 to 69	1043	124	221	219	259	220
70 to 79	266	43	62	51	50	60
80 to 89	45	5	11	7	9	13
Not recorded or less than 10	35	5	3	11	9	7
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 6: Notifications received by ethnicity July 2000 to June 2005

Ethnicity	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
European	2784	529	623	580	601	451
Maori	251	48	49	81	46	27
Pacific Island	137	41	34	42	7	13
Other	72	28	15	12	11	6
European/Maori	70	19	18	14	13	6
Asian	47	5	6	13	17	6
European/Pacific Island	37	2	14	1	7	13
Maori/Pacific Island	17	5	4	2	3	3
Unknown	1843	189	337	604	414	299
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 7: Notifications received by gender July 2000 to June 2005

Gender	Total	1/07/2000 to 30/6/2001	1/07/2001 to 30/6/2002	1/07/2002 to 30/6/2003	1/07/2003 to 30/6/2004	1/07/2004 to 30/6/2005
Male	4523	748	963	1212	930	670
Female	735	118	137	137	189	154
TOTAL	**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 8: Primary agencies associated with injury types

Occupationally–acquired noise–induced hearing loss	
Machinery and (mainly) fixed plant	1736
Mobile plant and transport	341
Powered non-fixed equipment, tools and appliances	196
Environment	112
Materials and substances	75
Animal human biological agencies	68
Non-powered hand tools, appliances and equipment	25
Other	18
Chemicals and chemical products	10

Occupationally–caused cancer	
Chemicals and chemical products	608
Materials and substances	70
Other	63
Environment	24
Powered non-fixed equipment, tools and appliances	20
Animal human biological agencies	20
Machinery and (mainly) fixed plant	19
Mobile plant and transport	8
Non-powered hand tools, appliances and equipment	1

Diseases affecting the lungs	
Materials and substances	308
Chemicals and chemical products	74
Machinery and (mainly) fixed plant	27
Animal human biological agencies	18
Environment	16
Powered non-fixed equipment, tools and appliances	12
Other	5
Non-powered hand tools, appliances and equipment	2
Mobile plant and transport	0

Poisoning and toxic effects	
Chemicals and chemical products	206
Materials and substances	17

Animal human biological agencies	17
Powered non-fixed equipment, tools and appliances	10
Machinery and (mainly) fixed plant	7
Environment	4
Mobile plant and transport	2
Other	1
Non-powered hand tools, Appliances and Equipment	0

Injury of the muscles, tendons or joints	
Powered non-fixed equipment, tools and appliances	116
Machinery and (mainly) fixed plant	33
Non-powered hand tools, appliances and equipment	32
Animal human biological agencies	25
Other	18
Environment	13
Mobile plant and transport	10
Materials and substances	4
Chemicals and chemical products	0

Table 9: Mechanisms of injury

Mechanism description	**code**	**Total**	**2001**	**2002**	**2003**	**2004**	**2005**
Fall, trip or slip	10	5	3		1		1
Falls from a height	11	4		2	1	1	
Falls on the same level, slips, trips, stumbles	12	3	1	2			
Stepping, kneeling or sitting on objects	13	1	1				
Hitting objects with part of the body	20	2			1	1	
Hitting stationary objects	21	1		1			
Hitting moving objects	22	1	1				
Rubbing and chafing	23	3		2	1		
Being bitten or stung by an animal, insect or spider	32	1	1				
Being trapped between stationary and moving objects	36	1		1			
Being hit by moving objects (not elsewhere classified)	39	2					2
Exposure to mechanical vibration	37	15	2	7	4	2	

Sound or pressure	40	196	67	29	44	39	17
Exposure to a single, sudden sound or noise	41	45	4	3	29	4	5
Long-term exposure to sounds or noise	42	2374	381	494	796	440	263
Body stressing	50	65	15	17	17	5	11
Muscular stress while lifting, carrying or putting down objects	51	27	9	8	8	1	1
Muscular stress while handling objects, other than lifting, carrying our putting down objects	52	17	5	4	6	2	
Muscular stress with no objects being handled	53	2		2			
Muscular stress from repetitive movement with low muscle loading, occupational overuse	54	180	54	38	48	20	20
Heat radiation or energy	60	4		1		3	
Contact with hot objects	61	1			1		
Exposure to environmental heat	63	5	1	1	2	1	
Exposure to environmental cold	64	3	2				1
Exposure to non-ionising radiation	65	1		1			
Contact with electricity	67	3	1			2	
Chemical or other substances	70	281	48	62	50	75	46
Single contact with chemical or other substance	71	44	11	10	6	8	9
Multiple but short-term contact with chemical and other substances	72	205	38	58	34	36	39
Chronic, multiple/long-term contact with chemical or other substances	73	937	110	209	162	218	238
Other and unspecified contact with chemical or other substance	79	126	24	32	15	24	31
Biological factors	80	82	11	18	24	23	6
Contact with, or exposure to, biological factors	81	284	51	65	63	74	31
Mental stress	90	61	9	5	8	19	20
Exposure to mental stress factors	91	36	9	5	2	13	7
Multiple mechanisms	92	11	1		8	2	
Motor vehicle accidents	93	1				1	
Other or unspecified mechanism of injury	99	228	6	23	18	105	76
TOTAL		**5258**	**866**	**1100**	**1349**	**1119**	**824**

Table 10: Chemicals, chemical products and dusts (where specified)*

Mineral dusts	327
Other materials, substances and dusts	80
Solvents	73
Metals	71
Other chemicals and chemical products	64
Wood and wood dust	61
Gases and fumes	44
Pesticides	32
Non-metals	29
Fire/combustion	9
Chemical products	7
Organic dusts	7
TOTAL	**804**

* In another 765 cases the agency was recorded simply as "chemicals and chemical products".

Table 11: Specific agency description

Agency description	**Total**
Lead	39
Mercury	3
Chromium	3
Other metals and their compounds (not specified)	10
Ferrous and non-ferrous metal	16
Metals	**71**

Chlorine	3
Arsenic	3
Acids	1
Sodium Hydroxide	2
Other basic chemicals (not specified)	20
Non-metals	**29**

Paint or varnish	9
Benzene	2

Other aromatic hydrocarbons including toluene and xylene	4
Mixed organic solvents	49
Other organic solvents (not specified)	9
Solvents	**73**

Organophosphates (plant preparations)	3
Herbicides (plant preparations)	9
Insecticides (plant preparations)	1

Other chemicals for the treatment of plants (not specified)	13
Organophosphates (animal preparations)	1
Insecticides (animal preparations)	1

Other chemicals for the treatment of animals (not specified)	4
Pesticides	**32**

Detergents	4
Plastics synthetic products	1
Explosives	2
Other chemical products (not specified)	48
Pharmaceuticals	2
Fertilisers (plant preparations)	3
Diesel	2
Other	2
Other chemicals and chemical products	**64**

Industrial gases, fumes	19
Isocyanates	17
Formaldehyde	6
Gluteraldehyde	2
Gases and fumes	**44**

Abrasive powders	1
Cement or lime	4
Bricks, tiles and concrete, clay or cement products	2
Chemical products	**7**

Formaldehyde-containing particle board or composite board dusts	3
Western red cedar dust	2
Rimu dust	2
Other softwood dust (not specified)	4
Other hardwood dust (not specified)	1
Sawn or dressed timber	47
Stationery and paper products	2
Wood and wood dust	**61**

Grain dusts	2
Other organic dust (not specified	2
Stock feed	1
Industrial sludge, manufactured by-products	1
Other natural substances (not specified)	1
Organic dusts	**7**

Asbestos	315
Silica	2
Fibreglass	9
Other synthetic mineral fibres (not specified)	1
Mineral dusts	**327**

Fire, combustion, flames and smoke	2
Smoke	2
Other fire, combustion, flame and smoke agencies (not specified)	2
Hot water or steam	1
Air under pressure	2
Fire/combustion	**9**

Other substances (not specified)	12
Food or beverages	1
Broken glass	1
Other materials (not specified)	6
Wet concrete	1
Materials and substances	30
Dust	24
Other dusts (not specified)	5
Other materials, substances and dusts	**80**

NOTIFIABLE OCCUPATIONAL DISEASE SYSTEM CASE STUDIES 2001 TO 2005

In the five-year review 1994 to 1999, the relevance of reporting case studies was explained as follows:

> *'Why "case studies" in this era of evidence-based medicine?*
>
> *The answer is simple – it is the patient with their story who first comes to the primary practitioner that starts the chain of events. In time, when a number of similar cases have come to hand, a case series may be reviewed. A little later, formal epidemiological methods may be utilised to look in more detail at causative factors and treatment protocols (evidence-based medicine).*
>
> *Is EBM something new? Not really. It is no more and no less than the application of the scientific method to the study of medical conditions. Yet for some reason it has caused surprising debate. As one doctor expressed it:*
>
> *"…. The notion of answering clinical questions by finding research evidence appraising its relevance and validity, assessing its potential implications and then making changes in practice to reflect one's conclusion is hardly revolutionary…. By giving it a catchy brand name and marketing it energetically, advocates of EBM have always emphasized the importance of adjusting the outputs of research to reflect the nature of one's individual patients, their differences from the average, and personal values."*

Nothing has happened in the five years since to change this situation. In fact two international journals *Occupational Medicine*, UK and the *Journal of Occupational Health*, Japan regularly include case studies. In this five-year review case studies will be dealt with under five major headings: workplace air, manual handling, noise and vibration, the social work environment, and skin conditions.

Workplace air

Polluted workplace air has led to deaths and diseases among those people who work under such conditions and continues to do so today. Traditionally it has been the mining industry where the most widespread consequences have occurred, with silicosis, coal miners pneumoconiosis and radiation disease as the three most common. In the 20th century asbestosis and asbestos-related lung disease took prominence and its consequences will extend well into the 21st century both internationally and in New Zealand[3 4].

The recent report, *Asbestos exposure in New Zealand 1992 to 2005,* shows no fall in the incidence of mesothelioma deaths[5].

With early Industrialisation polluted air in the workplace extended from mines to factories, byssinosis and lead poisoning being two examples. The 20th century saw the chemicalisation of industry and the rise in toxic systemic poisonings and occupational asthma. With the gradual reduction in smoking among blue collar workers in some western countries chronic obstructive pulmonary disease (COPD) has become recognised as a non-smoking work-related respiratory disease in some occupations[6] – welding is one.

Finally the office environment has not escaped the consequences of polluted air with conditions such as sick building syndrome, and legionnaires' disease.

3 Peto J, Decarli A, La Vecchia C et al *The European mesothelioma epidemic*. Br J Cancer 1999; 79: 666-72

4 Kjellstrom T, Smartt P, *Increased mesothelioma incidence in New Zealand. The asbestos-cancer epidemic has started* NZ Med J. 2000; 113:485-490

5 *Annual Report 2005, Asbestos and Occupational Respiratory Diseases Report,* Department of Labour, Wellington.

6 Balmes J R *Occupational contribution to the burden of chronic obstructive pulmonary disease* JOEM 2005; 47: 2, 154-160

Case studies of contaminated workplace air

Carbon monoxide poisoning in a hairdressing salon

Six people were taken to hospital after 'collapsing' at work with symptoms including headache, flush, nausea, dizziness, weakness. Carboxyhaemoglobin levels ranged from 13.7 to 25.5 percent.

A portable petrol generator had been used in an adjacent alleyway to power a concrete-cutting saw. Fumes from the generator entered the hair salon through below-floor air vents and into the salon through gaps around the edge of the floor.

The Fire Service was called and levels of carbon monoxide up to 300 ppm were measured an hour after the first person collapsed.

Chloramine exposure to a swimming pool attendant

A swimming pool attendant went to his GP and then to hospital with headache and irritation of the eye and respiratory tract.

Investigation revealed high humidity, low air movement and an inversion layer in the swimming pool complex. Chlorine was not detected but there was a smell; later attributed to chloramines.

Chloramines arise when organic matter from sweat and urine reacts with chlorine. Three chloramines (mono- and dichloramine and nitrogen trichloride) can result and cause eye and respiratory irritation and occupational asthma. Nitrogen trichloride is of most concern as it is hydrophobic and readily outgases from the swimming pool water into the atmosphere. It is of particular risk to attendants who spend much of their day patrolling indoor swimming pools. Recommendations were made by the Department of Labour to improve the number of air changes in the complex.[7]

[7] McCoach J S, Thicke H, *et al, Occupational asthma caused by chloramines in indoor swimming pool air* Eur Respir J 2002;19:827-832

Chemical exposure

A chemical exposure in a dairy products company resulted in 11 admissions to hospital with discharge the same day. Sanitisation and sterilization of plant equipment and working surfaces is a necessary process in such factories and the main products used in this particular factory as in most such factories are caustic, acid, chlorine quaternary ammonia compounds and glutaraldehyde. The chemicals are dose-controlled by automatic in-line mixing to foaming stations.

The evening before the exposure occurred, epoxy resin (Sureshield) sealing had taken place. This process had been completed by 3.30 am. An increased cleaning programme had also been instigated and the usual quaternary ammonia compound Sterbac used as a sanitizer had been replaced by Ecosafe a glutaraldehyde-based product. These products were used at foaming stations and at footbaths and surface wipe-downs. Drains are dosed with trichlorocide (sodium dichloroisocyanurate) a chlorinated alkaline powder with 10% available chlorine. However the evening shift had run out of trichlorocide and had replaced it with HTH (a chlorinated alkaline powder with 60% available chlorine). Prior to the morning staff arriving from 4.30 am the normal clean down process begins but on this occasion with the changes outlined above. The packing team arrived at 5.30 am and carried out their normal clean down. Within 45 minutes some staff noticed eye irritation, upper respiratory tract irritation, skin irritation, nausea and headache.

The Department of Labour investigated the episode and although initially there was some uncertainty as to the cause – for example the styrene component of the epoxy resin was suggested as the cause by a non-Departmental source, but discarded on the grounds that the concentration of styrene vapour required to cause the symptoms would have had to be 300 ppm. Attention then focused on the chlorine and glutaraldehyde, with chlorine

seen as the most likely to cause the rapid irritation and burning sensation of the nose, throat and eyes. The HTH powder with the higher level of available chlorine used the evening before together with the reduced ventilation used to ensure the 'tented off' doorways did not collapse during the epoxy resin process was the most likely explanation for the episode. In addition glutaraldehyde and chlorine are known to react with each other releasing a toxic mist of both chemicals.

Subsequently two of the staff had ongoing effects. In one case irritant type asthma – or RADS (reactive airways dysfunction syndrome) was diagnosed by a respiratory physician. In the second case an allergic skin response developed in the eyelids with swelling on re-exposure to glutaraldehyde.

The importance of industrial hygiene measurements

The two cases which follow illustrate the importance of the environmental scientist (industrial hygienist).

In the first case it would have been easy and not altogether unreasonable to ascribe the cause of the photocopier's illness to photocopier fumes perhaps ozone, although clinically the symptoms were not characteristic of ozone poisoning.

In the second case involving the men exposed to fumes from the fumigation process, a presumptive diagnosis of methyl bromide poisoning was reasonable except again the symptoms were not typical.

In both cases it was the careful work of the environmental scientists that lead to a more precise cause being determined.

In contrast in the third case, that involving Actellic, the circumstances and the symptoms coincided with the use of Actellic, even though no blood tests for cholinesterase were carried out. They could have confirmed what was a reasonably clear presumptive diagnosis.

Volatile organic compounds (VOCs) in a photocopier room cause an environmental illness

This case concerned a woman employed as a photocopier who developed acute symptoms of headaches, nausea, respiratory discomfort, chest tightness and increased heart rate and was admitted to hospital. The room she worked in contained two photocopiers. She initially noted an unusual smell in the workroom and over the next six to seven days the smell persisted and her symptoms developed.

An investigation was carried out by an environmental chemist who used equipment to measure volatile organic compounds (VOCs). The TVOC analyzer while not measuring specific VOCs did give a total measure which at 150 ppb (parts per billion) was higher than expected for such a room. Further investigations revealed that the TVOC rose to 1400 ppb at a point of entry into the room surrounding some pipes. The pipes come from an adjacent room via a cupboard in which cleaning materials were stored and TVOC levels of 2000 ppb were measured in the cupboard. It was considered that leakage from the chemical containers had occurred and the volatile substances entered the photocopier room in the space surrounding the pipes.

In conclusion the scientific report noted that the Indoor Air Quality Association (IAQ) guidelines as recommended by the US Environmental Protection Agency (EPA) for Building Air Quality was a TVOC of 640 ppb, and that levels above 250 ppb indicate potential IAQ contaminants. It was further noted that individuals can vary in their sensitivity to VOCs and further that VOCs tend to be continuously absorbed onto surface and re-emitted and that months may be required to clean the air of a room.

Fumigation episode causes health problems?

Drivers were waiting at a wharf to load up cement. They were several metres away from a wharf shed containing logs which were being fumigated and from which the methyl bromide fumigant was being vented. At the time the wind was blowing from the shed toward the drivers.

The drivers noticed a smell variously described as a 'pesticide' smell or like 'brake linings'. Within a few minutes the drivers noticed a burning sensation of the lips, mouth and tongue, some skin irritation and chest tightness. Subsequently (two to three hours later) severe headache and nausea developed. Blood bromine levels ranged in the three drivers from 9-16 mgm/L .

The use of methyl bromide fumigation at the port had been ongoing and there was a belief that the symptoms reflected exposure to methyl bromide even though the acute nose/lips burning effects were not typical. A Department of Labour scientist investigated the event in more detail and it became apparent that while the more delayed symptoms of nausea and severe headache could have been due to exposure to methyl bromide the more acute burning effects were in fact due to a release of solvent vapour from the timber which had prior to fumigation been treated with a light organic solvent preservative (LOSP) which contained white spirit.

This case, like the photocopier study, reinforces the need for scientific investigation particularly where the clinical symptoms do not fit the apparent chemical exposure.

Spraying for pests

A decision was made to spray the exterior of a building using Actellic EC50 with a knapsack spray pack and a 1.5-metre wand, with the spray operator wearing cotton overalls, safety footwear, goggles and a dust mask. The work was completed after 2½ hours of spraying. At the time of the spraying a number of employees inside the building had noticed a smell and had complained of headaches, nausea and dizziness.

Meanwhile the spray operator who had completed the spraying process by 4.30 in the afternoon, went home but within one to one and a half hours noticed his eyes were itchy, red, and puffy, he was nauseated, dizzy and headachy. In the night he vomited. Next day he returned to work still nauseated and unwell and when asked to carry out further spraying refused. He saw a doctor but no specific test for blood cholinesterase was carried out.

One of the staff in the building had also become seriously ill with headaches, nausea, sore eyes, breathing difficulties and dizziness.

Investigation indicated that the spray had been sucked into the air conditioning system during the spraying activity. The inadequate respiratory protection of the sprayer resulted from a failure to recognise that there was a significant risk of inhalation.

Workers burnt during herbicide production

This episode occurred to two highly experienced and well-trained chemical operators.

MIPA (monoisopropylamine) is an ingredient used in the preparation of a Roundup product, Roundup Renew. It is added in sequence with other ingredients in a reactor. The ingredients can be added by a top hatch or by pump from the bottom with glyphosate acid being added through the top hatch and MIPA via the pump from below. Once all ingredients are added a sample is taken from the mix for, pH testing in the laboratory. On this occasion it was found necessary to add a further 50 kg of MIPA. At the same time the pump which had been causing problems had been removed. One of the operators found a partially empty drum of MIPA and decided to add the MIPA though the top hatch. He wore a full-face respirator and gloves. On unscrewing the bung there was a surge of MIPA which splashed out of the drum and all over the area. The operator tried to force the bung back into the drum but in the process caused the MIPA to spray out on all sides with considerable force contaminating the forehead skin of the operator with the full-face mask and contaminating the face and shoulder of the second operator who wore safety goggles and was observing the procedure from below. Both were admitted to hospital with burns.

Isopropylamine is an extremely flammable vapour causing skin and eye burns and marked respiratory irritation. It is also absorbed though the skin.

In this case both operators immediately went and stood under the emergency shower which undoubtedly minimised the skin consequences.

Manual handling

Manual handling at work can result in a range of musculoskeletal conditions which involve muscle strains, ligament, sprains, tendonitis, nerve entrapment conditions and arthritic joint conditions. Both work and non-work factors can be contributory in terms of causation and difficulties and debate can occur in determining which factors are dominant and causative.

In a number of cases, chronic pain can follow the traumatic injury and this can complicate finding the root cause.

By taking a careful work history, visiting the workplace and observing the nature of the work movements, their force, repetition, direction, frequency and duration, a decision as to causation can more easily be reached.

A careful physical examination and clinical history is also a necessary part of the diagnostic process. MRIs, CTs, x-rays, ultrasound and blood tests also have a role.

A holistic approach to these injuries is required if effective intervention, treatment and rehabilitation is to succeed. By looking only at either an ergonomic or psychological approach the likelihood of determining causation will be limited and implementing intervention will be less effective.

Cubital tunnel syndrome from using a chainsaw

A 55-year-old boiler maintenance worker spent three hours chainsawing a large rimu cupboard with a 30 kg chainsaw. At the end of this activity he noticed tingling in three fingers of his left hand. His wrist ached and the ache extended to the inner side of his elbow. By the next day the ache became a pain, the tingling (pins and needles) was worse, he was dropping objects, and his left-hand grip was weak.

Investigations included a failed nerve conduction test and an MRI of the cervical spine with no left C8 nerve root compression. Seven months and many referrals after the injury the left ulnar nerve was decompressed. There was a prompt improvement in symptoms and the worker was back at full time work in three months.

The risk factors were several, the intensity with which the chain sawing was carried out – he worked 'flat tack', the hand-arm vibration effect on the ulnar nerve, the flexed position of the elbow during the chain sawing so increasing the pressure in the cubital tunnel and finally the direct pressure on the ulnar nerve at the elbow as the worker steadied the chain saw by pushing his elbow against a solid structure.

District Court Decision No 84/2005 (41629/03)

Left lateral epicondylitis in a water blaster

A 35-year-old worker had been involved in water blasting containers over a five-year period. Initially he had an assistant who did most of this work. However for the past year he was the sole water blaster averaging three-four hours a day over a five-day week.

The water blaster used hot water; the wand was a metre in length weighing almost 5 kg. The supplying water hose was supported by an overhead gantry. The worker was right-handed; the trigger required a constant force to maintain the squeeze and was altered by the worker who attached a toggle so reducing the required force. The wand was gripped by the left hand using a power grip, the wrist was repeatedly flexed and extended as was the left elbow. The jet had a pressure of 3500 psi with a water volume of 21-litres-a-minute and this created a significant force which forced the wand upwards requiring the worker to counteract that force to maintain the downward direction of the jet.

The combination of power grip, flexion/extension and applied force together with the sudden increase in work hours resulted in the development of lateral epicondylitis at the elbow.

Right acromio-clavicular arthritis in a meat inspector

This 49-year-old meat inspector has been employed in the industry for the last 31 years. His inspection of sheep carcasses began at above shoulder height with the carcass. If there was a defect a tag was attached. With sheep one to four tags were required; with lambs one to two. Tagging occurred in approximately one-in-four sheep and one-in-fifteen lambs. Once tagged the inspector would press a button, both tagging and button pushing also involved above-the-shoulder work. The work was continuous over approximately 7½ hours , five days a week alternating day and

night shift. Some 2000 animals (sheep and lambs) were processed each shift, or one every 20 to 30 seconds.

His condition developed with localised right shoulder pain after 25 years which initially was infrequent, but gradually worsening. His GP organised x-ray and ultrasound investigations and referred him to an orthopaedic surgeon. X-ray showed 'quite marked degenerative change at the acromio-clavicular joint'. Ultrasound showed no rotator cuff tear, joint effusion or sub-deltoid bursal thickening.

Factors of one sided activity, high work load, time pressure and above-shoulder work resulted in work intensification and led to the arthritis.

Right shoulder impingement syndrome (tendinitis) in a meat worker

This case concerned a 20-year-old meat worker who, following a knife wound to his left forearm, returned to work carrying out pre-trim, trimming and some boning activities. Heavy lifting and pulling was involved together with above-shoulder work with the pre-trim. He worked a 40-hour week at a rate of three sheep a minute.

There was a temporal relationship between his work and his symptoms, with easing over the weekend and intensifying by Thursday or Friday.

He was seen by a rheumatologist who diagnosed a painful arc in abduction and external rotation and an impingement syndrome probably associated with inflammation tendonitis of the rotator cuff.

The work-related diagnosis was supported by overseas studies which showed slaughter house workers carrying out shoulder intensive work were at risk of an impingement syndrome of the shoulder.

Osteoarthritis of the knees in a fisherman

A 44-year-old fisherman with 28 years experience was diagnosed by an othopaedic specialist on the basis of examination and an MRI scan of having medial compartment osteoarthritis with moderately extensive cartilage loss and medial osteophyte formation of the left knee. The condition caused knee pain, particularly in the right knee when walking and difficulty standing on the moving deck of a fishing trawler even with a knee brace. A high right tibial osteotomy was carried out one year later.

In a contentious Accident Compensation Corporation claim it was successfully argued that his work as a fisherman was causative. The features of his work were the 5-15 hours spent hauling in a 600 metre set net (the average length being 200 metres), during which the patient had to maintain his balance on a constantly moving deck, without hand support. This job of hauling in occurred three to four times a week for some six months of the year over many years. The activity of fish gutting and washing was also carried on without hand support. Both activities required balance to be maintained on a constantly moving deck by coping with lateral forces on the knee structures, which varied in intensity, direction and suddenness.

Reference to the literature confirmed knee arthrosis as a risk to seafarers with in particular degenerative change to the medial compartment. Other factors of note are weight and genu varus (bowlegs). Although this fisherman was a heavy man he did not suffer from genu varus.

Noise and vibration

Noise

Noise remains a widespread and important occupational risk to workers in industry. Occupational deafness develops slowly over time and as one gets older is compounded with deafness due to age (presbyacussis) so that the two effects can result in the older worker not only being hard of hearing but often experiencing social isolation.

Vibration can present as a local condition known as hand-arm vibration and a general condition, whole-body vibration.

Hand–arm vibration (HAV)

At the beginning of the last century the effects of working with vibrating tools was recognised as causing pain, numbness and blanching of the fingers, a condition known as vibration white finger.

Today it is recognised that hand-transmitted vibration can affect both the circulation of blood to the fingers known as vibration white finger as well as affecting the sensation to the fingers from damage to the nerves. In addition, vibration can be a factor in the development of carpal tunnel syndrome, cubital tunnel syndrome and arthritis.

Industries where this condition can be found include mining, stone cutting, forestry, construction work, concrete cutting and the use of high pressure water hoses – and is aggravated where in addition to vibration the vibrating tool may require a stronger grip.

It is difficult to determine safe levels of exposure for all workers using vibrating tools. This means that the intervention process must include worker health surveillance so that early changes can be detected. An annual questionnaire-based approach is usually satisfactory.

The changes associated with hand-arm vibration (HAV) can be graded for both vascular and sensorineural components and removal from further exposure is recommended if a worker reaches a stage 3 grade.

The United Kingdom Health and Safety Executive has a range of publications dealing with this condition.

Whole-body vibration

In 2005 the UK introduced new regulations concerning whole-body vibration (WBV). There is evidence that it is linked with back pain and, in particular, with operators of heavy earthmoving equipment.

Case studies resulting from noise and vibration

Chart 1: This 56-year-old man had been a fitter/welder for 38 years and worked in the fitters shop in a foundry for 28 of these years. There was no family history of hearing loss, no recreational exposure to noise and no head injury. He had worn hearing protection only intermittently. He has marked loss over his mid to high speech frequencies 2000, 3000, 4000 hertz.

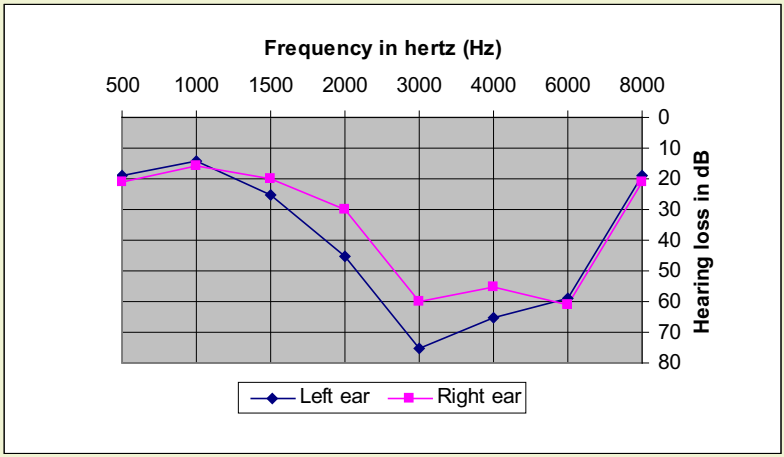


Chart 2: This 41-year-old man had operated a head rig for 14 years. He had no recreational exposure to noise. He occasionally wore cotton wool as ear plugs. He now wears earmuffs. He has marked loss over his mid to high speech frequencies 2000, 3000, 4000 hertz.

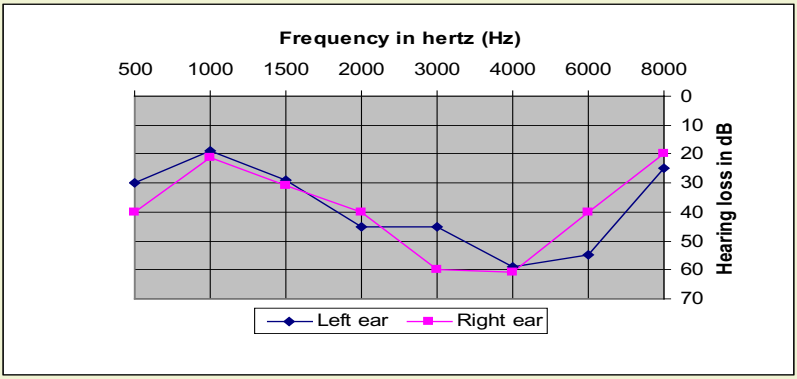


Chart 3: This 42-year-old man had worked as a farm worker for 18 years with a lot of tractor driving, when he occasionally wore earmuffs. He had been a 303 rifle shooter for 10 years and had worked as a timber mill machinist for three years wearing earmuffs most days. His hearing loss is more symmetrical than in chart 3 but of a similar pattern and more severe.

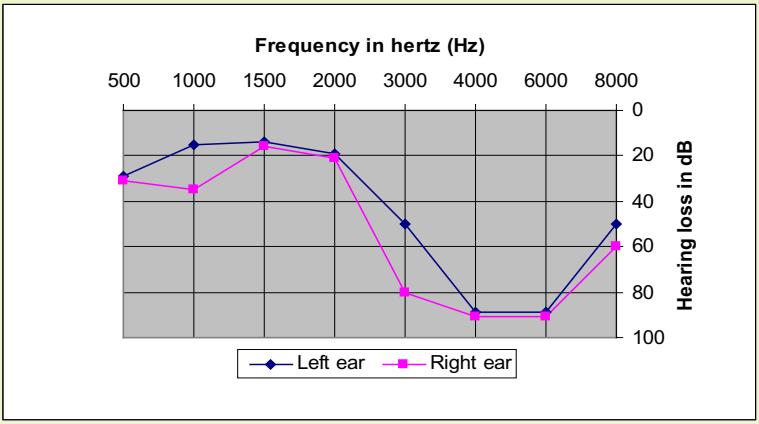
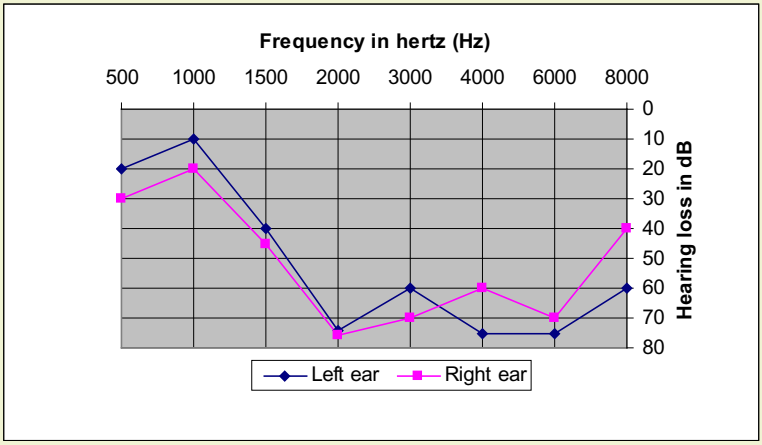


Chart 4: This 43-year-old man had been a loader driver for 25 years. He rarely wore ear protection. He had been deer stalking since the age of 19. He has a marked loss in his mid and high speech frequencies.



Hand-arm vibration (HAV) in a contract builder

This 45-year-old contract builder had worked throughout his life in joinery, and carpentry. From the age of 25 to 37 he used routers, buzzers, belt sanders, skill saws, grinders and hammer drills. He worked a 60-hour week and averaged 30 hours a week using vibrating tools. Between the ages of 38 to 40 he carried out scrubcutting on the weekends using a chainsaw.

He first noticed symptoms involving his fingers at about age 28. There was periodic blanching of his fingers involving his right hand more than his left (he was right handed), tingling and numbness after using vibrating tools. He said his grip was weaker which when measured was reduced to 100 mm Hg right, 90 mm Hg left. This case is interesting in that initially a presumptive diagnosis of carpal tunnel syndrome was made, however nerve condition tests were negative, and ultimately hand-arm vibration was diagnosed.

Hand-arm vibration in a concrete worker

This condition was diagnosed in a 26-year-old man who was employed as a labourer in an inland South Island town. His job was the installation of footpaths, drains, roading and curbing and channeling. He used compacters, jac-hammers and drills. He used this range of vibrating tools for up to six hours a day over a five-and-half-day week for some two and a half years.

His symptoms began towards the end of his second year and included numbness and pins and needles in the fingers of both hands, blanching of his fingers was more noticeable on cold days and also occurred away from work on cold days. There was stiffness and aching of his finger and wrist joints. He stopped this employment. However, some eight years later he still suffered from tingling and blanching of his fingers when he used a chainsaw or motor mower.

Hand-arm vibration (HAV) or carpal tunnel syndrome in a road worker

This man began road work at age 20. His work involved curbing and channeling and involved a plate compactor (Dynapad), hand rolling of asphalt using a vibrating hand roller as well as a hand rammer which had a jarring action. This work was combined with driving. The intensity of his exposure was thus less than the two cases already outlined.

As a consequence it was some seven years before he first noticed symptoms. These included numbness in his hands and fingers more in his right hand (he was right handed), aching extending up his right arm when gripping or holding objects, pins and needles in his fingers, night time numbness and pins and needles which would wake him up.

He had no blanching of his fingers. At examination he had normal grip and no signs of carpal tunnel syndrome. He had been recently diagnosed as a diabetic some 10 years after his symptoms began He had also begun smoking again after diagnosis of his symptoms.

His story was less classical than the two earlier cases and he was referred for nerve conductivity texts which showed moderate bilateral lesions of the median nerve at the wrists.

In this case a presumptive diagnosis of carpal tunnel syndrome was confirmed and it is noted that vibration can be one of the causative factors in this condition.

THE SOCIAL WORK ENVIRONMENT

For some years now the Department of Labour has been drawing industry's attention to issues such as shiftwork, overtime, and employment procedures with particular reference to 'stress' as a possible consequence[8]. A number of publications have been produced and are listed in footnotes 8-11. Such concerns are in accord with overseas research and recommendations.

In an editorial in the Scandinavian *Journal of Work Environment and Health* in 2005 some interesting facts were recorded[9].

In Denmark, the percentages of employees who answered 'yes' when asked the question "is your work unevenly spread so that work piles up?" increased from 36% in 1995 to 61% in 2000.

In France 2004, 49% of the employees reported to have "not enough time to finish work".

In 2004 The European social partners (trade unions and employer organizations signed the *Framework Agreement on Work-related Stress* the objective being "to provide employers and workers with a framework to identify and prevent problems of work-related stress."

The Agreement noted it was not about attaching blame to the individual for stress (article 2) and in article 4 it noted –

> Identifying whether there is a problem of work-related stress can involve an analysis of factors such as work organisation and processes (working time arrangements, degree of autonomy, match between workers skills and job requirements, workload, etc) working conditions and environment (exposure to abusive behaviour, noise, heat, dangerous substances, etc) and subjective factors (emotional and social pressures, feeling unable to cope, perceived lack of support etc).

8 *Stress and Fatigue Their Impact on Health and Safety in the Workplace*. Department of Labour Wellington 1998

9 Kompier M *Assessing the psychosocial work environment "subjective versus 'objective' measurement"* Editorial Scand J Work Environ Health 2005; 31: (6) 405-408

The main features of the framework agreement was a proper assessment of risk factors with an emphasis on prevention.

A study in the Auckland region and in Tokoroa published in 1996[10] which was interview based and included 5467 European, Maori, Pacific Island and Asian employees aged 40 or older found that there were significant associations between increased stressors and male gender, young age, and the administrative group.

In a much smaller study carried out in Nelson in 2002[11] by the two occupational health nurses in the Nelson/Marlborough region, among the 832 individuals working in 44 workplaces (government departments, emergency services, health services, the transport industry and a miscellaneous group), concluded that the main causes of stress in all industry groups were:

- high pressure to get the job done
- no control over workloads, work overload
- conflicting home/work demands.

Other important causes were:

- poor pay in the transport and health group
- shift work in the health and emergency sectors
- poor communication and unpredictable hours in the transport industry.

The following case study illustrates the importance of New Zealand's Health and Safety in Employment Act 1992 in dealing with stress.

10 Dryson EW, Scragg RKR, Metcalf PA, Baker JR *Stress at work: An evaluation of occupational stressors as reported by a multicultural New Zealand workforce* Int J Occup Environ and Hlth 1996; 2: 18-25

11 Baxter A, Power P *Workplace Stress Survey 2002* Department of Labour Nelson

Case studies resulting from the social work environment

Stress case

This case concerned a female employee appointed to work in accounting and administration in a medium sized company. Her work load became excessive, largely as a result of two senior staff leaving at the time of her appointment which lead her to taking over their responsibilities. The result was her work piled up and working extra hours didn't help. In time the employee expressed her concern at her work load to her boss, however while there was a verbal response, and concern, insufficient was done to reduce her workload. She was put on 'stress leave' at her doctor's advice. She ultimately terminated her contract.

The company was prosecuted on the grounds that they:

1. Failed to take all practical steps to ensure employee safety by ensuring that the employee was not exposed to a hazard arising out of the arrangement and organisation of work.
2. Failed to ensure effective methods for systematically identifying hazards.
3. Failed to investigate harm to an employee when the employee advised them.
4. Failed to record harm when she advised of her work stress.

This situation was a failure to comply with the requirements of the Health and Safety in Employment Act 1992. It is important to note that the Act is all-embracing, not just when dealing with work injuries but also with work-related diseases such as hearing loss, lung disease, overuse conditions and in this case, the newer social environment work issues such as stress.

This case resulted in the first stress conviction under the Act.

In summing up the judge noted "that where it was known an employee was working in stressful conditions and having medical difficulties due to stress, then 'immediate remedial action is required'".

SKIN CONDITIONS

An occupational skin disease is one in which workplace exposure to some physical, chemical or biological hazard has been a causal or a major and necessary contributing factor in the development of the disease.

Contact dermatitis accounts for at least 60% of all occupational dermatoses. Contact dermatitis may be irritant, allergic or both.

Irritant contact dermatitis

This occurs when damage to the skin is greater than the ability of the skin to repair itself and may result from exposure to acids, alkalis, soaps, detergents, solvents abrasive substances etc. Factors important in causing this condition include the concentration of the irritant, the length of time and the frequency of exposure. Extremes of temperature or humidity, or covering the skin with protective gloves may increase the irritant effect. The hands are usually affected, and the appearance of the skin changes is no different from other types of hand dermatitis. The diagnosis being dependent on a careful history, and exclusion of allergy.

Allergic contact dermatitis

Although this condition occurs on the skin, it also involves the immune system (type 4 cell mediated) and is usually associated with a delayed response occurring a few days after contact with the substance. It is difficult to diagnose, because workers can be exposed to a range of chemicals at work or at home and determination of the particular cause can be assisted by using a patch test. The allergy does not usually develop on first contact but follows repeated contact or exposure to a high concentration of the substance. Both forms of contact dermatitis may develop after weeks, months, or even years in a particular job and both may exist at the same time.

Some common causes include nickel, often found in women's jewellery, hexavalent chromium which can be present in cement and from

chrome-treated leather and apoxy and acrylic resins. Formaldehyde and glutaraldehyde, plants, perfumes and toiletries are other causes.

Non-eczema work-related conditions

There are a number of skin conditions which do not present with a dermatitis- or eczema-type pattern and they include urticaria which is a wheal and flare response from irritant or allergic which can occur in sensitive individuals from exposure to laboratory animal hair, kitchen workers working with vegetables or fruit and hairdressers working with persulphates.

Acne can arise in workers exposed to oils and can occur in workers exposed to dioxin.

Ulcerations to the skin may arise from exposure to chrome in the chrome plating industry and skin cancer can occur to engineering workers from minerals, and road workers from coal tar products.

Case studies resulting from skin conditions

Dermatitis in a saw doctor

This man had a history of repeated skin lesions in his lower left thigh he described a pattern of pimples which became infected and broke down. His work as a saw doctor exposed him to lubricating soluble cutting oils, as well as canola oil. His lesions occurred at the edge of his shorts which he wore under his work overalls. The overalls were only washed once a week and in the course of the week became soaked with the oil. He wore gloves which were also covered in oil. He worked with his left hand resting and rubbing over the affected left thigh region. He showered every second night.

Groin dermatitis in a nursery worker

This man was employed as a maintenance worker in a horticultural nursery. His job included general maintenance and fertigation, a term used to describe irrigation with fertilizers.

Calcium nitrate tetra hydrate was used in the fertigation. The worker prepared the mix by tipping sacks of granular calcium nitrate into a 1100-litre PVC tank, water was added. He wore a shirt, shorts, no mask, no gloves and no eye protection. At first he noticed a worsening of his pre-existing asthma but in time developed a rash in the groin region. The company had no material safety data sheets (MSDS) at the time, but subsequently obtained these.

Nickel sensitivity in a motor mechanic

This man first noticed a rash on his right middle finger when he was an apprentice motor mechanic. In time the dermatitis spread to all his fingers of his right hand. A diagnosis of nickel dermatitis was diagnosis by a skin specialist. He left the trade for eight years and on returning suffered a recurrence. Nickel is present in some crescent spanners and other tools as well. It may also contaminate lubricating oils.

Epoxy resin dermatitis among floor surfacers

Three workers were employed to resurface the floors in a freezing works. An epoxy resin was used, Supascreed resin A which contained bisphenol A/F epoxy resin and plasticizers. The workers spent three days initially, but when they returned to do further surfacing their skin reaction developed. No gloves were worn.