

EMERGENCY NURSES ASSOCIATION WHITE PAPER LATEX ALLERGY

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Latex allergy remains a serious threat to the health¹⁻³ and careers⁴⁻⁶ of nurses and other health care providers routinely exposed to natural rubber latex in the workplace. Prevalence studies indicate a latex sensitization rate of 3% to 17% among exposed health care workers compared to a sensitization rate of less than 1% among the general population.⁷ Sensitization can be described as, “the development of an immunological memory to specific latex proteins that may lead to sensitivity or allergic reactions to latex.”¹ The health care setting is rife with latex-containing medical devices and equipment and provides ample opportunity for sensitization to occur. For health care providers, sensitization most often develops over time with repeated exposure to latex proteins or allergens contained in these products.^{1,8-10} Allergen absorption takes place primarily through the skin or by inhalation,^{9,11} but may take other paths, including ingestion, parenteral injection, wound inoculation, or mucosal contact.^{1,9} Allergic reactions range in severity from contact dermatitis, conjunctivitis, and urticaria, to asthmatic reactions, airway obstruction, anaphylactic shock, and even death.^{1,9}

Latex gloves are the single most significant source of allergen exposure among health care workers and the most important cause of sensitization in the health care setting.^{1,2,12,13} Powdered latex gloves raise the risk even more.^{1,5} Allergenic proteins from the latex bind with powder, and each glove change may disperse proteins into the air where they may become inhaled and accelerate sensitization.^{1,5} In addition, “protein-bearing” particles can remain suspended in the air for up to five hours,⁸ increasing a facility’s latex aeroallergen levels.¹

At present, there is no cure for latex allergy,^{7,8,11} and experts agree that the only means of preventing sensitization is avoidance.^{1,7,14} While federal agencies recognize this problem, no federal policies ban latex from the health care environment. Instead, the Food and Drug Administration (FDA) requires that latex-containing products carry warning labels,¹⁵ and the National Institute for Occupational Safety and Health only recommends that when selecting latex gloves, health care providers choose powderless gloves with lower protein content.¹⁶ This situation shifts responsibility for eliminating sources of exposure to employers and health care providers.

Most health care workers had been wearing latex gloves for years with only minor allergic reactions,^{5,17} but after introduction of universal precautions in 1987, glove usage skyrocketed and changes in glove processing to keep up with demand resulted in increased allergen levels.^{5,18} By 1992, the FDA received more than 1,100 reports of serious allergic reactions, including anaphylaxis, in both patients and health care workers, and 15 reports of patient deaths linked to latex barium enema catheters.¹⁷ Between 1992 and 2002, the FDA received another 1,200 reports, including some deaths, possibly due to latex glove exposure.¹⁷

Today, latex allergy remains a multifaceted problem.² Much is yet to be learned about immunological cross-reactivity (i.e., similar allergic reactions to different substances with similar

protein structures) and deficiencies in glove processing still persist.¹⁹ Furthermore, studies show that prevalence rates among the general population may be rising, which may be due to increased use of latex gloves among non-health care providers such as restaurant employees and security personnel.^{19,20} At present, more than 16,000 affected people wear medical-alert bracelets and necklaces to alert emergency care providers to their latex allergy.⁵

Children with spina bifida and other congenital anomalies are at the greatest risk for developing latex allergy, with sensitization rates ranging from 35% to 70%.^{1,21} Other high-risk populations include rubber workers and patients with histories of multiple surgical interventions.^{1,21} Predisposing factors include eczema, allergies to other substances, such as ragweed or shellfish, and a history of allergy to certain fruits including bananas, avocados, chestnuts, and kiwi, whose protein structures may cross-react with latex proteins.^{7,21} Many researchers agree that current trends in allergic diseases reflect a complex interaction between genetic factors and exposure to allergens in the environment.²² Results from a recent study examining the genomic DNA of 432 health care providers with and without latex allergy confirm this belief.²³

Potential responses to the use of latex gloves include: (1) non-allergic reactions (irritant contact dermatitis), characterized by skin redness, swelling, burning, horizontal cracks, and itchy dermatitis;¹ (2) local contact dermatitis (type IV t-cell mediated/delayed hypersensitivity reaction) in response to chemicals used in latex manufacturing, including red, raised, palpable areas similar to a poison ivy-like rash with fluid-filled vesicles, erythema, pruritis, and edema;^{1,5} and (3) “true,” systemic latex allergy (type I immunoglobulin-mediated/immediate hypersensitivity reaction) with sudden onset of symptoms that begin with skin redness, hives, and itching and may progress to hoarseness, chest tightness, runny nose, itchy or swollen eyes, life-threatening bronchospasms, respiratory distress, and circulatory collapse.^{1,5,8}

Although contact dermatitis is not considered life-threatening, skin breaks may allow absorption of larger amounts of glove chemicals or proteins and may increase the risk of systemic sensitization.²⁴ Published guidelines recommend that providers who experience even the mildest of symptoms promptly identify and remove suspected sources of latex from the environment.^{1,25} Nurses should make efforts to identify the source of an allergic reaction at work before taking medications that mask symptoms (e.g., itchy eyes, runny noses, and wheezing) while allergies potentially become more severe.⁵

High-risk and latex-allergic patients should receive treatment in a latex-safe environment,^{1,21} defined as one in which “every reasonable effort has been made to remove high-allergen and airborne latex sources from coming into direct contact with affected individuals.”¹ Accordingly, latex gloves should not come into contact with mucosal surfaces during clinical interventions.⁵ Whenever possible, medications for latex-sensitive or allergic patients should come from vials with latex-free stoppers.¹ If this is not an option, nursing staff should remain with patients after administering medication, in case allergic reactions to potential latex content develop.^{1,3} The American Society of Health-System Pharmacists has drafted a proposal to urge the FDA to mandate labeling of medication vials with dry rubber stoppers and medication-device combination products, such as pre-filled syringes, which are not included under the current FDA labeling requirement.²⁶ The efficacy of preoperative treatment for patients with latex allergy remains controversial.^{1,27} Premedication, such as antihistamines or steroids, may not universally prevent latex anaphylaxis and may attenuate early allergy symptoms allowing anaphylaxis to occur without warning.¹⁻⁸

Diagnosis of latex allergy begins with a detailed clinical history, including symptoms, latex exposures, and risk factors, such as allergies to other substances.^{9,13} A patch test is performed if type IV allergy is suspected.^{13,28} If the history suggests immediate type I allergy, a radioallergosorbent test (RAST) and/or skin prick test (SPT) is performed.^{1,9,13} The RAST is safer than the SPT, but less accurate, while the SPT can cause serious side effects in allergic individuals.^{9,25} The reagents used in these tests often are prepared by practitioners themselves. Standardized commercial reagents are available in Europe, but have not received FDA approval in the United States.^{3,7,9,13,25} Individuals testing positive for natural rubber latex sensitivity should receive the same treatment as allergic individuals because serious reactions may occur with little warning.^{1,2} A new, more sensitive diagnostic test presented at the 61st annual meeting of the American Academy of Allergy, Asthma & Immunology (AAAAI) may eventually be used to distinguish between asymptomatic individuals with cross-reactivity and those with latex-specific allergy who must take precautions to prevent severe allergic reactions.²⁹

At present, immunotherapy for latex allergy continues to be experimental.³⁰ However, researchers recently identified allergens thought to be the most clinically important latex allergens affecting health care workers, and that discovery may facilitate safe allergen-specific immunotherapy in the future.³¹ Pilot experiments using modifications of these allergens in animal models are currently in progress.⁷ Other research shows promise for a sublingual mode of immunotherapy.³²

Until safe and effective therapies are identified, standardizing levels of latex glove allergens to reduce exposure and sensitization continues to be a major intervention goal.³⁰ Allergens and residual chemical levels vary significantly in gloves from different manufacturers and from lot to lot in the same manufacturer.⁸ Standardization authorities in the United States (American Society for Testing of Materials) and in Europe (European Committee for Standardization) are working to set acceptable limits for latex allergens in medical gloves, and substantial progress is anticipated in this area within the next few years.⁷

In the meantime, the number of new latex allergy cases among health care providers may be declining.^{2,3,7,13,30,33} A number of experts cite switching from natural rubber latex gloves, especially those with powder, to non-latex, synthetic gloves or powderless, low-allergen latex gloves as an important factor in this decline.^{3,12,13,33} A ban on powdered gloves in Germany has reduced the incidence of suspected cases of occupational latex allergy by 80%.³⁴ Many medical facilities in the United States, including Johns Hopkins Hospital, the Mayo Clinic, and Ohio State University Medical Center, also have replaced powdered latex gloves with powder-free, low-allergen latex gloves and have experienced good outcomes.^{12,15,30} One author, in an article reviewing advances in occupational diseases, has suggested that powdered examination gloves “be relegated to the history books,”²² and AAAAI acknowledges that “immediate removal of powdered gloves from the workplace minimizes allergic reactions.”³³ Others have suggested that latex gloves, powdered or unpowdered, be banned altogether and replaced by non-latex, synthetic gloves.¹⁴

In fact, sale of synthetic gloves are on the rise.³⁵ The most popular latex substitute materials are vinyl, nitrile, neoprene, and polyisoprene.³⁵ Studies show that nitrile has better barrier integrity than vinyl or polyethylene, but lacks some of the desired properties found in latex, such as fit and elasticity.¹² The development of a new material made from a desert shrub called guayle

(pronounced why-YOU-lee) is under way and may be a new source of high-quality, non-allergenic natural rubber material for use in medical gloves.³⁶ Other interventions in progress include a process to deactivate allergenic latex proteins, which was reported at the 2005 International Latex Conference,³⁷ and a zinc-containing topical cream to prevent irritant contact dermatitis and possible antigen entry through skin breaks.³⁸

Apart from its physical consequences, latex allergy may affect personal and professional lives and even end careers.^{4,6,5} Some health care providers with latex allergy-associated symptoms withhold telling employers about their symptoms, fearing they may lose their jobs or jeopardize their careers.^{14,19} In a recent article addressing latex policy issues, the author notes that “nurses have died from anaphylactic reactions on the job, after making the inappropriate decision to return to work.”¹⁴

Latex allergy remains a complex puzzle. Until research brings all of the pieces together, it is crucial that nurses and other health care providers take appropriate steps to educate themselves about this multifaceted problem so they may protect their patients and themselves from this potentially serious disease.

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