

LETTER

NOTES & COMMENTS

Nickel allergy in the United States: A public health issue in need of a “nickel directive”

To the Editor: Once thought to be rare in the pediatric population, allergic contact dermatitis is now recognized as a significant problem,¹⁻³ and nickel has received much attention for being the most commonly sensitizing agent. Nickel sensitization among pediatric patients is well known, but recently it has become apparent that the prevalence is on the rise.⁴⁻¹¹ The alarming frequency of sensitization to nickel—especially in women and children—led to nickel being named the 2008 “Allergen of the Year” by the American Contact Dermatitis Society.

Galvanization eczema (nickel contact allergy) historically referred to the presentation of severe hand dermatitis in miners and electroplating manufacturers.¹² Today, however, patients with nickel contact allergy present with a range of reactions, from localized dermatitis, classically located in the periumbilical area or on the earlobes (relating to repeated contact with clothing snaps and jewelry, respectively), to a severe and debilitating systemic dermatitis.¹³ Studies demonstrating that females are more frequently affected^{14,15} suggests a likely relationship with early age exposure to nickel during ear piercing practices.¹⁶

Nickel is ubiquitous in our environment, and exposure is difficult to prevent. Because it is durable and alloys easily with other metals, it is widely used, being present in many commonly encountered objects from zippers, paper clips, and belt buckles to jewelry, keys, and cell phones.^{17,18} In addition, higher plants extract nickel from the soil and use it as a cofactor in growth and metabolism.¹⁹ Food, therefore, is a source of environmental nickel exposure and can be of importance in the management of nickel allergic contact dermatitis. Some complementary and alternative remedies also contain high levels of nickel.²⁰ Nickel can also be found in several multivitamins, including Centrum and One-a-Day Maximum, as well as in various generics such as Rite Aid Whole Source Multivitamin and Kirkland Signature Daily Multivitamin. In addition, nickel and metal allergy may play a role in hypersensitivity reactions associated with endovascular, orthopedic, and dental devices, and dermatologists and allergists are increasingly being consulted about the risk of allergic reactions from inserting these devices.^{21,22} The ubiquitous presence of nickel and nickel-containing alloys in our environment makes frequent

contact with the metal practically unavoidable. This, in addition to the rise in body piercing in both males and females where allergenic materials may be used has resulted in increasing rates of sensitization.

In 1992, the Danish Ministry of Environment enacted legislation dictating that nickel release from products in prolonged contact with the skin, such as earrings, buttons, and spectacle frames, should be less than 0.5 $\mu\text{g}/\text{cm}^2$ per week.²³ Following implementation of this legislation, rates of nickel sensitization in the Danish population dropped; among Danish children 0 to 18 years of age, the prevalence of nickel allergy decreased from 24.8% to 9.2% between 1985 and 1998.²⁴ The European Union (EU) passed similar legislation in 1994, issuing “The Nickel Directive,” which mandated that the allowable release limit be less than 0.5 mg/cm^2 per week in objects that come into direct and prolonged contact with the skin. The directive was amended in 2004 to reduce the permitted release of nickel from posts placed in wounds after piercing to 0.02 mg/cm^2 per week.²⁵ Observed rates of sensitization have been decreasing since then. For example, sensitization in German women under age 30 decreased from 36.7% to 25.8% over an 8-year period.²⁶

Despite the success reported in Denmark and Europe, the United States has yet to enact similar legislation or regulations. In fact, infants as young as 6 months old have been reported to be sensitized to nickel.²⁷ Furthermore, it has become apparent that rates of nickel allergy are increasing dramatically. The North American Contact Dermatitis Group (NACDG) reported an increase in positive patch tests to nickel from 10.5% between 1985 and 1990²⁸ to 18.8% between 2003 and 2004.¹¹ In the pediatric population, multiple studies have shown that nickel is the number one cause of positive patch tests, with 20% to 33% of the children evaluated in these studies experiencing positive reactions.⁴⁻¹¹ It is important to note, however, that it is problematic to draw conclusions from these statistics. Earlier studies may have underestimated rates of nickel sensitization because fewer children were patch tested in the past, and more recent studies may similarly underestimate current rates of sensitization because today, most children with clinically obvious nickel allergy are not referred for patch testing.⁹

Because it is recognized that early exposure to nickel is a risk factor for developing allergy,²⁹

regulation and/or legislation set forth to prevent or limit nickel contact at a young age would decrease rates of sensitization. We propose that a directive which limits the maximum allowable release of nickel from products with prolonged skin contact, consistent with the concentrations mandated in Europe, be adopted in the United States. Approximately 15.6% of males and 35.8% of females under the age of 18 are affected with nickel contact allergy in the United States,¹¹ and we believe that a similar nickel directive would lead to dramatic reductions in these rates because of the combined effect of regulation and heightened public awareness. The American Contact Dermatitis Society has recommended such action and the American Academy of Dermatology is actively considering similar proposals. The importance of implementing an EU-like "Nickel Directive" in the United States is paramount; only then will there be recognition of this public health problem.

Another highly effective strategy to combat the rising rates of nickel sensitization is to encourage manufacturers to use products that adhere to the EU's guidelines for acceptable nickel release. Heim and McKean³⁰ recently demonstrated that children's clothing fasteners, including zippers and snaps, constitute a significant source of nickel exposure in this age group, with approximately 6% of fasteners on the market in the United States releasing an unacceptable amount of nickel. Levi Strauss recently added nickel to their restricted substances list and required that all metal parts used in their products abide by the EU guidelines.³¹ Other manufacturers and retailers should be educated about this growing health issue and urged to play their part in protecting the health of their customers.

Currently, many parents are not conscious of the dangers of nickel exposure and therefore cannot be held accountable for the growing frequency of nickel allergy. Increased awareness of the rising rates of sensitization through the implementation of nickel limiting legislation will be a major step in reducing the number of children affected. Through awareness and legislation, we together can potentially prevent this public health problem.

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Dr Jacob has been a speaker for Astellas, Coria, Kinetic, and Shire. Dr Zirwas has been a speaker for Astellas, Coria, and Shire. Dr Taylor has been a consultant for and received honoraria from AMA Press, BASF, Betco, Inc, the Consumer Products Safety Commission, Convatec, Inc, Novartis, NIOSH, Proctor and Gamble, Regent Medical, and Shire Labs, PLC. He has been a speaker for and received honoraria from Aula Medica Spain, Hermal Labs Germany, Medicis, and Watson Labs. He has been on the advisory boards and received honoraria from Connetics, Inc and United Health Care. He has been an investigator for and received grants from Guidant and Mekos Lab Denmark. He has been a stockholder of Amgen, Bristol Myers Squibb, GlaxoSmithKline, Johnson and Johnson, Keithley Instruments, Medco Health Solutions, Merck, Renovo, PLC, and Wyeth. He has been an author for and received honoraria from HMP Communications, Unitech Communications, and Web MD. He was Director of the North American Contact Dermatitis Group and Vice-President of the American Academy of Dermatology.

Conflicts of interest: None declared.

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