

TYPE I AND TYPE IV ALLERGIES

A self-study monograph for continuing education for healthcare workers with an interest in occupational and patient safety and infection prevention.

LEARNING OBJECTIVES

At the conclusion of this activity, participants should be able to:

1. Understand occupational irritant contact dermatitis (ICD), allergic contact dermatitis (ACD) and occupational latex allergy (OLA);
2. Describe the roles of glove formulation, hand hygiene solution and technique in contributing to contact dermatitis and immune responses;
3. Develop or update procedures and policies relating to contact dermatitis and OLA across the organisation and in the operating room;
4. Understand issues of importance when assessing healthcare workers' hands, investigating, and eliminating potential causes of contact dermatitis and allergy; and
5. Appreciate the views of a panel of clinical experts in regard to practical prevention and management of immunological and non-immunological responses to glove usage.

ISSUE 3

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The opinions expressed in this edition are the authors' only and may not represent the official position of Ansell or Bond University.

In this edition, a panel of global experts provides responses to a series of questions relating to occupational dermatoses and latex allergy among healthcare workers. As well, they discuss practical aspects of preventing and responding to occupational dermatoses. Their perspectives add valuable insight into the tasks of educating and monitoring staff about safe glove use and practical hints about critical features to consider when choosing gloves. Panel members include:

Professor, Doctor Henning Allmers, MPH, (HA), Department of Dermatology, Environmental Medicine and Health Sciences, University of Osnabrueck, Germany.

Ms Sue Barnes, RN, CIC, (SB), National Leader Infection Prevention and Control Quality and Safety Department, Program Office, Kaiser Permanente, United States.

Ms Ruth Melville, RN, CertORNmgt, CertWT&A, GradCertMgt, FACORN, (RM), President International Federation of Perioperative Nurses 2015-2018, Australia.

Associate Professor Rosemary Nixon BSc (Hons), MB BS, MPH, FACD, FAFOEM, RACP, MPH, (RN)
Director, Occupational Dermatology Research and Education Centre, Skin and Cancer Foundation Inc, Melbourne
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OCCUPATIONAL SKIN DISEASE AND LATEX ALLERGY IN HEALTHCARE



Allergic Contact Dermatitis

Over the past three decades the impact of healthcare workers (HCWs) wearing gloves and in many cases frequently undertaking wet work that involves water, chemicals and friction has been well studied. Initially allergists and dermatologists^{1, 3, 5} noted “epidemics” of dermatitis and latex allergy. Understanding the true incidence of the problem globally, making comparisons between countries and evaluating the impact of preventative measures are all hindered by the lack of standardised methods for monitoring and reporting cases. As well, variations in the capacity and inclinations of non-specialist medical staff to suspect and/or diagnose and differentiate between allergic and non-allergic responses further confound our understanding of this important occupational risk.^{2, 6} Further, changes and increases in the types of chemicals, compounds and formulations to which HCWs are routinely exposed in occupational and domestic settings^{2, 5, 7-17} may confound understanding and continue the suspected global underestimation of the magnitude of occupational skin disease (OSD). As well, they lead to a situation where practice guidelines lag behind changes in the epidemiology of natural rubber latex (NRL) allergy including a substantial global reduction of new latex allergy cases likely to be associated with refined glove manufacturing and greater healthcare adoption of powder-free, non-latex, accelerator-free gloves.^{3-6, 8}

In the majority of countries, OSD (which includes cases of irritant contact dermatitis and allergic contact dermatitis and latex allergy) accounts for a substantial proportion of all work-related disease and for many countries OSD is reported more frequently than any other occupational disease. Almost all, (80-95%) of all

reported OSD is irritant contact dermatitis.⁸ Occupational contact dermatitis is commonly associated with water, wet work, use of soap and detergents.⁸ The effect of these irritants is multiplicative and this is problematic for healthcare workers as they are typically exposed to each many times per shift. This is particularly concerning when work also involves glove use as healthcare workers can wrongly assume that their skin reaction is allergic contact dermatitis rather than irritant contact dermatitis. Data from a comprehensive 17 year study in Victoria confirmed this point by showing that among healthcare workers the relative annual rate of irritant contact dermatitis (10.9 per 100,000 workers) was more than twice that of allergic contact dermatitis (5.2 per 100,000 workers).

Cahill and colleagues provide a useful classification of HCWs for this edition of InTouch. Cahill’s classification includes the major individual occupational groups of allied health professionals, dental assistants, dentists, doctors nurses and nursing assistants.⁷ Like other prior researchers, Cahill’s recent Australian study of all occupations found that HCWs had higher rates of occupational dermatitis than almost all other occupations.^{1, 2, 5, 6, 8, 15} It also showed that latex allergy affects many non-healthcare work occupations and confirmed previous reports indicating that healthcare workers have higher rates of latex allergy than other

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non-healthcare workers.⁸ Given the substantial changes to glove manufacture over the 17 year period in which Cahill’s data was collected and especially the moves towards latex-free, powder-free and now accelerator-free gloves for healthcare workers it is likely that users of gloves that exclude all three of these irritants/allergens will experience less OSD and ACD. Germany’s experience, described below by Professor Allmers certainly suggests this may be the case.

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Prevention, diagnosis and management of occupational dermatoses is complicated by the many factors that contribute to it.⁷ Some of these are briefly outlined below in [Table 1](#). Also sufferers may have multiple diagnoses with coexisting allergic contact dermatitis (ACD), irritant contact dermatitis (ICD), latex allergy and/or endogenous eczema.² Obtaining an accurate history including an occupational history and using an appropriate specialist trained in skin prick and patch testing is critical for exclusion of alternate diagnoses, referral, accurate diagnosis and management including possible deployment to alternative work.^{2, 18}

Germany remains one of the most successful countries to legislate reporting to the appropriate statutory accident insurance company of all cases of suspected occupational disease.¹² This approach enabled progressive public policy reform including regulations mandating that only low-allergen powder-free NRL gloves should be used and that the use of powdered NRL gloves was not permissible in the workplace.^{12, 19}



Allergic Contact Dermatitis

The next section briefly describes and differentiates between the two types of contact dermatitis, irritant and allergic as well. It also differentiates between the non-allergic response (ICD) and allergic responses (ACD) and (NRL allergy) possible among susceptible people who have contact with glove-related irritants and/or NRL allergens. [Table 1](#) provides a classification of important differentiating points relating to ICD, ACD and NRL allergy.

IRRITANT CONTACT DERMATITIS (ICD) IN HCWs

ICD usually follows breakdown of the skin's barrier function between 6-48 hours after it has been exposed to skin irritants.^{2, 5, 6, 13} It is the most common form of occupational dermatoses and can be either acute or chronic.² Australia's largest study of occupational skin disorder sufferers presenting to a skin clinic reported a HCW ICD rate of 11 cases per 100,000 per year which was more than twice that of HCW ACD (5 cases per 100,000 per year).⁶ HCWs suffering from ICD will often have acquired risk factors such as atopy or pre-existing dermatitis or eczema.¹³ Frequent wet work, hand washing including use of paper towels or use of powdered gloves when hands are sweaty or wet can contribute to ICD. HCWs who are unaware of or non-compliant with ICD risks and safe preventative work practices are also at risk.¹ Importantly, ICD often precedes ACD so measures such as adequate skin care, replacement of irritants with non-irritant containing substitutes and use of powder-free gloves are mainstays of treatment.^{1, 2, 5, 6} Appropriate diagnosis is critical to prevent subsequent sensitisation and ACD. This can be difficult for HCWs when access to occupational medicine services and trained dermatologists is difficult.

ALLERGIC CONTACT DERMATITIS IN HCWs

Unlike ICD, ACD is an immune response with response time depending on the individual, the duration of their contact with the sensitiser and its concentration.⁵ It is often referred to as Type IV: delayed contact dermatitis or chemical allergy.¹³ ACD typically occurs hours after contact which can make diagnosis difficult.⁵ Patch testing by a qualified clinician is recommended for accurate diagnosis.²⁰ For sensitised HCWs, hand hygiene and use of gloves that contain accelerators are often associated with ACD. They are thought to be associated with exposure to chemical accelerators such as thiurams, diphenyl guanidine (DPG),

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carbamates, and mercaptobenzothiazoles (MBT),^{6,21} surfactants in hand cleansers or preservatives in water based substances.^{1,3,4} It is worth noting that there also appears to a shifting trend of chemical allergy to rubber glove accelerators from thiurams to DPG.²²⁻²⁴ Investigators have recently expressed concern and caution glove purchasers and users to better understand the nature of chemicals present in gloves so that allergic contact dermatitis among users can be prevented and properly treated.²⁴ The escalation of hand hygiene related ACD is likely associated with the global campaign to improve HCW hand hygiene compliance.²⁵

Persons responsible for responding to HCW skin issues should remain aware that eczema, ICD, ACD and NRL-allergy are not exclusive and a HCW may have co-existing episodes of one or more condition.

allergic HCWs who wear gloves containing NRL-allergen will likely experience rapid onset itching, burning, stinging, redness and be uncomfortable. Mucousal contact can lead to localised swelling. Respiratory symptoms and possibly anaphylaxis may occur in extreme cases or paradoxically some NRL allergic HCWs may only experience an eczema-like rash or urticaria.⁵ Like ICD and ACD accurate diagnosis of NRL-latex is critical so that appropriate preventative measures including avoidance of allergens, product substitution and re-engineering of workplace and work practices can be initiated. Past occupational history including exposure to NRL is vital. Patch testing is not appropriate for diagnosis of NRL allergy. Testing should be by RAST test or prick testing. Again, HCW referral to a qualified, allergy specialist is important.

Persons responsible for responding to HCW skin issues should remain aware that eczema, ICD, ACD and NRL-allergy are not exclusive and a HCW may have co-existing episodes of one or more condition.

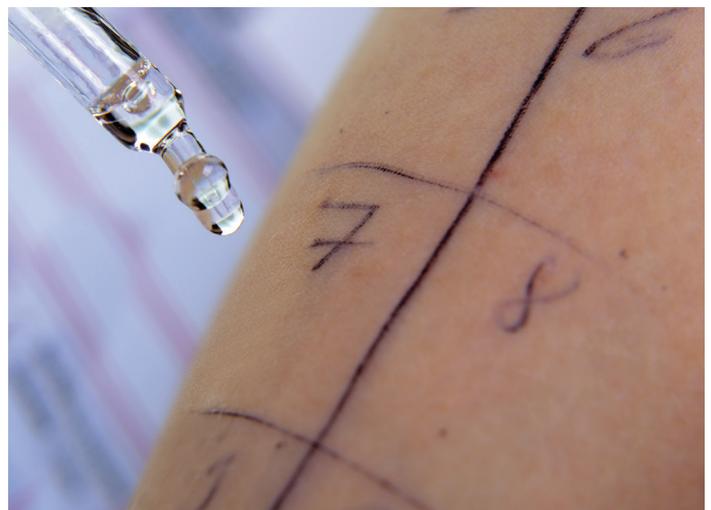


Patch Testing

LATEX ALLERGY IN HCWs

Once a major concern, latex allergy is now considered a much rarer event¹⁰ with some experts daring to refer to it as a “disappearing” epidemic.^{9,26} Historically among HCWs adherence of NRL-allergens to cornstarch in glove powder resulted in aerosolization, room contamination, inhalation and subsequent type-I sensitisation in up to almost a fifth of all HCWs.⁹ The problem became much more prevalent during the early years of bloodborne viral diseases where surgical glove usage increased by 56% and examination glove use by 2,426%.⁹ Subsequent work modifications including use of non-powdered, low protein latex and accelerator-free gloves appear to have reduced the rate of new cases of occupational NRL allergy.^{9,20,26}

Different to ACD, NRL allergy is an immediate hypersensitivity to rubber protein with atopics more at risk.⁵ Atopics are people who have an individual or family history of asthma, atopic dermatitis or hay fever.⁶ NRL



Skin Prick Testing

OCCUPATIONAL SKIN DISEASE AND LATEX ALLERGY IN HEALTHCARE

CHARACTERISTIC	IRRITANT CONTACT DERMATITIS ^{2, 5, 13} (ICD)	ALLERGIC CONTACT DERMATITIS (ACD) ^{5, 13} Type IV: delayed contact dermatitis	LATEX ALLERGY ^{9, 13 20} Type I: immediate hypersensitivity
Reaction Type	Inflammatory reaction No allergic response	Immune mediated, delayed hypersensitivity reaction to chemical that has sensitised skin	Immediate hypersensitivity reaction to natural rubber latex proteins
At-Risk Populations And Factors	Healthcare workers whose role includes water and wet work, frequent hand washing and use of paper towels and/or glove use.		
	Atopy P/H of hand eczema	Contact with chemical sensitisers (duration, concentration and individual susceptibility)	Atopy Users of cheap, poorly produced and/or powdered gloves
Time After Exposure	Preceded by defatting of skin's barrier layer and dry skin	Usually follows skin damage Sensitisation after 7-21 days Reaction within 24 hours of next exposure	Reaction within 15 minutes of contact
Signs And Symptoms	Mostly affects hands Scaling, redness and possibly blisters Increased susceptibility to skin irritants	Itchy rash, comprising scaling, redness and possibly blisters that may then spread to other areas of the body	Skin redness, burning and itching Hayfever-like symptoms, asthma and anaphylaxis
Reaction Likely Caused By Contact With	Strong acids and alkalis Follows irritation from glove powder a most common cause is wet work – repetitive wetting and drying of skin.	Chemical accelerators used in medical glove production Surfactants in hand cleansers Preservatives in water based substances	Latex protein transferred to the skin Inhalation of latex protein via aerosolized glove powder (cornstarch) Mucousal contact with latex
Diagnoses	Patch testing is negative. ICD is often a default diagnosis.	Patch testing	RAST Testing Pinprick testing Latex glove challenge
Prevention Strategies	Use powder free gloves Ensure appropriate hand hygiene Treat barrier damage with moisturiser.	To reduce chemical sensitisation select gloves manufactured without the allergic accelerator or, select accelerator-free gloves	Use non-latex synthetic gloves such as nitrile, neoprene, and polyisoprene
Other Issues	More common than allergic contact dermatitis. Chronic or acute ² Facilitates the development of sensitisation and often precedes ACD		

Table 1: Overview of occupational dermatoses in healthcare workers⁵ (modified from Latex allergy management : understanding natural rubber latex, chemical allergies and powder-related problems associated with glove barriers. 2009¹³)

WHY WET WORK WRECKS HANDS



Irritant Contact Dermatitis

In 2012 Peiser and colleagues highlighted data illustrating the extent HCWs' hands are exposed to wet work. They suggested that in the United Kingdom some HCWs perform hand hygiene at least 60 times a day whilst others suggest each day hand hygiene opportunities range from between 13-300 times.¹ Constant hand wetness, recurrent use of potential irritant or allergenic chemicals and use of harsh paper towels are recognised risk factors for occupational dermatoses. The following points are provided to help managers and HCWs think about issues influencing practice as well as innovations and changes that may be needed for ongoing compliance with infection control measures and maintenance of skin integrity on hands.

- There are various hand hygiene formulations and some HCWs may require alternatives rather the traditional "one-type suits whole of the organisation" approach.¹
- Globally the maximum sustainable rate of hand hygiene compliance is approximately 80% with experts considering innovative ways to raise this rate. If their efforts are successful and widely adopted, HCWs exposed to potential irritants may increase by up to 20%.
- Maintaining skin integrity requires a consistent multi-modal approach including selection of quality product, good technique, good skin care and ongoing monitoring of HCWs' hands. Each step is as important as the other.
- Hand hygiene formulations may include chemicals previously considered irritant but now possibly allergenic.³
- HCW can become non-occupationally sensitised to chemicals that are commonly contained in solutions used domestically and in healthcare delivery.^{3, 4}

EXPERT PANEL PERSPECTIVES

WHAT WE NEED TO KNOW ABOUT ICD, ACD AND OCCUPATIONAL LATEX ALLERGY.

In the following edited dialogue, Professors Nixon (**RN**) and Allmers (**HA**) respond to questions on dermatitis and natural rubber latex allergy. A/Prof. Nixon heads Australia's only dedicated Occupational Dermatology Clinic. Her Centre publishes their work prolifically and whilst based in Australia, Prof. Nixon is active and well recognised as a global expert in dermatology. Her responses to InTouch are based largely on experiences with patients seeking her clinical expertise. Her comments and insights are also informed either from data published or in draft manuscripts.



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Similarly, Prof Allmers is an acknowledged global expert in dermatitis and occupational health. His publications relating to NRL allergy among healthcare workers span more than two decades. His accounts of Germany's success in near elimination of NRL allergy and reductions in occupational dermatoses through adoption of powder-free and accelerator-free non-latex gloves provide a useful model for other individual organisations and national policy makers. Prof Allmers' responses to InTouch focus almost entirely on the German experience and his salient warning regarding remaining vigilant even in the absence of new cases of NRL-allergy will resonate with readers now and in future years.

Ansell thanks and acknowledges both Prof Nixon and Prof Allmers for their independent, informed and important contributions to this edition which have been reproduced and edited for InTouch readers. Editorial comments (**CM**) are also included to extend discussion.

Can you please tell us about the early days of ICD, ACD and occupational latex allergy (OLA) recognition as a problem among HCWs?

RN: Contact dermatitis has often been seen as part of the job for a number of occupations, particularly healthcare workers. Irritant contact dermatitis (ICD) is far more common than allergic contact dermatitis. A common scenario is that a nurse or other HCW has a history of atopic eczema, often in childhood, or sometimes as a baby, which they do not even recall. This predisposes them to develop skin barrier damage. When exposed to skin irritants, especially wet work involving recurrent hand washing, HCW develop occupational irritant dermatitis. Once the skin barrier is damaged, this may facilitate the passage of allergens, causing allergic contact dermatitis and sometimes, latex allergy.

HA: Since the mid-1980s because of the increasing demand for examination gloves that were virtually all powdered the amount of natural rubber latex (NRL) containing cornstarch powder, increased by more than



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1000 %. The increased exposure to airborne NRL allergens led to an increasing number of HCWs being sensitized to NRL. Up to 20% of healthcare workers became sensitized in some countries. Most HCWs only had skin symptoms when wearing gloves, but some developed hay fever-like symptoms or even allergic asthma when wearing gloves or being in a room where gloves were being used.

ACD and OLA are two distinct and different responses to exposure to certain triggers. In your opinion, to what extent are HCWs still unable to differentiate between ACD and OLA?

RN: More often than not they cannot differentiate these adequately. In a minority, OLA presents as itching, burning and redness after wearing latex gloves (occupational contact urticaria). However in the majority, recurrent contact urticarial causes protein contact dermatitis, which is clinically indistinguishable from ICD and ACD, both for the worker and the diagnosing clinician. In order to treat adequately, all contributing factors need to be identified and treated. Therefore it is important that when hand dermatitis is not getting better, patients are referred to a dermatologist who can organise patch testing, so that an accurate diagnosis can be made

HA: OLA is not a problem in Germany or Europe anymore so people tend to forget about the disease.

“In order to treat adequately, all contributing factors need to be identified and treated.”

- Rosemary Nixon



Latex Allergy

Where are the best sources of information for HCWs to access for better understanding of the differences between ACD and OLA?

CDC National Institute of Occupational Safety and Health

<http://www.cdc.gov/niosh/topics/latex/>

German Social Accident Insurance Institution for the health and welfare services

<https://www.bgw-online.de>

Occupational Dermatology Research and Education Centre

<http://www.occderm.asn.au/>

United States Department of Labour (OSHA)

<https://www.osha.gov/SLTC/latexallergy/>

In the past decade or so how has the incidence of ACD and OLA changed among HCWs?

To what do you attribute these changes?

RN: Our rates of OLA have started to decline now, but were much slower to decline than in Germany, where there was a rapid legislative response to the latex allergy epidemic. Thiurams have been for some time the commonest allergen in HCW.

HA: If we look at the data relating to medically

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confirmed NRL allergy cases for the fourteen years from 1998 – 2012 we note a **97 % reduction in skin allergy**. **Over the thirteen years 1999 -2012 there was a similar 99.15 % reduction in occupational asthma.**

In our studies inhalation of NRL-contaminated glove powder was the main cause for developing type-I sensitization to NRL. By switching to powder-free NRL gloves the danger virtually disappeared.

Assuming that prevention of ACD and OLA is the joint responsibility of glove manufacturers, healthcare organisations and individual healthcare workers, could you describe the role of each in reducing reactions?

RN: The overall message is to reduce exposure to allergens. For example, Ansell now has an accelerator-free glove for HCW, Ansell Micro-touch Nitra-free, which is terrific, especially for those with allergies to other accelerators. We have also proposed the concept of ACD to hard-to avoid allergens, which particularly includes allergens in skin care products, such as preservatives and antiseptics such as chlorhexidine, as well as gloves. What we mean is that people just doing their job and using gloves and skincare products appropriately are still becoming sensitised. These causes of ACD can only be addressed by allergen substitution.

For healthcare organisations, it means using products with fewer allergen. Our recent paper is going to be quite useful in this regard, as there has been no local data published previously.⁶

For individuals- being aware to use appropriate skincare early, such as use of after-work moisturiser. And not to continually wash their hands as well as using hand hygiene. We have seen that 'double dipping' may contribute to skin problems.

HA: Hospitals adhering to guidelines and switching from powdered to powder-free NRL gloves was the major factor in reducing new cases of NRL allergy.

What current and future challenges do you recognise in reducing incidence of ACD and OLA?

RN: More allergen substitution. More early treatment of ICD, with appropriate skincare. Earlier use of skin moisturisers for mild dermatitis, to restore the skin barrier, and people seeking treatment and advice early in more severe cases. Having an accurate diagnosis made is crucial.

HA: People tend to forget about the disease. This is a problem for HCWs who were sensitized and might be at risk when having medical, surgical or dental procedures when NRL materials are being used.

Would you be willing to make a prediction or give preliminary insight into changes in healthcare delivery or available/future technologies that may reduce the future incidence of ACD or OLA?

RN: Use of alcohol rubs (ABHR) has generally led to reduced hand dermatitis in HCWs, because of less wet work (wetting and drying is very damaging to the skin) and less use of paper towels. Still, there needs to be improvement in education of HCWs, so that people do not continue to wash their hands with water AND use ABHR as well. This is something we will suggest in improving HCW education modules.

“The overall message is to reduce exposure to allergens.”

- Rosemary Nixon

CM: In his recent publications^{9,26} and in responding to InTouch Professor Allmers makes two important points that may further reduce ACD or OLA. Firstly, having already achieved significant reductions in both ACD and OLA in Germany maintaining vigilance and interest in this issue is difficult. This may limit opportunities to explore benefits of future refined technologies. Secondly, these reductions are attributed to routine use of only powder-free and latex-free gloves which suggests that even further refinement such as gloves which are powder-free, latex-free and accelerator-free

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may be the best way to further reduce ACD and OLA so that new cases are as close to zero as possible.

Could you discuss the extent to which 1,3-diphenylguanide hypersensitivity may be contributing to ACD among healthcare workers and the extent to which DPG-free gloves will likely reduce ACD incidence?

RN: We saw 3 cases 2-3 years ago from polyisoprene gloves and thought that this was going to be the next big thing. We also heard that these gloves were being banned in Sweden because of this problem. But subsequently we have seen no more cases. Two of the initial cases were from interstate. Of course, these people need to be adequately patch tested and diagnosed, so we are not sure if people are still developing problems and not being investigated appropriately.

HOW INFECTION PREVENTION AND OPERATING ROOM LEADERS RESPOND TO HEALTHCARE WORKERS WITH DAMAGED HANDS

Sue Barnes (**SB**) and Ruth Melville (**RM**) are leaders within their respective fields of infection prevention and control and perioperative nursing. As national leader for one of the US's largest healthcare providers, Sue's responsibilities and decisions cover multiple locations and impact several thousand healthcare workers and consumers. Her responses to the set questions are brief and in their brevity they demonstrate the importance of having well established programs for occupational health and infection prevention. Sue willingly provided InTouch with examples of her organisation's policy, decision-making tool and training materials relating to HCW skin integrity. Whilst InTouch is currently unable to provide these to readers, we strongly recommend decision makers invest in developing their own locally applicable materials. The useful websites included in this edition provide useful, high-quality relevant information.

In contrast, Ruth Melville currently holds complimentary roles. Ruth's primary work is as Manager of an Operating Room suite in a government funded hospital

in tropical Australia. In this setting, Ruth oversees the prevention and management of occupational dermatoses and NRL-allergy for all OR staff. She is responsible for ensuring OR compliance with relevant state based guidelines and safe workplace regulations. As an elected volunteer leader, Ruth currently presides over the International Federation of Perioperative Nurses (IFPN). IFPN membership includes OR staff from all around the world and it is committed to finding areas of common practice despite inherent difficulties in global harmonisation of OR standards and recommendations regarding safe work practice. In the process of being interviewed by InTouch, Ruth acknowledged IFPN's need to formalise a position on safer hand hygiene, glove use and regular monitoring of HCWs' hands.

The dialogue below summarises email and verbal responses provided by Sue and Ruth to the questions InTouch provided to them. Again, Ansell is grateful for Sue and Ruth's real-world insights which readers will find useful in their own education, policy and monitoring activities.

Does your organisation have a specific policy or guideline for responding to healthcare workers (HCW) who present with skin irritation and could you briefly outline the content of that policy?

SB: Kaiser provides a detailed algorithm that includes advice regarding immediate product substitution and referral to Environmental Health. In the event that improvement does not occur staff may be referred to Occupational Medicine and possibly Dermatology. The algorithm details time limits before alternate referral is made. It also details products available as alternatives to the general hand hygiene product and skincare products and their respective costs.

RM: Neither the IFPN nor its Australian counterpart, the Australian Confederation of Operating Room Nurses (ACORN) have specific policies. The Queensland state government has a detailed flowchart and is currently drafting a specific policy that includes information about types of dermatitis and brief information about hand hygiene. The draft policy is silent on specifics of how managers and OR staff should respond to and manage occupational dermatoses.

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Can you please tell us about any one or more cases of HCW skin irritation that you have managed within your current or any previous organisation and symptoms the HCW present with?

SB: This is not within the scope of infection control and prevention. It is managed by employee health. However, I understand that the majority of HCWs present with symptoms consistent with contact dermatitis.

RM: There are a few cases I can recall. The first involved an ICU nurse who experienced contact dermatitis and was referred by her family doctor to a specialist outpatient clinic. The specialist recommended the nurse no longer work clinically but due to boredom she returned to work in the Recovery Unit. She brought her own hand hygiene solution as the product currently used by the mainstream was thought to have contributed to her condition. She was also prescribed a steroid cream. Her case raises some of the problems in terms of accurate diagnosis, lack of access to dermatologists, long-term management, the need for product substitution and the cost of relocation. It also confirmed for me the importance of at least annual competency testing of OR staff for hand hygiene technique and regular monitoring of the skin integrity of their hands and forearms so that early intervention can occur if needed.

The second case was also interesting and involved a scrub nurse who had a localised reaction to gloves despite having used them for an extended period prior. At the time of the investigation the hospital was changing hand antiseptics solutions from a CHG-based solution to a iodine-based solution. A waterless surgical scrub was also being introduced. These confounders make diagnosis and assessment difficult. As an intervention the HCW changed to latex-free polyisoprene gloves and the issue resolved.

What steps were involved in your investigation, treatment and prevention strategies?

SB: Our organisation recommends an initial visit to Employee Health, product substitution to a hypoallergenic soap and a follow-up visit at one week.

If conservative management fails to improve the condition in one week the HCW is referred to

Occupational Medicine for further assessment, implementation of a skin protectant, barrier cream and nightly repair cream. If the new protection regime is ineffective the worker is referred to Dermatology and fitness for duty is assessed.

RM: We did not have access to skilled specialists so the investigations focussed on hand hygiene product and technique (including rinsing) and product substitution including glove change to a synthetic, NRL-free glove.

CM: Ruth's anecdote clearly shows InTouch readers how important it is to make a diagnosis.

“It also confirmed for me the importance of at least annual competency testing of OR staff for hand hygiene technique and regular monitoring of the skin integrity of their hands and forearms so that early intervention can occur if needed.”

- Ruth Melville

What specific clinical practice solutions did you implement? i.e. change in hand hygiene/ scrubbing technique and what specific product solutions did you implement? i.e. change in composition of hand hygiene solution or gloves?

SB: Changes are always according to the algorithm. On employment we also provide HCWs with information about hand dermatitis including symptoms, causes, prevention and treatment as well as tips for prevention.

RM: These cases prompted the OR to introduce efforts to stop surgical team members from using irritating brushes to scrub. It also initiated review of medical staff practice and education to change their practice of scrubbing till their skin was raw. Staff technique is regularly assessed and all new staff are placed with hand hygiene coaches and clinical educators who provide assistance and role-modelling for surgical hand preparation, hand care and self-monitoring.

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What were some of the issues you had to address in implementing either clinical practice or product changes?

SB: Communication regarding this protocol has been challenging – many times I hear that employees don't know there is a process for addressing issues with hand hygiene products.

RM: The multiple issues and insights we experienced included:

- realising staff perceptions about hand hygiene solutions is really important and education is critical;
- finding that in other hospitals where they worked, surgeons were not provided with powder-free options;
- confusion when we had to manage quarantining of specialist gloves for sensitised staff and ensuring adequate supply of those sizes;
- addressing staff concerns regarding restricted movement with double-gloving;
- dealing with administrative constraints under existing tender arrangements when a staff member requires specialist gloves which are off tender.

What education and awareness initiatives does your organisation have available to prevent HCW skin irritation?

SB: Our formal education is limited to the general employee information sheet and a basic brochure on employee hand dermatitis. Otherwise as needed by Occupational Medicine and Employee Health.

RM: These are as described previously.

How do you think we could further reduce the issue of skin irritation among HCWs?

SB: Communication and information efforts should focus primarily on nursing departments – inpatient and outpatient.

RM: These are some of the strategies we are considering or dream about:

- More emphasis on education and best practice with focus on hands being dry and ensuring that soap solution is rinsed off
- Remaining up to date in regard to new or alternate non-irritant solutions for hand hygiene
- Having a dedicated Occupational Health & Safety medical officer or access to a dermatologist who understands the hospital setting, is able to determine degree of skin reactions and make accurate diagnoses
- Education which specifically clarifies misconceptions and confusions about and between ICD, ACD and NRL-allergy
- HCW's appreciating that hand health and care is as important as any preventative measure against other occupational risks
- HCWs looking after their hands even when they are not at work.

SEVEN HANDY HINTS FOR PREVENTING AND RESPONDING TO HEALTHCARE WORKER HAND DAMAGE² (Courtesy of Prof. Nixon)

1. Stop washing hands with water AND using ABHR as well
2. Substitute allergenic products and solutions for known non-allergenic products and solutions
3. Earlier use of moisturisers for mild dermatitis and adoption of an appropriate skin care program
4. Treat irritant contact dermatitis early
5. Use engineering controls and modification of work processes to reduce exposure²
6. Work from principles of ELIMINATION, REPLACEMENT OR REDUCTION OF HAZARD
7. In the case of persisting dermatitis, the worker needs thorough assessment and patch testing to make a diagnosis

USEFUL WEBSITES AND RESOURCES

American Academy of Allergy Asthma & Immunology

<http://www.aaaai.org/conditions-and-treatments/allergies/latex-allergy.aspx>

American Latex Allergy Association

<http://latexallergyresources.org/about-latex-allergy>

Canadian Centre for Occupational Health and Safety

<http://www.ccohs.ca/oshanswers/diseases/latex.html>

European Academy of Allergy and Clinical Immunology

<http://www.eaaci.org/>

European Federation of Asthma and Allergy Association

<http://patient.info/support/efa-european-federation-of-asthma-and-allergy-association>

German Social Accident Insurance Institution for the health and welfare services

<https://www.bgw-online.de>

Latex allergy management: understanding natural rubber latex, chemical allergies and powder-related problems associated with glove barriers

www.ansellhealthcare.com/pdf/ceu/Latex_Allergy.pdf

Occupational Dermatology Research and Education Centre

<http://www.occderm.asn.au/>

The Australasian Society of Clinical Immunology and Allergy (ASCIA - See more at: <http://www.allergy.org.au/health-professionals/papers/management-of-latex-allergic-patients/about-guidelines>)

World Allergy Association

www.worldallergy.org/public/allergic_diseases_center/latexallergy/latexallergy.php

GLOSSARY AND ACRONYMS

Accelerators: processing chemicals used in both NRL glove and synthetic (non-latex) glove manufacturing.¹³

Atopy: condition where person has individual or family history of asthma, atopic dermatitis or hay fever.⁶

Irritant Contact Dermatitis is a non-allergic reaction. Clinically you cannot make an accurate diagnosis based on signs and symptoms. <http://latexallergyresources.org/definition>

Latex Allergy: Type I hypersensitivity to certain latex proteins in natural rubber latex. This is also referred to as Natural Rubber Latex allergy by many authors.¹⁸

Sensitisation: The immune response in allergy begins with sensitisation. Sensitisation, in the allergic response, upon first exposure specific antibodies are developed in response to an antigen and causes hypersensitivity. The response may be antibody mediated (IgE) or cell-mediated. Subsequent exposure to the allergen may or may cause an allergic response.

Type I Allergy: is an immediate type hypersensitivity reaction to one or more proteins in natural rubber latex (*Hevea brasiliensis*). Histamine is released causing symptoms. This reaction is systemic.

<http://latexallergyresources.org/definition>

Type IV Allergy: presents as hand eczema and is an immunological reaction to a residual processing chemical leached from finished glove products into the skin of the wearer. Often referred to as chemical allergy or allergic contact dermatitis.

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