WHAT WE'VE LEARNED ABOUT...

Occupational Skin Disease

A lay-language research synthesis from the Centre for Research Expertise in Occupational Disease (CREOD)

2020 update

www.creod.on.ca

Background

What is contact dermatitis?

Contact dermatitis is a skin reaction that looks like a rash or burn. It can be itchy or painful. It's caused by exposure to an irritant (irritant contact dermatitis) or an allergen (allergic contact dermatitis). First symptoms may appear a day or two after first exposure, or after years of using an irritant or allergen on a regular basis.

What is work-related contact dermatitis (WRCD)?

Work-related contact dermatitis (WRCD) is dermatitis that's caused by exposure to an irritant or allergen at work. WRCD is common, especially among people involved in wet work. Dishwashers, cleaners, mechanics, hairdressers and people who work in health care are particularly vulnerable to irritant WRCD. People who work with allergens like resins, rubber chemicals, metals and biocides are vulnerable to allergic WRCD.

How well do we understand WRCD?

While much is known about WRCD, there is still more to learn about its prevention, its treatment, and how to help workers with WRCD continue or go back to work. Several recent reviews – including an initial systematic review by our group in 2005 – have focused on WRCD prevention. Another focused on WRCD prevention, diagnosis and management. These reviews have all noted the limited amount of available evidence. However, some excellent references do exist, including the book "Controlling Skin Exposure to Chemicals and Wet-Work" by Rajadurai Sithamparanadaraj.

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Key Messages and Contents

The following is a lay-language synthesis of CREOD's body of research on work-related contact dermatitis (WRCD).

Key Messages

WRCD is common.

WRCD is preventable.

Many workers are at risk of WRCD, but don't know it.

WRCD prevention and education are low priorities in many Ontario workplaces. Training related to prevention of exposure to skin hazards is lacking in many Ontario workplaces.

There are serious gaps in occupational health care delivery in Ontario. Many doctors don't ask patients about work and work exposures, and it takes workers a long time and many doctor's visits to get a diagnosis.

Recovering from WRCD can be difficult. Research shows that WRCD can be difficult to control and those affected can have a hard time continuing work or returning to work.

Workers with WRCD may not file workers' compensation claims.

Early medical intervention is critical – the longer a person experiences WRCD symptoms before they're diagnosed, the less likely they are to get better.

Prevention tips

Avoid contact with the skin

elimination, substitution, ventilation, process change

Protect the skin from contact with an irritant or allergen

personal protective equipment, skin care

Check for early signs of exposure

redness, dryness, rash

Contents

Burden and Risk

It's not just a rash!

WRCD is common. CREOD analyzed the Canadian data from the North American Contact Dermatitis Group (NACDG) database and found that 17% of the people tested had a work-related diagnosis.[1] Of these work-related cases, 64% had an allergic diagnosis and 34% had an irritant diagnosis. Another CREOD study found that 21% of male indoor cleaners reported a rash in the past year.[2] A series of studies of hospital workers have found a high prevalence of hand dermatitis with values ranging from 31% to 72%.[3-5]

Watch for the top-ten occupational allergens. Our NACDG database study identified the following as the top ten occupational allergens: epoxy resin, thiuram, carba mix, nickel sulphate, cobalt chloride, potassium dichromate, glyceryl thioglycolate, p-phenylenediamine, formaldehyde and glutaraldehyde.[1]

Many industries are affected by WRCD. Our NACDG database study[1] found that industries most commonly affected by WRCD were aircrafts and parts, beauty salons and hospitals. People at highest risk of WRCD were electrical equipment assemblers, precision assemblers, hairdressers and cosmetologists. High rates were also found in health care workers and cleaners.

Many exposures are associated with WRCD, particularly wet work. There's a significant association between wet work and WRCD; a CREOD study[3] found that hospital personnel involved in wet work were 4.8 times more likely to report hand eczema in the past year, compared to those involved in dry work. This has been confirmed in two recent studies.[4,5]

A study of 100 workers being assessed for contact dermatitis found common exposures in those with WRCD included cleaning agents, oils and greases, metal, solvents and plastics.[6] Another small study of people with WRCD[7] demonstrated a wide variety of exposures including metals, oils and lubricants, solvents, mechanical irritation, metalworking fluids or corrosives (acids/alkalis). About half reported exposure to wet work, glues/adhesives/sealants, heat and epoxy compounds.

Some exposures can put people at risk of both WRCD and occupational asthma (OA). Our NACDG database study[1] found that epoxy resin, nickel sulfate, cobalt chloride, potassium dichromate, paraphenylenediamine, formaldehyde and glutaraldehyde have established associations with both WRCD and OA. When we looked at symptoms among embalmers, soda ash workers (ammonia), softwood workers and cabinet makers, we found that 11% reported both lung and skin symptoms.[8] Our survey of indoor cleaners found that if workers had reported a rash in the past year, they were more likely to also have work-related asthma symptoms.[2]

Prevention

WRCD can be prevented. In a systematic review[9] of 49 studies on contact dermatitis, CREOD found that people who wore cotton liners in gloves and fabrics treated with fabric softener were less likely to develop irritant contact dermatitis. The use of lipid-rich moisturizers, barrier creams containing dimethicone or perfluoropolyethers, topical skin protectant, quaternium 18 bentonite (organoclay) and diethylene triaminepenta-acetic acid (chelator) cream also appeared to prevent various forms of dermatitis.

Our study of dental staff and students[10] found that changing to non-powdered latex gloves led to a decrease in latex sensitivity. Students who had entered the school after the introduction of powder-free gloves showed no sensitivity at all.

There is a significant lack of awareness regarding WRCD in Ontario's service sector. We conducted focus groups and electronic surveys of 37 Ontario Services Safety Alliance (OSSA) staff, and 39 OSSA Advisory Committee members.[11] The surveys showed that these groups didn't know very much about WRCD. Both groups also rated knowledge among people in their sectors as "low". Participants told us that WRCD prevention programs are a low priority in their sector.

Few Ontario workplaces have practices or programs in place to prevent or address WRCD. Training programs for WRCD prevention are particularly lacking. In a survey of 100 workers with hand dermatitis being patch tested and assessed for contact dermatitis (CD)[6], we found that most had been through some occupational health and safety or WHMIS training in their workplace, but training for glove use, skin care and hand washing was much less common – especially among workers involved in wet work. Several recent studies continued to find a minority of workers reporting skin-specific prevention training.[12-14] This is also true in groups of workers from a particular industry or job.

We surveyed 139 hospital personnel and found that only about one-third of respondents had received skin protection training.[3] Our survey of indoor cleaners found that cleaners with a skin rash were less likely than other cleaners to have received workplace training on how to protect their skin.[2] An interview study exploring skin-specific prevention training found workers desired hands-on training with content relevant to their job. They favoured training from supervisors who had practical experience.[15] A summary of skin-specific prevention training programs has been published.[16]

In a small study of workers with WRCD who were off work because of their skin problems[7], only about one-quarter of respondents reported that their workplace conducted assessments for skin hazards or provided access to an onsite occupational nurse/physician or pre-placement medical skin examinations. Almost none reported skin protection programs in their workplaces. About half reported that incident reports were routinely filled out, and that modified work was available for people with skin problems. Although moisturizer or barrier cream have been shown to prevent WRCD, only about one-quarter of participants reported that these tools for prevention were available in their workplace.

Skin allergens may not be identified as skin sensitizers in commonly-used occupational health and safety resource material. A CREOD study[1] that identified the 10 most common skin allergens found that only the NLM Haz-Map identified all 10 as potential skin sensitizers. The ACGIH TLV booklet didn't list three of the substances and only listed three of the remaining with a sensitizer notation. The NIOSH Pocket Guide didn't list four of the substances and only listed three of the remaining with a sensitizer notation. Listings between these two sources were inconsistent.

Diagnosis and Treatment: Barriers and Challenges

Getting a diagnosis for WRCD can take a long time, and many doctors visits. A study examining health care utilization showed that on average, workers with WRCD experienced symptoms for 25 months before they were seen in our clinic.[18] 95% saw their family doctor. About 70% had seen a dermatologist. Another study found that 20% of people with WRCD had seen their family physicians more than 5 times before coming to the clinic; 15% had seen a dermatologist more than 5 times.[19] An additional study showed that 20% of workers waited more than a year before seeking primary care.[20] If they saw their family physician, the average number of visits was 4 with a range from one to 30. If they were referred to a dermatologist, 13% had to wait more than six months for their first appointment.

Workers do not always seek care. The most common reasons workers with WRCD reported for not seeking care was that they thought their symptoms would get better or they didn't think their symptoms were serious enough.[20] Workers were also concerned about missing work for their appointments and the cost of treatment, and assumed their symptoms were a natural consequence of work; co-workers had similar problems.

Very few family doctors ask people with contact dermatitis (CD) about workplace exposures. Our research shows that only 5-45% of family physicians and 36-54% of dermatologists asked CD patients about workplace exposures.[19]

Patients get little information and advice from physicians regarding their problem. A CREOD survey of workers with WRCD[18] showed that doctors provided minimal advice about how to modify work to protect skin and hands. Another found that only 43% of patients reported that visits with family physicians or dermatologists helped them to understand their problem.[19] There was a relationship between workers' satisfaction with care and how long their symptoms lasted.

Streamlined tools and processes and more training would make recognition, referral and treatment of WRCD easier for physicians. Our physician survey[21] found the main barriers to detailed history-taking among family physicians and dermatologists were lack of time and expertise. They told us that improved remuneration, easily available standard tests and referral sources, templates for asking questions during history taking and 1–800 numbers or websites for information would improve recognition and treatment of WRCD. They also asked for education on how to detect WRCD early, initiate a claim and refer to specialists. Both groups reported that a lack of timely access to specialists was an important barrier to referral.

SCREENING FOR HAND DERMATITIS

The earlier a correct diagnosis is made, the better the outcome. A CREOD study showed that the earlier the diagnosis is made, the better the outcome for workers with work-related contact dermatitis.[18] These results are echoed in similar European studies. Among workers who received a diagnosis within one year of the onset of symptoms, 53% were better 6 months later, compared with only 23% who had experienced symptoms for more than one year before diagnosis.

Screening for hand dermatitis in health care is feasible. A series of CREOD studies have developed and tested a screening tool for hand dermatitis in healthcare workers.[3-5] The tool can be used by occupational health staff or the worker can use the tool to self screen. The tool was quick and easy to use. A study of occupational health staff at GTA hospitals found that screening occurred at hire but was not consistently carried out thereafter.[22,23]

Diagnosis and Treatment: Ensuring Accuracy and Efficacy

Standard practice models may not be enough to make an accurate diagnosis. If the correct diagnosis is not made, treatment may not work – an important part of treatment is correctly identifying and removing the irritant and/or allergic factors that may be causing or aggravating the worker's skin problem. A study of workers with CD[24] thought to be related to glove use found that it's important to both prick and patch test; workers may have multiple diagnoses. For example, 11% had both allergic contact dermatitis and contact urticarial. Of those with allergic contact dermatitis, almost one third also had irritant contact dermatitis. Similarly, about one third of those with contact urticarial also had irritant contact dermatitis.

It is important to test with workplace materials in addition to standard screening. When we looked at patch test results for auto mechanics and machinists, we found positive results for allergens not included on a coolants tray.[25] Other studies have shown positive results for several groups of workplace agents including epoxy materials[26] and isocyanate materials[27]. Although testing with workplace materials can be essential, it's important to note that this kind of testing is complicated and needs to be done by experts.

Use patch test checklists to improve the quality of care. We developed and tested a patch test safety checklist to improve the quality of care in the our specialized clinic.[28,29] We found that using the checklist improved the education provided to patients before coming to the clinic for testing. The checklist is available for download at www.creod.on.ca.

The right treatment can make a difference. Our systematic review of 49 studies on contact dermatitis[10] found that potent or moderately potent steroids were effective in treating allergic contact dermatitis, and lipid-rich moisturizers were effective in treating irritant contact dermatitis. Pentoxifylline and barrier cream containing aluminum chlorohydrate did not have an effect on WRCD.

Be open to innovation. In our multidisciplinary clinic, we see workers with hand-arm vibration syndrome who often use anti-impaction gloves to reduce vibration exposure. One of our dermatologists thought this type of glove could be useful for workers with frictional hand dermatitis. When implemented along with medical treatment, all patients that used the glove were able to return to work.[30]

MORE ON CREOD'S WORK...

Participating in guideline development. Our expertise in contact dermatitis was recognized when we were invited by the Joint Task Force on Practice Parameters which represents the American Academy of Allergy, Asthma and Immunology; the American College of Allergy, Asthma and Immunology and the Joint Council of Allergy, Asthma and Immunology to participate in updating the Practice Parameter on Contact Dermatitis.[31]

Understanding provincial health care utilization. To understand how patch testing is used provincially, we have analyzed 20 years of the Ontario Health Insurance Plan patch test data. This has demonstrated variation across the province in patch test utilization. Occupational patch testing has remained relatively constant while patch testing for non-occupational causes has increased.[32]

Helping Workers Return to Work

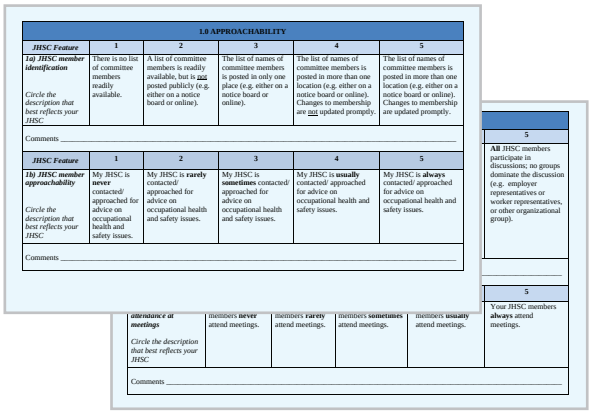
Workers must be able to protect their skin at work. CREOD studies have shown that one of the most-reported return-to-work barriers is fear of exposure.[33] Workers have told us that this concern was due to their inability to identify and then avoid the exposures that may have caused or contributed to their dermatitis. They worried that their pain, itching and bleeding would continue or get worse. These fears were linked to perceptions of poor hygiene and housekeeping practices at work. Key barriers to successful return to work included ongoing skin problems and continuing exposure at the workplace.

Other return-to-work barriers include: Concerns about ability to do the job safely (e.g. inability to use required tools), concerns about appearance (e.g. embarrassment, issues of self-esteem and body image), issues with workplace modifications (e.g. perceived inability to accommodate), issues with personal protective equipment (e.g. worry that it may get caught in machinery), worker or co-worker fear that rash is contagious, workplace attitudes (e.g. management and/or coworkers unwilling to cooperate with return-to-work accommodations) and pain.[33]

A multidisciplinary model of care, available protective equipment and modified work may all help workers return to work. In addition to medical treatment, workplace changes are often needed to help a worker return to work. A model of care that includes clinicians, an occupational hygienist and an occupational therapist may help workers and workplaces make the necessary changes. Our review of our experience using our multidisciplinary care model for RTW for workers with occupational contact dermatitis found the key components of a RTW plan included specific direction for avoidance of particular exposures, skin status monitoring, specific recommendations for personal protective equipment and skin care products and either a RTW trial or graduated RTW.[34] Key facilitators included effective communication between the workplace parties, worker compliance with their treatment plan and the availability of modified work.

We have reviewed our experience with our multidisciplinary RTW program for nurses who most often have irritant contact dermatitis form wet work exposure. A key determinant of successful RTW is titrating the number of consecutive shifts they work.[35]

Aids to improve communication may assist in return to work. Our research shows that return to work is easier when there is good communication between the worker and the workplace.[34] At their final clinic visit, workers receive a lot of information to remember about their diagnosis, treatment and suggested workplace changes. We developed a "Workplace Prescription" to help communicate this information to the worker – and to their workplace if they choose to share it. The "Workplace Prescription" was developed based on input from workers with WRCD and occupational health professionals.[36] An implementation trial demonstrated that most workers decided to take the "Workplace Prescription" to their employer and found it helpful.[36]



1.0 APPROACHABILITY

JHSC Feature	1	2	3	4	5
1a) JHSC member identification *Circle the description that best reflects your JHSC*	There is no list of committee members readily available.	A list of committee members is readily available, but is not posted publicly (e.g. either on a notice board or online).	The list of names of committee members is posted in only one place (e.g. either on a notice board or online).	The list of names of committee members is posted in more than one location (e.g. either on a notice board or online). Changes to membership are not updated promptly.	The list of names of committee members is posted in more than one location (e.g. either on a notice board or online). Changes to membership are updated promptly.
Comments					
JHSC Feature	1	2	3	4	5
1b) JHSC member approachability *Circle the description that best reflects your JHSC*	My JHSC is **never** contacted/ approached for advice on occupational health and safety issues.	My JHSC is **rarely** contacted/ approached for advice on occupational health and safety issues.	My JHSC is **sometimes** contacted/ approached for advice on occupational health and safety issues.	My JHSC is **usually** contacted/ approached for advice on occupational health and safety issues.	My JHSC is **always** contacted/ approached for advice on occupational health and safety issues.
Comments					
					5
					All JHSC members participate in discussions; no groups dominate the discussion (e.g. employer representatives or worker representatives, or other organizational group).
					5
attendance at meetings *Circle the description that best reflects your JHSC*	members **never** attend meetings.	members **rarely** attend meetings.	members **sometimes** attend meetings.	members **usually** attend meetings.	Your JHSC members **always** attend meetings.
Comments					

Download the CREOD Workplace Prescription at www.creod.on.ca.

Outcomes for Workers

It takes a long time to recover from WRCD, and sometimes disease outcomes are very poor. A CREOD study found that only 40% of people with WRCD showed clinical improvement six months after assessment in our clinic.[10]

Contact dermatitis (CD) affects quality of life and impairs hand function. In a survey of 339 people with CD[37], almost three-quarters of participants experienced itching or pain. About a third reported that CD was embarrassing, interfered with work and interfered with sleep. About a quarter said that it interfered with housework and social/leisure activities, and one in five said that treatment was bothersome. Embarrassment was most commonly associated with hand dermatitis, and itch was most commonly associated with work-related and allergic contact dermatitis. A study of hand and upper extremity function in patients with CD[38] found that four out of five had impaired grip strength, and half had numbness.

Many people with WRCD lose time at work, mainly due to their skin problem. Only 62% of our clinic's patients were back at work six months after assessment in our clinic. Of the people who had returned to work, about one-third had changed jobs. Almost all of this group had changed jobs because of their skin problem.[39]

Many people with WRCD don't file worker compensation claims. We found that six months after assessment in our clinic, only two-thirds of workers assessed had filed a workers' compensation claim, and 70% of those were accepted.[3] Our physician survey[21] found that family practitioners and dermatologists report seeing many more patients with WRCD than filed workers' compensation claims for WRCD that year.

Vulnerable Workers

Vulnerable workers may have increased challenges with respect to occupational disease including occupational skin disease. Nail salon technicians are one such group. CREOD studies have documented allergic contact dermatitis from acrylates in this group of workers.[40,41] We have also examined barriers to prevention.[42]

Other Occupational Skin Diseases

There is increasing recognition of occupational skin cancer. CREOD collaborated with Ryerson University and the Occupational Cancer Research Centre on a national study to implement sun safety programs into municipal and utilities organizations.[43-45] A suite of resources to support the development and implement of sun safety programs has been developed and is available at www.sunsafetyatwork.ca.

Increasing Awareness

To help address the significant lack of awareness regarding WRCD in Ontario's service sector[11], CREOD worked with Workplace Safety and Prevention Services to create a series of awareness posters. These resources make it easier for service sector occupational health and safety professionals to increase awareness of WRCD at their workplaces.[46]

We tested the posters at workplaces, with employer groups and with workers being assessed for possible contact dermatitis in our clinic. They told us that different types of images (e.g. positive versus negative images) are needed, and that customization to the specific sector or workplace is important.

In response, we created three sets of sector-specific posters for download: one for vehicle sales and services, one for restaurants and food services and one for hairdressing. In addition, workplaces can use an interactive, online poster template to customize the visuals to their needs. To access the ready-made posters and the interactive template, visit www.creod.on.ca.

For more research findings and resources including these posters, the Workplace Prescription and the patch test safety checklist, visit the CREOD website at **www.creod.on.ca**.

An e-learning module, developed in partnership with the Public Services Health and Safety Association is also available on our website.

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Research that makes a Difference

About the Centre for Research Expertise in Occupational Disease (CREOD)

The Centre for Research Expertise in Occupational Disease is dedicated to improving understanding and prevention of occupational disease. Our research addresses the full spectrum of the health and safety continuum: from prevention, through exposure assessment, early recognition, diagnosis, treatment, return-to-work and outcomes. We work across disciplines and methodological paradigms to contribute to policy, knowledge and practice in both the workplace and clinical settings. Our programs include Occupational Lung Disease, Occupational Skin Disease, Hand-Arm Vibration Syndrome (HAVS) and Biological Hazards.

CREOD was founded in 2004 with the active support and generous funding of the Workplace Safety and Insurance Board. Since 2012 funding for CREOD has been provided by the Ontario Ministry of Labour. We are a collaborative program of the University of Toronto and St. Michael's Hospital.

To learn more about CREOD and to access plain language summaries of the studies referenced in this synthesis, visit our website at www.creod.on.ca.

WSIB ONTARIO Workplace Safety & Insurance Board
CSPAAT Commission de la sécurité professionnelle et de l'assurance contre les accidents du travail

Ontario

ST. MICHAEL'S UNITY HEALTH TORONTO

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