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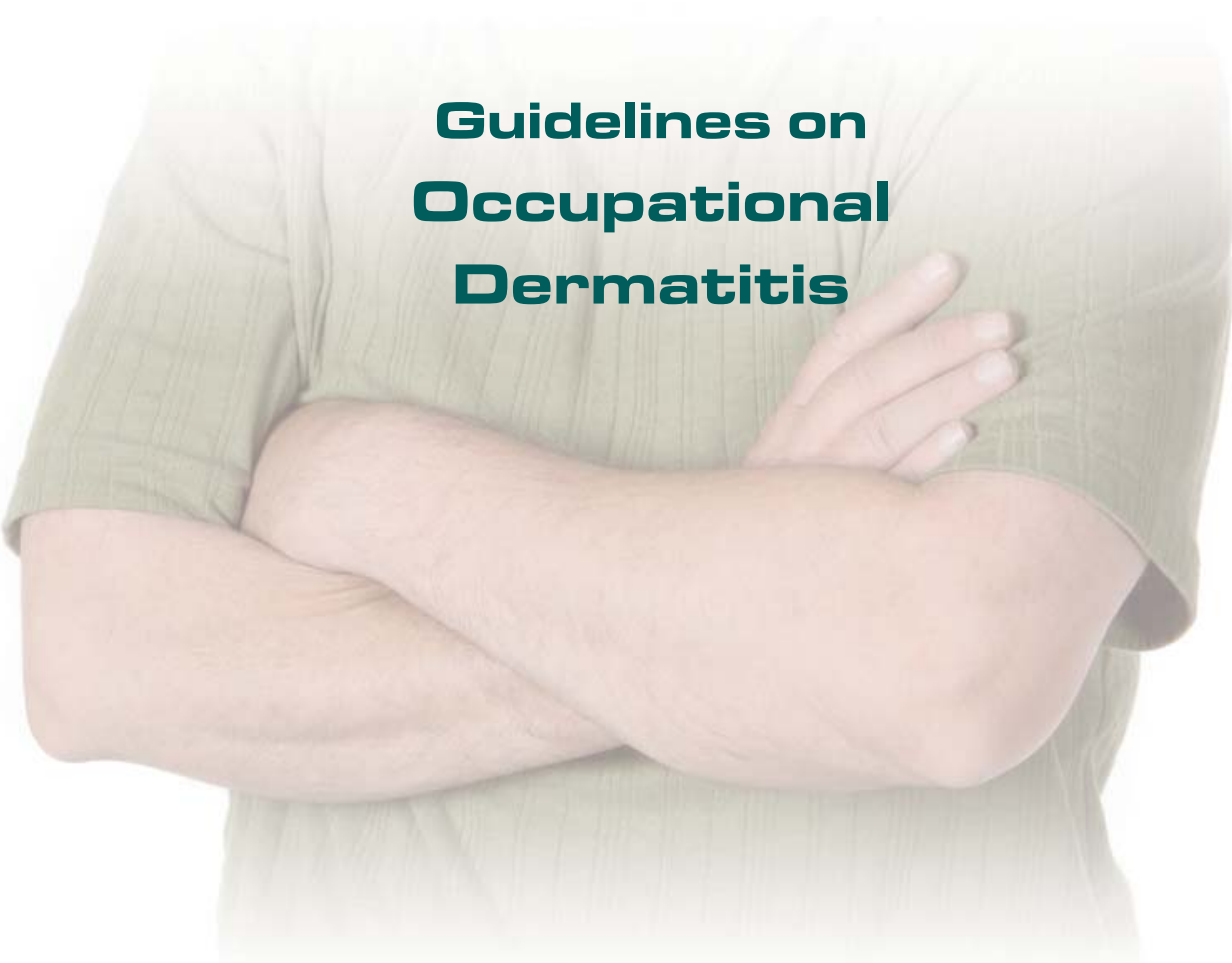


Guidelines on Occupational Dermatitis





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A photograph of a person's arms crossed, wearing a light green short-sleeved shirt. The person's hands are resting on their forearms, and the background is a soft, out-of-focus white.

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Published in February 2009 by the Health and Safety Authority, The Metropolitan Building, James Joyce Street, Dublin 1.

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Guidelines on Occupational Dermatitis

Introduction

The objective of these guidelines is to provide useful information to enable employers and employees manage the prevention of occupational dermatitis in workplaces. The guidelines describe occupational dermatitis and the substances which cause it. They also give good practical advice on complying with health and safety legislation including the carrying out of a Risk Assessment.

What is dermatitis?

Dermatitis is an inflammation of the skin (see photo 1). The term dermatitis is synonymous with eczema. The skin becomes red, itchy, and can be blistered. The skin becomes hard, thickened and cracked.

Many people suffer from skin conditions. Most of these are not work related. In some instances these go back as far as childhood. The majority of work related skin diseases are dermatitis.

An important clue is the site of the area affected. If it is the hands, contact dermatitis should always be suspected.

The next question is whether the 'contact' arises from work or outside work.

The following suggest a work related cause :

- if it is mainly on the hands and exposed skin
- if the condition improves away from work and relapses on return
- if more than one person is affected in same work area or handling same materials.

The following suggest a non occupational cause:

- if there is a history of childhood/endogenous eczema
- if there is major involvement of the trunk or covered area



Photo 1: Non occupational dermatitis at back of knees



What is occupational dermatitis?

Occupational dermatitis is a skin disorder caused by coming into **contact** with certain substances in the workplace. It is therefore termed contact dermatitis. Contact dermatitis is the most common work related disease in Ireland. It can have long term consequences for workers health and in extreme cases their ability to continue working. Research has indicated that 10 years after the condition first occurs, up to 50% of affected workers will still have some skin problems.

It has financial implications in terms of ongoing medical treatment, absence from work, social welfare compensation and possible civil claims. It brings other costs in terms of pain and suffering to affected workers. In many instances it may be totally preventable by simple inexpensive measures.

How is normal skin made up?

The skin is basically a protective layer for the body. It is an elastic envelope which secretes a slightly oily substance to cover the surface area of the skin and provide an additional barrier layer on top of the skin. It consists of 3 layers; the **epidermis** on the outside, then the **dermis** and the **hypodermis** (see fig 1).

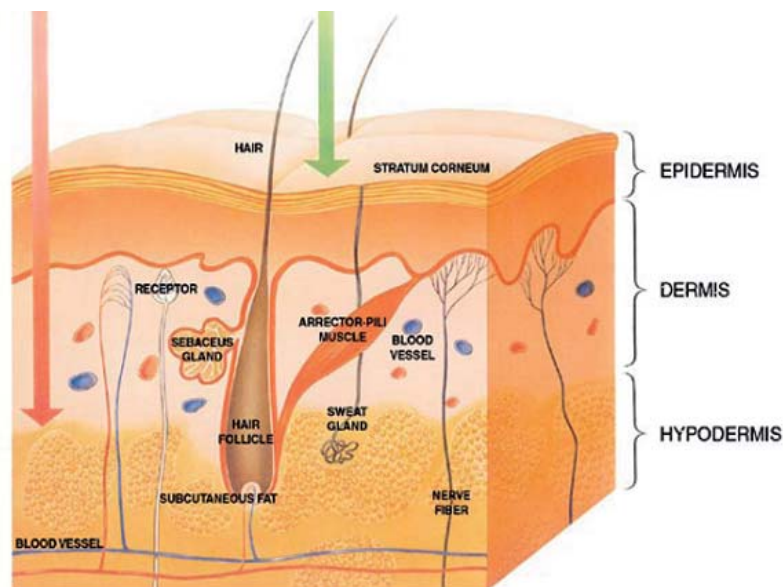


Figure 1: Cross section of human skin, showing the 3 layers

The outer layer of skin is called the **epidermis**. This is as thin as 0.1 mm in most of the body but as much as 1 mm on the palms and soles of the feet. New cells are constantly being formed and migrate to the surface over a period of 1-2 months where they die and harden. Here they form a protective layer called the horny layer. This is constantly being worn away by friction.

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Under the epidermis is a layer known as the **dermis** layer. The dermis is about 4 times thicker. It contains numerous specialised supporting tissues as well as blood vessels and nerve endings (responsible for hypersensitivity and sense of touch).

The **hypodermis** contains the hair follicles, sweat glands and nerve fibres and a capillary network responsible for a sense of temperature.

Throughout the dermis other types of protein, notably collagen and elastin, give it strength and flexibility. A reduction in these proteins is normal as we get older and this is why skin is more fragile in elderly people. Medications, in particular steroid drugs, also weaken the collagen fibres, causing thinning of the skin in the long term and an increased tendency to bruising.

How are skin problems caused?

The protective layer is normally worn away but is constantly being regenerated. The problem arises where the rate of damage or wearing to this layer exceeds the rate of repair.

Normal skin on a hand appears as in photo 2 while that with dermatitis appears in photo 3.



Photo 2: Hand with normal skin



Photo 3: Hand with dermatitis



How many types of dermatitis are there?

There are 2 forms of contact dermatitis, contact irritant dermatitis and allergic contact dermatitis.

What is contact irritant dermatitis?

In contact irritant dermatitis the substance that damages the skin is known as the irritant. A highly irritant substance is known as a corrosive. Irritant dermatitis makes up about 80% of contact dermatitis. The other 20% is allergic.

There are several ways that skin damage can be caused.

- Detergents, soaps such as in repeated hand washing or the use of solvents can remove the protective oily layer and so leave the skin exposed to damage.
- Physical damage such as friction, minor cuts for example from fibre glass and grazes can breakdown the protective layer and allow substances access.
- Chemical such as acids or alkalis can burn the layer.

Hand creams can be used to replace the naturally occurring oily substance, if frequent hand washing or solvents have removed them. Cuts and grazes should be covered as a protective measure.

Irritation is analogous to a chemical burn. It acts by eroding or burning the outer protective layers of the skin. The rate at which this happens depends on several factors including:

- How corrosive the substance is, for example it take much less time for a strong acid or base to have its effect than a weaker irritant
- The concentration of the irritant on the skin. The higher the concentration the greater the effect.
- The time or duration of contact. The longer the time the greater the effect.
- The vulnerability of the individual. People vary in their susceptibility to irritants. Certain groups of people are more susceptible to irritants:
 - a. those with childhood allergic dermatitis/eczema (known as 'atopics');
 - b. those with very dry skins;
 - c. those with very fair complexions.
- If there is repeated exposure there can be a cumulative effect

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Irritant contact dermatitis usually occurs only on the parts of the body in direct contact with the irritant substance e.g. hands, forearms, face.

Common irritants are wet work, cutting oils, solvents and degreasing agents which remove the skin's outer oily barrier layer and allow easy penetration of hazardous substances, alkalis and acids (see Table 1). Wet cement coming into contact with exposed feet and hands is a particular example of a skin irritant.

What is allergic contact dermatitis?

In this case, the substance causes the worker to become sensitised or to develop an allergic reaction some time after initial contact. The type of allergic mechanism is known as Type IV or **delayed** hypersensitivity. People do not become allergic to a substance immediately in first contact. The sensitisation period, the time between contact and the development of an allergy, can vary from a number of days to months or even years. The risk of becoming allergic depends on several factors:

The nature of the substance. A substance with a higher likelihood to cause allergy is known as a skin sensitiser. Many of these are known but it is possible for an individual to become allergic to a substance not previously recognised as a sensitiser.

The nature of contact. The higher or more repeated the exposure the more likely it is for the individual to develop sensitisation.

The vulnerability of the host. Typically people with other allergies are NOT particularly more vulnerable to developing contact allergic dermatitis. Individuals with a previous history of non allergic dermatitis ARE more vulnerable. This may be because the sensitiser may more easily enter the bloodstream in those individuals.

Once the individual becomes sensitised each time the worker comes into contact with the sensitising substance, even in very small amounts, dermatitis will develop. This is different to irritant dermatitis which is dose related. The long term health consequences and ability to remain at work can be significant.

Some sensitisers are potent, others are less so. The process of sensitisation produces no visible change in the skin. In general the majority of an exposed occupational group do NOT become sensitised. It is an idiosyncratic or individual reaction.



Sensitisation is specific to one substance or to a group of substances that are chemically similar. Once sensitised a person is likely to remain so for life. In allergic dermatitis the rash can occur in areas of the skin not in direct contact with the substance the so called “Id” reaction.

Common sensitisers are chromates (found in cement), nickel (cheap jewellery), epoxy resins, formaldehyde, wood dust, flour, printing plate chemicals and adhesives (see Table 1).

Can a worker have both types of dermatitis together?

Both irritant and allergic contact dermatitis can occur together and it is not uncommon for an employee to be exposed to several irritants and sensitisers simultaneously. An irritant contact dermatitis may also develop first, rendering the skin more susceptible to penetration by sensitisers. It is also possible that an original allergic contact dermatitis might be later sustained by an irritant.

What is Contact Urticaria?

Contact urticaria is a hive like response occurring rapidly on the application of certain substances to intact skin. It is probably more common than currently recognised. It usually results from an allergic mechanism although some are non- immunological . Like allergic contact dermatitis, it depends on previous exposure to the substance and development of an immune reaction to it, i.e. sensitisation. It is usually caused by histamine release and this is a Type I or **immediate** hypersensitivity response.

Probably the commonest cause of occupational immunological contact urticaria is latex. Substances capable of causing non-immunological contact urticaria that are seen occupationally include cobalt and platinum salts.

Persulphates can cause contact urticaria of uncertain cause in hairdressers and chemical workers.

What are the types of substances which cause dermatitis?

Table 1 lists a number of well known substances and work activities which can cause occupational dermatitis. Substances which are skin irritants or sensitisers have the symbol **Xi** on the packaging (bag or container). The safety data sheet will also have valuable information on the health hazards associated with the substance and protective and preventive measures. Also some substances with the toxic symbol **T** or very toxic **T+** can affect the skin, while others with the corrosive symbol **C** can cause burns.

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The following safety and risk phrases indicate substances which are harmful to skin:

- Avoid contact with skin (S24)
- Wear suitable gloves (S37)
- Irritant to skin (R38)
- May cause sensitisation by skin contact (R43)
- Toxic in contact with skin (R24)
- Very toxic in contact with skin (R27)
- Causes burns (R34)
- Causes severe burns (R35)

There are other substances which have the capacity to penetrate intact skin and be absorbed directly into the body without necessarily having any effect on the skin. These are identified with the notation **Sk** under the Code of Practice, 2007, Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001. Under this Code substances with the **Sen** notation apply only to respiratory sensitisers.

Table 1: Substance Groups and Work Activities

Substance Groups	Work Activities
Irritants	
Wet cement	Contact with wet cement in construction
Cutting oils	Metal workshops
Solvents	Dry cleaning, galvanising
Degreasers	Cleaning metals
Alkalis	Cleaning agents
Acids	Crystal glass manufacture
Sensitisers	
Latex	Health care, food preparation
Chromates	Contact with wet cement
Nickel	Cheap jewellery manufacture, repair
Epoxy resins	Electronics industry
Formaldehyde	Furniture manufacture
Wood dust	Saw milling, woodworking , furniture manufacture
Flour	Handling grain at docks, milling, baking
Printing plate chemicals	Printing fixing and developing
Adhesives	Book binding, installing floor coverings



What is an employer required to do?

The employer must ensure a safe working environment where exposure to substances which can cause dermatitis is prevented or controlled. The employer should have or provide the following:

- An up to date Safety Statement
- A Risk Assessment
- Adequate control measures
- Information to employees
- Health surveillance where appropriate

How is a Risk Assessment carried out?

All employers are required to have a written Safety Statement which must be brought to the attention of all employees. It is a further requirement to implement all health and safety measures identified in the Safety Statement. The Safety Statement will include a written Risk Assessment which will identify if there are substances in the workplace that may cause dermatitis. The Risk Assessment should be able to answer the following questions:

- Are you using one of the substances listed in Table 1?
- Does the package containing the substance have the symbol Xi?
- Does the safety data sheet have the safety or risk phrases S24, S37, R24, R27, R34, R35, R38 or R43?
- Who is likely to be exposed?
- To what amounts or concentrations?
- For how long?
- How often?
- Does the exposure exceed the daily occupational exposure level specified in the Chemical Agents Regulations?
- Has anybody in the workplace suffered skin problems in the past?

How is exposure prevented and controlled?

Both contact irritant and allergic dermatitis can be prevented or at least minimisation of skin contact with that substance. If the Risk Assessment identifies that workers are being exposed to substances, the following control measures should be considered to remove, minimise or reduce the risk:

- **Removal** of the substance.
- **Substitution** by a less hazardous substance.
- **Closed systems of work** which minimise worker contact with the substance.

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- **Removal of excess material** using drainage, vacuuming or local exhaust ventilation.
- **Washing, drying and applying hand creams.** The most effective way of reducing dermatitis is to reduce skin contact with the hazardous substance and the easiest way to do this is to wash it off. Good welfare facilities are required including a sufficient number of wash hand basins with hot and cold running water or a mixture of both, hand cleaners, drying facilities and hand creams. There must be a sufficient number of wash hand basins depending on the substance being used and the number of workers. The choice of hand cleaners is important as it needs to remove the substance but not damage the skin by removing the protective oily layer. They should not contain harsh abrasives or organic solvents. In general employees should be advised to wet their hands before applying soaps as in concentrated form many soaps are themselves irritants. Clean dry towels or disposable paper towels or hot air dryers may be used. The use of hand creams or emollients after washing helps replace the skins natural oily layer.
- **Barrier creams.** Barrier creams must be used with caution. Very often they are not effective barriers. In general they are not a substitute for appropriately chosen gloves. Even creams which do provide an effective barrier when first applied can wear off quickly when actually working and provide much less effective protection. Unlike when gloves fail, the user will not usually be aware of decreasing protection. Barrier creams may sometimes be used with gloves and sometimes are used to facilitate cleaning of the skin after work
- **Use of personal protective equipment.** The objective of personal protective equipment, in this case gloves and clothing is to prevent direct skin contact with the hazardous substance. Gloves are useful but care in their selection is vital. No glove provides protection from all chemicals and care must be taken that an appropriate glove is chosen. Glove suppliers can provide advice on the choice of appropriate gloves. If possible latex gloves should be avoided because of the risk of latex allergy but there are occasions when they are still the best option. Sweat is itself an irritant and sweating under gloves can be a problem. Regularly changing gloves and cotton undergloves can help. Care must be taken that all the skin is protected. For example there should be no gap between the glove and the sleeve of the protective overall. Torn or damaged gloves should be replaced immediately. Workers should be trained in how to remove gloves to minimise skin contact with the hazardous substance on the outside of the glove. Apart from gloves and protective overalls, aprons and face masks may be required

What do employees need to know?

Employees are entitled to information about hazards in the workplace and that contained in the Risk Assessment. They are also entitled to information on the protective and preventive measures to be taken.



Employees who are likely to work with and be exposed to substances causing dermatitis need information, instruction and supervision so that they know and understand the following;

- Label and safety data sheet for chemicals used in the workplace
- Substances which are known to cause dermatitis in the workplace
- Risk Assessment
- Proper use of control measures
- Need to report any failures in control measures
- Risks to health
- Symptoms of sensitisation
- Importance of reporting symptoms at an early stage
- Role of health surveillance
- Self examining and reporting

What is the role of health surveillance?

Health surveillance is used to detect the early onset or symptoms of dermatitis. The earlier a skin condition is discovered the better the prognosis. It is deemed to be secondary prevention and not as effective as the primary prevention measures outlined above. Health surveillance where used, has to be used in conjunction with these other control measures. Health surveillance can help to show that workplace control measures are working.

Pre Employment Medical

A pre employment health questionnaire should be completed by all those going to work with substances which can cause dermatitis. There may be limitations in employing a person who currently suffers from dermatitis.

A health assessment is usually aimed at identifying an effect of work on health, in this case skin. It may be required before a worker commences work, especially for people with a previous known sensitivity to an irritant or sensitiser used in the workplace. People with pre existing dermatitis are more likely to develop irritant dermatitis in the workplace. The person carrying out the assessment must be familiar with substances and processes used, standards of cleaning and hygiene, personal protective equipment used. The initial health assessment can be carried out by a health professional but the decision on whether an individual is suitable for a particular post is normally made by a doctor, preferably one with qualifications in occupational medicine. Dermatitis may be considered a disability and the obligations under Equality Legislation should be considered on the suitability for employment.

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Another consideration may be the possible effect of health, in this case the dermatitis, on the work. Certain industries such as the pharmaceutical or medical devices have clean areas. These can cause several issues. These include the need for repeated hand washing which may irritate those who are vulnerable. Skin conditions that can shed or that can act as a focus for infection may not be consistent with product safety.

Routine Health Surveillance

Again the decision whether to carry out health surveillance is based on the Risk Assessment. When the Risk Assessment suggests there is the potential for an employees to develop work related dermatitis because of workplace exposure then usually health surveillance is required.

Because dermatitis is normally evident first to the individual **self examining and reporting** of problems is hugely important. This can only be successful if individuals know what to report and to whom. Employee education and training is vital and should include the principles of prevention, skin care and the early signs of dermatitis. It should also include who to report to, usually the occupational health nurse if present or company doctor.

Self reporting can be augmented by a skin questionnaire which should be completed again and results compared to pre employment ones. Ideally abnormal results should lead to the individual being assessed by a doctor qualified and experienced in occupational medicine or dermatology.

If health surveillance indicates that an employee has developed dermatitis, it is important to try to identify the cause. If a suspect cause can be identified and the dermatitis goes way either by avoiding the suspect substance or changing work practices, such as using gloves then usually no further action is required.

If however the condition persists, the opinion of a specialist occupational physician or dermatologist should be sought. The assessment may include an inspection of the workplace.

If allergic dermatitis is considered Patch Testing may be performed. The test involves the application of various test substances to the skin under adhesive tape that are then left in place for 48 hours. The skin is then examined on the removal of these patches and again a further 48 hours later for any response. This can help the doctor decide which allergens the employee may be allergic to and identify those that could be aggravating the dermatitis. This is normally carried out by a dermatologist.

Any new case of dermatitis may indicate that the existing control measures are inadequate and the Risk Assessment should be reviewed and any necessary changes made.

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Tel. 1890 289 389

International Callers

00353 1 6147000

Fax. (01) 6147020

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