

**Low-Protein, Low-Powder or Powder-Free Natural Rubber Latex Gloves  
Reduce Latex Protein Allergy and Allow Sensitive Individuals  
To Work with Colleagues Wearing Latex, Hospital Studies Show**

Changing to low-protein and/or low-powder or powder-free natural rubber latex (NRL) gloves caused significant reductions in the incidence of latex protein sensitivity among hospital workers, three academic studies show. Two of the three studies show that sensitive individuals wearing synthetic gloves can work side by side with colleagues wearing latex gloves and suffer no ill effects.

Studies I and II were presented at the 56<sup>th</sup> annual meeting of the American Academy of Asthma, Allergy and Immunology in 2000. Study III was published in the *Journal of Allergy and Clinical Immunology* in November 1998.

- § Study I, undertaken at a teaching hospital in Toronto, Canada, found that switching to low-protein, low-powder NRL gloves dramatically decreased the incidence of latex protein allergy.
- § Study II, conducted at a university hospital in Munich, Germany, found that replacing powdered with powder-free NRL gloves significantly reduced latex protein sensitivity in a substantial number of workers.
- § Study III, conducted at a different hospital in Munich, Germany, found that replacing powdered with powder-free NRL gloves reduced airborne NRL allergen loads below detectable levels and permitted sensitized or allergic personnel to remain on the job.

**Study I:**  
**"Outcomes of a Natural Rubber Latex Control Program in an Ontario Teaching Hospital"**

Switching to low-protein, low-powder NRL gloves dramatically decreased the incidence of latex protein allergy at a Toronto, Canada, teaching hospital:

- § Two of three nurses who had stopped work due to latex protein allergy were able to return to work alongside co-workers wearing low-protein, low-powder NRL gloves.
- § The hospital was able to reduce expenses related to missed work days and workers' compensation claims, without incurring additional costs for gloves.

***The Details***

In 1994, 45 hospital employees were diagnosed with latex protein allergy – up from only one each in 1988 and 1989.

By 1995, three nurses had stopped work due to latex protein allergy, and the Ontario Workers' Compensation Board had accepted five claims for occupational asthma due to latex protein allergy.

In 1995, non-sterile NRL gloves were replaced with low-protein, low-powder non-sterile NRL gloves. In 1997, sterile NRL gloves were replaced with low-protein, low-powder sterile NRL gloves.

After 1995, two of the three nurses who had stopped work due to latex protein allergy were able to return to work alongside co-workers who were wearing low-protein, low-powder NRL gloves. The nurses themselves continued to avoid personal contact with NRL by wearing synthetic gloves.

After 1995, no further claims for occupational asthma due to latex protein allergy were accepted by the Ontario Workers' Compensation Board.

In 1997, only three employees were diagnosed with latex protein allergy, and only one additional employee was diagnosed between then and the end of the study in May 1999.

## **Study II:**

### **“Parameters of Natural Rubber Latex Sensitization Decrease in Health Care Workers (HCW) Following Reduction of NRL Exposure”**

Replacing powdered NRL gloves, known to have high protein content, with low protein powder-free NRL gloves significantly reduced latex protein sensitivity in a substantial number of workers in a university hospital in Munich, Germany.

#### ***The Details***

Of 81 health care workers with diagnosed NRL sensitivity (NRLS) or NRL allergy (NRLA):

- § 61 (75.3%) had positive skin prick test (SPT) reactions using various NRL test solutions;
- § 57 (70.4%) had latex-specific IgE antibodies in their serum, as determined by CAP-  
FEIA; and
- § 31 (38.3%) were found to have NRLA by medical history and/or challenge tests.

Follow-up investigations performed after  $13.9 \pm 3.6$  months – during which powdered NRL gloves has been gradually replaced by powder-free NRL gloves for all employees and the 81 latex-sensitive workers had avoided intense NRL contact – yielded these improvements:

- § Of the 61 workers previously positive by SPT, 8 (13%) had no SPT reactions;
- § Of the 57 that previously had latex-specific IgE antibodies in their serum, 13 (22%) had no such antibodies. For the others, the antibodies had declined by at least one class in 19 (33%), had risen in one (< 2%), and remained the same in 24 (42%);
- § Of the 31 workers previously found to have NRLA, the allergy had completely disappeared in one (3%);
- § None of the workers originally diagnosed with NRLS had developed NRLA; and
- § The 20 workers without positive initial SPT reactions and the 24 without initial latex-specific IgE antibodies remained non-reactive to those tests.

### **Study III:**

#### **“Reduction of latex aeroallergens and latex-specific IgE antibodies in sensitized workers after removal of powdered natural rubber latex gloves in a hospital”**

Replacing powdered NRL gloves with powder-free NRL gloves reduced airborne NRL allergen loads below detectable levels and permitted sensitized or allergic personnel to remain on the job in a hospital in Munich, Germany.

#### *The Details*

Powdered NRL gloves of high protein content, were replaced with low-protein powder-free NRL gloves in five areas of the hospital: pediatrics ward, general surgery, orthopedics operating room, surgical clinic and adult intensive care unit. Powdered NRL gloves continued to be used on one floor of a surgical ward, which served as a control area; non-latex gloves were used in the pediatrics intensive care unit.

- § Switching from powdered to powder-free NRL gloves reduced atmospheric loads of NRL antigen to nondetectable levels. Nondetectable levels were achieved almost immediately in the areas where the switch to powder-free gloves was made; they eventually were also achieved in the control area, where powdered NRL gloves continued to be used.
  - Within 24 hours after switching from powdered to powder-free NRL gloves, atmospheric loads of NRL allergens in the rooms where the switch was made decreased from between 1.73 ng/m<sup>3</sup> and 49.93 ng/m<sup>3</sup> to no detectable level.
  - Even in the control area, where powdered NRL gloves continued to be used, the atmospheric load of NRL allergens decreased from initial levels of between 4.25 ng/ m<sup>3</sup> and 10.58 ng/ m<sup>3</sup> to only 0.61 ng/m<sup>3</sup> after 6 months and no detectable level after 12 months.

- § Seven of the 90 participating health care workers were found at the outset to be latex-sensitive; that is, they responded positively to a skin prick test, exhibited NRL-specific IgE antibodies, and reported glove-related reactions ranging from urticaria to asthmatic symptoms. They wore synthetic, non-NRL gloves throughout the study.
- Two of the seven latex-sensitive workers initially required antihistamines or inhalers at work. After the switch, both workers' symptoms disappeared and their medication could be terminated.
  - Six of the seven latex-sensitive health care workers initially had latex-specific IgE antibody concentrations  $\geq 1$ kU/L. Within one year after the switch, concentrations were reduced by 50 percent in five of the workers and by 25 percent in the sixth.
  - No new cases of sensitization could be detected in the other participants.

#### Sources

*“Outcomes of a Natural Rubber Latex (NRL) Control Program in an Ontario Teaching Hospital.” S.M. Tarlo, A. Easty, K. Dubanks, F. Min, and G. Liss, University Health Network and Department of Medicine and Public Health Sciences, University of Toronto. Presented at the 56<sup>th</sup> annual meeting of the American Academy of Asthma, Allergy and Immunology (AAAAI) in 2000.*

*“Parameters of Natural Rubber Latex (NRL) Sensitization Decrease in Health Care Workers (HCW) Following Reduction of NRL Exposure.” F. Rueff, P. Schopf, and B. Przybilla, Klinik und Poliklinik für Dermatologie und Allergologie, Ludwig-Maximilians-Universität, Munich, Germany. Presented at the 56<sup>th</sup> annual meeting of the American Academy of Asthma, Allergy and Immunology (AAAAI) in 2000.*

*“Reduction of latex aeroallergens and latex-specific IgE antibodies in sensitized workers after removal of powdered natural rubber latex gloves in a hospital.” Henning Allmers, Randolph Brehler, Zhipping Chen, Monika Raulf-Heimsoth, Hubert Fels, and Xaver Baur. J. Allergy Clin. Immunol. 1998; 102:841-846.*