COLLECTING SURVEILLANCE DATA ON RISKS FOR OCCUPATIONAL CONTACT DERMATITIS

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Australian Government
Australian Safety and Compensation Council

Collecting surveillance data on risks for occupational contact dermatitis

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Glossary

ABS	Australian Bureau of Statistics
ACD	Allergic contact dermatitis
ASCC	Australian Safety and Compensation Council
GHS	Globally harmonised system of classification and labelling of chemicals
ICD	Irritant contact dermatitis
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
OCD	Occupational contact dermatitis
ODREC	Occupational Dermatology Research and Education Centre
OHS	Occupational health and safety
OSD	Occupational skin disease
PPD	Paraphenylenediamine
PPE	Personal protection equipment

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.

In most western industrialised countries, OCD 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. Sources of information for these statistics include national occupational disease registers, workers' compensation data, voluntary reporting schemes and workplace and household surveys. It is generally acknowledged that none of the available datasets provide an adequate representation of the magnitude and severity of this condition. There is evidence that workers' compensation datasets particularly underestimate its occurrence.

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

Effective prevention measures for the control of OCD must be directly targeted at specific risk factors and exposures. The success of an occupational disease control program could then be measured through specific indicators of occupational exposure which lead to the development of OCD.

The performance of 'wet work' and the use of powdered disposable latex gloves are two important causes of occupational dermatitis. Workers who have their skin exposed to liquids or use occlusive or non-permeable gloves for longer than two hours per day are classified as performing 'wet work'. People performing wet work are at a much higher risk of developing OCD. Wet work is an exposure which is common to a range of industries. The Office of the Australian Safety and Compensation Council has developed Guidelines for the Prevention of Wet Work. However, awareness of this issue needs to be increased.

Latex is an allergen which can cause anaphylaxis, a severe allergic reaction which may be life threatening. Disposable latex gloves are widely used in the health care industry and often inappropriately in other industries. Powdered latex gloves are especially hazardous as the powder may transfer the latex allergen to the skin, thereby facilitating the development of allergy. The use of powdered latex gloves should be ceased, and the use of non powdered latex gloves limited to those with potential exposure to blood borne pathogens.

This preliminary survey of several important exposures for OCD in healthcare, hairdressing and food handling has shown appreciable exposure to skin irritants. This includes wet work, as shown through the

number of hand washes per shift, the number of tasks workers perform daily involving wet work and the total duration of wet work per shift in different areas. Food handlers and also hairdressers performed a considerable number of wet work tasks daily. Reports by participants of the number of hand washes correlated well with their estimates for lower levels of hand washing but not at higher levels. This means that these workers have an increased risk of developing dermatitis. It would be extremely useful to clarify the validity of the worker estimates for hand washing, as has occurred in two overseas' studies.

Hand washing more than 20 times a shift was associated with an increased risk of dermatitis reported over the past year in hairdressers. The study has also highlighted large numbers of food handlers at risk of dermatitis from wet work.

These are important findings and reinforce the importance of the Guidelines for the Prevention of Wet Work mentioned above. The RASH (Resources About Skin Health) kit, developed by ODREC and the Office of the ASCC, provides resources for workplaces to prevent OCD and could be adopted and promoted through the jurisdictions.

In addition, we have also demonstrated the inappropriate use of powdered latex gloves by many hairdressers and the inadequate use of protective gloves by users of epoxy resins. One food handler used latex gloves inappropriately, which means that latex could be transferred via food with the development of severe adverse effects. Some healthcare workers used vinyl gloves which do not provide sufficient protection from blood borne pathogens. These important issues could be effectively targeted by compliance campaigns, developed by the jurisdictions. WorkSafe Victoria has commenced a project in the area of the safe handling of epoxy resins.

Various estimates of the number of workers in these groups were made, in order to identify actual numbers of workers who are exposed to high rates of wet work, exposed to powdered latex gloves or inappropriately exposed to any latex gloves, especially in hairdressers. On the basis of these calculations, a surprising 13,856 hairdressers nationally may be inappropriately exposed to latex gloves and hence are at risk of latex allergy, especially if they are atopic or have pre-existing dermatitis.

This finding provides sufficient evidence to instigate the development of a collaborative approach to work for the phased withdrawal of powdered latex gloves from the marketplace. We believe that this would in fact have support from the major glove manufacturers, for whom the issue of latex allergy creates detrimental publicity. Such a project could also be developed through the jurisdictions.

While it is useful and interesting to include health outcomes, such as the presence of dermatitis, the data on exposures is useful in itself and does not necessarily need to be linked to health outcomes. Asking about the

existence of dermatitis can complicate the survey as it is always difficult to ascertain from a questionnaire as to its true work-relatedness.

In summary, use of exposure surveillance to both raise awareness and monitor trends in exposures can be an important step in the prevention of occupational dermatitis. We believe that this mode of exposure surveillance has great potential, especially when focusing on one particular variable. While the role of wet work in the causation of occupational dermatitis is indisputable, we believe that the questionnaire would be particularly useful for identifying inappropriate usage of powdered disposable latex gloves. This study not only provides important evidence detailing the existence in Australia of a number of reversible risk factors for occupational dermatitis, but also highlights the opportunity for effective campaigns to tackle these risk factors through education of the workforce.

Chapter 1: Introduction

Contact dermatitis is a skin condition caused by external factors, particularly substances, interacting with the skin. It predominantly affects the hands in occupational cases, although other exposed areas may be involved, such as the arms and face. There are 3 main types of contact dermatitis. Approximately 75% of occupationally related cases are caused by irritant contact dermatitis (ICD) and 25% by allergic contact dermatitis (ACD). Approximately 1% of cases are caused by contact urticaria (CU) (2006).

While there are many causes of occupational skin disease (OSD), the major cause in approximately 90% of cases is OCD. Sometimes the diagnosis of OCD is not straightforward and is complicated by pre-existing atopic eczema or hand eczema. People with a history of atopic eczema are more likely to experience OCD. In addition, it is quite common for individuals to have a combination of these conditions.

Irritant Contact Dermatitis

What is 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 (Appendix 1). These substances dry and irritate the skin, eventually causing an inflammatory reaction. Wet work is a significant risk factor for ICD (Diepgen and Fartasch 1994). Wet work has been defined as where:

- any part of your body is in water or other liquids for longer than 2 hours a shift
- any part of your body is in waterproof or other occlusive personal protective clothing for longer than 2 hours a shift
- wet objects are handled for longer than 2 hours a shift
- hands are washed more than 20 times a shift.

Predisposing factors – Atopy, 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 ICD (Coenraads and Diepgen 1998). In addition, people who are not atopic but have a background of hand eczema are also at increased risk (Lammintausta 2000).

Diagnosis

There is no routine diagnostic test for ICD. The diagnosis may be suspected from the clinical history of the condition and exposure to workplace irritants. It is frequently necessary to perform patch testing to exclude ACD, as these forms of contact dermatitis can appear similar or may coexist.

Treatment and prevention of irritant contact dermatitis

There are a number of factors that are important in the treatment and prevention of ICD. These include reduced exposure of the skin to contact with irritants by substitution where possible, awareness of risk factors for the development of ICD and appropriate preventative measures, use of personal protection and skin care.

Allergic Contact Dermatitis

What is 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 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. 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.

Diagnosis

Patch testing is a technique used by dermatologists to diagnose ACD. There are over 400 commercial allergens that are available for testing and in addition, patients are tested to their own samples, appropriately diluted, from work. Allergens are applied to the patient's back for two

days, and then the patient is reviewed after a further two to four days, when an interpretation is made of any reactions. Chemicals which may irritate the skin are generally not used for testing.

When an individual develops a positive patch test reaction, the relevance and work-relatedness of the reaction must be considered. This is done after consideration of the individual's work environment and the use of the Mathias criteria (Mathias 1989, see Appendix 2). This set of criteria uses objective measures that assess the probability of a causal relationship with employment.

Sometimes a positive test reaction occurs because of previous sensitisation to a chemical, and thus the reaction is classed as being of past relevance only eg to nickel, present in costume jewellery.

Common causes of allergic contact dermatitis

The most common causes of occupational ACD at the Occupational Dermatology Clinic at the Skin and Cancer Foundation in Melbourne are rubber accelerators and vulcanisers used in the manufacture of rubber gloves, chromate in leather and cement, hairdressing allergens such as paraphenylenediamine (hair dye), ammonium persulphate (hairdressing bleach) and glyceryl monothioglycolate (perming solution) and epoxy resins (Matheson, Frowen et al. Submitted for publication, see Appendix 3).

Treatment and prevention of allergic contact dermatitis

This is similar to the treatment and prevention of ICD and involves awareness of potential allergens, substitution of allergens where possible, and skin protection. In cases of ACD where other measures have failed, job modification or even change may be required.

Contact Urticaria

What is contact urticaria?

Contact urticaria 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, which is usually a protein-containing substance such as natural rubber latex or 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, such as healthcare workers, in workers whose skin is already damaged, such as 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.

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.

Diagnosis

Prick testing is used to test for this type of allergy, by pricking small amounts of substances into the skin and observing the reaction over 15-30 minutes. Radioallergosorbent testing (RAST) is also performed, and is preferred when screening for latex allergy, since severe reactions may develop on prick testing.

Causes

These include natural rubber latex from powdered latex gloves and raw proteins from seafood, red meat, chicken, some fruits and vegetables and flours, as handled by chefs and bakers. In addition, ammonium persulphate or bleach, used in hairdressing, may also cause contact urticaria.

Treatment and prevention of contact urticaria

This involves awareness of potential allergens, use of gloves where possible, and skin protection. Use of powdered, disposable latex gloves should be avoided by all workers.

International and Local Rates of Occupational Contact Dermatitis

Available statistics indicate that OCD presents a considerable occupational disease burden. Incidence rates have been estimated at between 50-190 cases per 100,000 full time workers per year in western industrial countries (Diepgen and Coenraads 1999). However, estimations of the incidence and prevalence of OCD vary.

Sources of information include national occupational disease registers, workers' compensation data and voluntary reporting schemes. It is also

recognised that many cases of OCD never reach medical attention, hence studies of workplaces reveal higher rates of disease than workers' compensation data or clinic based studies (Nixon and Frowen 1991). Furthermore, when workers do seek medical care, the medical practitioner may not always recognise the occupational cause or contribution.

Studies have generally indicated that 90-95% of occupational skin disease is comprised of contact dermatitis (Lushniak 1995).

There is just one Australian study, performed by our group, which has recorded local estimates of the incidence and prevalence of OCD (Keegel, Cahill et al. 2005). Cases of OCD were referred by general practitioners, leading to a probable underestimate of OCD. However all cases were confirmed utilising thorough clinical assessment and patch testing. Nevertheless, an incidence rate of 20/100,000 workers and a prevalence rate of 35/100,000 workers were determined.

Statistics collected by the Victorian WorkCover Authority revealed a rate of 6.5 per 100,000, but a distinction between incidence and prevalence was not made (Dickel, Kuss et al. 2001).

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 rate of at least 70 cases per 100,000 workers and 'high risk' having between 30-70 cases per 100,000 workers.[11] 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.

Glove usage

Although the use of personal protective equipment rates at the lower end of the principle of the hierarchy of controls (Appendix 4), glove use is nevertheless an important part of the prevention and management of OCD. The importance of appropriate glove use is often not well understood by employers, workers and even OHS professionals. The 1990s was associated with an epidemic of latex allergy[7] and yet inappropriate use of latex gloves, particularly of the cheaper powdered variety, occurs to this day in occupations such as hairdressing, where there is actually no need to use gloves which protect the wearer from bodily fluids.

Epoxy resins are strong skin sensitisers and are also known to penetrate most glove types, such as latex. Therefore in the protection of the skin from exposure to epoxy resins, it is of utmost importance to wear gloves which are sufficiently protective. Thick, reusable nitrile gloves have been shown to be adequate (Sakata, Cahill et al. 2005). Unfortunately glove penetration by epoxy resins is often not well understood by users of

epoxy resins and there is currently no mechanism in place to alert commercial users of epoxy resin to the appropriate gloves to use.

Table 1: Rates of dermatitis (one diagnosis per worker) by occupational group in Victoria based on the number of cases assessed at the Occupational Dermatology Clinic*

Major group name	2001 ABS Vic employment numbers	Total OSD	ICD	ACD	Rate per 100,000 with total OSD	Rate per 100,000 with ICD	Rate per 100,000 with ACD
Hair & beauty	15,191	115	26	78	68.8	15.6	46.7
Machine & plant operators	23,475	131	48	52	50.7	18.6	20.1
Automobile workers	28,729	73	53	12	23.1	16.8	3.8
Healthcare workers	124,300	259	126	61	18.9	9.2	4.5
Veterinary	2,488	5	3	0	18.3	11	0
Science	11,366	21	9	8	16.8	7.2	6.4
Photographic workers	2,897	5	1	3	15.7	3.1	9.4
Trades persons & labourers	226,152	379	153	141	15.2	6.2	5.7
Engineering	29,582	49	22	17	15.1	6.8	5.2
Food handlers	106,396	145	73	26	12.4	6.2	2.2
Process workers & packers	66,031	68	32	19	9.4	4.4	2.6
Cleaners	44,713	38	20	7	7.7	4.1	1.4
Farmers	83,177	39	10	21	4.3	1.1	2.3
Production managers & inspectors	30,535	14	1	7	4.2	0.3	2.1
Miscellaneous	100,755	21	6	12	1.9	0.5	1.1
Childcare	17,528	3	1	1	1.6	0.5	0.5
Transport workers	57,453	8	2	2	1.3	0.3	0.3
Emergency workers-Other	14,669	1	1	0	0.6	0.6	0
Teachers	103,539	6	2	1	0.5	0.2	0.1
Cash handlers	227,822	12	3	2	0.5	0.1	0.1
Clerical & managerial	565,190	12	2	6	0.2	0	0.1
Others	48,426	1	1	0	0.2	0.2	0
Social welfare	18,963	0	0	0	0.0	0	0
Missing		36	13	9			

* (Matheson, Frowen et al. Submitted for publication)

Workplace Exposures

There is increasing understanding of the many hazards that workers are exposed to in the workplace. The type of hazard can be varied, including everyday substances such as water and detergents, harmful chemicals, physical factors such as heat and low humidity and dangerous work practices such as incorrect lifting and environmental factors such as noise. To date, there is no comprehensive knowledge or database of these hazards that people are exposed to in their workplaces and how they are protected from these. The Office of the ASCC has recently undertaken consultations with experts in a variety of fields, with a view to gaining an improved understanding of the potential hazards that exist in workplaces. This project comes under Priority Three of the ASCC National OHS Strategy – to more effectively prevent occupational diseases.

Exposure intervention and control should be planned using the principle of the hierarchy of controls (Appendix 4). 'Upstream' measures incorporate the substitution or elimination of hazardous substances or the implementation of engineering controls, such as enclosed systems for hazardous materials to reduce the exposure of workers.

Other measures to reduce exposure are administrative controls, adoption of safe work practices and the use of personal protective equipment (PPE). An effective intervention may involve implementing measures across a number of levels of the hierarchy. Prevention will also be enhanced through the supply and uptake of occupational health information.

Our group has recently undertaken an analysis of 12 years of clinic data from patients seen at the Occupational Dermatology Clinic at the Skin and Cancer Foundation in Melbourne, which has highlighted the common causes of ICD, with exposure to soaps and detergents being the most common, closely followed by exposure to wet work (Matheson, Frowen et al. Submitted for publication).

Exposure surveillance

The ASCC had identified a series of priority occupational diseases on the basis that they were:

- Diseases of latency
- Significant in magnitude and severity
- Had evidence of work-relatedness, and
- Amenable to prevention activity.

Occupational contact dermatitis was one of these priority diseases. The Office of the ASCC convened a national hazard exposure surveillance workshop in June 2006, where experts in occupational diseases meet, in

order to examine what steps needed to be taken to develop to develop a national workplace hazard exposure system. The workshop included hazard specific expert groups which examined the feasibility of surveillance for a given priority hazard.

To address exposure issues concerning occupational contact dermatitis, three skin hazards were selected after review of the literature, discussions with ASCC and after the national workshop. These included:

- Wet work, which is associated with the development of ICD;
- Latex glove use, which is associated with the development of latex allergy, especially with use of powdered latex gloves;
- Use of epoxy resins, which are a well-recognised cause of ACD.

Again, data from the clinic was utilised in this selection process to highlight high risk occupations and common causes of OCD.

Hairdressers have a unique set of risk factors. As junior apprentices they have maximal exposure to wet work when shampooing and rinsing clients' hair. As their training progresses, they are exposed to allergenic chemicals. They are at risk of sensitisation to the hair dye paraphenylenediamine (PPD), bleach (ammonium persulphate) and to glyceryl monothioglycolate in perming solutions. Thus they are at risk of both irritant and allergic dermatitis. They may also be inappropriately and unnecessarily exposed to latex gloves.

Food handlers predominantly experience ICD, although many develop CU from contact with proteins in foods.

Epoxy resin was in the top five allergens causing an occupationally relevant reaction (Matheson, Frowen et al. Submitted for publication).

Those who work with epoxy resins almost only experience ACD as generally epoxy chemicals are not particularly irritating to the skin. However they are strong sensitisers, and almost all epoxy workers who develop dermatitis and are referred to the clinic are found to be allergic to them.

Of those patients suffering from latex allergy assessed at our clinic, 51% were from the healthcare industry (Williams, Lee et al. Accepted for publication). One of the main risk factors for the development of latex allergy is the use of powdered latex gloves. Powder is known to facilitate the development of latex allergy. There is also the risk of latex protein transfer to food when latex gloves are inappropriately worn by food handlers (Nixon and Lee 2001) and we have previously undertaken an intervention study to reduce the use of latex gloves in this occupational group (Lee, Nixon et al. 2001). This study showed that a brief education session can be beneficial in changing work practices concerned with glove use.

For some time, the majority of healthcare institutions have made it policy to provide only non-powdered non-sterile latex examination gloves. However, powdered latex gloves remain freely available from wholesalers and anecdotal evidence from our clinic suggests that there remain numerous areas within the healthcare environment where powdered latex gloves continue to be used. In particular, our experience suggests that these hazardous exposures may be more prevalent in aged care facilities. This presents a significant hazard not only to the worker, but also to any patient allergic to latex.

Over the last two years we have been developing a questionnaire for use in the Occupational Dermatology Clinic to assess dermal exposures. Often workers will be exposed to many different substances including physical or environmental factors, such as heat and sweating, both at work and at home. Sometimes domestic exposures are in fact found to cause a workers' dermatitis, which had previously been presumed to be work related. By documenting all exposures in detail, the complex clinical assessment of work relatedness is made simpler. This questionnaire (SEAT: Skin Exposure Assessment Tool) is currently being trialled in the clinic and a paper detailing its applicability will be submitted for publication soon. The SEAT tool provided the basis for our exposure surveillance questionnaires.

Previous surveillance tools have been developed for use in the occupational hygiene area, and have generally just focussed on one exposure or one task. They were found to be lacking when used in clinical assessments of workers with dermatitis.

In an international context, there are few relevant studies (Jungbauer, Lensen et al. 2004; Anveden, Lidén et al. 2006; Anveden, Wrangsjo et al. 2006). Two observational studies of hand washing have been undertaken with differing results (Jungbauer, Lensen et al. 2004; Anveden, Lidén et al. 2006).

In the first study by Jungbauer reported in 2004, observation of healthcare workers revealed less than half the duration of wet work compared to self-reports, and almost double the frequency of wet exposure periods (Jungbauer, Lensen et al. 2004). By contrast in Sweden, a tendency to over-estimate the frequency of hand washing was found. Reasonable correlations in their study were found for exposure times to water, foods and occlusive gloves (Anveden, Lidén et al. 2006).

These questions regarding exposures were asked in a 1996 Swedish population study of hand eczema and reported in 2006 following validation of the questions as reported above (Anveden, Wrangsjo et al. 2006). Interestingly both cases and controls reported similar exposures to skin irritants. Job titles did not always accurately reflect the risk of exposures.

Chapter 2: Methodology

Our local ethics committee (St Vincent's Hospital) was approached regarding the need for ethics approval for this study. After some discussions, it was decided that if we were to proceed with a skin examination in addition to our questionnaire, then ethics approval was required.

Approval was granted on 8 January, HREC-A 168/06. In addition, a letter of clarification was received and dated 31 January, stating that this ethics approval did cover application of this protocol at external sites, subject to the requirement that the Skin and Cancer Foundation is legally liable in the event of a mishap associated with the study.

By modifying and simplifying the SEAT questionnaire and adapting it to four different populations of workers: those in healthcare, hairdressers, food handlers and users of epoxy resins, it was decided to interview a non-randomised population of workers in the above industries (total number 200 people, spread across the industries, with workplaces identified from our clinic contacts). Basic demographic questions were to be asked, including questions relating to the presence of rashes on the hands and information on exposures. At the time of the interview, a brief examination of the hands was also undertaken. Some of the workers counted the number of times that they are exposed to certain hazards such as washing their hands, to help validate their answers in the survey. No personally identifiable data was to be collected on any individuals, at any time.

The questionnaires were developed for our four pilot groups, nurses, hairdressers, food handlers and users of epoxy resins (Appendix 6). The questionnaire was converted into a format suitable for on-line completion via our website by a consultant in this area. It was proposed that this questionnaire would be computer-based but that interviews would be conducted in person and the answers either directly entered into the computer or entered from a paper copy later. Local experts working in the area of occupational asthma were asked to provide a validated questionnaire for the presence of occupational asthma, but none was available. A literature search was also unhelpful, so participants were just asked about the existence of any job-induced wheeze.

Managers at St Vincent's Hospital were approached initially for permission for their staff to participate, as it was unclear prior to the letter of 31 January whether the study could be performed at sites other than the hospital. We spoke to managers from healthcare areas: intensive care, medical wards, surgical wards and renal dialysis and from catering who authorised their staff to participate in interviews.

The employers of hairdressers attending the Occupational Dermatology Clinic were approached and asked if their salon staff could be interviewed for the study.

A large manufacturer of aircraft parts utilising a process involving epoxy resins was involved and we interviewed approximately 13 workers at the factory. One drawback was that in the middle of last year, we had instructed this workforce on appropriate glove use with epoxies and they were generally now handling them with the correct gloves, which they had not done previously.

Additional workers using epoxy resins were recruited from the workplaces of attendees at the clinic, which required one workplace visit and others answered the questionnaire on the telephone.

Workers from these four industries completed the questionnaire, by interview and answers recorded on paper version of the questionnaire by the interviewer, but also by direct entry of answers into computer by the interviewer. No workers answered the questionnaire on-line by themselves; however the questionnaire was designed for this to occur if required.

Additional workers to make up the numbers were recruited through personal contacts, for example food handlers at a restaurant and nurses at an aged care facility. Interviewers included Dr Jason Williams, dermatologist, Dr Rosemary Nixon, dermatologist, Ms Kath Frowen and Ms Amanda Palmer, researchers.

ODREC obtained numbers of workers in the four different industries, on a national scale, using figures from the Australian Bureau of Statistics (ABS). These figures were used as the denominators to provide prevalence estimates on a national scale.

Sample size estimates were performed for future studies.

Chapter 3: Results and Discussion

Questionnaires

Comments on the methodology are provided in Appendix 5. The questionnaires themselves are included in Appendix 6. No workers declined to participate in the survey, which took approximately 5-10 minutes to complete. Two hundred and three workers participated in the survey and their demographic details are included in Table 2.

Whilst the intention was to perform the interview in person in order to check for the presence of dermatitis, this was not possible in all 203 cases and 22 completed the survey by telephone.

In these occupations there was a predominance of females (70%). There was quite a marked background of atopic eczema in the food handlers (33.3%) and healthcare area (22.1%) but particularly in hairdressing (43.2%). Similarly, there was a history of asthma in 25.1% of the total sample.

We have also observed surprisingly high rates of atopic eczema in hairdressers' previously (Jungbauer, Lensen et al. 2004), which underlines the need for pre-employment counselling (Anveden, Lidén et al. 2006) and the implementation of guidelines for atopics in this high risk profession for OCD (Anveden, Wrangsjo et al. 2006).

As might be expected, those who worked in healthcare were the most qualified, with the majority completing a university degree.

Table 2 also includes the existence of dermatitis on their hands on the day of examination and over the past year. Fifty seven workers or 28.1% of the total reported dermatitis on their hands over the last year, while 27 or 13.3% admitted to dermatitis on the day of examination. Hairdressers had the highest rate of dermatitis over the past year (37.8%) and just slightly more dermatitis on examination day (18.9%) than food handlers.

Users of epoxy resin are more likely to experience ACD not ICD caused by wet work. Excluding that group from analysis, 30.7% of the "wet work" professions, healthcare, hairdressing and food handling reported dermatitis on their hands in the last year.

Overall, people with dermatitis in the past 12 months were significantly more likely to be female (OR 2.5, 95% 1.12-5.6 p=0.03) and more likely to be younger (p=0.07). There was no relationship between age and sex with dermatitis reported on day of interview.

Questions regarding the presence of dermatitis have previously been validated by a Finnish group in the Nordic Occupational Skin

Questionnaire (Roberts, Frowen et al. 2006). They noted that in occupational populations reported previously, that 2.9-32% of participants reported hand dermatitis over the last 12 months. In general populations, the prevalence was 2.5-8.8% (men) and 5.4-14.6% (women). However, it is reasonable to ask how this question distinguishes from pre-existing atopic eczema, or hand eczema which may or not be associated with atopy.

In the Nordic questionnaire, the presence of a history of atopic eczema is assessed by the question “Have you had ever had eczema in the fold of your elbows or behind your knees?” (Roberts, Frowen et al. 2006). Interestingly, for healthcare workers, hairdressers and food handlers, more people had had past eczema than had had dermatitis on their hands in the past year. However, for users of epoxy resin the opposite occurred, although the numbers were small: two had a history of eczema and three recalled dermatitis on their hands over the past year.

The intent of the Nordic questionnaire would appear to be that involvement of the hands (and forearms) implies an occupational origin. Nevertheless, it is possible that this point could be better clarified by the addition of a question such as “Have you had dermatitis on the hands before starting this job?” It is reasonable to note here that the determination of work-relatedness in a clinical context is not always straightforward and is relatively time consuming, in that a comprehensive history, examination and patch testing are required. Asking participants whether they believe their dermatitis to be work-related would introduce significant bias.

Participants were asked to rate their skin from 0 to 10, when 0 is normal skin and 10 is the worst it could be. This rating system is utilised in the Occupational Dermatology Clinic, as when people attend for assessment, their hands have often improved with treatment and it provides a guide as to the severity of their dermatitis. The interviewers also have experience with using the same rating system. The rating by the participant was generally less but similar to the interviewer: for the people who reported dermatitis on the day of interview (n=27) the correlation between consultant and patient rating of severity of dermatitis was moderate but significant (0.46, p=0.02).

Nevertheless, the clinic assessments of dermatitis when scored by the trained examiners were relatively low, range 0-3 for healthcare and hairdressing and 0-4 for food handling, suggesting that this cohort had less severe dermatitis than observed in our clinic population, although we are currently assessing this statistically.

As mentioned, we were unable to source a validated question on asthma. In healthcare and hairdressing, there were similar numbers of participants with past eczema as asthma. In food handling there were slightly less people with asthma and in users of epoxy resin, there were actually more people with asthma than eczema, although only one

complained of job induced wheeze. There was potential exposure to allergens causing asthma in all groups.

Table 2: General demographics and presence of skin problems by occupational group

	Healthcare workers	Hairdressers	Food handlers	Epoxy resin users	Total
N (%)	106 (52.2%)	37 (18.2%)	33 (16.2%)	27 (13.3%)	203 (100%)
Sex (female)	86 (84.3)	32 (86.5)	22 (66.7)	2 (7.7)	142 (70.0)
Age (mean±SD)	35.2 ± 11.7	25.8 ± 7.9	36.6 ± 12.8	36.8 ± 9.7	
Age (range)	20-63	17-52	20-60	18-59	
Highest qualification					
1 Uni degree	73 (70.2)	8 (21.6)	4 (12.1)	1 (3.9)	
2 Diploma	18 (17.3)	3 (8.1)	5 (15.2)	2 (7.7)	
3 Vocational certificate	8 (7.7)	10 (27.0)	7 (21.1)	8 (30.8)	
4 Completed high school	4 (3.9)	6 (16.2)	11 (33.3)	6 (23.1)	
5 Did not complete high school	1 (0.96)	10 (27.0)	6 (18.2)	9 (34.6)	
Past eczema	23 (22.1)	16 (43.2)	11 (33.3)	2 (7.7)	52 (25.6)
Dermatitis on hands in past year	30 (28.9)	14 (37.8)	10 (30.3)	3 (11.5)	57 (28.1)
Dermatitis on hands today	13 (12.3)	7 (18.9)	6 (18.2)	1 (3.7)	27 (13.3)
Patient rating of dermatitis	2.15±1.99	4.86±2.67	2.67±1.2	2	
Mean±SD Range	0-8	2-9	2-5		
Median (IQR)	2 (1-3)	5 (2-7)	2 (2-3)	2 (-)	
Consultant dermatitis rating	0.92±1.12	0.92±1.12	2±1.67	2	
Mean±SD Range	0-3	0-3	0-4		
Median (IQR)	1 (0-1)	3 (0-7)	2.5 (0-3)	2 (-)	
Asthma ever	22 (21.2)	15 (40.5)	8 (24.2)	6 (23.1)	51 (25.1)
Job induced wheeze	9 (8.7)	2 (5.4)	4 (12.1)	1 (3.9)	16 (7.9)
Skin cancer	8 (7.7)	0	0	1 (3.9)	

The question on skin cancer was included as it may be of interest in future applications of this questionnaire.

Although they were not specifically asked in the questionnaires, it was our impression that relatively few of the participants had sought medical care for their dermatitis. This corroborates our previous findings that dermatitis is often considered by workers to be “part of the job” and that

medical attention is only occasionally sought (Saunders, Keegel et al. 2003). In the future, this question could be added.

Three of the industries surveyed are known to have high rates of wet work, and this was reflected in Table 3: Wet work by occupational group. Almost all hairdressers, but only half those in healthcare, performed wet work. More information regarding job descriptions for those in healthcare and food handling is provided in Appendix 7. Some instrument technicians were included in the healthcare group, who may not have had as much exposure to wet work. It is noted that the healthcare and food handling groups contained individuals working in a number of different areas within these industries and so could be regarded as quite heterogeneous groups.

Epoxy resin users will not be included in further discussions of "wet work" as they did not perform wet tasks. The epoxy workers were broadly divided into two groups: those working in the manufacture of aircraft parts using epoxy-impregnated carbon fibre and those working in the surface coatings area. Neither area is particularly well characterised using the ABS classifications listed later on in the Results.

Table 3: Wet work by occupational group

	Healthcare workers	Hairdressers	Food handlers	Epoxy resin users
N (%)	106 (52.2%)	37 (18.2%)	33 (16.2%)	26 (13.3%)
Wet tasks performed	52 (49.1)	36 (97.3)	27 (81.8)	0

The performance of "wet tasks" does not equate to the definition of "wet work" as mentioned above but denotes the performing of certain discrete tasks, such as showering a patient, dishwashing, shampooing hair, as listed in Table 25, Appendix 7.

The relationships in this pilot study between any type of wet tasks being performed in healthcare workers, hairdressing and food handling and the presence of current dermatitis or dermatitis in the past year were not found to be significant (Table 4).

Table 4: Relationship between any type of wet work and dermatitis in the last year and on the day of interview in healthcare workers

	N	Wet work N (%)	OR (95% CI)	P
		52 (49.1)		
Dermatitis in the past year	31	13 (25.0)	0.71 (0.39, 1.29)	0.26
Dermatitis today	13	5 (9.6)	0.61 (0.21, 1.75)	0.35

Similarly, when wet tasks were subdivided, there were no significant relationships between wet tasks performed and dermatitis, in this sample size (Table 5).

Table 5: Risk of dermatitis in the last 12 months by type of wet work in hairdressers, healthcare workers and food handling workers

Occupational group	N	Wet work task	OR (95% CI)	P
Hairdressers	37	General cleaning	0.81 (0.36, 1.85)	0.62
		Shampooing	0.73 (0.25, 2.14)	0.60
		Handling damp hair	0.93 (0.37, 2.29)	0.87
Healthcare workers	106	Patient hygiene	1.20 (0.67, 2.18)	0.54
Food handlers	33	Dishwashing	1.33 (0.47, 3.76)	0.59
		Food preparation	0.50 (0.18, 1.37)	0.18
		General cleaning	2.20 (0.68, 7.06)	0.16
		Other	2.30 (0.85, 6.21)	0.10

Rates of hand washing are reported in Table 6: Hand washing frequency by occupational group. Those who washed their hands more than 20 times per shift were as follows: for food handlers, 26/33 (78.8%), for hairdressers 19/37 (51.4%) and in healthcare workers 26/102 (25.5%). Hand washing greater than 20 times per shift is a threshold utilised by previous authors. (Jungbauer, Lensen et al. 2004)

Appreciable numbers of food handlers and also hairdressers washed their hands more than 20 times per shift and this was easily assessed by the questionnaire. The German legislation relating to wet work, the

Technische Regeln fur Gefahrstoffe 531, cautions against work with more than 25% of the activities that cause the hands to become wet (more than 2hr and/or frequent; more than 20 times in an 8 hour shift) because of the significant risk of hand dermatitis (Coenraads and Diepgen 1998). Guidelines were produced for the Office of the ASCC on wet work in Australia incorporating some of this information (Susitaival, Flyvholm et al. 2003).

Table 6: Hand washing frequency by occupational group

	Healthcare workers	Hairdressers	Food handlers	Epoxy resin users
N (%)	106 (52.2)	37 (18.2)	33 (16.2)	27 (13.3)
< 10 times	29 (27.4)	5 (13.5)	2 (6.1)	21 (77.8)
11-15 times	30 (28.3)	7 (18.9)	2 (6.1)	3 (11.1)
16-20 times	19 (17.9)	6 (16.2)	3 (9.1)	0 (0.0)
21-25 times	7 (6.6)	6 (16.2)	5 (15.2)	1 (3.7)
26-40 times	11 (10.4)	9 (24.3)	7 (21.2)	0 (0.0)
> 40 times	8 (7.6)	4 (10.8)	14 (42.4)	1 (3.7)
missing	2 (1.9)	0 (0.0)	0 (0.0)	1 (3.7)

Table 7: Hand washing type by occupational group records appreciable use of liquid soap, particularly in hand washing by hairdressers (73.0%), but also in food handling (39.4%) and healthcare (30.2%). Interestingly, the “other” group for hairdressers involved them washing their hands with shampoo. No hairdressers or food handlers washed their hands with a soap-free wash which is recommended according to published guidelines (Nixon, Roberts et al. 2006).

Not surprisingly, healthcare workers most often used antiseptic washes (62.3%).

However, they also frequently use alcohol based hand rubs, also called waterless hand cleansers, as noted in Table 8: Frequency of alcohol based hand rubs usage in healthcare workers. In healthcare workers, 42/106 (39.6%) used these products more than 20 times a day. The use of these rubs should enable less episodes of hand washing with water.

More information on the tasks performed is provided in Appendix 7.

Table 7: Hand washing type by occupational group

Type of wash	Healthcare workers	Hairdressers	Food handlers	Epoxy resin users
	N =106* (%)	N =37 (%)	N = 33 (%)	N =27**(%)
Water alone	0 (0.0)	4 (10.8)	5 (15.2)	0 (0.0)
Water & antiseptic	66 (62.3)	0 (0.0)	13 (39.4)	0 (0.0)
Water & soap bar	3 (2.8)	0 (0.0)	1 (3.0)	0 (0.0)
Water & liquid soap	32 (30.2)	27 (73.0)	13 (39.4)	20 (74.1)
Soap free hand wash	3 (2.8)	0 (0.0)	0 (0.0)	1 (3.7)
Other	0 (0.0)	6 (16.2)	1 (3.0)	5 (18.5)
Brush	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

*2 missing; ** 1 missing

Table 8: Frequency of alcohol based hand rubs usage in healthcare workers

	N= 106	%
Total using alcohol based hand rubs	79	74.5
1-5 times/day	19	24.1
6-10 times/day	10	12.7
11-15 times/day	3	3.8
16-20 times/day	5	6.3
More than 20 times/day	42	53.2

Table 9 details the presence of dermatitis when compared to the use of alcohol based hand rubs more than 10 times a day. While dermatitis was not significantly more common, there was a trend of increasing amounts of dermatitis in those using rubs more frequently. This would corroborate our anecdotal experience in the clinic that sometimes healthcare workers continue to wash their hands as they did previously, as well as using the alcohol rubs.

Use of the RASH workplace education tool would assist in the provision of important and useful instruction in such areas (Appendix 8).

Table 9: Risk of dermatitis in the last 12 months by amount of hand washing with alcohol based hand rubs in healthcare workers

Hand wash count	Dermatitis (N)	(%)	OR (95% CI)	P
< 10 times/day (n=30)	7	23.3	1.0	
> 10 times/day (n=50)	16	32.0	1.55 (0.55, 4.35)	0.41

Food handlers particularly perform episodic wet work for long periods, as detailed in Table 10. In fact 66.7% (22/33) admitted to more than 20 episodes per day of a task involving wet work for more than 15 minutes. This translated to longer total periods of wet work, as detailed in Table 11: Total duration of performing wet work by occupational group.

Note that epoxy workers who are principally at risk of ACD not ICD from wet work were not included in this table.

Table 10: How often wet work tasks were performed (more than 15 min) per day by occupational group

	Healthcare workers	Hairdressers	Food handlers
N (%)	106 (52.2%)	37 (18.2%)	33 (16.2%)
Less than daily	1 (0.9)	0 (0.0)	0 (0.0)
1-5/day	43 (40.6)	6 (16.2)	2 (6.1)
6-20/day	2 (1.9)	13 (35.1)	5 (15.2)
11-20/day	5 (4.7)	12 (32.4)	2 (6.1)
Over 20/day	1 (0.9)	5 (13.5)	22 (66.7)
Don't perform wet work	54 (50.0)	1 (2.7)	2 (6.1)

Surprisingly, 72.7% of food handlers in our survey said that they performed over 4 hours wet work per day, highlighting the need for greater awareness of the issue of wet work. As mentioned previously, this includes the definition that any part of the body is in water or other liquids for longer than 2 hours a shift.

Future initiatives to reduce hand washing in food handlers could include the use of alcohol-based rubs and use of tools such as tongs to avoid wetting hands.

Table 11: Total duration of performing wet work by occupational group

	Healthcare workers	Hairdressers	Food handlers
N (%)	106 (52.2%)	37 (18.2%)	33 (16.2%)
Less than 30 mins/day	10 (10.4)	0 (0.0)	0 (0.0)
30 mins to 2 hours/day	31 (29.3)	10 (27.0)	3 (9.1)
2-4 hours/day	8 (7.6)	12 (32.4)	4 (12.1)
Over 4 hours/day	2 (1.9)	14 (37.8)	24 (72.7)
Don't perform wet work	54 (50.0)	1 (2.7)	2 (6.1)

In Table 12, there is a significant relationship between hairdressers washing their hands more than 20 times daily with a history of dermatitis in the last 12 months. It is possible that the "homogeneity" of the hairdressing group, that is all performing similar work with similar exposures, led to this result. The results for the other work areas did not achieve significance. This could be addressed both by increasing the sample size in future studies, and concentrating on groups of workers all performing approximately similar tasks.

Hand washing greater than 20 times per shift is a threshold utilised by previous authors (Jungbauer, Lensen et al. 2004). Our results were assessed to see if lesser amounts of hand washing were associated with significant rates of dermatitis in the past year by hairdressers, but the sample sizes were too small in these groups.

Table 12: Risk of dermatitis in the last 12 months by amount of hand washing in different occupational groups

Occupational group Hand wash count	Dermatitis N (%)	OR (95% CI) P
Healthcare		
< 20 times/day (n=78)	23 (29.5)	1.0
>20 times/day (n=26)	8 (30.8)	1.06 (0.41, 2.79) 0.90
Hairdresser		
< 20 times/day (n=18)	2 (11.1)	1.0
>20 times/day (n=19)	12 (63.2)	13.7 (2.41, 78.2) 0.003
Food handling		
< 20 times/day (n=7)	3 (42.9)	1.0
>20 times/day (n=26)	7 (26.9)	0.49 (0.09, 2.77) 0.42
Epoxy users		
< 20 times/day (n=24)	2 (8.3)	1.0
>20 times/day (n=2)	1 (50.0)	11.0 (0.48, 250.9) 0.13

The numbers of times participants said that they washed their hands was validated by giving them charts to record when they washed their hands. In fact their estimates and actual hand washing counts were reasonable for lower amounts of hand washing, but more inaccurate at higher levels, particularly 21-25 times (N=3) which was estimated at 11.60±2.22, 26-40 times (N=7) at 12.00±5.82 and >40 times (N=4) at 20.00±12.10.

Table 13: Comparison of reported hand washing and actual hand washing

Report hand washing	N	Mean ± SD	Range
<10	9	9.75 ± 5.09	2.67 - 18.0
11-15 times	6	9.00 ± 7.50	3.30 - 22.7
16-20 times	6	16.60 ± 5.53	10.3 - 25.0
21-25 times	3	11.60 ± 2.22	9.00 - 13.0
26-40 times	7	12.00 ± 5.82	4.00 - 20.0
> 40 times	4	20.00 ± 12.10	10.7 - 37.7

Use of skincare measures was also assessed in the questionnaires, such as the use of a moisturiser for the hands. Moisturisers were most often

supplied in the healthcare area, despite the fact that the above Table 12 indicates that hairdressers who washed their hands more than 20 times a day were at greatest risk of dermatitis. Although moisturisers are often supplied in some occupations, they are quite frequently never used or used less than daily. In particular, despite moisturisers frequently being supplied for use by healthcare workers (93.4%), they were only used at least once daily by 48.5% (48/99).

Only 40.5% of hairdressers had moisturiser supplied at their workplace, despite their frequent wet work. This emphasises the importance of educational programs about skincare in workplaces, such as the RASH project (2005, see Appendix 8). By contrast, moisturiser supply is of less importance in those workplaces where the main risk is of ACD rather than ICD, which applies to epoxy workers.

Table 14: Frequency of moisturiser supply and usage by occupational group

	Healthcare workers	Hairdressers	Food handlers	Epoxy users
N (%)	106 (52.2%)	37 (18.2%)	33 (16.2%)	26 (13.3%)
Moisturiser was supplied	99 (93.4)	15 (40.5)	15 (45.5)	4 (14.8)
Never	32 (30.2)	2 (5.4)	9 (27.3)	4 (14.8)
Less than daily	19 (17.9)	5 (13.5)	4 (12.1)	1 (3.7)
1-2 times daily	25 (23.6)	2 (5.4)	1 (3.0)	
3-5 times daily	15 (14.2)	3 (8.1)	1 (3.0)	
Over 5 times daily	9 (8.5)	2 (5.4)		

Glove use was assessed and presented in Table 15. Not only did 35% of hairdressers not wear any gloves, the same percentage wore latex gloves, which are regarded as being inappropriate for hairdressing (Bourke, Coulson et al. 2001), since they are associated with the risk of latex allergy. In particular, almost all of the hairdressers wore the cheaper powdered disposable latex gloves, which have a greater risk of latex allergy. We have also reported on the problem of latex allergy in hairdressers locally (ODREC Unpublished).

The highest rate of non-glove wearing occurred in hairdressers (35.1%), followed by food handlers (27.3%).

While no healthcare workers used powdered latex gloves, two workers used vinyl gloves, which are generally not regarded as being suitable for work with bodily fluids. There has been relatively little education in the healthcare community regarding the unsuitability of vinyl gloves to adequately protect against blood-borne pathogens.

A surprising 27% of food handlers did not wear gloves, although this would need to be correlated with their exact job description. One wore latex gloves and it was mentioned earlier that this is potentially hazardous, as minute amounts of latex could be transferred to those eating the food (Nixon and Lee 2001).

In the epoxy users group, 13/24 (52%) workers were assessed by the interviewer as not to be wearing the correct gloves. This result would have been higher, had we not recently been involved in an education program in the aircraft parts workforce. In the Occupational Dermatology Clinic, we have never assessed a worker with ACD to epoxy resins who was wearing the correct gloves when working with epoxies. It is well known by experts in this area that many glove types do not protect adequately against epoxy resins, as these chemicals often penetrate through gloves.

However in this cohort, the aircraft manufacturers were all wearing appropriate reusable nitrile gloves, as there had previously been an outbreak of dermatitis at the factory, with many cases of allergic contact dermatitis being diagnosed, resulting in substantial workplace education by our group. All of those working in the floor finishing area however, wore inappropriate gloves for work with epoxies.

Table 15: Glove usage by occupational group

	Glove type	Healthcare workers†	Hairdressers	Food handlers	Epoxy users††
	N (%)	174	37	33	39
1	Cotton gloves	1 (0.6)	0 (0.0)	0 (0.0)	7 (18.0)
2	Disposable latex	88 (50.6)	13 (35.1)	1 (3.0)	10 (25.6)
	-Powdered	0	12 (13.6)	0 (0.0)	1 (10.0)
3	Disposable vinyl	2 (1.2)	3 (8.1)	21 (63.6)	0 (0.0)
4	Disposable nitrile	12 (6.9)	0 (0.0)	0 (0.0)	8 (20.5)
5	Reusable neoprene	0 (0.0)	0 (0.0)	2 (6.1)	2 (5.1)
6	Reusable rubber	12 (6.9)	8 (21.6)	2 (6.1)	0 (0.0)
7	Reusable PVC	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
8	Reusable leather/cloth	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
9	Do not know	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
10	Surgical latex	52 (29.9)	0 (0.0)	0 (0.0)	0 (0.0)
11	Surgical neoprene	4 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)
12	Reusable nitrile	0 (0.0)	0 (0.0)	0 (0.0)	10 (25.6)
	Do not wear any	3 (1.7)	13 (35.1)	9 (27.3)	2 (5.1)

†68 used more than 1 type of glove; †† 12 used more than 1 type of glove

When considering the risk of dermatitis by glove type, there was a significantly decreased tendency for dermatitis in those food handlers wearing vinyl gloves. These gloves are regarded as being appropriate for food handlers and thus this result would fit with expectations.

Given that rates of latex allergy in healthcare workers are now declining with the advent of use of non-powdered gloves, and are in the order of 5%, it is perhaps not surprising that there was no increased risk of dermatitis demonstrated with use of latex gloves in this sample size. In addition, latex allergy may present with symptoms of itching and burning, but may not necessarily present with dermatitis.

Table 16: Risk of dermatitis in the last 12 months by type of glove used in different occupational groups

Occupational group Glove type	Dermatitis N(%)	OR (95% CI) P
Healthcare workers	N=31	
Disposable latex (n=88)	24 (27.3)	0.48 (0.16, 1.44) 0.19
Disposable vinyl (n=2)	1 (50.0)	2.40 (0.15, 39.6) 0.54
Disposable nitrile (n=12)	6 (50.0)	2.68 (0.79, 9.09) 0.11
Surgical latex (n=52)	15 (28.9)	0.91 (0.39, 2.11) 0.83
Surgical nitrile (n=3)	2 (66.7)	4.97 (0.43, 56.9) 0.20
Hairdressers	N=14	
Disposable latex (n=13)	4 (30.77)	0.62 (0.15, 2.60) 0.52
Disposable vinyl (n=3)	2 (66.67)	3.67 (0.30, 44.7) 0.31
Reusable rubber (n=8)	2 (25.00)	0.47 (0.08, 2.75) 0.40
Food handlers	N=10	
Disposable vinyl (n=21)	3 (14.3)	0.12 (0.02, 0.64) 0.013
Epoxy resin users	N=3	
Disposable nitrile (n=9)	1 (11.11)	0.94 (0.07, 12.0) 0.96
Reusable nitrile (n=10)	1 (10.0)	0.78 (0.06, 9.88) 0.85

The gloves utilised were often considered effective, as assessed by how often liquid inadvertently entered gloves. However quite appreciable numbers reported liquid inside their gloves sometimes/usually/always: healthcare 18/99 (17.2%); hairdressing 13/24 (54.2%), food handling 17/24 (70.8%).

Table 17: Liquid inside gloves by occupational group

Frequency of liquid in gloves	Healthcare workers	Hairdressers	Food handlers	Epoxy users
N (%)	106 (52.2)	37 (18.2)	33 (16.2)	27 (13.3)
Always	1 (0.9)	2 (5.4)	2 (6.1)	0 (0.0)
Usually	1 (0.9)	1 (2.7)	2 (6.1)	0 (0.0)
Sometimes	16 (15.1)	10 (27.0)	13 (39.4)	4 (14.8)
Rarely	18 (17.0)	4 (10.8)	2 (6.1)	2 (7.4)
Never	63 (59.4)	7 (18.9)	5 (15.2)	19 (70.4)
Missing	7 (6.6)	13 (35.1)	9 (27.3)	2 (7.4)

Table 18: Problems with wearing gloves

	Healthcare workers	Hairdressers	Food handlers	Epoxy users
N	155 †	52 ‡	48 §	40 ††
Hands too hot and sweaty in gloves	53	16	11	18
Gloves tear or break easily	25	1	7	6
Forget to wear	1	2	0	1
Difficult to work with	11	6	9	9
Gloves don't go far enough up arms	8	4	4	1
Other	2	0	4	0
Water gets inside gloves	19	6	0	0
Pull out client's hair				
Missing	36	17	13	5

† n=29 multiple answers; ‡ n=10 multiple answers; § n=9 multiple answers; †† n=10 multiple answers

Workers employed in these areas

Data from Australian Bureau of Statistics 2001 Census of Population and Housing was sought (van der Walle and Brunsveld 1995). The aim of obtaining this data was to calculate the numbers of workers who may be exposed to risk factors for OCD such as wet work and the inappropriate use of latex gloves, given the findings from the exposure surveys.

Table 19: Workers in healthcare

	Male	Female	Total
Nursing professionals	14,613	156,994	171,607
Miscellaneous health professionals	27,870	43,370	71,240
Medical practitioners	32,434	15,777	48,211
Enrolled nurses	1,691	17,807	19,498
Welfare associate professionals	6,259	11,978	18,237
Miscellaneous health and welfare professionals	9.454	7,910	17,364
Total	92,321	253,836	346,157

Table 20: Workers in hairdressing

	Male	Female	Total
Hairdressers	7,018	35,705	42,723

Table 21: Workers in food handling

	Male	Female	Total
Food tradespersons	57,074	27,961	85,035
Elementary food preparation and related workers	44,047	50,949	94,996
Total	101,121	78,910	180,031

However, these figures exclude workers predominantly classified as hospitality who perform some food handling.

Table 22: Users of epoxy resin

	Male	Female	Total
Final finishes construction tradespersons*	45,838	2,291	48,129
Fabrication engineering tradespersons**	61,017	570	61,587
Total	106,855	2861	109,716

* Likely to include workers not working with epoxies

**Likely to include workers not working with epoxies

Sample size calculations for future studies

Sample size calculations would need to be based on which question was being utilized, for example, the presence of dermatitis during the past year.

Table 23: Sample size estimates assuming a 2-fold increased risk of dermatitis in the last 12 months

Exposure prevalence in controls	Controls: cases ratio	Sample size controls	Cases	Total
25%	3:1	321	107	428
30%	3:1	300	100	400
40%	3:1	285	95	380
50%	3:1	297	99	396
60%	3:1	336	112	448
70%	3:1	414	138	552

* assumes a prevalence of dermatitis of 30%

In hairdressers, the prevalence of hand washing more than 20 times per day in those without dermatitis in the last 12 months was 25%. A total sample size of 428 subjects (hairdressers) would be required in order to observe a 2-fold increased risk of dermatitis if the prevalence of hand washing was 25% in the controls. If the prevalence of hand washing in the controls was 50% then the required sample size would be 396 subjects.

These sample size calculations will be the same for any exposure since the prevalence of dermatitis was similar (~30%) in the different occupational groups.

Population data

The ABS data from 2001 indicates that there are significant numbers of workers employed in these fields in Australia. In the healthcare area, there are more worker categories and probably a variety of job types, with some varied amount of exposures. These totalled 346,157. There were 42,743 hairdressers and 180,031 workers in food handling, although this does not include those classified in hospitality, some of whom at least would be expected to handle food. These might include bar attendants and waitresses, for example.

However, 109,000 workers were thought to represent a significant over-estimate of workers exposed to epoxy resin. Whilst workers who use epoxy resins would be expected to be included in both “final finishes

construction tradespersons" and "fabrication engineering tradespersons," the majority of workers in these areas would not use epoxies.

This enables crude estimates of those at risk as follows:

Presence of dermatitis	
Healthcare	Dermatitis over past year (28.9%) or 100,039 workers Dermatitis on day of examination (12.3%) or 42,577
Hairdressers	Dermatitis over past year (37.8%) or 16,157 workers Dermatitis on day of examination (18.9%) or 8078 workers
Food handlers:	Dermatitis over past year (30.3%) or 54,550 workers Dermatitis on day of examination (18.2%) or 32,766 workers

Assuming rates of dermatitis over the past year of 11.5% and on the day of examination of 3.7%, the corresponding figures for epoxy workers would be 12,617 and 4056 respectively.

Those washing their hands more than 20 times per shift	
Healthcare	25.5% of 346,157 or 88,270 workers or 25,500/100,000 workers
Hairdressers	51.4% of 42,723 or 21,960 workers or 51,400/100,000 workers
Food handlers:	78.8% of 180,031 or 141,864 workers or 78,800/100,000 workers

Those wearing powdered latex gloves	
Hairdressers	12/37 or 32.4% or 13,856 workers. Even at a rate of latex allergy at the same as the normal population, less than 5%, this implies there is significant risk of latex allergy. This risk is also enhanced by atopy, and the high rate of atopy in hairdressers has already been alluded to.19

Chapter 4: Conclusion

This pilot study has highlighted key areas for future work in the area of skin exposure surveillance, particularly in regards to wet work, inappropriate use of latex gloves by hairdressers and food handlers and incorrect glove use by epoxy resin workers.

In regards to wet work, the survey has shown appreciable exposure to skin irritants, particularly wet work, as shown through the frequency of hand washing, the number of tasks involving wet work and total duration of wet work per shift. It is generally recognised that wet work is associated with an increased risk of ICD of the hands, although the literature detailing this risk is limited.

Food handlers, hairdressers and healthcare workers washed their hands many times during the course of a working day. Many workers washed their hands more often than recommended by international and national guidelines. Workers' own estimates of the number of hand washes were accurate for lower levels of hand washing but not for 21 or more washes per shift. Moisturiser use on the hands was suboptimal. These results reinforce the need for both workplace policies on wet work practices and workplace education. In addition, it would be extremely useful to clarify the validity of the worker estimates for hand washing, as has occurred in two overseas' studies.

Our data highlights that latex gloves were used primarily by both healthcare workers and hairdressers. Healthcare workers have traditionally used latex gloves as they provide appropriate protection from blood borne pathogens, and they almost always used non-powdered latex gloves. Powdered latex gloves were found to be used by hairdressers, who actually do not need protection from blood borne pathogens. Use of powdered gloves is a risk factor for the development of latex allergy. There are many other more suitable glove types available for hairdressers. As well, two healthcare workers were incorrectly using vinyl gloves, which do not offer adequate protection from pathogens.

Finally, many epoxy resin workers used gloves which would not prevent exposure to these highly sensitising chemicals, rather than protective thick, reusable nitrile gloves.

The pilot study provides robust evidence to support the development of national educational campaigns by stakeholders to address some of these important and reversible risk factors for occupational dermatitis. Future approaches could include the validation of these questions through observation and a more extensive surveillance program involving many different occupations. Phased withdrawal of the use of powdered latex gloves and the widespread use of the RASH workplace training tool are important measures which merit serious consideration.

Summary of conclusions
Hairdressers inappropriately wore latex gloves, which were almost always powdered.
In most circumstances healthcare workers wore appropriate non powdered latex or nitrile gloves, with the exception of two cases where vinyl gloves were worn, which provide suboptimal protection from blood borne pathogens.
Epoxy resin workers often wore gloves which do not offer sufficient protection from epoxy resins.
Food handlers, hairdressers and healthcare workers washed their hands many times during a working day, and often more than recommended by national and international guidelines.
Moisturiser use was suboptimal in those who performed wet work, suggesting the need for a comprehensive skincare program in workplaces, such as provided by the RASH educational tool.

Chapter 5: Questions for the national survey

Possible questions for discussion

1. Do you wear powdered latex gloves in performing your work duties?

This is a useful question, but many people do not know what their gloves are made from and our clinic experience suggests that latex and vinyl are frequently confused. Photos provided in the questionnaire may help the participant to respond accurately. It would be possible to validate this question in our clinic population before the national survey.

2. How many times do you wash your hands with water during a working day?

This question contributes information about an important cause of wet work. Our results presented here already suggest that this question has validity.

3. What glove type do you use?

This question will flag areas where people are not wearing the right gloves for the job, using our experience as to the appropriate glove for the occupation.

4. Have you ever had eczema in the folds of inner elbows or behind the knees (even as a baby)?

This is a validated questionnaire about past eczema, which is an important risk factor for occupational dermatitis. However, highlighting this association sometimes results in people with past eczema being discriminated against.

5. Have you had dermatitis on your hands in the last 12 months?

This is a useful question regarding the prevalence of dermatitis, but of course there are many other causes of rashes on the hand which may not be accurately diagnosed by the respondent.

6. Do you have dermatitis on your hands today?

This is a useful question regarding the point prevalence of dermatitis, but similar reservations apply to this question with respect to the accuracy of the self-diagnosis.

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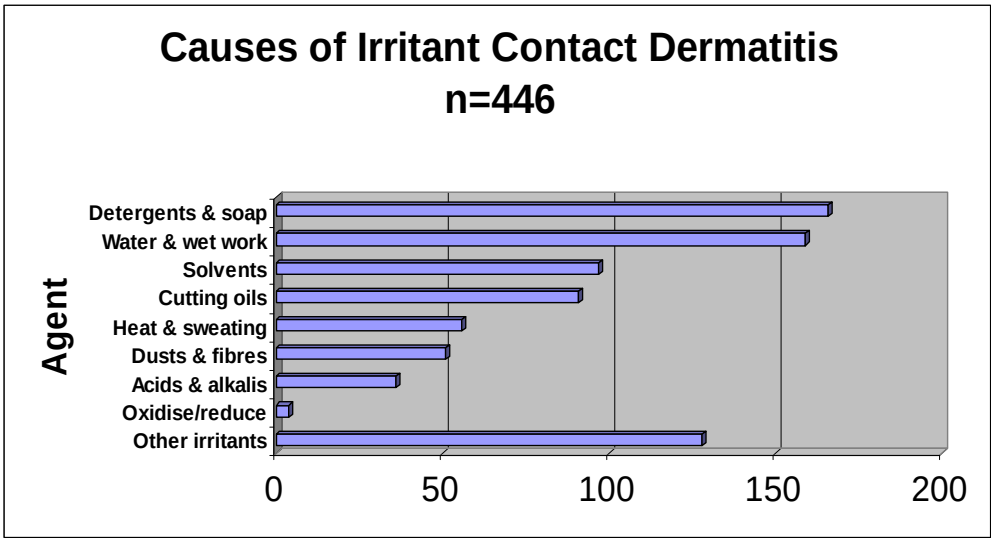
Appendix 1: Irritants and wet work

The most common irritants causing irritant contact dermatitis in an occupational dermatology clinic in Melbourne are listed in Figure 3.

Figure 1: Most common causes in primary diagnosis of irritant contact dermatitis from an occupational dermatology clinic



Appendix 2: Mathias Criteria

Criteria for establishing occupational causation and aggravation (Lammintausta 2000)

The clinical appearance is consistent with contact dermatitis.

There are workplace exposures to potential cutaneous irritants or allergens.

The anatomic distribution of dermatitis is consistent with the form of cutaneous exposure in relation to the job task.

The temporal relationship between exposure and onset is consistent with contact dermatitis.

Non-occupational exposures are excluded as likely causes.

Removal from exposure leads to improvement of dermatitis.

Patch tests or provocation tests implicate a specific workplace exposure.

Probable occupational causation may be considered if 4 of the 7 criteria are met.

Appendix 3: Allergens

There are an enormous number of allergens used in a wide variety of industries that have the potential to cause allergic contact dermatitis (refer Table of Common Occupational Allergens).

As previously discussed, the relevance of a positive patch test reaction is a key factor. As demonstrated in Figure 1, many of the reactions seen are not of relevance to the patients' current clinical problem.

Figure 2: Top 15 relevant allergen reactions of 1590 patients in an occupational dermatitis clinic, Melbourne

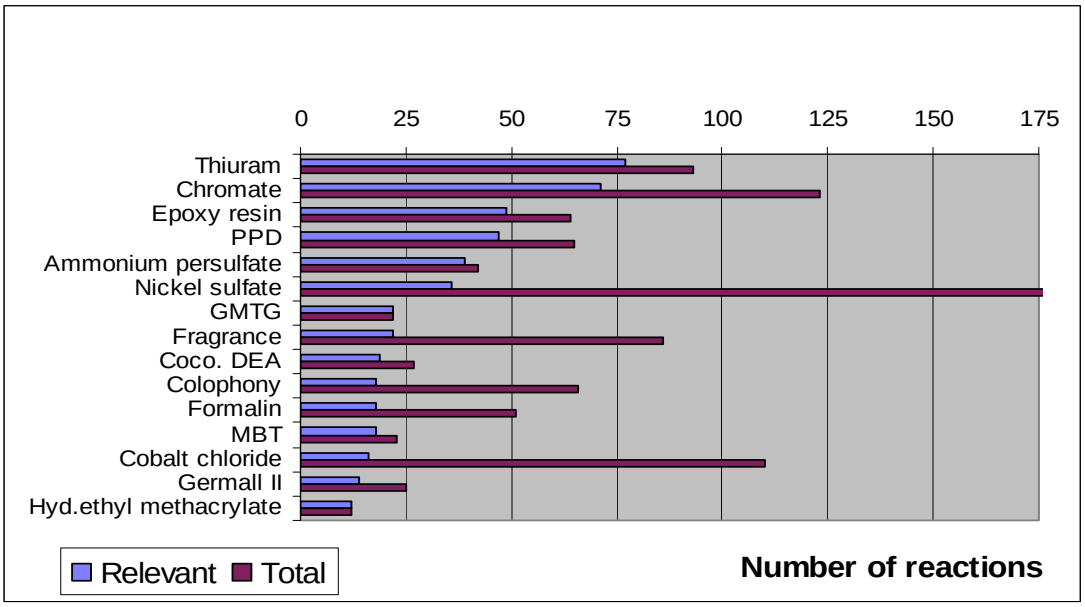


Table 23: Common occupationally relevant allergic reactions from an Occupational Dermatology Clinic in Melbourne, Australia

Allergen	Relevant reactions of 1500 workers referred for assessment	Occupational uses:	Percentage of Occ. clinic population (relevant reactions only)
Thiuram (mixture)	61	Accelerators & activators used in manufacture of rubber products	4.0%
Potassium dichromate	56	Present in cement, tanned leather & many other situations	3.7%
Paraphenylenediamine (PPD)	42	Primary intermediate in permanent hair dyes, as well as other uses	2.8%
Epoxy resin	37	2 pack glues, commonly used as a coating for industrial flooring	2.4%
Ammonium persulfate	36	Hair bleach as an oxidizer & bleach	2.4%
Tetraethylthiuram disulfide (TETD)	36	A component of the thiuram mix	2.4%
Nickel sulfate	30	Base metal used in many metallic objects & alloys	2%(*Total=10.8%)
Tetramethylthiuram monosulfide (TMTM)	27	A component of the thiuram mix	1.8%
Tetramethylthiuram disulfide (TMTD)	23	A component of the thiuram mix	1.5%
Glyceryl monothioglycolate (GMTG)	20	"Acid" permanent wave solution used in hairdressing	1.3%
Dipentamethylenethiuram disulfide (PTD)	19	A component of the thiuram mix	1.3%
Fragrance	18	Used in many products to disguise the chemical smell, particularly skin washes & preparations	1.2%
Coconut diethanolamide (Coco. DEA)	16	Mixture of ethanolamides of coconut acid, used in hand washes & cooling fluids	1.1%
Colophony	15	Yellow resin from pine, used in varnishes, inks, paper, cutting fluids, glues, surface coatings	1.0%
Formalin	15	Preservative especially in industry	1.0%
Cobalt chloride	14	Base metal used in many metallic objects & alloys, also cement	0.9%
2-Mercaptobenzothiazole (MBT)	14	Accelerator used in rubber products	0.9%
Germall II (Diazolidinylurea)	13	Formalin releasing preservative used in hand washes & skin care creams	0.9%
2-Hydroxyethyl methacrylate	12	Methacrylic monomer used in acrylic finger nails, dental materials, adhesives & lacquers	0.8%
Dowicil 200 (Quaternium 15)	11	Formalin releasing preservative used in hand washes & skin care creams	0.7%
Ethyleneglycol dimethacrylate	11	Cross-linking methacrylic monomer used in acrylic finger nails, dental materials, adhesives & lacquers	0.7%

Relevance: These reports did not take into consideration whether the reaction to the allergen was relevant to the patients' skin condition, just that they were allergic to this chemical. This is particularly noticeable for nickel, where reactions are very common, but occupational relevance is relatively rare.

Appendix 4: Hierarchy of controls

Controlling the health and safety risks in a workplace is necessary to prevent injury and illness. First, identify and assess the risks, then decide on the best way to control (i.e. remove or reduce) them, by applying the Hierarchy of Controls.

The Hierarchy of Controls = preferred order of control measures for OHS risks.

Elimination - Controlling the hazard at source.

Substitution - eg Replacing one substance or activity with a less hazardous one

Engineering - eg Installing guards on machinery

Administration - Policies and procedures for safe work practices

Personal Protective Equipment - eg respirators, ear plugs

When deciding on the best way to control a risk, start at the top of the hierarchy of controls, i.e. investigate if the risk can be eliminated first, for example by changing the way the work is done, or by using safer substances or equipment. This is the most effective way to control a hazard. If these methods are not possible, use engineering or administrative controls to reduce or minimise the risk.

Appendix 5: Comments on the methodological aspects

We believe that our pilot study has shown that this method of exposure surveillance is feasible and achievable, relatively brief to perform taking in the order of 5-10 minutes, and acceptable to workers and management. To date, we have had no complaints or concerns about the study or any refusals to participate.

After initial discussions, we included a brief hand examination as part of the questionnaire. It was thought that this might provide some useful information and might in a larger study provide some correlation with those whose exposures placed them at increased risk of dermatitis.

The addition of the examination necessitated ethics approval: our advice from the Ethics Committee of St Vincent's Hospital who administers ethics applications at the Skin and Cancer Foundation was that simply administering a de-identified questionnaire did not require ethics approval.

In fact 27 workers or 13.3% in our pilot study had abnormalities on examination. By including the hand examination as part of the questionnaire, it required the interviewer to meet with the participant. If this question were not included, then the questionnaire could have been performed remotely and completed on-line. This would probably be an easier way to conduct skin exposure surveillance in the future, as it would require less time for the examiners and workers could then complete questionnaire at a time that is most suitable for them.

The ease of obtaining data regarding skin exposure in this manner has given us a new perspective for future studies.

Appendix 6: Skin Exposure Online Surveys

Skin Exposure Online Survey- Healthcare

Front screen
Please select your industry (have icons/words for each of the following)
Aircraft manufacturing
Floor finishing
Cafes/restaurants/food retailing/pubs/bars/food processing
Hairdressing/beauty salons
Health Services

Question 1: Demographic questions

1a. Are you male/female?	**Male**	☐
	Female	☐
1b. How old are you? ***Please type age in box.***		☐
1c. What is your highest level of education?	**University degree or higher**	☐
	Undergraduate or associate diploma	☐
	Vocational certificate	☐
	Completed school	☐
	Did not complete secondary school	☐

1d. Have you ever had eczema in the folds of inner elbows or behind the knees (even as a baby) **Yes ☐ No ☐**

1e. Have you had dermatitis on your hands in the last 12 months?
If no is ticked, go to Q.1h **Yes ☐ No ☐**

1f. Do you have dermatitis on your hands today? **Yes ☐ No ☐**

1g. How would you rate the dermatitis on a scale from 0-10 today?
0 being no dermatitis and 10 being severe **0 5 10**

1h. Do you mind if I examine your hands now? **Yes ☐ No ☐**

1i. Dr's rating of dermatitis
0 being no dermatitis and 10 being severe **0 5 10**

1j. Have you ever had asthma (even as a child)? **Yes ☐ No ☐**

1k. Have you ever had asthma or wheeze related to your work?
Yes ☐ No ☐

1l. Have you ever been diagnosed with a sun-related skin lesion or cancer?
If No is selected, skip to Q.2a **Yes ☐ No ☐**

1m. What type of lesion or cancer was this?	**Solar keratosis (sunspot)**	☐
	Basal cell carcinoma	☐
	Squamous cell carcinoma	☐
	Malignant melanoma	☐
	Other	☐
	Unsure/don't know	☐

Question 2: Workplace questions

2a. How many years have you been doing this type of work? Please type years in box		☐
2b. How many days a week do you normally work?	**1**	☐
	2	☐
	3	☐
	4	☐
	5	☐
	6	☐
	7	☐
2c. How many hours do you normally work per day/shift?	**Less than 4 hours**	☐
	4-5 hours	☐
	6-7 hours	☐
	8-9 hours	☐
	More than 10 hours	☐
2d. What percentage of working time do you spend outdoors? *(Mark along the bar with an X)*	**0%** **50%** **100%**	
2e. Does your workplace provide sunscreen for your use? If no, skip to Q.12		**Yes ☐ No ☐**
2f. How frequently do you use it?	**Never**	☐
	Sometimes-in summer	☐
	Only when outdoors	☐
	Always	☐

2g.Approximately, how many people work for your employer at your workplace?	**1-4 employees** **5-19 employees** **20-99 employees** **More than 100 employees**	☐ ☐ ☐ ☐
2h. How many people work for your employer in total (include all workplace sites). Note – if you work at a hospital, just included the hospital where you work.	**1-4 employees** **5-19 employees** **20-99 employees** **More than 100 employees**	☐ ☐ ☐ ☐
2i. Which of the following best describes your role?	**Registered nurse** **Personal care attendant** **Medical practitioner** **Dental practitioner/ dental assistant** **Other**	☐ ☐ ☐ ☐ ☐
2j. Which best describes your workplace setting?	**Aged care facility/Nursing home** **Acute Hospital** **Dental practice** **Other**	☐ ☐ ☐ ☐

Question 3: Hand hygiene and skin care

3a. How many times do you wash your hands with water during a working day?	**Less than 10 times** **11 to 15 times** **16 to 20 times** **21 to 25 times** **26 to 40 times** **Over 40 times**	☐ ☐ ☐ ☐ ☐ ☐
3b. What do you wash your hands with? ***(Tick all that apply)***	**Water alone** **Water and antiseptic** **Water and bar soap** **Water and liquid soap** **Soap free hand wash** **Brush** **Other**	☐ ☐ ☐ ☐ ☐ ☐ ☐
3c. How do you normally dry your hands at work? ***(Tick one only)***	**Fabric towel** **Paper Towel** **Dryer** **Nothing, just a shake**	☐ ☐ ☐ ☐

	Other	☐
3d. Does your workplace supply a moisturiser cream for your use? If no, go to Q3g.		**Yes☐ No☐**
3e. What brand is the moisturiser?	**(Specify name)**	
3f. How often do you use this? *(Tick one)*	**Never**	☐
	Less than daily	☐
	1-2 times daily	☐
	3-5 times daily	☐
	Over 5 times daily	☐
3g. Does your workplace supply a barrier cream or 'before work' cream for your use? *If no, go to Q 4a*		**Yes☐ No☐**
3h. What brand is the barrier cream?	**(Specify name)**	
3i. How often do you use this at work? *(Tick one)*	**Never**	☐
	Less than daily	☐
	1-2 times daily	☐
	3-5 times daily	☐
	Over 5 times daily	☐
3j. Do you use waterless hand cleaners/alcohol based hand rub? (If no, go to Q4a).		**Yes☐ No☐**
3k. How often do you use waterless hand cleaners/alcohol based hand rub during a working day? *(Tick one only)*	**1-5 times**	☐
	6-10 times	☐
	11-15 times	☐
	16-20 times	☐
	More than 20 times	☐

Question 4: Work tasks

4a. Apart from hand washing, are your hands immersed or exposed to water for long periods (more than 15 minutes per day) *at work*? *If no, go to Q.5a)*		**Yes☐ No☐**
4b. What is the task you are performing? (Tick all that are relevant)	**Dishwashing**	☐
	Patient hygiene	☐
	Food preparation	☐
	General cleaning	☐
	Other	☐

4c. What substances do you use? ***(Tick one)***	**Water alone**	☐
	Water and detergent/shampoo	☐
	Other	☐
4d. How often would you perform this task each day? ***(Tick one)***	**Less than daily**	☐
	1-5/day	☐
	6-10/day	☐
	11-20/day	☐
	Over 20/ day	☐
4e. On average, what is the duration of each individual task? ***(Tick one)***	**Less than 30 mins**	☐
	30 mins to 1 hour	☐
	Over 1 hour	☐
4f. On average, how long in total, would you spend performing this task? ***(Tick one)***	**Less than 30 mins/day**	☐
	30 mins to 2 hour/day	☐
	2-4 hours/day	☐
	Over 4 hours/day	☐

Question 5: Personal protective equipment

5a. Do you wear gloves at work? **When No is selected, this should be followed by Q.5o.**		**Yes☐ No☐**
5b. What type of gloves do you wear? **Please select the most common glove type used.** **When disposable latex gloves are selected, skip to Q.5c. For all other gloves types go to Q.5d.** **Once all questions related to this glove have been answered (Q.5b-5o), ask 'What is the second most common glove you wear?' And repeat Q.5d-5o).**	**Cotton gloves**	☐
	Disposable latex	☐
	Disposable vinyl	☐
	Disposable nitrile	☐
	Surgical latex	☐
	Surgical Nitrile	☐
	Reusable neoprene	☐
	Reusable rubber	☐
	Reusable PVC	☐
	Do not know	☐
	Do not wear any	☐

5c. Are the gloves powdered?		**Yes☐ No☐**
5d. Do you wear cotton gloves underneath these gloves?	**Always** **Usually** **Sometimes** **Rarely** **Never**	☐ ☐ ☐ ☐ ☐
5e. For which tasks do you wear these gloves?	**Dishwashing** **Patient hygiene** **Food preparation** **General cleaning** **Other**	☐ ☐ ☐ ☐ ☐
5f. How many times do you put these gloves on during a shift/day?	**Less than daily** **1-5** **6-10** **11-15** **16-20** **Over 20**	☐ ☐ ☐ ☐ ☐ ☐
5g. On average, how long would you wear gloves on *each* occasion?	**Less than 5 mins** **5-30 mins** **30 mins to 2 hours** **Over 2 hours**	☐ ☐ ☐ ☐
5h. On average, how long in total, would you wear gloves during a day/ shift?	**Less than ½ hour** **½ - 2 hours** **2-4 hours** **Over 4 hours**	☐ ☐ ☐ ☐
5i. Do you experience any of the following problems when wearing gloves?	**Your hands are too hot and sweaty in the gloves** **Your gloves tear or break easily** **You forget to wear the gloves** **The gloves are difficult to work with** **The gloves do not go far enough up your arms** **Water gets inside the gloves** **Other**	☐ ☐ ☐ ☐ ☐ ☐
5j. Are the gloves suitable for the task?		**Yes☐ No☐**
5k.Are the gloves actually suitable? (Dr's decision)		**Yes☐ No☐**

5l. Does any liquid ever get inside these gloves?	**Always**	☐
	Usually	☐
	Sometimes	☐
	Rarely	☐
	Never	☐
5m. Are they the correct size?		**Yes☐ No☐**
5n. Is there an adequate supply?		**Yes☐ No☐**
5o. Are the gloves re-used? This should be the last question		**Yes☐ No☐**
5p. If you never wear gloves is this because…? This question should only be linked to Q. 5a	**They are not provided**	☐
	They are unsuitable for job	☐
	They make your skin too hot and sweaty	☐
	They tear or break easily	☐
	They are difficult to work with	☐
	They were not needed for the job	☐

Skin Exposure Online Survey- Hairdressers

Front screen
Please select your industry (have icons/words for each of the following)
Aircraft manufacturing
Floor finishing
Cafes/restaurants/food retailing/pubs/bars/food processing
Hairdressing/beauty salons
Health Services

Question 1: Demographic questions

1a. Are you male/female?	**Male** **Female**	☐ ☐
1b. How old are you? *Please type age in box*.		☐
1c. What is your highest level of education?	**University degree or higher** **Undergraduate or associate diploma** **Vocational certificate** **Completed school** **Did not complete secondary school**	☐ ☐ ☐ ☐ ☐
1d. Have you ever had eczema in the folds of inner elbows or behind the knees (even as a baby)?		**Yes** ☐ **No** ☐
1e. Have you had dermatitis on your hands in the last 12 months? **If no is ticked, go to Q.1h.**		**Yes** ☐ **No** ☐
1f. Do you have dermatitis on your hands today?		**Yes** ☐ **No** ☐
1g. How would you rate the dermatitis on a scale from 0-10 today? **0 being no dermatitis and 10 being severe**	**0** **5** **10**	
1h. Do you mind if I examine your hands now?		**Yes** ☐ **No** ☐
1i. Dr's rating of dermatitis **0 being no dermatitis and 10 being severe**	**0** **5** **10**	
1j. Have you ever had asthma (even as a child)?		**Yes** ☐ **No** ☐
1k. Have you ever had asthma or wheeze related to your work?		**Yes** ☐ **No** ☐

1l. Have you ever been diagnosed with a sun-related skin lesion or cancer? **If No is selected, skip to Q.2a?**		**Yes** ☐ **No** ☐
1m. What type of lesion or cancer was this?	**Solar keratosis (sunspot)**	☐
	Basal cell carcinoma	☐
	Squamous cell carcinoma	☐
	Malignant melanoma	☐
	Other	☐
	Unsure/don't know	☐

Question 2: Workplace questions

2a. How many years have you been doing in your current type of work? **Please type years in box**		☐
2b. How many days a week do you normally work?	**1**	☐
	2	☐
	3	☐
	4	☐
	5	☐
	6	☐
	7	☐
2c. How many hours do you normally work per day/shift?	**Less than 4 hours**	☐
	4-5 hours	☐
	6-7 hours	☐
	8-9 hours	☐
	More than 10 hours	☐
2d. What percentage of working time do you spend working outdoors? ***(Mark along the bar with an X)***	**0%** **50%** **100%**	
2e. Does your workplace provide sunscreen for your use? **If no, skip to Q.2g.**		**Yes** ☐ **No** ☐
2f. How frequently do you use it?	**Never**	☐
	Sometimes-in summer	☐

	Only when outdoors	☐
	Always	☐
2g. Approximately, how many people work for your employer at your workplace?	1-4 employees	☐
	5-19 employees	☐
	20-99 employees	☐
	More than 100 employees	☐
2h. How many people work for your employer in total (include all workplace sites). *Note – if you work at a hospital, just include the hospital where you work.*	1-4 employees	☐
	5-19 employees	☐
	20-99 employees	☐
	More than 100 employees	☐

Question 3: Hand hygiene and skin care

3a. How many times do you wash your hands with water during a working day?	Less than 10 times	☐
	11 to 15 times	☐
	16 to 20 times	☐
	21 to 25 times	☐
	26 to 40 times	☐
	Over 40 times	☐
3b. What do you wash your hands with? (Tick all that apply)	Water alone	☐
	Water and antiseptic	☐
	Water and bar soap	☐
	Water and liquid soap	☐
	Soap free hand wash	☐
	Other	☐
3c. How do you normally dry your hands at work? (Tick one only)	Fabric towel	☐
	Paper Towel	☐
	Dryer	☐
	Nothing, just a shake	☐
	Other	☐
3d. Does your workplace supply a moisturiser for your use? (If no, go to Q 3g.i; if yes go to 3e)		Yes☐ No☐
3e. What brand is the moisturiser?	(Specify name)	
3f. How often do you use it? *(Tick one)*	Never	☐
	Less than daily	☐
	1-2 times daily	☐

	3-5 times daily	☐
	Over 5 times daily	☐
3g. Does your workplace supply a barrier cream or 'before work' cream for your use? (If no, go to Q 4a; if yes go to 3h)		Yes☐ No☐
3h. What brand is the barrier cream?	(Specify name)	
3i. How often do you use this at work? *(Tick one)*	Never	☐
	Less than daily	☐
	1-2 times daily	☐
	3-5 times daily	☐
	Over 5 times daily	☐

Question 4: Work tasks

4a. Apart from hand washing, are your hands immersed or exposed to water for long periods (more than 15 minutes per day) *at work*? *(If no, go to Q5a; if yes proceed with Q. 5b)*		Yes☐ No☐
4b. What wet tasks do you perform?	Shampooing/rinsing out chemicals	☐
	General cleaning	☐
	Handling damp hair	☐
	Other	☐
4c. What substances do you use? *(Tick one)*	Water alone	☐
	Water and detergent/shampoo	☐
	A liquid substance or product alone	☐
	Other	☐
4d. How often would you perform this task each day? (Tick one)	Less than daily	☐
	1-5 times a day	☐
	6-10 times a day	☐
	11-20 times a day	☐
	Over 20 times a day	☐
4e. On average, what was the duration of each individual task? *(Tick one)*	Less than 30 mins	☐
	30 mins to 1 hour	☐
	Over 1 hour	☐
4f. On average, how long in total, would you spend	Less than 30 mins/day	☐

performing this task each day?	**30 mins to 2 hour/day**	☐
	2-4 hours/day	☐
	Over 4 hours/day	☐

Question 5: Personal protective equipment

5a. Do you wear gloves at work? **(When no is selected, this should be followed by Q. 5p)**		**Yes** ☐ **No**☐
5b. What type of gloves do you wear? **When "disposable latex glove" is selected, Q. 5c should follow. For all other gloves selected, go straight to Q5d.** **For the two types of glove most commonly worn, answer the questions 5b-5o.**	**Cotton gloves** **Disposable latex** **Disposable vinyl** **Disposable nitrile** **Reusable neoprene** **Reusable rubber** **Reusable PVC** **Re-usable leather/cloth** **Don't know** **Don't wear any**	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
5c. Are the gloves powdered? This should only be linked to Q. 5b and the latex glove option.		**Yes**☐ **No**☐
5d. Do you wear cotton gloves underneath these gloves?	**Always** **Usually** **Sometimes** **Rarely** **Never**	☐ ☐ ☐ ☐ ☐
5e .For which tasks do you wear these gloves?	**Shampooing/rinsing out chemicals** **General cleaning** **Handling damp hair** **Other**	☐ ☐ ☐ ☐
5f. How many times do you put on these gloves during a shift/day?	**Less than daily** **1-5** **6-10** **11-15** **16-20** **Over 20**	☐ ☐ ☐ ☐ ☐ ☐
5g. On average, how long would you wear gloves on *each* occasion?	**Less than 5 mins** **5-30 mins**	☐ ☐

	30 mins to 2 hours	☐
	Over 2 hours	☐
5h. On average, how long in total, would you wear gloves during a day/ shift?	Less than ½ hour	☐
	½ - 2 hours	☐
	2-4 hours	☐
	Over 4 hours	☐
5i. Do you experience any of the following problems when wearing gloves?	Your hands are too hot and sweaty in the gloves	☐
	Your gloves tear or break easily	☐
	You forget to wear the gloves	☐
	The gloves are difficult to work with	☐
	The gloves do not go far enough up your arms	☐
	Water gets inside the gloves	☐
	They pull out clients hair	☐
	Other	☐
5j. Do you think these gloves suitable for the task?		Yes☐ No☐
5k. Are the gloves actually suitable? *(Dr's decision)*		Yes☐ No☐
5l. Does liquid ever get inside the glove?	Always	☐
	Usually	☐
	Sometimes	☐
	Rarely	☐
	Never	☐
5m. Are they the correct size?	Yes☐ No☐	
5n. Is there an adequate supply?		Yes☐ No☐
5o. Are these gloves re-used? **This should be the last question**		Yes☐ No ☐
5p. If you never wear gloves is this because…? **(This should only be asked if 'No' is selected in Q. 5a)**	They are not provided	☐
	They are unsuitable for job	☐
	They make your skin too hot and sweaty	☐
	They tear or break easily	☐
	They are difficult to work with	☐

	They were not needed for the job	□
	They aren't provided	□

Skin Exposure Online Survey- Food handlers

Front screen
Please select your industry (have icons/words for each of the following)
Aircraft manufacturing
Floor finishing
Cafes/restaurants/food retailing/pubs/bars/food processing
Hairdressing/beauty salons
Health Services

Question 1: Demographic questions

1a. Are you male/female?	**Male**	☐
	Female	☐
1b. How old are you? ***Please type age in box*****.**		☐
1c. What is your highest level of education?	**University degree or higher**	☐
	Undergraduate or associate diploma	☐
	Vocational certificate	☐
	Completed school	☐
	Did not complete secondary school	☐

1d. Have you ever had eczema in the folds of inner elbows or behind the knees (even as a baby) **Yes ☐ No ☐**

1e. Have you had dermatitis on your hands in the last 12 months?
If no is ticked, go to Q.1h **Yes ☐ No ☐**

1f. Do you have dermatitis on your hands today? **Yes ☐ No ☐**

1g. How would you rate the dermatitis on a scale from 0-10 today?
0 being no dermatitis and 10 being severe **0 5 10**

1h. Do you mind if I examine your hands now? **Yes ☐ No ☐**

1i. Dr's rating of dermatitis
0 being no dermatitis and 10 being severe **0 5 10**

1j. Have you ever had asthma (even as a child)? **Yes ☐ No ☐**

1k. Have you ever had asthma or wheeze related to your work?
Yes ☐ No ☐

1l. Have you ever been diagnosed with a sun-related skin lesion or cancer?
If No is selected, skip to Q.2a **Yes ☐ No ☐**

1m. What type of lesion or cancer was this?	**Solar keratosis (sunspot)**	☐
	Basal cell carcinoma	☐

	Squamous cell carcinoma	☐
	Malignant melanoma	☐
	Other	☐
	Unsure/don't know	☐

Question 2 - Workplace questions

2a. How many years have you been doing in your current type of work? Please type years in box		☐
2b. How many days a week do you normally work?	**1**	☐
	2	☐
	3	☐
	4	☐
	5	☐
	6	☐
	7	☐
2c. How many hours do you normally work per day/shift?	**Less than 4 hours**	☐
	4-5 hours	☐
	6-7 hours	☐
	8-9 hours	☐
	More than 10 hours	☐
2d. What percentage of working time do you spend working outdoors? *(Mark along the bar with an X)*	**0%** **100%**	**50%**
2e. Does your workplace provide sunscreen for your use? If no, skip to Q.2g)		**Yes ☐ No ☐**
2f. How frequently do you use it?	**Never**	☐
	Sometimes-in summer	☐
	Only when outdoors	☐
	Always	☐
2g. Approximately, how many people work for your employer at your workplace?	**1-4 employees**	☐
	5-19 employees	☐
	20-99 employees	☐

	More than 100 employees	☐
2h. How many people work for your employer in total (include all workplace sites). Note – if you work at a hospital, just included the hospital where you work.	1-4 employees	☐
	5-19 employees	☐
	20-99 employees	☐
	More than 100 employees	☐
2i. Which of the following best describes your role?	Meat tradesperson	☐
	Bakers and pastry cooks	☐
	Chef/cook/fast food cook	☐
	Other food tradesperson/food trades assistant	☐
	Sales assistant	☐
	Waiter/waitress	☐
	Kitchen hands	☐
	Bar attendant	☐
	Other	☐
2j. Which of the following best describes your workplace setting?	Small café/fast food venue	☐
	Large hotel/restaurant	☐
	Pub/bar/hotel	☐
	Food processing/ factory	☐
	Other food retail e.g. Bakery/butchery.	☐

Question 3 - Hand hygiene and skin care

3a. How many times do you wash your hands with water during a working day?	Less than 10 times	☐
	11 to 15 times	☐
	16 to 20 times	☐
	21 to 25 times	☐
	26 to 40 times	☐
	Over 40 times	☐
3b. What do you wash your hands with? (Tick all that apply)	Water alone	☐
	Water and antiseptic	☐
	Water and bar soap	☐
	Water and liquid soap	☐
	Soap free hand wash	☐
	Other	☐
3c. How do you normally dry your hands at work? (Tick one only)	Fabric towel	☐
	Paper Towel	☐
	Dryer	☐

	Nothing, just a shake	☐
	Other	☐
3d. Does your workplace supply a moisturiser for your use? (If no, go to Q 3g)		**Yes☐ No☐**
3e. What brand is the moisturiser?	**(Specify name)**	
3f. How often do you use it? *(Tick one)*	Never	☐
	Less than daily	☐
	1-2 times daily	☐
	3-5 times daily	☐
	Over 5 times daily	☐
3g.Does your workplace supply a barrier cream or 'before work' cream for your use? (If no, go to Q 4a)		**Yes☐ No☐**
3h. What brand is the barrier cream?	**(Specify name)**	
3i. How often do you use it at work? (Tick one)	Never	☐
	Less than daily	☐
	1-2 times daily	☐
	3-5 times daily	☐
	Over 5 times daily	☐

Question 4: Work tasks

4a. Apart from hand washing, are your hands immersed or exposed to water for long periods (more than 15 minutes per day) *at work*? (If no, go to Q5a)		**Yes☐ No☐**
4b. What is the task you are performing? (Tick all that are relevant)	Dishwashing	☐
	Food preparation	☐
	General cleaning	☐
	Other	☐
4c. What substances are you in contact with? (Tick one)	Water alone	☐
	Water and detergent/shampoo	☐
	A liquid substance or product alone	☐
	Other	☐

4d. How often would you perform this task each day? *(Tick one)*	**Less than daily**	☐
	1-5/day	☐
	6-10/day	☐
	11-20/day	☐
	Over 20/ day	☐
4e. On average, what was the duration of each individual task? *(Tick one)*	**Less than 30 mins**	☐
	30 mins to 1 hour	☐
	Over 1 hour	☐
4f. On average, how long in total, would you spend performing this task each day?	**Less than 30 mins/day**	☐
	30 mins to 2 hour/day	☐
	2-4 hours/day	☐
	Over 4 hours/day	☐

Question 5: Personal protective equipment

5a. Do you wear gloves at work? **When No is selected, this should be followed by 5p.**		**Yes ☐** **No ☐**
5b. What type of gloves do you wear? **Please select the most common glove type used.** **When disposable latex gloves are selected, skip to Q.5c. For all other gloves types go to Q.5d.** **Once all questions related to this glove have been answered (Q.5b-5o), ask 'What is the second most common glove you wear?' And repeat Q.5d-5o).**	**Cotton**	☐
	Disposable latex	☐
	Disposable vinyl	☐
	Disposable nitrile	☐
	Reusable neoprene	☐
	Reusable rubber	☐
	Reusable PVC	☐
	Re-usable leather/cloth	☐
	Don't know	☐
5c. Are the gloves powdered? *Link with Q.5b only*		**Yes☐ No☐**
5d. Do you wear cotton gloves underneath these gloves?	**Always**	☐
	Usually	☐
	Sometimes	☐
	Rarely	☐
	Never	☐
5e. For which tasks do you wear gloves?	**Dishwashing**	☐
	Food preparation	☐
	General cleaning	☐
	Other	☐
5f. How many times do you put on these gloves	**Less than daily**	☐

during a shift/day?	**1-5**	☐
	6-10	☐
	11-15	☐
	16-20	☐
	Over 20	☐
5g. On average, how long would you wear these gloves on *each* occasion?	**Less than 5 mins**	☐
	5-30 mins	☐
	30 mins to 2 hours	☐
	Over 2 hours	☐
5h. On average, how long in total, would you wear these gloves during a day/ shift?	**Less than ½ hour**	☐
	½ - 2 hours	☐
	2-4 hours	☐
	Over 4 hours	☐
5i. Do you experience any of the following problems when wearing gloves?	**Your hands are too hot and sweaty in the gloves**	☐
	Your gloves tear or break easily	☐
	You forget to wear the gloves	☐
	The gloves are difficult to work with	☐
	The gloves do not go far enough up your arms	☐
	Other	☐
5j. Do you think these gloves are suitable for the task?		**Yes☐ No☐**
5k. Does the liquid get inside the gloves? (Tick one)	**Always**	☐
	Usually	☐
	Sometimes	☐
	Rarely	☐
	Never	☐
5l. Are the gloves actually suitable (Dr's decision)		**Yes☐ No☐**
5m. Are they the correct size?		**Yes☐ No☐**
5n. Is there an adequate supply?		**Yes☐ No☐**
5o. Are the gloves re-used? *This should be last question*		**Yes☐ No☐**
5p. If you never wear gloves is this because…? **This question is only applicable for**	**They are not provided**	☐
	They are unsuitable for job	☐
	They make your skin too hot and	☐

those who answer No in Q.5a	**sweaty**	
	They tear or break easily	□
	They are difficult to work with	□
	They were not needed for the job	□

Skin Exposure Online Survey- Epoxy resin exposure

Front screen
Please select your industry (have icons / words for each of the following)
Aircraft manufacturing
Floor finishing
Cafes / restaurants / food retailing / pubs / bars / food processing
Hairdressing / beauty salons
Health Services

Question 1: Demographic questions

1a. Are you male/female?	**Male**	☐
	Female	☐
1b. How old are you? *Please type age in box*.		☐
1c. What is your highest level of education?	**University degree or higher**	☐
	Undergraduate or associate diploma	☐
	Vocational certificate	☐
	Completed school	☐
	Did not complete secondary school	☐
1d. Have you ever had eczema in the folds of inner elbows or behind the knees (even as a baby)		**Yes ☐ No ☐**
1e. Have you had dermatitis on your hands in the last 12 months? If no is ticked, go to Q.1h		**Yes ☐ No ☐**
1f. Do you have dermatitis on your hands today?		**Yes ☐ No ☐**
1g. How would you rate the dermatitis on a scale from 0-10 today? 0 being no dermatitis and 10 being severe	**0 5 10**	
1h. Do you mind if I examine your hands now?		**Yes ☐ No ☐**
1i. Dr's rating of dermatitis 0 being no dermatitis and 10 being severe	**0 5 10**	
1j. Have you ever had asthma (even as a child)?		**Yes ☐ No ☐**
1k. Have you ever had asthma or wheeze related to your work?		**Yes ☐ No ☐**
1l. Have you ever been diagnosed with a sun-related skin lesion or cancer? If No is selected, skip to Q.2a		**Yes ☐ No ☐**
1m. What type of lesion or cancer was this?	**Solar keratosis (sunspot)**	☐
	Basal cell carcinoma	☐

	Squamous cell carcinoma	☐
	Malignant melanoma	☐
	Other	☐
	Unsure/don't know	☐

Question 2: General workplace questions

2a.How many years have you been doing this type of work? *Please type years in box*		☐
2b. How many days a week do you normally work?	**1**	☐
	2	☐
	3	☐
	4	☐
	5	☐
	6	☐
	7	☐
2c. How many hours do you normally work per day/shift?	**Less than 4 hours**	☐
	4-5 hours	☐
	6-7 hours	☐
	8-9 hours	☐
	More than 10 hours	☐

2d. What percentage of working time do you spend outdoors? *(Mark along the bar with an X)*

0% **50%** **100%**

2e. Does your workplace provide sunscreen for your use? *If no, skip to Q. 2g.* **Yes ☐ No ☐**

2f. How often do you use it?	**Never**	☐
	Sometimes-in summer	☐
	Only when outdoors	☐
	Always	☐
2g.Approximately, how many people work for your employer at your workplace?	**1-4 employees**	☐
	5-19 employees	☐
	20-99 employees	☐
	More than 100 employees	☐

2h. How many people work for your employer in total (include all workplace sites). Note – if you work at a hospital, just included the hospital where you work.	**1-4 employees** **5-19 employees** **20-99 employees** **More than 100 employees**	☐ ☐ ☐ ☐

Question 3: Hand hygiene and skin care

3a. How many times do you wash your hands with water during a working day?	**Less than 10 times** **11 to 15 times** **16 to 20 times** **21 to 25 times** **26 to 40 times** **Over 40 times**	☐ ☐ ☐ ☐ ☐ ☐
3b. What do you wash your hands with? (Tick all that apply)	**Water alone** **Water and antiseptic** **Water and bar soap** **Water and liquid soap** **Soap free hand wash** **Other**	☐ ☐ ☐ ☐ ☐ ☐
3c How do you normally dry your hands at work? (Tick one only)	**Fabric towel** **Paper Towel** **Dryer** **Nothing, just a shake** **Other**	☐ ☐ ☐ ☐ ☐
3d. Does your workplace supply a moisturiser for your use? (If no, go to Q.3g)		**Yes☐** **No☐**
3e. What brand is the moisturiser?	**(Specify name)**	
3f. How often do you use it? (Tick one)	**Never** **Less than daily** **1-2 times daily** **3-5 times daily** **Over 5 times daily**	☐ ☐ ☐ ☐ ☐
3g. Does your workplace supply a barrier cream or 'before work' cream for your use? (If no, go to Q. 4a)		**Yes☐** **No☐**
3h. What brand is the barrier cream?	**(Specify name)**	

3i. How often do you use this at work? ***(Tick one)***	**Never**	☐
	Less than daily	☐
	1-2 times daily	☐
	3-5 times daily	☐
	Over 5 times daily	☐

Question 4: Work tasks

4a. Are you exposed to epoxy resin? If No is selected, that is end of survey	**Yes☐**	**No☐**
4b. How would you describe this epoxy resin? ***(Tick one)***	**Gas/ airborne**	☐
	Liquid	☐
	Powder	☐
	Solid	☐
4c. Which of the following best describes your contact with epoxy resin? ***(Tick one)***	**Mixing the resin and hardener together**	☐
	Applying to surfaces as a coating or paint	☐
	Handling epoxy-impregnated carbon fibre in the manufacture of aircraft parts (Pre-Pregs)	☐
	Airborne exposure	☐
	Immersing hands / equipment	☐
4d. Do you perform this task with…..? ***(Tick one)***	**An implement**	☐
	Your hands (including gloved)	☐
4e. How often do you work with epoxy resin (Tick one)	**Frequently (daily/most days)**	☐
	Usually (at least weekly)	☐
	Sometimes (a few days a month)	☐
	Rarely (few times a year)	☐
4f. On average, what was the duration of each individual exposure? ***(Tick one)***	**Less than 30 mins**	☐
	30 mins to 1 hour	☐
	1 hour to 4 hours	☐
	More than 4 hours	☐
4g. On average, how long in total, would you spend performing this task each day? ***(Tick one)***	**Less than 30 mins/day**	☐
	30 mins to 1 hour/day	☐
	1-2 hours/day	☐
	2-4 hours	☐
	More than 4 hours/day	☐
4h. How often do you wear the following	**Face mask**	**Always** ☐

personal protective equipment?		**Usually**	☐
		Sometimes	☐
		Rarely	☐
		Never	☐
		Always	☐
		Usually	☐
	Overalls/Uniform	**Sometimes**	☐
		Rarely	☐
		Never	☐
		Always	☐
		Usually	☐
	Safety footwear	**Sometimes**	☐
		Rarely	☐
		Never	☐
4i. Could you inadvertently come into contact with epoxy resins, e.g. splashing?		**Yes, easily**	☐
		Yes, occasionally	☐
		No	☐

Question 5: Personal protective equipment

5a .Do you wear gloves at work? When No is selected, this should be linked to Q5p.		**Yes☐** **No☐**
5b. What type do you wear? **Please select the most common glove type used.** **When disposable latex gloves are selected, skip to Q.5c. For all other gloves types go to Q.5d.** **Once all questions related to this glove have been answered (Q.5b-5o), ask 'What is the second most common glove you wear?' And repeat Q.5d-5o).**	**Cotton gloves** **Disposable latex** **Disposable vinyl** **Disposable nitrile** **Reusable neoprene** **Reusable rubber** **Reusable PVC** **Re-useable nitrile** **Re-usable leather/cloth** **Don't know**	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
5c. Are these gloves powdered?		**Yes ☐** **No☐**
5d. Do you wear cotton gloves underneath these gloves?	**Always** **Usually** **Sometimes** **Rarely** **Never**	☐ ☐ ☐ ☐ ☐

5e. For which tasks to do you wear gloves?	**Mixing epoxy resin and hardener**	☐
	Applying epoxy resin	☐
	Grinding/sanding epoxy resin	☐
	Other	☐
5f. How many times do you put on these gloves during a shift/day?	**Less than daily**	☐
	1-5	☐
	6-10	☐
	11-15	☐
	16-20	☐
	Over 20	☐
5g. On average, for how long would you wear these gloves on *each* occasion?	**Less than 5 mins**	☐
	5-30 mins	☐
	30 mins to 2 hours	☐
	Over 2 hours	☐
5h. On average, how long in total, would you wear these gloves during a day/ shift?	**Less than ½ hour**	☐
	½ - 2 hours	☐
	2-4 hours	☐
	Over 4 hours	☐
5i. Do you experience any of the following problems when wearing these gloves?	**Your hands are too hot and sweaty in the gloves**	☐
	Your gloves tear or break easily	☐
	You forget to wear the gloves	☐
	The gloves are difficult to work with	☐
	The gloves do not go far enough up your arms	☐
	Other	☐
5j. Do you think these gloves are suitable for the task?		**Yes☐ No☐**
5k. Are the gloves actually suitable? *(Dr's decision)*		**Yes☐ No☐**
5l. Does liquid ever get inside the gloves?	**Always**	☐
	Usually	☐
	Sometimes	☐
	Rarely	☐
	Never	☐
5m. Are they the correct size?		**Yes☐ No☐**

5n. Is there an adequate supply?		**Yes□ No□**
5o. Are these gloves re-used? **This should be the last question**		**Yes□ No□**
5p. If you never wear gloves is this because…? **This question should only be linked to Q. 5a**	**They aren't provided**	□
	They are unsuitable for job	□
	They make your skin too hot and sweaty	□
	They were not needed for the job	□
	They tear or break easily	□
	They are difficult to work in	□
	They were not needed for the job	□

Appendix 7: Additional information

Table 24: Type of worker in healthcare and food handling

Healthcare	N=106 (%)
Registered nurse	81 (77.88)
Personal care attendant	1 (0.96)
Medical practitioner	9 (8.65)
Dietician	1 (0.96)
Instrument technician	11 (10.6)
Food handling	N=33 (%)
Baker	1 (3.0)
Chef/cook/fast food	14 (42.4)
Other	4 (12.1)
Waiter	1 (3.0)
Kitchen hand	6 (18.2)
Bar attendant	7 (21.2)

Table 25: Type of wet work by occupational group

		Health Services	Hairdresser †	Food handling ††
		N=106(%)	N=84(%)	N=62(%)
1	Dishwashing	0 (0.0)	0 (0.0)	11 (17.7)
2	Patient hygiene	39 (36.8)	0 (0.0)	0 (0.0)
3	Food preparation	0 (0.0)	0 (0.0)	22 (35.5)
4	General cleaning	1 (0.9)	23 (27.4)	17 (27.4)
5	Other	12 (11.3)	0 (0.0)	10 (16.1)
6	Shampooing	0 (0.0)	33 (39.3)	0 (0.0)
7	Handling damp hair	0 (0.0)	27 (32.1)	0 (0.0)
	nothing	54 (50.9)	1 (1.2)	2 (3.2)

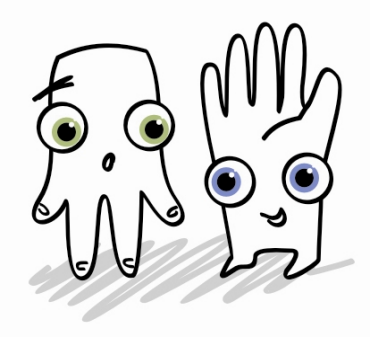
†28 more than one task; ††23 more than 1 task

Table 26: Duration per wet task by occupational group

		Health Services	Hairdresser †	Café/ Restaurant ††
		N=106(%)	N=37(%)	N=33(%)
1	Less than 30 mins	46 (43.4)	31 (83.8)	28 (84.9)
2	30 mins to 1 hour	2 (1.9)	5 (13.5)	2 (6.1)
3	Over 1 hour	4 (3.8)	0 (0.0)	1 (3.0)
		54 (50.0)	1 (2.7)	2 (6.1)

Appendix 8: Resources About Skin Health

RASH™
Resources About Skin Health



Occupational contact dermatitis (OCD) is one area of occupational health and safety (OH&S) in Australia where awareness needs to be raised. The implementation of preventative measures can be a challenging task for both workplaces and training centres, often compounded by a lack of resources and poor knowledge of work-related skin conditions.

The RASH program is designed to educate students attending vocational training institutions about OCD, to raise awareness about appropriate methods of prevention, to reinforce safe work practices, and to fulfil competency standards within OH&S components of courses. The program is equally suitable for OH&S updates in the workplace setting.

Stakeholders were invited to participate in the development of the package and included representatives from industry skills councils of 'high risk' occupations, including healthcare, hairdressing, food handling, construction and mechanical trades; government representatives; industry partners; and OH&S professional groups.

RASH is a 'train-the-trainer' style education resource, with a comprehensive package of materials including a training manual and teaching tools for the trainer, presentation, self-paced learning CD, posters to reinforce teaching points and 'take away wallet cards' for participants.

The design concept is very colourful and based around a pair of engaging mascot style characters. They teach each other appropriate 'safe skin' behaviour with a touch of humour.

The RASH program has been developed by the Occupational Dermatology Research & Education Centre (a unit of the Skin and Cancer Foundation), in partnership with the Department of Health and Ageing and the Office of the Australian Safety and Compensation Council.