

Latex: a hypersensitive issue

Once seen as part of the solution to occupational disease, latex gloves are now recognized as part of the problem.

It is currently estimated that more than 10 per cent of the country's health care workers are allergic to latex. In fact, experts contend the number could be as high as 17 per cent among those who work in hospitals, particularly those in contact with patient's fluids. Allergies to latex tend to worsen with continued exposure.

The sharp rise in reported allergies stems from a seven-fold increase in the use of gloves since 1987 when the Centers for Disease Control and Prevention in Atlanta, Georgia issued universal precaution measures, advocating the use of gloves for health care workers to protect them against infection from the human immunodeficiency virus (HIV). Many other government bodies, including Health Canada, followed suit shortly thereafter.

The Occupational Safety and Health Administration (OSHA), Food and Drug Administration (FDA) and National Institute for Occupational Safety and Health (NIOSH) now recognize latex allergies as a significant hazard to a health care worker's health and career. In 1997, the American College of Allergy, Asthma and Immunology went further and called the situation "a major health problem of epidemic proportions" for health care workers.

What is latex?

Latex products are manufactured from a milky fluid derived from the rubber tree, *Hevea brasiliensis*. Several chemicals are added to this milky fluid during the processing and manufacture of commercial latex. These chemicals include polyisoprene, lipids, phospholipids and proteins. Of these, it is the proteins in latex that can cause a range of mild to severe allergic reaction in susceptible workers. The method of manufacture of the latex product can also lead to allergic

reaction. For instance, the use of antioxidants, biocides and detergents used in glove manufacture are known to cause irritation and sensitization in susceptible workers.

What products contain latex?

A wide variety of products contain latex.

- Hospital supplies (anesthesia masks, catheters, wound drains, etc.);
- Emergency equipment (blood pressure cuffs, stethoscopes, disposable gloves, etc.);
- Personal protective equipment (gloves, surgical masks, goggles, respirators etc.); and
- Office supplies (rubber bands, erasers).

Who is at risk?

Workers in the health care industry, including physicians, nurses, aides, laboratory technicians, dentists, dental hygienists, emergency response workers, operating room surgeons and hospital cleaners and laundry workers, who frequently use latex gloves and other latex-containing medical supplies, are at risk for developing latex allergy. Workers in other sectors who may also be at risk include, emergency response workers like police officers, hairdressers, cleaners, day care workers and those who work in food preparation and in the meat packing industry.

How are workers exposed?

The two major routes of exposure to latex include direct contact and inhalation. Absorption of latex protein has been reported to be greater when perspiration collects under a latex glove. Exposure may also occur by the respiratory route, particularly when glove powder acts as a carrier for those proteins that become airborne when gloves are donned or removed.

What are the health effects?

Use of natural rubber latex products can result in a range of reactions from irritation to allergy. They can vary from localized redness and rash to nasal, sinus and eye irritation to general allergic reaction of the skin or respiratory system. Rarely, systematic reactions occur with swelling of the face, lips and airways that may progress to shock and potentially, death.

There are three types of reactions that can occur from latex products:

- Irritant contact dermatitis;
- Allergic contact dermatitis (delayed hypersensitivity or chemical sensitivity dermatitis); and
- Latex allergy (immediate hypersensitivity).

Irritant contact dermatitis is the most common reaction associated with skin exposure to latex gloves. This condition may be due to direct irritation of the skin from the gloves or glove powder, but may also be caused by contact with other chemicals used in glove manufacture. Irritant contact dermatitis is characterized by dry, cracked and spilt skin. While not an allergic reaction, breaks in the skin can provide a pathway for latex proteins to gain access to the body and promote an allergy.

Allergic contact dermatitis (also known as chemical sensitivity dermatitis) is the second most common reaction associated with glove use. This reaction results from exposure to chemicals added to latex during harvesting, processing or manufacturing. These chemicals can cause skin reactions similar to those caused by poison ivy. The primary symptoms of allergic contact dermatitis are blistering, itching, crusting and oozing lesions. As with poison ivy, the rash usually begins 24 to 48 hours after contact and may progress to oozing skin blisters or spread away from the area of the skin touched by the latex.

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Latex allergy is potentially the most serious type of reaction resulting from latex glove use. This reaction is generally the result of exposure to natural rubber latex proteins. Certain proteins in latex may cause sensitization (positive blood or skin test, with or without symptoms). Although the amount of exposure needed to cause sensitization or symptoms is not known, exposures at even very low levels can trigger allergic reactions in some sensitized individuals.

Reactions usually begin within moments of exposure to latex, but they can occur hours later and produce various symptoms. Mild reactions to latex involve skin redness, hives, or itching. More severe reactions may involve respiratory symptoms such as runny nose, sneezing, itchy eyes, scratchy throat and asthma. In rare cases, touching latex gloves or inhaling the powder contained in the glove can elicit an anaphylactic response similar to a bee sting which can evolve rapidly from slight swelling of the lips and airways, to shortness of breath, to possibly shock.

Once natural rubber latex allergy occurs, allergic individuals often continue to experience symptoms, not only upon exposure to latex products at work but also at home. Moreover, some of those affected will experience symptoms without contact with latex.

How can one reduce the risk of latex?

A number of controls can be implemented to reduce worker exposure to latex. By far the most effective strategy is to eliminate the use of latex products altogether. However when this is not possible, the next best strategy is to reduce the amount of worker exposure to the hazard. To reduce worker exposure, the employer should implement workplace policies that ensure latex gloves are used only in situations where protection from infectious agents is necessary.

When it is necessary to use latex gloves, workers should be given gloves that are both powder-free and low in latex proteins. While neither allergen can be completely eliminated, multiple washing and leaching during manufacturing reduce the levels of these chemicals significantly. In addition, workers should be trained on the hazards associated with latex and to recognize the symptoms of latex allergy: skin rashes, hives, flushing, itching, nasal, eye or sinus symptoms, asthma and shock.

Also, when latex gloves are used, employers should periodically screen high-risk workers for latex allergy symptoms. Early detection and removal of symptomatic workers from latex exposure is essential for preventing long-term health effects.

Are there alternatives?

Another effective solution to reduce the risk of latex sensitivity is substitution. Provision of suitable non-latex gloves such as those made of nitrile or vinyl to workers who are allergic to latex or workers who prefer not to use latex is considered a viable option. While the use of alternatives may be more expensive than continued latex glove use, a recent study has shown it is actually less costly than even low levels of latex-associated disability in health care workers.

Non-latex gloves

A number of medical grade non-latex glove materials now meet government standards and are available for use in clinical, examination and surgical procedures. These include vinyl, nitrile, neoprene and thermoplastic elastomer gloves. Each glove type has both advantages and disadvantages.

Vinyl

Several manufacturers now offer medical grade vinyl examination and surgical gloves in both powdered and powder-free versions. When compared to latex these gloves perform similarly in terms of tensile strength and elongation but are considered less durable and more likely to leak. Vinyl gloves are not recommended for procedures lasting longer than 30 minutes at which point the barrier protection provided starts to decline. To avoid this, double gloving with vinyl gloves is a common practice in some surgical operations, as is changing gloves every 30 minutes. Vinyl gloves cost the same as latex.

Nitrile

Nitrile gloves have proven to be more resistant to tears and punctures and degradation by chemical agents compared to latex and vinyl. In terms of durability and pathogen barrier protection, nitrile gloves perform as well or better than latex gloves. However, nitrile gloves, like latex, are manufactured through a process of vulcanization and may contain chemical additives similar to those used in latex gloves that can cause allergic reactions. Nitrile gloves are more expensive than either latex or vinyl.

Neoprene

Neoprene gloves provide similar protection against pathogens as latex. The strength, elasticity and comfort of neoprene are also similar to latex. But like nitrile, neoprene is vulcanized and may contain chemical additives that can initiate an allergic response upon contact. Neoprene gloves are most commonly used in the operating room but are expensive, costing more than a dollar a pair.

Thermoplastic elastomer

Thermoplastic elastomer (TPE) gloves have a tensile strength equal to or superior to that of latex, without the latex allergens or the chemical additives that induce allergic reaction. The effectiveness of this product as a barrier to blood-borne pathogens is equal or better than latex.

NOTE: For more detailed information and training on latex gloves and other health care hazards contact a Workers Health & Safety Centre office near you.



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