

Developing a public health policy response to wet work exposure

Monash University

Dr Tessa Keegel and Ms Kristen Benke

28 June 2012

Research report #: 0612-024-R1C

Accompanying documents to this report

Document	Report number
Developing a public health policy response to occupational contact dermatitis - Summary of Research Findings	0612-024-R1B

A joint initiative of

Contents

1. Background	3
2. Methods	6
3. Results	9
4. Discussion	24
5. Knowledge translation activities	26
6. Bibliography	29

Background

Contact dermatitis

Contact dermatitis is the most prevalent occupational skin disease in westernised industrial countries, contributing to 90-95% of all occupational skin diseases [1]. Occupational skin disease, (including occupational contact dermatitis) was the second most common work-related problem presenting to general practitioners in Australia [2]. Occupational contact dermatitis is a skin condition commonly affecting the hands, although other sites may be affected or become involved soon after [3]. There are two main types of contact dermatitis; irritant contact dermatitis and allergic contact dermatitis. Irritant contact dermatitis is caused by acute exposure to strongly acidic or alkaline substances, or by the cumulative effect of ongoing exposure to substances such as soap and water. Allergic contact dermatitis is caused by sensitisers contacting the skin and eliciting a Type IV immune response, which is typically delayed, 4-24 hours following contact and is detected by patch testing [4]. The ideal process for the diagnosis of occupational contact dermatitis includes assessment by an occupational dermatologist, using a specific set of diagnostic criteria [5], along with patch testing, and if required, radioallergosorbent (RAST) tests or prick testing.

There are many inconsistencies in the terminology utilised for occupational contact dermatitis. Some authors use the term "hand eczema" or "hand dermatitis" to encompass all skin conditions affecting the hands, whilst others prefer "hand eczema" for endogenous disease (originating from within the body, and "hand dermatitis" for exogenous disease (caused by external exposures to the body), some of which may be occupational in origin. The definition of occupational contact dermatitis may also vary, sometimes because of different legal requirements necessary for a successful workers' compensation claim.

Contact dermatitis can have profound effects on workplace productivity and workplace costs [6]. Affected workers may require extended time off work and changes in workplace practices. Some workers have to change their occupations [6, 7]. The worker may also accrue an ongoing financial burden as a result of treatment expenses (medical costs including topical corticosteroids) and preventative items (such as soap substitutes, and moisturisers), which the employer or compensation authority do not recompense. Occupational contact dermatitis impacts on domestic activities, can necessitate social restrictions and may have a detrimental psychological effect [8].

Wet work exposure

Exposure of the hands to liquids, either through frequent hand washing or through immersion of the hands in liquids is known as 'wet work'. Another common component of wet work is the wearing of moisture-proof (occlusive) gloves [9]. Previous studies have found a prolonged duration of exposure to wet work and high frequency of hand washing to be associated with occupational contact dermatitis of the hands [10, 11]. According to the best available international evidence, immersion of the hands in liquids for more than two hours per shift and/or spending long periods wearing occlusive gloves, and/or washing hands more than twenty times per shift are considered risk

factors for damage of the outer layer of the skin (the stratum corneum), increasing the risk of development of irritant or allergic occupational contact dermatitis [9].

In Germany the *Technical standards for hazardous substances: Skin damage from work in wet environments* [9] have been implemented since 1996. The *Technical standards* regulate activities for employees who “spend a large part of their work time, that is, more than ¼ of the daily shift (two hours) with their hands in wet environments” or who “spend a corresponding amount of time wearing moisture-proof gloves, or must frequently clean their hands” [9]. These levels of more than two hours are also specified in the Australian Government guidelines, *Guidance on the prevention of dermatitis caused by wet work* [12].

Although there are international and Australian guidelines for exposure to wet work there is very little information in the available literature regarding the level of exposure of Australian workers to wet working conditions, either self-reported or through objective observation. Adequate information regarding levels of exposure in specific contexts (such as small businesses), or specific industries that are most at risk of elevated exposure, is required by workers, employers and policy-makers to enable the development and implementation of appropriate work health and safety policy. However the most important employment-related determinant of wet work exposure risks are the specific tasks performed by individual workers and these may vary considerably from worker to worker within specific industries. For example a worker in a food processing plant may be at high risk if they work on the production line, but someone who works in the same industry in the pay office will likely be at very low risk for exposure to wet work. Information about the patterns of exposure to wet work will also serve as a guide for the development and implementation of workplace interventions and information campaigns targeting excessive levels of wet work thereby reducing the harmful exposure of workers.

The Wet Work project

Available statistics for occupational contact dermatitis are generally considered to underestimate disease prevalence and incidence [13-15]. Best international estimates of incidence and prevalence rates of occupational contact dermatitis, obtained from reporting schemes using medical practitioners as voluntary reporters range between 1.3 per 10 000 workers in the UK to 15 per 10 000 workers in the Netherlands [16]. An Australian reporting scheme, (conducted by CI Keegel and CI Nixon) using general practitioners and dermatologists as reporters found an incidence rate of 2.2 (95% CI, 1.3-3.2) per 10 000 workers and a one year period prevalence rate of 3.5 (95% CI, 2.4-4.8) per 10 000 workers [13].

The 2011 Wet Work study, funded through an ISCRR Development grant, compared data from three stages of the wet work exposure/occupational contact dermatitis disease pathway. The first dataset consisted of self-reported wet work exposure data from the National Hazard Exposure Worker Surveillance (NHEWS) survey. The second dataset consisted of de-identified diagnosed disease data from the Victorian Occupational Dermatology Research and Education Centre (ODREC) at the Skin and Cancer Foundation, Melbourne. The final dataset consisted of de-identified Victorian Workers' Compensation claims data requested through ISCRR. This report provides an

overview of the research project. More detailed research findings are being prepared in the format of journal publications. Details are provided of the proposed journal articles in the “Knowledge transfer activities” section of this report.

Methods

Description of the Datasets

1. National Hazard Exposure Workplace Survey (NHEWS)

In 2008, Safe Work Australia conducted the NHEWS survey, which collected self-reported occupational exposure data from Australian workers using computer-assisted telephone interviews (CATI). Information collected covered a range of occupational hazards including sun exposure, noise, vibration, dusts, gases, fumes and vapours, biological materials, wet work, chemical substances and psychosocial hazards[17]. The survey used an industry quota based sampling technique and obtained an Australia-wide sample of workers across all 17 industry groups defined by the Australian Bureau of Statistics (ABS)[18], with an emphasis on five Australian National Priority Industries, 'Manufacturing', 'Construction', 'Agriculture, forestry and fishing', 'Transport and storage' and 'Health and community' services as determined by Safe Work Australia. The industry quota-based sampling technique is described in detail elsewhere[17].

The Desk Top Marketing Systems database collected its information from directories such as the White/Yellow pages telephone listings to randomly select households. Participants were required to have worked in the last week and to have earned money from the work. For the wet work component of the NHEWS survey, workers were asked to estimate how many times a day they washed their hands, how long they spent each day with their hands immersed in liquid, and to identify the type of liquid.

The study was approved by the University of Sydney Human Research Ethics Committee in Sydney, Australia (02-2008/10506).

2. Occupational Dermatology Research and Education Centre (ODREC) Clinic Data

The Occupational Contact Dermatitis and Skin and Cancer Foundation clinics maintain a database of all patients seen through the clinics. The database is known as the Patch-Contact Allergy Management System (PatchCAMS) database. PatchCAMS data is supplied for the period January 1993-December 2010. All patients attending the clinics in this time period were routinely patch-tested to the European Standard Series of patch tests (Chemotechnique Diagnostics, Malmo, Sweden), as well as the workers' own samples appropriately diluted. Patch tests were applied using Finn chambers on Scanpor tape (Epitest, Tuusula, Finland). Sex, age, job description, and diagnosis of irritant or allergic occupational contact dermatitis were ascertained from the PatchCAMS database.

Access to the PatchCAMS was approved by the Monash University ethics committee (HREC# CF11/2190 – 2011001218)

3. Compensation Research Database (CRD)

In Victoria, unless employers are self-insured or participate in a national workers' compensation scheme, they are obliged to maintain workers' compensation insurance through the Victorian WorkCover Authority (VWA). VWA covers 85% of workers across the state of Victoria [19]. Once an employee has been off work for 10 days or when the threshold of medical expenses has been reached, a workers' compensation claim may be lodged.

All information regarding workers' compensation claims under the scheme from 1986 onwards are held in the Compensation Research Database (CRD), which is hosted by the Institute for Safety, Compensation and Recovery Research (ISCRR).

The CRD data is de-identified and information such as claim numbers, names and contact details of claimants were removed prior to being accessed by the research team. Information regarding industry, occupation, apprentice status, injury type, bodily location of injury, claim cost, and number of days off work were ascertained from the CRD data.

Access to the CRD was approved by the Monash University ethics committee (HREC# CF11/2190 – 2011001218)

4. Comparison between the Patch CAMS diagnosed disease data and the Compensation Research Database

Demographic variables which were common to the diagnosed disease data and the workers' compensation CRD were compared to characterise similarities and differences between the two datasets. Unfortunately wet work exposure information was not collected in a manner which enabled us to describe the diagnosed disease data, or the workers' compensation data by wet work exposure. However there are a number of occupations where workers are known to be highly exposed to working with liquids. These occupations include nurses, chefs, cooks and kitchen hands, cleaners and hairdressers. The Wet Work project adopted an approach whereby high risk occupations were individually characterised using diagnosed disease and workers' compensation claims data. A case study for one of these occupations, Hairdressing, is presented as part of this report.

Case Study: Hairdressers

The diagnosed disease database PatchCAMS was searched for all hairdressers who attended the Occupational Dermatology Clinic between January 1993 and December 2009, who had a diagnosis of significantly work related occupational contact dermatitis as assessed by the clinic specialist occupational dermatologist. The Compensation Research Database was searched for claims from Hairdressers between the same dates. Descriptive analyses were undertaken for both the PatchCAMS and the CRD datasets by gender, age and apprenticeship status. For the CRD the total costs per claim are reported in 2009 Australian dollar equivalent values. We also report the total days away from work.

Statistical Analysis

Analyses were carried out across all three datasets. The NHEWS exposure dataset, the PatchCAMS diagnosed disease dataset and CRD workers' compensation claims data were stratified by demographic and workplace variables. Percentages were calculated for categories within each of these groups. Where appropriate, categorical variables were compared using chi square tests or two sample tests of proportions. Significance was set at the 0.05 level and all tests were two-sided. Odds ratios and 95% confidence intervals are reported for hand washing and hands immersed in liquids.

The incidence rate for the CRD data was calculated as incidence rate = number of new cases of disease/population at risk in a period of time[20]. We used employed persons in Victoria from the midpoint year 1997 as reported by the Australian Bureau of Statistics *Labour Force* survey [21] as the denominator and the number of initial claims as the numerator.

Analyses were completed using the STATA 10.1 statistical programme (Stata Corporation, College Station, TX).

Results

1. National Hazard Exposure Worker Surveillance (NHEWS)

The wet work analysis of the NHEWS survey was recently published in the journal *Contact Dermatitis* [22]. The NHEWS survey obtained an Australia-wide sample of 4500 workers across all 17 industries, with a 42.3% response rate. No further information is available about non-responders.

Hand-washing

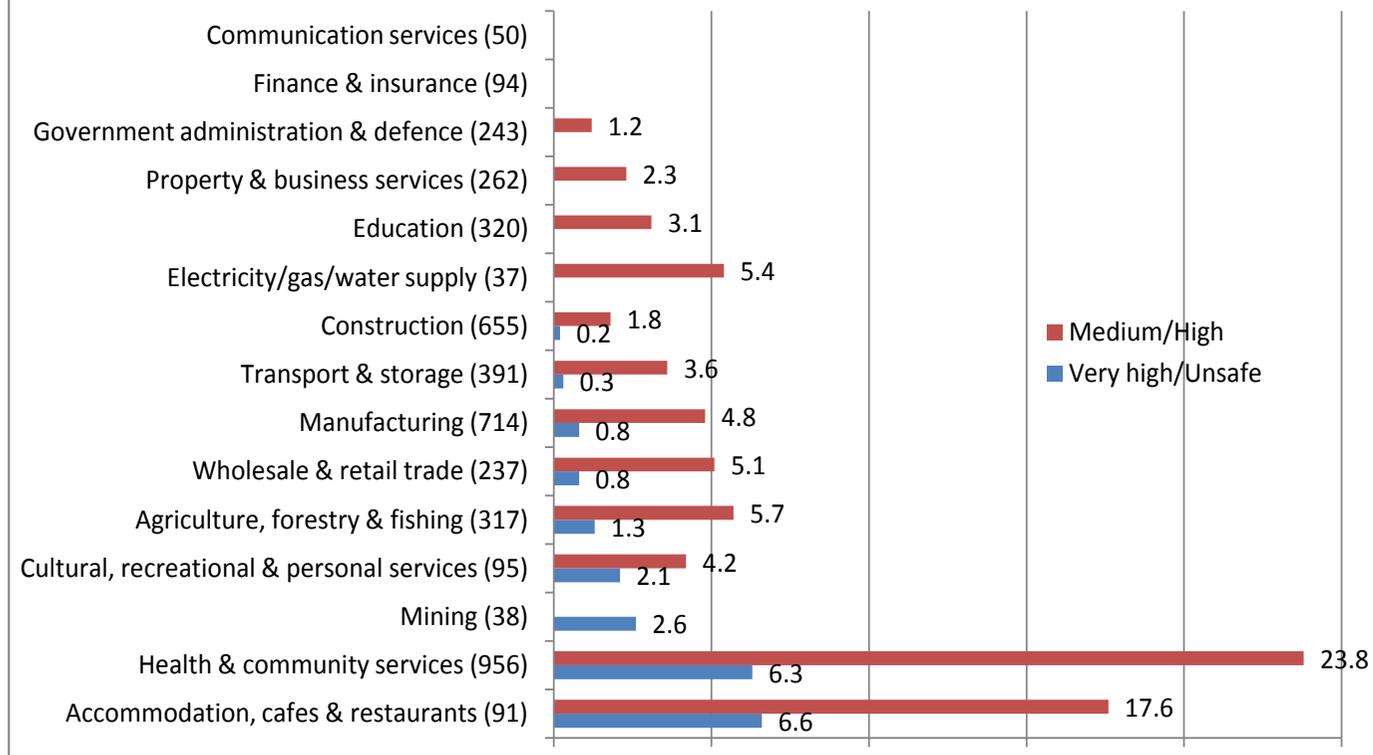
Overall 9.8% (95% Confidence Interval [95% CI]: 8.9-10.7%) of workers reported that they washed their hands more than 20 times per typical day at work in the week preceding the survey. There were 8.0% (95% CI: 7.1-8.8%) of workers in the 'high' exposure category (washing their hands more than twenty times, but less than 100), and 1.8%: (95% CI 1.4-2.2%) of workers in the 'very high' exposure category (washing their hands more than 100 times). Self-reported exposure to hand washing is presented in Table 1. Hand-washing by industrial grouping is presented in Figure 1. The industries with the highest percentages of workers reporting hand washing 100 times or more per typical day were 'Accommodation, cafes and restaurants' (6.6%) and 'Health and community services' (6.3%).

Table 1. Exposure to wet work (hand washing) by demographic and workplace variables

Demographic and employment variables N=4500	unexposed/low	high	very high	p-value*
Gender (n=4500)				
Females – n (%)	1664 (83.8)	256 (12.9)	65 (3.3)	<0.001
Males – n (%)	2394 (95.2)	103 (4.1)	18 (0.7)	
Age group (n=4464)				
15-24 - n (%)	224 (89.6)	23 (9.2)	3 (1.2)	= 0.949
25-34 - n (%)	559 (89.15)	55 (8.8)	13 (2.1)	
35-44 - n (%)	1038 (90.3)	88 (7.7)	23 (2.0)	
45-54 - n (%)	1326 (90.7)	111 (7.6)	25 (1.7)	
55+ - n (%)	883 (90.5)	77 (7.9)	16 (1.6)	
Occupational skill level (n=4337)				
Level one (highest) - n (%)	1352 (88.4)	134 (8.8)	43 (2.8)	<0.001
Level two - n (%)	364 (88.1)	41 (9.9)	8 (1.9)	
Level three - n (%)	760 (94.65)	41 (5.1)	2 (0.25)	
Level four - n (%)	980 (88.4)	107 (9.65)	22 (2.0)	
Level five (lowest) - n (%)	449 (93.0)	28 (5.8)	6 (1.2)	
Employment arrangements (n=3627)				
Permanent - n (%)	2648 (89.5)	244 (8.25)	66 (2.2)	= 0.327
Temp/casual - n (%)	472 (89.4)	48 (9.1)	8 (1.5)	
Fixed term - n (%)	128 (90.8)	13 (9.2)	0 (0)	
Number of employees at workplace (n=4472)				
Less than 5 - n (%)	913 (93.45)	54 (5.5)	10 (1.0)	<0.001
5 to 19 - n (%)	886 (92.7)	59 (6.2)	11 (1.15)	
20 to 199 - n (%)	1344 (88.9)	141 (9.3)	27 (1.8)	
200 or more - n (%)	893 (86.95)	99 (9.6)	35 (3.4)	

*chi-square test

Figure 1: Exposure to wet work (hand-washing) by industry



Hands immersed in liquids

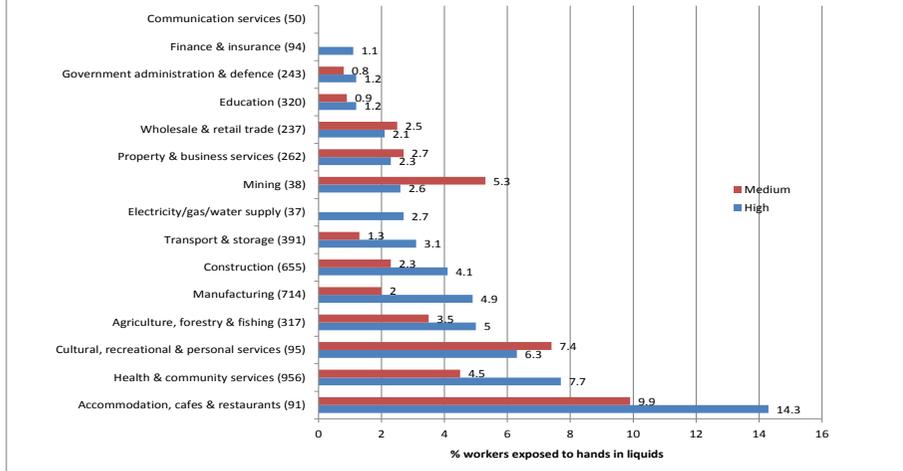
Overall, 7.3% (95% CI: 6.5-8.0%) of workers reported their hands immersed in liquids for more than an hour during the course of their work on a typical working day. There were 2.8% (95% CI: 2.3-3.2%) of workers in the medium exposure group (contact with liquids between one and two hours per day) and 4.5 % (95% CI: 3.9-5.1%) in the high exposure group (contact with liquids for more than two hours per day). Self-reported exposure to hands immersed in liquids is presented in Table 2. Hands immersed in liquids by industrial grouping is presented in Figure 2. 'Accommodation, cafes and restaurants' (14.3%) was the industry with the largest percentage of workers in the high category, followed by 'Health and community services' (7.7%).

Table 2. Exposure to wet work (amount of time hands in liquid) by demographic and workplace variables

Demographic and employment variables N=4500	Unexposed / low	medium	high	p value*
Gender - n (%)				
Females	1805 (90.9)	73 (3.7)	107 (5.4)	p<0.001
Males	2367 (94.1)	51 (2.0)	97 (3.9)	
Age group - n (%)				
15-24	228 (91.2)	9 (3.6)	13 (5.2)	p=0.085
25-34	573 (91.4)	12 (1.9)	42 (6.7)	
35-44	1063 (92.5)	34 (3.0)	52 (4.5)	
45-54	1368 (93.6)	36 (2.5)	58 (4.0)	
55+	907 (92.9)	33 (3.4)	36 (3.7)	
Occupational skill level - n (%)				
Level one (highest)	1487 (97.25)	14 (0.9)	28 (1.8)	p<0.001
Level two	379 (91.8)	18 (4.4)	16 (3.9)	
Level three	724 (90.2)	27 (3.4)	52 (6.5)	
Level four	1025 (92.4)	32 (2.9)	52 (4.7)	
Level five (lowest)	405 (83.85)	28 (5.8)	50 (10.35)	
Employment arrangements - n (%)				
Permanent	2754 (93.1)	69 (2.3)	135 (4.6)	p<0.05
Temp/casual	472 (89.4)	25 (4.7)	31 (5.9)	
Fixed term	133 (94.3)	2 (1.4)	6 (4.3)	
Number of employees at workplace - n (%)				
Less than 5	891 (91.2)	38 (3.9)	48 (4.9)	p=0.054
5 to 19	885 (92.6)	19 (2.0)	52 (5.4)	
20 to 199	1408 (93.1)	42 (2.8)	62 (4.1)	
200 or more	966 (94.1)	23 (2.2)	38 (3.7)	
Exposure of the skin to chemicals - n (%)				
Unexposed	2803 (97.2)	30 (1.0)	51 (1.8)	p<0.001
Exposed	1369 (84.7)	94 (5.8)	153 (9.5)	

*chi-squared test

Figure 2: Exposure to wet work (hands in liquids) by industry



In response to the question requesting identification of liquids, the most commonly reported exposure was water, with 64% of those exposed to liquids reporting exposure. Industries reporting the highest percentages of exposure to water were 'Health and Community Services' (30%), followed by 'Construction' (14%) and 'Manufacturing' (11%). The industries with the highest percentage of exposure to detergents, cleaning products and disinfectants were 'Health and Community Services' (42%), followed by 'Manufacturing' (9%). 'Manufacturing' was the industry with the highest percentages of exposed workers for a number of liquids, including oils (28%), solvents, thinners and methylated spirits (43%), hydraulic oil (28%), degreaser (30%) and grease (28%). 'Construction' had the highest percentages of workers exposed to concrete (93%) and to paint (26%). 'Transport and storage' had the highest percentage of workers exposed to fuel, petrol and kerosene (24%). Finally, the industry with the highest percentage of workers exposed to bodily fluids was 'Health and community services' (79%).

Wet work exposure: Hand-washing and/or hands immersed in liquids

Finally, 13.1% (95% CI: 12.1-14.1%) of workers reported that they washed their hands more than 20 times per typical day at work and/or had contact with liquids for more than two hours per day.

2. Occupational Contact Dermatitis and Skin and Cancer Foundation clinic data

1494 patients with occupationally-related contact dermatitis attended a clinic at either the Occupational Contact Dermatitis or the Skin and Cancer Foundation Clinics between January 1993 and December 2010, and had their details entered into the PatchCAMS database. Patients were assessed by the consultant dermatologist as having partially or significantly work related dermatitis (Table 3).

Table 3 Diagnosed disease data: Partially and significantly work related diagnosed disease cases 1993-2010 by demographic and workplace variables

Demographic and employment variables N=1494	Partially work related	Significantly work related	Total n (%)
Gender - n (%) n=1494			
Females	129	588	717 (48)
Males	118	659	777 (52)
Age group - n (%) n=1485			
15-24	41	287	328 (22)
25-34	78	324	402 (27)
35-44	59	273	332 (22)
45-54	44	225	269 (18)
55+	24	130	154 (11)
Employment status - n (%) n=1392			
Apprentice	4	112	116 (8.3)
Casual	8	33	41 (3.0)
Full time	143	798	941 (67.6)
Part time	17	62	79 (5.7)
Retired	1	1	2 (0.1)
Self-employed	30	91	121 (8.7)
Shift-worker	10	46	56 (4.0)
Student	5	13	18 (1.3)
Unemployed	5	13	18 (1.3)

In the course of diagnosis the specialist dermatologist assesses whether the dermatitis is partially or significantly related to occupational exposures. At the time of their clinic appointment patients were asked if they had submitted a claim for workers' compensation (Table 4 & 5). It should be noted that this information is only current at the time of the patient's appointment.

Table 4 Diagnosed disease data: Self-reported workers' compensation claims at the time of clinic appointment 1993-2010, by demographic and disease variables

	Accepted	Applied	Denied	Not applied
Gender - n (%) n=1149				
Females	103 (19.0)	55 (10.2)	5 (0.9)	379 (69.9)
Males	179 (29.5)	85 (14.0)	2 (0.3)	341 (56.2)
Age group - n (%) n=1145				
15-24	44 (18.2)	28 (11.6)	0 (0)	170 (70.3)
25-34	71 (22.3)	46 (14.4)	3 (0.9)	199 (62.4)
35-44	73 (28.3)	31 (12.0)	0 (0)	154 (59.7)
45-54	61 (29.1)	22 (10.5)	3 (1.4)	124 (59.1)
55+	32 (27.6)	13 (11.2)	1 (0.9)	70 (60.3)
Work relationship – n (%) n=1149				
Partially related to work	27 (15.3)	8 (4.5)	4 (2.3)	138 (78.0)
Significantly related to work	255 (26.2)	132 (13.6)	3 (0.3)	582 (59.9)

Table 5 Diagnosed disease data: Self-reported workers' compensation claims at the time of clinic appointment 1993-2010, by workplace variables

Workplace variables	Accepted	Applied	Denied	Not applied
Employment status - n (%) n=1133				
Apprentice	15 (16.3)	9 (9.8)	0 (0)	68 (73.9)
Casual	4 (12.9)	4 (12.9)	1 (3.2)	22 (71.0)
Full time	227 (28.3)	98 (12.2)	3 (0.4)	474 (59.1)
Part time	14 (20.3)	10 (14.5)	1 (1.5)	44 (63.8)
Retired	0 (0)	0 (0)	0 (0)	1 (100.0)
Self-employed	1 (1.5)	2 (2.9)	0 (0)	65 (95.6)
Shift-worker	14 (27.5)	9 (17.7)	0 (0)	28 (54.9)
Student	0 (0)	1 (16.7)	0 (0)	5 (83.3)
Unemployed	2 (15.4)	3 (23.1)	1 (7.7)	7 (53.9)

3. The Compensation Research Database (CRD)

Workers' compensation claims from the CRD for the time period January 1985- December 2009 were sorted by the variable "Affliction_Nature_CD" and the following codes were selected for inclusion in this analysis:

- Contact Dermatitis- codes 410 and 741
- Other and unspecified dermatitis- codes 420 and 742

This left 5,197 claims for occupationally related dermatitis. The claims were also sorted by the "Work-Activity_type_CD" variable and claims resulting from an exposure "during a recess period" and "journey to/from employment" were dropped from the analysis, leaving 5,189 claims.

These 5,189 claims included 416 repeat claims as described in table 6

Table 6 Initial and repeat claims, Compensation Research Database January 1985-December 2009

Claims per claimant	Total
Initial claim	4,773
Two claims	342
Three claims	53
Four claims	13
Five claims	7
Six claims	1
Total repeat claims	416
Total claims	5,189

The cost of all claims (initial and repeat) for 'contact dermatitis' and 'other and unspecified dermatitis' for the period January 1985 to December 2009 was \$26,724,383. The most expensive claim was reported as costing \$856,297. The mean cost of a claim was \$5,150 (standard deviation \$30,575). The total cost of the 4773 initial claims was \$23,580,851. The mean cost of initial claims was \$4,940 (standard deviation \$30,757). The 416 repeat claims cost a total of \$3,143,532. The maximum claim cost for repeat claims was \$357,650, the mean cost of repeat claims was \$7,556 (standard deviation \$28,334).

The total days away from work as a result of occupationally related dermatitis, as recorded in the CRD for the period January 1985 to December 2009, (both initial and repeat claims) was 213,772 days. The mean number of days away from work was 41 days (standard deviation 189 days). The mean number of days away from work for the 4773 initial claims was 40 (standard deviation 189). The mean number of days away from work for the 416 repeat claims was 51 (standard deviation 182).

Repeat claims (n=416) were dropped from the dataset, leaving a total of 4,773 claims for the descriptive analyses reported in Table 7. The rate for initial claims was approximately 9.4 per 100,000 part time and full time employed Victorians.

Table 7 Compensation Research Database, demographic and employment variables

Demographic and employment variables	CRD data
Gender - n (%) n=4,538	
Females	1,482 (32.7)
Males	3,056 (67.3)
Age group - n (%) n=4,538	
15-24	1,172 (25.8)
25-34	1,169 (25.8)
35-44	953 (21.0)
45-54	825 (18.2)
55+	419 (9.2)
Occupational group - n (%), n=4,537	
Managers and administrators	56 (1.2)
Professionals	438 (9.7)
Associate professionals	174 (3.8)
Tradespersons and related workers	1,361 (30.0)
Advanced clerical and service workers	17 (0.4)
Intermediate clerical	193 (4.2)
Intermediate production and transport workers	427 (9.4)
Elementary clerical	145 (3.2)
Labourers and related workers	1,726 (38.1)

4. Comparison between the PatchCAMS diagnosed disease data and the Compensation Research Database

There were broad similarities and differences between the diagnosed disease data and the workers' compensation claims data (Table 8). Note the workers' compensation data was restricted to initial claims only. When we compare the two data sources by gender using a two sample test of proportions, we see contrasting distributions. However when we compare the two data sources by age we find somewhat similar distributions for the two data sources, with the only differences in the youngest age group (15-24), with a higher proportion of young workers claiming workers' compensation compared to the diagnosed disease data.

Table 8 Demographic variables: Diagnosed disease data and workers' compensation data (initial claims only)

Demographic variables	Diagnosed disease data	Workers' compensation data	p value*
Gender			
Females	717 (48)	1,482 (33)	p<0.001
Males	777 (52)	3,056 (67)	p<0.001
Age group			
15-24	328 (22)	1,172 (26)	p<0.005
25-34	402 (27)	1,169 (26)	p=0.318
35-44	332 (22)	953 (21)	p=0.2681
45-54	269 (18)	825 (18)	p=0.9548
55+	154 (11)	419 (9)	p=0.1948

*two sample test of proportions

Case study Hairdressers

From the Skin and Cancer Foundation, PatchCAMS clinic data 156 hairdressers were diagnosed with significantly work-related occupational contact dermatitis between January 1993 and December 2009 (note this is a slightly different time frame to the PatchCAMS data described above). Table 9 provides demographic and occupational characteristics of the study participants diagnosed with significantly work-related occupational contact dermatitis.

From the CRD workers' compensation data, between January 1993 and December 2009, there were 46 hairdressers who had successful workers compensation claims. No repeat claims are included in this total. Table 9 provides demographic and occupational characteristics of the study participants who had successful workers compensation claims for occupationally-related dermatitis.

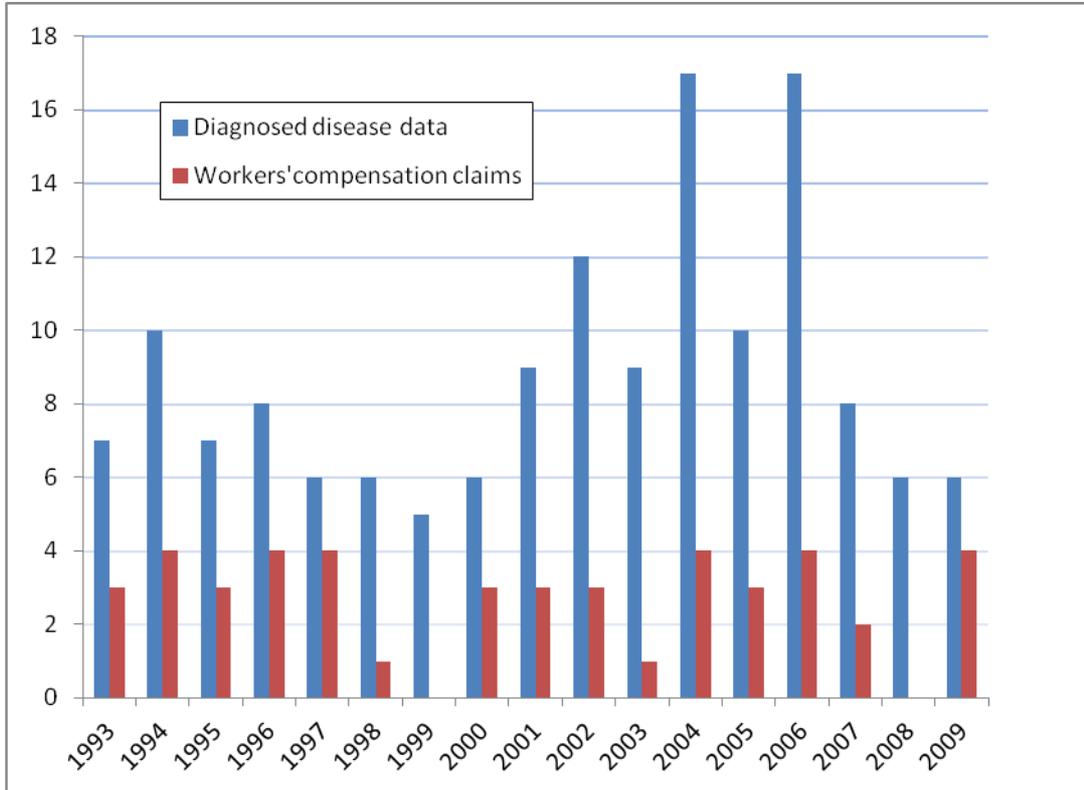
The total recorded cost of workers' compensation claims for work-related dermatitis for hairdressers between 1993 and 2009 (not including repeat claims) was \$427,080. The mean cost of claims was \$4146 and the highest individual claim was \$68,575. The total days away from work across all claims, as recorded by the CRD, was 2648. The mean days away from work per claim was 58 and the highest amount reported for an individual claim was 642. According to the CRD, only one of the hairdressers who had successful workers' compensation claims had no days off work.

**Table 9 Case Study Hairdressers:
 Diagnosed disease data and workers' compensation data
 January 1993- December 2009**

	Diagnosed disease data	Workers' compensation data
Gender	N=156	N=46
Females – n (%)	150 (96)	42 (91)
Males – n (%)	6 (4)	4 (9)
Age group (n=)		
15-24 - n (%)	108 (69)	41 (89)
25-34 - n (%)	30 (19)	5 (11)
35-44 - n (%)	12 (8)	--
45-54 - n (%)	4 (3)	--
55+ - n (%)	2 (1)	--
Apprentice/other status		
Apprentice	70 (45)	14 (30)
Hairdresser/other	86 (55)	32 (70)

Figure 3 depicts diagnosed disease data and workers' compensation data from the CRD by the year of diagnosis for the disease data and the reported year of 'affliction' for the CRD data.

**Figure 3: Case Study Hairdressers:
Diagnosed disease data vs workers' compensation data, by year 1993-2009**



Discussion

The 2011 Wet Work study represents a first attempt to obtain information about the extent and characteristics of exposure to wet work, as well as the resulting diagnosed occupational contact dermatitis and successful workers' compensation claims amongst Victorian workers.

Data from the NHEWS survey indicate extensive exposure to wet work amongst participating Australian workers. This was particularly the case for hand-washing, with 1 in 10 participants reporting that they washed their hands more than 20 times per typical day at work in the previous week. For immersion of the hands in liquids 4.5% of participants reported more than two hours per typical day at work in the previous week.

According to diagnosed disease data, between January 1993-December 2010 1,494 patients were diagnosed with occupational contact dermatitis at the Skin and Cancer Foundation, Melbourne. Most (68%) were employed as full time workers. Self-employed people made up 9% of the sample and 8% were apprentices, with the number of apprentices varying according to occupation. Amongst hairdressers, 45% of patients were apprentices at the time of diagnosis. At the time of their clinic appointment patients were asked if they had submitted a claim for workers' compensation. Amongst the apprentices, 16% reported having their workers' compensation claims accepted, compared to 28% of those who worked full time; however it is likely that many patients may have submitted a workers' compensation claim subsequent to their diagnosis.

According to the CRD, from January 1985 until December 2009 there were 4,773 initial claims and 416 repeat claims for occupationally-related dermatitis amongst Victorian workers. Most of the initial claims were from Labourers and related workers (38%) and from Tradespersons and related workers (30%). The total cost of all claims (initial and repeat) was \$26,742,383. There were suggestions of differences between initial and repeat claims. The mean cost of repeat claims (\$7,556), was higher than the mean cost of initial claims (\$4,940). These differences between initial and repeat claims are also reflected in the reported total days away from work. The mean days away from work for initial claims was 40, the mean days away from work for repeat claims was 51.

When comparing the diagnosed disease data with the workers' compensation claims from the CRD there were significant differences by gender ($p < 0.001$) with a much higher proportion of females diagnosed with occupational contact dermatitis (48%) compared to the CRD workers' compensation data (33%). This gender discrepancy between the diagnosed disease data and the workers' compensation data requires further investigation as to why males were more likely to claim than females, particularly as the gender differences for diagnosed disease do not seem to follow the same pattern. The gender split for the diagnosed disease data was about 50%, but the workers' compensation data was a third for females compared to two thirds for males. When compared by age group there was a difference ($p < 0.005$) for the youngest age group, with a lower proportion of the youngest workers diagnosed with occupational contact dermatitis (22%) compared to those claiming workers compensation (26%). All other age groups had similar proportions for diagnosed disease and workers' compensation claims. As the hairdresser case study shows there are considerable variations to these patterns by occupation. Amongst the hairdressers this was particularly the case for apprentices with a much higher proportion of apprentices being represented in both the diagnosed disease data (45%) as well as the

workers' compensation data (30%), compared to the respective broader datasets. Even though there was a high proportion of apprentice hairdressers in the CRD data, there were still higher proportions of apprentices in the diagnosed disease data. Although the numbers are very small it is also interesting to note that there are larger proportions of female hairdressers in the diagnosed disease data (96% for females and 4% for males) compared with the CRD data (91% for females and 9% for males). This suggests that the trend for males to claim more than females can also be seen in occupations which are predominantly female. Other case studies in specific occupations will provide more information about the differences between diagnosed disease and workers' compensation claims data.

As can be seen from the hairdresser case study, as well as previous Australian studies, there are often large discrepancies between the numbers of workers diagnosed with occupational contact dermatitis and successful workers' compensation claims for occupationally-induced dermatitis [13-15]. There are many underlying reasons for this. Medical practitioners do not always ask about workplace exposures and thus do not recognize the contribution of the workplace to the disease [23]. Even if an occupational relationship is suspected, many workers affected by occupational contact dermatitis do not claim workers' compensation or even seek medical advice, and their access to both varies widely throughout the world. From the Wet Work study it seems as if factors as gender and apprentice status may also be important factors when determining why a person will claim workers' compensation.

Development of a public health response to occupationally related dermatitis requires information about where the problem is at its worst as well as what factors might enable rehabilitation and return to work for affected workers. Our findings suggest that this information cannot be provided by a sole focus on exposure data, diagnosed disease data or workers' compensation data alone, but requires information across all three data sources. The Wet Work project has presented information from a range of complementary datasets thereby providing information for action for the prevention of occupationally related dermatitis.

Targeted policies and education packages are required to guide intervention on exposure to wet work within the specific workplace contexts of high-risk occupations and industries. As mentioned in the introduction, the German *Technical Standards (531)*, together with the *Technical Rules for Hazardous Substances 530 "Hairdressing trade"* were fully enforced in 1996 after a long period of consultation and implementation with employers, employees, the German hairdresser's guild, cosmetic manufacturers and legislators. As a result of these collaborative efforts, a ten-fold reduction was seen in the numbers of incident cases of occupational contact dermatitis amongst hairdressers in Northern Bavaria. This success story was the result of a multi-disciplinary effort between dermatologists, employer and employee groups and policy makers [24, 25]. Findings from the Wet Work project present an opportunity for development of targeted policy and practice interventions that could ultimately lead to a reduction in occupational irritant and allergic contact dermatitis.

Knowledge Transfer Activities

Meeting with stakeholders

On Tuesday 15 November 2011, Dr Tessa Keegel, Associate Professor Rosemary Nixon and Kristen Benke held a meeting about the Wet Work project with representatives from various unions, WorkSafe Victoria and ISCRR at the Monash Conference Centre at Collins St in the city. Initial contact was made by Gwynnyth Evans from the Australian Meat Industry Employees Union who approached the research team regarding the wet work research project. As a result of this contact, the study team felt it would be a useful exercise to meet with union colleagues. ISCRR was extremely enthusiastic in support for this meeting and organised the publicity, venue and catering for the event.

Dr Keegel provided a broad overview of the Wet Work Project and broadly discussed very preliminary findings from the workers' compensation claims dataset. Dr Nixon also presented; her talk focused on the link between wet work and occupational contact dermatitis, as well as providing an overview of her ten years of clinic data from the Occupational Dermatology Clinic at the Skin and Cancer Foundation.

Dr Keegel's presentation was a starting point for discussion about wet work and the project in general. Colleagues from the unions provided a useful workplace perspective of wet work. Representatives from WorkSafe attended the meeting and contributed valuable information about the workers' compensation database, as well as how they might make use of the project findings.

Representatives from the plumbers, nurses, CFMEU, and the union representing cleaners and kitchen hands were unable to attend the meeting. Overall however, the meeting allowed for a successful introduction and discussion of the Wet Work Project and the opportunity for feedback from workplace and policy stakeholders.

Proposed dissemination activity

Proposed journal articles:

- The incidence of occupational contact dermatitis in hairdressers and workers' compensation data, G Lyons, T Keegel, J Cahill, R Nixon

Proposed journal: *Contact Dermatitis*

- Workers' compensation claims data for occupational dermatitis in Victoria, Australia, T Keegel, AD LaMontagne, R Nixon, M Sim

Proposed journal: *Dermatitis*

- Diagnosed occupational contact dermatitis and workers' compensation claims data for occupational dermatitis: A comparison between clinic data and workers compensation data for high risk occupations T Keegel, AD LaMontagne, M Sim, R Nixon

Proposed journal: *Contact Dermatitis*

Proposed conference presentation:

- "Occupational contact dermatitis and workers' compensation claims" T Keegel, R Nixon, M Sim, AD LaMontagne Population Health Congress 2012: Population Health in a Changing World. Adelaide 10-12 September

Proposed stakeholder engagement:

- We hope to hold another meeting in the second half of 2012 to update workplace stakeholders regarding the findings of the Wet Work project

Bibliography

1. Lushniak, B.D., *The Epidemiology of Occupational Contact-Dermatitis*. Dermatologic Clinics, 1995. **13**(3): p. 671-680.
2. Hendrie, L. and T. Driscoll, *Work-related presentations to general practitioners in Australia*. Journal of Occupational Health and Safety-Australia and New Zealand, 2003. **19**: p. 133-143.
3. Rietschel, R.L., et al., *Relationship of Occupation to Contact Dermatitis: Evaluation in Patients Tested from 1998 to 2000*. American Journal of Contact Dermatitis, 2002. **13**(4): p. 170-176.
4. Nixon, R., K. Frowen, and M. Moyle, *Occupational dermatoses*. Australian Family Physician, 2005. **34**(5): p. 327 - 377.
5. Mathias, C.G.T., *Contact dermatitis and workers' compensation: Criteria for establishing occupational causation and aggravation*. J Am Acad Dermatol, 1989. **20**: p. 842-8.
6. Burnett, C.A., et al., *Occupational dermatitis causing days away from work in US private industry, 1993*. American Journal of Industrial Medicine, 1998. **34**(6): p. 568-573.
7. Rosen, R.H. and S. Freeman, *Prognosis of Occupational Contact-Dermatitis in New-South-Wales, Australia*. Contact Dermatitis, 1993. **29**(2): p. 88-93.
8. Holness, D.L., *Results of a quality of life questionnaire in a patch test clinic population*. Contact Dermatitis, 2001. **44**(2): p. 80-4.
9. BAuA German Federal Institute for Occupational Safety and Health, *Technical standard for hazardous substances: Skin damage from work in wet environments (TRGS 531: wet work)*, Translation jointly prepared by NIOSH and BAuA, Editor 1996.
10. Larson, E., et al., *Prevalence and correlates of skin damage on the hands of nurses*. Heart Lung, 1997. **26**(5): p. 404-12.
11. Uter, W., et al., *Risk of hand dermatitis among hairdressers versus office workers*. Scand J Work Environ Health, 1999. **25**(5): p. 450-6.
12. ASCC, *Guidance on the prevention of dermatitis caused by wet work*, 2005, Department of Employment and Workplace Relations: Canberra.
13. Keegel, T., et al., *Incidence and prevalence rates for occupational contact dermatitis in an Australian suburban area*. Contact Dermatitis, 2005. **52**(5): p. 254-9.
14. Rosen, R.H. and S. Freeman, *Occupational contact dermatitis in New South Wales*. Australas J Dermatol, 1992. **33**(1): p. 1-10.
15. Keegel, T., et al., *Occupational contact dermatitis in Australia: diagnostic and management practices, and severity of worker impairment*. Contact Dermatitis, 2007. **56**(6): p. 318-324.

16. Keegel, T., et al., *The epidemiology of occupational contact dermatitis (1990-2007): a systematic review*. Int J Dermatol, 2009. **48**(6): p. 571-8.
17. ASCC, *National Hazard Exposure Worker Surveillance (NHEWS) Survey: 2008 Results*, 2008, Australian Government Canberra.
18. Australian Bureau of Statistics and Statistics New Zealand, *ANZSCO- Australian and New Zealand Standard Classification of Occupations 2006*: ABS Statistics New Zealand.
19. Ruseckaite, R. and A. Collie, *Repeat workers' compensation claims: risk factors, costs and work disability*. BMC Public Health, 2011. **11**: p. 492.
20. Boyle, P. and D.M. Parkin, *Statistical methods for registries*, in *Cancer Registration: Principles and Methods*, O.M. Jensen, et al., Editors. 1991, IARC,: Lyon.
21. ABS, *Labour Force*, ABS, Editor 1997, ABS Canberra.
22. Keegel, T.G., R.L. Nixon, and A.D. Lamontagne, *Exposure to wet work in working Australians*. Contact Dermatitis, 2012. **66**(2): p. 87-94.
23. Holness, D.L., *Health care services use by workers with work-related contact dermatitis*. Dermatitis, 2004. **15**(1): p. 18-24.
24. Dickel, H., et al., *Impact of preventive strategies on trend of occupational skin disease in hairdressers: population based register study*. BMJ, 2002. **324**: p. 1422-3.
25. Dickel, H., et al., *Surveillance scheme for occupational skin disease in the Saarland, FRG - First report from BKH-S*. Contact Dermatitis, 2002. **46**(4): p. 197-206.