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HALYARD Knowledge Network*

THE CLINICAL ISSUE

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DOES THE GLOVE FIT? CRITICAL CONSIDERATIONS FOR THE SELECTION OF MEDICAL GLOVES

INTRODUCTION

Medical gloves are considered one of the most critical components of barrier protection for those who are exposed to infectious substances and hazardous materials. Whether facing the demands of routine patient care, antibiotic resistance, threats of bioterrorism, or other challenges, healthcare personnel must have appropriate personal protective equipment, including gloves, and be able to rely on that protection throughout the performance of their tasks. Indeed, the Centers for Disease Control and Prevention (CDC), the Occupational Safety and Health Administration (OSHA), and the National Institute for Occupational Safety and Health (NIOSH) all stress the importance of appropriate glove selection.[1,2,3]

Questions that should be asked when selecting medical gloves include: Does the glove chosen fit the task at hand? What physical glove characteristics should be evaluated? What potential complications might be experienced when using gloves? Should the environmental impact of glove disposal be a concern? These are all issues that must be considered for appropriate glove selection.

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PHYSICAL CHARACTERISTICS

Two key physical characteristics of medical gloves are barrier integrity and desired attributes.

BARRIER INTEGRITY

It would be wonderful if all medical gloves were created without imperfections, afforded complete protection, and could withstand conditions that might compromise their integrity. But unfortunately, this is not the case as gloves vary in performance reliability. Major considerations for appropriate glove barrier selection include the quality of the manufacturing process, base glove material, everyday practices, and storage conditions.

QUALITY OF THE MANUFACTURING PROCESS

Glove manufacturing is a complex process. There are hundreds of combinations of added chemicals and processing conditions that affect the barrier integrity and surface residuals [e.g., protein, chemicals, powder] on a glove. The chemical formulation or "recipe" affects the physical properties of glove materials.

Manufacturing processes include dipping of the glove formers into the liquid glove solution or emulsion, rinsing, curing, stripping the gloves from the formers and drying (See Image 1.). Additional processing is required for powder-free gloves. All of these processes have an impact on the physical characteristics of gloves such as thickness, strength, softness (modulus) and stretchability (elongation). Each of these characteristics contributes to out-of-the-box (new, unused) glove barrier quality as well as in-use barrier performance.

Quality manufacturing is critical for the production of quality medical gloves. Therefore, the manufacturing process must be stringently monitored in order to control the physical properties of the final product. Furthermore, medical gloves manufactured for healthcare purposes are subject to the Food and Drug Administration's (FDA) evaluation and clearance.[1] In order to obtain this approval, the FDA has recognized several voluntary ASTM International standards which may be used for this clearance process.[4]

BASE GLOVE MATERIALS

Another consideration when assessing barrier integrity is the material from which the glove is made.

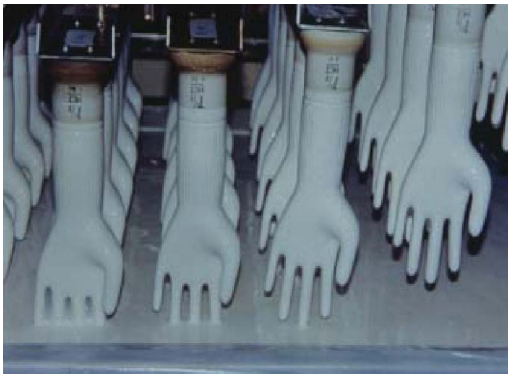
Many healthcare personnel assume that all well manufactured gloves will maintain the same barrier protection throughout the course of their activities, but this is an incorrect assumption. Regardless of the quality of the manufacturing process, the material from which the glove is made will have its own strengths and limitations.

The three primary materials from which medical gloves are made include natural rubber latex (NRL), acrylonitrile-butadiene (nitrile), and polyvinyl chloride (vinyl, PVC). Each of these materials will differ, sometimes dramatically, in strength and durability when subjected to various stresses under different conditions.

Natural Rubber Latex (NRL)

NRL gloves are made from a milk-like substance derived from the rubber tree, **Hevea brasiliensis**. Processed NRL has a molecular structure that allows for the properties of stretchability and elasticity that are ideal for tasks involving rigorous manipulation. These properties enable the glove to stretch when challenged and return rapidly to its original shape.[5] They are highly durable[6] and provide resistance to penetration of many chemicals.

Image 1.



Glove formers being dipped into the liquid glove solution.

They also provide excellent comfort, ease of movement and tactile sensitivity.[6,7] However, NRL gloves do have some limitations. The barrier properties of NRL may deteriorate when exposed to petroleum-based products, ozone, oxygen, or ultraviolet light.[6,8]

Acrylonitrile-Butadiene (Nitrile)

Like NRL, nitrile is an elastomeric polymer comparable to NRL in maintaining its barrier protection during rigorous use;[5,14] however, nitrile is a synthetic. Nitrile is resistant to oil-based products,[9,10] glutaraldehydes,[7] and many other chemicals.[6] It has excellent in-use durability and is highly resistant to abrasion and punctures.[11] Nitrile does have some limitations. For instance, nitrile is susceptible to deterioration by ozone, oxygen, and ultraviolet light.

Polyvinyl Chloride (Vinyl, PVC)

Vinyl, also a synthetic, is resistant to oils and ozone and is generally less expensive than NRL or nitrile. However, vinyl has several limitations. Vinyl has a rigid and brittle molecular structure that can fracture or separate when the material is manipulated. Even with the addition of many chemicals used to enhance softness and stretchability, vinyl is still less capable than NRL and nitrile of maintaining its integrity when challenged during use.[7] This material does not withstand being snagged, repeatedly jabbed, or stretched. It has less durability[7] and limited use with chemicals such as alcohols[12] and glutaraldehydes.[13]

Image 2.

Three types of base glove materials (from top): natural rubber latex (NRL), acrylonitrile-butadiene (nitrile) and polyvinyl chloride (vinyl, PVC).

IN-USE BARRIER PERFORMANCE STUDIES

Protection of healthcare personnel is of the utmost importance when evaluating glove durability and the real relevance to the wearer is whether or not the glove is protective during use. Both simulated and actual hospital in-use studies have been performed to evaluate glove durability. Hospital in-use studies are significant as they use actual situations within the clinical setting. Historically, however, when simulated and actual in-use tests were performed for the same functions, simulated-use results have mirrored clinical studies.

Table 1 is a summary of four published barrier studies performed on NRL, nitrile, and vinyl examination gloves over the last decade. It is important to note that little has changed regarding in-use barrier capability during this time. NRL and nitrile are far more protective than vinyl.

In these studies, gloves were used for routine healthcare tasks [e.g., unscrewing caps off of irrigation fluids; manipulating sharp instruments, taping dressings in place and picking up different sized objects]. In all cases, the vinyl glove material had the highest percentage of barrier breach or leakage.

Table 1. Medical Examination Glove Barrier Performance Studies

Author	Date	Durability Challenge (a)	Leakage Percentage Rates (b)			
			Standard Vinyl	Stretch Vinyl	Latex (NRL)	Nitrile
Kerr (c)[14]	2004	X(d)	33.0 %		9.2 %	5.5 %
		X	35.5 %		9.0 %	7.5 %
Kerr[15]	2002	X	35.0 %		9.0 %	
Korniewicz[16]	2002	X	8.2 %		2.2 %	1.3 %
Rego[5]	1999	X	43.5 %	16.0%	2.0 %	2.0 %

(a) Simulated use
(b) When more than one brand of a particular material was evaluated, failure rates were averaged
(c) Chloroprene was included in the original study
(d) Glove durability method (shaking gloves in an abrasive medium for 10 min.)

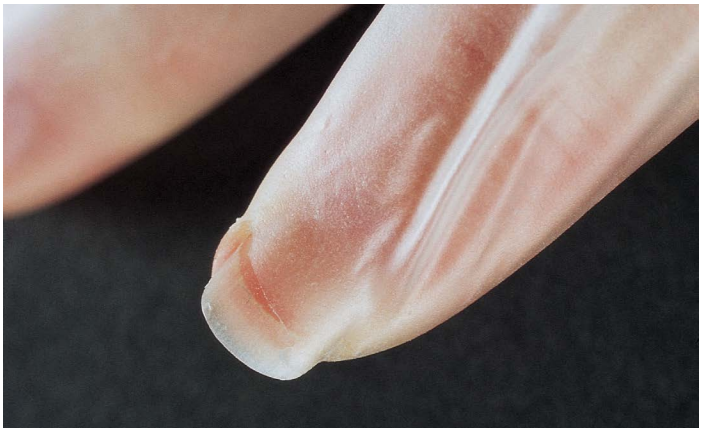
The nitrile glove material did as well or better than the NRL material. Of particular interest, the 2004 Kerr study noted that glove wearers are often not aware of a breach in their glove barrier protection. In fact, 78 percent of the barrier breaches were not recognized by the glove wearer. Moreover, the majority of these defects were located in the finger regions of the gloves.[14]

EVERYDAY PRACTICES

Everyday practices should also be considered when assessing the barrier integrity of gloves.

The barrier protection of any glove may be further compromised by everyday practices. As defects may occur during their manufacture, gloves should be inspected prior to use. Artificial nails or long fingernails or the wearing of jewelry may snag, tear or puncture gloves.[17] Use tapes, labels and other adhesive materials with caution as they may stick to gloves and cause small fragments of the glove material to rip away when pulled off. Avoid practices that will degrade the glove material such as using incompatible lotions and donning gloves over hands that are wet with hand sanitizers. How a glove is used, the stress placed on the glove material as well as the length of time the glove is worn can impact the barrier integrity. The rate of material fatigue can be compounded by many factors that include rigorous manipulation, contact with various chemicals and quality of the material coverage in areas that are difficult to coat [e.g., the saddle between the fingers]. Observe for obvious signs of glove degradation that include cracking, brittleness, hardening, softening, tackiness and a loss of elasticity, strength and tear resistance. Gloves should be changed if a breach in glove barrier is suspected.[8]

Image 3.



Artificial nails or long fingernails or the wearing of jewelry may snag, tear or puncture gloves.

STORAGE CONDITIONS

An additional consideration when assessing barrier integrity is glove storage. All gloves should be stored properly. Direct light, high heat, excessive humidity and ozone degradation from improper storage can lead to gloves with degraded barrier properties. If opened glove boxes are stored near generators, ultraviolet or fluorescent light, fans, laser instruments or X-ray machines, ozone degradation can occur. Ozone breaks down the chemical bonds between the elastic coils in gloves thus weakening the protective barrier and eventually causing holes along fold lines and creases.

DESIRED ATTRIBUTES

In addition to barrier integrity, there are certain attributes that are desired by those who wear medical gloves. Medical personnel expect manufacturers to create gloves with excellent donning ease, fit, comfort, dexterity, and grip in order to ensure the best possible in-use performance.

Gloves should be easily donned and the glove material should conform to the hand and not feel stiff or cause finger and hand fatigue after wearing for extended periods of time. Glove length, width, finger contour, and thumb position are among the factors to consider when evaluating appropriate glove fit. A glove that fits too tightly or is too stiff can affect fine motor skills, irritate and constrict the skin, contribute to hand fatigue and potentially aggravate symptoms associated with repetitive movements. Baggy gloves can cause wearers to execute procedures awkwardly and enable potential contamination if infectious agents or hazardous chemicals are involved. The glove should allow the wearer to securely grasp objects without fear of dropping while possessing sufficient tactile sensitivity for the task at hand.

Image 4.

All gloves should be stored properly. Direct light, high heat, excessive humidity and ozone degradation from improper storage can lead to gloves with degraded barrier properties.

PHYSICAL CHARACTERISTICS: CONSIDERATIONS FOR GLOVE SELECTION

Given this information on the physical characteristics of medical gloves, the following are considerations for appropriate glove selection.

BARRIER INTEGRITY

Quality of Manufacturing Processes

Prior to purchase and use, obtain barrier performance data from the manufacturers on testing performed by independent laboratories for the gloves under evaluation. Make certain the test data represent the actual gloves to be purchased.

Base Glove Materials

Recommendations for the selection of glove type for non-surgical use are based on factors that include sizing, the task to be performed and anticipated contact with chemicals and chemotherapeutic agents. Of note, in the most recent update of the Guideline for Isolation Precautions, the CDC states that either NRL or nitrile gloves are preferable to vinyl for clinical procedures that require manual dexterity and/or will involve more than brief patient contact.[1]

Everyday Practices

Recommendations for everyday practices include:[17-23]

- Inspect unused gloves for defects
- Avoid wearing jewelry
- Avoid wearing long and/or artificial fingernails
- Allow hand sanitizers to dry
- Choose lotions compatible with the glove material
- Use proper donning technique
- Change gloves when barrier breach is suspected
- Be cautious of tape and label use
- Observe for signs of glove degradation

Storage Conditions

Recommendations for storage conditions include:[7]

- Keep gloves dry and away from high, long-term humidity
- Shield gloves from direct sunlight and intense artificial light
- Store gloves away from x-ray machines and other energy generating sources that produce ozone
- Avoid temperature extremes
- Keep unused gloves in their original packaging
- Keep boxes free of dust
- Rotate stock … the gloves first in should be the first out
- Make note of the expiration date on glove packaging

DESIRED ATTRIBUTES

Commonly desired attributes include:

- Ease of removal from packaging
- Ease of donning
- Ease of movement/flexibility
- Good fit (not too tight or loose)
- Secure grip
- Tactile sensitivity

These desired attributes are very individual, subjective and task dependent therefore it is recommended that staff trials take place to assess each quality.

ASSOCIATED COMPLICATIONS

Complications associated with medical gloves is a second consideration for selection. These complications include irritant and allergenic potential as well as powder complications.

IRRITANT & ALLERGENIC POTENTIAL

The three types of glove-associated reactions from least to most severe are: Irritation; Type IV, Chemical Allergy; and Type I, Natural Rubber Latex [NRL] Protein Allergy.

IRRITATION (DERMATITIS, IRRITANT DERMATITIS, IRRITANT CONTACT DERMATITIS)

In addition to being the most common of the three glove-associated reactions,[24,25] irritation is non-allergenic. It can affect any individual and may occur when wearing either NRL or synthetic gloves.[25] Glove-related irritation may be caused by the presence of chemicals, powder and/or endotoxin left on the glove post-manufacture.[26] Additionally, friction may cause irritation if the glove fits too tightly and rubs continuously against the skin.[25]

Irritation may also be caused by air occlusion when gloves are worn too long and the skin cannot breathe. The initial symptoms of irritation often include redness and an itching or burning sensation confined to the area of glove contact.[25] Failure to remove the source of irritation may progress to a chronic stage where symptoms include cracks or horizontal fissures, sores, blisters, papules (small hard bumps) and dry, thickened skin with crusting and peeling.

ALLERGENIC POTENTIAL

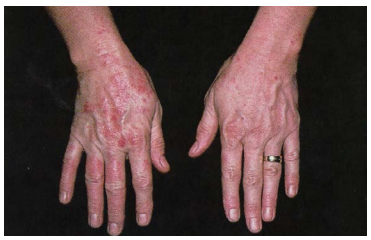
While anyone who wears gloves can suffer from a glove-associated irritation, only individuals who are genetically predisposed to respond to specific allergens are capable of experiencing an allergic response. The other two types of glove-associated reactions, a Type I, NRL Protein Allergy and a Type IV, Chemical Allergy, are different from irritation in that they are allergic reactions to specific allergens that may be present in the gloves. For susceptible individuals, repeated exposure to the specific allergen(s) to which they are vulnerable increases their level of sensitization until their unique critical symptom threshold is reached. It is at this point that further exposure to the allergen can result in a reaction. The time required to reach this threshold differs depending upon each individual's genetic make-up, environment and allergen exposure.[27] Some individuals may never reach this symptom threshold.

Type IV, Chemical Allergy (allergic contact dermatitis, delayed hypersensitivity)

A Type IV, Chemical Allergy is a T-cell-mediated allergic response to chemicals referred to as chemical contact sensitizers.[24,25,28] Chemical accelerators (e.g., thiurams, thiazoles, carbamates) have been linked to glove-associated Type IV, Chemical Allergies more than any other chemicals used in the manufacture of gloves.[25,28,29] Although one or more accelerators are necessary in the manufacturing of most medical gloves, the type and quantity used vary by manufacturer. Other types of chemicals found in both NRL and synthetic gloves that may cause Type IV, Chemical Allergy reactions include antioxidants, preservatives, lubricants, colorants, and plasticizers.[28]

When coming in contact with a specific chemical contact sensitizer(s), the allergic individual will have symptoms. However, they may be delayed and/or minimal for 6 to 48 hours.[30] Type IV, Chemical Allergy symptoms include redness and itching followed by small blisters or clustered vesicles on the hands that elicit pain when scratched. In chronic conditions, symptoms may be characterized by dry, thickened skin, open lesions and may eventually extend up the arm beyond the area of glove contact.[29]

Image 5.



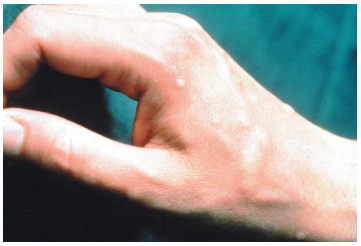
Example of Type IV, Chemical Allergy.

It should be noted that anytime the natural skin barrier is breached, whether by irritation or a Type IV, Chemical Allergy, the glove wearer is at increased risk for infection. Not only does it hurt to scrub sore hands that contain fissures and other skin breaches, these areas provide a path for microbial passage. Colonization of pathogens may also be facilitated.

Type I, Natural Rubber Latex (NRL) Protein Allergy (Latex Allergy, Protein Allergy, Immediate Hypersensitivity)

A Type I, NRL Protein Allergy is an IgE antibody mediated allergy to the naturally occurring proteins found in raw NRL from the rubber tree, Hevea brasiliensis.[2,28,31] This allergy is the least common but, potentially, the most serious of the three glove-associated reactions.[29] Risk factors include a history of frequent surgeries,[2] atopy (genetic predisposition for allergies),[31] a history of

Image 6.



Example of Type I, Natural Rubber Latex (NRL) Protein Allergy.

progressive reactions to foods known to cross-react with NRL,[29,31,32] and occupational exposure to NRL products.[26]

Once their symptom threshold has been reached, individuals who have an allergy to NRL proteins may have a reaction within minutes to an hour after exposure to the allergen(s).[31] Symptoms may appear locally at the point of contact or may spread throughout the body. These symptoms may include general itching, hives, itchy, watery eyes, runny nose, and facial swelling. More severe symptoms include dyspnea, hypotension, tachycardia, anaphylactic shock, and cardio-respiratory arrest.[7,33]

POWDER COMPLICATIONS

In addition to the irritant and allergenic potential, powder complications have also been associated with medical gloves. A powdered glove has powder on both its outer and inner surfaces. The amount of powder on the glove will differ depending on the manufacturing process. Once in the healthcare environment, this powder may be dispersed by direct and indirect contact, aerosolization and torn or perforated gloves. Powder released into the healthcare environment has been linked to glove-associated reactions, respiratory complications, poor wound healing and faulty laboratory results.

Image 7.

Powder released into the healthcare environment has been linked to glove-associated reactions, respiratory complications, poor wound healing and faulty laboratory results.

GLOVE-ASSOCIATED REACTIONS

Powder particles may contribute to all categories of glove-associated reactions that have previously been described. Powder may serve as an irritant as lipids and natural moisture can be absorbed by powder leaving hands chapped, irritated and vulnerable to further injury or infection. Chemical contact sensitizers, which may be carried by the powder, can trigger Type IV, Chemical Allergic reactions. Additionally, NRL proteins can adhere to the powder particles and be released into the surrounding environment or directly on NRL protein sensitive individuals.[34] This may precipitate a Type I, NRL Protein Allergic reaction in NRL allergic individuals.[35,36] It has been reported that powdered NRL gloves are the most common contributors to the NRL load in healthcare facilities.[26]

RESPIRATORY COMPLICATIONS

Respiratory complications range in scope from irritation due to the particulate nature of the powder to allergic or toxic reaction to the substances carried on the powder. The specific symptoms, whether irritant or allergenic in nature, depend on the substances transported, the individual sensitivities and any pre-existing disease conditions. For example, if an NRL allergic individual inhales powder carrying NRL protein on its surface, Type I, (NRL) Protein Allergic symptoms may be triggered ranging from allergic rhinitis or hives to asthma or anaphylactic shock.[35] Furthermore, chemicals from the hospital environment, including those in disinfectants and cytotoxic chemicals used in chemotherapy may bind to or be absorbed by the powder and subsequently inhaled.[4] Many of these agents are known to induce respiratory distress in sensitized individuals.

IMPAIRED WOUND HEALING

Powder can enter wounds either directly from gloved hands or perforated gloves, indirectly from materials prepared with powdered gloves or from aerosolized powder within the environment. Once introduced into the wounds, the powder particles can have multiple adverse effects including inflammation,[37,38] adhesions,[35,39] granulomas,[35] infection[4,40] and prolonged healing.[37,38]

Furthermore, several studies have shown that it takes time for glove powder to dissolve within wounds. Most powder will dissolve within 3 to 6 weeks but it has been shown that, in some cases, powder may remain unabsorbed in the body for weeks to years.[41,42]

FAULTY LABORATORY RESULTS

Glove powder may also cause complications in the laboratory including physical interference,[43] absorption of the specimen,[44] transport of microorganisms,[45] and cross-contamination during the performance of a number of assays.[46,47]

ASSOCIATED COMPLICATIONS: CONSIDERATIONS FOR GLOVE SELECTION

Given the information on the potential complications of medical gloves, the following are considerations for appropriate glove selection.

IRRITANT AND ALLERGENIC POTENTIAL

Glove-Associated Irritation

In order to reduce the risk of developing a glove-associated irritation, select gloves that are:[48,49]

- Appropriate for the barrier protection needed
- Low in residual chemicals
- Low in endotoxin
- Powder-free
- Well-fitting

Glove-Associated Type IV, Chemical Allergy

In order to reduce the risk of developing a glove-associated Type IV, Chemical Allergy, select gloves that are:[49]

- Appropriate for the barrier protection needed
- Low in residual chemicals
- Low in chemical contact sensitizers
- Powder-free

Glove-Associated Type I, NRL Protein Allergy

To prevent a glove-associated Type I, NRL Protein Allergy, the goals are to prevent initial sensitization of non-sensitized persons and to prevent reactions in individuals who are NRL-sensitized. It has been noted that "The only effective prevention strategy at this time is NRL avoidance."[26]

However, if NRL gloves must be worn, select gloves that are:[49,50]

- Low in proteins [specifically NRL proteins]
- Powder-free

And, of course, if an individual is already allergic to NRL, they should avoid all products made of NRL. According to OSHA's Bloodborne Pathogen Standard, employers must provide suitable non-NRL gloves as choices for employees who are allergic to NRL. These gloves should provide the appropriate barrier protection for the task[s] to be performed.[8,26,50]

POWDER COMPLICATIONS

Powder-free gloves are recommended. Specific recommendations include:[26]

- Avoid wearing powdered NRL gloves near individuals who are NRL allergic
- Avoid use of powdered gloves near immune compromised patients (consider by department)

If powdered gloves are the only option:[26]

- Choose gloves with lower powder levels
- Reduce activities that disperse powder (e.g., snapping gloves on/off, tossing into trash)

ENVIRONMENTAL IMPACT

An increasingly critical consideration for glove selection is the impact of medical gloves on the environment. This begins with the removal and disposal of the gloves at the point of use. Gloves that are not removed and disposed of properly can contaminate the wearer as well as the environment. Therefore, appropriate removal is essential.

The CDC advises that when removing gloves, the wearer should:[1]

- Using one gloved hand, grasp the outside edge of the opposite glove near the wrist
- Pull and peel the glove away from the hand. The glove should now be turned inside-out with the contaminated side now on the inside
- Hold the removed glove in the opposite gloved hand
- Slide one or two fingers of the ungloved hand under the wrist of the remaining glove.
- Peel glove off from the inside, creating a bag for both gloves
- Discard in appropriate waste container
- Perform hand hygiene

Two options for glove disposal at the point of use, depending on the level of contamination, are general waste and regulated medical waste.[51] If gloves have not become contaminated, they may be discarded in the general waste. If gloves have been contaminated with blood or other potentially infectious material, they should be discarded in a red bag designated for regulated medical waste or in accordance with facility policy.

After disposal, the gloves will be transported from the healthcare facility to either a landfill or an incinerator where they will ultimately have some impact on the environment. This impact has become an increasing concern for industries. The factors that must be considered when choosing a method of disposal will vary with material type.

The following is a review of the environmental impact of gloves made from NRL, nitrile and vinyl materials based on the method of disposal.

NATURAL RUBBER LATEX (NRL)

NRL is considered environmentally friendly. It has been noted that in a landfill, residual chemicals in the material, if present, will harmlessly leach out as the rubber biodegrades.

Figure 1. Glove Removal and Point of Use

NRL incineration is a relatively clean process. Some hydrocarbons, minute quantities of unreacted nitrogen-based chemicals, and sulfur dioxide may be produced at low incineration temperatures.[52,53]

ACRYLONITRILE-BUTADIENE (NITRILE)

In a landfill, nitrile resists degradation and leaches out residual chemicals, if present. And, during incineration, minimal amounts of nitrogen-based reaction products are released. The other chemical byproducts are similar to those produced by NRL.[52,53]

POLYVINYL CHLORIDE (VINYL, PVC)

Polyvinyl chloride is not environmentally friendly. Whether disposed of in a landfill or by incineration, vinyl has a clear disadvantage when compared to the environmental impact of NRL and nitrile products. Vinyl is not bio-degradable in a landfill and toxic chemicals can leach out thus contaminating the soil and ground water. During incineration, large amounts of dioxin and other toxic substances may be released into the air, water, and soil. Additionally, incineration installations may be damaged by the production of significant amounts of hydrochloric acid.[52,54,55]

Of the three materials reviewed, vinyl has been implicated as being the most harmful to the environment. For example, dioxins are unintentional byproducts of industrial activity [e.g., when vinyl is intentionally burned in medical waste and municipal waste incinerators]. They are known human carcinogens, reproductive and developmental toxicants, and highly toxic chlorinated organic compounds, even at low doses.[56]

Dioxin levels in the environment can be reduced. Of course, local, state, and federal regulations must be followed when disposing of medical waste, including gloves. Additionally, environmentalists and coalition groups who are concerned with environmental pollution have established recommendations to address this concern.[56]

One coalition group, Healthcare Without Harm, has recognized the negative impact of vinyl products. They have established recommendations which may be accessed on their website, www.noharm.org. The recommendations encourage healthcare facilities to establish an organization-wide vinyl reduction policy, identify vinyl medical products and vinyl-free alternatives, and reduce vinyl throughout the institution. Healthcare personnel may assist in this effort by becoming knowledgeable about this issue, involved in a facility reduction plan, and request vinyl-alternatives when possible.[56]

ENVIRONMENTAL IMPACT: CONSIDERATIONS FOR GLOVE SELECTION

Consider the environmental impact of the glove material selected

CONCLUSION

Considerations for the appropriate selection of medical gloves include physical characteristics, potential complications and the environmental impact. Barrier integrity is a major concern for the wearer; therefore, it is critical to understand that this is determined by the quality of the manufacturing process, base material of the glove, everyday practices, and storage conditions. However, barrier integrity is not the only characteristic sought when making a glove selection. The wearer often desires the glove to be easily donned, fit well, allow for ease of movement, afford tactile sensitivity and provide a secure grip. Additionally, potential complications from glove-associated reactions and powder are critical considerations as they may impact not only the wearer but also the patient. Anyone who wears medical gloves can develop a glove-associated irritation. Predisposed individuals may become allergic to either the chemicals or protein found in certain glove materials. As an irritant and a vehicle for substances such as contact chemical sensitizers, protein, microorganisms and cytotoxic chemicals, glove powder has been identified as a contributor to glove-associated reactions, respiratory complications and poor wound healing. Powder has also been implicated in faulty laboratory test results. Finally, there is a growing concern regarding the environmental impact of medical waste, including medical gloves. Of the three most frequently used glove materials (NRL, nitrile, vinyl), vinyl has been implicated as being the most harmful to the environment. A thorough understanding of these issues will enable healthcare personnel to make a more informed decision when selecting medical gloves.

ACCREDITED EDUCATION ON THIS TOPIC:

A CE accredited, speaker facilitated presentation on this topic is available through your Halyard Health Sales Representative.

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