

Managing Safety and Health – Latex Products

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Introduction

Latex gloves have proved effective in preventing transmission of many infectious diseases to health care workers. Eliminating exposure to latex products in a healthcare industry is a major challenge because numerous medical products and equipment contain latex derivatives. For some healthcare workers exposures to latex has resulted in changing their profession to prevent an anaphylactic shock and/or death. . Reports of such reactions have increased in recent years-- especially among health care workers. Reports of immediate hypersensitivity to latex have increased dramatically since the first case was reported (in English) in 1979.¹ Sixteen deaths occurred in association with the use of a latex barium enema tip, leading to the recall of the device in 1991 by the U.S. Food and Drug Administration (FDA)² and an increase in awareness of the risk of a life-threatening type I allergy associated with natural latex devices. ***Ten to 17 percent of health care workers have already become sensitized, and over 2 percent have occupational asthma as a result of latex exposure.***¹

Frequency

In the US: Latex allergy is present in 1-5% of the general population, with an increased prevalence in atopic individuals. Latex allergy is increased in populations with chronic occupational exposure to latex. It is found in 2-17% of HCWs and in at least 10% of rubber industry workers. Symptoms of latex allergy have been described in 14% of a group of EMS providers and in 54% of a pediatric ED staff. Atopy raises the risk of occupational sensitization

According to the Workers' Compensation Case Law, former Circuit Judge Steven Zinter of Pierre, who decided in October 2001 that Mary Beth Kennedy was not entitled to worker's compensation benefits, was overruled 4-1 by the court Supreme Court. Zinter, who is now a member of the Supreme Court had ruled that Kennedy who had suffered from an occupational disease that did not qualify her for benefits. Overturning that decision, the Supreme Court said solid medical evidence proved that Kennedy's condition qualified for benefits under state law. Allergists have testified that the woman's exposure to latex dust during surgery at St. Luke's was the major cause of her disability, the justices said.

"Any exposure to latex is now a major life or death situation for Kennedy," wrote Circuit Judge Jack Von Wald of Selby, serving as an acting justice. "Although Kennedy was predisposed to her

¹ CDC

allergy and was, no doubt, suffering from the disease of latex allergy, an injury may occur when a pre-existing disease makes an employee more susceptible to a work-related injury." Severe allergic reaction, triggered by working conditions, may be considered an injury that makes people eligible for worker's compensation benefits, the state Supreme Court ruled.

The decision land marked the first time the high court ruled that an allergic episode may be the basis of payments for medical expenses and total loss of wages.

Physiological Effects of Latex

Latex refers to the natural rubber latex manufactured from a milky fluid that is primarily obtained from the rubber tree (*Hevea brasiliensis*). Some synthetic rubber materials may be referred to as "latex" but they do not contain the protein that produces latex allergy.

Allergy to latex was first recognized in the late 1970s. Since then, it has become a major health concern as an increasing number of people in the workplaces use latex personal protective equipment to prevent exposures to biological hazards, chemicals or avoiding contamination of food and beverages for the food industry, and electronic products in manufacturing in clean room environments. Health care workers exposed to latex gloves or medical products containing latex are especially at risk. According to CDC it is estimated that 8-12% of health care workers are latex sensitive. Between 1988-1992, the Federal Drug Administration (FDA) received more than 1000 reports of adverse health effects from exposure to latex, including 15 deaths due to such exposure.

Continuous exposure to latex sensitive people results in sensitization. Sensitization is the progressive increase in the size of a response over repeated presentations of a stimulus (1). Time-dependent sensitization (TDS), a term suggested by Antelman (2,3), involves sensitization by the simple passage of time between initial and later re-exposures to a stimulus. Thus, intermittency is an important time-related feature of stimuli that initiate sensitization as opposed to continuous exposures that initiate tolerance (4). Pharmacologic agents, direct electrical stimulation, and physical and psychological stressors can all initiate or elicit the amplified responses in TDS (2,5,6,7). Sensitization can interact with tolerance and with conditioning (8-10), but each of these processes can be distinguished from the other by proper experimental design. The mechanisms of sensitization are not fully understood but may involve persistent changes in neurotransmitters, receptors, and basic neural cellular functions (5,6). Sensitization of immune function can occur during TDS protocols (11), but neural rather than classical immunological changes appear to mediate TDS of neurobehavioral functions (2,6,).

Over time sensitization results in allergy - Allergic reactions include skin rashes, hives, runny nose, red and itchy eyes, sinusitis types of symptoms, coughing, wheezing, asthma, an anaphylactic shock and death.

Other common reaction to latex products is not life threatening but localized - ***irritant contact dermatitis***- dry, itchy, irritated areas on the skin, usually the hands. This reaction is caused by irritation from wearing gloves and by exposure to the powders added to them. Irritant contact dermatitis is not a true allergy. ***Allergic contact dermatitis*** results from the chemicals added to latex during harvesting, processing, or manufacturing. These chemicals can cause a skin rash

similar to that of poison ivy. Neither irritant contact dermatitis nor chemical sensitivity dermatitis is a true allergy

The National Institute for Occupational Safety and Health (NIOSH) recommends workplaces develop program for preventing allergic reactions to natural rubber latex* among workers who use gloves and other products containing latex. But for some workers, exposures to latex may result in skin rashes; hives; flushing; itching; nasal, eye, or sinus symptoms; asthma; and (rarely) shock. Reports of such allergic reactions to latex have increased in recent years --especially among health care workers.

At present, scientific data are incomplete regarding the natural history of latex allergy. Also, improvements are needed in methods used to measure proteins causing latex allergy. This Alert presents the existing data and describes six case reports of workers who developed latex allergy. These recommendations include reducing exposures, using appropriate work practices, training and educating workers, monitoring symptoms, and substituting nonlatex products when appropriate.

NIOSH requests that employers, owners, editors of trade journals, safety and health officials, and labor unions enhance awareness of all workers who may be exposed to latex on effective methods for preventing exposure to latex if they have allergy or sensitivity.

Who is at Risk?

Workers with ongoing latex exposure are at risk for developing latex allergy. Such workers include health care workers (physicians, nurses, aides, dentists, dental hygienists, operating room employees, laboratory technicians, and hospital housekeeping personnel) who frequently use latex gloves and other latex-containing medical supplies. Workers who use latex gloves less frequently (law enforcement personnel, ambulance attendants, funeral-home workers, fire fighters, painters, gardeners, food service workers, and housekeeping personnel) may also develop latex allergy. Workers in factories where latex products are manufactured or used can also be affected.

Atopic individuals (persons with a tendency to have multiple allergic conditions) are at increased risk for developing latex allergy. Latex allergy is also associated with allergies to certain foods especially avocado, potato, banana, tomato, chestnuts, kiwi fruit, and papaya. People with spina bifida are also at increased risk for latex allergy.

Diagnosing Latex Allergy

Latex allergy should be suspected in anyone who develops certain symptoms after latex exposure, including nasal, eye, or sinus irritation; hives; shortness of breath; coughing; wheezing; or unexplained shock. Any exposed worker who experiences these symptoms should be evaluated by a physician, since further exposure could result in a serious allergic reaction. A diagnosis is made by using the results of a medical history, physical examination, and tests.

Taking a complete medical history is the first step in diagnosing latex allergy. In addition, blood tests approved by the Food and Drug Administration (FDA) are available to detect latex

antibodies. Other diagnostic tools include a standardized glove-use test or skin tests that involve scratching or pricking the skin through a drop of liquid containing latex proteins. A positive reaction is shown by itching, swelling or redness at the test site. However, no FDA-approved materials are yet available to use in skin testing for latex allergy. Skin testing and glove-use tests should be performed only at medical centers with staff that are experienced and equipped to handle severe reactions.

Testing is also available to diagnose allergic contact dermatitis. In this FDA-approved test, a special patch containing latex additives is applied to the skin and checked over several days. A positive reaction is shown by itching, redness, swelling, or blistering where the patch covered the skin.

Occasionally, tests may fail to confirm a worker who has a true allergy to latex, or tests may suggest latex allergy in a worker with no clinical symptoms. Therefore, test results must be evaluated by a knowledgeable physician.

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Treatment

Once a worker becomes allergic to latex, special precautions are needed to prevent exposures during work as well as during medical or dental care. Certain medications may reduce the allergy symptoms, but complete latex avoidance (though quite difficult) is the most effective approach. Many facilities maintain latex-safe areas for affected patients and workers.

Case Reports

The following case reports briefly describe the experiences of six workers who developed latex allergy after occupational exposures. These cases are not representative of all reactions to latex but are examples of the most serious types of reactions. They illustrate what has occurred in some individuals.

Case No. 1

A laboratory technician developed asthma symptoms after wearing latex gloves while performing blood tests. Initially, the symptoms occurred only on contact with the gloves; but later, symptoms occurred when the technician was exposed only to latex particles in the air [Seaton et al. 1988].

Case No. 2

A 33-year-old woman sought medical treatment for occupational asthma after 6 months of periodic cough, shortness of breath, chest tightness, and occasional wheezing. She had worked for 7 years as an inspector at a medical supply company, where her job included inflating latex gloves coated with cornstarch. Her symptoms began within 10 minutes of starting work and worsened later in the day (90 minutes after leaving work). Symptoms disappeared completely while she was on a 12-day vacation, but they returned on her first day back at work [Tarlo et al. 1990].

Case No. 3

A nurse developed hives in 1987, nasal congestion in 1989, and asthma in 1992. Eventually she

developed severe respiratory symptoms in the health care environment even when she had no direct contact with latex. The nurse was forced to leave her occupation because of these health effects [Bauer et al. 1993].

Case No. 4

A midwife initially suffered hives, nasal congestion, and conjunctivitis. Within a year, she developed asthma, and 2 years later she went into shock after a routine gynecological examination during which latex gloves were used. The midwife also suffered respiratory distress in latex-containing environments when she had no direct contact with latex products. She was unable to continue working [Bauer et al. 1993].

Case No. 5

A physician with a history of seasonal allergies, runny nose, and eczema on his hands suffered severe runny nose, shortness of breath, and collapse minutes after putting on a pair of latex gloves. He was successfully resuscitated by a cardiac arrest team [Rosen et al. 1993].

Case No. 6

An intensive care nurse with a history of runny nose, itchy eyes, asthma, eczema, and contact dermatitis experienced four severe allergic reactions to latex. The first reaction began with asthma severe enough to require treatment in an emergency room. The second and third reactions were similar to the first. The fourth and most severe reaction occurred when she put on latex gloves at work. She went into severe shock and was successfully treated in an emergency room [Rosen et al. 1993].

Conclusions

Latex allergy in the workplace can result in potentially serious health problems for workers, who are often unaware of the risk of latex exposure. Such health problems can be minimized or prevented by following the recommendations outlined in this Alert.

Recommendations

The following recommendations for preventing latex allergy in the workplace are based on current knowledge and a common-sense approach to minimizing latex-related health problems. Evolving manufacturing technology and improvements in measurement methods may lead to changes in these recommendations in the future. For now, adoption of the recommendations wherever feasible will contribute to the reduction of exposure and risk for the development of latex allergy.

Employers

Latex allergy can be prevented only if employers adopt policies to protect workers from undue latex exposures. NIOSH recommends that employers take the following steps to protect workers from latex exposure and allergy in the workplace:

1. Provide workers with nonlatex gloves to use when there is little potential for contact with infectious materials (for example, in the food service industry).

2. Appropriate barrier protection is necessary when handling infectious materials [CDC 1987]. If latex gloves are chosen, provide reduced protein, powder-free gloves to protect workers from infectious materials.

The goal of this recommendation is to reduce exposure to allergy-causing proteins (antigens). Until well accepted standardized tests are available, total protein serves as a useful indicator of the exposure of concern.

3. Ensure that workers use good housekeeping practices to remove latex-containing dust from the workplace:

- Identify areas contaminated with latex dust for frequent cleaning (upholstery, carpets, ventilation ducts, and plenums).
- Make sure that workers change ventilation filters and vacuum bags frequently in latex-contaminated areas.

4. Provide workers with education programs and training materials about latex allergy.

5. Periodically screen high-risk workers for latex allergy symptoms. Detecting symptoms early and removing symptomatic workers from latex exposure are essential for preventing long-term health effects.

6. Evaluate current prevention strategies whenever a worker is diagnosed with latex allergy.

Workers

Workers should take the following steps to protect themselves from latex exposure and allergy in the workplace:

1. Use *nonlatex* gloves for activities that are not likely to involve contact with infectious materials (food preparation, routine housekeeping, maintenance, etc.).

2. Appropriate barrier protection is necessary when handling infectious materials [CDC 1987]. If you choose latex gloves, use powder-free gloves with reduced protein content:

- Such gloves reduce exposures to latex protein and thus reduce the risk of latex allergy (though symptoms may still occur in some workers).
- So-called hypoallergenic latex gloves do not reduce the risk of latex allergy. However, they may reduce reactions to chemical additives in the latex (allergic contact dermatitis).

3. Use appropriate work practices to reduce the chance of reactions to latex:

- When wearing latex gloves, do not use oil-based hand creams or lotions (which can cause glove deterioration) unless they have been shown to reduce latex-related problems and maintain glove barrier protection.
- After removing latex gloves, wash hands with a mild soap and dry thoroughly.

- Use good housekeeping practices to remove latex-containing dust from the workplace:
 - Frequently clean areas contaminated with latex dust (upholstery, carpets, ventilation ducts, and plenums).
 - Frequently change ventilation filters and vacuum bags used in latex-contaminated areas.

4. Take advantage of all latex allergy education and training provided by your employer:

- Become familiar with procedures for preventing latex allergy.
- Learn to recognize the symptoms of latex allergy: skin rashes; hives; flushing; itching; nasal, eye, or sinus symptoms; asthma; and shock.

5. If you develop symptoms of latex allergy, avoid direct contact with latex gloves and other latex-containing products until you can see a physician experienced in treating latex allergy.

6. If you have latex allergy, consult your physician regarding the following precautions:

- Avoid contact with latex gloves and other latex-containing products.
- Avoid areas where you might inhale the powder from latex gloves worn by other workers.
- Tell your employer and your health care providers (physicians, nurses, dentists, etc.) that you have latex allergy.
- Wear a medical alert bracelet.

7. Carefully follow your physician's instructions for dealing with allergic reactions to latex.

Additional Information

For additional information about latex allergy, call 1-800-35-NIOSH (1-800-356-4674); or visit the NIOSH Home Page on the World Wide Web at <http://www.cdc.gov/niosh/homepage.html>

You may access the following latex allergy website directly or by selecting *Latex Allergy* through the NIOSH Home Page:

US Department of Health and Human Services. Public Health Service. CDC. NIOSH Alert. *Preventing allergic reaction to natural rubber latex in the workplace.*

http://www.familyvillage.wisc.edu/lib_latx.html

Keys to Reducing Exposure to Latex

AVOIDANCE STRATEGY	OCCUPATIONAL HAZARD
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<p>Airborne contamination Eliminate air borne Latex</p> <p><i>1. Personal Protective Equipment</i></p> <ul style="list-style-type: none"> • Latex Gloves <p>Recommendations: Eliminate usage of latex gloves Use powder free gloves</p> <p><i>2. Fun Products/Greetings</i></p> <ul style="list-style-type: none"> • Latex Balloons <p>Recommendations: Develop a policy to prohibit latex balloons. Allow only mylar balloons in the healthcare organizations. Provide training to all healthcare workers including the gift shop personnel, and the front desk receptionist and security personnel. Post notice to inform staff, patients and visitors of the policy.</p>	<p>Manufacturers' use of corn starch synergy effect with latex protein. Latex protein readily binds to cornstarch. During donning of gloves healthcare workers stretch and pull gloves. This activity releases the latex/corn starch in to air and becomes airborne hazard for not only for the glove user but other individuals- patient, visitor, other healthcare professionals. Example: In operating room surgeon's use of gloves may affect an anesthesiologist, etc. Other incidental exposure to the cornstarch powder/Latex occurs during housekeeping duties- vacuuming, sweeping floor, or any activity that may result in disturbing the cornstarch/Latex mixture.</p> <p>When latex balloons burst they emit airborne latex contaminants in air triggering allergic reactions.</p>
<p>Accidental Injection <i>Medical Equipments and Products</i></p> <p>Recommendations: Conduct a thorough review of medical products. Don't have purchasing agent make decisions in procurement. Provide training to all healthcare personnel involved in purchasing products about the latex allergy. Develop a policy to avoid purchasing latex containing products and equipments. Develop a policy of no eating, drinking and applying cosmetics and lip barriers while employees have gloves on/ Provide training to all healthcare workers on the importance of washing their hand before eating, drinking and applying cosmetics. Purchase non-latex gloves for the food handlers to prevent food</p>	<p>Many medical products and equipment contain latex. Some of these items are: medication vial cap, needle plungers. When drawing medication from a latex tipped vial the medication may get the latex particulates which can result in accidental injection of latex into patient's blood stream. Anything injected has an immediate absorption- in this situation it may result in immediate allergic reaction including an anaphylactic shock and death.</p> <p>Accidental ingestion may occur if the food products come in contact with the latex products. Food handlers may contaminate food during the food preparation and food distribution.</p>

contamination with latex protein.	
<p>Skin Absorption <i>Medical Equipments and Products</i></p> <ul style="list-style-type: none"> • Latex gloves • EKG pads • Tourniquet • IV tubing • Foley catheters • First-aid supplies- adhesive tape <p>Recommendations: Provide training to all healthcare workers on early reporting of symptoms, early diagnosis, early intervention to eliminate further exposure to latex. Develop a policy to use non-latex products that may have exposure to mucous membranes. Example: gastroscopy, vaginal/ rectal exam, catheterization Purchasing non-latex products.</p>	<p>Contact with skin Latex exposure to skin-hands- initially may give localized reaction. EXAMPLE: skin rash, dry skin, dermatitis. However, studies report that continuous exposure to latex via skin contact results in physiological symptoms like runny nose, itchy eyes, asthma. Contact with mucous membranes Latex exposure to the mucous membranes has an immediate reaction. Avoid contact with internal organs, eyes, nose, mouth, vagina, penis and rectum.</p>
<p>Food and Latex Conduct training for patients and food handlers regarding the food and latex interaction. Label food choices and ingredients</p>	<p>Individuals known to have latex allergy may have similar physiologic symptoms if they eat banana, kiwi, avocados and chestnuts</p>

Recommendations for Latex Safe Work Environment:

- ✓ Use non-latex, and non-chlorine examination and personal protective equipment in the healthcare industry.
- ✓ Use latex free medical equipments- resuscitation and invasive procedures.
- ✓ Provide training to all healthcare personnel during orientation that include: latex exposure, routes of exposures- air, contact, accidental injection; safe usage of the personal protective equipment, recognizing sensitization, early recognition of sensitization and reporting requirements, early intervention, availability of non-latex products, acute allergic reaction, medical intervention, etc

Conclusion

It is essential to protect all individuals- employees, patients and all healthcare workers from latex exposure as continuous exposure may result in a life threatening incident. There is no cure or immunotherapy for an individual becomes sensitized to latex.

SO PREVENTION IS A BEST MEDICINE FOR CONTROLLING OCCUPATIONAL EXPOSURE TO LATEX.

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