Guideline for Preventing Sensitivity and Allergic Reactions to Natural Rubber Latex in the Workplace
Acknowledgements

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Preface

Workers and patients exposed to latex gloves and other products containing natural rubber latex may develop sensitivity or allergic reactions such as skin rashes; hives; nasal, eye, or sinus symptoms; asthma; and (rarely) shock. Latex allergy is an increasing problem in health care. An estimated 8% to 12% of health care workers are sensitized, compared to 1% to 6% of the general population (National Institute of Occupational Safety and Health [NIOSH], 1997). A recent study of healthcare workers with frequent latex exposures showed asymptomatic persons to have a higher rate of allergy than in those with clinical symptoms (Brown, Schauble, & Hamilton, 1998). Just how much exposure is needed to sensitize individuals to latex is not known, but reduced exposure to latex proteins has been associated with a decrease in sensitization and symptoms.

Occupational latex allergy is one of the top priorities of the U. S. Occupational Safety and Health Administration (OSHA, 1999). No regulatory action is planned, but officials are in the process of collecting data for future action.

Definition of Terms

For the purpose of this document, SGNA has adopted the following definitions:

**Allergy** refers to a state of hypersensitivity induced by exposure to a particular antigen (allergen) resulting in harmful immunologic reactions on subsequent exposures.

**Atopy** (Atopic) refers to an individual found to have IgE antibodies to one of more common environmental allergies including latex (Taylor & Erkek, 2004).

**CDC** refers to the Centers for Disease Control and Prevention.

**FDA** refers to the United States Food and Drug Administration.

**Latex** refers to natural rubber latex (NRL) and includes products made from dry natural rubber. Natural rubber latex is the product manufactured from a milky fluid derived from the rubber tree *Hevea brasiliensis*.

**NIOSH** refers to the National Institute for Occupational Safety and Health.

**OSHA** refers to the Occupational Safety and Health Administration.

**Sensitization** is the process of developing an immunologic reaction to an antigen (Katz, Holzman Brown, Hamid Hirshman, Kinsella, et al, 2005).

**Sensitivity** refers to a state of altered reactivity that develops after sensitization.

**Urticaria** refers to a transient condition of the skin, usually caused by an allergic reaction, characterized by pale or reddened, irregular, elevated patches and severe itching.

General Principles

**Background**
The emergence and spread of hepatitis B virus and the discovery and spread of HIV prompted the CDC to issue recommendations for universal precautions in 1987. These precautions resulted in a dramatic increase in the use of disposable, natural rubber latex gloves. The increased demand for
gloves may have temporarily changed manufacturing procedures, resulting in a poor-quality, highly allergenic product. Increased awareness of latex allergy has resulted in more numerous reports of this allergy.

Health care workers develop sensitization from regular latex exposure—wearing latex gloves or inhaling aerosolized latex in the workplace. In 2000, there were more than 600 product liability lawsuits pending over latex allergies (Kurtz, 2000). In 1999, the FDA released a proposed guidance document entitled “Medical Glove Guidance Manual,” which recommended protein and glove powder limits.

**Products Containing Latex**

A wide variety of products contain latex. The following are examples of products that may contain latex.

<table>
<thead>
<tr>
<th>Emergency Equipment</th>
<th>Personal Protective Equipment</th>
<th>Household Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure cuffs</td>
<td>Gloves</td>
<td>Carpeting</td>
</tr>
<tr>
<td>Stethoscopes</td>
<td>Surgical masks</td>
<td>Shoe soles</td>
</tr>
<tr>
<td>Electrode pads</td>
<td>Goggles</td>
<td>Dishwashing gloves</td>
</tr>
<tr>
<td>Endotracheal tubes</td>
<td>Respirators</td>
<td>Baby bottle nipples</td>
</tr>
<tr>
<td>Tourniquets</td>
<td></td>
<td>Pacifiers</td>
</tr>
<tr>
<td>Intravenous tubing</td>
<td></td>
<td>Balloons</td>
</tr>
<tr>
<td>Syringes</td>
<td></td>
<td>Instant lottery tickets</td>
</tr>
<tr>
<td>Oral and nasal airways</td>
<td></td>
<td>Toy balls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bathroom throw rugs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chewing gum</td>
</tr>
<tr>
<td></td>
<td><strong>Hospital Supplies</strong></td>
<td>Contraceptive sponges</td>
</tr>
<tr>
<td>Anesthesia masks</td>
<td>Rubber bands</td>
<td>Condoms</td>
</tr>
<tr>
<td>Adhesive tape</td>
<td>Art Supplies</td>
<td>Elastic on diapers</td>
</tr>
<tr>
<td>Elastic Bandages</td>
<td>Telephone Cords</td>
<td>Bicycle helmets</td>
</tr>
<tr>
<td>Catheters</td>
<td>Erasers</td>
<td>Socks</td>
</tr>
<tr>
<td>Wound drains</td>
<td></td>
<td>Computer mouse pads</td>
</tr>
<tr>
<td>Injection ports</td>
<td></td>
<td>Calculator/remote control</td>
</tr>
<tr>
<td>Rubber tops of multi-dose vials</td>
<td></td>
<td>buttons</td>
</tr>
</tbody>
</table>

**Effective September 1997, all medical devices must be labeled regarding their latex content**

This ruling requires that medical devices containing natural rubber latex state, “Caution: This Product Contains Natural Rubber Latex Which May Cause Allergic Reactions” (FDA, 1997, Hamilton, Brown, Veltri, Ferolli, Primeau, Schauble et al., 2005).

**Types of Reactions to Latex**

Three types of reactions can occur in persons using latex products: Irritant Contact Dermatitis, Allergic Contact Dermatitis, and Latex Allergy.

**Irritant Contact Dermatitis (Contact dermatitis)**

The most common reaction to latex products is irritant contact dermatitis. This is exhibited by the development of dry, itchy, irritated areas on the skin, usually the hands. It may occur on the first exposure and is not life threatening (Hepner & Castells, 2003). Irritant reactions reduce the barrier properties of the skin, allowing latex antigens to enter microabrasions and cracks in the skin surface placing susceptible persons at risk for repeated exposure (Muller, 2003). The alkaline pH of most powered gloves is the most likely cause of this reaction (Hepner & Castells, 2003). Irritant contact dermatitis symptoms can be improved by thorough washing and drying of hands, use of powdered-
Preventing Latex Allergy

free gloves and frequent changing of gloves to prevent irritation from sweat (Reines & Seifert, 2005). This is not a true allergy.

*Allergic Contact Dermatitis (Delayed Hypersensitivity or Type IV)*

Delayed hypersensitivity (Type IV) results from exposure to chemicals added during harvesting, processing or manufacturing of latex (Huber & Terezhalmy, 2006; Amado, 2006). These chemicals can cause erythema, pruritus and vesicles. The rash usually begins 24 to 48 hours after contact, and may progress to blisters or spread, but can present as early as 8 hours or as late as 5 days (Muller, 2003). This is not a true allergy.

*Latex Allergy (Type I Hypersensitivity)*

True latex allergy (Type I) is more serious than either of the two preceding conditions and could lead to anaphylactic reactions. Certain proteins in latex may cause sensitization, with or without symptoms. It is unknown how much exposure is needed to cause sensitization or symptoms. Exposures at even low levels can trigger allergic reactions in some sensitized individuals. Sensitization appears to be permanent, although the normal course of the immune response to latex remains unclear (Burt, 1998). Recent studies show contact desensitization of Type I latex allergic individuals may be possible (Hepner & Castells, 2003). Reactions usually begin within minutes of exposure to latex, but they can occur hours later. Mild reactions involve skin redness, hives or itching. Angioedema may present from mucosal exposure and is characterized by localized, non-pitting swelling commonly affecting the lips, face, limbs, trunk, and abdominal viscera. Edema to the upper airway or larynx can be severe or life threatening (Huber & Terezhalmy, 2006). Other severe reactions may involve respiratory symptoms such as runny nose, sneezing, itchy eyes, scratchy throat and asthma (NIOSH, 1997) and may be more directly related to airborne latex proteins released from powdered gloves. Rarely, shock may occur.

**Who is at Risk for Developing Latex Allergy?**

1. Workers with ongoing latex exposure, e.g. those in healthcare who frequently change latex gloves.
2. Atopic individuals (persons with a tendency to have multiple allergic conditions such as urticaria, asthma, allergic rhinitis) (Muller, 2003).
3. Persons with allergies to certain foods: especially avocado, chestnuts, kiwi fruit, and banana. Also, potatoes, tomatoes, papaya, passion fruit, grapes, pineapples, peaches, watermelons, nectarines, mangoes, guavas, strawberries and cherries have also been documented as foods which cause allergic reactions in half the patients who are also latex allergic (ANA, 1997, Taylor and Erkek, 2004).
4. Persons with spina bifida, or a history of multiple surgical procedures.

**Diagnosis of Latex Allergy**

Diagnosis of latex sensitization should include (NIOSH, 1997; Hamilton et al, 2002; Hepner & Castells, 2003; Huber & Terezhalmy, 2006).

1. **History and physical examination** by a knowledgeable physician. This is the initial step in the diagnostic process, followed by blood and serological testing.
2. **Skin prick test** (SPT). An in vivo test which involves 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 site.
3. **RAST** (radioallergosorbent test) immunoassay. In vitro tests approved by the FDA to detect IgE antibodies in serum of sensitized individuals. This blood test is useful in conjunction with a history and physical when in vivo tests cannot be performed or in cases where antihistamines continue to be used. In vitro testing eliminates the risk of possible systemic reactions (FDA, 2001).

4. **Glove-use test** which involves wearing a finger-cot or whole latex glove, as well as a non-latex finger-cot or glove for control, and observing for the development of rash, erythema, and pruritis.

5. **Patch test** (in vivo provocation test) used to differentiate between irritant contact dermatitis, allergic contact dermatitis and NRL allergies. A positive test is shown by itching, swelling, redness, or blistering where the patch covered the skin.

**Treating Latex Allergy**
Once an individual 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 allergy symptoms, but complete latex avoidance is the most effective approach.

**Conclusions**
Latex allergy in the workplace can result in potentially serious health problems. Such health problems can be minimized by following the recommendations outlined in this document.

**Recommendations**
The following recommendations for preventing latex allergy in the workplace (NIOSH, 1997; OSHA 1999) 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 these recommendations, wherever feasible, will contribute to the reduction of exposure and risk for the development of latex allergy.

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

A. Consider implementing pre-employment screening for latex sensitivity.

B. Consider designated latex-safe areas in all offices and clinics or convert your entire office, clinic or hospital into a latex-safe environment (Lieberman, 2002; Muller, 2003).

C. Provide workers with non-latex gloves when there is little potential for contact with blood or body fluids.

D. Select powder-free, reduced-protein gloves if choosing latex gloves for protection from blood or body fluids. 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. Protein levels below 50mg/g are considered the least allergenic (Muller, 2003).

E. Select nitrile, neoprene or polyisoprene gloves as an alternative to latex gloves when needed.
for prolonged exposure of blood and body fluids. These gloves are comparable to latex as a barrier protection. Vinyl does not provide adequate protection and is not considered a sufficient barrier against blood and body fluids (Taylor & Erkek, 2004, Reines & Seifert, 2005).

F. Practice good housekeeping methods to remove latex-containing dust from the workplace. These include:
   1. Identify areas contaminated with latex dust for frequent cleaning (upholstery, carpets, ventilation ducts)
   2. Ensure that ventilation filters and vacuum bags are changed frequently in latex-contaminated areas.

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

H. Develop policies and procedures for health care workers with latex allergies (Elliott, 2002). These include:
   1. Screen high-risk workers for latex allergy symptoms
   2. Remove symptomatic workers from latex exposure.
   3. Evaluate current prevention strategies whenever a worker is diagnosed with latex allergy.

Refer to Appendix A for examples of questions for a latex sensitivity screening questionnaire.

II. Health Care Workers
Health care workers should take the following steps to protect themselves from latex exposure and allergy in the workplace:

A. Use non-latex gloves for activities that are not likely to involve contact with infectious materials.
   1. Select a reduced-powder or powder-free glove with reduced protein content for those activities where contact with blood or body fluids is anticipated and latex gloves are used.
   2. Understand that hypoallergenic latex gloves do not reduce the risk of latex allergy. However, they may reduce reactions to chemical additives in the latex.
   3. Use appropriate work practices to reduce the chance of reactions to latex:
      a. When wearing latex gloves, do not use oil-based hand creams or lotions unless they have been shown to reduce latex-related problems.
      b. After removing latex gloves, wash hands with a mild soap and dry thoroughly.
   4. Take advantage of all latex allergy education and training provided by your employer.
   5. Use topical barrier products and cotton glove liners to prevent direct contact of latex with the skin if you have irritant reactions to latex gloves (Muller, 2003).
   6. Avoid direct contact with latex gloves and other latex-containing products if you develop symptoms of latex allergy. Consult a physician experienced in treating latex allergy.
   7. Report allergic events related to latex medical devices to the FDA MedWatch Program (phone 1-800-FDA-1088, Fax 1-800-FDA-0178) (ANA, 1997).

B. If you have a known latex allergy:
   1. Avoid contact with latex gloves and other latex-containing products.
   2. Avoid areas where you might inhale the powder from latex gloves worn by other workers.
3. Tell your employer and health care providers that you have latex allergy.
4. Wear a medical alert bracelet.
5. Carefully follow your physician’s instructions for dealing with allergic reactions to latex. **This may include carrying auto-injectable epinephrine at all times** (Muller, 2003).

**Patients**

Healthcare workers should take the following steps to protect patients.

A. Screen all patients for allergies. Those being identified as sensitive or allergic to latex should be treated in a manner that minimizes the risk of an allergic reaction. Avoidance of latex containing products and a latex-free environment are mandatory in the case of sensitized individuals (Hepner & Castells, 2003).

B. Assess patients for pre-disposition or actual allergy to latex. Whenever possible, prescreen preoperative patients before admission. Pertinent information that might prove helpful includes:
   1. Presence of atopy, including hay fever, food allergy (especially avocado, chestnuts, kiwi fruit, and banana) childhood or adult eczema and asthma.
   2. Multiple surgeries.
   3. Intraoperative urticaria, angioedema, respiratory distress or difficulty with ventilation.
   4. History of latex exposure; type of latex device, nature and duration of exposure.
   5. Work-related symptoms of possible latex allergy such as cutaneous symptoms (dermatitis, eczema, urticaria), respiratory symptoms (rhinorrhea, pruritus, sneezing, cough, wheeze, and shortness of breath).
   7. Other symptoms such as itchy hands, localized angiodema, possible systemic anaphylactic symptoms with the use of household latex cleaning gloves, balloons, condoms, and diaphragms.

C. **Latex-free** supplies must be available for use on patients with latex allergies. Refer to Appendix B for examples of items to include on a latex-free cart.

D. Remove all sources of latex from the immediate patient environment, especially latex gloves, tourniquets, elastic straps, etc.

E. Remove suspected allergen and provide immediate care as needed and directed by the physician if the patient develops an allergic reaction. This may include IV fluids, airway management, and resuscitation medications (Hepner & Castells, 2003).

F. Follow Institutional policies regarding puncturing of vial stoppers containing latex. Filter needles used to withdraw medications have not been proven to reduce latex the content of the medications. The literature identifies three main approaches to vial closures (Hamilton et al, 2005, El-Atti et al, 2006):
   
   a. **Removal of vial stoppers.** Vial stoppers or closures may contain synthetic rubber or a mixture of synthetic and natural rubber latex. Removal of vial stoppers may lead to microbial contamination and the solution may already contain latex leached during manufacturing and storage.
   
   b. **One-stick-rule.** The stoppers on vials are punctured only once, medications are drawn into a non-latex syringe and the patient is observed following medication administration. Closed-vial system is maintained but does not
address the possibility of leached latex.

c. *Catalog-avoidance approach.* Pharmacy staff review, identify and catalog medications packaged in vials containing latex. This requires time to develop and maintain the catalog and may lead to inaccurate or incomplete information.

Refer to institutional policies and procedures for specific information on the care of patients with latex sensitivities.

**References**


Elliot, B. A. (2002). Latex allergy: The perspective from the surgical suite. *Journal of Allergy and Clinical Immunology, 110*(2), S117-120.


Katz, J. D., Holzman, R. S., Brown, R. H., Hamid, R., Hirshman, C., Kinsella, S., Petrovich, C., Randel,
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Muller, B.A. (2003). Minimizing latex exposure and allergy: How to avoid or reduce sensitization in the healthcare setting. Latex Allergy, 113(4), 91-96.


Recommended Reading
Allergy to Latex Education and Resource Team, Inc. [Resource organization]


# Appendix A

This sample is a tool for assessing patients or staff who report latex allergy. Multiple “yes” responses to these questions may suggest latex allergy, and precautions should be implemented.

## SAMPLE LATEX ALLERGY SCREENING TOOL

<table>
<thead>
<tr>
<th>Date_________________</th>
<th>Name__________________________________________</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

1. Have you ever had an anaphylactic reaction to latex devices/products? ___ ___  
   If yes, under what circumstances did it occur?  

2. Have you ever been told by a doctor that you have an allergy to any latex product? ___ ___  
   If yes, to what specifically did the doctor say you were allergic to?  

3. Do you have any congenital abnormalities (spina bifida, myeloma, myelodysplasia)? ___ ___

4. Have you had a reaction to the following personal sources of latex?  
   Balloons ___ ___  Latex birth control devices ___ ___  
   Rubber gloves ___ ___  Erasers ___ ___  
   Hot water bottles ___ ___  Face Masks ___ ___  
   Rubber bands, balls ___ ___  Elastic bandages ___ ___  
   Foam pillows ___ ___  Cuffs, elastic waist bands ___ ___  
   Baby bottles, nipples ___ ___  Ostomy bags ___ ___  
   Pacifiers, teething rings ___ ___  Shoes or other footwear ___ ___  
   Belts, bras, suspenders ___ ___  Other __________________ ___ ___

5. After handling latex products, have you experienced any of the following?  
   Difficulty breathing ___ ___  Redness ___ ___  
   Runny nose/congestion ___ ___  Cracking or chapping hands ___ ___  
   Itching hands or eyes ___ ___  Swelling ___ ___  
   Hives ___ ___  Other________________ ___ ___

6. Do you have a history of the following?  
   Contact dermatitis ___ ___  Eczema ___ ___  
   Asthma ___ ___  Autoimmune disease ___ ___  
   Hay fever ___ ___  (e.g. Lupus) ___ ___  

7. Do you have allergies to any of the following?  
   Recent onset ___ ___  Long-standing ___ ___  
   Recent onset ___ ___  Long-standing ___ ___  
   Bananas ___ ___  Kiwis ___ ___  
   Avocados ___ ___  Chestnuts ___ ___  
   Potatoes ___ ___  Peaches ___ ___  
   Tomatoes ___ ___  Papaya ___ ___  
   Poinsettia ___ ___  Other ___ ___  

If yes, describe the reaction:
8. Does your occupation involve contact with products containing latex?  ___ ___
   If yes, which products?

   Yes   No

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Appendix B

Latex-Free Product Cart Contents

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For staff use</strong></td>
<td></td>
</tr>
<tr>
<td>Examination gloves</td>
<td>1 box each, variety of sizes</td>
</tr>
<tr>
<td>Isolation gowns</td>
<td>2 each</td>
</tr>
<tr>
<td>Isolation masks</td>
<td>2 each</td>
</tr>
<tr>
<td><strong>For perioperative use</strong></td>
<td></td>
</tr>
<tr>
<td>Isolation masks</td>
<td>1 box</td>
</tr>
<tr>
<td>Nurses’ caps</td>
<td>4 boxes</td>
</tr>
<tr>
<td>Patient gowns</td>
<td>2 each</td>
</tr>
<tr>
<td>Sterile drapes</td>
<td>2 each</td>
</tr>
<tr>
<td>Surgeons’ caps</td>
<td>1 box</td>
</tr>
<tr>
<td>Sterile gloves</td>
<td>4 pair each, variety of sizes</td>
</tr>
<tr>
<td><strong>For patient use</strong></td>
<td></td>
</tr>
<tr>
<td>Airway</td>
<td>1 each, variety of sizes</td>
</tr>
<tr>
<td>Angiocath catheters</td>
<td>2 each, variety of sizes</td>
</tr>
<tr>
<td>Arm board</td>
<td>1 each, variety of sizes</td>
</tr>
<tr>
<td>Blood pressure cuff</td>
<td>1 each</td>
</tr>
<tr>
<td>Blood pressure cuff for Dinamap</td>
<td>1 each</td>
</tr>
<tr>
<td>Drain, cap</td>
<td>1 each</td>
</tr>
<tr>
<td>Dressing, transparent</td>
<td>2 each</td>
</tr>
<tr>
<td>Electrodes</td>
<td>1 package</td>
</tr>
<tr>
<td>Foley catheter</td>
<td>2 each</td>
</tr>
<tr>
<td>Gauze 4 in. x 4 in.</td>
<td>6 packages</td>
</tr>
<tr>
<td>Intravenous sets</td>
<td>1 set each: adult set, burette, T-connector, extension set, pediatric set</td>
</tr>
<tr>
<td>Incontinence underpad</td>
<td>1 package</td>
</tr>
<tr>
<td>Lavage tube</td>
<td>1 each</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td>1 each</td>
</tr>
<tr>
<td>Needles</td>
<td>4 each</td>
</tr>
<tr>
<td>Nasogastric tube</td>
<td>2 each</td>
</tr>
<tr>
<td>Oxygen mask</td>
<td>1 each: simple, resuscitation, rebreathing</td>
</tr>
<tr>
<td>Pulse oximeter finger probe</td>
<td>1 each</td>
</tr>
<tr>
<td>Salem sump drain</td>
<td>2 each</td>
</tr>
<tr>
<td>Sharps container</td>
<td>1 each</td>
</tr>
<tr>
<td>Steri-Strips</td>
<td>2 packages</td>
</tr>
<tr>
<td>Stethoscope, disposable</td>
<td>1 each</td>
</tr>
<tr>
<td>Suction catheter</td>
<td>5 each</td>
</tr>
<tr>
<td>Syringes, glass</td>
<td>1 (50 ml), 4 (10 ml), 5 (5 ml), 5 (3 ml)</td>
</tr>
<tr>
<td>Tape, non-allergenic</td>
<td>1 roll</td>
</tr>
<tr>
<td>Tape, Transpore</td>
<td>1 roll</td>
</tr>
<tr>
<td>Thermometer probe covers</td>
<td>1 box each, tympanic and oral/rectal</td>
</tr>
</tbody>
</table>

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