

examinetics

Occupational Health Pathfinder

Dermal exposure

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Overview

The Bureau of Labor Statistics (BLS) provides annual data on occupational diseases and illnesses; recent statistics show that there were 41,400 cases of reported skin diseases in 2006 - a rate of 4.5 reported cases per 10,000 workers. To put this in context, the incidence rate for occupational skin diseases is much higher than that calculated for respiratory illnesses.

The skin

Without adequate exposure prevention and protection, workers in various industries (eg construction, agriculture and manufacturing) can be exposed to hazardous chemicals and substances which harm the skin on contact. Some are readily absorbed through the skin and enter the bloodstream from where they can cause ill effects in other parts of the body. Hazardous chemicals and toxic substances that are non-volatile (slow to evaporate) can remain on work surfaces for long periods of time thus increasing exposure potential for workers and visitors alike.

The skin is composed of distinct layers. The outermost layer, known as the epidermis, contains a protective covering of dead cells known as the *stratum corneum* that overlies the living cells of the epidermis. Underneath this layer, the dermis contains elastic and collagen tissues, hair follicles, sweat glands and blood vessels. On primary contact with the skin, a chemical may cause irritation (redness of the skin and damage to the tissues), or burns. Allergic contact dermatitis can arise when the skin is sensitized over time by low concentrations of a chemical - often resulting in irritation after repeated exposure. When chemicals penetrate the *stratum corneum*, they are said to have been absorbed by the skin, something that can be accelerated by dry or broken skin.

What regulations do you need to be aware of?

Skin diseases cause significant health problems for the worker and days lost through illness impact on the economy. Direct assessments for dermal exposure include dosimeter patches and surface and dermal wipes. Indirect assessments include biological marker monitoring for the chemicals directly in the body. The OSHA website is an excellent gateway to find out more about these techniques through their page on 'exposure evaluation' from the 'Dermal exposure' subject area. There is a page specifically highlighting the standards that employers, from particular industries, should be aware of in relation to dermal exposure. For example, read the subparts from the following main standards: 29 CFR 1910 (General industry), 29 CFR 1915 (Shipyard employment), 29 CFR 1917 (Marine terminals) and 29 CFR 1926 (Construction).

KEY BRIEFING POINTS:

- In 2006, there were 41,400 reported cases of occupationally induced skin disease in the US
- Dermal exposure incidence rates are higher than respiratory exposure rates
- Toxic chemicals and hazardous substances can harm the skin on contact or affect the rest of the body by entering the bloodstream once absorbed through the skin
- The two main layers of the skin are the protective epidermis and the underlying dermis
- Skin exposure to chemicals can cause irritation, burns and allergic contact dermatitis. Absorption occurs when chemicals penetrate the *stratum corneum* layer of the epidermis
- Employers should be aware of a number of OSHA standards that relate to different industries and discuss exposure to hazardous chemicals including 29 CFR 1910 (General Industry)

FIND OUT MORE...

OSHA website

www.osha.gov/SLTC/dermalexposure/index.html

American Academy of Dermatology

www.aad.org

National Institute for Occupational Safety and Health

www.cdc.gov/niosh/topics/skin/

Business Owner Briefing

OSHA technical manual. Chapter 2
Occupational Skin Exposure

www.osha.gov/dts/osta/otm/otm_ii/otm_ii_2.html

Medical Director Review

"Dermal Exposure Assessment:
Principles and Applications"
(EPA, 1992)

cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=12188

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