

Assessing and managing **WORKPLACE EXPOSURE TO CHEMICALS**



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The 17th century Italian physician Ramazzini invited doctors to extend their interrogatory questions of their patients to include "What is your occupation?" This invitation is still relevant today.

Many people present to their General Practitioner concerned about the possible health consequences of chemical exposures. Despite this, the health effects of the commonest workplace chemical exposures are often overlooked.

Assessment of patients with such exposures, and their clinical outcomes, is complex and difficult, with many cases presenting as more conventional illnesses. Failure to recognise a problematic exposure, coupled with on-going exposure, can lead to medical conditions that are difficult to manage.

Effective evaluation of possible chemical exposures contributing to a health concern requires consideration of a person's occupation as part of their clinical history, as well as some knowledge about the effects of specific chemical exposures.

The potential medical consequences of workplace chemical exposures

Workplace chemical exposures can result in the development of a new medical condition, however, the more common consequence is a worsening of a pre-existing condition. For example, a welder who has asthma may develop more brittle asthma as a result of exposure to welding fume.

The impact of adverse workplace exposures on a person with compromised health is often under-recognised. In such situations, the workplace exposure initiates the "illness cascade". For example, a worker who is obese, with poorly controlled diabetes, who smokes, and who works in an enclosed environment with petrol/ diesel powered equipment without adequate ventilation (carbon monoxide exposure), is suddenly required to undertake some excess physical activity (emergency response); this can lead to angina or collapse.

Assessing a patient's concerns

In order to detect health consequences from any exposure of concern, it is necessary to identify which substances are involved, and understand the likely effects of these chemicals. Patients who present with concerns about hazardous substance exposure without any particular exposure history (or specific substance of concern) are particularly challenging to assess.

Once the substance of concern has been identified, a clinical history should identify the patient's occupation and in particular what the tasks and likely exposures are. The health

Notification of disease and injury from hazardous substances exposure

Cases of injury or disease relating to hazardous substances, and wider poisonings arising from chemical contamination of the environment, require notification to the Medical Officer of Health under the Hazardous Substances and New Organisms Act 1996 and the Health Act 1956.

A short electronic notification form is available on the *bestpractice* dashboard (log in at www.bestpractice.org.nz or go directly through MedTech) – look for "Hazardous Substances & Lead Notifications". Primary care practices that do not use *bestpractice*, should still inform their Public Health Unit of any notifications. Access to the notification form for non-MedTech Patient Management Systems will be available later in 2014.

The employer is expected to notify the Ministry of Business Innovation and Employment when an illness arises from workplace exposures, but this is not a requirement of the General Practitioner.

ACC carries out its own determinations according to its Act, and it is possible for a worker to suffer a work related illness but not meet ACC's criteria for assistance.

Common illness presentations resulting from chemical exposures

Common workplace illnesses that are often misdiagnosed include:

- Metal fume fever or chemical pneumonitis (“welder’s flu”)
 - Sudden onset of fever, shortness of breath, cough and wheeze within 24 hours of exposure to metal or plastic fume from the welding process
 - Rarely diagnosed on the history; lung function tests are useful to confirm the diagnosis and recovery. A chest x-ray excludes other issues.
- Carbon monoxide exposure
 - Common, and occurs in unusual circumstances, e.g. prolonged chainsaw use in dense undergrowth
 - Often overlooked in the illness cascade leading to collapse
- Organic solvent exposures
 - Acute (intoxication) and chronic (encephalopathy) illness patterns from printing, painting/finishing and plastic industries
- Occupational asthma
 - From many industries, including pine wood processors, MDF manufacturing, cedar wood processing and car painting
- Pesticide/biocide exposures
 - Patients may present with chronic malaise, the cause of which can be difficult to confirm
 - Many of the more toxic biocides are no longer in use

consequences of chemical exposures depend not only on the material that people are exposed to but the route of exposure, metabolism and excretion. An important concept is “dose” – how much for how long?

The timing of symptoms is important. Symptoms that persist during an absence from work tend not to be related to the workplace. Ask about chronic effects of the exposure, but also try to identify episodes of acute toxicity around the exposure time. For example, pesticide spray exposures are often blamed for low grade chronic “unwellness” but a history of symptoms, such as acute malaise, skin rashes or shortness of breath, around peak exposure times (e.g. mixing concentrate, unexpected soakings) would suggest a more significant exposure.

Identifying health consequences of chemical exposure is only occasionally aided by specific testing of the patient or the workplace. These measurements are either of:

1. Exposure assessment, e.g. static sampling in a workplace or personal sampling of the worker (e.g. dust/fume measurements in the breathing zone of a welder). There are specific “acceptable” concentration limits for known hazardous chemicals (in New Zealand called Workplace Exposure Standards). However, measurement against these Standards is usually only done by concerned companies.
2. Effect assessment, e.g. peak flow measurements at work or away from work
3. Specific biological monitoring (very occasionally), e.g. blood lead levels

If physiological or laboratory measurements are possible, they might be taken both during and away from exposures.

In reality, there are few exposure assessment services available to General Practitioners, and physiological measurements (“effect assessments”) are usually the only accessible tests in primary care.

There are currently few New Zealand governmental resources to assist General Practitioners with advice on assessment of workplace exposure to chemicals and illness this may cause. Potential sources of information/contacts include:

- The University of Otago Department of Preventive and Social Medicine

- The National Poisons Centre
- Occupational medical specialists
- Local occupational health services
- Medical literature

Other considerations

Many people at work fear that they place their job security at risk if they report their concerns about workplace conditions.

General Practitioners may be involved in a patient's dispute with their employer or the workplace insurer, e.g. providing a medical certificate. Such circumstances often complicate determining whether a workplace chemical exposure may be affecting their patient's health, confirming the suspected relationship, and advising on appropriate treatment or protection.

Management of occupational exposure

General Practitioners have two main roles in management of workplace exposure related illness: treating the symptoms, and providing the patient with appropriate information about preventing further exposures. An overall goal is to help the patient to maintain their work.

Many conditions are either self-limiting (the symptoms resolve when exposure ceases or shortly after) or can be attributed to historical exposures. Controlling the exposure at the source (e.g. ventilation, substitution with less toxic products) is optimal because it controls the symptoms and benefits employer and employee. In general, recommending "safety gear" (Personal Protective Equipment) is not a useful way to provide protection.

Where workplace chemical exposures cannot be reduced, or the health consequences of these are significant, advice about seeking suitable alternative work may be necessary. For example, when people develop allergies to workplace chemical exposures, they usually have to abandon that work.

The important message is that control of symptoms caused or worsened by workplace exposures becomes very difficult where the linkage between those symptoms and that exposure remains undetected. Enquire about a patient's occupation, and consider if workplace exposure to chemicals is causing or contributing to their symptoms.



Hazardous Substances

Hazardous Substances Disease & Injury Notification

GPs in all regions of New Zealand are now able to use e-notification to inform your Medical Officer of Health about hazardous substances, diseases and injuries.

By law, injuries from hazardous substances, lead absorption and poisoning arising from chemical contamination of the environment (including from agricultural spraydrift) are required to be notified.

Look for 'Hazardous Substances & Lead Notifications' on the Module list of your BPAC dashboard.

For more information on these notifications see the article on page 34 of the April **Best Practice** journal <http://www.bpac.org.nz/BPJ/2013/April/docs/BPJ52.pdf>.

If you have any questions regarding a patient or notification, please contact your local public health unit.



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