

The Effect of a Transition to Powder-Free Latex Gloves on Workers' Compensation Claims for Latex-Related Illness

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Background: Adverse reactions to natural rubber latex gloves are an important cause of workers' compensation claims among health care personnel. In an effort to reduce latex-related illness, our institution transitioned to powder-free latex gloves in 2001.

Objective: To examine the effect of this transition on the number of workers' compensation claims for latex-related illness.

Methods: A review of claims data from 1997 to 2005 was conducted.

Results: The incidence of claims for latex-related illness was significantly lower following the switch to powder-free gloves.

Conclusions: The switch to powder-free latex gloves was associated with a significant decrease in workers' compensation claims for latex-related illness. The cost of gloves increased but was partially offset by a decrease in workers' compensation payments and operating room expenses.

NATURAL RUBBER LATEX GLOVES are produced from the fluid of the *Hevea brasiliensis* tree and a variety of compounding chemicals.^{1,2} Latex gloves are widely used by health care workers because of their desirable features of comfort, elasticity, flexibility, and barrier function against potentially infectious materials.³⁻⁵

Complications of latex glove use include irritant and allergic contact dermatitis as well as immediate (type I) hypersensitivity reactions such as contact urticaria, rhinitis, conjunctivitis, asthma, and anaphylaxis.⁶

Cornstarch powder has traditionally been added to the inner surface of latex gloves to increase the ease of donning; however, this powder has been shown to bind latex proteins,⁷ and powdered gloves generally have higher extractable allergen levels than do powder-free gloves.⁸ Some studies suggest that health care workers who use powdered gloves have a higher frequency of positive test results for latex sensitization compared with those who use powder-free gloves^{9,10}; however, one prospective study found no difference in the incidence of sensitization to latex over 1 year between users of powdered gloves and users of powder-free gloves.¹¹ In addition to directly contacting the hands of the wearer, glove powder may be dispersed into the air, and the concentration of aerosolized

latex allergen is higher in areas where powdered gloves are used,^{11,12} potentially leading to exposure of other individuals in the surrounding area. Finally, in addition to its role in allergic reactions, powder can be a skin irritant.¹³

At several international health care institutions, a transition from high-protein powdered latex gloves to low-protein powder-free latex gloves has been associated with a decrease in the prevalence of latex sensitization as well as of glove-related urticaria, pruritus,¹⁴ hand eczema,¹⁵ and occupational asthma.¹⁶ In some instances, such transitions have been made with a minimal increase in glove cost, owing to the consolidation of glove purchases.¹⁷

Our health care system, which employs approximately 11,000 workers at its hospitals and clinics, experienced an increasing number of workers' compensation claims for latex-related illness from 1997 to 2001. We report the claims-related outcomes of an intervention implemented in October 2001 to eliminate powdered latex gloves.

Methods

We performed a chart review of occupational latex-related illness claims among employees of our institution from 1997 to 2005. Employees at risk were considered to be those with any work-related exposure to latex gloves, estimated as 52% of the work force, which equated with 3,999 to 5,700 employees per year during the time frame studied. The yearly claim incidence was then calculated as the number of new claims divided by the number of persons in the population at risk. Records of payments to

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claimants were also reviewed, as well as data on the cost of gloves before and after the intervention.

Results

During the study period of 1997 to 2005, a total of 80 latex-related workers' compensation claims were identified. The number of claims increased steadily from 1998 to 2001 and then declined. The average yearly incidence of claims was 3.16 times higher before the transition to powder-free gloves than after the transition (95% CI, 1.87–5.34; $p = .001$) (Table 1). Among 40 patients for whom the data were available, the primary reason for filing a claim was dermatitis for 26 (65%) of the patients and respiratory symptoms for 14 (35%). This distribution did not appreciably change after the intervention.

The total yearly cost of latex-related claims declined after the change to powder-free gloves (see Table 1). The median cost per claim was not significantly different before or after the intervention. (Preintervention median cost was \$119 [US] with a range of \$0–\$68,936 [US]; postintervention median cost was \$181 [US] with a range of \$0–\$1,892 [US] [$p = .30$, Wilcoxon rank sum test, individual data not shown].)

Changing to powder-free gloves resulted in an increase in the cost of a box of 50 nonsterile examination gloves from \$3.07 to \$4.18 (US), a 36% increase. For sterile gloves, the cost per box of 40 gloves increased from \$11.70 to \$26.78 (US), a 128% increase.

Discussion

Our results showed a decrease in the number of workers' compensation claims for latex-related illness following the institution's transition to powder-free gloves. This effect may be due to decreased cutaneous and mucosal exposure of employees to latex allergens. It is also noteworthy that a latex education campaign was implemented in 1999 to increase awareness of latex-related illness among the employees. It is possible that some employees with long-standing symptoms first recognized the relationship to latex at that time, leading to a disproportionate increase in claims in 2000 to 2001. Following this, it is conceivable that some relative decline in claims would have occurred even with no intervention; however, the postintervention decrease in claims to levels lower than those prior to the educational program argues in favor of a true intervention effect. Both the increase in reported cases of latex allergy in association with educational programs and the decline following the transition to powder-free gloves are similar to those reported at a Canadian teaching hospital.¹⁷

A limitation of our study is that we could not determine the true prevalence or incidence of latex-related illness during the years of our study, and the incidence of claims was used as a surrogate. There were undoubtedly some employees who suffered from latex-related symptoms but did not file a claim. Also, during the years for which data were available (2001–2005), only approximately 75% of claimants were seen in the dermatology or allergy departments for further evaluation and confirma-

Table 1. Claims for Latex-Related Illness before and after Changing to Powder-Free Gloves

Year	No. of Claims	Estimated No. at Risk	Claim Incidence per 1,000 at Risk	Payments to Claimants (\$ US)
Before intervention				
1997	8	3,999	2.0	4,172
1998	8	4,118	1.94	36,530
1999	10	4,242	2.36	38,483
2000	14	4,369	3.2	4,026
2001	22	4,519	4.87	90,732
Total	62	21,247	2.92*	173,943
Mean	—	—	—	34,789
After intervention				
2002	7	4,422	1.58	4,816
2003	3	4,567	0.66	3,544
2004	4	4,815	0.83	1,236
2005	4	5,700	0.7	465
Total	18	19,504	0.92*	10,061
Mean	—	—	—	2,505

*The average yearly incidence was 3.16 times higher before the intervention (95% CI, 1.87–5.34; $p = .001$).

tion of diagnosis; the other claimants were not referred, or they declined referral. This finding resulted in a change in policy at our institution such that referral is now required for all latex-related claims.

One obstacle to institutional changes in glove purchasing is the cost of gloves. One institution reported a transition to powder-free gloves without significant increase in cost, owing to the consolidation of purchases.¹⁷ In our case, the switch to powder-free gloves resulted in an increase in glove expenditures of 36% for nonsterile examination gloves and 128% for sterile gloves even after consolidation of purchasing, for a total yearly cost increase of approximately \$130,000 (US). Notably, it was no longer necessary for glove powder to be washed off prior to surgical procedures, which resulted in an estimated yearly savings of \$57,000 (US) for sterile water, basins, and sponges. The mean yearly total claims payment for latex-related illness was \$34,789 (US) from 1997 to 2001; it decreased to \$2,505 (US) after the intervention, resulting in an average yearly savings of over \$30,000 (US). In addition to these direct savings, there was also likely a decrease in indirect costs such as the costs of missed work, reduced functionality, and task reassignment. The benefits that are related to decreased patient exposure to latex allergens are also worthy of consideration but are difficult to quantify.

Since the completion of this study in 2006, our institution has increasingly replaced powder-free latex gloves with nonlatex gloves. From January 2006 to March 2008, there was only one additional claim for latex-related illness.

Conclusions

The transition from powdered to powder-free latex gloves was associated with a significant decrease in the number of workers' compensation claims for latex-related illness. The increased cost of powder-free gloves was partially offset by direct savings in operating room materials and decreased workers' compensation claims.

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