OCCUPATIONAL CONTACT DERMATITIS IN AUSTRALIA

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Australian Government
Australian Safety and Compensation Council

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FOREWORD

The Australian Safety and Compensation Council (ASCC) leads and coordinates national efforts to prevent workplace death, injury and disease in Australia and aims to improve national workers' compensation arrangements and return to work of injured employees.

Through the quality and relevance of the information it provides, the ASCC seeks to influence the awareness and activities of every person and organisation with a role in improving Australia's occupational health and safety (OHS) performance.

The *National OHS Strategy 2002-2012, (*the National Strategy) which was endorsed by the Workplace Relations Ministers' Council on 24 May 2002, records a commitment by all Australian, State and Territory governments, the Australian Chamber of Commerce and Industry and the Australian Council of Trade Unions, to share the responsibility of ensuring that Australia's performance in work-related health and safety is continuously improved.

The National Strategy sets out five 'national priorities' to achieve short-term and long-term improvements.

The priorities are to:

- reduce high incidence and high severity risks
- improve the capacity of business operators and worker to manage OHS effectively
- prevent occupational disease more effectively
- eliminate hazards a the design stage, and
- strengthen the capacity of government to influence OHS outcomes.

In March 2004 it was agreed by the then National Occupational Health and Safety Commission (NOHSC) that, under the national priority to prevent occupational disease more effectively, eight disease categories would be considered for particular focus under any national action plan. These are work-related musculoskeletal disorders; mental disorders, noise-induced hearing loss; respiratory diseases; occupational cancers; contact dermatitis; infectious and parasitic diseases, and cardiovascular disease.

To assist the setting of national action priorities to prevent these diseases, reports were prepared for members on each disease category. The following report is an extract of the information provided to members on the causes and risk factors for cardiovascular disease, the available data on the magnitude and severity for the disease category within Australia, approaches to prevention and evidence for their effectiveness.

ACKNOWLEDGMENTS

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Executive Summary

Occupational contact dermatitis (OCD) is a skin condition caused by work-related exposures. It occurs in workers who are exposed to irritating or allergenic substances or specific physical factors in the workplace. Eliminating or preventing exposure to these agents or conditions can largely prevent the occurrence, and if already present, the severity of OCD.

The disease is most common amongst nurses, food handlers, hairdressers and beauty therapists, motor mechanics, cleaners, construction workers and specialised epoxy workers, printers and those within the health care and manufacturing industries.[1] In most western industrialised countries, OCD is one of the most commonly reported and underestimated occupational diseases with international estimates of incidence varying between 50-190 cases per 100 000 full-time workers per year.

Specific OCD prevention activities derived from the literature and analysis of the data suggest that the largest gains are likely to be made by targeting the following seven areas:

- cement dermatitis – guidance and consideration of regulating the addition of ferrous sulphate to cement;
- latex – awareness and elimination of powdered latex gloves;
- national OCD audits in specific industries;
- education and skills – inclusion of information on OCD in vocational training competency packages and appropriate career counseling for at-risk individuals;
- wet work – awareness and development of risk management approaches to wet work;
- hairdressing - promote the substitution of glyceryl monothioglycolate and the substitution, or reduced use, of powdered bleach products; and
- surveillance – consider OCD in the national strategy for the surveillance of disease hazards and exposures.

1. Rosen & Freeman (1992); Wall & Gebauer (1991); Occupational Dermatology Research and Education Centre, 2004

1. Background

This report was derived from material prepared by the Occupational Dermatology Research and Education Centre (ODREC) and the NOHSC Office.

Suggestions for the prevention of OCD are based on a literature review of epidemiological studies, consideration of data on the magnitude and severity, major risk factors, affected occupational groups and possible prevention approaches. Data sources included the National Data Set for Compensation-Based Statistics (NDS), Australian Bureau of Statistics National Health Survey (NHS), Bettering the Evaluation and Care of Health (BEACH) study, but also data derived from studies conducted by ODREC.

2. Contact Dermatitis: Explanation & Overview

Contact dermatitis is a skin condition caused by external factors, particularly substances, interacting with the skin. It predominantly affects the hands, although other exposed areas may be involved, such as the arms and face. There are three main types of contact dermatitis. Approximately 75% of work-related related cases are caused by irritant contact dermatitis, and 25% by allergic contact dermatitis. Approximately 1% of cases are caused by contact urticaria.

Sometimes the diagnosis of OCD is not straightforward and is complicated by pre-existing atopic eczema or hand eczema. People who have an atopic background, that is, past eczema, asthma or hayfever, or a strong family history of these conditions, are at higher risk of developing OCD.

2.1 Irritant Contact Dermatitis

Irritant contact dermatitis (ICD) is caused in an acute setting when strongly acidic or alkaline substances contact the skin, damaging its natural barrier function. ICD can also be caused by the cumulative effect of substances, such as water, soaps, detergents and solvents. These substances dry and irritate the skin, eventually causing an inflammatory reaction. Wet work is a significant risk factor for ICD.[2] The skin may take many months to heal, even once it appears to have returned to normal.

2.2 Allergic Contact Dermatitis

Allergic contact dermatitis (ACD) is caused by a reaction known as delayed hypersensitivity (type IV immune response) to a chemical which contacts the skin and which has the ability to induce an allergic reaction. The skin reaction is often delayed, occurring some

2. Adams, 1999.

24-48 hours after skin contact, and may take days or even weeks to settle.

A chemical that has the potential to cause an allergic reaction is called an allergen, however only approximately 3% of all chemicals are allergens. For example, solvents are frequent causes of skin irritation but not allergy. The development of an allergic reaction to a particular chemical is a mechanism unique to certain individuals, whereas all people may develop skin irritation given sufficient exposure to an irritant. Sensitisation to a substance may occur after days, weeks or years of exposure. Once a person is sensitised, the allergy is likely to be lifelong.

If the skin is already damaged or irritated, such as with preceding ICD, there is an increased likelihood of developing ACD. This condition can have a similar appearance to that of ICD, although it may be more severe. Initially, the rash may only appear in the site of contact with the allergen. The rash may appear in other areas as a result of spread via hands contaminated with the allergen or even in sites which have never been in contact with the allergen.

2.3 Contact Urticaria

Contact Urticaria (CU) is caused by an immediate hypersensitivity reaction (type 1 immune response). It usually presents as reddening and itching of the skin, within fifteen minutes of skin contact with an allergen. The allergen is usually a protein-containing substance such as natural rubber latex as well as some foods.

The skin usually returns to normal within a few hours after contact ceases, although an ongoing inflammatory skin reaction may develop. This ongoing reaction generally occurs where there is repeated exposure to a causative allergen, such as when people who are allergic to latex continue to wear latex gloves.

Latex allergy is of special concern because of the risk of anaphylaxis, which is a life threatening allergic reaction. This can occur in an individual who has direct contact with latex, but has also been reported in people who eat food prepared by personnel wearing latex gloves. Latex allergy is more likely to occur in workers who frequently use products containing latex. These include healthcare workers or workers whose skin is already damaged with pre-existing irritant contact dermatitis, and in those who have an atopic background. Use of powdered latex gloves further increases the risk as the powder appears to facilitate transfer of the latex allergen to the skin.

3. Magnitude and Severity of OCD

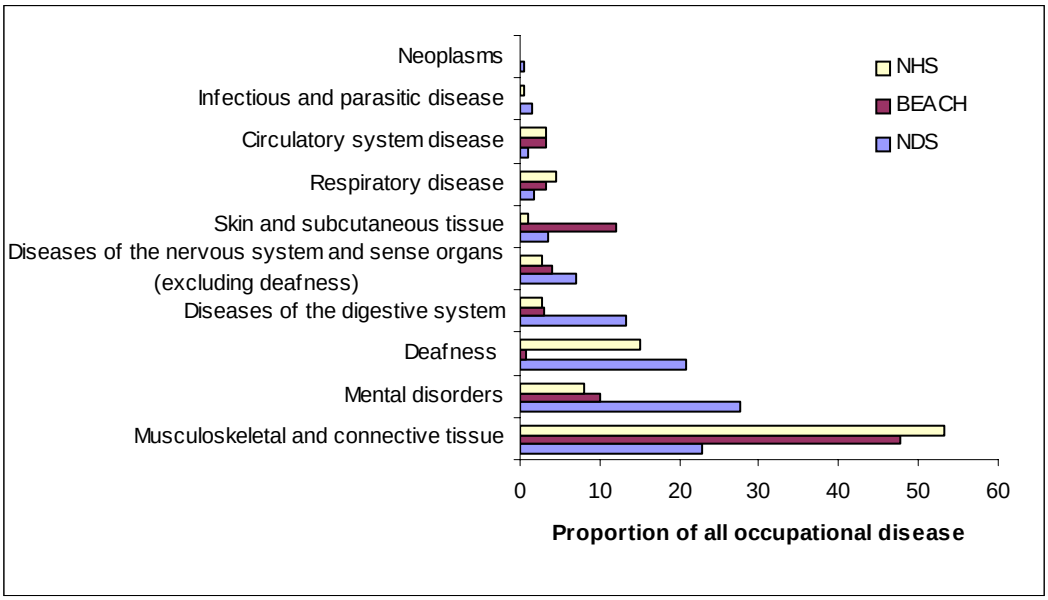
In most western industrialised countries, work-related contact dermatitis is one of the most commonly reported occupational diseases. International estimates of incidence vary between 50-190

cases per 100 000 full-time workers per year.[3] However, Australian comparison is impeded as it is generally acknowledged that none of the available datasets in Australia provide an adequate representation of the magnitude and severity of this condition. There is evidence that workers' compensation datasets particularly underestimate its occurrence.

There are no published Australian studies specifically on the incidence of OCD. Figure 1 shows data from three main sources, namely the Australian Bureau of Statistics National Health Survey (NHS), the Bettering the Evaluation and Care of Health (BEACH) study, and the National Data Set for Compensation-Based Statistics (NDS), Australia.

3. Sources of information for these statistics include national occupational disease registers, workers' compensation data, voluntary reporting schemes and workplace and household surveys

Figure 1: Summary: Proportion of work-related disease reported by data sources, 2000-01 (from NOHSC)



The NHS is a population-based, self-reported survey conducted by the Australian Bureau of Statistics (ABS) to collect information on a range of health issues. Based on this survey, it is estimated that 110 000 people experience dermatitis or eczema, and of these, 14% (or an estimated 16 000) perceived their condition to be work-related.

A large study of general practitioner (GP) activity in Australia (BEACH) obtained information on work-related illness, as reported by a random sample of GPs.[4] Work-related problems accounted for 2.4% of cases managed by GPs, 28% of these were new presentations. Skin conditions were the second most common work-related problem presented to GPs (13%). Dermatitis caused 1.5% of all new work-related problems. Dermatitis was particularly common in younger persons, and workers' compensation was obtained in only 19.7% of all cases.[5]

In 2002-03 there were 290 claims accepted for contact dermatitis recorded in the NDS. It is acknowledged that this is probably an underestimation due to: a lack of awareness of the availability of workers' compensation for this disease; only the more serious cases are being claimed; and the difficulty proving a work-related component to the disease.

The Spot study conducted by ODREC, generated rates for OCD within a defined geographical area within Melbourne and provided an indication of the extent of this condition. The total working population in the area covered by Spot was approximately 200 000

4. Britt, Sayer, Miller, Charles, Scahill, Horn, Bhasale 1999
5. Hendrie & Driscoll et al. 2003.

(188 463), and the annual incidence rate was 20 per 100 000. The annual prevalence rate for Spot was found to be 35.5 per 100 000.[6]

3.1 Severity of OCD

The severity of OCD may be measured in terms of medical, pharmaceutical and workers' compensation costs, employment prospects, retraining costs and effects on quality of life.

Occupational contact dermatitis often has a poor prognosis or outcome, and, of particular importance, is the condition *persistent post-occupational dermatitis*. In this condition, a worker may be incorrectly re-classified as having non-work-related eczema some time after an original diagnosis of OCD. Workers' compensation payments may be terminated. This is different from many other countries, where once work-related causation has been established, a worker is not re-assessed and is not in danger of losing financial support.

4. High Risk Occupations and industries

Some occupations are associated with a higher risk of developing OCD than others, depending upon the nature of exposure in the workplace. It has been proposed that occupations may be classified as 'exceedingly high-risk', having an incidence of at least 70 cases per 100 000 workers and 'high risk', between 30-70 cases per 100 000 workers.[7] The ranking of various high-risk occupations may vary between reporting centres and also between countries, depending upon a range of factors, including specific working conditions.

The ODREC assessed 1646 patients over 9½ years. Of these, 1010 were found to have significant work-related OCD whilst a further 311 had partial work-related OCD. The three most common occupations affected were registered nurses, machine operators and hairdressers/beauty therapists (see Table 1). The most commonly-affected industries are depicted in Figure 2.

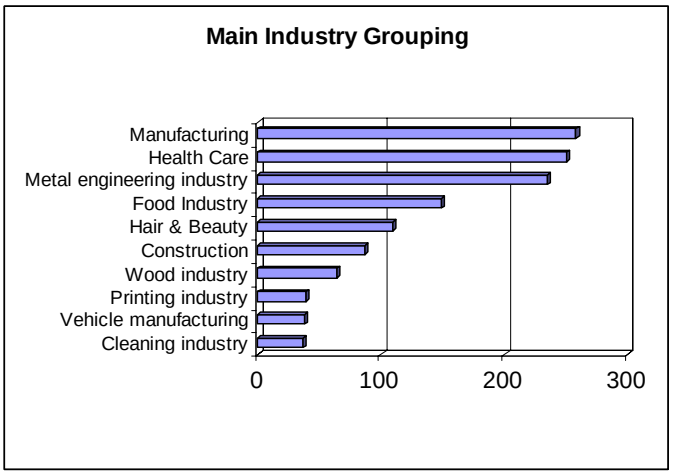
6. The Spot study received referrals of suspected occupational skin disease from general practitioners and dermatologists working within a defined geographical area. Patients were assessed clinically and patch tested to confirm the diagnosis. Rates were generated using labour force statistics for the area as the denominator.

7. Dickel, Kuss, Blesius, Schmidt & Diepgen 2001

Table 1. High-risk occupations ODREC data, Melbourne.

Occupation	Victorian clinic
Registered nurses	187
Machine operators	153
Hairdressers & beauty therapists	109
Chefs, cooks, fast food cooks, including bakers & pastry cooks	89
Packers and process workers (varied)	70
Metal fitters & machinists	67
Carpenters, wood machinists & turners, cabinet makers & trades	56
Industrial floor finishers (epoxy), concreters & tilers	53
Motor mechanics	46
Cleaners	35
Total patients seen in the top 10 occupations (9.5 years)	865

Figure 2 High-risk industries. ODREC data, Melbourne



It is of note that Rosen and Freeman (1992) found that a greater proportion of younger people were affected by contact dermatitis, with approximately one third of sufferers being aged between 15-24 years of age. This finding suggests that prevention activity should record and target this age group.

5. Occupational Exposures and Prevention

5.1 Irritants

Irritants are substances which have the potential to damage the natural barrier function of the skin. Occupational irritants include strongly acidic or alkaline substances, such as wet cement or other corrosive chemicals, as well as substances such as oils, detergents, shampoos, and cleaning agents. Other agents include dust, fibreglass and water.

Physical exposures, such as drying the skin with paper towels and exposure to heat and friction can also irritate the skin. Workplace interventions targeted at irritant exposures in the workplace range from substitution and engineering controls to improved administrative practices. Moisturisers and barrier creams supplied by the workplace are a useful and worthwhile initiative. A range of interventions have targeted water and 'wet work' as irritants.

Moisturising creams are designed to repair the skin and maintain skin hydration. Barrier creams are used as substitutes for protective clothing in situations when gloves, sleeves or faceguards cannot be used.[8] Large, well-designed studies looking at the effectiveness of moisturising and/or barrier creams in the prevention of OCD have not been reported. Smaller studies have combined the use of barrier creams and moisturising creams, often accompanied with employee education programs. There has been sufficient evidence to suggest that moisturisers can prevent ICD, but the beneficial effects have not yet been convincingly confirmed in field studies.[9]

Furthermore, there is conflicting evidence on the effectiveness of barrier creams in protecting against OCD. More studies are needed on barrier creams targeted against specific hazards, in order to duplicate different working conditions more accurately.[10]

5.2 Allergens

In many high-risk occupations, workers are exposed to substances which have the potential to cause an allergic reaction. These substances are referred to as allergens or sensitisers. According to the Australian *Approved Criteria for Classifying Hazardous Substances,* sensitisers present in products at a concentration more than, or equal to, 1% must be listed on a material safety data sheet (MSDS) and identified with the designated risk phrases, R43 "May cause sensitisation by skin contact".[11] If a worker has been sensitised to a particular allergen, amounts present at less than 1%

8. Lachapelle in Rycroft 2001
9. Agner, Held 2002
10. Lachapelle in Rycroft 2001
11. NOHSC, 2003

concentration may cause a flare of dermatitis. This can be particularly problematic if the allergen is not named on a list of ingredients or on the MSDS. Programs for the prevention of OCD include support for employers to enable compliance with hazardous substances regulations, and pre-employment and vocational training for individuals considering a high-risk career. Other preventative measures include the substitution of highly-sensitising substances for non-sensitising or less-sensitising substances, and improved engineering controls to reduce worker exposure to hazardous substances. Common allergens are listed below.

5.2.1 Latex

Latex is an allergen which can cause an anaphylactic reaction (a severe allergic response that may be life threatening). Many food handlers inappropriately wear latex gloves, which have been reported to cause allergic reactions in consumers as well as workers.[12] Powdered disposable latex gloves are particularly hazardous as the powder may transfer the latex allergen to the skin, thereby enabling sensitisation.

5.2.2 Glyceryl monthioglycolate

Glyceryl monthioglycolate (GMT), an ingredient in acid-perming solutions is a common allergen encountered by hairdressers. Following an agreement between hair cosmetic manufacturers and the then hairdresser's guild in Germany to stop the use of GMT in the 1990s, the annual incidence of OCD amongst hairdressers decreased from 194 to 18 cases per 100 000.[13]

5.2.3 Chromate

The addition of ferrous sulphate to cement can reduce the level of hexavalent chromate, a common allergen.[14] Legislation limits the amount of hexavalent chromate in cement to less than 2ppm in Scandinavian countries. Since the introduction of this legislation in Denmark in 1983, evidence has shown a significant decrease in allergy to chromate from 3% in 1985-86 to 1.2% in 1997-98.[15]

5.3 Risk factors

There are a number of risk factors that are common to high-risk occupations. These include:

- atopy;
- wet work; and
- use of gloves.

12. Rycroft, Menne, Frosch, Lepoittevin 2001
13. Uter, Geier, Schnuch 2000
14. Diepgen 2003
15. Johansen, Menne, Christophersen 2000

5.3.1 Atopy

Workers who are atopic are at a higher risk of developing OCD in occupations with frequent exposure to irritants.[16] Education for people with atopy about avoidance of exposure to skin irritants in high-risk careers is an important preventative measure. Ideally, this would occur at the time of choosing a career or before the commencement of work experience, apprenticeships or part-time employment. Careers' counsellors and general practitioners may potentially be key individuals in the delivery of this message.[17]

5.3.2 Wet work

'Wet work', according to the German regulation of hazardous substances at the workplace, is defined as occupational duties where "individuals have their skin exposed to liquids for longer than two hours per day, or use occlusive gloves for longer than two hours per day, or clean their hands very often (e.g. 20 times per day), or fewer times if the cleaning procedure is more aggressive."[18]

Preventative measures aimed at reducing the risk associated with wet work may include:

- trialing of waterless hand cleansers for nurses;
- recommendations regarding the amount of wet work to be carried out by a worker per day; and
- supply, by the employer at the workplace, of barrier creams, moisturising creams and lined gloves.

5.3.3 Gloves

Gloves are a form of personal protective equipment (PPE), with different types of gloves providing protection for different irritants and allergens. The supply of PPE is distinct from upstream control measures such as substitution of hazardous substances.

Whilst the use of gloves may provide a degree of protection against workplace exposures, gloves also present a level of associated risk for workers. To be effective in the control of work-related exposures, appropriate gloves for the specific task must be supplied by the employer. Also, the worker needs to use the gloves, and use them *correctly* when carrying out the task. A worker who uses damaged gloves or re-uses disposable gloves may falsely think they are protected against hazardous substances. Many gloves that are appropriate for protection against hazardous substances are

16. Coenraads, Diepgen 1998
17. Saunders, Keegel, Nixon et al. 2003
18. Diepgen 2003

occlusive, i.e. they form a non-permeable barrier. Occlusive gloves, whilst necessary for protection, have the potential to cause sweating, which can irritate the skin.

Latex gloves, which are widely used in the healthcare industry, are a particular risk (see 5.2.1). Synthetic gloves that do not contain latex include those made of vinyl, nitrile, neoprene or polyurethane. Vinyl gloves, whilst suitable for food handlers, do not offer appropriate protection against infectious agents found in bodily fluids. Nitrile gloves are suitable for this purpose.

6. Prevention Activity

The issue of OCD has been of concern to most jurisdictions for several years. As a result many have already produced a range of advice and guidance material for those occupations where this condition is acknowledged to be a problem.[19] In addition, all stakeholders have been active participants in ongoing projects (such as the review of hazardous substances), which will ultimately contribute to the prevention of OCD. For more information on jurisdiction and other prevention activities, readers are directed to the following web sites:

NSW WorkCover Authority
http://www.workcover.nsw.gov.au/default.htm
Victorian WorkCover Authority
http://www.workcover.vic.gov.au/dir090/vwa/home.nsf
WorkSafe Western Australia
http://www.safetyline.wa.gov.au/
South Australian WorkCover Authority
http://www.workcover.com/
Workplace Services South Australia
http://www.eric.sa.gov.au/home.jsp
Queensland Division of Workplace Health and Safety
http://www.whs.qld.gov.au/
Workplace Standards Tasmania
http://www.wst.tas.gov.au/node/WST.htm
Northern Territory WorkSafe
http://www.nt.gov.au/deet/worksafe/
ACT WorkCover
http://www.workcover.act.gov.au/
Comcare
http://www.comcare.gov.au/
Occupational Dermatology and Research Centre (ODREC)
The aim of ODREC is to create a multi-disciplinary research team for the study of occupational skin disease (OSD) which includes a

19. For example, Government of South Australia guide on Contact Dermatitis – http://www.eric.sa.gov.au/uploaded_files/gs30i.pdf; Government of WA – What is Contact Dermatitis? http://www.safetyline.wa.gov.au/pagebin/pg000655.htm; Hazardous Substances in the Hairdressing and Beauty Industry DIR http://www.whs.qld.gov.au/information/96-i-43.pdf

dermatologist/ occupational physician, occupational health nurse/research assistant, epidemiologist, dermatology fellow, administrator, health promoter, research fellows. Other experts are enlisted as needed.
http://www.occderm.asn.au/

NSW Health
NSW Health has a policy framework and prevention guidelines for latex allergy. http://www.health.nsw.gov.au/index.html

7. Conclusion

OCD is a largely preventable and under-recognised condition. Based on empirical research and good OHS practice, this report proposes a range of OCD preventative actions. Raising overall awareness of this issue, appropriate targeted education, introducing the issue of wet work as a risk factor for OCD to industry, and cessation of the use of powdered disposable latex gloves are the most important recommendations for prevention arising from this report.

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