



## **Latex Allergy: A Serious Problem**

Patients or health care workers with a latex allergy or sensitivity can be at a significant risk for a serious allergic reaction, including anaphylaxis. The incidence of latex allergy in the health care environment has been increasing. Learn how to identify individuals at risk for latex allergy or sensitivity and how to prevent and treat allergic reactions. Latex medical equipment frequently used in the emergency department will be identified, and recommendations for latex-free equipment will be discussed.

- Recognize patients at an increased risk of latex allergy and sensitivity.
- Understand the pathophysiology of latex allergy and anaphylaxis.
- List necessary supplies to include in a Latex Allergy Cart for your emergency department.
- Describe measures to prevent a reaction in susceptible individuals.
- Discuss how to recognize and treat latex-induced anaphylaxis.

TH-215  
Thursday, October 14, 1999  
10:00 AM - 10:55 AM  
Room # N223  
Las Vegas Convention Center

## **FACULTY**

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## Natural Rubber Latex Allergy

Tracy G. Sanson MD, FACEP

### Natural rubber latex:

Refers to natural rubber latex and includes products made from dry natural rubber  
Natural rubber latex is a complex protein by-product of rubber trees capable of causing immunoglobulin E (IgE) mediated allergic reactions  
Natural rubber latex should not be confused with synthetic rubber  
butyl or petroleum-based rubber  
Synthetic rubber poses no hazard to latex-sensitive individuals

### Process:

Natural rubber latex is the product manufactured from a milky fluid derived mainly from the rubber tree, *Hevea brasiliensis* found in Africa and Southeast Asia.

After the harvesting process:

Vulcanization

latex sap is turned into rubber through vulcanization  
heating the sap to produce structural changes in the latex that allow polymers to form  
this process gives rubber elasticity and pliability

Additives:

ammonia (keeps it from coagulating) and other preservatives are immediately added to the latex to prevent degradation  
low-ammonia latex products often contain other preservatives, such as sodium pentachlorophenate, tetramethylthiuram, and zinc oxide  
anti-oxidants (phenylenediamine)  
accelerators (thiurams, carbamates) to speed up the curing process

Porcelain molds are then dipped into these latex concentrates to produce products of different shapes and sizes, such as balloons, gloves and condoms

### Allergic reactions:

Anaphylaxis or immediate generalized allergic reactions are due to immediate allergic sensitization to latex proteins themselves

Chemical additives are responsible for some local skin reactions but are virtually never the cause of immediate generalized allergic reactions or anaphylaxis

The single largest source of allergens is the powdered cornstarch in latex gloves. The latex protein in gloves combines with the powder during the manufacturing process

### Gloves:

- first introduced into surgery by William Halstead at Johns Hopkins University in 1890 used to protect the skin of healthcare workers from harmful antiseptics
- effective barrier protection against infectious diseases for both the healthcare professional and the patient.
- usage in U.S. acute care hospitals increased dramatically from 1989 to 1995.

### History:

1979: first case report of latex allergy in Great Britain

by 1988: ~ 50 case reports recorded

1989: reports of anaphylaxis from latex-cuffed enema 15 deaths

1988 to 1991: the FDA received 44 reports of allergic reactions associated with condom use

Spring of 1991: Children's Hospital of Wisconsin reported 11 cases of anaphylaxis among children with Spina Bifida who were about to undergo surgery

by 1991: reports of >1,000 significant allergic reactions to latex

March 1991: U.S. Food and Drug Administration issued a medical alert to physicians warning them of the danger and advising them to ask questions about latex allergies as routinely as they ask about adverse reactions to penicillin

**Risk Factors:**

Populations at risk for developing latex allergy:

- Patients with neural tube defects:
  - Myelomeningocele/meningocele
  - Spina Bifida
  - Lipomyelomeningocele
- Patients requiring chronic bladder catheterizations:
  - Spinal cord trauma
  - Exstrophy of the bladder
  - Neurogenic bladder
  - Congenital genitourinary disorders
- Health care workers:
  - physicians
  - nurses
  - aides
  - dentists
  - dental hygienists
  - OR personnel
  - laboratory technicians
  - hospital housekeeping pre hospital personnel
- Patient's who have undergone multiple procedures
- Workers in industries that manufacture latex products
- Other workers with less frequent glove use:
  - police officers
  - funeral home workers
  - food service workers
  - firemen
  - painters
  - gardeners
  - hairdressers
  - housekeepers
- Atopic patients (asthma, rhinitis, eczema)
- Individuals who have certain food allergies:

implicated foods and food products include

banana	papaya	plum
avocado	passion fruit	cherry
chestnut	pineapple	melon
apricot	peach	fig
kiwi	nectarine	grape

potato	carrot	profilin
tomato	hazelnut	potatin
celery	wheat	ficus
apple	rye	plant stress proteins
pear	mugwort	

*the latex proteins are structurally homologous with proteins contained in some foods*  
*latex sensitivity may appear before, at the same time or after the development of the food sensitivity*  
*not all patients with these food allergies will require latex avoidance, and similarly, not all patients with latex allergies will have problems with these foods*

**R is for Risk groups** Pneumonic: RUBBER as a screening tool

**R** is for Risk groups: Children with Spina Bifida, genitourinary anomalies, cerebral palsy, shunts, asthma, eczema, or food allergies--esp. banana, kiwi, avocado, potato, or tomato

**U** is for **U**nexplained problems during surgery

**B** is for **B**reathing difficulties at the dentist's office

**B** is for **B**alloons that cause swelling or wheezing

**E** is for **E**arly surgery, under 1 year of age

**R** is for **R**epeated latex exposures, from surgery and bladder or bowel programs.

(J Pediatric Health Care 1998; November/December: 320): Pediatric Nurse Practitioner Ellen V. Meeropol

#### Rates of observed sensitivities to natural rubber latex

Children with Spina Bifida	ranges from	28% to 67%
Healthcare workers		5% to 10 % in 1993 <b>to</b> 5% to 20 % in 1996
Rubber industry workers		>10%
General population		1% to 6%

According to the CDC:

1993 there were 600 reported cases of Type I latex sensitivity  
Sixteen of these patients died as a result of their allergy

#### Pathophysiology:

There are two types of *latex allergies* -- Type I and Type IV

**Type I:** most serious and can result in respiratory arrest

**Type IV:** less serious and more localized, causing skin irritation and discomfort

#### **Contact dermatitis:**

Both irritant and allergic responses  
Most common clinical reaction associated with latex and its additives

- Irritant Contact Dermatitis

Described by Downing in 1933  
Most common reaction to latex products  
Appearing 48 to 72 hours after contact

Experienced by 35% of healthcare personnel wearing medical gloves at some time

Skin:

- usually the hands
- irritated areas, dry, itchy, crusty, cracking, scaling sometimes vesicle formation
- lesions are localized to the areas in direct contact with the rubber product

Reaction caused by several methods:

- irritation from wearing gloves and by exposure to the powders added to them
- repeated hand washing and drying
- incomplete hand washing and drying
- use of cleaners and sanitizers
- residual soaps and detergents in prolonged contact with the gloved cutaneous surface

Clinically:

rubber glove eczema in health care workers,  
contact stomatitis in those using rubber orthodontic appliances  
condom dermatitis

*Irritant contact dermatitis is not a true allergy*

- Chemical Sensitivity Dermatitis

Allergic contact dermatitis (ACD)

Type IV reaction

Delayed hypersensitivity

Not IgE-related

It is a specific immune response of sensitized lymphocytes to chemical additives contained in latex products.

Not life-threatening

Unrelated to the proteins that incite Type I reactions

Results from the chemicals added to latex during harvesting, processing or manufacturing (mercaptothiobenzothiazole, tetramethyluram) residual chemicals can be adsorbed onto the skin during glove use

Occur within several hours to several days after contact with offending chemicals

Occur mostly in patients with occupational exposure to latex

Skin:

- rash similar to that of poison ivy
- red rash, palpable areas with bumps, sores and horizontal cracks
- affected area may extend beyond the glove and up to the forearm
- 

**Note:** contact dermatitis, especially in atopic individuals, may herald future systemic (Type I anaphylactic) sensitivity

Irritant or allergic contact reactions reduce the barrier properties of the skin and allow absorption of larger amounts of chemicals or proteins.

This is thought to increase the risk of latex sensitization.

An increased frequency and progression through allergic contact dermatitis may precede the onset of latex allergy.

### Immediate Allergic Reaction

Type I

Immediate hypersensitivity

IgE mediated reaction caused by proteins in latex

Reactions usually begin within minutes of exposure to latex  
but can occur hours later and produce various symptoms

Clinically:

- mild reactions: skin redness, hives, or itching, wheal and flare reaction
- more severe reactions:
  - respiratory symptoms
  - scratchy throat                      rhinitis
  - conjunctivitis                      angioedema
  - asthma
- rarely: life-threatening anaphylaxis

Clinical symptoms usually arise from direct contact with a natural rubber latex product but may also result from inhalation of airborne allergens bound to substances such as glove powders

There are several theories about the recent increase in prevalence of latex allergy.

- Greater exposure of predisposed health care workers and patients to latex products
  - glove usage in U.S. hospitals increased dramatically from 1989 to 1995
  - prior to adoption of universal precautions ~ 300 million gloves used/year
  - today > 9.6 billion gloves used/year
  - Introduction of universal precautions in an effort to prevent the spread of hepatitis B and HIV infections
    - Centers for Disease Control and Prevention (CDC) in 1987
    - Bloodborne Pathogens Standards (OSHA) in 1992
- Increased growth of the latex industry
  - led to changes in glove processing and manufacturing
  - (to meet the excessive demand for latex gloves)
  - led to shorter washes and shorter shelf times increasing the amount of latex protein antigens in gloves and other products
- Increased awareness of the disease process and manifestations

The diagnosis of latex allergy is challenging.

Many other allergens can cause the same manifestations as latex allergy.

Avoidance of latex products and the use of synthetics is recommended for those identified as latex allergic.

### Testing:

**History** primary tool for diagnosing latex allergy

- risk factors
- allergic symptoms occurring after contact with latex-containing items
  - Ask specifically about:
    - Reactions during hospital visits, operations, or dental visits
    - Rash when using gloves
    - Lip and facial swelling after blowing up balloons
    - Asthma symptoms
    - Rhinitis and conjunctivitis
    - Allergy to foods such as bananas, chestnuts, and avocados

### **Special Tests**

**Tests to measure latex-specific IgE**

Confirm latex IgE in the serum of patients suspected of having latex allergy  
Sometimes positive in patients with no history of allergic reactions to latex  
Unclear positive predictive value

Not recommended for general screening

- **Radioallergosorbent (RAST)**  
*in vitro* test for IgE antibody directed towards latex.  
specific for latex allergy  
variable sensitivity (65 - 85%)
- **Enzyme-linked immunosorbent assay (ELISA)**
- **Alastat Latex-Specific IgE Allergen Test Kit.** AlaSTAT (Diagnostic Products Corporation, Los Angeles, Calif.)
- **ImmunoCAP System** (Upjohn-Pharmacia, Uppsala, Sweden)

#### **SKIN PRICK Testing (SPT)**

Latex-allergic patient exhibits a wheal-and-flare reaction  
Standardized, FDA-approved, latex extract with which to perform the test is not yet available

Useful for patients in high-risk groups who lack a clear history  
Small but definite risk of anaphylaxis: should be performed in a hospital or clinic with resuscitation and medical support services

In vitro and skin testing does not necessarily predict clinical presentations such as anaphylaxis.

It is safest to recommend latex-avoidance precautions to protect all individuals with a positive latex skin test and/or serological test.

#### Legal:

##### Legal Options

- Workers compensation insurance  
for injuries and illnesses that occur on the job  
covers:
  - medical expenses for job-related illnesses
  - 2/3 of your usual weekly wage if you're unable to work
- Americans With Disabilities Act (ADA)  
Latex allergy has not been specifically classified as a disability  
Falls under the ADA's general definition of a physical impairment that substantially limits major life activities  
ADA requires an employer to make reasonable accommodations to allow disabled employees to perform their jobs unless the employer can prove that the accommodation would impose an undue hardship.

PRESS RELEASE  
For Immediate Release  
November 17, 1997

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#### **DISABILITY DISCRIMINATION LAWSUIT SETTLED BY EEOC**

Los Angeles, California - - On October 14, 1997, U.S. District Court Judge Mariana R. Pfaelzer entered a Consent Decree resolving a lawsuit filed by the Los Angeles District Office of the U.S. Equal Employment Opportunity Commission ("EEOC") against Friendly Hills Regional Medical Center ("Friendly Hills"). In the lawsuit, the EEOC alleged that Friendly Hills failed to provide a reasonable accommodation to Sherry Puig and subsequently discharged her because of her disability, in violation of the Americans with Disabilities Act of 1990 ("ADA"). Ms. Puig, a staff nurse who developed an allergy to latex, was denied a

transfer to an open position within the medical center for which she was qualified and which did not require the use of latex gloves.

Defendant believed that it did not have to give Ms. Puig the open position because she was not the best qualified. EEOC argued that under the ADA Ms. Puig only needed to be qualified to get the vacant position. Moreover, Ms. Puig was told by Defendant's supervisors that they had no responsibility to assist her in finding another position in the company for which she was qualified. EEOC believes such inaction by Defendant violated ADA's "reasonable accommodation" obligations. As a result of this lawsuit and settlement, employers should understand the obligation to transfer employees with disabilities to other vacant positions as well as assist employees to find other vacant positions.

Under the Consent Decree, Friendly Hills will pay Sherry Puig \$66,885.00 in damages. The Consent Decree further provides that Friendly Hills will comply with the Americans with Disabilities Act. Friendly Hills will also conduct yearly training on the ADA to educate its supervisors, managers and employees of the medical center's obligations under the ADA. The Consent Decree will remain in effect until October 1, 1999.

The EEOC is an agency of the United States of America charged with the administration, interpretation, and enforcement of Title VII of the Civil Rights Act of 1964, which prohibits employment discrimination on the basis of race, color, religion, sex, or national origin, the Age Discrimination in Employment Act which forbids employment discrimination on the basis of age, the Americans with Disabilities Act, which bars discrimination against qualified persons with physical or mental disabilities and the Equal Pay Act which requires that women and men be paid the same wages for the same work.

- Products liability suits
  - >250 lawsuits are pending in a large multidistrict litigation in federal court
- Verdicts
  - \$20 million suit Karen Vivonetto of Naples, FL
    - disabled by a latex allergy acquired during a career as an obstetrics nurse at Naples Community Hospital
  - Linda Green against Smith & Nephew AHP Inc.
    - First major latex product liability case in the United States to go to trial
    - Jury awarded \$1 million saying it wanted to tell manufacturers to improve the safety of latex gloves
    - Jurors awarded Ms. Green
      - \$34,000 for past medical expenses
      - \$42,000 for future medical expenses
      - \$90,000 in lost earnings
      - \$250,000 for lost future potential earnings
      - \$584,000 for pain and suffering
      - \$1 million in all

#### Legal Risks

If a patient is exposed to latex by healthcare professional who knew or should have known of the patient's latex sensitivity, the care provider may be liable for negligence.

#### **Management:**

To manage an acute latex allergic reaction:

- Remove latex agents
  - Do not delay immediate emergency therapy**
- Stop treatment/procedure
- Support airway--administer 100% oxygen
- Start intravascular volume expansion with Ringer's lactate or normal saline

- Administer epinephrine
  - Subcutaneously: 0.1-1 mcg/kg 0.3 - 0.5 cc 1:1000
  - Infusion: 0.1 - 1.0 ug/kg/min
    - 2 - 4 ug/min or more (adult)
  - Endotracheal: 5 to 10 times IV dose
    - 50-100 mcg (adult) (10 cc of 1:10,000 epi)
  - MDI: > 10 puffs
  - Nebulizer: .5 cc of 2.25% racemic epinephrine in 3 cc of normal saline
- Secondary Treatment:
  - Diphenhydramine:
    - 0.5 - 1 mg/kg IV (maximum dose 100 mg)
    - .5-1.0 mg PO
  - Corticosteroids:
    - Hydrocortisone: 5 mg/kg IV (adult 250 mg -1 gm)
    - Methylprednisolone: 2 mg/kg IV (maximum dose 125 mg)
    - Prednisone 1-2 mg/kg PO
  - Cimetidine:
    - 4 mg/kg IV or PO (adult 300 mg)
  - Aminophylline 5 - 6 mg/kg IV over 20 minutes (for persistent bronchospasm)
  - Aerosolized bronchodilators as needed
- Consider:
  - Norepinephrine
    - 0.05 - 0.1 ug/kg/min; 2 - 4 ug/min
    - may rarely be required for refractory hypotension
  - Isoproterenol
    - 0.01 - 0.02 ug/kg/min
    - can be used for severe bronchospasm, pulmonary hypertension, or right ventricular dysfunction.
  - Sodium bicarbonate 0.5 - 1 mEq/kg for persistent hypotension with acidosis
  - Glucagon 1 mg IV for refractory symptoms in patients on beta adrenergic blocking agents

Management of the non acute latex allergic ED patient:

- Allergy alert I.D. Band
- Documentation outside patient care unit
- Secure a private room, if possible
- Mark all pharmacy requisitions with a "Latex Allergy" sticker
- Bedside resuscitation, medication and equipment
- Latex-safe care cart for the patient's room and any department where the patient is transported. Use synthetic examination gloves in the patient's room
- Notify all departments who will care for the patient, to ensure precautions are maintained in other patient care areas
- Remove all patient care equipment made of natural rubber latex (NRL)
- Check all labels and packaging before using to ensure they do not contain NRL.
  - If in doubt, do not use
- Use a stopcock rather than rubber ports to administer intravenous medication.
- Remove rubber stoppers used to draw up medications.
- Use non-latex catheter equipment.

NIOSHA recommendations for 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 [CDC1987].

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).
  - \* 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.

• **Latex Free Crash Cart List**

\* **Product that frequently contains latex**

- \* Alternative product or method that does NOT contain latex

\* **Airway, masks:**

- \* Hudson (800) 848-3766
- \* VITAL SIGNS (800) 932-0760
- \* Polamedco Airways (800) 932-0760
- \* Kendall (508) 261-8000
- \* Ferris Medical (716) 537-2391
- \* Relicare Express (800) 556-3210

\* **Ambu bag:**

- \* Silicone:
  - \* PMR 2 by Nellcor Puritan-Bennett (800) NELLCOR
  - \* Laerdal (800) 431-1055
  - \* Resprionics (800) 345-6443
  - \* Armstrong Medical (800) 323-4220

\* **Anesthesia, bags & ventilator circuits:**

- \* Neoprene bag Anesthesia Associates (619) 744-6561

- \* Ohmeda (800 345-2700
- \* Dreger
- \* use a well-washed system
- \* **Bandages:**
  - \* Active Strips & Comfort Strips (latex in package) 3M (3M-HELPS)
  - \* Cetra (888) LATEX-NO
  - \* Curad Bandages (latex in package) (508) 261-8000
  - \* Readi-Bandages
  - \* use sterile dressing with latex free tape
- \* **Blood administration sets:**
  - \* Terumo-Tranfusion Division (800) 283-7866
- \* **Blood pressure cuff, tubing:**
  - \* TRIMLINE medical products (800) 526-3538
  - \* Cleen Cuff by VITAL SIGNS (800) 932-0760
  - \* Dinamap by Critikon (813) 887-2000
  - \* Use over clothing, cover w/ webril or stockinette
- \* **Bulb syringes:**
  - \* PVC Bard (800) 526-4455
  - \* Medline (800) MEDLINE
  - \* Davol (800) 526-4455
- \* **Catheters, leg bags, drainage systems:**
  - \* Velcro
  - \* Nylon straps
  - \* PVC:
  - \* Mentor (800) 235-5731
  - \* Davol (800) 526-4455
- \* **Catheters, rectal pressure:**
  - \* Lifetech (800) 345-6443
  - \* Cook (800) 457-4448
- **Catheters: Embolectomy, Biliary Embolectomy and Irrigation, Occlusion and Thermodilution, Balloon, Venous**
  - \* American BioMed/Cathlab Division (800) 894-4418
  - \* World Medical Manufacturing Corp. (954) 846-0418
  - \* Walrus (800) 886-6741
- \* **Catheters, condom:**
  - \* Silicone:
  - \* Coloplast (800) 726-6362
  - \* Clear Advantage mentor (800) 235-5731
  - \* ConvaTec (800) 422-8811
  - \* Rochester Medical (800) 299-3266
- \* **Catheters, indwelling urinary:**
  - \* Silicone:
  - \* Kendall (800) 962-9888
  - \* Bard (800) 225-0927
  - \* Rusch
  - \* Rochester Medical (800) 299-3266
  - \* Mentor (800) 235-5731
  - \* Cook (800) 456-4448
- \* **Catheters, urodynamics:**
  - \* Double, triple lumen for urodynamics, Bard (800) 225-0927
  - \* Silicone feeding tubes, Mentor (800) 235-5731
  - \* Cook Urological (800) 593-2080
  - \* Lifetech (713) 495-9411
  - \* Catheters, straight:
  - \* Mentor (800) 235-5731
  - \* Coloplast (800) 237-4555
  - \* RobNel Sherwood (800) 325-7472
  - \* Bard (800) 225-0927
- \* **Dressings: Moleskin, Dyna-flex (J&J)**
  - \* Tetra Medical Supply (800) 621-4041

- \* Reston foam liner (3M)
- \* Andover Coated Products (800) 432-6686
- \* Cetra (888) LATEX-NO
- \* Webril Kendall (508) 261-8000
- \* Comfeel, Venigard, Opsite, Coloplast (800) 237-4555
- \* Action Wrap, Coban (3M)
- \* Xerofoam Sherwood (800) 325-7472
- \* BDF Elastoplast
- \* **Note:** Steri-Strips, Active Strips, Comfort Strips, flexible fabric adhesive band, Tegaderm, Tegisorb (3M) (800) 3M-HELPS; Curad Bandage (508) 261-8000 **contain latex** in outer package
- \* **Elastic bandages: ace wraps, Esmarch, Elastikon (J&J)**
  - \* Tetra Medical Supply (800) 621-4041
  - \* Esmark Deroyal (800) 251-9864
  - \* CoNco all cotton white elastic bandage
  - \* Adban adhesive compression bandage
  - \* X-Mark Avcor (800) 282-6748
  - \* Cover skin with cotton barrier
- \* **Electrode pads, grounding:**
  - \* Valleylab (800) 255-8522
  - \* 3M Red Dot electrodes #2330, 2269T, 2237, 2259, 2263, 2265, 2270, 9640 (with expiration dates 1999 or later) (800)228-3957
  - \* Conmed (315) 797-8375
  - \* Dantec EKG & EMG (800) 835-9873
- \* **Endotracheal Tubes, airways:**
  - \* Mallinckrodt (800) 262-3654
  - \* Polemedco Airways (310) 577-1422
  - \* Shiley, Berman (617) 737-7855
  - \* Kendall (508) 261-8000
- \* **Enema, ready to use:**
  - \* Glycerin, Babylix Fleet, Latex Free Fleet (804) 528-4000
  - \* Theravac, Bowel Management Tube (MIC), cone irrigation set, ConvaTec (800) 422-8811
  - \* silicone retention cuff tip (Lafayette)
  - \* Fleet Bag Emena Vinyl
- \* **Gloves: sterile, exam:**
  - \* Vinyl, neoprene, polymers nitril Allerderm (800) 365-6868
  - \* Nitril SafeSkin (800) 462-9989
  - \* Neolon, Sensicare, Tru-touch Maxxim (800) 727-7340
  - \* Tactyl 1,2 SmartPractice (800) 822-8956
  - \* Dermaprene Ansell (800) 927-8659
  - \* Allergard J&J (800) 526-3967
  - \* Duraprene Triflex Baxter, Neotech Regent (800) 843-8497
  - \* N-DEX Best (800) 241-0323
  - \* American Health & Safety (800) 522-7554
- \* **IV access tubin injection ports (Y-sites, bags buretrol ports, PRN adapters in needleless systems**
  - \* Cover Y-sizes
  - \* use stop cock for meds
  - \* do not puncture
  - \* flush all tubing before use
  - \* Use polymer injection caps
  - \* Walrus Gemini Imed (800) 854-2033
  - \* Angio-caths:
    - \* Insyte cathlons Becton Dickenson (888) 237-2762
    - \* SAFESITE B. Braun Medical Products (800) 258-9000
    - \* SmartSite IVAC Medical Systems (800) 482-IVAC
- \* **Medication: vial stoppers**
  - \* Remove latex stopper,
  - \* Eli-Lilly (800) LILLY-RX

- \* Fujisawa (800) 888-7704 has some MMR, (Merck)
- \* For Insulin: Advantaget (800) 991-4464
- \* **OR masks, hats, shoe covers:**
- \* American Health & Safety (800) 522-7554
- \* Kimberly-Clark (800) 524-3577
- \* TecnoI (800) 826-5763
- \* Sultan (800) 637-8582
- \* Biotrol (800) 822-8550
- \* **Oxygen masks, cannulas:**
- \* Remove elastic bands
- \* check valve content
- \* Cetra (888) LATEX-NO
- \* Alternative Resources Catalog (880) 618-3129
- \* **Peak Flow Meters:**
- \* Monaghan Medical (800) 833-9653
- \* Ferris Medical (419) 535-7490
- \* ENACT Health Management Systems (415) 967-0379
- \* HealthScan (800) 902-1266
- \* **Penrose drain:**
- \* (PVC) Zimmer Hemovac
- \* (silicone) Jackson Pratt
- \* **Protective sheets: (rubber)**
- \* Disposable Kimberly-Clark (800) 524-3577
- \* **Pulse Oximeters:**
- \* Adult clip sensor by Nellcor (800) NELLCOR
- \* cover digit with Tegaderm or Opsite
- \* **Respirators:**
- \* Advantage MSA
- \* Hepa-tech (Uvex)
- \* PFR 95 TecnoI (800) 832-6651
- \* **Resuscitation Equipment: CPR "Annie's"**
- \* Breath of Life Pacific Dental Rim (800) 298-9074
- \* CPR manikins LaerdI (800) 431-1055
- \* Mouth to Mask by Vital Signs (800) 932-0760
- \* **Rubber reflex hammer**
- \* Cover with baggie
- \* **Spacer: (for MDI inhalers)**
- \* ACE spacer Center Laboratories (800) 223-6837
- \* Opti Haler, HealthScan (800) 902-1266
- \* **Stethoscope tubing:**
- \* Cover w/ stockinette
- \* ScopeCoat (800) 373-0747
- \* Littman 3M (800) 3M-HELPS
- \* **Suction tubing:**
- \* PVC Mallinckrodt (800) 955-9525
- \* Ballard (800) 345-1595
- \* Laerdal (800) 431-1055
- \* Medline (800) MEDLINE
- \* Kendall
- \* **Surgical gowns, boots, drapes:**
- \* Kimberly-Clark (800) 524-3577
- \* DeRoyal (800) 251-9864
- \* **Syringes, disposable, auto injectable:**
- \* Norm-Ject Air-Tite (800) 231-7762
- \* Terumo syringes (800) 231-7762
- \* Epi-Pen by Center Labs (800) 223-6837
- \* Abbotject
- \* glass syringes
- \* or prepare medication in syringe right before use
- \* **Tape adhesive:**

- \* Microfoam, Micropore, Durapore, Transpore 3M (800) 3M-HELPS
- \* Dermicel, Waterproof J&J (800) 526-3967
- \* Mastisol Ferndale Laboratories (800) 621-6003
- \* Andover Coated Products (800) 432-6686
- \* **Tourniquet:**
  - \* Cover with cloth
  - \* X-Tourn straps by Avcor (800) 282-6748
  - \* Children's Med Ventures (800) 377-3449
  - \* Velcro Pedic, Grafco, DeRoyal (800) 251-9864

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**Note:** This list is a guideline for informational purposes only. It is very difficult to obtain full and accurate information on the latex content of products which may vary between companies and product series. A.L.E.R.T., Inc. disclaims any legal responsibility associated with the use of any products on this list. All individuals and professionals must obtain written verification of non-latex status from the product supplier before use with latex allergic individuals. Many companies listed under alternatives also carry latex products. Please contact A.L.E.R.T., Inc. at (414) 677-9707 or 1-888-97ALERT to share information you obtain about products not listed

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American Latex Allergy Association  
Sue Lockwood 1-888-97-ALERT  
Executive Director FAX 1- 414-677-2808  
<http://www.execpc.com/~alert>

**Additional latex containing products:**

It is difficult to obtain full and accurate information on the latex content of products, which may vary between companies and product series

**Office Supplies**

Rubber bands  
Erasers

**School Supplies**

Erasers  
Glue  
Pencil grips  
Rubber bands  
Clay  
Paste  
Paint  
Crayons  
Markers  
Pens  
Rubber stamps

**Household Items**

Automobile tires	Diaphragms
Art supplies	Dishwashing gloves
Baby bottle nipples	Disposable diapers, rubber pants
Balloons	Electrical appliance cords
Breath Right Strips	Erasers
Chewing gum	Expandable fabric (waistbands)
Carpeting	Food storage bags
Condoms	

Gloves  
Glues  
Handles (rubberized)  
    kitchen utensils  
    tools  
    toothbrush  
Hot water bottle  
Motorcycle and bicycle  
handgrips and helmets  
Mouse pads  
Pacifiers  
Pantyhose  
Racquet handles  
Rubber bands  
Rubber button pads (phones,  
remote controls)

Shoe soles  
Sports equipment  
    balls  
    bungee cords  
    handles/grips  
    rafting equipment  
    various boats  
    swim cap goggles  
    scuba/snorkel  
    equipment  
Toys  
Underwear  
Upholstery padding  
Weather stripping

**Sample Protocols & Guidelines**

are available on line from [Latex Allergy Links](#) a comprehensive listing of latex allergy-related sites on the Internet.

By ELASTIC, the Education for Latex Allergy / Support Team and Information Coalition  
[http://www.netcom.com/~nam1/latex\\_allergy/prot.html](http://www.netcom.com/~nam1/latex_allergy/prot.html)

- \* [EMS Latex Precaution Protocol](#) Saint Joseph's Hospital Marshfield, WI  
Mar 11 1999
- \* [Providing a Latex Free Environment](#) C. Patricia Maness Hartford Hospital  
Hartford, CT
- \* [Latex Allergy Policy](#) University of North Carolina at Chapel Hill School  
of Dentistry Nov. 11 1998
- \* [Suggested Guidelines in the Development of a Latex-Safe Environment](#)  
Ansell Healthcare, Inc.
- \* [Latex Allergy Policies](#) Health Care Professional's Network
- \* [Latex Allergy Protocol](#) *Medical Wing Instruction 44-39* US Air Force  
Medical Service Jul. 03 1998
- \* [Proposed Recommended Standards of Practice for the Latex Protein  
Allergic Patient in the Operating Room Environment](#)  
courtesy of Pat Lawson, CST
- \* [Latex Allergy Patient Protocol](#) Policy and Procedure Exchange  
*submitted by Pat Davidson Sandpoint, Idaho*
- \* [Managing latex allergy in the cardiac surgical patient](#)  
by Mary-Michael Brown and Rebecca Hess  
*Critical Care Nursing Quarterly* May 31 1998
- \* [Guidelines for Employee Health Services in Health Care Facilities](#)  
American College of Occupational and Environmental Medicine  
APR 1998
- \* [Implementation recommendations for making health care facilities latex safe](#)  
by Kim et al *AORN Journal* Mar 1998
- \* [Latex Allergy Protocol](#)  
produced by Dr. M Dakin and Dr. S Yentis Chelsea & Westminster  
Hospital, London
- \* [Clinical Management: Latex Allergy / Sensitivity](#)  
Revised Intravenous Nursing Standards of Practice Oct. 14 1997
- \* [Guidelines for the management of latex allergies and safe use of latex  
in perioperative practice settings](#)  
by Anita J. Shoup, RN, MSN, CNOR  
*Clinical Issues AORN Journal* Oct. 1997
- \* [Guidelines for the Management of Latex Allergies and Safe Latex Use in  
Health Care Facilities](#)  
Gordan Sussman, MD and Milton Gold, MD Mar 1996
- \* [Latex Allergy Protocol](#)  
American Association of Nurse Anesthetists (AANA) Apr 1993
- \* [Perioperative Management of the Latex-Allergic Patient](#)  
courtesy of Gary Kantor, MD

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Revised on Sat Jul. 24 1999  
Latex Allergy Links

**RESOURCES**

The following organizations can be contacted for further information on latex sensitivity.

ACAAI [American College of Allergy, Asthma & Immunology](#)

85 West Algonquin Road, Suite 550  
Arlington Heights, IL 60005  
Phone: (847) 427-1200 FAX: (847) 427-1294  
[www.allergy.mcg.edu/physicians/latex.html](http://www.allergy.mcg.edu/physicians/latex.html)

AAD American College of Dermatology [www.aad.org](http://www.aad.org)

A.L.E.R.T. of Wisconsin -- (414) 677-9707  
(Allergy to Latex Education and Resource Team)  
A.L.E.R.T., Inc. at (888) 97 ALERT (972-5378)  
Contact A.L.E.R.T., Inc. at [alert@execpc.com](mailto:alert@execpc.com)  
FAX: (414) 677-2808

American Assoc. of Nurse Anesthetists -- (708) 692-7050  
222 South Prospect Avenue, Park Ridge, IL 60068-4001  
A sample letter to manufacturers requesting latex info. and resources  
regarding latex allergy are available in a Latex Packet from the Practice  
Dept.: ext. 305

The American Society of Anesthesiologists  
520 N. Northwest Highway  
Park Ridge, IL 60068-2573  
(847)825-5586 FAX: (847) 825-1692  
[www.asahq.org](http://www.asahq.org)

AnsellCares - Source to Surgery (414) 369-5838

Ansell Healthcare Division  
<http://www.ansell.com/america/usa/latex/cover.htm>

Ansell Perry Inc. --1-800-321-9752

Canadian Latex Allergy Association -- (905) 885-5270

Cleveland Clinic Foundation  
[Management of the Latex-Allergic Patient](http://gasnet.med.yale.edu/gta/latex/latxhome.html)  
<http://gasnet.med.yale.edu/gta/latex/latxhome.html>

Delaware Valley Latex Allergy Support Network  
PO Box 6010 Philadelphia, PA 19114  
(800) LATEX-NO  
e-mail: [smcgann@comcat.com](mailto:smcgann@comcat.com)  
web site: <http://www.latex.org>

E.L.A.S.T.I.C. Education for Latex Allergy Support Team and Information Coalition -  
(203) 482-6869  
Lise C. Borel DMD ELASTIC Inc. National Director  
PO Box 2228 West Chester, PA 19380  
610-436-4801 FAX: 610-436-1198  
[http://www.netcom.com/~nam1/latex\\_allergy.html](http://www.netcom.com/~nam1/latex_allergy.html)  
<http://www.netcom.com/~ecbdmd/elastic.html>

FDA Latex Allergy Hot Line -- 1-800-332-1088  
FDA's MedWatch Program, to report an allergic reaction related to a latex  
medical product.

**F.L.A.R.E.** - Foundation for Latex Allergy Research & Education  
5100 E. Anaheim Rd Long Beach CA 90815  
310- 597-4303 FAX: 310-494-0250  
[www.flare.org](http://www.flare.org)

Latex Allergy Help (905) 885-5270

<http://www.latexallergyhelp.com>

The Latex Allergy Information Resource (LAIR)  
<http://www.anesth.com/lair/lair.html>

Latex Allergy Information Service (LAIS)  
176 Roosevelt Avenue  
Torrington, Connecticut, USA 06790  
(860) 482-6869 FAX: (860) 482-7640  
e-mail: [76500.1452@compuserve.com](mailto:76500.1452@compuserve.com) or  
[debia@ix.netcom.com](mailto:debia@ix.netcom.com)

Latex Allergy News -- (203) 482-6869

Maureen Allen, RN, at Mercy's Employee Health Services, (515) 247-3083,  
Mercy Nurse at 2-HEALTH (243-2584)

Medical Devices Bureau Canada -- 1-800-267-9675

National Institute for Occupational Safety and Health (NIOSH)  
(800) 356-4674  
4676 Columbia Parkway, Cincinnati, OH 45226-1998;  
To receive a free copy of the Latex alert, call (800) 35-NIOSH  
ask for publication number 97-135  
Web site: <http://www.cdc.gov/niosh/homepage.htm>  
You may access the following latex allergy websites directly or by  
selecting *Latex Allergy* through the NIOSH Home Page:  
<http://mediswww.cwru.edu/dept/anesth/lair/lair.htm>  
[http://www.familyvillage.wisc.edu/lib\\_latx.htm](http://www.familyvillage.wisc.edu/lib_latx.htm)

**Nancy Mitchell's Latex Allergies Links**  
[http://www.netcom.com/~nam1/latex\\_allergy.html](http://www.netcom.com/~nam1/latex_allergy.html)

PALS Physicians Against Latex Sensitization  
[bzpmd@aol.com](mailto:bzpmd@aol.com) <http://www.pals.net>

Spina Bifida Association of America  
4590 MacArthur Blvd., NW Suite 250 Washington, DC 20007  
1-800-621-3141 FAX: 202-944-3295  
<http://www.sbaa.org/Latex.htm>

**US Department of Justice, Americans with Disabilities Act**  
ADA HOME PAGE Americans with Disabilities Act  
To obtain answers to general and technical questions about the  
ADA and to order technical assistance materials: 1-800-514-0301  
(voice) 1-800-514-0383 (TDD)

DEROYAL Industries, Inc. has developed a **Latex Safe "TracePack"**™. contains latex-safe supplies and equipment for several procedures.  
1-800-251-9864

**Tetra Medical Supply** has a catalog of Latex Free Products (800-621-4041)

**CETRA Latex-Free Supplies** (web site [www.latexfree.com](http://www.latexfree.com))  
(888)-LATEX NO (888)- 528-3966

**Certified Latex-Free Hospital Product Database**™  
Contains product numbers, product name/descriptions and case quantities of exclusively Latex-Free hospital products. 650-299-1232

RELIACARE EXPRESS has a catalog of latex free products (800) 556-3210

ALTERNATIVE RESOURCE CATALOG latex free products (800) 618-3129

**REFERENCES**

Allergy," Immunology & Allergy Clinics of North America: Latex Allergy. Vol 15, No 1, Feb. 1995.

American Academy of Allergy & Immunology. Task force of allergic reactions to latex. J. Allergy Clin Immunology 1993; 92:16-18.

American Association of Nurse Anesthetists. "Latex Allergy Protocol," J. of American Assoc of Nurse Anesthetists 1993; 16:223-4.

American Nurses Association. (1997). Position statements: Latex allergy. Washington, DC.

Arellano R, Bradley J, Sussman G. Presence of latex sensitisation among hospital physicians occupationally exposed to latex gloves. Anesthesiology 1992; 77:905-908.

Bauer X, Ammon J, Chen Z, Beckman U, Czuppon AB [1993]. Health risk in hospitals through airborne allergens for patients pre-sensitized to latex. Lancet 342:1148-1149.

Beezhold, D.H., et al, "The transfer of protein allergens from latex gloves. A study of influencing factors," AORN Journal 1994; 59:605-613.

Beezhold, D.H., et al, "Surgical Glove Powders Bind Latex Antigens," Archives of Surgery November 1992, Volume 127, pp. 1354-1357.

Beezhold, D.H., "Latex Allergy", Biomedical Instrumentation & Technology, May/June 1992, pp. 23240.

Beezhold DH, Sussman GL. "Determining the Allergenic Potential of Latex Gloves." Surgical Services Management, Vol 3, No 2, Feb. 97, p 35-41.

Beezhold D [1992]. LEAP: Latex ELISA for antigenic protein. Guthrie J 61:77-81.

Beezhold D, Pugh B, Liss G, Sussman G. [1996a] Correlation of protein levels with skin prick test reactions in patients allergic to latex. J Allergy and Clin Immunol 98 (6):1097-102.

Beezhold DH, Sussman GL, Liss GM, Chang NS [1996b]. Latex allergy can induce clinical reactions to specific foods. Clin Exp Allergy 26:416-422.

Beuers U, Baur X, Schraudolph M, et al. Anaphylactic shock after game of squash in atopic woman with latex allergy. Lancet 1990; 335:1095.

Blanco C, Carrillo T, Castillo R, Quiralte J, Cuevas M [1994]. Latex allergy: clinical features and cross-reactivity with fruits. Ann Allergy 73:309-314.

Binkley K, Cheema A, Sussman G, et al. Generalised allergic reactions during anesthesia. J Allerg Clin Immunol 1992; 89:768-774.

Briefings on Hospital Safety. The Newsletter for Hospital Safety Committees, "Latex in hospitals: The Solution," Vol 4, Number 3, May 1996.

Briefings on Hospital Safety. The Newsletter for Hospital Safety Committees, "Special Report. Managing latex in the hospital environment." May 1996.

Burt, S. (1998). "What you need to know about latex allergy." *Nursing* 98, 28(10).

Centers for Disease Control "Recommendations for Prevention of HIV Transmission in Health-Care Settings." MMWR 36 (Suppl25): 25-185, 1987.

- CDC (Centers for Disease Control and Prevention) [1989]. Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. *MMWR* 38(S-6):1-37.
- Dillard SF, MacCollum MA. Reports to FDA: "Allergic reactions to latex containing medical devices." International Latex Conference: Sensitivity to Latex in Medical Devices. Nov 1992.
- Downing JG, "Dermatitis from Rubber Gloves," *N Engl J Med*, 1993, 208, p 196-198.
- Feczko, P., Simms, S., Bakirci, N.. (1989). Fatal hypersensitivity reaction during a barium enema. *American Journal of Roentgenology*. 153, 275-276.
- Fink, J. N., *Immunology and Allergy Clinics of North America*. "Latex Allergy." Vol. 15, Number 1, Feb.1995.
- Food & Drug Administration: "Allergic reactions to latex-containing medical devices." FDA Medical Alert, March 1991, MDA 91-1.
- Gehring, L. and Kelly, K.J., "Latex Precautions in the Operating Theater," *Source to Surgery*, February 1994, Vol. 2, Issue I.
- Gelfand, D. (1991). Commentary: Barium enemas, latex balloons, and anaphylactic reactions. *American Journal of Roentgenology*. 156, 1-2.
- Gelfand, D., Sowers, J. DePonte, K, Summer, T., Ott, D. (1985). Anaphylactic and allergic reactions during double contrast studies: is glucagon or barium suspension the allergen?. *American Journal of Roentgenology*. 144, 405-406.
- Gerber AC, Jorg W, Zbinden S, et al. Severe intra-operative anaphylaxis to surgical gloves: latex allergy, an unfamiliar condition. *Anesthesiology* 1989; 71:800-2.
- Gold M, Swartz JS, Braude BM, et al. Intraoperative anaphylaxis: an association with latex sensitivity. *J Allerg Clin Immunol* 1991; 87:662-6.
- Goldstein, A. (1998, May 9) Allergies lead to wave of lawsuits against latex glove manufacturers. *The Washington Post*, A12.
- Green v. Smith & Nephew AHP Inc., Wis. Cir. Ct., No. 94-CV-4199 (1994).  
Grandy Lynell ,and Slater Jay: "The History and Diagnosis of Latex Allergy."
- Heilman DK, Jones RT, Swanson MC, Yunginger JW [1996]. A prospective, controlled study showing that rubber gloves are the major contributor to latex aeroallergen levels in the operating room. *J Allergy Clin Immunol* 98(2):325-330.
- Hirshman CA. Latex anaphylaxis. [Editorial] *Anesthesiology* 1992;77:223-5
- Holzman RS. Latex allergy: an emerging operating room problem. *Anesth Analg* 1993; 76: 635-41
- Hunt LW, Fransway AF, Reed CE, Miller LK, Jones RT, Swanson MC, et al. [1995]. An epidemic of occupational allergy to latex involving health care workers. *JOEM* 37(10):1204-1209.
- Hunt LW, Boone-Orke JL, Fransway AF, Fremstad CE, Jones RT, Swanson MC, et al. [1996]. A medical-center-wide, multidisciplinary approach to the problem of natural rubber latex allergy. *JOEM* 38(8):765-770. *Immunology & Allergy Clinics of North America: Latex Allergy* Vol. 15, No.1, Feb.95.
- International Rubber Study Group: *Rubber Statistical Bulletin*, 48: No 12, 1994.
- Javors, B., Applbaum, Y. Gerard, P. (1984). Severe allergic reaction: an unusual complication of barium enema. *Gastrointestinal Radiology*. 9, 357-358.
- Katellaris CH, Widmer RP, Lazarus RM [1996]. Prevalence of latex allergy in a dental school. *Med J Australia* 164:711-714.

Kelly K, "Latex Sensitivity in the Operating Theatre," Source to Surgery. October 1993, Vol I, Issue III.

Kelly, Kevin: "Management of the Latex-Allergic Patient." Immunology & Allergy Clinics of North America: Latex Allergy Vol. 15, No.1, Feb.95.

Kelly, Kevin: "Stop the Sensitization" Source to Surgery Newsletter Vol. 3, No. 1, Feb. 95.

Kelly KJ, Kurup VP, Reijula KE, et al. The diagnosis of natural rubber latex allergy. J Allerg Clin Immunol 1994; 93:813-6.

Kelly K, Sitlock M, Davis JP: Anaphylactic reactions during general anesthesia among pediatric patients-United States, January 1990-January 1991. *MMWR* 1991;40:437-443.

Kelly KJ, Sussman G, Fink JN [1996]. Stop the sensitization. J Allergy Clin Immunol 98(5): 857-858.

Kelly KJ, Walsh-Kelly CM. Latex allergy: a patient and health care system emergency. Ann Emerg Med 1998 Dec;32(6):723-9

Koriewicz, Denise: "Barrier Protection of Latex." Immunology & Allergy Clinics of North America: Latex Allergy Vol. 15, No.1, Feb.95.

Kurup P, Murali PS, and Kelly K "Latex Antigens." Immunology & Allergy Clinics of North America: Latex Allergy Vol. 15, No.1, Feb.95.

Levy DA, Charpin D, Pons A, et.al: "Allergy to Latex."Allergy 47:579-589, 1992.

**Latex Glove Cases, Case #JCCP-4003**, Superior Court San Diego.

Liss GM, Sussman GL, Deal K, Brown S, Cividino M, Siu S, et al. [1997]. Latex allergy: epidemiological study of hospital workers. *Occup Environ Med* 54:335-342.

Marchione, M. (1998, Feb. 26). Health worker receives \$1 million in latex case: Verdict likely to affect medical glove lawsuits nationwide, lawyers say. *Milwaukee Journal Sentinel*, p 1.

Martin, B., Lux, G. (1984). Systemic reactions with barium contrast procedures. *Journal of Allergy and Clinical Immunology*. 73, 138.

**Multi-District Litigation No. 1148**, U.S. District Court, E.D. of Pennsylvania.

Nemeth, D. (1997). Workers' compensation and latex allergy: Dos and don'ts. *J. Emerg. Nurse.*, 23(2), 165.

Nutter AF. Contact urticaria to rubber. *Br J Dermatol* 1979; 101:597-8.

Orfan NA, Reed R, Dykewicz MS, Ganz M, Kolski GB [1994]. Occupational asthma in a latex doll manufacturing plant. *J Allergy Clin Immunol* 94(5):826-830.

Ownby DR, Ownby HE, McCullough J, Shafer, AW [1996]. The prevalence of anti-latex IgE antibodies in 1000 volunteer blood donors. *J Allergy Clin Immunol* 97(6):1188-1192.

Ownby, D., Tomlanovich, M., Sammons, N., McCullough, J. (1991). Anaphylaxis associated with latex allergy during barium enema examinations. *American Journal of Roentgenology*. 156, 903-908.

Rosen A, Isaacson D, Brady M, Corey JP [1993]. Hypersensitivity to latex in health care workers: report of five cases. *Otolaryngol Head Neck Surg* 109(4):731-734.

Rimarenko, S., Finkel, L. Taff, M., et al. (1988). Fatal complications related to diagnostic barium enema. *American Journal of Forensic Medicine and Pathology*. 9, 78-84.

Schwartz, E., Glick, S., Foggs, M., Silverstein, G. (1984). Hypersensitivity reactions after barium enema examination. *American Journal of Roentgenology*. 143, 103-104.

- Schwartz HA, Zurowski D. Anaphylaxis to latex in intravenous fluids. *J Allerg Clin Immunol* 1993; 92:358-9
- Seaton A, Cherrie B, Turnbull J [1988]. Rubber glove asthma. *Br Med J* 296:531-532.
- Setlock MA, Cotter TP, Rosner D. Latex allergy: failure of prophylaxis to prevent severe reaction. *Anesth Analg* 1993; 76:650-2.
- Shampaine EL. International latex conference: sensitivity to latex in medical devices. *Anesthesiology* 1993; 79:207-8
- Slater JE. Latex Allergy. *J Allergy Clin Immunol* 1994; 94:139-49.
- Slater, J. (1989). Rubber anaphylaxis. *New England Journal of Medicine*. 320, 1126-1130.
- Sondeimer, J, Pearlman, D, Bailey, W. (1989). Systemic anaphylaxis during rectal manometry with a latex balloon. *American Journal of Gastroenterology*. 84, 975-977.
- Spaner, D., Dolovich, J, Tarlo, S., Sussman, G., Buttoo, K. (1989). Hypersensitivity to natural latex. *Clinical Immunology*. 83, 1135-1137.
- Sussman GL, Beezhold DH [1995]. Allergy to latex rubber. *Ann Intern Med* 122: 43-46.
- Sussman GL, Beezhold DH, "Latex Allergy," *A Clinical Perspective, Surgical Services Mgmt, Vol 3, No 2, Feb 97, p 25-28.*
- Sussman G, Gold M, "Guidelines for the Management of Latex Allergies and Safe Latex Use in Healthcare Facilities," *Canadian Healthcare Association, Ottawa, 1996.*
- Sussman GL, Tarlo S, Dolovich J. The spectrum of IgE-mediated responses to latex. *JAMA* 1991; 265:2844-7.
- Swanson MC, Bubak ME, Hunt LW, Yunginger JW, Warner MA, Reed CE [1994]. Quantification of occupational latex aeroallergens in a medical center. *J Allergy Clin Immunol* 94(3): 445-551.
- Swanson, M.C. and Yunginger J., "Clinical Aspects of Allergic Disease. Quantification of Occupational Latex Aeroallergens in a Medical Center," *J. Allergy Clin. Immunology*. 1994, Volume 94, pp. 445-451.
- Tarlo SM, Wong L, Roos J, Booth N [1990]. Occupational asthma caused by latex in a surgical glove manufacturing plant. *J Allergy Clin Immunol* 85(3):626-631.
- Tarlo SM, Sussman G, Contala A, Swanson MC [1994]. Control of airborne latex by use of powder-free latex gloves. *J Allergy Clin Immunol* 93: 985-989.
- Task Force on Allergic Reactions to Latex, American Academy of Allergy and Immunology, "Committee Report," *Journal of Allergy & Immunology*, 1992 (July 93), 16-18.
- Taylor, J., Cassettari, J., Wagner, W., Helm, T.. (1989). Contact urticaria and anaphylaxis to latex. *Journal of the American Academy of Dermatology*. 21, 874-877.
- Tosi LL, Slater JE, Shaer C, et al. Latex allergy in spina bifida patients: prevalence and surgical implications. *J Pediatr Orthop* 1993; 13:709-12.
- Truscott W [1995]. Abstracts: new proposals for the increased incidences of immediate type hypersensitivity to latex. *J Allergy Clin Immunol* 95(1, Part 2):252.
- Turjanmaa, Kristiina, "Clinical Manifestations: A Review," *Source to Surgery, Vol 3, Issue 5, 1995.*
- Turjanmaa K, et al, "Natural Rubber Latex Allergy," *Allergy*, 1996:51:593-602.
- Turjanmaa, K. (1987). Incidence of immediate allergy to latex gloves in hospital personnel. *Contact Dermatitis*. 17, 270-275.

U.S. Equal Employment Opportunity Commission v. Friendly Hills Regional Medical Center, No. 97-CV-3139, C.D. Cal., W. Div. (1997).

van der Walle HB, Brunsveld VM [1995]. Latex allergy among hairdressers. *Contact Dermatitis* 32:177-178.

Vandenplas O, Delwiche JP, Evrared G, Aimont P, Van Der Brempt S, Jamart J, Delaunois L [1995]. Prevalence of occupational asthma due to latex among hospital personnel. *Am J Respir Crit Care Med* 151:54-60.

Venables K, Chan-Yeung M [1997]. Occupational asthma. *The Lancet* 349:1465-1469.

Yunginger JW, Jones RT, Frasway AF, Kelso JM, Warner MA, Hunt LW [1994]. Extractable latex allergens and proteins in disposable medical gloves and other rubber products. *J Allergy Clin Immunol* 93(5):836-842.

Yip E, et al: "Allergic Response and Levels of Extractable Protein in Natural Rubber Latex Gloves and Dry Rubber Products," *J. Natural Rubber Research*, 9(2), 79-86.

Young M.A., Myers M., McCulloch L.D., Brown L.J., "Latex Allergy: A guide for peri-operative nurses," *AORN Journal*, 1992; 56:488-502