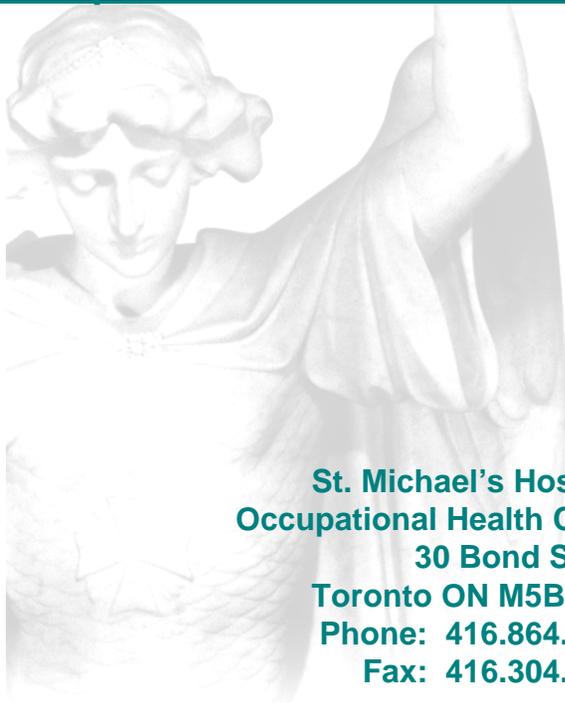


# PRIMARY PREVENTION STRATEGIES

## Occupational Contact Dermatitis



**St. Michael's Hospital  
Occupational Health Clinic  
30 Bond Street  
Toronto ON M5B 1W8  
Phone: 416.864.5074  
Fax: 416.304.1902**



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## General Introduction

Occupational skin disease accounts for a significant percentage of occupational illnesses reported to the Ontario Workplace Safety & Insurance Board (WSIB). Contact dermatitis is the most frequent type of occupational skin disease and WSIB occupational skin disease claims often result in time lost from work. Moreover, the prognosis for occupational skin disease in general is poor, with contact dermatitis, the most common type, lacking resolution in many affected workers<sup>1</sup>. Given this surprisingly poor prognosis, prevention of contact dermatitis in the first place should have priority. There are two types of dermatitis most associated with occupational exposures, allergic contact dermatitis and irritant contact dermatitis. These forms of dermatitis are difficult to distinguish from one another, often requiring specific medical tests to differentiate between the two. As the names suggest, these forms of dermatitis are caused by skin contact with a causal agent. As with all occupational disease, prevention is the key, and with most cases of occupational dermatitis, preventing skin contact with chemicals or other skin damaging agents will prevent the disease.

## Primary Prevention Strategies

Primary prevention strategies are designed to prevent new cases of contact dermatitis. Although prevention of contact dermatitis in the workplace should ideally be accomplished through the total elimination of dermal exposure to hazardous substances, this is often not feasible. A number of basic elements of a multidimensional approach to prevention have been identified<sup>1</sup>.

These elements include:

- ✚ Hazard Recognition
- ✚ Hazard Control
- ✚ Personal Protection
- ✚ Personal and Workplace Hygiene
- ✚ Regulation
- ✚ Education

For an effective primary prevention strategy, all of these elements should be considered and implemented where feasible.

## Hazard Recognition

### **Dermatitis**

Contact dermatitis is a sentinel health event of occupation (SHE(O)) the occurrence of which serves as a warning that preventive efforts in the workplace likely need to be improved<sup>2</sup>. The skin irritant or allergen must be identified for the development of appropriate prevention strategies.

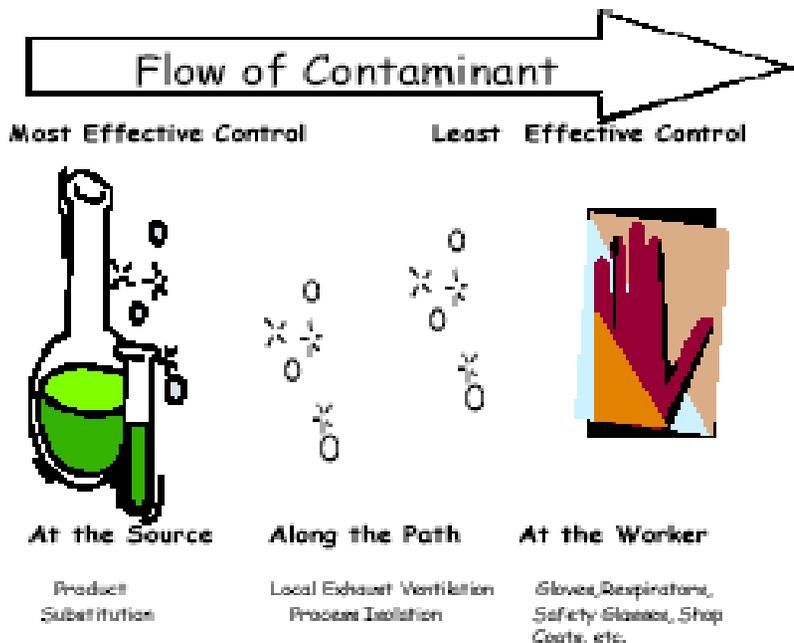
## Skin Toxicity

It may be possible to anticipate potential problems by recognizing potential hazardous skin allergens and irritants based on their toxicological properties<sup>1</sup>. This information may be available on material safety data sheets (MSDS) which must be provided by manufacturers or suppliers of raw materials or industrial products in compliance with provincial occupational health and safety legislation (WHMIS). Also, it cannot be assumed that no sensitizers are present in a product classified as non-hazardous. Manufacturers are required to list chemicals in concentrations greater than 1.0% or 0.1% depending on their toxicological properties, therefore, sensitizers could still be present in a product that is deemed non-hazardous if present in concentrations below 1.0% or 0.1%. It is often advantageous to follow-up with the manufacturer to confirm the presence/absence of potential skin sensitizers in a product. If MSDS are not available, a search of medical and toxicology literature may provide additional information on cutaneous toxicity.

## Hazard Control

Controlling hazards in the workplace (whether a hazard to the skin or any other body system) should always follow the hierarchy of controls: controlling hazards at the source, along the path and finally, at the worker. As always, the most effective option is control at the source with the least effective option being, control at the worker.

# Hierarchy of Controls



Source: Safety & Health Assessment & Research for Prevention, Washington State Department of Labor & Industries. Preventing Occupational Dermatitis – General Information (Publication 56-01-1999), August, 2001.

Dermal exposure control is most effective when addressed by the Joint Health & Safety Committee (JHSC) in conjunction with a team of health and safety specialists such as occupational hygienists and health care practitioners, production engineers, line management and most importantly, the workers themselves.

## Control at the Source

Control at the source is the most effective method to eliminate exposure to a compound or product causing the skin condition.

This can be accomplished by substituting with another compound of lower skin reactivity. The substitution of one key compound may require a full evaluation of the process with modifications in work practices down the line<sup>3</sup>. For example, ferrous sulfate has been successfully added to commercial cement in Sweden and Denmark to inhibit potentially sensitizing chromate and is now required by law<sup>1</sup>. Chemical substitution becomes problematic, however, if the skin allergen or irritant is critical to the industrial process. In this case, the expertise of a chemist or engineer may be required to further investigate the potential for successful substitution options.<sup>1</sup>

## Control along the Path

Hazard control along the path refers to engineering controls that capture the contaminant between the source of the hazard and the worker. Engineering controls include enclosing, containing or isolating the potential irritants and allergens to prevent them from contacting the skin<sup>1,3</sup>. If direct contact with a solid or liquid occurs, devices such as splash guards are essential<sup>1</sup>. If skin exposure to a contaminant is airborne in the form of a particulate mist, dust, fume, vapour or combination, ventilation controls should be considered. If this is not possible, relocation of equipment or a process within the workplace may sometimes eliminate or reduce exposure among workers not directly involved with the job task.<sup>1</sup>

## Control at the Worker

Within the hierarchy of controls, controlling exposure solely at the worker is least effective. The table below presents the differences with regards to controlling the actual work process vs. controlling the person<sup>4</sup>.

Control the Process	Control the Worker
Control lies with management	Control lies with the individual worker
Controlling the process is usually the most effective and reliable method	Using techniques such as person protective equipment is generally less effective and less reliable
Systems can often be made fail-to-safe	Systems and techniques are almost fail-to-danger
Whilst initial expenditure may seem high, in the medium and long term this approach will almost always be the most cost-effective	In almost every case this will prove to be the most expensive method, taken over time

Source: EnviroDerm Services Technical Bulletin No. 12: Risk Management, July 2001.

Personal Protective Equipment (PPE) includes gloves, safety glasses or goggles, shop coats, protective sleeves, overalls, aprons, etc.

Administrative controls include those policies established to educate workers, define work practices and procedures (e.g., job rotation) and the consequences of not following policies<sup>3</sup>.

## Personal Protective Equipment

Choosing the proper chemical protective clothing is complex. Many factors must be considered such as: the chemical and physical resistance properties, the dexterity required for job tasks and skin surfaces most likely exposed<sup>1</sup>. The selection process for gloves, for example, is usually based on manufacturer's laboratory-generated chemical permeation data.

This data may not necessarily reflect the conditions in the workplace where there are many variables. Studies in the literature have shown that reliance on this selection process is questionable<sup>5</sup>. Some confounding factors to the laboratory testing data are: mixtures, temperature, physical stress, reuse, product variation and the human factor<sup>3</sup>.

Some researchers have proposed a concept based on: potential health effect, relative toxicity of the agent and objective in-use performance measurements.<sup>5,6</sup> It is important to be aware that protective clothing may be a factor in causing contact dermatitis. The following examples illustrate this point<sup>1</sup>:

- ✚ Irritation from sweating and the continuous contact of the PPE against the skin.
- ✚ Inadvertent trapping of the chemical irritants and allergens under the protective clothing which could result in an increased risk for skin absorption.
- ✚ Development of contact allergy to the additives in the protective clothing, for example, accelerators and antioxidants in rubber.

## Barrier Creams

The clinical effectiveness of barrier creams remains controversial. One disadvantage to barrier creams is that they may give the worker a false expectation that they (or at least, their hands) are invincible. Barrier creams can, however, be useful in the removal of sticky oils, greases, and resins from the skin, decreasing the need to wash with potentially irritating abrasives and waterless cleansers<sup>1</sup>. Barrier creams should be used only on normal, undamaged skin. Applying barrier cream to damaged skin could lead to a flare-up of the original dermatitis condition.

## Hygiene

### Workplace

Work surfaces should be kept clean to avoid inadvertent skin contact with allergens and irritants<sup>1</sup>. This requires special attention such as covering the work surface with disposable protective sheets, cleaning with the appropriate industrial cleaner (which may also require appropriate protective clothing) and “wet” sweeping or vacuuming vs. “dry” sweeping to prevent irritants or allergens from becoming airborne<sup>1</sup>. Also, if tools are shared amongst workers they should also be cleaned of any contaminants prior to the next worker using them.

### Personal

In most cases, a quick rinse with water or washing with a mild soap is sufficient for the removal of many allergens and irritants. Harsh soaps should not be used if water and mild soap can

clean the skin<sup>1</sup>. Use of abrasive soaps should be isolated to the palms since the skin is thicker and more resistant to friction. Following the use of waterless cleansers, the skin should be rinsed with soap and water. A skin moisturizer should always be applied after washing the hands.

The condition of personal protective clothing should be closely monitored. Also, skin contact with a contaminant often occurs when clothing is donned or removed or when clothing becomes dirty<sup>1</sup>.

PPE should be regularly checked for wear and tear and changed as required.

## Regulations

### Warnings

The provincial occupational health & safety regulation referred to as WHMIS (Workplace Hazardous Materials Information System) provides hazard warnings via product labels and material safety data sheets (MSDS). This regulation also has a training component stating that workers must be educated as to what hazards they are exposed to in the workplace and how to access information about these hazards. The MSDS may list the specific product ingredients but product manufacturers are required to do so only if the concentrations exceed 1.0% or 0.1% (depending on the toxicological characteristics) in commercial products. Some workers may be sensitized at concentrations

below this, and it is expected that manufacturers will list chemical ingredients falling below the standard concentration limit where clinical experience has already implicated them as common causes of contact dermatitis. This is not always the case.

## Education

### Employees and Employers

Workplace education needs to focus on general awareness of work-related contact dermatitis and identification of job tasks in which exposures to allergens and irritants are likely. This includes training to identify the early signs and symptoms of contact dermatitis, the proper use of personal protective equipment and barrier cream as well as stressing the importance of both workplace and personal hygiene issues. The delivery of such information can take on many forms such as pamphlets, videos, information sessions or one-on-one training with the worker. What the literature has shown is that such training measures are only effective if there is a high level of repetition – the more the message is given, the greater the possibility of it being heard<sup>7</sup>. Ideally, such education sessions should occur prior to placing workers in jobs with potential exposure to skin irritants or allergens<sup>1,7</sup>.

A Skin Care Management Program is something employers should consider given the need for an effective approach beyond gloves and skin care products. Skin management is: *the process of structuring the workplace, equipment and work done so as to minimize risk of skin exposure causing damage to health.*<sup>8</sup>

A Skin Care Management Program should be incorporated into the employer's overall health and safety program and be tailored to the specific workplace.

Ideally, a Skin Care Management Program should communicate the following information to workers at risk of developing dermatitis<sup>3</sup>:

- The structure of the skin and its susceptibility to various compounds.
- Specific compounds, processes or areas in the workplace that can cause dermatitis.
- Controls in place to prevent dermatitis.
- What to do if a worker develops dermatitis.

Employers have a legal obligation to provide a safe work place free from hazards (to the skin or any other body system). Employers may be motivated to provide a skin care management program if they realize (or are convinced) that a safe workplace increases worker satisfaction and therefore, productivity. Lastly, employer motivation could be increased by the realization that controlling dermal exposures in the workplace will give rise to decreased WSIB costs.

## Skin Surveillance

It is important to be alert to workplace irritants and allergens that can result in aggravation of pre-existing skin conditions. Ideally, workers should be examined for active skin disease before job placement.

Workers with a personal/family history of atopic dermatitis or other atopic diseases have an increased predisposition to irritant contact dermatitis (but not to allergic contact dermatitis).

Periodic monitoring of workers' skin condition is important in order to identify any potential problems early on and take action to prevent further skin damage. The "active" monitoring of the skin is also an opportunity to reinforce the skin hazard prevention message.

**The best approach to preventing occupational dermatitis is the recognition, evaluation and identification of potential skin exposure hazards prior to the onset of symptoms and immediate implementation of hazard control methods. The primary prevention strategies presented in this booklet can assist employers and workers in preventing occupational dermatitis in their workplaces.**

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