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# **Contact Allergy: Alternatives for the 2007 North American Contact Dermatitis Group (NACDG) Standard Screening Tray**

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## **Introduction**

Most primary care physicians see a large number of patients each year with eczematous skin diseases. Although many of these patients have atopic eczema, another extremely common cause of eczema is contact allergy. This subgroup of eczema patients is notably resistant to treatment unless the causative allergens can be identified and eliminated. It is estimated that allergic contact dermatitis (ACD) to topical products alone occurs in 1% to 3% of the general population.<sup>1,2</sup> Unlike respiratory and food allergies, ACD is not histamine-mediated but is instead a T-cell-mediated delayed-type hypersensitivity reaction.<sup>3</sup> The basic pathophysiologic process behind ACD is primary skin contact with an allergenic chemical which triggers an immune cascade and results in an eczematous reaction at the site of contact.

On first exposure to low molecular weight chemical substances (haptens <500 Da), there is generally no skin reaction.<sup>4</sup> During this first phase, these haptens enter the epidermis and are recognized by antigen presenting cells, which in turn create signals that transform naïve T cells into memory T cells, a process which typically takes 5 to 25 days.<sup>4</sup> Subsequent reactions due to “challenge” with the same chemical substance generally occur between 24 and 48 hours after exposure; however, reports of reactions occurring as early as 8 hours after exposure and as long as 1 week after exposure are not uncommon.<sup>4</sup>

ACD is diagnosed by a procedure called patch testing. Many dermatologists obtain significant training in skin patch testing during their residencies. In addition, some physicians in other fields (such as allergists and occupational medicine doctors) may also have some training with this procedure. Comprehensive patch testing is performed by placing standardized concentrations of contact allergens on either aluminum (Finn) or plastic (IQ) chambers and attaching these to the skin of the back with hypoallergenic paper tape. A commercially available screening tool [The Thin-Layer Rapid Use Epicutaneous Test (TRUE) Allerderm Laboratories/Smarterhealth, Phoenix, AZ] is also available in the U.S. This FDA-approved patch test consists of 23 common contact allergens and mixes.<sup>9</sup> The TRUE test is a pre-prepared peel-off system which can be easily performed in any office setting. Unfortunately, recent studies have shown that the TRUE test only fully diagnoses approximately 25.5% of all cases of contact allergy<sup>10</sup> and is more likely to give false-negative reactions than when using Finn chambers.<sup>9,11</sup>

With both comprehensive and TRUE testing, patches are typically left in place for 48 hours and then removed.<sup>5</sup> Patch test readings in the U.S. are most commonly done at 72 and 96 hours after applications of the allergens.<sup>6</sup> Some physicians also do a reading at 1 week after application.<sup>7</sup> Patch reactions are graded 1<sup>+</sup> (erythema), 2<sup>+</sup> (papules or edema in less than half of the test site), or 3<sup>+</sup> (papules or edema in greater than half of the patch test site, or confluent vesiculobullous reactions).<sup>8</sup> At 96 hours, a final patch test reading will be done and the results are then explained to the patient. The information which is passed to the patient during the final visit is of paramount importance. Although performing a patch test procedure is not technically difficult, the interpretation of the patch test results and the education of the patch test patient are much more difficult. A patch testing specialist must know the significance of each test material, where the material is found, and, most importantly, be able to educate the patient on how to avoid contact with each test substance.

Over the past 50 years, more and more diverse chemicals have entered our daily existence. For example, there are over 5000 registered cosmetic ingredients which are used in skin, hair, and cosmetic products in the U.S. today.<sup>12</sup> Therefore, comprehensive contact allergy testing has become much more complicated over the past several decades. A survey from 1997 found that 83% of dermatologists in the U.S. perform patch testing and 74% of these physicians use the TRUE test.<sup>6</sup> Approximately 83% of dermatologists who do patch testing indicate that they perform testing on fewer than 5 patients per month.<sup>6</sup> Therefore, it is clear that most

dermatologists perform very limited patch testing on small numbers of patients.

A small number of dermatologists are dedicated experts in the practice of comprehensive contact allergy testing. Typically, these physicians purchase contact allergy testing materials from overseas and have multiple testing materials covering a wide range of potential chemicals which are likely to be experienced in the home or in a variety of work settings. Typically, contact dermatitis specialists will spend considerable time investigating the history of the patient and individualizing patch testing to customize to the topical exposure experienced by each patient. Correctly selecting the allergens to use in testing is vital, as the only known cure for ACD is avoidance of the offending allergen. Because avoidance generally requires the substitution of safe alternatives, it is essential that the patch testing expert have a sound working knowledge of potential product alternatives which may be selected to exclude the patient's known allergens.

In 2004, the American Academy of Dermatology and Society of Investigative Dermatology studied the burden of skin diseases and found that 72 million Americans that year suffered with ACD. Primary care physicians are on the frontline encountering this large number of patients every year. Whereas many of these patients will respond readily to standard treatments, there will be others that demonstrate recalcitrant dermatitis. Many authors have recommended that patch testing be considered in all patients with recalcitrant eczema. It has been estimated that approximately 16% of all chronic eczema patients would benefit from contact allergy patch testing.<sup>13</sup> In 1979, it was estimated that there were 5.7 million medical office visits made in the U.S. for evaluation of dermatitis.<sup>14</sup> Over the past 28 years, this number has likely increased considerably. Therefore, it would be a conservative estimate to state that approximately 1 million patients each year in the U.S. would benefit from patch testing.

ACD can follow certain distributions suggestive of contact with a particular substance. For instance, eczema limited to the armpits may suggest contact allergy to an ingredient in antiperspirant or deodorant, whereas eczema limited to the scalp may suggest contact allergy to hair products, such as shampoos, conditioning agents, or dyes. With an eczema on the soles of the feet, a contact allergy to a shoe insole or adhesive material should be considered, especially if there is sparing of the instep (where contact is not made with the shoe component). For all of these types of patients, correct identification of the culprit chemical by

the patch testing specialist may lead to complete elimination of severe, debilitating eczema.

In this article, the American Contact Alternative Group (Members: A. Scheman, M. Zirwas, S. Nedorost, S. Jacob, R. Katta, and E. Warshaw) will discuss the most common substances known to cause ACD, where these substances are found, and alternative products which can be used by individuals allergic to each of these substances. The allergens discussed in this article are those found on the current 2007 North American Contact Dermatitis Group (NACDG) standard tray. NACDG refers to a group of 13 contact dermatitis specialists in Canada and the United States who regularly research and compile data on the frequency of contact allergy to various substances.<sup>15</sup> The standard screening tray is designed as a base panel to investigate the most common causes of contact allergy; however, comprehensive contact allergy testing centers generally supplement the standard screen with a number of selected chemical allergens from a large battery of site- or type-specific trays (eg: fragrances, shoe components, botanicals, vehicles, and cosmetics).

It is the opinion of the authors of this article that primary care physicians play a large role in the identification and successful treatment of patients experiencing contact allergy. And because there are a large number of patients suffering needlessly from potentially debilitating skin dermatitis who, given appropriate testing, counseling, and alternatives, could live dermatitis-free, this tool has been developed. We recognize that appropriate patch testing is critical. However, without appropriate education on avoidance of substances and recommendation of alternative allergen-free alternatives, avoidance compliance, and thus positive outcomes, will be low. Although much of this education can be done at the time of testing, many of these allergens are ubiquitous, and it is easy for the patient to have flare-ups due to unexpected contact with allergenic substances. Therefore, to obtain optimal success in treating these patients, it is necessary for them to receive reinforced education regarding avoidance of the substances to which they are allergic.

In this article, we hope to familiarize primary care physicians with the allergens found on the NACDG standard tray, their significance, and alternatives which will allow the patient to avoid each substance. In this way, we hope to encourage primary care physicians to recognize ACD and to know when to refer patients for comprehensive testing and to help them play a significant role in counseling their patients on an ongoing basis after contact allergy has been identified.

For purposes of discussion and organization, we have divided the allergens of the NACDG standard tray into several sub-groupings. Parts

I and II discuss cosmetic contact allergy. In Part I, fragrances and related oral allergens are discussed. Part II discusses other non-fragrance allergens in skin, hair, cosmetic, nail, and oral products. In Part III, allergens in topical medications and antimicrobials are discussed. Part IV deals with allergens in rubber, artificial rubber, and neoprene, and Part V covers allergens in clothing and leather apparel. Finally, Part VI covers allergens found in adhesives and metals.

## *Cosmetic Contact Allergy*

Cosmetic contact allergy is a complex subject since patients are often allergic to several substances found in skin, hair, nail, and cosmetic products. Therefore, it can be difficult to provide alternative products devoid of specific cosmetic allergens, since it is often necessary to find products that are free of various combinations of different allergens. Parts I and II will discuss the individual cosmetic allergens found on the NACDG standard tray and will then provide tables showing which of these allergens are found in specific currently available products. In this way, it will be possible to identify products on the market which are free of any combination of these allergens.

## **Part I: Fragrances and Related Oral Allergens**

### *Fragrance*

The NACDG standard tray has nine substances which help screen for contact allergy to fragrances. Allergy to fragrance is by far the most common cause of contact allergy to skin care and cosmetic products.<sup>16-18</sup> It has been estimated that between 1% and 4% of the general population is allergic to fragrance.<sup>19,20</sup> Fragrance allergy is a very complicated topic. In 1966, the Fair Packaging and Labeling Act was passed which requires products in the U.S. to list all of the ingredients found in skin, hair, nail, and cosmetic products, but fragrance formulas were exempted as trade secrets.<sup>21</sup> Although some manufacturers actually list specific fragrance ingredients on their labels, this is uncommon and most products simply list either “fragrance” or “perfume” on their ingredient list. When either of these words are found on an ingredient list, it is possible that there are hundreds of different fragrance ingredients mixed together to form the final fragrance in a given product. Therefore, it is possible for one product which lists “fragrance” as an ingredient to contain a hundred specific fragrance ingredients and for the product next to it on the shelf which also lists “fragrance” as an ingredient to have a hundred completely different fragrance ingredients. For this reason, it has been very difficult for contact

allergy specialists to devise ways to test patients for fragrance allergy and to advise them on which products to avoid.

As a result of studies evaluating the sensitivity and specificity of different fragrance chemicals, two main substances were initially recommended for screening to identify persons allergic to fragrance. The first substance, which has been called fragrance mix (and is now referred to as fragrance mix I) is a mixture of eight common artificial fragrances used in products on the market. In the past, this mix was able to identify approximately 80% of individuals allergic to fragrance.<sup>22</sup> A second material, called balsam of Peru (*Myroxylon pereirae*), was reported to be able to identify approximately 50% of individuals allergic to fragrance.<sup>22</sup> Although balsam of Peru is not actually used in the fragrance industry, many of its components are fragrance ingredients.<sup>23</sup> It was originally estimated that over 90% of individuals allergic to fragrance would be detected by patch testing to fragrance mix I and balsam of Peru.<sup>24</sup> However, the fragrances used by industry are evolving constantly. More recent articles have suggested that these two testing substances now pick up only 60% to 70% of individuals allergic to fragrance.<sup>25</sup> Based on more recent studies, an additional mixture called fragrance mix II has been added to the NACDG standard tray to identify individuals reacting to other fragrance ingredients missed by fragrance mix I and balsam of Peru.<sup>26</sup>

### *Fragrance Mix, Cinnamic Aldehyde*

Fragrance mix I (8.0% in petrolatum) was introduced as a screening tool for fragrance sensitivity in the late 1970s.<sup>27</sup> As mentioned above, it is a combination of eight fragrance allergens: cinnamic alcohol 1.0%, cinnamic aldehyde 1.0% (also tested separately on the 2007 NACDG standard tray), eugenol 1.0%, hydroxycitronellal 1.0%, isoeugenol 1.0%, geraniol 1.0%, oak moss absolute, and alpha-amyl cinnamic aldehyde 1.0%.

Originally formulated at 16% in petrolatum (2% of each constituent), it frequently produced irritant reactions. Therefore the concentration was lowered in July, 1984 to 8% (1% of each constituent). Using the latter formulation, the North American Contact Dermatitis Group 2001–2002 patch test results showed fragrance mix as one of the 10 top allergens with a prevalence rate of 10%.<sup>28</sup>

**Cinnamic aldehyde** or cinnamaldehyde is synthesized from benzaldehyde and acetaldehyde and is the chemical compound that gives cinnamon its spice.<sup>29</sup> Since this ingredient is an important allergen, it is also patch tested alone and is part of the NACDG standard screening tray. It is a yellowish, oily viscous liquid with a powerful aromatic, warm-spicy

odor<sup>30</sup> that occurs naturally in the bark of cinnamon trees, which are the source of cinnamon, and other species of the genus *Cinnamomum* such as cassia.<sup>31</sup> The essential oil of cinnamon bark is 90% cinnamaldehyde. Furthermore, cinnamic aldehyde is the main component of cassia oils<sup>31</sup> (commonly used as artificial cinnamon flavoring) and is also a constituent of patchouli oil. It is found in bath oils, tonics, cosmetics, hair care products, mouthwashes, breath fresheners, soaps, detergents, and as a flavoring agent in toothpastes, candies, chewing gum, soft drinks (cola), and pastries.<sup>30,32</sup>

Concentrated cinnamaldehyde is a skin irritant, and the chemical is toxic in large doses. The most obvious applications for cinnamaldehyde are as a flavoring agent and fragrance. It is added in ice cream, candy, and beverages such as cola and vermouth. It is also used in some perfumes of natural, sweet, or fruity scents. Almond, apricot, butterscotch, and other aromas may partially include the compound due to its pleasant smell.

Cinnamic aldehyde and related chemicals are used widely, and patients may be exposed by many sources. There is a potential of developing stomatitis due to the use of certain toothpastes, dental floss, mouthwashes, and oral anaesthetic which contain cinnamon oil. Chewing gums such as Big Red, Slim-mint, Dentyne Fire, and Ban-Smoke also expose patients to cinnamic aldehyde.

**Cinnamic alcohol** occurs as an ester in natural fragrance materials such as balsam of Peru, storax, cinnamon leaves, hyacinth oil, and propolis.<sup>30</sup> It is found in perfumes, cosmetics, deodorants, paper, and household cleansing products.<sup>30</sup> It is also often used as a flavoring agent. Because of its sensitization potential, cinnamic alcohol should not be used at a concentration >4% in fragrance compounds.<sup>33</sup>

**Hydroxycitronellal** is a synthetic floral fragrance that is not found in nature.<sup>29</sup> It has a characteristic lily-of-the-valley odor and is used widely in floral-scented perfumes, soaps, antiseptics, and insecticides.<sup>32</sup>

**Eugenol** is a phenol obtained by distilling or extracting either clove leaf oil or clove stem oil.<sup>29</sup> The result is a clear to pale yellow oily liquid. It has a spicy, clove-like aroma and is found in the oils of clove, bay, cinnamon leaf, patchouli, pimento, and saffron among others. It is also used as a spice and, like cinnamic alcohol, it is FDA-approved to be used as a flavoring agent. Eugenol is commonly used in dental procedures in the form of impression materials, dental cements, and periodontal packings.<sup>30</sup> It is also used in colognes, tonics, analgesics, antiseptics, mouthwashes, toothpastes, and toothache drops among others.<sup>32</sup>

**Isoeugenol** is a phenol obtained via the isomerization of eugenol. It is a colorless oily liquid which turns yellow and has a sweet spicy floral



odor reminiscent of cloves weaker than that of eugenol<sup>31</sup>; it should not be used at concentrations >1%.<sup>33</sup> It is used in perfumery, cosmetic products, mouthwashes, over-the-counter medications, and dental cements.

**Oak moss absolute** is a natural substance derived from tree lichen, *Evernia prunastri* (oak moss) and *Pseudevernia furfuracea* (tree moss). It is widely used in scented products marketed for men, such as perfumes, colognes, and aftershaves, to impart a woody, earthy, “masculine” odor.<sup>29</sup> Oak moss contains the allergens atranorin, evernic acid, fumarprotocetraric acid, and is a photosensitizer.<sup>34</sup> It should not be used in fragrance compounds in >3% concentrations.<sup>33</sup>

**Geraniol** is a clear oily alcohol which is insoluble in water. It can be obtained synthetically from pinene or isolated from natural oils such as palmarosa and citronella oils.<sup>31</sup> It has a characteristic floral, sweet, rose-like pleasant scent. Geraniol constitutes the chief part of rose and palmarosa oils, geranium oil, citronella oil, lavender oil, jasmine oil and is present in small quantities in over 250 essential oils.<sup>30</sup> In addition, it is used to give flavors such as peach, blueberry, and raspberry. Furthermore, geraniol is one of the most widely used terpenes in soaps, detergents, and cosmetics.<sup>33</sup>

The final component of the fragrance mix is **alpha-amyl cinnamic aldehyde**. It is a greenish-yellow liquid with an intense sweet floral, jasmine-like odor not found in nature. Because it may be a constituent of several synthetic essential oils (eg, synthetic jasmine oil), it is widely found in cosmetics, perfumes, soaps, and a wide range of industrial products.<sup>30</sup>

## *Balsam of Peru*

Balsam of Peru (BOP) is a dark brown, sticky, aromatic fluid that comes from cutting the bark of the tree, *Myroxolon balsamum*, a tree that is native to El Salvador.

Balsam of Peru smells of vanilla and cinnamon because it contains 60% to 70% cinnamein, a combination of cinnamic acid, benzoyl cinnamate, benzoyl benzoate, benzoic acid, vanillin, and nerodilol.<sup>35</sup> These are all potential allergens, making BOP one of the five most prevalent allergens detected by both the TRUE test and the NACDG standard tray.<sup>28,36</sup> Cross-reactions may occur to colophony (rosin) found in pine trees, wood and coal tars, resorcin monobenzoate, coniferyl benzoate, Tolu balsam, storax, propolis, turpentine, benzoin, tomatoes, orange peel, and clove.<sup>37</sup>

Today, BOP has three main uses: healing properties in medicinal products, flavoring in food and drink, and fragrances in perfumes and toiletries. It is used in wound healing ointments and hemorrhoidal creams



due to its antimicrobial action and capillary stimulant effects. Certain foods, such as tomatoes and tomato-containing products, citrus fruit peel/zest, chocolate, ice cream, wine, beer, vermouth, dark colored sodas, and spices such as cinnamon, cloves, curry, and vanilla, have “natural-identical” chemical ingredients such as the ones contained in BOP.<sup>38</sup> To further illustrate this point, in 2005, Srivastava and coworkers performed a chemical analysis of tomatoes and found intense chemical peaks of cinnamyl alcohol, one of the more allergenic components of balsam of Peru.<sup>39</sup>

BOP can cause many cases of allergic contact stomatitis and cheilitis<sup>37</sup> due to the BOP-derived flavoring agents added to toothpastes, mouthwashes, and lip balms that give that minty (mentholated), fresh clean taste. Some food ingredients found as components or related to BOP include benzyl alcohol, benzyl salicylate, benzoic acid (and its derivative: sodium benzoate), cinnamic acid, cinnamic alcohol, amylcinnamaldehyde, eugenol (bay rum), isoeugenol, and vanillin.<sup>37</sup> Although benzoic acid and sodium benzoate are not used as fragrance ingredients, some patients found to be allergic to BOP will need to be instructed to avoid these ingredients which are used as preservatives in skin, hair, cosmetic, and food products.

As mentioned above, BOP is not actually used in the fragrance industry, but many of its components are fragrance ingredients.<sup>23</sup> One component of BOP which is a ubiquitous fragrance and preservative is benzyl alcohol.<sup>40</sup>

## *Benzyl Alcohol*

Benzyl alcohol, also called phenylmethanol or phenylcarbinol, is a clear, colorless liquid with a mild, pleasant aromatic odor. Its structure consists of an aromatized benzene ring with an attached hydroxylated carbon. This naturally occurring chemical is an important allergen and is also tested alone as part of the NACDG standard screening tray. It is a relevant allergen found in over-the-counter medications, topical creams, lotions, shampoos, and facial cleansers.

Benzyl alcohol is found in many naturally occurring plant products such as BOP, and is also a component of essential oils such as hyacinth, jasmine, and ylang ylang oils.<sup>40</sup> It is also found in foods such as apricots, cranberries, cocoa, honey, mushrooms, and snap peas.<sup>41</sup> Benzyl alcohol also has antibacterial and fungicidal properties and may function as a preservative in over-the-counter medications, topical creams, and lotions. Benzyl alcohol may be a relevant allergen in hair dyes, shampoos, facial cleansers, sunscreens, fragrances, and cosmetics. Delayed contact derma-

titis reactions as well as immediate, urticarial, and systemic reactions have been reported.<sup>42</sup> Most reported incidences have occurred due to repetitive use of topical antifungal and steroid creams containing benzyl and other topical medications including Aveeno daily moisturizing lotion (by Johnson & Johnson), Elidel cream (by Novartis), and Bactroban cream (by GlaxoSmithKline).<sup>41</sup>

## *Botanical Fragrances*

In addition, the trend toward aromatherapy has led to tremendous growth in the use of botanical ingredients. Botanical ingredients are essential oils derived from various plants. Although some manufacturers do not consider essential oils to be fragrances, these plant extracts are natural sources of various fragrance ingredients. Although there is information on the specific chemical fragrance components found in many essential oils, this information is difficult to obtain, and it is prudent to consider all of these essential oils as fragrance ingredients and possible sources of contact allergy.<sup>42</sup> The NACDG standard tray includes tea tree oil (*Melaleuca*) and ylang ylang oil, which are two essential oils known to cause contact allergy.<sup>43-47</sup> In addition, the tray includes compositae mix, which is a mixture of extract from several plants in the compositae family of plants. Positive reactions to this mixture can also indicate contact allergy to fragrance.<sup>16</sup> The 2007 NACDG standard tray also includes propolis, a botanical-based substance derived from bee glue. Finally, colophony (also called rosin) is a substance derived from pine trees which may also cause positive patch tests reactions in individuals allergic to fragrance.<sup>48</sup> Therefore, all of these ingredients can help identify those individuals allergic to fragrance.

## *Compositae and Sesquiterpenlactone Mixes*

Compositae or Asteraceae is also known as the daisy, aster, or sunflower family. The name comes from the genus *Aster* and is characterized by the star-shaped flower head of its members. This family consists of dicotyledons and is the second largest family in the Magnoliophyta division.

The patch testing substance compositae mix (6% in petrolatum) consists of short ether extracts of five different plant species: German chamomile (*matricaria*) 2.5%, tansy 1%, yarrow 1%, arnica 0.5%, and feverfew 1%.<sup>49</sup> German chamomile, arnica, and feverfew are flowers, whereas tansy and yarrow are commonly considered to be herbs.

The short ether extracts were produced originally by cutting the fresh plant material and extracting it with peroxide-free ether. Then, the short

ether extract was dried over sodium solvent for 1 hour or until the evaporation of the solvent. Finally, the extracts were incorporated into white petrolatum in the concentrations previously mentioned.<sup>49</sup>

The compositae mix supplied by one of the main manufacturers of patch test materials, Chemotechnique® (Dormer Laboratoies Inc.), consists of a 5.0% mix in petrolatum with the following constituents: Tansy (*Tanactum Vulgare*) 1.0%, Arnica Montana 0.5%, Parthenolide 0.1%, Chamomilla Romana (*Anthemis nobilis*) 2.4%, and Yarrow (*Achillea Millefolium*) 1.0%.<sup>50</sup>

When looking for the components of the compositae mix while reading a product's label, it is important to consider their names given by the International Nomenclature for Cosmetic Ingredients (INCI), used for ingredient disclosures inside a product ingredients' list.

**German Chamomile (matricaria)** (INCI name: *Chamomilla recutita*) is a sweet scented flower that has been used as a medicinal herb worldwide for hundreds of years.<sup>51</sup> Chamomile has demonstrated anti-inflammatory and spasmolytic effects attributable to one of its active ingredients, alpha-bisabolol.<sup>52</sup> It has also proven to have wound-healing and sedative/anxiolytic effects.<sup>51</sup> Chamomile is widely used in teas and "natural" personal care products and cosmetics, such as lip balms.

**Arnica** (INCI name: *Arnica montana*) comes from the Latin word "arna" meaning lamb in context as soft, hairy leaves. This plant is one of the most important European medicinal plants<sup>53</sup> and is commonly used to alleviate bruises, muscle aches, and has added anti-inflammatory and wound-healing effects as well.<sup>52</sup> In the United States, *Arnica montana* extract was used in 97 cosmetic formulations, according to the data submitted to the FDA in 1998.<sup>54</sup> With the current trend toward aromatherapy products, it is in many more products today. It is also commonly found in pain-relieving medications such as Bengay and Icy Hot.

**Feverfew** (INCI name: *Tanacetum parthenium*) is a rapidly growing small bush with citrus-scented leaves and daisy-like flowers. Since the first century, it has been used to reduce fever, arthritic pain, menstrual irregularity, stomachache, and headache. Interestingly, the use of this herb as an antipyretic is what led to its being commonly referred to as feverfew, a corruption of the Latin *febrifugia*, or fever reducer (circa 1400 A.D.).<sup>55,56</sup> In 1633, Thomas Johnson, in the second edition of Gerard's *Herbal*, described the use of feverfew to treat migraine headaches,<sup>57</sup> and in 1985, a group of British researchers from the City of London Migraine Clinic and Chelsea College at the University of London performed the first controlled study on feverfew as prophylactic treatment of migraines.<sup>58</sup> More specifically, feverfew is used as treatment for migraines

because it acts as serotonin and prostaglandin antagonist.<sup>59</sup> One of the extracts of feverfew, parthenolide, has been found to inhibit platelet aggregation and the release of serotonin from platelets, which can result in vasodilatation. Therefore, it is thought that through this pathway parthenolide can normalize blood vessel tone, releasing the vessel spasm which may contribute to the migraine,<sup>60</sup> further decreasing the frequency of this type of headache.<sup>61</sup>

The two herbs which belong to the compositiae mix are tansy and yarrow.

**Tansy** (INCI name: *Tanacetum vulgare*) is a flowering herb native to Europe and Asia. It has characteristic compound leaves and yellow button-like flowers. Its scent is reminiscent of camphor, and its oil is high in thujone. Thujone is an ingredient found in absinthe which is known to cause convulsions. If consumed in excess, the tansy's leaves are poisonous.

**Yarrow**, also known by the INCI name *Achillea millefolium*, is a flowering plant that has a rhizoid growth pattern. The leaves have a very characteristic degree of hairiness. Yarrow is known for its wound-healing effects, and compresses of this herb have been used to treat skin diseases. Because of its spasmolytic effect, yarrow has been used in traditional medicine to treat indigestion and liver diseases.<sup>52</sup> Furthermore, yarrow extracts are used in "natural" cosmetics as a "biological additive," and a 2001 report states that it was used in 65 cosmetic formulations in the U.S. in 1998<sup>62</sup> and is in many additional aromatherapy products today.

Additionally, sesquiterpenes are essential oils common to all members of the Asteraceae family, and it is the sesquiterpene oils that exert the major allergenic effects of this plant family. The subtypes of sesquiterpenes that most commonly cause dermatitis are the lactones, or sesquiterpene lactones (SLs). The previously mentioned parthenolide is classified as a SL. **Sesquiterpenelactone mix** (SL mix), a 0.1% mixture of equal parts of three different lactones in a petroleum base, can be applied as a patch test to screen for Asteraceae allergy. Both SL mix and compositiae mix are included on the 2007 NACDG standard tray.

## Tea Tree Oil

Tea tree oil or *Maleluca* oil is a clear to very pale golden color essential oil with a fresh camphoraceous odor. It is obtained by steam distillation of the leaves taken from the plant *Melaleuca alternifolia*, which is native to the northeast coast of New South Wales, Australia. The oil is believed to have beneficial cosmetic and medical properties, including antiseptic

and antifungal action. Tea tree has a long history of traditional use. Australian aboriginals used tea tree leaves for healing skin cuts, burns, and infections by crushing the leaves and applying them to the affected area. The compound terpinen-4-ol is the most abundant and is thought to be responsible for most of tea tree oil's antimicrobial activity. It can be used to treat dandruff by killing the fungus *Malassezia furfur* or vaginosis by killing *Candida albicans*

It is a popular ingredient in many over-the-counter healthcare and cosmetic products, such as creams, ointments, lotions, soaps, and shampoos.<sup>63</sup> It is also found in many oral care products, including certain toothpaste, mouthwash, dental floss, and lip balm products. Allergic patients may exhibit contact stomatitis with skin irritation, redness, blistering, and itching around the lips and gingiva. The tea tree oil in commercial toothpastes and mouthwashes is generally considered to be acceptable because it is not swallowed. If it is swallowed, however, it can cause impaired immune function, diarrhea, and potentially fatal central nervous system depression, such as excessive drowsiness, sleepiness, confusion, and coma.<sup>64</sup>

## Ylang Ylang Oil

Ylang ylang oil is an essential oil obtained through steam distillation of the *Cananga odorata*, a small flower of the Cananga tree that grows in the rainforest habitat of the Philippines and Indonesia. The yellow-green, star-shaped flower yields a highly fragrant oil that is deep with notes of rubber and custard, and bright with hints of jasmine and neroli, which make it a very common "masculine oil." The main aromatic component of ylang ylang is methyl anthranilate. Ylang ylang blends well with most floral, fruit, and wood smells. The name ylang ylang is derived from the word *ilang*, which means "wilderness," alluding to its natural habitat, or from the word *ilang-ilan*, which means "rare," suggestive of its exceptionally delicate scent. Ylang ylang is used in aromatherapy and is believed to decrease high blood pressure and normalize sebum secretions for skin problems. The oil from ylang ylang is widely used in perfumery for oriental- or floral-themed perfumes.<sup>47</sup>

Positive patch test reactions to fragrance materials, such as ylang ylang oil are very common in North America. Patients may even develop contact stomatitis as the oil is added to several lip balms and lip plumpers (Telbari Lip Balm, CITY Lips Lip Plumping Treatment, CITY Lips Collagen Lip Plumping Treatment).

## *Propolis*

Propolis, also known as “bee glue,” is a wax-like resinous substance that is produced by the honeybee (*Apis mellifera*). The resins are collected by the bees from a variety of tree buds and barks (conifers and poplars), processed with bee saliva, and then combined with beeswax. Propolis consists of a complex mixture of approximately 50 constituents: balsams and resins (55%), waxes (30%), essential oils (10%), and pollen plus cinnamyl alcohol (5%).<sup>65</sup> As it is partially derived from tree resins, it may also cross-react with BOP.<sup>37</sup> Although propolis is a common contaminant in non-pharmacologic grade beeswax (such as commonly used in toothpaste, dental floss, and lip balm products), pharmacologic grade beeswax does not contain propolis.

Because it is an adhesive substance, it is used as a cement to seal cracks or open spaces in the hive. Its color varies from green to brown and reddish, depending on its botanical source. The human consumption of this substance is wide, as it is used in cough syrups, cosmetics, oral pills, lozenges, ointments, lotions, toothpastes, and vitamins.<sup>66</sup> Propolis is marketed by health food stores as a traditional medicine and for its claimed beneficial effect on human health. Holistic therapists often use propolis for the relief of many inflammations, viral diseases, fungal infections, ulcers, superficial burns, or scalds, in conjunction with acupuncture, ayurveda, and homeopathy.

## *Fragrance-Free Products*

Once fragrance allergy is identified by patch testing, it is necessary to help the patient to find products that are fragrance-free. This can be difficult. It is important to inform patients that products claiming to be “fragrance-free” or “unscented” cannot be trusted. Some products claiming to be unscented contain masking fragrance.<sup>67</sup> Other products claiming to be fragrance-free simply mean that there are no artificial fragrances in their product; however, a product may still contain essential plant oils which the manufacturer does not consider fragrance.<sup>68</sup> There are also ingredients which have more than one function in a product. Therefore, if an ingredient acts both as a fragrance and a preservative, the company may take the position that the ingredient is a preservative and consider the product to be fragrance-free.<sup>69</sup> This is often the case with benzyl alcohol, an allergen on the NACDG standard tray.<sup>69,41</sup> It is apparent that fragrance can have many aliases on a product label.

The fragrance allergic patient must be instructed to read the actual ingredient list on the product label. These patients should be counseled to

avoid products where the ingredient list indicates fragrance, perfume, or any botanical plant extracts. Also, they should avoid any products which do not list all of their ingredients. Manufacturers are allowed to omit any ingredients which comprise less than 1% of the final product if they put the words “and other ingredients” at the end of the ingredient list. Also, over-the-counter drugs are only required to list active ingredients on the product label. Therefore, if the words “active ingredients” are seen on a label without inactive ingredients, that product should be avoided. Finally, some manufacturers choose to list specific fragrance ingredients which allergic patients may not recognize as being fragrances. Some common chemical fragrances listed on products include benzyl alcohol, benzaldehyde, ethylene brassylate, 15-pentadecanolide, citral, citronellol, and linalool.<sup>69</sup>

Table 1 identifies fragrance ingredients in common products available on the market today. On this chart, “F” indicates the presence of fragrance and “E” indicates the presence of essential oils (ie, botanicals). In addition, products with specific fragrance ingredients found on the standard tray are also indicated. The abbreviation BAL indicates benzyl alcohol, TT indicates tea tree oil, Y indicates ylang ylang oil, PR indicates propolis, CO indicates compositae plant extracts, and R indicates rosin.

### *Oral Exposure to Fragrance-Related Substances*

As mentioned above, many of the same allergens which function as fragrances are also the chemicals that act as the flavorants in foods and dental care products. This type of exposure can cause cheilitis or stomatitis. Therefore, it is important to be able to identify and avoid possible oral exposure to these substances in both lip cosmetics as well as in food and dental products. In addition, oral exposure to a substance which has previously caused contact allergy on the body of a sensitized patient can induce a recurrence of their previous contact allergy. This phenomenon is called “systemic contact allergy.” Therefore, if an individual with contact allergy does not improve with avoidance of topical exposure to an allergen, a trial avoidance of oral exposure to the allergen may be warranted.

In general, avoidance of foods containing chemicals related to BOP-related chemicals will automatically eliminate many fragrance-related substances, including (but not limited to) cinnamic aldehyde, benzyl alcohol, and propolis. Therefore, a BOP avoidance diet has been demonstrated to be helpful not only in the treatment of allergy to BOP, but also in the treatment of allergy to fragrance mix I. The BOP avoidance diet has been shown to be helpful in the treatment of cheilitis and stomatitis due to



**TABLE 1.** NACDG standard allergens in common OTC products

Company	Product	NACDG Sensitizers
<b>ACNE &amp; ROSACEA TREATMENTS, SELECTED</b>		
Burt's Bees	Blemish Stick	E,TT
Clean and Clear	Advantage Acne Spot Treatment	E,F,P,PG
Clean and Clear	Advantage Concealing Treatment Stick	E,P,PG
Clean and Clear	Maximum Strength Persa Gel 10	—
Clearasil	Acne Control Acne Treatment Cream (±tint)	P,PG
Clearasil	Adult Care Acne Treatment Cream (±tint)	F,P,R
Clearasil	Blackhead Control Treatment Gel	E,F,PG
Clearasil	Ultra Acne Treatment Cream (all types)	P
Neutrogena	Oil Free Acne Stress Control 3-in-1 Hydrating Acne Treatment	E,F
Neutrogena	Rapid Clear Treatment Pads	F
Neutrogena	On The Spot Acne Treatment	P
Neutrogena	Rapid Clear Acne Eliminating Spot Gel	E,F,PG
Oxy	Spot Treatment	D,E,IBC,VE
Prosacea	Gel Rosacea Treatment	D,F,P
Zapzyt	Zapzyt Acne Treatment Gel	—
<b>ANTIFUNGALS</b> –TP/TC = separate products for tinea pedis and tinea cruris with the same sensitizers		
Alva Amco	Fungicure Liquid	F,VE
Cruex	Cruex Cream	F
Desenex	Cream	BAL
Desenex	Liquid Spray	—
Kramer	Fungi Nail Solution	—
Lamisil	AF Defense Powder	F
Lamisil	AT Cream - TP/TC	BAL
Lamisil	AT Gel	BAL
Lamisil	AT Spray Pump	PG
Lotrimin	AF Ultra Cream - TP/TC	BAL,PG
Lotrimin	Deodorant Powder Spray	F
Lotrimin	Liquid Spray	C,D,PG,VE
Lotrimin	Lotrimin AF Cream	—
Lotrimin	Powder	—
Lotrimin	Powder Spray	—
Micatin	Micatin Cream	—
Neosporin	AF Cream - TP	—
Neosporin	AF Cream TC	—
Quinsana	Plus AF Powder	—
Tinactin	Cream - TC/TP	PG
Tinactin	Deodorant Powder Spray	F
Tinactin	Liquid Spray	—
Tinactin	Powder Spray - TC/TP	—
Tinactin	Pump Spray	—
Tinactin	Super Absorbant Powder	—
Woodward	Mycocide NS	CPB,PG,Q
Zeasorb	Zeasorb AF Powder	CX,F,I
<b>ANTI-ITCH PRODUCTS</b>		
Aveeno	Anti-Itch Concentrated Lotion	—
Aveeno	Anti-Itch Cream	—
Aveeno	Overnight Itch Relief Cream	BAL
B.F.Ascher	Itch-X Gel	BAL,D,F,P,PG
Benadryl	Extra Strength Cream	D,P,PG
Benadryl	Itch Stopping Gel	D,P,PG
Benadryl	Original Strength Cream	D,P,PG
Benadryl	Spray	—
Blistex	Ivarest CM	BAL,L,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Caladryl	Clear Lotion	D,F,P,PG
Caladryl	Lotion	D,F,P,PG
Gold Bond	Medicated Anti-Itch Cream	D,E,F,IBC,PG,VE
Lanacaine	Maximun Strength Anti-Itch Crème	F,L,P,VE
Lanacaine	Ultra Moisturizing Anti-Itch Crème	F,P,VE
Sarna	Anti-Itch Lotion	DM,F
Sarna	Sensitive Anti-Itch Lotion	BAL
<b>ANTIPERSPIRANTS AND DEODORANTS</b>		
Adidas	24 Hour Deodorant Control	F,PG
Adidas	24 Hour Fragrance Clear Stick Deodorant	F,P,PG
Adidas	Action 3 Tech	F
Adidas For Women	24 Hour Absorbent Control Deodorant	E,F,PG
Adidas For Women	Action 3 Tech	F
Almay	Hypo-Allergenic Fragrance Free Clear Gel	PG
Almay	Hypo-Allergenic Fragrance Free Roll On	—
Arm & Hammer	Ultra Max Invisible Solid	F,PG
Arm & Hammer	Ultra Max Regular Solid Unscented	F
Arm & Hammer	Ultra Max Deodorant	E,F,PG
Arm & Hammer	Ultra Max Invisible Solid	F,PG
Arm & Hammer	Ultra Max Regular Solid Unscented	F
Arrid	Extra Dry Antiperspirant & Deodorant Cream	F,L,P
Arrid	XX Aerosol XX Dry; X Dry	F
Arrid	XX Dry Unscented; Scented	F
Axe	Body Spray	F
Axe	Deodorant Stick	F,PG
Axe	Dry Deodorant/Antiperspirant	F
Axe	Gel	F
Ban	Clear Gel	E,F,PG
Ban	Invisible Solid	E,F
Ban	Original Roll-On	E,F
Ban	Original Roll-On Unscented	E
Brut	24 Hour Antiperspirant & Deodorant	F,PG
Brut	24 Hour Deodorant	F,PG
Brut	Aerosol Antiperspirant & Deodorant	F
Brut	Deodorant	F,PG
Brut	Deodorant Stick	F,PG
Certain Dri	Certain Dri	—
Certain Dri	Certain Dri A.M.	F
Crystal	Roll-On Body Deodorant for Sensitive Skin	—
Crystal	Stick Body Deodorant for Sensitive Skin	—
Degree	Antperspirant & Deodorant (all types)	F
Degree	Invisible	F,PG
Degree	Invisible Solid (For Men and For Women)	F
Degree Men	Deodorant Stick (all types)	F,PG
Degree Women	Aerosol Deodorant	F
Dove	Invisible Solid	F,PG
Dove	Invisible Solid Sensitive Skin	E,PG
Dove	Ultimate Clear	E,F
Dry Idea	Clear Gel	F,PG
Dry Idea	Clear Gel Unscented*	F,PG
Dry Idea	Roll-On	F
Dry Idea	Roll-On Unscented*	F
Gillette	3X Protection Clear Stick	F,PG
Gillette	3X Protection Invisible Solid Antiperspirant & Deodorant	F

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Gillette	Clear Gel	F,PG
Gillette	Deodorant	F,PG
Lady Speed Stick	24/7 Gel Antiperspirant & Deodorant	F,PG
Lady Speed Stick	Gel	F,PG
Lady Speed Stick	Invisible Dry 24/7 Antiperspirant & Deodorant	F
Lady Speed Stick	Invisible Dry 24/7 Antiperspirant & Deodorant - Conditioning	F,VE
Lady Speed Stick	Invisible Dry 24/7 Antiperspirant & Deodorant - Soothing with Aloe	F,VE
Mitchum	Clear Gel	F,PG
Mitchum	Clear Gel Unscented	F,PG
Mitchum	For Women Clear Gel	F,PG
Mitchum	For Women Clear Gel Unscented	F,PG
Mitchum	For Women Roll-On	F
Mitchum	For Women Smart Solid	F,PG
Mitchum	Roll-On	F
Mitchum	Roll-On Unscented	—
Mitchum	Smart Solid, Smart Solid Unscented	F,PG
Old Spice	Classic Deodorant Stick	F,PG
Old Spice	High Endurance Antiperspirant & Deodorant Clear Gel	F,PG
Old Spice	High Endurance Deodorant	F,PG
Old Spice	High Endurance Invisible Solid	F
Old Spice	Red Zone Clear Gel	F,PG
Old Spice	Red Zone Deodorant Stick	F,PG
Old Spice	Red Zone Invisible Solid	F
Old Spice	Red Zone Soft Solid Antiperspirant & Deodorant	F
Right Guard	Sport Aerosol Original Fresh Antiperspirant & Deodorant Spray	F
Right Guard	Sport Aerosol Original Fresh Deodorant Spray	F,PG
Right Guard	Sport Clear Gel Antiperspirant & Deodorant	F,PG
Right Guard	Sport Clear Stick Deodorant	F,PG
Right Guard	Xtreme Power Stripe Invisible Solid Antiperspirant & Deodorant	F
Right Guard	Xtreme Power Stripe Invisible Solid Deodorant	F
Right Guard	Xtreme Sport Max Gel Deodorant	F,PG
Right Guard	Xtreme Sport Ultra Gel Antiperspirant & Deodorant	F,PG
Secret	Aerosol Antiperspirant & Deodorant	F
Secret	Clinical Strength	F
Secret	Invisible Solid Antiperspirant & Deodorant	F
Secret	Roll-On Antiperspirant & Deodorant	F
Secret	Soft Solid Platinum Clear Gel Antiperspirant & Deodorant	F,PG
Secret	Soft Solid Platinum Deodorant Unscented	—
Secret	Soft Solid Platinum Invisible Solid Antiperspirant & Deodorant	F
Secret	Soft Solid Platinum Soft Solid Antiperspirant & Deodorant	F
Secret	Solid Antiperspirant & Deodorant	F,PG
Soft & Dry	Aerosol Antiperspirant & Deodorant	F
Soft & Dry	Clear Glide Invisible Solid Antiperspirant & Deodorant	F
Soft & Dry	Dri Gel Clear Gel Antiperspirant & Deodorant	F,PG
Speed Stick	24/7 Antiperspirant & Deodorant	F
Speed Stick	24/7 Antiperspirant & Deodorant Gel	F,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Speed Stick	24/7 Deodorant	F,PG
Speed Stick	24/7 Gel Antiperspirant & Deodorant	F
Speed Stick	Antiperspirant	F
Speed Stick	Antiperspirant and Deodorant	F
Speed Stick	Deodorant	F,PG
Speed Stick	Gel Antiperspirant & Deodorant	F,PG
Speed Stick	Gel Deodorant	F,PG
Stiefel	B-Drier	—
Suave	24 Hour Protection Aerosol Antiperspirant & Deodorant	F
Suave	24 Hour Protection Invisible Solid	F
Sure	Invisible Solid Antiperspirant & Deodorant	F
Sure	Invisible Solid Unscented Antiperspirant & Deodorant	F
Sure	Original Solid Antiperspirant & Deodorant	F,PG
Tom's of Maine	Deodorant Stick (all types)	E,F,PG
Yardley	English Leather Deodorant Stick	F,P,PG
<b>BATH OIL, SELECTED</b>		
Free & Clear (800-325-8232)	Robathol Bath Oil	—
<b>CHEWING GUM &amp; BREATH MINTS</b>		
Bazooka	Bubble Gum	FL
Breath Savers	3-Hour Sugar-Free Mints: Peppermint; Spearmint	FL,FO
Dentyne	Fire - Spicy Cinnamon Sugarless Chewing Gum	FL
Dentyne	Ice - Arctic Chill; Peppermint Sugarless Chewing Gum	FL,FO
Eclipse	Sugar Free Chewing Gum (all flavors)	FL,FO
Fruit Stripe	5 Juicy Flavors Chewing Gum	FL
Glee	Glee Gum Chewing Gum	E,FL (PPM only),PR,R
Ice Breakers	Center Ice 2-Stage Liquid Breath Mints	FL,R,VE
Ice Breakers	Liquid Ice Breath Mints - Cool Mint	FL,VE
Ice Breakers	Sugar-Free Breath Mints - Hot Cinnamon	FL
Ice Breakers	Sugar-Free Breath Mints: Cool Mint; Wintergreen	FL,FO
Ice Breakers	Sugar-Free Sours (all flavors)	FL,FO
Life Savers	Sugar-Free Fruit Tarts (all flavors)	—
Orbit	Sugar Free Chewing Gum (all flavors)	FL,FO
Orbit	White Sugarless Chewing Gum: Peppermint; Spearmint	FL,FO
Stride	Sugar Free Chewing Gum (all flavors)	FL,FO
Tic Tac	Breath Mints (all flavors)	FL
Trident	Splash Sugar Free Center Filled Chewing Gum: Apple with Raspberry; Peppermint with Vanilla	FL,FO
Trident	Splash Sugar Free Center Filled Chewing Gum: Strawberry with Lime	FL,FO
Trident	Sugarless Chewing Gum with Xylitol - Cinnamon	FL
Trident	Sugarless Chewing Gum with Xylitol - Green Apple Fusion	FL
Trident	Sugarless Chewing Gum with Xylitol - Strawberry Fusion	FL,FO
Trident	Sugarless Chewing Gum: All other flavors	FL,FO
Trident	White Sugarless Chewing Gum: Peppermint; Spearmint	FL,FO
Wrigley's	Big Red Cinnamon Chewing Gum	FL
Wrigley's	Chewing Gum: Doublemint; Juicy Friut; Spearmint; Winter Fresh	FL,FO
Wrigley's	Extra Sugar Free Chewing Gum (all flavors)	FL,FO

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Wrigley's	Freedent Chewing Gum: Peppermint; Spearmint	FL,FO
<b>COLD SORE PRODUCTS</b>		
Carmex	Lip Balm for Cold Sores	E,F,L
Herpecin L	Lip Protectant, Sunscreen & Cold Sore Balm (stick - SPF 30)	B,E,PR,VE
Lip Clear	Lysine & Cold Sore Treatment - All Natural Ointment	E,PR,TT,VE
Novitra	Maximum Strength Cold Sore Treatment - With Active Zinc	L,P,VE
Orajel	Medicated Mouth Sore Swabs	BZ,FL
Releev	1 Day Cold Sore Symptom Treatment	P
Zilactin	Early Relief Cold Sore Gel	BAL,PG
<b>CORTICOSTEROIDS, TOPICAL HYDROCORTISONE</b>		
<b>Creams</b>		
	Aveeno 0.01 Hydrocortisone Anti-Itch Cream	P,PG,VE
	CaldeCORT	L,P
	Rx Carmol HC	F,PG
	Cortaid Intensive Therapy	P,PG
	Cortaid Maximum Strength	F,P
	Cortaid Sensitive Skin	P
	Cortizone for Kids	P
	Cortizone-5	P
	Cortizone-10	P
	Cortizone-10 Plus - Maximum Strength	P,PG,VE
	Dermarest DriCort	—
	Rx Hytone	PG
	KeriCort 10	P,PG
	Lanacort	L,P,VE
	Preparation H	L,P,PG
	Rx Proctocort	PG
<b>Ointments</b>		
	Ointments	
	Anusol HC-1	D,P
	Cortizone-5	—
	Cortizone-10 Maximum Strength	—
	Rx Hytone	—
<b>Lotions</b>		
	Aquanil HC	—
	Beta HC	P,PG
	Hytone 1.0	PG
	Rx Hytone 2.5	PG
	Rx LactiCare-HC 1.0	F
	Rx LactiCare-HC 2.5	F
	Rx Nutracort 1.0	P
	Rx Nutracort 2.5	P
	Rx ReDerm	L,P,PG
<b>Solutions</b>		
	Neutrogena T/Scalp	PG
	Rx Texacort 1.0	PG
	Rx Texacort 2.5	—
<b>Sprays</b>		
	Caldecort (aerosol)	—
<b>COSMETICS, BLUSHER</b>		
Almay	Powder Blush	E,P
BareMinerals	Blusher	—

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Clinique	Blush Wear	VE
Clinique	Blushing Blush	—
Cover Girl	Cheekers	E,F,P,Q
Cover Girl	Classic Color Blush	E,F,P,Q
Cover Girl	Instant Cheekbones	E,F,P,Q
L'Oreal	Bare Naturale Blush	—
L'Oreal	HIP Blendable Blushing Crème	L,P
L'Oreal	True Match (Various Shades)	P
Maybelline	Dream Mousse Blush	P
Maybelline	Expert Wear Fade-Proof Blush	P
Neutrogena	Healthy Skin Blends	F,P,VE
Neutrogena	Soft Color Blush	P,VE
Revlon	Cream Blush	E,P,VE
Revlon	Golden Affair Sculpting Blush	E,P
Revlon	Powder Blush	D,E,F,P,VE
<b>COSMETICS, BRONZER</b>		
Almay	Powder Bronzer	E,P
Beauty Wise ( <a href="http://www.bewellstaywell.com">www.bewellstaywell.com</a> )	Bronzing Powder	—
Clinique	True Bronze Loose Powder Bronzer	—
Cover Girl	Cheekers Blush Bronzer	E,F,P,Q
Cover Girl	Tan Fastic	E,F,P,Q
Maybelline	Dream Mousse Bronzer	P
Neutrogena	Healthy Skin Blends Bronzer	F,P,VE
L'Oreal	Glam Bronze Powder	P,VE
<b>COSMETICS, CONCEALER</b>		
Almay	Clear Complexion Concealer	E,F,P,VE
Almay	Line Removing Under Eye Concealer	E,F,P,VE
Almay	Nearly Naked Complete Coverage Concealer	E,P,VE
BareMinerals	Miracle Concealer	—
Clinique	Acne Solutions Concealing Stick	PR,VE
Clinique	All About Eyes Concealer	VE
Cover Girl	Advanced Radiance Concealer	F,P,PG
Cover Girl	CG Smoothers Concealer	E,P,VE
Cover Girl	Fresh Complexion Concealer	F,P,PG
Cover Girl	Invisible Concealer	F,I,P,PG
L'Oreal	Visible Lift Line Minimizing Concealer	D,E,L,P,PG,VE
Maybelline	Cover Sticks	P
Maybelline	Instant Age Rewind Under Eye Concealer	D,P,VE
Maybelline	Pure Concealer	E,F,VE
Maybelline	True Illusion Concealer	D,P,PG,VE
Neutrogena	3-In-1 Concealer for Eyes	E,F,MZ,PG
Neutrogena	Healthy Skin Smoothing Stick Concealer	P,VE
Neutrogena	Skin Clearing Oil Free Concealer	E,F,P,PG,VE
Neutrogena	Skin Clearing Under Eye Corrector	E,F,IBC,P
Revlon	Age Defying Concealer	E,F,P,VE
Revlon	Color Stay Blemish Concealer	E,F,P,VE
Revlon	Color Stay Under Eye Concealer	E,P,VE
Revlon	New Complexion Concealer	P
<b>COSMETICS, EYELINER</b>		
Almay	Intense I-Color (all shades)	E,P,VE
Clinique	Cream Shaper For Eyes	VE
Clinique	Quickliner For Eyes	PR
Cover Girl	Brow & Eye Makers Pencil	E,L,P,VE
Cover Girl	Liquid Pencil	D,P,PG
Cover Girl	Outlast Smooth Wear	P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Cover Girl	Perfect Blend Eye Pencil	E,P
Cover Girl	Perfect Point Plus	P,VE
L'Oreal	Art Supplies for Eyes (pencils)	P
L'Oreal	Brow Stylist	P
L'Oreal	HIP Color Truth Eyeliner	—
L'Oreal	Le Kohl Pencil	P,VE
L'Oreal	Lineur Intense Brush Tip; Felt Tip	I,P,PG
L'Oreal	Microliner	E,L,P,VE
L'Oreal	Pencil Perfect	L,P
L'Oreal	Wear Infinite	P,VE
Maybelline	Brow and Eyeliner	P,VE
Maybelline	Expert Wear Defining Liner	P,VE
Maybelline	Expert Wear Soft Lining Pencil	P,VE
Maybelline	Line Stylist	F,P,VE
Maybelline	Lineworks Waterproof Liquid Liner	IBC,P
Maybelline	Twin Brow	L,P
Maybelline	Ultra Brow Brush On Color (cake)	L,P
Maybelline	Ultra Liner Liquid	L,P
Maybelline	Unstoppable Waterproof	VE
Revlon	Color Stay	P,VE
Revlon	Color Stay Brow Fantasy Pencil	P
Revlon	Color Stay Liquid Liner	E,F,P,PG,VE
Revlon	Luminous Color Eyeliner	P,VE
<b>COSMETICS, EYESHADOW</b>		
Almay	Intense I-Color	P
Beauty Wise ( <a href="http://www.bewellstaywell.com">www.bewellstaywell.com</a> )	Loose Mineral Eyeshadow	—
Clinique	Colour Strip Eye Shadow	P
Clinique	Pair Of Shades Eyeshadow	
Cover Girl	Eye Enhancer Eyeshadow	P,Q
L'Oreal	Color Contrasts	P,VE
L'Oreal	Illumination Loose Eye Color	I,P
L'Oreal	Wear Infinite Long Wearing Silky Powder	I,P,VE
Maybelline	Expert Wear	I,P
Maybelline	Mineral Sheers For Eyes	P,VE
Maybelline	Mousse Shadow	P
Maybelline	Roller Color Loose Shadow	P,VE
Maybelline	Shadow Stylist Loose Powder Eyeshadow	P
Revlon	Bedroom Eyes Powder Shadow	P
Revlon	Color Stay 12 hour	P
Revlon	Diamond Lust Sheer Shadow	P
Revlon	Illuminance Cream Shadow	L,P
Revlon	Molten Metal Liquid Shadow	—
<b>COSMETICS, FOUNDATION</b>		
Almay	Clear Complexion Blemish Healing Makeup	E,F,P,VE
Almay	Line Smoothing Foundation SPF 15	E,F,P,VE
Almay	Nearly Naked Liquid Makeup SPF 15	D,E,F,P,VE
Almay	Smart Shade Makeup SPF 15	E,F,P,VE
BareMinerals	Bare Minerals SPF 15 Foundation	—
Beauty Wise ( <a href="http://www.bewellstaywell.com">www.bewellstaywell.com</a> )	Full Cover Loose Foundation Powder	—
Clinique	Clarifying Make Up	E
Clinique	Repairwear Anti-Aging Make Up SPF 15	E,VE
Cover Girl	Advanced Radiance Age-Defying Compact Powder Foundation (SPF 10)	P,VE
Cover Girl	Advanced Radiance Makeup Base	BAL,C,F,P,VE



TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Cover Girl	Advanced Radiance Restorative Cream	
	Foundation SPF 10	BAL,C,F,P,VE
Cover Girl	Aqua Smooth	P,VE
Cover Girl	CG Smoothers All Day Hydrating	F,P
Cover Girl	Clean Makeup	E,F,P,PG
Cover Girl	Clean Makeup (Fragrance-Free)	P,PG
Cover Girl	Clean Makeup (Oil Control)	F,P,PG
Cover Girl	Fresh Complexion Pocket Powder Foundation	P,Q,R
Cover Girl	Simply Powder Foundation	P,Q,R
Cover Girl	TRU Blend	BAL,P
Cover Girl	TRU Blend Whipped Foundation	BAL,P
Cover Girl	Ultimate Finish Liquid Powder	BAL,P,VE
L'Oreal	Age Perfect	E,F,P,PG,VE
L'Oreal	Airwear	P,VE
L'Oreal	Bare Naturale SPF 19	F,VE
L'Oreal	Feel Naturale SPF 15	P,VE
L'Oreal	Ideal Balance	D,E,F,P,PG
L'Oreal	Infallible 16 Hour SPF 18	P,PG
L'Oreal	Quickstick SPF 14	—
L'Oreal	True Match SPF 17	D,P,VE
L'Oreal	Visible Lift Extra Coverage Line Minimizing Makeup SPF 17	DM,E,IBC
L'Oreal	Visible Lift Firming SPF 17	D,E,L,P,PG,VE
L'Oreal	Visible Lift Line Minimizing SPF 17	D,L,P,PG,VE
Maybelline	Dream Matte Mousse	P
Maybelline	Instant Age Rewind (liquid)	D,P,PG,VE
Maybelline	Instant Age Rewind Cream Foundation	D,P,PG,VE
Maybelline	Pure Powder Foundation	E,F,I,P,VE
Maybelline	Pure Powder Makeup Foundation	E,F,P,PG,VE
Maybelline	Pure Stay Powder Foundation - SPF 15	P,VE
Maybelline	Superstay Silky Foundation	P
Neutrogena	Healthy Skin Cream Powder Makeup - SPF 20	BAL,P,VE
Neutrogena	Healthy Skin Enhancer - SPF 20	F,P,VE
Neutrogena	Healthy Skin Liquid Makeup	D,E,F,P,PG,VE
Neutrogena	Skin Clearing Oil Free Compact Foundation	F,P,VE
Neutrogena	Skin Clearing Oil Free Liquid Makeup	D,E,F,P,PG,VE
Neutrogena	Visibly Even Makeup	BAL,D,F,IBC,P,VE
Revlon	Age Defying Compact Makeup	E,F,P,VE
Revlon	Age Defying Makeup - SPF 15	F,I,P,PG,VE
Revlon	Age Defying Makeup - SPF 20	F,P,PG,VE
Revlon	Color Stay Active Light Makeup for All Skin Types - SPF 25	D,E,F,P,VE
Revlon	Color Stay Makeup for Normal to Dry Skin - SPF 15	E,F,P,VE
Revlon	Color Stay for Combination/Oily Skin - SPF 6	E,F,P,VE
Revlon	New Complexion	F,P,PG
Revlon	New Complexion One Step Compact Makeup	P
<b>COSMETICS, LIP LINERS</b>		
Almay	Ideal Lip Liner	E,F,P,VE
Avon	Color Trend Lip Liner	P
Avon	Color Ultra Luxury Lip Liner	E,P
Boots	No. 7 - Line & Define Lip Pencil	P
Clinique	Quickliner For Lips	P
Mary Kay	Signature Lip Liner	P,PR,VE
Personal Basics by Andrea Rose	Lip Pencil	P,PR,VE
Sally Hansen	Invisible Lip Liner	E,F,L,P,PR,VE
Wet n Wild	Crème Lip Liner Pencil	L,P,PR

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
<b>COSMETICS: LIPSTICK; GLOSS; LIPCOLOR</b>		
Almay	Hydracolor Lipstick - SPF 15	P, + / - VE
Almay	Ideal Lip Color	B, E, F, P, VE
Almay	Ideal Lip Gloss	E, F, P, VE
Almay	Truly Lasting Lip Color	P
Almay	Truly Lasting Lipcolor Topcoat	E, F, VE
Avon	Color Trend Lip Color	D, DM, F, P
Avon	Color Trend Lip Gloss (all flavors)	F, L, P
Avon	Color Trend Lipstick	F, L
Avon	Color Trend Sheer Kiss Lipstick	B, F, L, P, VE
Avon	Ultra Color Rich Lipstick	F, VE
Bonne Bell	Lip Lites (all flavors)	FL, P, PG
Bonne Bell	Vita Gloss <sub>2</sub> O (all flavors)	B, E, EU, F, FL, P, VE
Boots	No. 7 High Shine Lip Gloss	L, VE
Boots	No. 7 Moisture Drench Lipstick	E, F, L, P, VE
Boots	No. 7 Sheer Temptatopn Lipstick	—
Boots	No. 7 Stay Perfect Lip Lacquer	E, VE
Boots	No. 7 Stay Perfect Lipstick	L, P
Bourjois	Lip Stain Pen	P
Burt's Bees	Lip Gloss	E, FL, L, PR, VE
Burt's Bees	Lip Shimmers	E, L, PR, VE
Clinique	Colour Surge Bare Brilliance Lipstick	P, PR, VE
Clinique	Colour Surge Impossibly Glossy Lip Gloss	E, VE
Clinique	Colour Surge Lipstick	E, VE
Clinique	Colour Surge Velvet; Colour Surge Butter Shine Lipsticks	E, VE
Clinique	Different Lipstick	L, P, PR, VE
Clinique	Full Potential Lips - Plum and Shine	E, VE
Clinique	Glosswear For Lips - Clear	E, F, L, P, VE
Clinique	Glosswear For Lips - Sheer Shimmers	P, VE
Clinique	Glosswear For Lips: Regular Shades; Intense Sparkle	E, F, L, P, VE
Clinique	Long Last Soft Matte	E, F, PR
Clinique	Long Last Soft Shine Lipstick	E, F, R, VE
Cover Girl	Continous Color with Vitamin A & E	L, P, VE
Cover Girl	Incredipull Volumizing Lipstick	BAL, F, P, VE
Cover Girl	Lipslicks (all flavors)	F, L, P, PG, VE
Cover Girl	Outlast All-Day Lip Color	F, P, PR, VE
Cover Girl	Outlast Color Coat	P
Cover Girl	Outlast Moisturizing Top Coat - Clear	E, VE
Cover Girl	Outlast Smooth Wear Color Coat	P
Cover Girl	Continous Color with Vitamin A & E	L, P, VE
Cover Girl	Incredipull Volumizing Lipstick	BAL, F, P, VE
Cover Girl	Lipslicks (all flavors)	F, L, P, PG, VE
Cover Girl	Outlast All-Day Lip Color	F, P, PR, VE
Cover Girl	Outlast Color Coat	P
Cover Girl	Outlast Moisturizing Top Coat - Clear	E, VE
Cover Girl	Outlast Smooth Wear Color Coat	P
Cover Girl	True Shine Lip Color	P
DHC	Fresh Lip Color	VE
DHC	Lip Creation	PG, VE
DHC	Moisture Care Lip Gloss - Shimmer	VE
Estee Lauder	High Gloss	E, F, FL, VE
Karma	Glassy and Classy Lip Gloss Duo - Clear	F, VE
Karma	Glassy and Classy Lip Gloss Duo - Color	F, PR, VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
L'Oreal	Colour Juice	BAL,F
L'Oreal	Endless Kissable	F,VE
Mary Kay	MK Signature Lip Gloss	E,F,VE
Mary Kay	Signature Crème Lipstick	E,F,L,P,PR,VE
Maybelline	Forever Lipcolor	E,VE
Maybelline	Moisture Extreme Lipcolor SPF 15	F,P,VE
Maybelline	Wet Shine	E,F,L,VE
Maybelline	Wet Shine Diamonds (liquid)	P
Maybelline	Wet Shine Diamonds Lipcolor	E,F,L,VE
Maybelline	Wet Shine Fusion	BAL,E,F,VE
Neutrogena	Moisture Shine Lip Gloss - Clear	E,F,FL,P,VE
Neutrogena	Moisture Shine Lip Soothers SPF 20	B,E,F,FL,P
Neutrogena	Moisture Shine Soothing Lipsheers SPF 20	FL,P,VE
NYC	Liquid Lip Shine	FL,P,VE
NYC	Precision Slant Tip Kiss Gloss	FL,P,PR,VE
Personal Basics by Andrea Rose	Moisturizing Lip Gloss	P,VE
Revlon	Color Stay Overtime Sheer; Lipcolor	P
Smackers	Lip Sparkler - Vanilla Frosting	E,F,FL,P,PG
Smackers	Snap Gloss (all flavors) - Opaque	E,F,L,P,PG
Smackers	Snap Gloss (all flavors) - Transparent (except Gum Drop)	E,F,L,P
Smackers	Snap Gloss - Gum Drop - Transparent	E,EU,F,L,P
Smackers	Squeazy Lip Smackers (all flavors)	EU,FL,PG,VE
Smackers	Whirly Shimmer Gloss	E,F,FL,P,PG,VE
VMV Hypoallergenic	Lip Bliss; Lipped Crème Lipsticks	P,PR,VE
<b>COSMETICS, LOOSE POWDER</b>		
Almay	Nearly Naked Loose Powder	E
Cover Girl	Professional Loose Powder	E,F,P,Q
Cover Girl	TRU Blend Loose Powder	P,Q
L'Oreal	Bare Naturale Soft-Focus Mineral Finish	E,F,VE
L'Oreal	Translucide with Vitamin C	F,I,P
Maybelline	Shine Free	I,P
Maybelline	Loose Shimmer	—
Neutrogena	Healthy Skin Loose Powder	P,VE
<b>COSMETICS, MASCARA</b>		
Almay	Intense I-Color	P
Almay	One Coat Nourishing - Lengthening	D,F,P,PG,VE
Almay	One Coat Nourishing - Thickening	F,I,P,Q,VE
Almay	One Coat Nourishing - Triple Effect Regular	F,I,P,Q,VE
Almay	One Coat Nourishing - Triple Effect Waterproof	F,P,VE
Beauty Wise ( <a href="http://www.bewellstaywell.com">www.bewellstaywell.com</a> )	Mineral Mascara	—
Cover Girl	Fantastic Lash	BAL,P,PG
Cover Girl	Fantastic Lash - Waterproof	P,R
Cover Girl	Lash Exact	BAL,P,PG
Cover Girl	Lash Exact - Waterproof	P,R,VE
Cover Girl	Marathon Mascara- Waterproof	P
Cover Girl	Multiplying Mascara	BAL,P,PG
Cover Girl	Professional Mascara	BAL,P,PG
Cover Girl	Remarkable Washable - Waterproof	BAL,P,PG
Cover Girl	Super Thick Lash - Smudgeproof	BAL,P,PG
Cover Girl	Volume Exact	BAL,P,PG
L'Oreal	Double Extend Regular	P
L'Oreal	Double Extend Waterproof	P
L'Oreal	Feather Lash	P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
L'Oreal	HIP High Drawn - Volumizing	I,P
L'Oreal	Lash Architect	P
L'Oreal	Lash Out	P
L'Oreal	Lash Out - Waterproof	I,P
L'Oreal	Panoramic Curl	P
L'Oreal	Panoramic Curl - Waterproof	P
L'Oreal	Telescopic Mascara	P
L'Oreal	Volume Shocking	P
L'Oreal	Volume Shocking - Waterproof	P
L'Oreal	Voluminous Curved Brush	I,P
L'Oreal	Voluminous Full Definition	D,I,P,VE
L'Oreal	Voluminous Original	I,P
L'Oreal	Voluminous Waterproof	P
Max Factor	2000 Calorie	P,PG
Max Factor	Lash Lift	P,PG
Max Factor	No Color Mascara	I,P
Max Factor	Stretch & Separate	P,PG
Max Factor	Stretch & Separate Waterproof	P
Maybelline	Define-A-Lash	P
Maybelline	Full 'N Soft	D,P,VE
Maybelline	Full 'N Soft - Waterproof	D,P,VE
Maybelline	Great Lash	P,PG,Q,(shellac)
Maybelline	Great Lash - Waterproof	P,R,VE
Maybelline	Intense XXL Length	I,P
Maybelline	Intense XXL Volume	P
Maybelline	Lash Discovery	P,PG
Maybelline	Lash Expansion	P
Maybelline	Lash Stylist	P
Maybelline	Sky High Curves	P
Maybelline	Unstoppable	P,VE
Maybelline	Volume Express	I,P
Maybelline	Volume Express Turbo Boost	P
Neutrogena	Clean Lash Tint	E,IBC,P
Neutrogena	Full Volume Fortifying Mascara	P,PG,VE
Neutrogena	Weightless Volume Wax Free Mascara	E,P,PG,VE
Revlon	Fabulash	P,VE
Revlon	Lash Fantasy	D,P,PG,VE
Revlon	Luxurious Length	F,P,PG,VE
Revlon	Luxurious Length - Waterproof	P,VE
<b>COSMETICS, NAIL POLISH</b>		
Cover Girl	Boundless Color - Top Coat; Base Coat (all types)	B,ER,TSF
Cover Girl	Continuous Color (all types)	B,ER,TSF
L'Oreal	Pro Manicure	B,TSF
Maybelline	Express Finish	B,TSF
Maybelline	Forever Strong	B,ER,TSF
Maybelline	Wet Shine; Wet Shine Diamonds	B,ER,TSF
Revlon	Color Beam Sheer Enamel	B
Revlon	Color Stay	B
Revlon	Glimmer Gloss	—
Revlon	Nail Enamel	—
<b>COSMETICS, PRESSED POWDER</b>		
Almay	Clear Complexion Pressed Powder	—
Almay	Line Smoothing Pressed Powder	E
Cover Girl	Advance Radiance	P

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Cover Girl	CG Smoothers	E,F,P,Q
Cover Girl	Clean Pressed Fragrance Free Powder	P,Q
Cover Girl	Clean Pressed Powder	E,F,P,Q
Cover Girl	Fresh Complexion Pocket	P,Q,R
Cover Girl	Fresh Look	P,Q
Cover Girl	Outlast	P
Cover Girl	TRU Blend	P
L'Oreal	Ideal Balance	E,P,PG
L'Oreal	True Match	P,VE
L'Oreal	Visible Lift	P
Maybelline	Finish Matte	I,P
Maybelline	Shine Free Oil Control	I,P
Neutrogena	Healthy Skin Pressed Powder	P,VE
Neutrogena	Skin Clearing Oil Free Pressed Powder	D,P,VE
Revlon	Age Defying Translucent	D,E,P,VE
Revlon	Color Stay	E,P
Revlon	New Complexion	D,P
<b>COUGH DROPS &amp; SYRUPS</b>		
CVS	Menthol Cough Drops: Black Cherry; Cherry, Honey Lemon; Menthol	E,FL
CVS	Menthol Cough Drops - Ice Blue (Extra Strength)	E,FL (EUC,MN,PPM only)
CVS	Menthol Cough Drops - Spearmint	E,FL (EUC,MN,SPM only)
CVS	Menthol Cough Drops: Strawberry	E
Halls	Mentho-Lyptus Cough Drops (all flavors)	E,FL
Triaminic	Cough/Sore Throat Syrup	FL
Pedia Care	Children's Long Acting Cough Syrup	FL
<b>DENTAL CARE, DENTURES</b>		
Benzodent	Denture Adhesive Ointment	BZ,F
Fixodent	Complete Denture Adhesive Cream	FL
Fixodent	Control Adhesive Ointment plus Scope	FL
Orajel	Denture Plus Gel	BZ,E,FL
Orajel	Fast Denture Pain Relief Gel	BZ,E,FL
<b>DENTAL CARE, FLOSS</b>		
Tom's of Maine	Antiplaque Flat Floss: Plain; Spearmint	E,PR
Tom's of Maine	Antiplaque Round Floss - Plain	E,PR
Tom's of Maine	Natural Flossing Ribbon	E
<b>DENTAL CARE, TOOTH WHITENERS</b>		
Listerine	Whitening Pre-Brush Rinse	FL
Rembrandt	Premium Whitening Mouth Rinse	FL
CVS	Whitening Pre-Brush Rinse - Clean Mint	FL
CVS	Once a Day Whitening Film	—
CVS	Dissolving Whitening Strips (7 Days)	FL,PG
CVS	Clear Gel Nighttime Whitening Gel (14 Days)	—
CVS	Advanced Whitening Film (7 Days)	—
Aquafresh	Once a Day White Trays	FL
Plus White	5 Minute Speed Whitening - Pre-Whitener Rinse	FL
Plus White	5 Minute Speed Whitening - Gel	—
Plus White	5 Minute Speed Whitening - One-Step Bleaching Power Gel	—
Plus White	Double Action Stain Removers - Cool Mint Paste (Tartar Control - w Fluoride)	FL
Plus White	Double Action Stain Removers - Clean Mint Paste (Tartar Control - w Fluoride & Peroxide)	FL,PG
Crest	Crest White Strips - Classic (14 Days)	—
Crest	Crest White Strips - Premium Plus (10 Days)	—

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Crest	Crest White Strips - Renewal Age Defying (10 Days)	—
Crest	Crest White Strips	—
Rembrandt	Whitening Touch Up Pen	FL
Rembrandt	Professional Strength Whitening Treatment Kit	E,FL
Rembrandt	Advanced Whitening Strips - Mint (10 Days)	FL
Rembrandt	2 Hour Whitening Kit	E,FL
<b>DENTAL CARE, TOOTHPASTE</b>		
Aim	Multi-Benefit Toothpaste	—
Aim	MultiBenefit Whitening Toothpaste with Baking Soda - Fresh Mint	FL
Aquafresh	Triple Protection Cavity Protection Toothpaste with Calcium	FL
Aquafresh	Triple Protection Extra Fresh Toothpaste with Calcium	FL
Aquafresh	Triple Protection Extreme Clean Toothpaste (all flavors)	CPB,FL
Aquafresh	Triple Protection Maximum Strength Sensitive Toothpaste	FL
Aquafresh	Triple Protection Tartar Control Whitening Toothpaste	FL
Aquafresh	Triple Protection Ultimate White Toothpaste	FL
Aquafresh	Triple Protection White and Shine Dual Action Toothpaste - Berry Fresh	FL
Arm & Hammer	Advance White Toothpaste (all flavors, types)	FL
Arm & Hammer	Complete Care Extra Whitening Tartar Control Toothpaste with Baking Soda & Peroxide	FL
Arm & Hammer	Peroxi-Care Baking Soda & Peroxide Toothpaste - Fresh Mint	FL
Close Up	Freshening Red Gel with Mouthwash	FL
Colgate	2-in-1 Whitening Liquid Gel Toothpaste and Mouthwash	CPB,FL
Colgate	2-in-1 Whitening Tartar Control Liquid Gel Toothpaste and Mouthwash	CPB,FL
Colgate	Colgate Flouride Toothpaste - Regular Flavor	FL
Colgate	Kids 2-in-1 Toothpaste and Mouthwash	CPB,FL
Colgate	Luminous Enamel Strengthening Toothpaste (all flavors)	CPB,FL
Colgate	Max Fresh Whitening Toothpaste with 50% More Mini Breath Strips: Peppermint; Spearmint	CPB,FL
Colgate	Max Fresh Whitening Toothpaste with Mini Breath Strips - Clean Mint	CPB,FL,PG
Colgate	Max Fresh Whitening Toothpaste with Mini Breath Strips - Cool Mint Liquid Gel	CPB,FL
Colgate	Max Fresh Whitening Toothpaste with Mini Breath Strips: Cool Mint; Kiss Me Mint	CPB,FL
Colgate	Maximum Strength Sensitive Whitening Toothpaste	FL
Colgate	Nickelodeon Spongebob and Squarepants™ Anticavity Flouride Toothpaste - Bubble Gum	FL
Colgate	Total Toothpaste (all types, flavors)	FL,PG
Colgate	Total Whitening Paste	FL,PG
Crest	Baking Soda & Peroxide Whitening Toothpaste with Tartar Protection - Fresh Mint	FL,PG
Crest	Cavity Protection Toothpaste - Regular Paste	FL

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Crest	Kids Flouride Anticavity Toothpaste - Sparkle Fun	FL
Crest	Multicare Whitening Toothpaste - Fresh Mint	FL
Crest	Pro Health Toothpaste - Clean Mint	FL,PG
Crest	Sensitivity Maximum Strength Extra Whitening Toothpaste - Mint	FL
Crest	Sensitivity Maximum Strength Whitening Toothpaste plus Scope	FL
Crest	Tartar Protection Toothpaste: Regular Paste; Fresh Mint Gel	FL
Crest	Whitening Expressions Flouride Anticavity Toothpaste (all flavors)	FL
Crest	Whitening Toothpaste Plus Scope - Extreme Mint Explosion	FL
Crest	Wild Expressions Flouride Anticavity Toothpaste - Bubble Gum	FL
CVS	Bright White Whitening Toothpaste with Flouride - Mint	FL,PG
CVS	Maximum Strength Sensitive Toothpaste with Flouride - Extra Whitening	FL
CVS	Maximum Strength Sensitive Toothpaste with Flouride - Fresh Mint	FL
CVS	Maximum Strength Sensitive Toothpaste with Flouride - Tartar Control Plus Whitening	FL
CVS	Premium Stain Removing Toothpaste with Flouride - Fresh Mint	CPB,FL,P,VE
J/A/S/O/N	Healthy Mouth Tea Tree Toothpaste	E,FL,TT
J/A/S/O/N	Nutrismile All Natural Ester-C Toothpaste	E,FL
Listerine	Essential Care Powerful Mint Gel Toothpaste	E,FL
Mayo Clinic Arizona	Rx Flavor Free Toothpaste	—
Mentadent	Baking Soda and Peroxide Toothpaste (all flavors)	FL
Orajel	Toddler Training Toothpaste - Bubble Burst	FL,P,PG
Rembrandt	Classic Premium Whitening Toothpaste with Flouride - Extra Gentle	FL
Rembrandt	Classic Premium Whitening Toothpaste with Flouride - Intense Stain	CPB,FL,P,VE
Rembrandt	Classic Premium Whitening Toothpaste with Flouride - Mint	CPB,FL,P
Rembrandt	Classic Premium Whitening Toothpaste with Flouride and Peroxide - Fresh Mint	CPB,FL,PG
Sensodyne	Maximum Strength Toothpaste with Flouride - Fresh Impact	FL
Sensodyne	Maximum Strength Toothpaste with Flouride - Fresh Mint	FL
Sensodyne	Maximum Strength Toothpaste with Flouride - Original Flavor	FL
Sensodyne	Maximum Strength Toothpaste with Flouride: Baking Soda; Cool Gel	FL
Sensodyne	ProName! Toothpaste - Mint Essence	CPB,FL
Sensodyne	Sensodyne Toothpaste	FL
Thera Neem	Original Herbal Mint Toothpaste	FL
Tom's of Maine	Anticavity + Whitening Flouride Liquid Gel Toothpaste (all flavors)	FL
Tom's of Maine	Anticavity Flouride Liquid Gel Toothpaste for Children - Goofy Grape	FL (GRX only)



TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Tom's of Maine	Anticavity Toothpaste - Spearmint	FL (PPM,SPM only)
Tom's of Maine	Anticavity Toothpaste for Children: Orange Mango; Silly Strawberry	FL
Tom's of Maine	Anticavity Toothpaste: Cinnamon; Wintermint	FL
Tom's of Maine	Baking Soda Anticavity Toothpaste - Gingermint	FL
Tom's of Maine	Baking Soda Anticavity Toothpaste - Peppermint	FL (PPM only)
Tom's of Maine	Homeopathic Style Whitening Toothpaste	E,FL
Tom's of Maine	Natural Antiplaque + Whitening Gel Toothpaste (all flavors)	FL
Tom's of Maine	Natural Antiplaque Tartar Control + Whitening Toothpaste - Apricot	FL
Tom's of Maine	Natural Antiplaque Tartar Control + Whitening Toothpaste: Fennel; Peppermint; Spearmint	SF (PPM,SPM only)
Tom's of Maine	Natural Antiplaque Toothpaste with Propolis and Myrrh (all flavors)	FL,PR
Tom's of Maine	Natural Apricot Toothpaste	—
Tom's of Maine	Natural Flouride-Free Toothpaste for Children - Silly Strawberry	FL
Tom's of Maine	Natural Toothpaste for Sensitive Teeth - Wintermint	CPB,FL
Tom's of Maine	Whole Care Flouride Gel Toothpaste (all flavors)	E,FL
Tom's of Maine	Whole Care Flouride Toothpaste (all flavors)	FL
Ultradrite	Advanced All-In-One Whitening Toothpaste - Clean Mint	CPB,FL
Viadent Advanced Care	Fresh Mint Paste	FL
VMV Hypoallergenics	Elation Skin-Sensitive Toothpaste - Natural Peppermint	FL (PPM only),P
VMV Hypoallergenics	Essence Skin-Saving Toothpaste	P
<b>HAIR CARE, CONDITIONERS</b>		
Alberto VO5	Detangle & Shine Leave-In Conditioner	B,DM,F,PG,VE
Alberto VO5	Extra Body Volumizing Conditioner	DM,F,VE
Alberto VO5	Hot Oil, Hot Oil Shower Works	F,P,VE
Alberto VO5	Moisture Milks Moisturizing Conditioner	DM,E,F,PG,VE
Aussie	3-Minute Miracle	BAL,E,F,MZ,TT,VE
Aussie	Awesome Volume Conditioner	BAL,E,F,MZ
Aussie	Cleanse & Mend Conditioner	BAL,E,F,MZ
Aussie	Hair Insurance Leave-In Conditioner	DM,E,F
Aussie	Moist Conditioner	BAL,E,F,MZ
Charles Worthington	Big Hair Full Volume Conditioner	F,PG
Charles Worthington	Results - Moisture Seal Conditioner	F,PG
Charles Worthington	Results - Moisture Seal Hair Healer Leave-In Conditioner	F,PG
Clairol Herbal Essences	Body Envy Conditioner	BAL,E,F,MZ,PG
Clairol Herbal Essences	Break's Over Strengthening Conditioner	BAL,E,F,MZ
Clairol Herbal Essences	Citrus Lift Conditioner	BAL,E,F,MZ,VE
Clairol Herbal Essences	Color Me Happy Conditioner	BAL,E,F,MZ
Clairol Herbal Essences	Dangerously Straight Conditioner	BAL,E,F,MZ
Clairol Herbal Essences	Drama Clean Conditioner	BAL,E,F,MZ
Clairol Herbal Essences	Hello Hydration Conditioner	BAL,E,F,MZ
Clairol Herbal Essences	None of Your Frizziness Conditioner	BAL,E,F,MZ,PG
Clairol Herbal Essences	Replenishing Conditioner	BAL,E,F,MZ,VE
Clairol Herbal Essences	Totally Twisted Conditioner	BAL,E,F,MZ
DHS (800-423-2341)	Conditioning Rinse	—
Dove	Advanced Care - Color Care Conditioner for Darker Hair	DM,F,MZ,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Dove	Advanced Care - Color Care Conditioner for Lightened/Highlighted Hair	DM,F,MZ,PG
Dove	Advanced Care - Condition Therapy Conditioner	DM,F,MZ,PG
Dove	Advanced Care - Pro Age Conditioner	DM,F,MZ,PG
Dove	Advanced Care - Sheer Moisture Conditioner	DM,F,MZ,PG
Dove	Cool Moisture Conditioner, Extra Volume Conditioner, Moisturizing Conditioner	DM,F,MZ,PG
Dove	Moisture Rich Color Conditioner	DM,F,MZ,PG
Finesse	Moisturizing Conditioner, Extra Volume Conditioner	DM,F,MZ,PG
Free & Clear (800-325-8232)	Free & Clear Hair Conditioner for Sensitive Skin	PG,VE
Garnier Fructis	Body & Volume - Fortifying Cream Conditioner	E,F,P
Garnier Fructis	Curl & Shine - Fortifying Cream Conditioner	E,F,P
Garnier Fructis	Curl & Shine - Leave-In Conditioning Cream	F
Garnier Fructis	Fortifying Cream Conditioner - For Color-Treated or Permed Hair	E,F,L,P
Garnier Fructis	Fortifying Cream Conditioner - For Dry or Damaged Hair	E,F,L,P
Garnier Fructis	Fortifying Cream Conditioner - For Normal Hair	E,F,P
Garnier Fructis	Fortifying Deep Conditioner	E,F,P
Garnier Fructis	Leave-In Conditioning Cream - For Color-Treated or Permed Hair	B,E,F,P
Garnier Fructis	Length & Strength Fortifying Cream Conditioner	E,F,L,P
Garnier Fructis	Length & Strength Leave-In Conditioning Cream	F,P,PG
Garnier Fructis	Sleek & Shine Fortifying Cream Conditioner	E,F,P
Garnier Fructis	Sleek & Shine Fortifying Deep Conditioner	E,F,P
Garnier Fructis	Sleek & Shine Leave-In Conditioning Cream	F,P
Garnier Fructis	Sleek & Shine Sheer Conditioning Glaze	F,P,PG
Garnier Fructis	Sleek & Shine Sheer Fortifying Conditioner	E,F,L,P
Garnier Fructis	Sleek & Shine Weightless Anti-Frizz Serum	F
Infusium 23	Colour(ologie) Conditioner	BAL,F,MZ
Infusium 23	Moistur(ologie) Conditioner	BAL,F,MZ
Infusium 23	Repair(ologie) Conditioner	BAL,F,MZ
Infusium 23	Repair(ologie) Leave-In Treatment	DM,F,P
Infusium 23	Volum(ologie) Conditioner	F,MZ
John Frieda	Brilliant Brunette Light Reflecting Daily Conditioner - Chestnut to Espresso	BAL,D,F,IBC,PG
John Frieda	Brilliant Brunette Light Reflecting Moisturizing Conditioner - Amber to Maple	BAL,D,F,IBC,PG
John Frieda	Brilliant Brunette Light Reflecting Moisturizing Conditioner - Chestnut to Espresso	BAL,D,F,IBC,PG
John Frieda	Glistening Perfection Volumizing Conditioner (all shades)	BAL,E,F,MZ,PG,VE
John Frieda	Radiant Red Daily Conditioner	B,E,F,MZ,PG,VE
John Frieda	Sheer Blonde Dream Crème	D,F,P,PG
John Frieda	Sheer Blonde Full-Blown Blonde Volumizing Spray	E,F,VE
John Frieda	Sheer Blonde Glistening Perfection Conditioner - Honey to Caramel	BAL,F,MZ,PG,VE
John Frieda	Sheer Blonde Glistening Perfection Moisturizing Conditioner - Honey to Caramel	BAL,E,F,MZ,PG
John Frieda	Sheer Blonde Glistening Perfection Moisturizing Conditioner - Platinum to Champagne	BAL,E,F,MZ,PG
John Frieda	Sheer Blonde Spotlight	EU,F,PG
John Frieda	Sheer Blonde Tousled Tresses Fine Mist Wax	DM,E,F,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
John Frieda	Sheer Blonde Volumizing Conditioner (all shades)	BAL,E,F,MZ,PG,VE
Johnson's	No More Tangles Spray Detangler	F
L'Oreal	Vive Pro - Color Vive Conditioner for Color Treated Dry Hair	B,F,P,VE
L'Oreal	Vive Pro - Color Vive Conditioner for Color Treated Regular Hair	B,F,P,VE
L'Oreal	Vive Pro - Color Vive Conditioner for Highlighted Hair	B,F,P,VE
L'Oreal	Vive Pro - Nutri Gloss Conditioner for Curly/Wavy Hair	F,P
L'Oreal	Vive Pro - Nutri Gloss Conditioner for Damaged Hair	F,P
L'Oreal	Vive Pro - Nutri Gloss Conditioner for Normal to Fine Hair	F,L,P
L'Oreal	Vive Pro - Nutri Gloss Conditioning Treatment	F,P
L'Oreal	Vive Pro - Smooth Intense Conditioner for Fine Hair	F,P
L'Oreal	Vive Pro - Smooth Intense Conditioner for Medium Hair	F,P
L'Oreal	Vive Pro - Smooth Intense Conditioner for Thick Hair	F,L,P
L'Oreal	Vive Pro - Style & Body Infusing Conditioner for Fine Hair	F,P
L'Oreal	Vive Pro - Style & Body Infusing Conditioner for Normal Hair	F,P
L'Oreal	Vive Pro - Style & Body Infusing Conditioner for Unmanageable Hair	F,P
Magick Botanicals (800-237-0674)	Conditioner	P
Mane & Tail	Conditioner	F,(germaben),L,P
Matrix	Biologie - Color Care Conditioner	E,F,P,PG,VE
Matrix	Biologie - Conditioning Balm	E,F,P,PG
Matrix	Biologie - Smoothing Conditioner	F,P
Matrix	Biologie - Smoothing Serum	F
Matrix	Color Smart Protective Luminating System Conditioner	E,F,L,P,PG,VE
Matrix	Curl Life Defining System Conditioner	F,P
Matrix	Sleek Look Smoothing System Conditioner	F,L,P
Neutrogena	Clean Replenishing Moisturizing Conditioner	F,P
Neutrogena	T/Gel Therapeutic Conditioner	F,P
Neutrogena	Triple Moisture Daily Deep Conditioner	E,F,P
Neutrogena	Triple Moisture Heating Shine Serum	E,F
Neutrogena	Triple Moisture Silk Touch Leave-In Cream	E,F,P,PG
Neutrogena	Triple Moisture Smooth Shine Anti-Frizz Cream	E,F,P,PG
Nexxus	Color Ensure Conditioner	E,EU,F,IBC,P,VE
Nexxus	Emergencee Reconstructor	DM,IBC,MZ,P,PG
Nexxus	Headdress Conditioner	F,L,MZ,P,VE
Nexxus	Humectress Conditioner	DM,F,IBC,P,VE
Nexxus	Hydra Sleek Conditioner	DM,E,F,PG,VE
Nexxus	Keraphix Conditioner	DM,E,F,IBC,P,PG,VE
Pantene	Pro-V - Blonde Expressions Daily Color Enhancing Conditioner - Platinum to Sandy	BAL,E,F,P,PG
Pantene	Pro-V - Blonde Expressions Daily Color Highlight Conditioner - Blonde Highlights	BAL,E,F,P,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Pantene	Pro-V - Brunette Expressions Daily Color Enhancing Conditioner	BAL,E,F,P,PG
Pantene	Pro-V - Color Revival Conditioner	B,BAL,F,MZ,VE
Pantene	Pro-V - Daily Moisture Renewal Conditioner	BAL,F,MZ
Pantene	Pro-V - Deep Fortifying Treatment	BAL,F,MZ
Pantene	Pro-V - Detangling Light Conditioning Mist	DM,F
Pantene	Pro-V - Full & Thick Conditioner	BAL,F,MZ
Pantene	Pro-V - Hydrating Curls Conditioner	BAL,F,MZ
Pantene	Pro-V - Intensive Restoration Treatment	BAL,F,MZ
Pantene	Pro-V - Midnight Expressions Conditioner	BAL,F,MZ
Pantene	Pro-V - Red Expressions Daily Color Enhancing Conditioner	BAL,E,F,MZ
Pantene	Pro-V - Relaxed & Natural Oil Cream Moisturizer for Women of Color	F,P
Pantene	Pro-V - Restoratives Breakage Defense Conditioner	BAL,F,MZ
Pantene	Pro-V - Restoratives Frizz Control Conditioner	BAL,F,MZ
Pantene	Pro-V - Restoratives Time Renewal Conditioner	BAL,F,MZ
Pantene	Pro-V - Sheer Volume Conditioner	BAL,F,MZ
Pantene	Pro-V - Smooth & Sleek Conditioner	BAL,F,MZ
Pantene	Pro-V - Texturize! Conditioner with Elastesse Complex	BAL,F,MZ
Redken	Clear Moisture Conditioner	E,F,P
Redken	Color Extend Conditioner	F,P,PG,VE
Suave	Naturals - Citrus Smoothie Conditioner	BP,E,F,MZ,PG,VE
Suave	Naturals - Ocean Breeze Conditioner	BP,F,MZ,VE
Suave	Naturals - Tropical Coconut Conditioner	BP,E,F,MZ,PG,VE
Suave	Professionals - Extreme Strength Conditioner	DM,F,MZ,PG,VE
Suave	Professionals - Humectant Conditioner	DM,F,MZ,PG,VE
Suave	Professionals - Radiant Brunette Conditioner	DM,F,MZ,PG
Suave	Professionals - Sleek Conditioner	DM,F,L,MZ, PG,VE
Suave	Professionals - Vibrant Blonde Conditioner	DM,E,F,MZ,PG
Suave	Professionals - Volumizing Conditioner	DM,F,MZ,PG
Sunsilk	Anti-Flat Conditioner	DM,F,MZ,PG
Sunsilk	Anti-Flat Volumizing Crème Conditioner	DM,F,IBC
Sunsilk	Beyond Brunette Conditioner	DM,F,MZ,PG,VE
Sunsilk	Blonde Bombshell Conditioner	DM,E,F,MZ,PG,VE
Sunsilk	Conditioner Anti-Poof	DM,F,MZ,PG
Sunsilk	D-Frizz 24/7 Crème Conditioner	DM,F,IBC,PG,VE
Sunsilk	D-Frizz Conditioner	DM,F,MZ,PG,VE
Sunsilk	Hydra TLC 24/7 Crème Conditioner	DM,E,F,IBC,PG,VE
Sunsilk	Hydra TLC Conditioner	DM,E,F,MZ,PG,VE
Sunsilk	No Major Issues Conditioner	DM,E,F,MZ,PG
Sunsilk	Straighten-Up 24/7 Crème Conditioner	DM,F,IBC,VE
Sunsilk	Straighten-Up Conditioner	DM,F,MZ,PG,VE
Sunsilk	Thermashine Conditioner	DM,F,MZ,PG
Thicker Fuller Hair	Hair Weightless Conditioner	DM,E,F,P
Thicker Fuller Hair	Instantly Thick Thickening Serum	DM,E,F,P
TRESemme	Anti-Breakage Conditioner	DM,F,VE
TRESemme	Color Revitalize Conditioner	DM,F,PG
TRESemme	Moisture Rich Conditioner	DM,E,F,PG,VE
TRESemme	Natural Conditioner	DM,E,F,VE
TRESemme	Re moisturize Pro-Vitamin B5 & Aloe Conditioner	DM,E,F,PG,VE
TRESemme	Smooth & Silky Conditioner	DM,F,VE
White Rain	Energizing Citrus Conditioner	B,E,F,P,VE
White Rain	Extra Body Conditioner	F,P

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
White Rain	Fruit Fortifying Conditioner	B,E,F,P,VE
White Rain	Water Blossom Conditioner	B,E,F,P,VE
<b>HAIR CARE, SHAMPOOS</b>		
Alberto VO5	Extra Body Shampoo	CPB,DM,F,VE
Alberto VO5	Herbal Escapes Moisturizing Shampoo	CPB,DM,E,F,PG,VE
Alberto VO5	Moisture Milks Nourishing Shampoo	CPB,DM,E,F,PG,VE
Alberto VO5	Normal Shampoo	CPB,DM,F,VE
American Crew	Citrus Mint Shampoo	E,MZ,PG
Aussie	Awesome Volume Shampoo	E,F,MZ
Aussie	Cleanse & Mend Shampoo	E,MZ
Aussie	Moist 2 in 1 & Conditioner	E,F,MZ
Aussie	Moist Shampoo	E,F,MZ
Aveeno	Baby Wash & Shampoo	CPB,F,IBC
Baby Magic	Gentle Hair & Body Wash	F,Q,VE
Charles Worthington	Big Hair Full Volume Shampoo	CPB,F,PG
Clairol Herbal Essences	Body Envy - Volumizing Shampoo	E,F,MZ,PG
Clairol Herbal Essences	Break's Over - Strengthening Shampoo	E,F,MZ,PG
Clairol Herbal Essences	Citrus Lift - Bodifying Shampoo	CPB,E,F,MZ,VE
Clairol Herbal Essences	Clarifying Shampoo	E,F,MZ
Clairol Herbal Essences	Color Me Happy Shampoo	CPB,E,F,MZ,PG
Clairol Herbal Essences	Dangerously Straight Shampoo	E,F,MZ,PG
Clairol Herbal Essences	DeGunkify Shampoo	CPB,E,F,MZ,PG
Clairol Herbal Essences	Drama Clean - Refreshing Shampoo	CPB,E,F,MZ,PG
Clairol Herbal Essences	Hello Hydration - 2 in 1 Shampoo & Conditioner	E,F,MZ,PG
Clairol Herbal Essences	Hello Hydration Shampoo	E,F,MZ,PG
Clairol Herbal Essences	None Of Your Frizziness Shampoo	E,F,MZ,PG
Clairol Herbal Essences	Replenishing Shampoo	CPB,E,F,MZ,VE
Clairol Herbal Essences	Totally Twisted - Curls & Waves Shampoo	CPB,E,F,MZ,PG
Clobex	Rx Clobex Shampoo	CPB
Denorex	2-in-1 Dandruff Shampoo and Conditioner Extra Strength	CPB,F,PG,VE
Denorex	2-in-1 Therapeutic Dandruff Shampoo and Conditioner	F,VE
Dermarest	Psoriasis Medicated 2-in-1 Shampoo and Conditioner	CPB,E,PG
DHS (800-423-2341)	Clear Shampoo	BAL,CPB
DHS (800-423-2341)	SAL Shampoo	CPB
DHS (800-423-2341)	Tar Shampoo (Fragrance-Free)	—
DHS (800-423-2341)	TarGel Shampoo	F
Dove	Advanced Pro-Age, Color Care (all types)	CPB,DM,F,MZ
Dove	Cool Moisture Shampoo, Sheer Moisture Shampoo	CPB,DM,F,MZ
Dove	Extra Volume Shampoo, Extra Volume 2 in 1 Shampoo & Conditioner	CPB,DM,F,MZ
Dove	Moisture Rich Color Shampoo	CPB,DM,F,MZ,VE
Dove	Moisturizing Shampoo	CPB,DM,F,MZ
Dove	Shampoo Therapy	CPB,F,MZ
Finesse	Enhancing Shampoo	DM,F,MZ
Finesse	Moisturizing Shampoo	CPB,DM,F,MZ
Finesse	Volumizing Shampoo	DM,F,MZ,PG
Free & Clear (800-325-8232)	Free & Clear Shampoo for Sensitive Skin & Scalp	F
Garnier Fructis	2-in-1 Antidandruff Shampoo and Conditioner	CPB,DM,E,F,P,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Garnier Fructis	2-in-1 Shampoo and Conditioner for Dry or Damaged Hair	DM,E,F,P,PG
Garnier Fructis	2-in-1 Shampoo and Conditioner for Normal Hair	CPB,DM,E,F,P,PG
Garnier Fructis	Body & Volume 2-in-1 Shampoo & Conditioner	DM,E,F,P
Garnier Fructis	Body & Volume Shampoo for Flat and Lifeless Hair	CPB,E,F,P,PG
Garnier Fructis	Curl & Shine Shampoo	CPB,DM,E,F,P
Garnier Fructis	Length and Strength Shampoo for Split Ends	CPB,DM,E,F,P
Garnier Fructis	Shampoo for Color Treated or Permed Hair	CPB,DM,E,F,P
Garnier Fructis	Shampoo for Dry or Damaged Hair	CPB,DM,E,F,P
Garnier Fructis	Shampoo for Normal Hair	CPB,DM,E,F,P
Garnier Fructis	Sleek & Shine Shampoo for Flyaway/Frizzy Hair	CPB,DM,E,F,P
Garnier Fructis	Sleek & Shine Sheer	CPB,E,F,P,PG
Head and Shoulders	Citrus Breeze Shampoo	BAL,E,F,MZ
Head and Shoulders	Classic Clean Shampoo - Regular and 2-in-1	BAL,F,MZ
Head and Shoulders	Dry Scalp Care Shampoo - Regular and 2-in-1	BAL,E,F,MZ,VE
Head and Shoulders	Extra Volume Shampoo	BAL,E,F,MZ,VE
Head and Shoulders	Hydrating Smooth & Silky Shampoo - Regular and 2-in-1	BAL,E,F,MZ,VE
Head and Shoulders	Intensive Treatment Shampoo	DM,F
Head and Shoulders	Ocean Lift Shampoo - Regular and 2-in-1	BAL,E,F,MZ
Head and Shoulders	Refresh Shampoo	BAL,F,MZ
Head and Shoulders	Restoring Shine Shampoo - Regular and 2-in-1	BAL,F,MZ,TT
Head and Shoulders	Sensitive Care Shampoo	BAL,E,F,MZ,VE
Huggies	Clean Team 2-in-1 Shampoo With Conditioner	CPB,DM,F,P,PG,Q
Infusium 23	(Moistur)ology, (Colour)ology, (Volum)ology, (Repair)ology Shampoos	F,MZ
John Frieda	Brilliant Brunette Daily Shampoo - Chestnut to Espresso	BAL,D,F,IBC,PG
John Frieda	Brilliant Brunette Moisturizing Shampoo - Amber to Maple	BAL,D,F,IBC,PG
John Frieda	Brilliant Brunette Moisturizing Shampoo - Chestnut to Espresso	BAL,D,F,IBC,PG
John Frieda	Brilliant Brunette Volumizing Shampoo - Chestnut to Espresso	BAL,D,F,IBC,PG
John Frieda	Radiant Red Daily Shampoo	B,E,F,MZ,PG,VE
John Frieda	Sheer Blonde Daily Shampoo - Honey to Caramel	BAL,D,F,IBC,PG
John Frieda	Sheer Blonde Daily Shampoo - Platinum to Champagne	BAL,D,E,F,IBC,PG
John Frieda	Sheer Blonde Moisturizing Shampoo - Honey to Caramel	BAL,D,E,F,IBC,PG
John Frieda	Sheer Blonde Moisturizing Shampoo - Platinum to Champagne	BAL,D,E,F,IBC,PG
John Frieda	Sheer Blonde Volumizing Shampoo - Honey to Caramel	BAL,F,MZ,PG,VE
John Frieda	Sheer Blonde Volumizing Shampoo - Platinum to Champagne	BAL,E,F,MZ,PG,VE
Johnson's	Baby Shampoo (all types)	CPB,F,Q
Johnson's	Buddies Easy Comb 2-in-1 Shampoo	CPB,F,Q
Johnson's	Detangling Shampoo - 2-in-1 Formula	CPB,F,P
L'Oreal	Vive Pro - Color Vive Shampoo for Color Treated Dry Hair	B,DM,F,P,VE
L'Oreal	Vive Pro - Color Vive Shampoo for Color Treated Regular Hair	B,DM,F,P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
L'Oreal	Vive Pro - Color Vive Shampoo for Highlighted Hair	B,DM,F,P,VE
L'Oreal	Vive Pro - Nutri Gloss Shampoo (all types)	CPB,DM,F,P
L'Oreal	Vive Pro - Smooth Intense Shampoo for Fine Hair	CPB,DM,F,P
L'Oreal	Vive Pro - Smooth Intense Shampoo for Medium Hair	CPB,DM,F,P
L'Oreal	Vive Pro - Smooth Intense Shampoo for Thick Hair	CPB,DM,F,P
L'Oreal	Vive Pro - Style & Body Infusing Shampoo (all types)	CPB,DM,F,P
L'Oreal	Vive Pro For Men - Daily Thickening 2-in-1 Shampoo and Conditioner	DM,F,P
L'Oreal	Vive Pro For Men - Daily Thickening Shampoo	DM,F,P
Loprox	Rx Loprox Shampoo	—
Magick Botanicals (800-237-0674)	Shampoo	CPB,P
Mane & Tail	Shampoo	CPB,DM,F
Matrix	Biolage Bodifying Shampoo	E,F,P
Matrix	Biolage Color Care Shampoo	CPB,E,F,P,PG
Matrix	Biolage Hydrating Shampoo	BAL,CPB,E,F,P,PG
Matrix	Biolage Smoothing Shampoo	CPB,F,P,PG
Matrix	Color Smart	F,VE
Matrix	Curl Life	CX,F,P
Matrix	Sleek Look	F,P,PG
MG 217	Medicated Tar Shampoo	F
Neutrogena	Clean Replenishing Moisturizing Shampoo	B,CPB,F,P
Neutrogena	Clean Volume Body Enhancing Shampoo	B,CPB,F,P
Neutrogena	Cream Lather Shampoo	E,F,P
Neutrogena	Dry Scalp Soothing Shampoo	E,F,P
Neutrogena	Neutrogena Shampoo - Anti-Residue Formula	CPB,F,I,P
Neutrogena	T/Gel Daily Control 2-in-1 Dandruff Shampoo and Conditioner	CPB,F,P,VE
Neutrogena	T/Gel Extra Strength Shampoo	CPB,F,I,P
Neutrogena	T/Gel Original Shampoo	CPB,F,I,P
Neutrogena	T/Gel Stubborn Itch Control	F,P,PG
Neutrogena	T/Sal Therapeutic Shampoo	CPB
Nexxus	AloeRid Shampoo	CPB,EU,F,MZ,VE
Nexxus	BotanOil Shampoo	CPB,E,EU,F, MZ,PG,VE
Nexxus	Color Assure Shampoo	CPB,E,EU,F,MZ,PG,VE
Nexxus	Diametress Shampoo	CPB,E,EU,F,MZ,P,PG,VE
Nexxus	SleekTress Shampoo	CPB,E,EU,F,MZ,PG,VE
Nexxus	Therappe Shampoo	CPB,E,EU,F,MZ,P,PG,VE
Nizoral	Nizoral AD Anti-Dandruff Shampoo	F,Q
Nizoral	Rx Nizoral Shampoo	CD,F,I
Pantene	ProV - Blonde Expressions Shampoo	CPB,E,F,MZ,PG
Pantene	ProV - Brunette Expressions Shampoo	E,F,MZ,PG
Pantene	ProV - Classic Clean Shinier Hair Shampoo, 2-in-1 Shampoo & Conditioner	F,MZ
Pantene	ProV - Color Revival Shampoo, 2-in-1 Shampoo & Conditioner	B,F,MZ,VE
Pantene	ProV - Daily Moisture Revival 2-in-1 Shampoo & Conditioner	F,MZ

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Pantene	ProV - Full & Thick Shampoo, 2-in-1 Shampoo & Conditioner	F,MZ
Pantene	ProV - Hydrating Curls Shampoo	F,MZ
Pantene	ProV - Ice Shine Shampoo	F,MZ
Pantene	ProV - Midnight Expressions Shampoo	F,MZ
Pantene	ProV - Red Expressions	E,F,MZ
Pantene	ProV - Relaxed & Natural for Women of Color	F,MZ
Pantene	ProV - Restorative Shampoo - Breakage Defense	CPB,F,MZ
Pantene	ProV - Restorative Shampoo - Frizz Control	F,MZ
Pantene	ProV - Restorative Shampoo - Time Renewal	F,MZ
Pantene	ProV - Sheer Volume Shampoo, 2-in-1 Shampoo & Conditioner	F,MZ
Pantene	ProV - Silver Expressions Shampoo	CPB,E,F,MZ,PG
Pantene	ProV - Smooth & Sleek Shampoo, 2-in-1 Shampoo & Conditioner	F,MZ
Pantene	ProV - Texturize! Shampoo	F,MZ
Pert	Pert Plus Shampoo + Conditioner (all types)	F,MZ
Prell	Classic Original Shampoo	B,F,MZ
Progain	Volumizing Shampoo	DM,F,IBC
Pronto Plus	Lice Removal Shampoo	F,VE
Redken For Men	Go Clean Shampoo	BAL,CPB,F,P
RID	Lice Removal Shampoo	F
Salex	Rx Salicylic Acid Shampoo	CPB,E,P,PG
Sebulex	Dandruff Shampoo	F
Selsun	Selsun Blue 2-in-1 Shampoo and Conditioner	DM,F
Selsun	Selsun Blue Medicated Shampoo	CPB,DM,F
Selsun	Selsun Blue Moisturizing Shampoo	DM,F
Selsun	Selsun Salon 2-in-1 Shampoo & Conditioner	BAL,DM,F,PG,VE
Suave	Daily Clarifying Shampoo	CPB,DM,F,MZ,VE
Suave	For Men - Deep Cleaning 2-in-1 Shampoo & Conditioner	CPB,DM,E,F,MZ,PG
Suave	For Men - Deep Cleaning Shampoo	DM,F,MZ,PG
Suave	Naturals - Citrus Smoothie Shampoo	CPB,DM,E,F,MZ,PG,VE
Suave	Naturals - Ocean Breeze Shampoo	DM,F,MZ,VE
Suave	Naturals - Tropical Coconut Shampoo	CPB,DM,E,F,MZ,PG,VE
Suave	Professionals - Extreme Strength Shampoo	CPB,DM,F,MZ,PG,VE
Suave	Professionals - Humectant Shampoo	CPB,DM,E,F,MZ,PG,VE
Suave	Professionals - Radiant Brunette Shampoo	CPB,DM,F,MZ,PG
Suave	Professionals - Sleek Shampoo	CPB,DM,F,MZ,PG,VE
Suave	Professionals - Vibrant Blonde Shampoo	CPB,DM,E,F,MZ,PG
Suave	Professionals - Volumizing Shampoo	CPB,DM,F,MZ,PG
Sunsilk	Anti-Flat Shampoo	CPB,DM,F,MZ
Sunsilk	Anti-Poof Shampoo	CPB,DM,F,MZ
Sunsilk	Beyond Brunette Shampoo	CPB,DM,E,F,MZ,PG,VE
Sunsilk	Blonde Bombshell Shampoo	CPB,DM,E,F,MZ,VE
Sunsilk	D-Frizz Shampoo	CPB,DM,F,MZ,PG,VE
Sunsilk	Hydra TLC Shampoo	CPB,DM,E,F,MZ,PG,VE
Sunsilk	No Major Issues Shampoo	CPB,DM,E,F,MZ,PG
Sunsilk	Straighten-Up Shampoo	CPB,DM,F,MZ,VE
Sunsilk	ThermaShine	CPB,DM,F,MZ
Thicker Fuller Hair	Hair Moisturizing Shampoo, Hair Revitalizing Shampoo	CPB,DM,E,F,P
TRESemme	Anti-Breakage Shampoo	CPB,DM,F,VE
TRESemme	Colour Revitalized Shampoo	CPB,DM,F,PG,VE
TRESemme	Deep Cleansing Shampoo	CPB,DM,E,F,PG,VE



TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
TRESemme	Moisture Rich Shampoo	CPB,DM,E,F,PG,VE
TRESemme	Natural Shampoo	CPB,DM,E,F,VE
TRESemme	Smooth & Silky Shampoo	CPB,DM,F,PG,VE
Ultra Swim	Chlorine Removing Shampoo	CPB,D,F,P,PG,VE
Wash & Curl	Curling Shampoo	CPB,F,MZ
White Rain	Energizing Citrus Shampoo	B,CPB,E,F,MZ
White Rain	Extra Body Shampoo	B,CPB,F,MZ
White Rain	Fruit Fortifying Shampoo	CPB,E,F,MZ,VE
White Rain	Water Blossoms Shampoo	B,CPB,E,F,MZ,VE
<b>HAIR CARE, STYLING PRODUCTS</b>		
Adorn	Hairspray (aerosol - all types)	F
Alberto VO5	Conditioning Extra Body Hair Dressing - for Fine Hair	DM,F,L,PG,VE
Alberto VO5	Conditioning Hair Dressing - for Grey/White/Silver Blonde Hair	F,L,PG,VE
Alberto VO5	Conditioning Hair Dressing - for Normal to Dry Hair	F,L,PG,VE
Alberto VO5	Curvaceous Curls Styling Mousse	CPB,F,L,PG,VE
Alberto VO5	Hair Dressing Gel For Men - Extra Hold	DM,F,PG
Alberto VO5	Hold to Hold Hairspray Scented and Unscented (aerosol)	F
Alberto VO5	Maximum Hold Hairspray (aerosol)	F,VE
Alberto VO5	Miracle Mist	B,DM,F,PG,VE
Alberto VO5	Obey & Play	DM,F,IBC,VE
Alberto VO5	Whipped Volume Styling Mousse	CPB,F,L,PG,VE
American Crew	Fiber Pliable Molding Crème	BAL,F,L,P,PG
American Crew	Forming Cream	E,F,L,P,PG
American Crew	Grooming Cream	BAL,E,F,L,P
American Crew	Styling Gel - Firm Hold	E,F,P,PG
Aqua Net	Fast-Drying Hairspray	F,VE
Aqua Net	Hair Spray (all types - aerosol and pump)	F
Aussie	Hi Hold & Hi Shine Hairspray	E,F,PG,VE
Aussie	Instant Freeze Hairspray - Extreme Hold	E,I,PG,VE
Aussie	Instant Freeze Sculpting Gel	BAL,DM,E,F
Aussie	Instant Freeze Sculpting Mousse	DM,E,F,PG
Aussie	Mega Hairspray - Flexible Hold	E,F
Aussie	Mega Hold Styling Spray	E,F
Aussie	Sprunch 'Catch the Wave' Hairspray - Flexible Hold	E,F,PG,VE
Aussie	Sprunch 'Catch the Wave' Hairspray - Strong Hold	E,F,L,PG,VE
Aussie	Sun-Touched Shine Enhancing Styling Gel	BAL,DM,E,F
Aussie	Sydney Smooth 12 hour Anti-Humidity Hairspray	E,F
Aussie	Sydney Smooth "Tizz No Frizz" Styling Gel	BAL,DM,E,F
Brylcreem	Blue	F,PG
Brylcreem	Original Hair Dressing	F,
Citre Shine	Anti-Frizz Serum	E,F
Citre Shine	Lacquer Spray	E,F,VE
Clairol Herbal Essences	Body Envy Volumizing Hairspray	E,F,PG
Clairol Herbal Essences	Body Envy Volumizing Mousse	DM,E,F,PG
Clairol Herbal Essences	Body Envy Weightless Volumizing Gel	BAL,DM,E,F,PG
Clairol Herbal Essences	Dangerously Straight Pin Straight Hairspray	E,F,PG
Clairol Herbal Essences	Dangerously Straight Pin Straight Mousse	DM,E,F,PG
Clairol Herbal Essences	Set Me Up Extra Hold Hairspray	E,F,PG

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Clairol Herbal Essences	Set Me Up Extra Hold Mousse	DM,E,F,PG
Clairol Herbal Essences	Set Me Up Extra Hold Spray Gel	DM,E,F,IBC,PG
Clairol Herbal Essences	Set Me Up Maximum Hold Gel	BAL,DM,E,F,PG
Clairol Herbal Essences	Set Me Up Maximum Hold Hairspray	E,F,PG
Clairol Herbal Essences	Shimmery Nights Flyaway Smoother	F,PG
Clairol Herbal Essences	Shimmery Nights Spray Gel	DM,F,PG,VE
Clairol Herbal Essences	Totally Twisted Curl Busting Mousse	DM,E,F,PG
Clairol Herbal Essences	Totally Twisted Curl Scrunching Gel	DM,E,F,P,PG
Clubman	Styling Gel	B,DM,F,IBC
Clubman	Super Hold	B,DM,F,IBC
Consort for Men	Bold Hold Styling Gel	DM,F,PG
Consort for Men	Hairspray (all types, including unscented)	F
Dove	Body & Lift Volumizing Mousse	CPB,DM,F
Dove	Define & Shine Control Gel	D,F,P,PG
Dove	Extra Hold Hairspray (aerosol - all types)	F
Dove	Extra Hold Hairspray for Natural Movement (pump)	B,F
Dove	Flexible Hold Hairspray (aerosol)	F
Dove	Pro-Age Finishing Spray	F
Dove	Pro-Age Styling Foam	CPB,DM,F
Dove	Smooth & Soft Anti-Frizz Cream	DM,F,IBC
Dove	Soothing Frizz Control Hairspray	DM,F,IBC
Finesse	Curl Defining Alcohol Free Mousse	CPB,DM,F
Finesse	Hairspray - Extra Hold (aerosol - scented and unscented)	F
Finesse	Hairspray - Extra Hold (pump)	B,F
Finesse	Hairspray - Maximum Hold (aerosol)	F
Free & Clear (800-325-8232)	Free & Clear Hair Spray - Firm Hold	—
Free & Clear (800-325-8232)	Free & Clear Hair Spray - Soft Hold	—
Free & Clear (800-325-8232)	Free & Clear Hair Styling Gel	—
Garnier Fructis	Brilliant Shine - Cream Gel	E,F,P,PG
Garnier Fructis	Brilliant Shine - Glossing Spray (pump)	E,F,PG
Garnier Fructis	Brilliant Shine - Water-Based Shine Wax	E,F,P,PG
Garnier Fructis	Curl Construct Mousse	E,F,P,PG
Garnier Fructis	Curl Shaping Spray Gel	DM,E,F,IBC,PG
Garnier Fructis	Fiber Gum Putty	B,E,F,P,PG
Garnier Fructis	Full Control Hair Spray (aerosol and pump)	E,F,PG
Garnier Fructis	Hard Curl Gel	B,DM,E,F,IBC,PG
Garnier Fructis	Pure Fix Spray	E,F,PG
Garnier Fructis	Shake Effect Liqui-Gel	DM,E,F,IBC,PG
Garnier Fructis	Sleek & Shine - Anti-Humidity Hairspray (aerosol)	E,F,PG
Garnier Fructis	Sleek & Shine - Anti-Humidity Styling Cream	E,F,P
Garnier Fructis	Sleek & Shine - Smoothing Milk	E,F,P,PG
Garnier Fructis	Super Stiff Gel	DM,E,F,IBC,PG
Garnier Fructis	Surf Hair	E,F,P,PG
Garnier Fructis	Volume Inject Mousse	CPB,E,F,P,PG
Garnier Fructis	Wet Shine Gel	DM,E,F,P,PG
Garnier Fructis	XXL Root Booster	DM,E,F,IBC,P,PG
Garnier Fructis	XXL Thickening Mousse	E,F,P,PG
Garnier Fructis	XXL Weightless Gel	B,E,F,P,PG
L'Oreal Studio	Overworked Styling Paste	F,P

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
L'Oreal Studio	Full Of It Volumizing Foam Spray	F,P
L'Oreal Studio	Clear Minded Clear Feeling Gel	B,D,F,P
L'Oreal Studio	Light Headed Non-Hardening Gel	B,DM,F,IBC
L'Oreal Studio	Absent Minded Non-Sticky Styler (Liqui-Gel)	F,P,PG
L'Oreal Studio	Amped Up Volumizing Mousse	B,CPB,F,P,PG
L'Oreal Studio	Above It All Volumizing Gel	DM,F,IBC
L'Oreal Studio	Head Lock Hard Hold Gel	B,DM,F,P,PG
L'Oreal Studio	Strong Suit Finishing Hairspray (pump)	F
L'Oreal Studio	Tightly Wound Cool Spray Gel	F,P
L'Oreal Studio	Upward Spiral Curl Defining Mousse	B,F,P,PG
L'Oreal Studio	Heat Seeker Straightening Cream	F,PG
L'Oreal Studio	Sedated Super Smoothing Spray	F,P
L'Oreal Studio	Weather Or Not Extreme Spiking Glue	DM,F,P
L'Oreal Studio	Shine Seeker Shine Spray (pump)	F
Magick Botanicals (800-237-0674)	Hairspray	P
Magick Botanicals (800-237-0674)	Styling Gel	PG
Pantene	Always Smooth Anti-Frizz Serum	F
Pantene	Body Builder Volumizing Gel	BAL,DM,F
Pantene	Body Builder Volumizing Mousse	DM,F,PG
Pantene	Classic In Control Mousse	DM,F,PG
Pantene	Curl Defining Scrunching Mousse	DM,F,PG
Pantene	Curl Defining Scrunching Spray Gel	DM,F,IBC
Pantene	Full & Thick Extra Fullness Mousse	DM,F,PG
Pantene	Ice Shine Volume Mousse	DM,F
Pantene	In Control Shaping Mousse	DM,F,PG
Pantene	Sculpting Wax	DM,F,PG,VE
Pantene	Sheer Volume Touchable Hairspray	F
Pantene	Texturize! Moussing Foam Wax	F,P,PG
Pantene	Texturize! Ultimate Texture Hair Spray (aerosol)	F
Rave	3X Hair Spray (aerosol - all types, scented/unscented)	B,F,VE
Rave	3X Shaping Mousse	CPB,DM,E,F
Rave	4X Hair Spray (aerosol - all types, scented/unscented)	B,F,VE
Redken for Men	Grip Tight Firm Hold Gel	F,P
Redken for Men	Maneuver Working Wax	F,P
Redken for Men	Polish Up Defining Pomade	DM,F,IBC,P
Revlon	Top Brass	F,I,L,P,PG
Suave	Extra Hold Shaping Gel	D,F,P,PG
Suave	Extra Hold Shaping Mousse	CPB,DM,F
Suave	Groom & Clean	F,L,PG
Suave	Maximum Hold Hairspray (aerosol and pump - all types)	F,VE
Suave	Naturals - Hairspray (aerosol - all types)	F,VE
Suave	Naturals - Hairspray (pump - all types)	F,VE
Suave	Naturals - Sculpting Gel Spray Gel	D,F,P,PG
Suave	Naturals - Volumizing Mousse Spray Gel	CPB,DM,F,VE
Suave	Professionals - Finishing Hair Spray (aerosol)	F
Suave	Professionals - Finishing Hair Spray (pump)	F
Suave	Professionals - Healthy Curls Anti-Frizz Cream	DM,F,IBC,L
Suave	Professionals - Healthy Curls Curl Enhancing Spray Gel	DM,EU,F,PG
Suave	Professionals - Healthy Curls Finishing Hairspray	F
Suave	Professionals - Healthy Curls Scrunching Mousse	CPB,DM,F

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Suave	Professionals - Root Lifter Spray Gel	DM,EU,F,PG
Suave	Professionals - Sleek Anti-Frizz Cream	DM,F,IBC,L
Suave	Professionals - Sleek Finishing Hairspray (aerosol)	F,VE
Suave	Professionals - Sleek Frizz Control Liqui-Gel	D,F,P,PG,VE
Suave	Professionals - Sleek Heat Protection Spray	DM,EU,F,PG,VE
Suave	Professionals - Volumizing Foam	CPB,DM,F
The Dry Look	Regular (aerosol)	F,L
TRESemme	Big Boost Root Lift Spray	B,F,PG
TRESemme	Curl Activating Spray	F,VE
TRESemme	Curl Straightening Gel	DM,F,IBC,PG,VE
TRESemme	Flawless Curls Curl-Enhancing Mousse	CPB,F,L,PG
TRESemme	Freeze & Control Hairspray (aerosol)	F
TRESemme	Heat Tamer Protection Spray	B,DM,F,PG,VE
TRESemme	Mega Sculpting Gel	DM,E,F,PG
TRESemme	So Sleek Anti-Frizz Secret Smoothing Cream	D,F,P,PG
TRESemme	So Sleek Defrizzing Gel	DM,F,PG
TRESemme	Tres Create Styling Putty	D,F,L,P,PG
TRESemme	Tres Hairspray (aerosol - all types)	F
TRESemme	Tres Mousse	CPB,F,L,PG
TRESemme	Volumizing Mousse	CPB,F,L,PG,VE
TRESemme	Weightless Body Volumizing Mousse	CPB,F,L
Vitalis	Hair Tonic	F,R
Vitalis	Maximum Hold Hair Spray	F
White Rain	Extra Hold Hairspray (pump and aerosol - all types, scented and unscented)	F
White Rain	Freeze It Original Freeze, Mega Freez (aerosol)	F
White Rain	Maximum Hold Hairspray (aerosol)	E,F
White Rain	Volumizing Extra Hold Mousse	CPB,D,F,IBC,PG,VE
Wildroot	Original Hair Dressing Gel For Men	F,FO,L,PG
<b>HAIR CARE, STYLING PRODUCTS: ETHNIC, SELECTED - (CHOSEN FOR LOW ALLERGEN CONTENT)</b>		
Blue Magic	Conditioner	F,L
Murray's	Superior Hairdressing Pomade	F
Pump It Up	Gold Super Hold Hairspray (pump)	F
Smooth 'N Shine	Hair Polisher, Spray-On Hair Polisher	F
Softée	Coconut Oil Hair & Scalp Conditioner	F
<b>HYDROCORTISONES, TOPICAL</b>		
Aveeno	1%HC Anti-Itch Cream	F,P,PG,VE
Cortaid	Advanced 12 Hour Anti-Itch Crème	BAL,E,F,P
Cortaid	Maximum Strength Cream	BAL,E,F,P
Cortaid	Maximum Strength Intensive Therapy Cooling Spray	—
Cortaid	Maximum Strength Ointment	P
Corticool	Anti-Itch Gel	B,E,PG
Cortizone 10	Maximum Strength Crème	F,P
Cortizone 10	Maximum Strength Ointment	—
Cortizone 10	Maximum Strength Plus Crème	F,P,PG,VE
Cortizone 10	Maximum Strength Quick Shot Spray	BAL,PG
Person & Covey	Aquanil HC	BAL
<b>LIP CARE: BALMS; MOISTURIZERS; SUNSCREENS; TREATMENTS</b>		
Aquafina	Premium Lip Care Cooling Balm	E,P,VE
Aveeno	Essential Moisture Lip Conditioner (SPF 15)	B,F,PR
Aveeno	Active Naturals Intense Relief Medicated Therapy Lip Protectant	E,F,PR
Aveeno	Positively Radiant Lip Enhancer Lip Balm	—
Avon	Color Trend Flavor Savers Lip Balm	FL,L,PR,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Banana Boat	Aloe Vera Sunscreen Lip Balm	B,E,F,P,VE
Blistex	Complete Moisture (SPF 15)	B,FL,P
Blistex	D.C.T. for Lips (SPF 20)	B,L,VE
Blistex	Fruit Smoothies (all flavors, SPF 15)	FL
Blistex	Gentle Sense	—
Blistex	Lip Infusion Liquid Balm	E,FL,L
Blistex	Medicated Balm (SPF 15)	B,L,P
Blistex	Medicated Lip Ointment (all flavors)	B,E,FL,L,P,PR
Blistex	Pro Relief Lip Protectant (External Analgesic)	FL,P,VE
Blistex	Silk & Shine Lip Protectant (Sunscreen - SPF 15)	B,FL,P,VE
Burt's Bees	Beeswax Lip Balm; Tube, Tin and Lifeguard's Choice	E,L,PR,VE
Burt's Bees	Beeswax Lip Gloss	E,FL,L,PR,VE
Burt's Bees	Honey Lip Balm	E,F,L,PR,VE
Burt's Bees	Radiance Lip Shimmer	E,L,PR,VE
Canary Cosmetics	Vegan Natural Lip Balm	—
Carmex	Carmex Lip Balm	E,F,L
Carmex	Click Stick (SPF 15)	B,L
Chapstick	Chapstick All Natural	E,VE
Chapstick	Chapstick Classic (SPF 4)	E,F,L,P
Chapstick	Chapstick Classic - Cherry (SPF 4)	E,F,FL,L,P
Chapstick	Chapstick Flava-Craze	FL,L,P
Chapstick	Chapstick Lip Moisturizer (tube)	B,E,F,L,P,VE
Chapstick	Chapstick - Medicated	E,L,P
Chapstick	Chapstick Moisturizer	B,E,F,L,P,VE
Chapstick	Chapstick Overnight Lip Treatment	E,P,VE
Chapstick	Chapstick - Peppermint	FL,P,PR
Chapstick	Chapstick Ultra SPF 30	B,E,FL,L,P,VE
Clinique	Superbalm Lip Treatment	E,VE
CVS	Chap Block Lip Balm - Medicated	E,FL,L,P
CVS	Chap Block Lip Balm - Aloe & Vitamin E (SPF 15)	B,E,FL,L,P,VE
CVS	Chap Block Lip Balm - Ultra 30 (SPF 30)	B,E,FL,L,P,VE
CVS	Cherry Chap Block Lip Balm (SPF 4)	FL,L,P
Estee Lauder	La Mer Lip Balm	E,F,P,VE
Lip Medex	Lip Medex Lip Balm	BAL,F,FL,L,PR
Mary Kay	Satin Lip Balm	E,L,P,PR,VE
Mary Kay	Satin Lip Mask	DM,E,FL,P,PG,VE
Mentholatum	Natural Ice (SPF 30)	F,VE
Neosporin	Neosporin LT Lip Treatment	E,FL,P,VE
Neutrogena	Lip Moisturizer (stick, SPF 15)	B,PR
Neutrogena	Lip Nutrition Balm - Berry Smooth	E,FL,IBC,P,PR
Neutrogena	Lip Nutrition Balm - Honey Rescue	E,FL,L,VE
Neutrogena	Lip Nutrition Balm - Mango Moisture	E,F,FL
Neutrogena	Lip Nutrition Balm - Passion Fruit Boosting	E,FL,L,PR,VE
Sally Hansen	Chapped Lip Repair	E,FL,P,VE
Sally Hansen	Gentle Peel for Rough Lips	E,P,VE
Sally Hansen	Line Freeze for Lips	E,P,VE
Sally Hansen	Smile Brightening Lip Treatment (various shades)	B,E,P,PG,VE
Softlips	Lip Protectant/Sunscreen - Strawberry (SPF 20)	B,E,FL,VE
Vanicream	Vanicream Lip Protectant (SPF 30)	—
Vaseline	Lip Therapy	FL
VMV Hypoallergenic	Armada Moisturizing Protective Lip Balm (SPF 60+)	P,PR,R,VE
<b>MOISTURIZERS</b>		
A&D	Cream with Zinc Oxide	BAL,F,PG
A&D	Original Ointment	F,L
Aquaphor	Healing Ointment	E,L

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Aquaphor	Healing Ointment For Babies	E,L
Aquaphor	Original Ointment	L
Aveeno	Baby Calming Comfort Lotion	BAL,F
Aveeno	Baby Daily Moisture Lotion	BAL,F
Aveeno	Baby Soothing Relief Diaper Rash Cream	E,P
Aveeno	Baby Soothing Relief Moisture Cream	BAL,F,P
Aveeno	Clear Complexion Daily Moisturizer	F
Aveeno	Daily Firming Moisturizing Lotion	BAL,F,P,PG
Aveeno	Daily Moisturizing Lotion	BAL
Aveeno	Eczema Care Moisturizing Cream	P
Aveeno	Intense Relief Hand Cream	BAL
Aveeno	Positively Ageless Daily Moisturizer SPF 30	B,E,F,P
Aveeno	Positively Ageless Night Cream	E,F,P
Aveeno	Positively Ageless Rejuvenating Serum	E,F,P
Aveeno	Positively Radiant Anti-Wrinkle Cream	BAL,DM,F,IBC,P,VE
Aveeno	Positively Radiant Daily Moisturizer SPF 15	BAL,F,IBC,P
Aveeno	Positively Radiant Eye Brightening Cream	CX,P,VE
Aveeno	Positively Radiant Moisturizing Lotion	BAL,P,VE
Aveeno	Skin Relief Moisturing Lotion With Cooling Menthol	BAL,E
Aveeno	Skin Relief Moisturizing Cream	BAL
Aveeno	Skin Relief Moisturizing Cream With Soothing Oat Essence	BAL
Aveeno	Stress Relief Moisturizing Lotion	BAL
Aveeno	Ultra-Calming Daily Moisturizer SPF 15	E,F,IBC,P
Aveeno	Ultra-Calming Night Cream	E,F,P
Baby Magic	Gentle Baby Lotion	D,F,IBC,L,P,VE
Bag Balm	Bag Balm	L
Balmex	Zinc Oxide Diaper Rash Cream	BAL,F,P,VE
Blue Star	Blue Star Ointment	—
Burt's Bees	Beeswax Hand Crème	E,F,VE
Burt's Bees	Body Butter	E,F,VE
Burt's Bees	Foot Crème	E,F,L,VE
Burt's Bees	Foot Lotion	E,MN,TT,VE
Burt's Bees	Hand Salve	E,VE
Burt's Bees	Marshmallow Vanishing Cream	E,F,VE
Burt's Bees	Naturally Nourishing Body Lotion	E,F,VE
Burt's Bees	Radiance Body Lotion	E,F,VE,YY
Burt's Bees	Radiance Day Cream	E,F,YY
Burt's Bees	Radiance Eye Cream	E,F,YY
Burt's Bees	Radiance Night Cream	E,F,YY
Burt's Bees	Royal Jelly Eye Cream	E,F,VE
Burt's Bees	Soothingly Sensitive Body Lotion	E,F,VE
Burt's Bees	Thoroughly Therapeutic Body Lotion	E,F,VE
Burt's Bees	Thoroughly Therapeutic Foot Crème	E,F,VE
Burt's Bees	Thoroughly Therapeutic Hand Crème	E,F,VE
Cerave	Moisturizing Lotion	P
Cetaphil	Daily Facial Moisturizer SPF 15	BAL,VE
Cetaphil	Moisturizing Cream	BAL,E,PG,VE
Cetaphil	Moisturizing Lotion	BAL,E,VE
Corn Husker's	Lotion	F,P
Curel	Foot Cream	E,F,MZ,P,PG,VE
Curel	Fragrance Free Lotion	P
Curel	Hand & Cuticle Cream	DM,E,F,P,PG,VE
Curel	Intensive Moisture Lotion	DM,E

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Curel	Lotion with Honey, Vanilla and Shea Butter	E,F,P,PG,VE
Curel	Nourishing Moisture Lotion for Dry Skin	E,F,P,PG,VE
Curel	Original Formula Lotion	F,P
Desitin	Creamy Zinc Oxide Diaper Rash Ointment	F,P,VE
Desitin	Original Zinc Oxide Diaper Rash Ointment	F,L,P
Doak	Acid Mantle Cream	P
Dove	Firming Beauty Body Lotion	F,P
Dove	Intensive Nourishing Lotion	DM,F,IBC,VE
Dove	Nourishing Moisture Beauty Body Lotion	F,P
Dove	Pro Age Beauty Body Lotion	F,P,PG
Dove	Pro Age Body Cream Oil	F,P,VE
Dove	Pro Age Day Moisturizer SPF 15	DM,F,IBC
Dove	Pro Age Eye Treatment SPF 8	DM,IBC
Dr. Smith's	Diaper Ointment	L
Dyprotex	Ultra Medicated Diaper Rash Ointment	E,F,L,P,VE
Elta (800-633-8872)	Elta Facial Moisturizer & Facial Block SPF 30+	P
Eucerin	Calming Crème	DM,IBC
Eucerin	Calming Itch-Relief Treatment Lotion	BAL,DM
Eucerin	Daily Replenish Lotion	L,P,VE
Eucerin	Extra Protective Moisture Lotion SPF 30	DM
Eucerin	Original Moisturizing Crème	L,MZ
Eucerin	Original Moisturizing Lotion	L,MZ,PG
Eucerin	Plus Body Crème	BAL,E,L
Eucerin	Plus Intensive Repair - Hand Crème	P
Eucerin	Plus Intensive Repair Lotion	E,L,MZ
Eucerin	Q10 Anti-Wrinkle Sensitive Skin Crème	DM,P,VE
Eucerin	Q10 Sensitive Skin Anti-Wrinkle Lotion SPF 15	B,P,VE
Eucerin	Redness Relief Daily Protecting Lotion SPF 15	IBC,P
Eucerin	Redness Relief Soothing Anti-Aging Serum	P,VE
Eucerin	Redness Relief Soothing Moisture Lotion SPF 15	P
Eucerin	Redness Relief Soothing Night Crème	BAL,IBC,P
Garnier	Skin Renew Daily Anti-Fatigue Eye Cream	E,I,P,PG,VE
Garnier	Skin Renew Daily Regenerating Moisture Cream	D,E,I,F,VE
Garnier	Skin Renew Daily Regenerating Moisture Lotion	E,F,I,P,VE
Garnier	Skin Renew Daily Regenerating Serum	E,F,I,P,PG,VE
Garnier	Ultra Lift Anti-Wrinkle Firming Moisture Cream	E,F,I,P,PG,VE
Garnier	Ultra Lift Anti-Wrinkle Firming Night Cream	D,E,F,P,PG
Garnier	Ultra Lift Anti-Wrinkle Firming Serum	E,F,I,P,PG
Gold Bond	Healing Skin Therapy Lotion with Aloe	D,E,F,P,PG,VE
Gold Bond	Softening Skin Therapy Lotion with Shea Butter	D,E,F,P,PG,VE
J/A/S/O/N	25,000 I.U. Vitamin E Crème	BAL,E,F,VE
J/A/S/O/N	Aloe Vera 84% Hand & Body Lotion	BAL,E,F,VE
J/A/S/O/N	Aloe Vera 84% Moisturizing Crème	BAL,E,F,VE
J/A/S/O/N	Glycerine & Rosewater Hand & Body Lotion	BAL,E,F,VE
J/A/S/O/N	Lavender Hand & Body Therapy	BAL,E,F,VE
J/A/S/O/N	Natural Apricot Hand & Body Lotion	BAL,E,F,VE
J/A/S/O/N	Vanilla Hand & Body Therapy	BAL,E,F,VE
Jergens	Original Scent Moisturizer	DM,F,L,P
Jergens	Shea Butter Moisturizer	E,F,MZ,P,VE
Jergens	Skin Firming Moisturizer	DM,E,F,P,VE
Jergens	Skin Smoothing Moisturizer	DM,E,F,P,VE
Jergens	Ultra Healing Moisturizer	DM,E,F,P
Johnson's	Baby Bedtime Lotion	F,P

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Johnson's	Baby Lotion	BAL,F,P,PG
Johnson's	Baby Lotion with Aloe Vera & Vitamin E	BAL,F,P,PG,VE
Johnson's	Baby Oil	F
Johnson's	Baby Oil Gel with Aloe Vera & Vitamin E	F,VE
Johnson's	Baby Oil Gel with Chamomile & Multi Vitamin Complex	F,VE
Johnson's	Baby Oil Gel with Lavender	F
Johnson's	Baby Oil with Aloe Vera & Vitamin E	A,F,VE
Johnson's	Baby Oil with Lavender	F
Johnson's	No More Rash Diaper Rash Cream	DM,IBC,L,VE
Johnson's	Softlotion 24 Hour Moisturizer	F,P
Johnson's	Softlotion Extra Care Healing Lotion	F,P
Johnson's	Softlotion Meltaway Stress Lotion	E,F,P,VE
Johnson's	Softlotion Nourishing Renewal Lotion	E,F,P,VE
Johnson's	Soothing Naturals Intense Moisture Cream	E,F,P,PG,VE
Johnson's	Soothing Naturals Nourishing Lotion	E,F,P,PG,VE
Johnson's	Soothing Vapor Baby Cream	BAL,F,P,PG
Keri	Advanced Moisture Therapy	D,F,P,VE
Keri	Nourishing Shea Butter Moisture Therapy	DM,F,IBC,P,VE
Keri	Original Moisture Therapy	DM,F,P,VE
Keri	Overnight Deep Conditioning Moisture Therapy	E,F,P,PG,VE
Lac-Hydrin	Five Lotion	D,MZ,PG
L'Oreal	Age Perfect Day Cream SPF 15	D,E,F,P,VE
L'Oreal	Age Perfect Eye & Lip Cream	P
L'Oreal	Age Perfect Eye Cream	E,P,PG,VE
L'Oreal	Age Perfect Pro-Calcium Day Cream SPF 15	DM,F,IBC,P
L'Oreal	Eye Defense	E,I,P
L'Oreal	Future.e Moisturizer SPF 15	D,F,P,VE
L'Oreal	Hydra-Renewal Cream	D,F,L,MZ,P,PG,VE
L'Oreal	Revitalift Complete Day Lotion - Fragrance Free SPF 15	E,I,P
L'Oreal	Revitalift Complete Day Lotion SPF 15	F,I,P
L'Oreal	Revitalift Face & Neck Day Cream	BAL,D,E,F,P
L'Oreal	Revitalift Night Cream	BAL,D,E,F,P
Lubriderm	Advanced Therapy Moisturizing Lotion	D,F,IBC,PG,VE
Lubriderm	Daily Moisture Lotion	F,IBC,L,P
Lubriderm	Daily Moisture Lotion Fragrance Free	IBC,L,P
Lubriderm	Daily Moisture Lotion with SPF 15	B,D,F,IBC,PG,VE
Lubriderm	Skin Nourishing Lotion with Premium Oat Extract	D,F,IBC
Lubriderm	Skin Nourishing Sea Kelp Extract Moisturizing Lotion	D,E,F,IBC,PG
Lubriderm	Skin Nourishing Sensitive Skin Therapy Moisturizing Lotion	DM,P,PG
Lubriderm	Skin Nourishing Shea/Cocoa Butter Moisturizing Lotion	D,F,IBC,VE
Mederma	Mederma	F,P
Moisture!	Lotion	BAL
Neutrogena	Anti-Oxidant Age Reverse Day Lotion SPF 20	B,BAL,E,F,MZ,P,VE
Neutrogena	Anti-Oxidant Age Reverse Eye Cream	E,F,MZ,P,VE
Neutrogena	Anti-Oxidant Age Reverse Night Cream	E,F,MZ,P
Neutrogena	Body Oil	F,P
Neutrogena	Body Oil - Fragrance Free	P
Neutrogena	Healthy Defense Daily Moisturizer SPF 30 (+/- tint)	E,P,PG,VE
Neutrogena	Healthy Defense Daily Moisturizer with Helioplex SPF 30	B,MZ,P,VE



TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Neutrogena	Healthy Defense Daily Moisturizer with Helioplex SPF 45	B,E,MZ,P,VE
Neutrogena	Healthy Skin Anti-Wrinkle Intensive Cream	B,MZ,P
Neutrogena	Healthy Skin Anti-Wrinkle Intensive Eye Cream	E,P
Neutrogena	Healthy Skin Anti-Wrinkle Intensive Night Cream	E,P,VE
Neutrogena	Healthy Skin Face Lotion SPF 15	B,D,E,F,P,VE
Neutrogena	Healthy Skin Original Formula Anti-Wrinkle Cream SPF 15	P,VE
Neutrogena	Healthy Skin Original Formula Anti-Wrinkle Eye Cream	D,E,P,VE
Neutrogena	Healthy Skin Original Formula Anti-Wrinkle Night Cream	D,P,VE
Neutrogena	Illuminating Whip Moisturizer SPF 20	E,F,MZ,P
Neutrogena	Moisture Oil-Free Facial Moisturizer for Combination Skin	D,P,VE
Neutrogena	Moisture Oil-Free Facial Moisturizer for Sensitive Skin	D,P
Neutrogena	Moisture Oil-Free Facial Moisturizer for Sensitive Skin SPF 15	B,D,P
Neutrogena	Norwegian Formula Body Moisturizer	BAL,F
Neutrogena	Norwegian Formula Body Moisturizer - Fragrance Free	BAL
Neutrogena	Norwegian Formula Cracked Heel Moisturizing Treatment	F,P,PG,VE
Neutrogena	Norwegian Formula Fast Absorbing Hand Cream	F,P,VE
Neutrogena	Norwegian Formula Foot Cream	D,E,F,P,VE
Neutrogena	Norwegian Formula Hand Cream	F,P
Neutrogena	Norwegian Formula Hand Cream - Fragrance Free	P
Neutrogena	Radiance Burst Eye Cream	E,F,P
Neutrogena	Summer Glow Daily Moisturizer SPF 15	E,F,P,VE
Neutrogena	Visibly Even Daily Facial Moisturizer SPF 15	E,F,P
Neutrogena	Visibly Even Night Concentrate	F,P
Neutrogena	Visibly Firm Eye Cream	P,VE
Neutrogena	Visibly Firm Face Lotion	P,VE
Neutrogena	Visibly Firm Lift Serum	E,F,PG,VE
Neutrogena	Visibly Firm Night Cream	E,F,P,VE
Nivea	Body - Essentially Enriched Daily Lotion	E,F,VE
Nivea	Body - Original Lotion	F,L,MZ,VE
Nivea	Body - Skin Firming Moisturizer Q10 Plus	F,P
Nivea	Body - Smooth Sensation Daily Lotion for Dry Skin	E,F,P,VE
Nivea	Crème	F,L,MZ
Nivea	Soft - Crème	F,L,P,VE
Nivea	Visage - Anti-Wrinkle & Firming Crème	E,F,IBC,VE
Nivea	Visage - Q10 Advanced Wrinkle Reducer Day Crème SPF 8	F,IBC,VE
Nivea	Visage - Q10 Advanced Wrinkle Reducer Eye Crème SPF 4	IBC,VE
Nivea	Visage - Q10 Advanced Wrinkle Reducer Lotion SPF 15	F,IBC,VE
Nivea	Visage - Q10 Advanced Wrinkle Reducer Night Crème	F,IBC
Olay	Active Beauty Fluid	DM,F,IBC
Olay	Active Hydrating Cream	DM,F,IBC
Olay	Age Defying - Anti-Wrinkle Daily Lotion SPF 15	BAL,F,P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Olay	Age Defying - Anti-Wrinkle Replenishing Night Cream	BAL,F,P,VE
Olay	Age Defying - Daily Renewal Cream	F,VE
Olay	Age Defying - Intensive Nourishing Night Cream	E,F,VE
Olay	Age Defying - Revitalizing Eye Gel	E,I,P,PG
Olay	Anti-Aging Anti-Blemish Daily Moisturizer	F,VE
Olay	Anti-Wrinkle Nutrients Daily Lotion SPF 15	BAL,E,F,P,VE
Olay	Anti-Wrinkle Nutrients Night Renewal Cream	BAL,E,F,P,VE
Olay	Body - Age Transform Body Crème Serum	BAL,F,P,VE
Olay	Body - Age Transform Intensive UV Defense Serum	BAL,E,F,P,VE
Olay	Body - Firming Reviver Body Lotion	BAL,E,F,P,PG,VE
Olay	Body - Thermal Pedicure Foot Treatment	F,P
Olay	Body Quench - Body Lotion for Extra Dry Skin	BAL,F,P,VE
Olay	Body Quench - Therapy Body Lotion	BAL,E,F,P,PG,VE
Olay	Body Quench - Therapy Repair Concentrate	BAL,E,F,P,PG,VE
Olay	Complete All Day Moisture Cream SPF 15	DM,F,IBC,VE
Olay	Complete All Day Moisture Lotion SPF 15	DM,F,IBC,VE
Olay	Complete All Day Sensitive Skin Moisture Lotion SPF 15	DM,IBC,VE
Olay	Complete Defense SPF 30 for Sensitive Skin	BAL,DM,F,IBC,P,VE
Olay	Definity - Correcting Protective Lotion SPF 15	BAL,E,F,P,VE
Olay	Definity - Deep Penetrating Foaming Moisturizer	DM,E,F,IBC,P,VE
Olay	Definity - Deep Penetrating Foaming UV Moisturizer SPF 15	E,F,P,VE
Olay	Definity - Intense Hydrating Cream	DM,E,F,IBC,P,VE
Olay	Night of Olay Firming Cream	DM,F,IBC
Olay	Regenerist - Daily Regenerating Serum	BAL,E,F,P,PG
Olay	Regenerist - Daily Regenerating Serum - Fragrance Free	BAL,E,P,PG,VE
Olay	Regenerist - Deep Hydration Replenishing Cream	E,F,P,PG,VE
Olay	Regenerist - Eye Lifting Serum	BAL,E,P,PG,VE
Olay	Regenerist - Night Recovery Moisturizing Treatment	BAL,E,F,P,PG,VE
Olay	Regenerist - UV Defense Replenishing Lotion SPF 15	BAL,E,F,P,VE
Olay	Total Effects - Intensive Restoration Treatment	DM,IBC,VE
Olay	Total Effects - Night Firming Cream	BAL,F,P,VE
Olay	Total Effects 7 Signs Serum	BAL,E,F,P,PG,VE
Olay	Total Effects 7X UVA/UVB Protection Lotion-Fragrance Free SPF 15	BAL,P,VE
Palmer's	Cocoa Butter Formula - Bottom Butter Diaper Rash Cream	BAL,D,F,P,PG
Palmer's	Cocoa Butter Formula with Vitamin E - Concentrated Cream	BAL,E,F,PG,VE
Palmer's	Cocoa Butter Formula with Vitamin E - Cream	E,F,VE
Palmer's	Cocoa Butter Formula with Vitamin E - Lotion	BAL,E,F,PG,VE
Person & Covey	Aquanil	BAL
Person & Covey	DML Forte Moisturizing Cream for Severe Dry Skin	BAL,PG
Ponds	Age DefEye Eye Therapy	D,DM,E,P,PG,VE
Ponds	Cold Cream	F
Ponds	Dry Skin Cream	DM,F,IBC,P
Pretty Feet & Hands	Rough Skin Remover	F,P
Purpose	Dual Treatment Moisture Lotion SPF 15	E,MZ

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Purpose	Redness Reducing Moisturizer SPF 30	BAL,DM,E,IBC,P,VE
RoC	Age Diminishing Daily Moisturizer SPF 15	BAL,F,IBC,P,VE
RoC	Age Diminishing Moisturizing Night Cream	BAL,DM,F,IBC,P,VE
RoC	Protient Fortifying Lift & Define - Eye Cream	P,PG
RoC	Protient Fortifying Lift & Define - Night Cream	F,P,VE
RoC	Protient Fortifying Lift & Define - Serum	F,P
RoC	Retinol Actif Pur Moisturizing Treatment - Day SPF 15	P,PG,VE
RoC	Retinol Actif Pur Moisturizing Treatment - Night	F,P,VE
RoC	Retinol Correxion Deep Wrinkle Daily Moisturizer	F,P,VE
RoC	Retinol Correxion Deep Wrinkle Night Cream	F,P
RoC	Retinol Correxion Deep Wrinkle Serum	E,F,P,VE
RoC	Retinol Correxion Eye Cream	P
St. Ives	24 Hour Moisture Body Moisturizer	DM,E,F,P,PG,VE
St. Ives	Aloe & Chamomile Body Moisturizer	DM,E,F,L,P,PG
St. Ives	Collagen Elastin Body Moisturizer	E,F,L,P,PG,VE
St. Ives	Mineral Therapy Body Moisturizer	DM,E,F,P,PG,VE
St. Ives	Vitamin E Body Moisturizer	DM,E,F,L,P,PG,VE
Steifel	Lacticare Lotion for Dry Skin	DM,F,P
Suave	Advanced Therapy Moisturizer	DM,F,P,VE
Triple Paste	Medicated Oat for Diaper Rash	E,L
Vanicream	Vanicream Lite Lotion	PG
Vanicream	Vanicream Moisturizing Skin Cream for Sensitive Skin	PG
Vaseline	Aloe Cool & Fresh Lotion	DM,E,F,IBC,VE
Vaseline	Intensive Care Active Firming Lotion	DM,F,IBC,VE
Vaseline	Intensive Care Cocoa Butter Lotion	DM,E,F,P,VE
Vaseline	Intensive Care Daily Skin Shield Lotion	DM,E,F,IBC,VE
Vaseline	Intensive Care Renewal Age Defying Body Lotion	DM,F,IBC,VE
Vaseline	Intensive Care Total Moisture Lotion	DM,F,IBC,P,VE
Vaseline	Intensive Health Hand & Nail Lotion	DM,F,P,VE
Vaseline	Intensive Rescue Heal & Repair Balm	F,P
Vaseline	Intensive Rescue Healing Hand Cream	DM,E,F,P,VE
Vaseline	Intensive Rescue Moisture Locking Lotion	F,P
Zim's	Zim's Crack Crème	D,E,IBC,P,PG
<b>ORAL CARE, ANESTHETICS</b>		
Anbesol	Maximum Strength Oral Anesthetic with Benzocaine (20%)-(all types)	BAL,BZ,FL,P,PG
CVS	Maximum Strength Oral Anesthetic Pain Relieving Liquid	BZ,FL
Orajel	Maximum Strength Toothache Powder	FL,FO
Orajel	Orajel Oral Anesthetic	BZ,FL
<b>ORAL CARE, BREATH STRIPS</b>		
Listerine	Pocketpacks Breath Strips: Cinnamon; Freshburst	E,FL,PG
Listerine	Pocketpacks Breath Strips - Cool Mint	E,FL,FO,PG
<b>ORAL CARE, DRY MOUTH</b>		
Biotene	Antibacterial Enzyme System Dry Mouth Toothpaste - Original Fresh Mint	FL
Biotene	Oral Balance Dry Mouth Moisturizing Gel	E
Tom's of Maine	Anticavity Toothpaste for Dry Mouth - Apricot	FL (AX only)
Tom's of Maine	Lemon-Lime Anti-Cavity Flouride Mouthwash for Dry Mouth	E,FL

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
<b>ORAL CARE, MOUTHWASH</b>		
ACT	Restoring Mouthwash	FL,PG
Cepacol	Cepacol Antibacterial Mouthwash	FL
Colgate	Peroxyl Antiseptic Oral Cleanser	E,FL (MN only)
Discus Dental	Breath R/X	CPB,E,FL (EUC, mint only), PG
LaCledé	Biotene	E,PG
Listerine	Advance Antiseptic Mouthwash - Tartar Protection	E,FL
Listerine	Antiseptic Mouthwash	E,FL (MN,EUC only)
Listerine	Antiseptic Mouthwash - Vanilla Mint	E,FL,PG
Listerine	Antiseptic Mouthwash: Cool Mint; Freshburst; Natural Citrus	E,FL
Listerine	Tooth Defense Anti-Cavity Fluoride Rinse - Mint Shield	—
PLAX	PLAX Mouthwash	FL
Scope	Mouthwash - Original Mint	FL
Smart Mouth	Zinc Ion Mouthwash - Mint	FL,PG
Tom's of Maine	Anticavity Fluoride Mouthwash (all flavors)	E,FL
Tom's of Maine	Cinnamint Cleansing Mouthwash	E
Tom's of Maine	Natural Tartar Control Mouthwash (all flavors)	E
Tom's of Maine	Peppermint Baking Soda Mouthwash	E,FL (MN,PPM only)
Tom's of Maine	Spearmint Cleansing Mouthwash	E,FL (MN,SPM only)
<b>ORAL CARE, RINSES</b>		
ACT	Anticavity Fluoride Rinse (Alcohol-Free)	BAL,FL,PG
Breath Rx	Anti-Bacterial Mouth Rinse - Clean Mint (Alcohol-Free)	CPB,E,FL (EUC, mint only), PG
CLOSYS	Complete Oral System Antiseptic Rinse (Alcohol-Free)	—
Colgate	Phos-Flur Anti-Cavity Fluoride Rinse - Cool Mint	FL
Crest	Pro-Health CPC Antigingivitis, Antiplaque Oral Rinse - Cool Wintergreen (Alcohol-Free)	FL,P,PG
CVS	Antiseptic Mouth Rinse	—
Listerine	Agent Cool Blue Plaque-Detecting Rinse (all flavors)	FL
Listerine	Tooth Defense Anti-Cavity Fluoride Rinse - Mint Shield	—
Listerine	Tooth Defense Anti-Cavity Fluoride Rinse - Mint Shield	FL
The Natural Dentist	Healthy Gums Daily Oral Rinse	E,FL
Ulcer Ease	Anesthetic Mouth Rinse	—
Viadent	Advance Care Oral Rinse - Fresh Mint	FL,PG
<b>POWDERS</b>		
Ammens	Original Medicated Powder	F
Caldesene	Protecting Powder	F
Gold Bond	Foot Powder	E
Gold Bond	Medicated Baby Powder Extra Strength	E
Gold Bond	Medicated Baby Powder Regular Strength	E
Gold Bond	Medicated Baby Powder Ultimate Comfort	E,F,VE
Johnson's	Aloe & Vitamin E Baby Powder	F,VE
Johnson's	Baby Powder	F
Johnson's	Lavender Baby Powder	E,F
Johnson's	Medicated Baby Powder	E,F
Johnson's	Shower to Shower (all types)	F

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Johnson's	Vanilla & Jasmine Baby Powder	F
Mexsana	Medicated Powder	E,F
Odor Eaters	Foot Powder	F
Scholl's	Odor Destroyer Medicated Foot Powder	E
Scholl's	Original Foot Powder	—
<b>SHAVING CREAM, FOAM, GEL, SOAP</b>		
Aveeno	Positively Smooth Shave Gel	BAL,E,F,P,VE
Aveeno	Therapeutic Shave Gel	E,F (BZA only),P,VE
Barbasol	Beard Buster Thick & Rich Shaving Cream - Original	F
Barbasol	Beard Buster Thick & Rich Shaving Cream - Sensitive Skin	F,L
Barbasol	Beard Buster Thick & Rich Shaving Cream - Soothing Aloe	D,F,P,PG
Brut	Shave Cream	F,L,P
Brut	Shave Gel (all types)	CD,F,P,VE
Clearasil	Skin Clearing Shave Gel	CD,E,F,P,PG,VE
Edge	Active Care - Deep Cleansing; Deep Hydrating Shave Creams; Revitalizing Shave Gel	D,F,P,PG,VE
Edge	Active Care Therapy Fragrance Free Shave Gel	BAL,F (BZA only)
Edge	Advanced Gel - Extra Moisturizing	F,VE
Edge	Advanced Gel - Extra Protection	F,VE
Edge	Advanced Gel - Ultra Sensitive	BAL,F (BZA only)
Edge	Advanced Gel With Aloe - Sensitive Skin	F
Gillette	Foamy Regular; Foamy Lemon-Lime	F
Gillette	Foamy Sensitive Skin	DM,IBC
Gillette	Fusion Hydra Gel - Clean & Fresh; Moisturizing; Ultra Sensitive	F,P,PG,VE
Gillette	Mach 3 for Dry Skin	F,PG,VE
Gillette	Mach 3 for Sensitive Skin	E,F,PG,VE
Gillette	Moisturizing Gel	F,PG
Gillette	Multi-Glide Shave Gel	B,CPB,F,MZ,P,PG,TT,VE
Gillette	Sensitive Skin Foam	F,Q
Gillette	Sensitive Skin Gel; Ultra Comfort Gel	F,PG
Gillette	Shave Gel	DM,E,F,IBC,MZ,PG,TT,VE
Gillette for Women	Satin Care Shave Gel - Dry Skin	E,F,P,PG,VE
Gillette for Women	Satin Care Shave Gel - Radiant Apricot	F,PG,VE
Gillette for Women	Satin Care Shave Gel - Sensitive Skin	F,P,PG,VE
Gillette for Women	Satin Care Shave Gel - Skin Soothing (fragrance free)	F,PG,VE
Gillette for Women	Satin Care Shave Gel - Vanilla Dream	F,PG,VE
Neutrogena	Razor Defense Shave Gel	E,F,P,VE
Neutrogena	Skin Clearing Shave Cream	BAL,F,PG,VE
Noxzema	Medicated Shave for Sensitive Skin	F
Noxzema	Medicated Shave with Aloe & Lanolin	F,L,P,
Noxzema	Regular Shave Cream	F
Old Spice	High Endurance Shave Gel	F,P,PG,VE
Old Spice	Shave Gel	F,L,P
Palmolive	Leather Shaving Cream	F
Skintimate	Aroma Therapy Shave Gel	F,VE
Skintimate	Signature Scents Shave Gel	E,F
Skintimate	Skin Therapy Shave Gel	F,VE
Tom's of Maine	Natural Mint Conditioning Shave Cream	—
Williams	Mug Shaving Soap	F

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
<b>SHAVING POWDER, SELECTED</b>		
Royal Crown	Dipilatory Shaving Powder	F
<b>SOAPS, CLEANSERS, SCRUBS, WASHES, ASTRINGENTS &amp; HAND SANITIZERS: GENERAL PURPOSE</b>		
Albolene	Moisturizing Cleanser	
Aquanil	Aquanil Cleanser	F
Aragard (800-225-4792)	Aragard D Cleanser	—
Aveeno	Clear Complexion Daily Cleansing Pads	CPB,F,P
Aveeno	Clear Complexion Foaming Cleanser	CPB,F,P
Aveeno	Daily Moisturizing Body Wash	CPB,F,PG,Q
Aveeno	Eczema Care Body Wash	—
Aveeno	Moisturizing Bar for Dry Skin	—
Aveeno	Positively Ageless Daily Exfoliating Cleanser	CPB,E,F,P
Aveeno	Positively Radiant Cleanser, Cleansing Pads	CPB,F,Q
Aveeno	Positively Radiant Cleansing Pads	CPB,F,P
Aveeno	Skin Brightening Daily Scrub	CPB,F,P
Aveeno	Skin Relief Body Wash	CPB,F,PG,Q
Aveeno	Skin Relief Body Wash - Fragrance Free	CPB,E,PG,Q
Aveeno	Stress Relief Body Wash	CPB,F,PG,Q
Aveeno	Ultra-Calming Foaming Cleanser - Fragrance Free	CPB,E,P
Aveeno Baby	Soothing Relief Creamy Wash	CPB,F
Aveeno Baby	Wash & Shampoo	CPB,F,IBC
Baby Magic	Gentle Hair & Body Wash	F,Q,VE
Basis	Sensitive Skin Bar	E,F,L
Biore	Blemish Fighting Ice Cleanser	CPB,D,F
Biore	Daily Deep Pore Cleansing Cloths	DM,E,F,P,PG
Biore	Pore Minimizing Foaming Face Wash	CPB,DM,E,F,P,PG
Biore	Pore Unclogging Scrub	B,D,F,IBC,PG
Biore	Triple Action Astringent	B,E,F
Biore	Warming Anti-Blackhead Cream Cleanser	F
Burt's Bees	Body Wash	CPB,E
Burt's Bees	Deep Cleansing Cream	E,F
Burt's Bees	Deep Pore Scrub	E,F
Burt's Bees	Facial Cleanser	E,F,L
Burt's Bees	Hand Soap	E,F
Caress	Berry Indulging Bar	CPB,F,PG,VE
Caress	Daily Silk Bar	CPB,E,F,P,PG
Caress	Daily Silk Cashmere Luxury Body Wash	CPB,E,F,MZ
Caress	Exotic Oil Infusions Bar	CPB,E,F,PG
Caress	Exotic Oil Infusions Body Wash	CPB,DM,E,F,IBC,PG
Caress	Glowing Touch Bar	CPB,F,PG
Caress	Glowing Touch Body Wash	CPB,F,PG
Caress	Tahitian Renewal Body Wash	CPB,F,MZ
Cerave	Hydrating Cleanser	P
Cetaphil	Antibacterial Cleansing Bar	F
Cetaphil	Daily Cleanser for Oily Skin	F,P
Cetaphil	Gentle Cleansing Bar	F
Cetaphil	Gentle Skin Cleanser	P,PG
Clean and Clear	Continious Control Acne Cleanser	F
Clean and Clear	Advantage Acne Cleanser	CPB,E,F,P,PG
Clean and Clear	Advantage Deep Cleaning Astringent	B,F
Clean and Clear	Blackhead Clearing Scrub	F
Clean and Clear	Daily Pore Cleanser	CPB,F,MZ,PG
Clean and Clear	Daily Pore Cleansing Pads	CPB,F,P

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Clean and Clear	Deep Action Cream Cleanser (Oil-Free)	F,MZ
Clean and Clear	Morning Burst	—
Clean and Clear	Morning Burst Facial Cleanser	CPB,E,F,VE
Clean and Clear	Morning Burst Facial Scrub	E,F,P,VE
Clean and Clear	Morning Burst Shine Control Facial Cleanser	CPB,E,F,P,VE
Clean and Clear	Morning Burst Shine Control Facial Scrub	E,F,P,VE
Clean and Clear	Oil Absorbing Sheets	—
Clean and Clear	Oxygenating Facial Scrub	E,F,P
Clean and Clear	Oxygenating Fizzing Cleanser	B,E,F
Clean and Clear	Warming Daily Pore Scrub	F,P
Clearasil	Acne Control Deep Cleansing Scrub	F,PG
Clearasil	Acne Control Pore Cleansing Pads	F,I,P
Clearasil	Daily Blackhead Control Astringent	F,P,PG
Clearasil	Daily Face Wash Cleanser	F
Clearasil	Daily Oil Control Cleansing Wipes	E,F,PG
Clearasil	Ultra Acne Clearing Gel Wash	F,PG
Clearasil	Ultra Acne Clearing Scrub	F,P,PG
Clearasil	Ultra Daily Face Wash	F,P,PG
Clearasil	Ultra Deep Pore Cleansing Pads	F,P,PG
Coast	Coast Bar Soap	F
Dial	Antibacterial Body Wash (all types)	CPB,DM,F
Dial	Antibacterial Hand Soap	CPB,DM,F
Dial	Complete Antibacterial Foaming Hand Wash	CPB,F,PG
Dial	Complete Antibacterial Foaming Hand Wash with Lotion	CPB,F,P,PG
Dial	Dial Antibacterial Bar Soap (all types)	F
Dial	Dial Body Bar With Vitamins	F,VE
Dove	Beauty Body Wash	CPB,DM,F,IBC
Dove	Beauty Bar (all types)	CPB,F
Dove	Cool Moisture Bar	E,F,PG
Dove	Cool Moisture Body Wash	CPB,DM,E,F,L,PG
Dove	Cream Oil Body Wash (all types)	CPB,DM,F,IBC,PG
Dove	Daily Hydrating Cleansing Cloths	CPB,DM,IBC,L,VE
Dove	Energy Glow Bar	CPB,F,PG
Dove	Energy Glow Beauty Body Wash	CPB,DM,F,L,PG
Dove	Facial Cleansing Cloths for Sensitive Skin	CPB,DM,E,F,IBC,VE
Dove	Gentle Exfoliating Bar	CPB,F,VE
Dove	Gentle Exfoliating Body Wash	CPB,DM,F,IBC
Dove	Gentle Exfoliating Daily Facial Cleansing Pillows	E,F,VE
Dove	Gentle Exfoliating Foaming Facial Cleanser	DM,F,IBC
Dove	Nourishing Hand Wash (all types)	CPB,DM,F,IBC,PG
Dove	Nutrium Bar	CPB,F,L,VE
Dove	Pro Age Bar	CPB,F,PG
Dove	Pro Age Beauty Body Wash	CPB,DM,F,IBC,PG
Dove	Pro Age Foaming Facial Cleanser	DM,F,IBC
Dove	Sensitive Skin Unscented Bar	CPB
Dove	Sensitive Skin Body Wash	CPB,DM,F,L
Eucerin	Redness Relief Soothing Cleanser	B,E,P
Free & Clear (800-325-8232)	Free & Clear Liquid Cleanser	
Garnier	Micro Bead Cream Scrub	E,F,I,P,VE
Garnier	Nutritioniste Nutri Pure Detoxifying Cream Cleanser	E,F,P,PG,VE
Garnier	Nutritioniste Nutri Pure Detoxifying Gel Cleanser	E,F,I,P,VE
Garnier	Nutritioniste Nutri Pure Detoxifying Wet Cleansing Towelettes	E,F,P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Gerber	Grins & Giggles Baby Wash	CPB,E,F,Q,VE
Huggies	Baby Wash (all types)	CPB,DM,F,P,PG,Q
Irish Spring	Bar Soap - Aloe, Micro Clean	F
Irish Spring	Bar Soap - Original, Icy Blast	F
Irish Spring	Body Wash Aloe	CPB,DM,F
Irish Spring	Body Wash Original / Icy Blast	CPB,DM,F
Ivory	Aloe Bar	F
Ivory	Lavender Bar	E,F
Ivory	Original Bar	—
Ivory	Liquid Hand Soap	CPB,DM,F
J/A/S/O/N	Body Wash - Aloe Vera	BAL,E,F,VE
J/A/S/O/N	Body Wash - Apricot	BAL,E,F,VE
J/A/S/O/N	Body Wash - Lavender	BAL,E,F,VE
J/A/S/O/N	Body Wash - Tea Tree	BAL,E,F,TT,VE
J/A/S/O/N	Super-C Cleanser	BAL,E,F,VE
Johnson's	Baby Creamy Bar Soap	F
Johnson's	Baby Wash - Head to Toe	CPB,F,Q
Johnson's	Baby Wash - Moisture Care	CPB,F,P,VE
Johnson's	Baby Wash - Shea and Cocoa Butter	CPB,F,P,Q,VE
Johnson's	Bedtime Moisture Wash	CPB,F,P
Johnson's	Bedtime Wash Cloths	CPB,F,P,PG
Johnson's	Buddies Instant Foam Hand & Face Wash	CPB,F,Q
Johnson's	Extra Care Bar	F,P
Johnson's	Head-to-Toe Wash Cloths	CPB,F,P,PG
Johnson's	MeltAway Stress Bar	E,F,P
Johnson's	Nourishing Care Bar	E,F,P,VE
Lever 2000	Bar Soap - Energize	CPB,E,F,PG,VE
Lever 2000	Bar Soap - Fresh Aloe	CPB,E,F,PG
Lever 2000	Bar Soap - Original	CPB,F,VE
Lever 2000	Pure Rain Body Wash	CPB,F,MZ,PG,VE
Neutrogena	Alcohol-Free Toner	F,P
Neutrogena	Clear Pore Cleanser/Mask	F
Neutrogena	Comforting Butter Body Wash	DM,E,F,P
Neutrogena	Deep Clean Facial Cleanser	CPB,F,PG
Neutrogena	Deep Clean Foaming Scrub	DM,F
Neutrogena	Deep Clean Invigorating Cleanser/Mask	F,IBC
Neutrogena	Deep Clean Invigorating Foaming Scrub	CPB,F,P
Neutrogena	Deep Clean Oil Free Cream Cleanser	F
Neutrogena	Energizing Body Wash	DM,F,P
Neutrogena	Fresh Foaming Scrub	CPB,F
Neutrogena	Healthy Skin Anti-Wrinkle Anti-Blemish Cleanser	CPB,F
Neutrogena	Illuminating Microderm Cleansing Pads	CPB,F,P
Neutrogena	Makeup Remover Cleansing Towlettes	F,IBC
Neutrogena	Oil Free Acne Stress Control Power Clear Scrub	E,F,VE
Neutrogena	Oil Free Acne Stress Control Power Foam Wash	CPB,E,F
Neutrogena	Oil Free Acne Wash Daily Scrub	F
Neutrogena	Pore Refining Cleanser	CPB,F
Neutrogena	Pore Refining Toner	E,F
Neutrogena	Visibly Even Foaming Cleanser	CPB,F,P
Neutrogena	Blackhead Eliminating Daily Scrub	F
Neutrogena	Body Clear Body Scrub	CPB,E,F,PG
Neutrogena	Body Clear Body Wash	CPB,E,F,PG
Neutrogena	Clear Pore Oil Controlling Astringent	B,E,F,PG
Neutrogena	Extra Gentle Cleanser	E,P,PG,VE
Neutrogena	Fresh Foaming Cleanser	CPB,DM,F
Neutrogena	Liquid Neutrogena Facial Cleansing Formula	CPB



TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Neutrogena	Oil Free Acne Wash	CPB,E,F,PG
Neutrogena	Oil Free Acne Wash Cream Cleanser	CPB,E,F,PG
Neutrogena	Rapid Clear Acne Oil Control Foaming Cleanser	F,PG
Neutrogena	Transparent Bar - Acne-Prone Skin	F,L,VE
Neutrogena	Transparent Facial Bar	F,VE
Noxzema	Original Deep Cleansing Cream	E,F,PG
Noxzema	60 Second Cleansing Whip	E,F,PG
Olay	Foaming Face Wash - Regular, Sensitive	DM,F
Olay	Total Effects Age Defying Cleansing Cloths	DM,F,IBC,VE
Olay	Age Defying Daily Renewal Cleanser	F
Olay	Body Bar (all types)	F
Olay	Daily Facials Cleansing Cloths - Deep Cleansing	BAL,E,F,P,VE
Olay	Daily Facials Cleansing Cloths - Hydrating	BAL,CPB,E,F,P,VE
Olay	Daily Facials Express Wet Cleansing Cloths - All Skin Types	DM,F,IBC,VE
Olay	Daily Facials Express Wet Cleansing Cloths - Sensitive Skin	DM,F,IBC,VE
Olay	Daily Facials Intensive Smooth Skin Exfoliating Scrub	F
Olay	Daily Facials Night Cleansing Cloths	BAL,E,F,P,VE
Olay	Definity Illuminating Cream Cleanser	F,MZ,VE
Olay	Definity Pore Re-Defining Scrub	E,F,MZ
Olay	Dual Action Cleanser & Toner	E,F,MZ
Olay	Hydrate & Cleanse - Anti-Oxidant Lathering Face Wash	F,MZ,VE
Olay	Hydrate & Cleanse - Micro-Bead Cleansing Serum	F,MZ,VE
Olay	Hydrate & Cleanse - Night Nourishing Cream Cleanser	E,VE
Olay	New Body Wash - Age Defying, Ultra Moisture	DM,F,VE
Olay	New Body Wash - Daily Purifying, Fresh Reviving	CPB,E,F,MZ
Olay	New Body Wash Plus Radiance Ribbons	F,MZ
Olay	New Body Wash Plus Ribbons - Almond Oil, Jojoba	DM,E,F
Olay	New Body Wash Plus Ribbons - Aloe	DM,F
Olay	Regenerist Daily Regenerating Cleanser	F,VE
Olay	Regenerist Micro-Exfoliating Wet Cleansing Cloths	DM,F,IBC,VE
Olay	Regenerist Thermal Skin Polisher	F,P,VE
Olay	Refrreshing Toner	E,F
Olay	Total Effects Anti-Aging Anti-Blemish Daily Cleanser	F
Olay	Warming Deep Purifying Cleanser	E,F,P,PG
Olay	Warming Hydrating Cleanser	F,P,VE
Oxy	Chill Factor Daily Cleansing Pads	F
Oxy	Chill Factor Face Scrub	CPB,D,E,EU,F,P,PG
Oxy	Face Scrub	CPB,D,E,F,P,PG
PanOxyl	PanOxyl BPO (10%) Acne Wash Bars	CPB
PanOxyl	Foaming Acne Wash (10% BPO)	CPB,I,P
Pears	Body Wash, Hand Wash	B,E,F
Pears	Facial Cleanser	B,CPB,DM,P
Pears	Transparent Soap	E,F,R
Pernox	Cleanser for Oily Skin	F
Phisoderm	Anti-Blemish Gel Facial Wash	DM,F,IBC
Phisoderm	Foaming Facial Wash	E,F
Phisoderm	Nurturing Facial Polish	F,I,P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Ponds	Cleansing and Makeup Remover Towelettes	BAL,DM,E,F,IBC,VE
Ponds	Dramatic Results Age Defying Cleansing Towelettes	DM,F,IBC
Ponds	Exfoliating Cleansing Towelettes	BAL,DM,E,F,IBC
Ponds	Cold Cream Cleanser	F
Ponds	Daily Exfoliating Cleanser	CPB,DM,E,F,IBC,PG,VE
Purell	Moisturizer Therapy Instant Hand Sanitizer	F
Purell	Sanitizer	F,PG,VE
Purell	Sanitizer with Aloe	F,PG,VE
Purpose	Gentle Cleansing Bar	F
Purpose	Gentle Cleansing Wash	CPB,F,Q
RoC	Age Diminishing Facial Cleanser	CPB,F,Q
Safeguard	Bar Soap	F
Sea Breeze	Sensitive Skin Fresh Clean Astringent	E,F
Sea Breeze	Actives Deep-Clean Astringent	E,F
Softsoap	Antibacterial Plus 2-in-1 Hand Soap	CPB,DM,F
Softsoap	Antibacterial Soap	CPB,DM,F
Softsoap	Antibacterial Soap - Juicy Melon	B,CPB,DM,F
Softsoap	Hand Soap - Lavender & Chamomile/Aloe	B,CPB,DM,F
Softsoap	Body Wash - Cashmere, Nutra Oil	CPB,DM,F
Softsoap	Body Wash - Mango, Pomegranate	B,CPB,DM,E,F
Softsoap	Body Wash - Milk Protein & Honey	B,CPB,DM,F
Softsoap	Body Wash - Ultra Rich Shea Butter	CPB,DM,F
Softsoap	Hand Soap - Aloe Vera	CPB,DM,F
Softsoap	Hand Soap - Ultra Rich Shea Butter	CPB,DM,F
Softsoap	Hand Soap - Wild Lavender	B,DM,F
St. Ives	Moisturizing Body Wash - Collagen Elastin, Fresh20	CPB,DM,E,F,PG
St. Ives	Apricot Cleanser - Renewing	CPB,DM,E,F,P,PG,VE
St. Ives	Apricot Scrub - Blemish & Blackhead Control, Invigorating	CPB,E,F,L,P,PG
St. Ives	Apricot Scrub - Renew & Firm	CPB,DM,E,F,IBC,PG,VE
St. Ives	Moisturizing Body Wash - Cucumber Melon, Exfoliating Apricot, Swiss Vanilla	CPB,DM,E,F,PG,VE
St. Ives	Moisturizing Body Wash - Oatmeal & Shea Butter, Whipped Silk	CPB,DM,E,F,PG,VE
Stri-Dex	Maximum Strength Pads	DM,F
Stri-Dex	Triple Action Medicated Acne Pads - Sensitive Skin w Aloe	DM,E,F
Suave	Cocoa & Shea Butter Moisturizing Body Wash	CPB,F,MZ,PG,VE
Suave	Naturals Moisturizing Body Wash (all types)	CPB,E,F,MZ,PG,VE
Tone	Skin Care Bar With Cocoa Butter	E,F,PG
Vanicream	Vanicream Cleansing Bar	PG
White Rain	Body Wash - Energizing Citrus	B,CPB,E,F,MZ
White Rain	Body Wash - Ocean Mist, Water Blossom	B,CPB,E,F,MZ,VE
White Rain	Body Wash - All Day Moisturizing	CPB,F,MZ
Yardley	Bar Soap - Aloe & Cucumber	F
Yardley	Bar Soap - English Lavender, Oatmeal and Almond	F
Zest	Bar Soap Aloe Effects	F
Zest	Bar Soap Aqua Pure	F
Zest	Bar Soap Hydrating Effects	E,F,VE
Zest	Bar Soap Stimulating Effects	F
Zest	Body Wash - Hydrating	CPB,E,F,MZ,PG,VE
Zest	Body Wash - Ocean Energy, Stimulating Effects	CPB,F,MZ
ZNP	ZNP Bar (2% zinc pyrithione)	—

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
<b>SUNSCREENS</b>		
Aveeno	Continuous Protection Sunblock Lotion - SPF 30	B,F,IBC,P,VE
Aveeno	Continuous Protection Sunblock Lotion - SPF 45	B,F,IBC,P,VE
Aveeno	Continuous Protection Sunblock Lotion - SPF 55	B,F,P,VE
Aveeno	Continuous Protection Sunblock Lotion - Face - SPF 30	B,F,IBC,P,VE
Aveeno	Continuous Protection Sunblock Spray - SPF 45	B,F,VE
Aveeno Baby	Continuous Protection Sunblock Lotion - SPF 55	B,P
Banana Boat	Baby Lotion - SPF 50	F,P,VE
Banana Boat	Dark Tanning Lotion - SPF 4	F,I,P,Q,VE
Banana Boat	Dark Tanning Oil Spray - SPF 4	EU,F,MZ,VE
Banana Boat	Kids Dri-Blok - SPF 30	B,F,IBC,VE
Banana Boat	Kids Sunblock Lotion - SPF 30	F,P,VE
Banana Boat	Kids Sunblock Spray Lotion - SPF 50	F,P,VE
Banana Boat	Maximum Sunblock Lotion - SPF 50	B,E,EU,F,MZ,VE
Banana Boat	Quick Dry Sport Sunblock Clear Spray - SPF 30	B,F,VE
Banana Boat	Sport Dri-Blok - SPF 30	B,F,IBC,VE
Banana Boat	Sport Quick Blok - SPF 35	B,EU,F,MZ,VE
Banana Boat	Sport Sunblock Lotion - SPF 15	B,F,P,Q,VE
Banana Boat	Sport Sunblock Lotion - SPF 30	B,EU,F,MZ,VE
Banana Boat	Sport Sunblock Lotion - SPF 50	B,E,EU,F,IBC,MZ,VE
Banana Boat	Sport Ultra Mist Spray - SPF 15	B,F,VE
Banana Boat	Sport Ultra Mist Spray - SPF 30	B,F,VE
Banana Boat	Sport Ultra Mist Spray - SPF 50	B,F,VE
Banana Boat	Sun Wear Faces - SPF 30	B,E,EU,F,MZ,VE
Banana Boat	Sun Wear Faces - SPF 50	B,E,EU,F,MZ,VE
Banana Boat	Sunblock Lotion - SPF 15	B,E,F,I,P,Q,VE
Banana Boat	Sunscreen Lip Balm - SPF 30	B,E,F,P,VE
Banana Boat	Sunscreen Lotion - SPF 8	B,E,F,I,P,Q,VE
Banana Boat	Ultra Sunblock Lotion - SPF 30	B,DM,F,I,IBC,Q,VE
Bull Frog	Marathon Mist - SPF 36	B,F,VE
Bull Frog	Quik Gel Sport Spray Sunblock - SPF 36	B,F,VE
Bull Frog	Quik Gel Sunblock Lotion - SPF 36	B,F,VE
Bull Frog	Super Block Sunblock Lotion - SPF 45	B,D,F,IBC,PG
Burt's Bees	Chemical-Free Sunscreen - SPF 15	E,F
Burt's Bees	Dark Tanning Oil - SPF 4	E,F,P,VE
Burt's Bees	Protective Tanning Oil - SPF 8	E,F,P,VE
Coppertone	Continuous Spray - SPF 15	B,F
Coppertone	Continuous Spray - SPF 30	B,F
Coppertone	Continuous Spray - SPF 50	B,F,VE
Coppertone	Dry Oil - SPF 8	B,E,F,L,VE
Coppertone	ES Ultrasheer Sunscreen Faces Lotion - SPF 45	B,BAL,E,P,PG,VE
Coppertone	Kids Sunblock Lotion - SPF 50	B,BAL,F,P,VE
Coppertone	Kids Sunblock Spray - SPF 45	B,D,F,P,PG
Coppertone	Oil-Free Sunblock Lotion - SPF 15	B,D,F,P,PG,VE
Coppertone	Oil-Free Sunblock Lotion - SPF 30	B,BAL,P,VE
Coppertone	Oil-Free Sunblock Lotion - SPF 45	B,BAL,P,VE
Coppertone	Oil-Free Sunblock Lotion Faces - SPF 30	B,P,VE
Coppertone	Quick Cover Lotion Spray - SPF 50	B,BAL,P,VE
Coppertone	Spectra 3 - SPF 50	B,D,P,PG,VE
Coppertone	Sport Sunblock Lotion - SPF 15	B,D,F,P,PG,VE
Coppertone	Sport Sunblock Lotion - SPF 30	B,D,F,P,PG,VE
Coppertone	Sport Sunblock Lotion - SPF 50	B,D,F,P,PG,VE
Coppertone	Sport Sunblock Lotion Spray - SPF 30	B,F,D,P,PG
Coppertone	Sport Sunblock Spray - SPF 30	B,F
Coppertone	Sunblock Lotion - SPF 15	B,BAL,F,I,P,VE
Coppertone	Sunblock Lotion - SPF 30	B,BAL,F,P,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Coppertone	Sunscreen Lotion - SPF 4	D,F,P,PG,VE
Coppertone	Sunscreen Lotion - SPF 8	B,D,F,P,PG,VE
Coppertone	Sunscreen Lotion - SPF 30	B,BAL,F,P,VE
Coppertone	Sunscreen Lotion - SPF 50	B,BAL,F,P,VE
Coppertone	Water Babies Quick Cover Lotion Spray - SPF 50	B,BAL,F,P,VE
Coppertone	Water Babies Sunscreen Lotion - SPF 50	B,BAL,F,P,VE
Coppertone	Water Babies Sunscreen Lotion Spray - SPF 50	B,BAL,F,P,VE
Elta (800-633-8872)	Elta Block SPF 30 Waterproof	DM,P,PG
Elta (800-633-8872)	Elta Block SPF 32 Dailywear	P
Hawaiian Tropic	Ozone Sunblock Lotion - SPF 70	B,E,F,I,P
Hawaiian Tropic	Sheer Touch Sunscreen Lotion - SPF 45+	B,BAL,E,F,P,VE
Neutrogena	Active Breathable Sunblock - SPF 45	B,F,IBC,P,VE
Neutrogena	Fresh Cooling Body Mist - SPF 30	B,F,PG,VE
Neutrogena	Fresh Cooling Body Mist - SPF 45	B,F,PG,VE
Neutrogena	Fresh Cooling Sunblock Gel - SPF 30	B,F
Neutrogena	Fresh Cooling Sunblock Gel - SPF 45	B,F
Neutrogena	Healthy Defense Oil-Free Sunblock Lotion - SPF 30	B,E,F,P,VE
Neutrogena	Healthy Defense Oil-Free Sunblock Stick - SPF 30	F,P,VE
Neutrogena	Sensitive Skin Sunblock Lotion - SPF 30	P,VE
Neutrogena	Ultra Sheer Body Mist Sunblock - SPF 30	B,F,VE
Neutrogena	Ultra Sheer Body Mist Sunblock - SPF 45	B,F,VE
Neutrogena	Ultra Sheer Dry-Touch Sunblock Lotion - SPF 15	B,F,MZ
Neutrogena	Ultra Sheer Dry-Touch Sunblock Lotion - SPF 30	B,BAL,E,F,P,VE
Neutrogena	Ultra Sheer Dry-Touch Sunblock Lotion - SPF 45	B,BAL,E,F,P,VE
Neutrogena	Ultra Sheer Dry-Touch Sunblock Lotion - SPF 50	B,F,IBC,P
Neutrogena	UltraSoft Hydrating Sunblock Lotion - SPF 30	B,E,F,IBC,P,VE
Neutrogena	UVA/B Sunblock Lotion - SPF 50	B,E,P,PG,VE
Vanicream	Vanicream Sunscreen SPF 15	VE
Vanicream	Vanicream Sunscreen for Sensitive Skin SPF 30	VE
Vanicream	Vanicream Sunscreen for Sensitive Skin SPF 60	VE
Vanicream	Vanicream Sunscreen Sport for Sensitive Skin SPF 35	VE
<b>THROAT DROPS &amp; LOZENGES</b>		
Chloroseptic	Sore Throat Spray	FL
CVS	Maximum Strength Sore Throat Lozenges - Black Cherry	E,FL,PG
CVS	Natural Herb Throat Drops (all flavors)	E,FL
CVS	Pectin Throat Drops - Wild Cherry	FL
Halls	Max Cough Relief Lozenges	E,FL
Ludens	Great Tasting Throat Drops (all flavors)	FL
Ricola	Natural Herb Throat Drops	E
Ricola	Natural Throat Drops (all flavors except Natural Herb)	E,FL
Sucrets	8 Hour DM Formula Cough Relief Lozenges - Cherry	E,FL
Sucrets	Complete Lozenges - Cool Citrus	E,FL,PG
Sucrets	Maximum Strength Sore Throat Lozenges - Black Cherry	E,FL
Sucrets	Original Formula Sore Throat Lozenges - Wild Cherry	E,FL,PG
<b>WIPES, BABY</b>		
7th Generation	Chlorine-Free Baby Wipes	E,F,VE
Huggies	Clean Team	DM,E,F,IBC,PG,VE
Huggies	Natural Care	DM,E,F,P,VE
Huggies	Sensitive	DM,E,F,P,VE
Huggies	Naturally Refreshing	DM,E,F,P,Q,VE

TABLE 1. Continued ...

Company	Product	NACDG Sensitizers
Huggies	Supreme	DM,E,F,P,VE
Huggies	Lavender & Chamomile	DM,E,F,P,Q,VE
Huggies	Shea Butter	DM,E,F,P,VE
Pampers	Clean 'N Go	BAL,F,IBC
Pampers	Baby Fresh	BAL,F,IBC
Pampers	Natural	BAL,E,F,IBC
Pampers	Unscented	BAL,E,F,IBC
Pampers	Sensitive Wipes	BAL,E,F,IBC
Pampers	Calming	BAL,F,IBC
Pampers	Swipers	BAL,F,IBC
Walgreen's	Comfort Smooth - Scented	E,F,MZ,Q,VE
Walgreen's	Comfort Smooth - Fragrance Free	E,F,MZ,Q,VE
<b>WIPES, GENERAL PURPOSE</b>		
Charmin	Freshmates	BAL,F,IBC
Cottonelle	Fresh Flushable Moist Wipes	DM,E,F,IBC,PG,VE
Herban Essentials	Towlettes: Eucalyptus, Lemon, Peppermint	E
Herban Essentials	Yoga Towlettes - Lavender	E
Walgreen's	Flushable Moist Wipes	E,F,P,Q,MZ,VE
<b>NACDG Sensitizers and Related Substances</b>		
AX -	apricot extract*	
B -	benzophenones	
BAL -	benzyl alcohol (fragrance)	
BP -	bronopol	
BZ -	benzocaine	
BZA -	benzaldehyde	
CA -	camphor	
CD -	cocamide DEA	
CPB -	cocamidopropyl betaine	
CX -	chloroxylenol	
D -	diazolidinyl urea	
DM -	DMDM hydantoin	
E -	essential oils and biological additives	
ER -	epoxy resin	
EU -	euyl-K400	
EUC -	eucalyptus*	
F -	fragrances	
FEN -	fennel*	
FL -	flavors, unspecified	
FO -	formaldehyde	
GRX -	grape extract*	
GTH -	glyceryl thioglycollate	
I -	imidazolidinyl urea	
IBC -	iodopropynyl butylcarbamate	
L -	lanolin	
MN -	menthol*	
MZ -	methylisothiazolinone, methylchloroisothiazolinone	
P -	parabens	
PG -	propylene glycol	
PPD -	paraphenylenediamine	
PPM -	peppermint*	
PR -	propolis	
Q -	quaternium-15	
R -	rosin (colophony)	
SF -	specified flavors*	

TABLE 1. Continued ...

SPM -	spearmint*
TSF -	toluene sulfonamide/formaldehyde resin
TT -	tea tree oil
VE -	vitamin E
Y -	ylang ylang

\*Specific flavors (low risk) are sometimes listed on product labels.

TABLE 2. Balsam of Peru diet (foodstuffs to avoid)\*

**Patients should eliminate all of the foods below for 1 month. After that, restricted foods can be reintroduced one every 3 days. If a flare-up occurs, this is thought to be an allergy and the particular food should be avoided.**

Citrus Fruit: Lemon, orange, lime, grapefruit, tangerine and foods containing these fruits (marmalade, juices, bakery goods)

Sweets: Candy, chocolate, cookies, cake, pastries, chewing gum, ice cream, soft drinks and other sweet bakery goods

Tomato: Tomato, tomato sauces, Italian or Mexican red sauces, pizza, chili, ketchup, chili sauce, barbeque sauce

Condiments: Spicy condiments (see also: tomatoes), chutney, liver paste, pickled items

Spices: Cinnamon, cloves, vanilla, allspice, ginger, anise, curry

Liquors: Wine, beer, gin, vermouth

Misc.: Perfumed tea or tobacco, many cough medicines/lozenges

\*Adapted from: Salam TN, Fowler JF Jr: Balsam-related systemic contact dermatitis. *J Am Acad Dermatol* 2001;45(3):377-81.

these substances and also in circumstances where contact allergy elsewhere on the body does not clear with avoidance of topical exposure alone.<sup>38</sup> The BOP diet consists of complete avoidance of all of the substances listed in Table 2 for at least 1 month. Afterward, if improvement is obtained, restricted foods can be resumed (one every 3 days), and those which cause a recurrence of the allergy are permanently avoided. Often only one or two of the top triggering foods on the restricted list will need to be permanently avoided.<sup>38</sup>

In Table 1, products with unspecified flavors are indicated by the abbreviation FL, and such products should be avoided by persons allergic to fragrance, BOP, cinnamic aldehyde, and benzyl alcohol. Sometimes, the particular flavors used in a product are specified and are ones which are unlikely to be a problem for patients with these allergies. These products are indicated in Table 1 with the abbreviation SF followed by the name of the specific flavor(s) (ie, peppermint, apricot, etc.) and may be tried by allergic individuals with caution.

## Part II: Non-Fragrance Allergens in Skin, Hair, Cosmetic, Nail, and Oral Products

### *Parabens*

The second most common cause of contact allergy to skin, hair, and cosmetic products are chemical preservatives.<sup>70</sup> A number of different preservatives are found on the NACDG standard tray. One of the most commonly used groups of preservatives are the parabens which include methyl paraben, ethyl paraben, butyl paraben, and propyl paraben. Although earlier generations of dermatologists were instructed that these preservatives were a common cause of contact allergy, it has become apparent over time that this group of preservatives is actually a relatively uncommon cause of contact allergy.<sup>71</sup> In addition, when contact allergy to parabens is found, allergic individuals often experience reactions to these ingredients only on inflamed skin. In other words, individuals allergic to parabens will often tolerate products which contain these ingredients when they are applied to normal, non-inflamed skin. This phenomenon has been called the “paraben paradox.”<sup>72,73</sup> Parabens are used extensively in facial cosmetics and safe alternatives are often difficult to find. In [Table 1](#), the presence of parabens is indicated by the letter P.

### *Formaldehyde-Releasing Preservatives*

Formaldehyde, the simplest aldehyde, is a colorless gas that is widely used in many products in the environment. It represents 5% of the U.S.’s gross national product.<sup>74</sup> Formaldehyde can be used as a disinfectant since it kills most bacteria and fungi. It was first commercially used in medical embalming fluid and as a preservative for laboratory specimens. Now it is used to make plywood and asphalt shingles. It is also added in bonded leather, waterproof glues, fertilizers, and photographic developer. It is released in the smoke from burning wood, coal, charcoal, cigarettes,<sup>75</sup> natural gas, and kerosene.

After fragrances, formaldehyde has been reported by some authors as the second most common source of cosmetic-associated contact dermatitis.<sup>2</sup> It is an irritant and an allergen, as well as a potential carcinogen. Many people have become sensitized to formaldehyde; therefore, manufacturers have replaced formaldehyde with formaldehyde-releasing preservatives (FRPs) in order to decrease sensitization and lower the concentration of formaldehyde. These FRPs include: quaternium-15, diazolidinyl urea (Germall II), DMDM hydantoin (Glydant), imidazolidinyl urea (Germall), 2-bromo-2-nitropropane-1,3-diol (Bronopol), and tris

nitromethane (Tris Nitro).<sup>76</sup> Tris Nitro is an industrial biocide and is not usually found in skin, hair, or cosmetic products.

Formaldehyde is not generally used as an ingredient in skin care and cosmetic products but can be used as a marker to identify individuals allergic to related preservatives. The five cosmetic FRPs above are the actual preservatives found in products on the market. FRPs are added to many skin, hair, and cosmetic products, baby wipes, and topical medications. Of these, the first four FRPs listed above are relatively common, whereas Bronopol is less commonly found. It has been controversial whether or not it is necessary for an individual who has a positive reaction to one of these substances to avoid all FRPs. Traditionally, it has been common practice to recommend avoidance of all FRPs when an individual patch tests positive to any one of these ingredients. However, one author has suggested that it is only necessary to avoid the specific preservatives to which an individual tests positive.<sup>77</sup> At the very least, it is probably prudent to recommend avoidance of all of these ingredients if an individual has positive patch tests to both formaldehyde and at least one FRP.

FRPs are also found in mouthwash, clothing, paper, orthopedic casts, and root canal disinfectants. Inhalation of cigarette smoke<sup>78</sup> as well as ingestion of foods which metabolize into formaldehyde can trigger allergic reactions in sensitized individuals.<sup>79-81</sup> Examples of formaldehyde-containing food include aspartame (Equal®), coffee (especially instant coffee), dried bean curd, cod fish, caviar, maple syrup, shitake mushrooms, and smoked ham.<sup>82-85</sup> Symptoms have been reported to greatly improve in patients with contact dermatitis to formaldehyde who avoid these cosmetic products and associated foods.

In [Table 1](#), the following abbreviations are used: BP, Bronopol; D, diazolidinyl urea; DM, DMDM hydantoin; I, imidazolidinyl urea; and Q, quaternium 15. The abbreviation FO indicates the presence of formaldehyde or related substances (such as aspartame).

### *Kathon CG (Methylisothiazolinone, Methylchloroisothiazolinone)*

The third preservative found on the NACDG standard tray is Kathon CG, a mixture of methylisothiazolinone and methylchloroisothiazolinone. Contact allergy to Kathon CG in the U.S. is less common than to formaldehyde or quaternium 15.<sup>86</sup> This preservative has been reported to be a more common allergen in Europe than in the U.S., and the reason for this discrepancy is not clear.<sup>45</sup> It is possible that its use in the U.S. is more frequently in wash-off products which are often tolerated by persons



allergic to this preservative.<sup>87</sup> The presence of Kathon CG is indicated by the abbreviation MZ in [Table 1](#).

### *Euxyl K400* *(Methyldibromoglutaronitrile/Phenoxyethanol)*

The fourth preservative on the NACDG standard tray is called Euxyl K400, a mixture of methyldibromoglutaronitrile and phenoxyethanol. Of these, the former ingredient is felt to be the predominant sensitizer.<sup>88</sup> In recent years, methyldibromoglutaronitrile has been identified with increasing frequency as a sensitizer, and some recent articles suggest that its use should not be allowed in cosmetic products.<sup>89</sup> This ingredient has been used more commonly in Europe and never achieved a strong presence in the U.S. market. Nevertheless, it is found in a small number of products on the market in this country.

Patients are often confused by the long chemical INCI names methyldibromoglutaronitrile and methylisothiazolinone. One strategy to educate patients on avoidance is to instruct patients to look for a single ingredient with “methyl” that is over eight syllables long. The sensitizers in Kathon CG and Euxyl K400 are virtually the only ingredients in skin care and cosmetic products that meet this description. The ingredients in Kathon CG are almost always found as a pair, whereas the ingredient in Euxyl K400 is always found by itself on a product label. In [Table 1](#), the abbreviation EU indicates the presence of Euxyl K400.

### *Iodopropynylbutylcarbamate*

The NACDG standard tray also includes the preservative iodopropynylbutylcarbamate. This preservative is a less frequent cause of contact allergy and is especially effective at preventing the growth of fungal organisms in topical products.<sup>90-92</sup> It is frequently found in baby wipes and moist toilet paper. In [Table 1](#), the abbreviation IBC indicates the presence of iodopropynylbutylcarbamate.

### *Preservatives Hidden in Herbal Extracts*

When herbal extracts are used in a product, the manufacturer may add preservatives to prevent spoilage before shipping the ingredient. Unfortunately, the product manufacturers will often not disclose these preservatives in the ingredient list of the finished product. Preservatives are not generally required in emollient plant oils, fine essential oils used as fragrances, or either alcohol-based or propylene glycol-containing extracts. They are most commonly added to aqueous herbal extracts. Unfortunately, when a given botanical ingredient is listed on a product

label, it is not possible to determine the type of extraction process used or whether preservatives were added to the ingredient. If the amount of botanical extracts in a product is minimal, the amount of added preservative would be expected to be negligible. In contrast, because the percentage of botanical ingredients in many aromatherapy products and anti-aging cosmeceuticals can be quite high, the amount of added preservative could be high enough to cause allergic contact dermatitis. To be safe, it may be necessary for persons allergic to preservatives to avoid products with herbal extracts. The presence of herbal extracts used as fragrance in products is indicated by the abbreviation E in Table 1. However, some anti-aging products contain non-fragranced antioxidant herbal extracts which may also need to be avoided by these patients. Some common examples are green tea extract (*Cammelia sinensis*) and grapeseed extract (*Vitis vinefera*).

### *Cocamidopropyl Betaine, Amidoamine*

The use of the mild detergent cocamidopropyl betaine (CPB) in sudsing products has increased in recent years.<sup>93</sup> CPB is a viscous, pale yellow, transparent liquid, derived from the fatty acids of coconut oil. It is also known as cocoyl amide propyldimethyl glycine, coconut oil amidopropyl betaine, tegobetaine L7, N-cocamidopropyl-N, and N-dimethylglycine hydroxide inner salt. It is used as a mild, high-foaming amphoteric surfactant that provides good foaming and foam liquid stabilization. It is primarily found in shampoos and bath gels but is also used in some other bath products, bar soaps, liquid hand soaps, liquid detergents, surface cleaners, pet care products, and other skin and hair-care products.<sup>37</sup> According to a 1991 Food and Drug Administration data report, CPB is found in over 600 personal care products.<sup>94</sup> It was first introduced into personal care and hygiene products when Johnson & Johnson developed the first cocamidopropyl betaine detergent-based shampoo, “No More Tears” baby shampoo, in 1967. When used with anionic agents, it can function as an emulsifying agent and thickener in cosmetics. It also serves as an antistatic agent in hair conditioners. Although amphoteric surfactants are generally considered fairly nonirritating as compared with anionic and cationic surfactants, under certain circumstances it is capable of irritating the skin or mucus membranes. More importantly, it has been identified in recent years as a cause of contact allergy.<sup>95,96</sup> CPB allergy often presents as an eyelid, facial, scalp, and neck dermatitis.<sup>95</sup> The NACDG 2001–2002 patch test results showed a prevalence rate of 2.8% to CPB (1% in aqueous vehicle).<sup>28</sup>

Studies have shown that CPB is probably not the actual cause of allergic

reactions to products containing this ingredient. Instead, it is likely that impurities produced in the manufacturing of this ingredient, amidoamine and dimethylaminopropylamine, are the actual allergens causing these reactions.<sup>93,97-99</sup> One of these intermediates, amidoamine, is on the NACDG standard tray, and a positive patch test reaction to this substance can sometimes identify allergic individuals with a negative patch test to actual CPB.<sup>99</sup> Individuals who patch test positive to either substance should be counseled to avoid CPB. In [Table 1](#), the presence of CPB is indicated by the abbreviation CPB. This ingredient will almost always be found in sudsing products, such as shampoos and cleansers.

### *Propylene Glycol*

Another common allergen in skin, hair, and cosmetic products, as well as in topical medicaments, is propylene glycol (also known by the systematic name propane-1,2-diol). It is an organic compound derived from natural gas, and it is used in many different products because it serves multiple functions. For skin and hair, propylene glycol is an excellent humectant that prevents the escape of moisture or water from the skin and cosmetic product.<sup>100</sup> It also is an exceptional solvent which helps to mix other relatively insoluble ingredients into cosmetic products.<sup>100</sup> It is a clear, odorless, oily fluid that is soluble in water, acetone, and chloroform. Specific to the soap-making and toiletry-making industry, it is used as a carrier in fragrance oils and in many soap bases. Propylene glycol acts as a penetration enhancer which helps active ingredients in topical medications penetrate the skin barrier.<sup>100</sup> Therefore, it is found in many topical medications and up to 50% of commercially available topical corticosteroids.<sup>101,102</sup> Propylene glycol also functions as a preservative in skin, hair, and cosmetic products as well as in topical medications.<sup>37</sup>

In an ideal world, we choose a concentration for testing possible contact allergens which is very likely to pick up individuals who are allergic to the substance but very unlikely to cause false-positive irritant reactions. In the case of propylene glycol, the Material Safety Data Sheet warns users to avoid skin contact with propylene glycol since it constitutes a strong skin irritant (when its concentration is above 50%). Currently, the NACDG tests propylene glycol in water at a 30% concentration.<sup>28</sup> However, the 30% concentration used to identify contact allergy is capable of causing irritation in many individuals with sensitive skin.<sup>100</sup> Therefore, it is sometimes impossible to determine whether positive patch test reactions indicate true allergy or just irritation. Nevertheless, the position can be taken that a positive reaction to propylene glycol indicates

that for one reason or another the individual being tested does not appear to tolerate this ingredient.

There are also a number of cosmetic ingredients closely related to propylene glycol. Some of these ingredients are butylene glycol, hexylene glycol, and derivatives such as propylene glycol stearate. Allergic contact dermatitis to some of these ingredients has been documented; however, little is known about the cross-reactivity with propylene glycol.<sup>103-105</sup> In [Table 1](#), the presence of propylene glycol or any directly related derivative (ie, propylene glycol stearate, dipropylene glycol, etc.) is indicated by the abbreviation PG. More distantly related ingredients (ie, butylene glycol, hexylene glycol, etc.) are not included on these charts.

Propylene glycol is a very versatile propylene oxide derivative which is also an ingredient in many industrial applications, including polyester and alkyd resins, paints and coatings, brake fluid, antifreeze coolants and heat transfer fluids, plasticizers, industrial solvents, and aircraft deicing fluids.

Propylene glycol can also be found in foods. It can be added to cake mixes, salad dressings, soft drinks, popcorn, food colorings, fat-free ice cream, and sour cream. Propylene glycol also protects food from freezing. Furthermore, propylene glycol or polyethylene glycol have been found in toothpastes, mouthwashes, lip balms, and breath fresheners. There are, however, many propylene glycol-free oral products that are listed in [Table 1](#). Foods with propylene glycol are listed in [Table 3](#).

### *Lanolin and Wool Alcohol*

Lanolin, also called wool wax, wool fat, or wool grease, is a greasy yellow substance, chemically similar to wax, which is secreted by the sebaceous glands of wool-bearing animals, such as sheep. It acts as a waterproofing wax and aids sheep in shedding water from their coats. Certain breeds of sheep produce large amounts of lanolin, and the extraction can be performed by squeezing the wool between rollers. Most or all of the lanolin is removed from the wool when it is processed into textiles such as yarn or felt. Lanolin is chiefly a complex mixture of sterols, fatty alcohols (esters and polyesters), and fatty acids.<sup>37</sup>

The sterols (lanolin alcohols or wool alcohols) include cholesterol, lanosterol, and agnosterol and are built from one or more benzene rings. Cholesterol is the major ingredient of lanolin alcohol. According to Oleffe and coworkers and Alexander Fisher (verbal), lanolin alcohols are the main sensitizers responsible for allergy to lanolin<sup>106</sup>; however, further studies are required to establish whether these lanolin alcohols are the sole or main allergens in lanolin.<sup>107</sup> On the other hand, the fatty alcohols are long-chained and include the closely related stearyl alcohol and cetyl

**TABLE 3.** Foods containing propylene glycol

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**Desserts:**

Dolly Donut Gems  
Dolly Fudge Brownies  
Hostess Crumb Donettes  
Hostess Cupcakes  
Hostess Frosted Donettes  
Hostess Powdered Donettes  
Tops Cakes  
Tops Cinnamon Buns  
Tops Vanilla Ice Cream

**Dessert Kits:**

Banquet Dessert Bakes Chocolate Silk Pie  
Banquet Dessert Bakes Coconut Cream Pie  
Betty Crocker Muffin and Quickbread Mixes  
Betty Crocker Super Moist Cake Mixes  
Duncan Hines Moist Deluxe Cake Mixes  
Duncan Hines Signature Desserts Chocolate Silk Torte  
Duncan Hines Signature Desserts Hot Fudge Brownie Sundae  
Duncan Hines Signature Desserts Orange Dreamsicle  
Duncan Hines Signature Desserts White Chocolate Raspberry  
Pillsbury Moist Supreme Cake Mixes  
Pillsbury Ultimate Dessert Kit Chocolate Caramel  
Pillsbury Ultimate Dessert Kit Cookie's and Cream  
Pillsbury Ultimate Dessert Kit Strawberry and Crème  
Sweet and Low Yellow Snack Cake Mix

**Potato Salads:**

Grandma's Mustard Potato Salad  
Grandma's Potato Salad with Egg

**Salad Dressings:**

Hidden Valley Light Original Ranch Salad Dressing  
Ken's Buttermilk Ranch Salad Dressing  
Ken's Chunky Blue Cheese Salad Dressing  
Ken's Lite Caesar Salad Dressing  
Ken's Peppercorn Ranch Salad Dressing  
Kraft Cucumber Ranch Salad Dressing  
Kraft Free Creamy Italian Salad Dressing  
Kraft Free Ranch Salad Dressing  
Kraft Lite Golden Caesar Salad Dressing  
Kraft Lite Roka Blue Cheese Salad Dressing  
Kraft Lite Zesty Italian Salad Dressing  
Kraft South Beach Diet Ranch Salad Dressing  
Marie's Blue Cheese Vinaigrette Salad Dressing  
Marie's Chunky Blue Cheese Salad Dressing  
Marie's Lite Chunky Blue Cheese Salad Dressing  
Old Cape Cod Chunky Blue Cheese and Chive Salad Dressing  
Old Cape Cod Light Sweet and Sour Poppy Seed  
Old Cape Cod Vineyard Honey Light  
T. Marzetti Asian Ginger Salad Dressing  
T. Marzetti Honey Balsamic Salad Dressing  
T. Marzetti Light Chunky Blue Cheese Salad Dressing  
T. Marzetti Light Original Slaw

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TABLE 3. Continued ...

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T. Marzetti Poppy Seed Salad Dressing
Wishbone Chunky Blue Cheese Salad Dressing
Wishbone Creamy Italian Salad Dressing
Wishbone Deluxe French Salad Dressing
Wishbone Garlic Ranch Salad Dressing
Wishbone Ranch Salad Dressing
Wishbone Raspberry Hazelnut Vinaigrette Salad Dressing
Wishbone Raspberry Walnut Vinaigrette Salad Dressing
Wishbone Thousand Island Salad Dressing
<b>Sauces:</b>
French's Gourn Mayo Caesar Ranch condiment
French's Gourn Mayo Dijon condiment
French's Gourn Mayo Wasabi Horseradish condiment
K.C. Masterpiece Steakhouse Marinade and Garlic & Herb Marinade
McCormick Golden Dipt Fat Free Tartar Sauce
Phillips Seafood Restaurants Tartar Sauce
<b>Snack foods:</b>
Durkee French Fried Onion Rings
French's French-Fried Onions
French's Potato Sticks
<b>Taco Bell Products:</b>
Avocado Ranch Dressing
Creamy Jalapeno Sauce
Creamy Lime Sauce
Pepper Jack Sauce
Zesty Chicken Bowl Dressing

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alcohol. These substances are uncommon causes of contact allergy. The last ingredients of lanolin, the fatty acids, have not been found to be sensitizers.<sup>37</sup>

Medical grade lanolin is used in skin creams and ointments to soothe skin. *Lansinoh*, a product that some breastfeeding mothers use on sore and cracked nipples, is pure, medical grade lanolin. Along with diaper rash, dry skin, minor cuts, and minor burns, this grade of lanolin can also be used to treat chapped lips. As an ointment base, it readily absorbs through the skin, facilitating absorption of the medicinal chemicals it carries. Lanolin is used in many lips balms and lipsticks, such as Carmex Lip Balm, ChapStick, Blistex Lip Protectant, and Burt's Bees Beeswax. Occasional cross-reactants of lanolin include the fatty alcohols: cetyl alcohol and stearyl alcohol.

The actual materials used to identify lanolin allergy are either wool alcohol or a specific lanolin alcohol product called Amerchol L101<sup>®</sup>, a mixture of lanolin alcohol and mineral oil which contains wool alcohol obtained from the hydrolysis of wool fat.<sup>108</sup> Individuals with allergy to these substances should at a minimum be advised to avoid lanolin alcohol

and actual lanolin (which contains lanolin alcohol). Products from Europe use the synonym wool wax to indicate lanolin and the synonym wool wax alcohol or wool alcohol to indicate lanolin alcohol. Therefore, patients allergic to this substance should be instructed to look for all five of these names on ingredient lists. Unfortunately, there have been no large well-controlled studies which conclusively demonstrate that individuals allergic to lanolin will not react to other derivatives, such as lanolin oil or lanolin acid. Therefore, in [Table 1](#), the presence of either lanolin or lanolin derivatives is indicated by the abbreviation L.

Lanolin is also used commercially in many products ranging from rust-preventative coatings to lubricants. It also may be added to waterproofing waxes or raw materials such as shoe polish. Some sailors use lanolin to create a slippery surface on their propellers and stern gear so that barnacles do not adhere. The water-repellent properties make it valuable as a lubricant, where corrosion would otherwise be a problem.

## Oxybenzone

Benzophenone-3 or oxybenzone, an aromatic ketone, is a white crystalline substance with a rose-like odor that is insoluble in water. Benzophenone is used as a constituent of synthetic perfumes and as a starting material for the manufacture of dyes, pesticides, and drugs. Oxybenzone is also a major constituent of many sunscreens since benzophenone is an effective protectant against both UVA2 and UVB rays. It protects and reduces skin damage by deactivating substrate molecules that have been excited by light. Benzophenone-3 is used in many lip balms, lip glosses, and lip treatments to reduce skin damage to the lips.

Oxybenzone has been commonly reported as a cause of contact allergy.<sup>109-111</sup> Previously, many cases of contact allergy to sunscreen ingredients were caused by PABA (para-aminobenzoic acid); however, this ingredient received so much publicity as a potential allergen that it has been removed from most products on the market.<sup>109,110</sup> Therefore, oxybenzone and avobenzone have replaced PABA as the most common causes of allergy to sunblock ingredients.<sup>112</sup> Many hair and nail products contain benzophenone-4, and it is not clear how often cross-reactions occur between benzophenone-3 and benzophenone-4.<sup>112</sup> The presence of either benzophenone-3 or benzophenone-4 is indicated by the abbreviation B in [Table 1](#). It is important to realize that not all contact allergy to sunscreen is caused by this ingredient. There are other sunscreen ingredients which can cause contact allergy that are not present on the NACDG standard tray, and it is also not uncommon for individuals to

have reactions to ingredients such as fragrance or preservatives in sunscreen vehicles.

Many reactions to oxybenzone occur only when the molecule is stimulated by UVA light. Therefore, photopatch testing may be needed to diagnose allergy. Photopatch testing begins with application of sunscreens or other photosensitizers in the same fashion as patch testing described earlier. However, after 48 hours, the patches are removed to expose one set of sunscreens to 10 joules of UVA light. This additional step is normally performed only for one duplicate set of sunscreen patches and the other set is not exposed to UV light to simultaneously test for non-photo contact dermatitis.

### *Vitamin E*

Vitamin E is a fairly infrequent cause of contact allergy.<sup>113,114</sup> Vitamin E in the form 100% DL-alpha-tocopherol is now on the NACDG standard tray. Again, it is not clear whether related derivatives can cause problems in allergic individuals. In [Table 1](#), the abbreviation VE indicates the presence of any form of vitamin E.

### *Cocamide DEA*

Cocamide DEA (also known as cocamide diethanolamine) is a foam-boosting ingredient found in sudsing products (such as shampoos and skin cleansers) and is an occasional cause of contact allergy.<sup>115,116</sup> This ingredient is indicated by the abbreviation CD in [Table 1](#).

### *Tolsylamide Resin, Toluene Sulfonamide Formaldehyde (TSF) Resin*

There are also a few specialty ingredients that can identify contact allergy to specific types of cosmetic products. The main cause of contact allergy to nail polish products is toluene sulfonamide formaldehyde resin (also known as TSF resin or tosylamide resin).<sup>117,118</sup> This ingredient can be found in nail polish, base coat, top coat, and quick-drying nail products. Contact allergy to nail products can occur at sites touched by the nails, such as the neck, face, and especially the eyelids.<sup>118</sup> It can also cause inflammation of the proximal nail folds.<sup>119</sup> In recent years, a number of products with alternative resins have appeared on the market, and this ingredient is no longer difficult to avoid. In [Table 1](#), the abbreviation TSF indicates the presence of this resin.

### *Paraphenylenediamine*

The most common cause of contact allergy to hair dye products is paraphenylenediamine.<sup>120</sup> Years ago, this ingredient was found only in



permanent hair dyes; however, it is now also found in most semi-permanent and demi-permanent dyes.<sup>121</sup> Hair dyes are now defined by the presence or absence of what has been called “lift.” A permanent dye contains ammonia and peroxide as lifting agents which lighten the ambient hair color to a lighter shade prior to dyeing hair in order to better cover gray.<sup>121</sup> A demi-permanent uses an alkanolamine (such as aminoethylpropanol or monoethanolamine) to provide a modest amount of lift but provides less coverage of gray hair.<sup>121</sup> A semi-permanent dye has no lifting agent and provides even less coverage of gray hair.<sup>121</sup> There are very few alternatives for individuals who are allergic to paraphenylenediamine since products containing this ingredient are far superior to other hair dye products. Nevertheless, persons allergic to this ingredient can use Goldwell Elumen hair dye as an alternative. This product uses acid dyes as active ingredients rather than paraphenylenediamine. Another possible alternative is Clairol Loving Care hair dye which uses disperse dyes as active ingredients; however, some persons allergic to paraphenylenediamine will cross-react to disperse dyes.<sup>121</sup> Although cross-reactions have also occurred with temporary hair color rinses, these cross-reactions have been much less common.<sup>121</sup> However, many patients do not like temporary hair color rinses since they provide less coverage of gray and have to be reapplied often. Other possible alternative hair dyes include products based on lead acetate such as the original Grecian Formula. These products darken gray hair but they do not provide good coverage.<sup>121</sup> However, many products marketed under the Grecian Formula brand name do contain PPDA. Another possible alternative for persons allergic to hair dye is henna; however, this ingredient has a reddish color and is mostly useful for individuals with red hair.<sup>120,121</sup>

Finding alternative products for persons allergic to both hair dye and fragrance is a more difficult problem. The approach to these patients should consist of obtaining one of the previously mentioned hair dyes which are free of paraphenylenediamine and then performing patch testing to the actual dye product (appropriately diluted) to determine whether there is allergy to the specific fragrance in the product. Sometimes it will not be possible to find an alternative product for these patients.

It is also important to mention that paraphenylenediamine has been identified as the cause of contact allergy to certain temporary tattoos.<sup>120</sup> Temporary tattoos may consist of henna with paraphenylenediamine (“black henna tattoos”).<sup>120</sup> Hair bleaches and highlights usually do not contain dye ingredients and should be tolerated by individuals allergic to paraphenylenediamine.

## *Glyceryl Thioglycolate*

Permanent wave products can also cause contact allergy. Although all permanent wave products have a basic pH, some have relatively lower pH than others and these permanent wave products have been called acid permanent waves.<sup>121</sup> Acid permanent waves are generally performed in a hair salon setting and are used to provide greater control of the resulting curl.<sup>121</sup> These products contain glyceryl thioglycolate, which was previously identified as the cause of an epidemic of contact allergy.<sup>122</sup> In contrast, alkaline permanent wave products contain ammonium thioglycolate, which causes contact allergy much less frequently.<sup>121,123</sup> Alkaline permanent wave products are available both for salon and home use. Although these products are less likely to cause contact allergy, alkaline permanent wave products have a higher pH and are more likely to cause non-specific irritation of the scalp.<sup>121</sup> Other possible alternative products without glyceryl thioglycolate are the ISO permanent wave products which use cysteamine HCl as an active ingredient.

## *Allergens in Home and Cleaning Products*

Obtaining home cleaning products for allergic individuals is a difficult problem. Current law does not require manufacturers to reveal the ingredients used in such products. For laundry, there are a number of products on the market that purport to be free of fragrance. These include laundry detergents and fabric softeners with the word “free” in their name. Cleaning products which are free of fragrance are more difficult to find. One alternative for both laundry and cleaning products is a line called Restore, which can be obtained at Whole Foods grocery stores. [Table 4](#) shows all of the products in the Restore product line and lists a phone number for direct ordering of products from the company. It should be noted that a few of these products contain marginal fragrance allergens which infrequently cause contact allergy. These ingredients are shown on the chart. None of these products contain any of the other NACDG standard allergens.

## **Part III: Allergens in Topical Medications and Antimicrobials**

### *Topical Medications*

A number of topically used medicaments are included on the NACDG standard tray. These allergens can be divided into three main groups: anti-bacterial agents, topical anesthetics, and topical corticosteroids.

**TABLE 4.** Restore cleaning products

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General Cleaning;
All Purpose Cleaner
Glass Cleaner
Kinder Kleen
Spray & Clean
Toilet Bowl Cleaner
Bathroom Lime & Scale Remover
Kitchen and Specialty
Dish Detergent (contains d-limonene)
Degreaser
Laundry and Furniture
Laundry Detergent (contains d-limonene)
Furniture Cleaner & Protector
Automatic Dishwasher Gel
Oven Cleaner
EnzAway Spot Remover (contains peppermint)
Bath and Body
Gentle Soap

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All above products completely fragrance-free except as indicated. Ordering: 1-612-331-5979.

Alternatives for individuals allergic to each of these allergens are discussed below. In addition, allergy to excipients in topical medicaments occurs commonly, and alternatives for patients who are allergic to common excipients are also discussed.

### *Neomycin and Bacitracin*

Neomycin is the medicament that caused the greatest number of positive patch test reactions and was overall the second most commonly positive allergen in the 2000–2001 NACDG data, with 11.6% of tested patients reacting to this allergen.<sup>124</sup> It is commonly used in many over-the-counter (OTC) antibacterial products and is also present in many otic preparations, both prescription and non-prescription.

Individuals allergic to neomycin will commonly have cross-reactions against structurally related antibiotics, including gentamycin, tobramycin, kanamycin, and amikacin.<sup>125</sup> Although not structurally related, there is also a high rate of co-sensitivity to bacitracin, so unless an individual has been specifically tested to bacitracin and found to not be allergic, the safest approach is to recommend avoidance of bacitracin in patients allergic to neomycin.<sup>125</sup>

Bacitracin is the medicament that caused the second greatest number of positive patch test reactions and was overall the ninth most commonly positive allergen in the 2000–2001 NACDG data, with 7.9% of tested patients reacting.<sup>124</sup> Similar to neomycin, it is commonly used in many

OTC products and prescription ophthalmic and otic products. It is likely that the majority of patients allergic to bacitracin will have co-reactivity to neomycin.<sup>125</sup>

For patients with isolated neomycin allergy, suitable alternative topical antibacterial products that can be applied to wounds to promote healing and prevent infection include mupirocin 2% ointment and cream (Rx), Silvadene Cream (Rx), bacitracin ointment, Polysporin Ointment (bacitracin/polymyxin B), generic double antibiotic ointments (bacitracin/polymyxin), and Bactine liquid (benzalkonium chloride/lidocaine). Agents that can be used for anti-sepsis but that may impede wound healing include gentian violet liquid, merthiolate liquid, Betadine solution, and hydrogen peroxide. Agents that are not antibacterial but that have been shown to promote healing of clean wounds (such as those created by skin biopsies or minor skin surgeries) include petroleum jelly, Aquaphor Ointment, and Biafine Cream (Rx).

For patients with isolated bacitracin allergy or allergy to both neomycin and bacitracin, suitable alternative topical antibacterial products include the above products with the exceptions of bacitracin ointment, Polysporin ointment, and double antibiotic ointments. Patients with isolated bacitracin allergy can also use gentamicin cream or ointment.

For patients with otitis externa and allergy to neomycin and/or bacitracin, there are several suitable alternatives, including Ciprodex Otic Suspension (ciprofloxacin/dexamethasone; Rx), Cipro HC Otic Suspension (ciprofloxacin/hydrocortisone; Rx), and Floxin Otic (ofloxacin; Rx).

For patients with conjunctivitis or blepharitis and allergy to neomycin and/or bacitracin, there are also several suitable alternatives available by prescription, including chloramphenicol ophthalmic ointment and solution, Ciloxan ophthalmic ointment and solution (ciprofloxacin), erythromycin ophthalmic ointment, Quixin ophthalmic solution (levofloxacin), Vigamox ophthalmic solution (moxifloxacin), Chibroxin ophthalmic solution (norfloxacin), Ocuflux ophthalmic solution (ofloxacin), and sulfacetamide sodium ophthalmic ointment and solution.

### *Chloroxylenol (Para-Chlorometaxylenol, PCMX)*

Chloroxylenol (p-chloro-m-xyleneol or PCMX) is a broad spectrum antibacterial that is most commonly found in antibacterial hand soaps, especially in the health care and food services industries.<sup>126</sup> It is commonly found in soaps in public restrooms, and allergic individuals should be instructed to avoid all soaps in dispensers in public restrooms. It is also found in personal care products, such as moisturizers, and in pre-operative skin preps and electrocardiograph pastes.<sup>126</sup> It is a fairly

uncommon allergen, with only 0.6% of patients reacting in the most recent NACDG data.<sup>124</sup> However, recently, chloroxylenol has been used more commonly as a preservative in skin, hair, and cosmetic products, and therefore it must be considered as a possible contact allergen in such products. The abbreviation CX in [Table 1](#) indicates the presence of chloroxylenol.

Patients who are allergic to chloroxylenol and need to use antibacterial hand soaps should be instructed to use triclosan-, triclocarban-, or chlorhexidine-based soaps. Examples include Dial brand liquid soaps (triclosan), Dial brand bar soaps (triclocarban), Kimberly Clark Mild Lotion Soap (triclosan), Hibiclens soap (chlorhexidine), and Clinishield Healthcare Personnel Handwash (triclosan). Ethanol-based waterless hand disinfectants can also be used safely.

Patients who need to use surgical scrubs can use Betasept Surgical Scrub (chlorhexidine) or Betadine Surgical Scrub (povidone-iodine).

Patients undergoing surgery can be prepped with CloraPrep (chlorhexidine) or Betadine (povidone-iodine).

Self-adhering electrocardiograph electrodes can be used safely and are currently the most commonly used electrodes in clinical practice.

## *Anesthetic Agents*

Anesthetic agents are commonly found in OTC products intended for use as remedies for itch, pain, poison ivy, sunburns, hemorrhoids, and oral pain. They are also available in topical forms via prescription for treating similar conditions. Finally, they are used in injectable forms for anesthesia during cutaneous surgical procedures, for nerve blocks, for orthopedic injuries, and other surgical procedures.

Topical and locally injected anesthetics can be divided into two structural classes: amides and esters. The structural class of a given agent is determined by the linkage between the lipophilic and hydrophilic portions of the molecule. This linkage can be either an amide or an ester.

Importantly, patients who are allergic to an anesthetic agent have a significant likelihood of cross-reacting to other agents in the same structural class but have not been traditionally expected to cross-react to agents in the other structural class. However, caution is required since this may not always be true. Ester anesthetics include benzocaine, tetracaine, propoxycaine, chlorprocaine, cocaine, and procaine. Amide anesthetics include lidocaine, prilocaine, bupivacaine, etidocaine, mepivacaine, and dibucaine.

## *Benzocaine*

Benzocaine is used to screen for allergies to ester type anesthetics. In the most recent NACDG data, 1.7% of patients had positive reactions to benzocaine.<sup>124</sup> Patients allergic to benzocaine may also experience reactions to other ester type anesthetics, and unless shown to not be allergic to other ester anesthetics, they should be advised to avoid them. In addition, occasional patients who react to benzocaine may demonstrate cross-reactions to para-phenylenediamine in hair dye (also tested on screening tray), PABA and related compounds in sunscreens, topical sulfonamides, and azo dyes in clothing.<sup>125</sup>

Products that contain benzocaine and alternatives free of benzocaine are listed in [Table 5](#).

## *Lidocaine and Dibucaine*

Lidocaine and dibucaine are used as screening agents for allergy to amide type anesthetics. Amides are in less common use in OTC products than are esters, such as benzocaine, and there are fewer patients who are allergic to amide agents, with 0.9% and 0.7% of patients, respectively, reacting to dibucaine and lidocaine in the most recent NACDG data.<sup>124</sup> Whereas patients allergic to lidocaine are not expected to demonstrate cross-reactivity with ester type anesthetics, patients allergic to dibucaine may demonstrate cross-reactivity to some ester anesthetics, such as benzocaine and tetracaine.<sup>125</sup>

Products that contain lidocaine or dibucaine and alternatives free of these allergens are listed in [Table 6](#).

## *Topical Corticosteroids*

Allergic contact dermatitis to topical corticosteroids (TCS) has become a much more recognized entity over the past several years, with TCS even being named the “Contact Allergen of the Year” by the American Contact Dermatitis Society in 2005.<sup>127</sup> Allergy to TCS can be difficult to recognize clinically, as the pharmacologic anti-inflammatory effects of the steroid can mask the allergic contact dermatitis. Allergy to a TCS product, due to either the active ingredient or a vehicle ingredient, should be considered when an eruption either persists, changes, spreads, or worsens following the use of TCS.

TCS are divided into five groups: Group A, Group B, Group C, Group D1, and Group D2. Agents in each group share certain characteristics in their molecular structure, and patients allergic to one agent in a given group are likely to also react to other agents in the same group. In addition, patients allergic to a Group A or Group B steroid are at

**TABLE 5.** Products containing benzocaine and alternatives

<b>Product category</b>	<b>Products with benzocaine</b>	<b>Safe alternatives for benzocaine-sensitive patients</b>
Anti-Itch	Lanacane Products, Dermoplast Products	Aveeno Active Naturals Anti-Itch Concentrated Lotion, Gold Bond Maximum Strength Medicated Anti-Itch Cream, Benadryl Extra Strength Itch Stopping Gel, Caladryl Clear, FirstOn Maximum Strength Medicated Anti-Itch Stick, Itch-X Anti-Itch Gel with Soothing Aloe Vera, Sarna Lotion, Sarna Sensitive Lotion, Ivarest Medicated Maximum Strength Anti-Itch Cream, Ivy-Dry Extra Strength Super Itch Relief Spray, Band-Aid Itch Relief Gel
Cuts, scrapes, burns	Boil Ease Maximum Strength Pain Relieving Ointment, Dermoplast Products	Campho-phenique Pain Relieving Antiseptic Gel, Campho-phenique Pain Relieving Antiseptic Liquid, Neosporin Maximum Strength Antibiotic Cream Plus Pain Relief, Tec Labs First Aid Gel, Activ BurnStuff First Aid Antiseptic & Topical Analgesic, Bactine First Aid Antiseptic/Anesthetic, Bactine Pain Relieving Cleansing Spray, Band-Aid Hurt-Free Antiseptic Wash
Sunburn Products	Dermoplast products, Solarcaine First Aid Medicated Spray	Sun Fusion Xtreme After Sun Aloe Vera Botanical Blast Gel, Banana Boat Sooth-A-Caine Aloe Vera Spray Gel with Lidocaine, Hawaiian Tropic Cool Aloe I.C.E. Lidocaine Burn Relief Gel Maximum Strength, Solarcaine Burn Aloe Extra Relief Spray, Solarcaine Burn Relief Aloe Vera Gel
Vaginal and perianal	Vagi-Gard Medicated Cream, Vagisil Anti-Itch Creams	Gynecort Anti-Itch Cream, Soothing Care Intimate Care Itch Relief Cream, Preparation H products, Nupercainal, Tronolane, Tucks Products
Oral and Nasal	Kanka Mouth Pain Liquid, Orabase, Orajel Mouth Sore Discs, Orajel Mouth Sore Swabs, Tanac, Zilactin-B	Finafta Anesthetic Liquid, Canker-X, UlcerEase Rinse
Throat	Cepacol Lozenges, Chloraseptic lozenges, Halls Max Lozenges	Cepacol Spray, Chloraseptic spray, Halls Bursts Lozenges, Halls Plus Lozenges, Halls Lozenges, Sucrets Lozenges

**TABLE 6.** Products containing lidocaine or dibucaine and alternatives

<b>Product category</b>	<b>Products with lidocaine/ dibucaine</b>	<b>Safe alternatives for lidocaine/ dibucaine-sensitive patients</b>
Anti-Itch	None widely available	Aveeno Active Naturals Anti-Itch Concentrated Lotion, Gold Bond Maximum Strength Medicated Anti-Itch Cream, Benadryl Extra Strength Itch Stopping Gel, Caladryl Clear, FirstOn Maximum Strength Medicated Anti-Itch Stick, Itch-X Anti-Itch Gel with Soothing Aloe Vera, Sarna Lotion, Sarna Sensitive Lotion, Ivarest Medicated Maximum Strength Anti-Itch Cream, Ivy-Dry Extra Strength Super Itch Relief Spray, Band-Aid Itch Relief Gel, Lanacane products, Dermoplast products
Cuts, scrapes, burns	Activ BurnStuff First Aid Antiseptic & Topical Analgesic, Bactine Pain Relieving Cleansing Spray, Bactine First Aid Antiseptic/Anesthetic, Band-Aid Hurt-Free Antiseptic Wash	Boil Ease Maximum Strength Pain Relieving Ointment, Dermoplast Products
Sunburn relief	Banana Boat Sooth-A-Caine Aloe Vera Spray Gel with Lidocaine, Hawaiian Tropic Cool Aloe I.C.E. Lidocaine Burn Relief Gel Maximum Strength, Solarcaine Burn Aloe Extra Relief Spray, Solarcaine Burn Relief Aloe Vera Gel	Dermoplast products, Solarcaine First Aid Medicated Spray, Sun Fusion Xtreme After Sun Aloe Vera Botanical Blast Gel
Vaginal and perianal	Nupercainal	Vagi-Gard Medicated Cream, Vagisil Anti-Itch Creams, Gynecort Anti-Itch Cream, Soothing Care Intimate Care Itch Relief Cream, Preparation H products, Tronolane, Tucks Products
Oral and nasal	None widely available	Kanka Mouth Pain Liquid, Orabase, Orajel Mouth Sore Discs, Orajel Mouth Sore Swabs, Tanac, Zilactin-B, Finafta Anesthetic Liquid, Canker-X, UlcerEase Rinse
Throat	None widely available	Cepacol Lozenges, Chloraseptic lozenges, Halls Max Lozenges, Cepacol Spray, Chloraseptic spray, Halls Bursts Lozenges, Halls Plus Lozenges, Halls Lozenges, Sucrets Lozenges,
Surgical topical anesthetics	LMX, EMLA	None



increased risk for showing cross-reactivity to steroids in Group D2.<sup>128</sup> See [Table 7](#) for a listing of agents in each group.

Allergy to group A steroids is most common, with the NACDG most recently reporting that 3% of patients reacted to this group.<sup>124</sup> Group B allergy is the second most common, with the NACDG reporting that 1.1% of patients reacted.<sup>124</sup> Group D allergy is less common, with only 0.5% of patients reacting.<sup>124</sup> Allergy to group C steroids is less common because the steroids in this group are less structurally related to the other groups and less likely to cross-react, and therefore, screening for allergy to this group is sometimes not done.

Screening agents are typically used to detect allergy to steroids in each group. [Table 7](#) lists screening agents. It should be noted that group C steroids can often be used as safe alternatives in patients with known or suspected allergy to TCS. The following specific recommendations for alternatives can be made for patients who react to one or more of the screening agents:

Allergic to group A: Can often safely use agents in groups B, C, D1.

Allergic to group B: Can often safely use agents in groups A, C, D1.

Allergic to group C: Can often safely use agents in groups A, B, D1, D2.

Allergic to group D1: Can often safely use agents in groups A, B, C.

Allergic to group D2: Can often safely use agents in group C.

Two important limitations must be noted when considering allergy to corticosteroids. First, cross-reactivity of different steroid classes is a complex subject, and although the recommendations above are generally correct, the qualifier “often” is present because it is not rare for a given patient to exhibit unusual cross-reactivity patterns that are not predicted by comparisons of the molecular structures of the various steroids. Second, false-negative patch test reactions are thought to be common due to the anti-inflammatory properties of the patch test agents. When choosing a topical steroid for a patient with corticosteroid allergy, it is worthwhile to have the patient perform a “use test” using the following protocol:

1. Apply the product to the antecubital fossa of one arm twice daily for 2 weeks.
2. If an inflammatory reaction develops at any time during these 2 weeks, stop applying the product. The patient is then considered allergic to the product.

**TABLE 7.** Topical steroid structural classes

<b>Group</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D1</b>	<b>D2</b>
Screening Agent(s)	Tixocortol pivalate	Budesonide Triamcinolone acetonide	Desoximetasone	Clobetasol-17-propionate	Hydrocortisone-17-butyrate
Allergens	Cloprednol Dichlorisone acetate Fludrocortisone acetate Flurorometholone Fluprednisolone acetate Hydrocortisone Hydrocortisone acetate Medrysone Meprednisone Methylprednisolone Prednisone Prednisolone	Amcinonide Budesonide Fluocinonide Halcinonide Triamcinolone acetonide Triamcinolone diacetate Triamcinolone Fluocinolone acetonide Desonide Flumoxonide Flunisolide Flurandrenolide	Desoximetasone Clocortolone pivalate Dexamethasone Betamethasone Betamethasone-21-disodium phosphate Diflucortolone pivalate Diflucortolone valerate Flumethasone Fluocortin butyl Fluocortolone (hexanoate, pivalate, caproate) Fluprednidene acetate Halometasone	Betamethasone dipropionate Clobetasol propionate Diflorasone diacetate Betamethasone valerate Fluticasone propionate Mometasone furoate Aclometasone dipropionate Clobetasone butyrate Halobetasol Mometasone furoate	Hydrocortisone valerate Hydrocortisone probutate Hydrocortisone butyrate Prednicarbate Methylprednisolone aceponate

3. After 2 weeks, stop applying the product and observe the area for 1 more week. If no inflammatory reaction appears, then it is unlikely that the patient is allergic to that product.

In addition to avoiding steroids to which patients are allergic, it is also important to consider inactive ingredients that are potential allergens. Several products can be recommended for patients with allergies to NACDG standard tray vehicle allergens (VAS). Topicort and generic desoximetasone ointment and gel are both class C steroids free of VAS. These products should be safe alternatives in most patients; however, both are high potency steroids and may not be appropriate for all situations. Topicort cream and generic desoximetasone 0.05% and 0.25% creams are also excellent alternatives for most steroid allergic patients (except those allergic to the lanolin in the product vehicle) since they are group C and contain no vehicle preservatives.

Generic desonide ointment is a class B steroid that is low potency and is free of VAS. Generic triamcinolone ointment is a class B steroid that is medium potency and is free of VAS. Both should be appropriate alternatives for patients with VAS.

Table 8 lists the 2007 NACDG standard allergens found in available prescription topical corticosteroids.

If a cream is desired, there are no creams that are free of VAS. However, Cloderm Cream (clocortolone) is a class C, mid-potency steroid that has only parabens and no other VAS. If a liquid is desired, clobetasol solution is a class D1, ultra-high potency steroid that is generally free of VAS.

### *Other Prescription Topicals*

There are many other prescription topical medications available, and the vehicle ingredients in these products can cause contact allergy. Table 9 lists common topical medications, NACDG standard allergens in these products, and alternatives that are free of these allergens. In addition, Table 1 indicates 2007 NACDG standard allergens found in OTC antifungal, acne/rosacea, anti-itch, and 1% hydrocortisone products.

### *Ethylenediamine Dihydrochloride*

Ethylenediamines are one structural class of antihistamines. Ethylenediamine dihydrochloride originally gained notoriety as an ingredient in Mycolog Cream, in which it functioned as a stabilizer. Many patients became sensitized to ethylenediamine through the use of Mycolog Cream, but ethylenediamine is present in very few topical skin care products

**TABLE 8.** NACDG allergens in prescription topical corticosteroids and calcineurin inhibitors\*

<b>Ointments</b>		
Acloivate		PG
Aristocort A		PG
Cordran 0.05% and 0.025%		-
Cormax		PG
Cutivate		PG
Cyclocort		BAL,PG
DermAtop		PG
Diprolene		PG
Diprosone		-
Elocon		PG
Halog		-
Kenalog		-
Lidex		PG
Locoid		-
Maxiflor		L
Maxivate		-
Psorcon		PG
Psorcon E		L
Synalar		-
Temovate		PG
Topicort		-
Tridesilon		-
Ultravate		PG
Westcort		PG
<b>Shampoos</b>		
Capex Shampoo		F,P,PG
Clobex Shampoo		CPB
<b>Solutions</b>		
Cormax Scalp Application		-
Diprolene lotion <sup>†</sup>		PG
Diprosone lotion <sup>†</sup>		PG
Elocon lotion <sup>†</sup>		PG
Halog		-
Lidex		PG
Locoid Scalp Lotion <sup>†</sup>		-
Maxivate lotion <sup>†</sup>		-
Synalar		PG
Temovate Scalp Application		-
<b>Sprays</b>		
Clobex		-
Kenalog		-
<b>Sprays, Nasal</b>		
Beconase AQ		-
Flonase		-
Nasacort HFA aerosol solid		-
Nasacort AQ (aqueous base)		-
Nasalide		PG
Nasarel		PG
Nasonex		-
Rhinocort aerosol solid		-
TriNasal		PG
Vancenase AQ - Regular and Double Strength		-
<b>Calcineurin Inhibitors</b>		
Elidel cream		BAL,PG
Protopic ointment - 0.03% and 0.1%		-

\*Modified from Scheman A, Severson D. Pocket Guide to Medications Used In Dermatology, Edition 8. Philadelphia, PA: Lippincott Williams & Wilkins, 2003.

<sup>†</sup>-Lotions<sup>†</sup> listed are really solutions.

**TABLE 9.** Allergens in other topical medications

Disease	Prescription topicals and vehicle allergens on NACDG standard tray
Psoriasis	Topical steroids: see <a href="#">Table 8</a> Taclonex ointment: none Tazorac Cream: benzyl alcohol Tazorac Gel: benzyl alcohol Dovonex cream: diazolidinyl urea Dovonex solution: propylene glycol, menthol (fragrance) Salex Cream, Lotion : parabens
Atopic Dermatitis	See Steroid Section Protopic: none Elidel: propylene glycol, benzyl alcohol Zonalon: benzyl alcohol
Acne	Tazorac cream: none Tazorac gel: none Differin gel: propylene glycol, parabens Differin cream: parabens Renova: benzyl alcohol, parabens, fragrance Retin A- micro gel: benzyl alcohol (phenylcarbinol), propylene glycol Ziana gel: parabens Evoclin Foam: propylene glycol Akne-mycin ointment: none Benazclin gel: none Zoderm Cream, Gel: none Duac gel: parabens Triaz Gel, Triaz Pads: none Benzliq Gel, LS Gel: none NeoBenz Micro: parabens Zoderm Wash: propylene glycol Brevoxyl Creamy Wash: cocamidopropyl betaine, formaldehyde releaser, parabens Benzliq cleanser: propylene glycol Triaz cleanser: fragrance
Rosacea	Metrocream: none Metro lotion: none Metrogel: propylene glycol, parabens, phenoxyethanol Noritate: parabens Rosula NS Medicated Pads: none Rosula gel: propylene glycol, parabens Klaron: propylene glycol, parabens Finacea: propylene glycol Azelex: propylene glycol Rosula Cleanser: parabens, fragrance
Actinic Keratoses	Solaraze: none Efudex: parabens, propylene glycol Carac: parabens, propylene glycol Aldara: parabens, benzyl alcohol Levulan Kerastick: propylene glycol
Tinea	Naftin Gel, Cream: none Oxistat Cream, Lotion: propylene glycol Ertaczo Cream: none Xolegel gel: propylene glycol Loprox gel: none Spectazole cream: none Lamisil cream: benzyl alcohol
Scalp Dermatoses	Loprox Shampoo: none Salex Shampoo: propylene glycol, cocamidopropyl betaine, parabens, fragrance Clobox Shampoo: cocamidopropyl betaine

currently. The Mycolog II Cream available today does not contain ethylenediamine, but some generic nystatin/triamcinolone creams may still contain ethylenediamine. Importantly, ethylenediamine dihydrochloride does not cross-react with ethylenediamine tetra-acetate (EDTA).<sup>125</sup>

Tincture of merthiolate, a topical antiseptic, is one of the few products that currently contains ethylenediamine, but it is rarely used today. A topical antihistamine which cross-reacts with ethylenediamine, Di-Delamine (contains tripeleminamine) remains on the market.<sup>129</sup> Zonalon cream is a topical form of the antihistamine doxepin that does not cross-react with ethylenediamine dihydrochloride. Benadryl gel is another topical antihistamine that does not cross-react with ethylenediamine dihydrochloride.<sup>125</sup>

Oral, intravenous (IV), or intramuscular (IM) administration of medications that contain ethylenediamine may cause systemic allergic contact dermatitis in patients allergic to ethylenediamine. The best known example is aminophylline, an oral and IV form of theophylline that contains ethylenediamine as an agent to make theophylline soluble. A theophylline derivate, dyphylline, does not contain ethylenediamine and is available in oral and IM forms. Oxtriphilline is a choline salt of theophylline that does not contain ethylenediamine.<sup>125</sup>

Systemic contact dermatitis can also occur if patients ingest compounds that are structurally related to ethylenediamine, such as other antihistamines classified as ethylenediamines or antihistamines classified as piperazines (which are based on a dimer of ethylenediamine).<sup>130</sup> Antihistamines classified as ethanolamines are safe alternatives. Patients should avoid hydroxyzine (Atarax, Vistaril), cetirizine (Zyrtec), and levocetirizine (Xyzal). Alternatives that do not cross-react include diphenhydramine (Benadryl), cyproheptadine (PeriActin), fexofenadine, loratadine, and doxepin.

Meclizine, a piperazine, is commonly used as an anti-motion sickness agent (Antivert, Bonine, Dramamine II) and should be avoided by ethylenediamine allergic patients. Dimenhydrinate (Dramamine), an ethanolamine, is a safe alternative for motion sickness.

Another class of medications that could potentially be problematic for ethylenediamine-sensitive patients are the antipsychotics that are structurally related to piperazine. These include fluphenazine, perphenazine, prochlorperazine, trifluoperazine, thiothixene, clozapine, and olanzapine. There have been no case reports of adverse drug reactions in ethylenediamine-sensitive patients treated with these medications, so it is unclear whether allergy to ethylenediamine should truly be considered a relative contraindication to use of these medications. However, it is worthwhile to

be aware of the possibility and to consider use of structurally non-related agents, such as haloperidol, quetiapine, or risperidone.

One other important ethylenediamine is pyrilamine, which is used in several OTC remedies for premenstrual symptoms, such as Midol, Multi-Symptom Pamprin, Premsyn, and similar products. Alternatives include standard nonsteroidal anti-inflammatories, such as ibuprofen and ketoprofen. The uncommonly used decongestant/antihistamine product Rynatan also contains pyrilamine.<sup>130</sup>

## **Part IV: Allergens in Rubber, Artificial Rubber, and Neoprene**

### *Rubber Contact Allergy*

Allergic reactions to rubber can present as delayed-type hypersensitivity (type IV) reactions or immediate (type I) hypersensitivity reactions. The rubber allergens in the NACDG standard tray are chemical additives, used in both natural and synthetic rubber products, which commonly cause type IV reactions. Type I reactions most commonly result from sensitization to natural rubber latex (NRL) proteins. The NACDG standard tray rubber allergens can be classified according to their typical use in rubber manufacture as vulcanization accelerators or antioxidants.<sup>131,132</sup> These chemicals are found alone or in varying combination in many different rubber products. There are no regulations in place requiring that these chemicals be listed as ingredients in consumer products, which, when coupled with the widespread protection of such information as proprietary, further complicates safe product selection for patients with rubber allergies. This section discusses the individual rubber allergens tested in the NACDG standard tray and documents the presence or absence of these chemicals in specific products. The products were chosen to represent five categories of consumer goods that are known to contain rubber in various forms, including: gloves (Table 10), shoes (Tables 11 and 12), clothing (Table 13), home medical products (Table 14), and sports equipment (Table 15). Presented in this way, products safe for patients with various combinations of rubber allergies can be selected. Given the widespread concern over NRL hypersensitivity and the similarities in exposure and avoidance to other rubber allergies, NRL is included in the present discussion, and latex-free products are also identified in Tables 10-15.

**TABLE 10.** Glove alternatives for patients with rubber allergies

<b>LATEX-FREE MEDICAL EXAM GLOVES</b>									
<b>Company</b>	<b>Product (material)</b>	<b>TH</b>	<b>CM</b>	<b>MB</b>	<b>MM</b>	<b>DT</b>	<b>BR</b>	<b>NL</b>	
Allerderm 3400 E. McDowell Rd Phoenix, AZ 85008-7899 Ordering: (800) 365-6868 <a href="mailto:info@allerderm.com">info@allerderm.com</a> <a href="http://www.allerderm.com">www.allerderm.com</a>	Allerderm® Disposable Blue Nitrile Gloves	no	no	yes	no	?	no	no	
	Allerderm® Disposable White Nitrile Gloves	yes	yes	no	no	no	no	no	
	Allerderm® Disposable Vinyl Gloves	no	no	no	no	no	no	no	
Ansell Healthcare Products LLC 200 Schulz Drive Red Bank, NJ 07701 Information: (800) 952-9916 <a href="http://www.ansellhealthcare.com">www.ansellhealthcare.com</a>	Micro-Touch® Smooth Nitrile	no	yes	yes	no	no	no	no	
	Micro-Touch® Nitrile	no	yes	no	no	no	no	no	
	Micro-Touch® Nitrile E.P.®	no	yes	no	no	no	no	no	
	Micro-Touch® Elite® (PVC)	no	no	no	no	no	no	no	
	Synsation® (PVC)	no	no	no	no	no	no	no	
	Conform® NL (PVC)	no	no	no	no	no	no	no	
	New Touch® (PVC)	no	no	no	no	no	no	no	
	Micro-Touch® NitraTex® Sterile Singles	no	yes	no	no	no	no	no	
	Micro-Touch® NitraTex® Sterile Doubles	no	yes	no	no	no	no	no	
	Micro-Touch® Affinity	no	yes	no	no	no	no	no	
Best Glove Best Manufacturing Company Company Headquarters P.O. Box 8 579 Edison Street Menlo, GA 30731 Information: (800) 241-0323 <a href="mailto:USA@bestglove.com">USA@bestglove.com</a> <a href="http://www.bestglove.com">www.bestglove.com</a>	N-DEX Medical Exam® (nitrile)	no	no	yes	no	no	no	no	
	N-DEX Free® (nitrile)	no	no	no	no	no	no	no	
	RealFeel® (PVC)	no	no	no	no	no	no	no	
CardinalHealth 7000 Cardinal Place Dublin, Ohio 43017 Information: (800) 234-8701 <a href="http://www.cardinal.com">www.cardinal.com</a>	Esteem® Stretchy Nitrile	no	yes	no	no	no	no	no	
	Esteem® TRU-BLU Stretchy Nitrile	no	yes	yes	no	no	no	no	
	Esteem® Stretchy Nitrile Neu-Thera	no	yes	no	no	no	no	no	
	Esteem® XP (nitrile)	no	yes	no	no	no	no	no	
	Esteem® Stretchy Synthetic with Neu-Thera (PVC)	no	no	no	no	no	no	no	
	Esteem® Stretchy Synthetic (PVC)	no	no	no	no	no	no	no	
	Sterile Nitrile Exams Singles and Pairs	no	yes	no	no	no	no	no	
	Esteem® NV Stretchy Synthetic (PVC/Nitrile blend)	no	no	no	no	no	no	no	
	InstaGard® Powder-Free Synthetic Exam Gloves (PVC)	no	no	no	no	no	no	no	
Medline Industries, Inc. One Medline Place Mundelein, IL 60060 Information: (800) MEDLINE <a href="http://www.medline.com">www.medline.com</a>	Aloetouch Ultra IC PF Stretch Synthetic Exam Gloves	no	no	no	no	no	no	no	
	Universal 3G PF Stretch Synthetic Exam Gloves	no	no	no	no	no	no	no	
	Medline Advantage PF Stretch Synthetic Exam Gloves	no	no	no	no	no	no	no	
	Accutouch PF Vinyl Synthetic Exam Gloves	no	no	no	no	no	no	no	
	Aloetouch 12" Chemo PF Nitrile Exam Gloves	no	yes	no	no	no	no	no	
	Accutouch Chemo PF Nitrile Exam Gloves	no	yes	no	no	no	no	no	
	Mediguard Chemo PF Nitrile Exam Gloves	no	yes	yes	no	no	no	no	



TABLE 10. Continued ...

LATEX-FREE MEDICAL EXAM GLOVES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
SmartPractice® 3400 E. McDowell Phoenix, Az 85008 Ordering: 1-800-522-0800 <a href="http://www.smartpractice.com">www.smartpractice.com</a>	QualiTouch® Nitrile PF Ambidextrous Examination Gloves	no	yes*	no	no	no	no	no
	QualiTouch® Nitrile Duet PF Ambidextrous Examination Gloves	no	yes*	no	no	no	no	no
	Neosooth® Polychloroprene Powder Free Exam Gloves	no	yes*	no	no	no	no	no
	Pink Ribbon® Vinyl Powder Free Exam Gloves	no	no	no	no	no	no	no
	FlexTec® Vinyl Powder Free Exam Gloves	no	no	no	no	no	no	no
	Royal Shield® Vinyl Powder Free Exam Gloves	no	no	no	no	no	no	no
	Royal Shield® Vinyl Powdered Exam Gloves	no	no	no	no	no	no	no
	Royal Shield® Vinyl Fitted Powdered Exam Gloves	no	no	no	no	no	no	no
LATEX MEDICAL EXAM GLOVES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Ansell Healthcare Products	DermaClean® X-AM®	yes	yes	yes	no	no	no	yes
	Conform® Plus	yes	yes	yes	no	no	no	yes
	Micro-Touch® Plus	no	yes	yes	no	no	no	yes
	Micro-Touch® NextStep®	no	yes	no	no	no	no	yes
	Micro-Touch® ErgoGrip™	no	yes	no	no	no	no	yes
	E.P® Gloves	yes	yes	yes	no	no	no	yes
	DermaClean X-AM® Sterile Singles	yes	yes	yes	no	no	no	yes
	Conform® Plus	yes	yes	yes	no	no	no	yes
	Perry™ X-AM®	no	yes	yes	no	no	no	yes
	Micro-Touch® Powder	no	yes	yes	no	no	no	yes
DermaClean X-AM® Sterile Singles	yes	yes	no	no	no	no	yes	
CardinalHealth	Positive Touch® Powder-Free Latex Exam Gloves	no	yes	no	no	no	no	yes
	InstaGard® Latex Exam Gloves	no	yes	no	no	no	no	yes
Medline Industries, Inc.	Aloetouch PF Latex Exam Gloves	no	yes	no	no	no	no	yes
	Accucare PF Latex Textured Exam Gloves	no	yes	no	no	no	no	yes
	Mediguard Powdered Latex Exam Gloves	no	yes	no	no	no	no	yes
SmartPractice®	Kulorful™ Latex PF Exam Gloves	no	yes*	no	no	no	no	yes
	à la mode™ Flavored Latex Examination Gloves	no	yes*	no	no	no	no	yes
	QualiTouch™ Latex Examination Gloves	no	yes*	no	no	no	no	yes
	QualiTouch™ Left/Right Fitted Latex Examination Gloves	no	yes*	no	no	no	no	yes
	QualiTouch® Powder Free Textured Grip Latex Exam Gloves	no	yes*	no	no	no	no	yes

TABLE 10. Continued ...

LATEX MEDICAL EXAM GLOVES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
SmartPractice®	SmartPractice® Latex Powdered Exam Gloves	no	yes*	no	no	no	no	yes
	SmartPractice® Powder Free Latex Exam Gloves Polymer Coated	no	yes*	no	no	no	no	yes
	SmartTouch™ Latex Powder Free Exam Gloves	no	yes*	no	no	no	no	yes
	REFLECTION™ Latex PF Exam Gloves	no	yes*	no	no	no	no	yes
	Lesoothe™ Latex PF Exam Gloves	no	yes*	no	no	no	no	yes
	Lesoothe™ Latex PF Fitted Gloves	no	yes*	no	no	no	no	yes
	Lesoothe™ Duet Latex PF Exam Gloves 2-ply	no	yes*	no	no	no	no	yes
Pink Ribbon Latex PF Exam gloves	no	yes*	no	no	no	no	yes	
LATEX-FREE SURGICAL GLOVES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Ansell Healthcare Products	Derma Prene® PI (synthetic polyisoprene)	no	yes	no	no	no	no	no
	Derma Prene® Ultra (neoprene)	no	no	no	no	no	no	no
	Cut-Resistant Glove Liners (polyethylene fiber)	no	no	no	no	no	no	no
CardinalHealth	Esteem® (synthetic polyisoprene)	no	yes	yes	no	no	no	no
	Esteem® SMT (synthetic polyisoprene)	no	yes	yes	no	no	no	no
	Esteem® Neu-Thera (synthetic polyisoprene)	no	yes	yes	no	no	no	no
	Esteem® Blue with Neu-Thera (synthetic polyisoprene)	no	yes	yes	no	no	no	no
	Duraprene™ Synthetic Surgical Glove (neoprene)	no	yes	no	no	no	no	no
Duraprene™ SMT PF Synthetic Surgical Glove (neoprene)	no	yes	no	no	no	no	no	
ECI Medical Technologies Inc. 2 Cook Road, Bridgewater Nova Scotia, Canada B4V 3W7 Information: (800) 668-5289	Elastyfree®	no	no	no	no	no	no	no
	Elastylite®	no	no	no	no	no	no	no
Mölnlycke Health Care Inc. 5550 Peachtree Parkway Suite500 Norcross, GA 30092 Information: (800) 843-8497 <a href="http://www.molnlycke.com">www.molnlycke.com</a>	Biogel® Skinsense™	no	yes	no	no	DP	no	no
	Biogel® Skinsense™ Underglove	no	yes	no	no	DP	no	no
	Biogel® Skinsense™ Polyisoprene	no	yes	yes*	no	DP	no	no
	Biogel® Neotech™	no	yes*	no	no	DP*	no	no
SmartPractice®	Neosoothe® Polychloroprene powder free fitted surgical gloves	no	yes*	no	no	no	no	no

TABLE 10. Continued ...

LATEX SURGICAL GLOVES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Ansell Healthcare Products	Encore® Orthopaedic	no	yes	no	no	no	no	yes
	Encore® MicroOptic®	no	yes	no	no	no	no	yes
	Encore Acclaim®	no	yes	no	no	no	no	yes
	Encore®	no	yes	no	no	no	no	yes
	No Powder™	yes	yes	yes	no	no	no	yes
	Encore® Hydrasoft™	no	yes	no	no	no	no	yes
	The Original Perry® Style 42®	no	yes*	no	no	no	no	yes
	Micro-Touch®	no	yes	yes	no	no	no	yes
	Neutralon®	no	yes*	yes	no	no	no	yes
	Sensi-Touch®	yes	yes	no	no	no	no	yes
	Perry™ Orthopaedic	no	yes	no	no	no	no	yes
	Procedure Gloves Style 354	no	yes	no	no	no	no	yes
	Radiation Attenuation	no	yes	no	no	no	no	yes
CardinalHealth	Ultraderm® Latex Surgical Gloves	no	yes	no	no	no	no	yes
	Ultrafree™ Powder-Free Latex Surgical Gloves	no	yes	no	no	no	no	yes
	Kashmere SLK Powder-free	no	yes	no	no	no	no	yes
	Protegrity®	no	yes	no	no	no	no	yes
	Protegrity® SMT	no	yes	no	no	no	no	yes
	Protegrity® Neu-Thera	no	yes	no	no	no	no	yes
	Protegrity® Micro SMT	no	yes	no	no	no	no	yes
	Protegrity® Blue with Neu-Thera	no	yes	no	no	no	no	yes
	Triflex® Orthopedic Surgical Gloves	no	yes	no	no	no	no	yes
	Triflex® Custom Surgical Gloves	no	yes	no	no	no	no	yes
Triflex® Latex Surgical Gloves	no	yes	no	no	no	no	yes	
Mölnlycke Health Care Inc.	Biogel M®	no	yes	no	no	no	no	yes
	Biogel Eclipse™	no	yes	no	no	no	no	yes
	Biogel® Super-Sensitive™	no	yes	no	no	no	no	yes
	Biogel® Optfit Super-Sensitive™	no	yes	no	no	no	no	yes
	Biogel® Indicator™ Underglove	no	yes	no	no	no	no	yes
	Biogel® Diagnostic™	no	yes	no	no	no	no	yes
	Biogel®	no	yes	no	no	no	no	yes
	Biogel® Sensor™	no	yes	no	no	no	no	yes
Biogel® Optfit Orthopaedic	no	yes	no	no	no	no	yes	
INDUSTRIAL/CHEMICAL/HOUSEHOLD GLOVES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Allerderm	Nitrile Decontamination Gloves	no	yes	yes	yes	no	no	no
	Silver Shield® / 4H® Gloves	no	no	no	no	no	no	no
	Allerderm® Heavy-Duty Vinyl Gloves	no	no	no	no	no	no	no
	Allerderm® Seamless Cotton Gloves	no	no	no	no	no	no	no
	Allerderm® Soft Touch Cotton Gloves	no	no	no	no	no	no	no
Ansell Healthcare Products	Latex/Nitrile Utility#	no	yes	no	no	no	no	yes
	Housekeeping#	no	yes	no	no	no	no	yes

TABLE 10. Continued ...

INDUSTRIAL/CHEMICAL/HOUSEHOLD								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Best Glove	The Original Nitty Gritty® (latex)	no	yes	yes	no	no	no	yes
	Nitri-Pro® (nitrile)	no	yes	yes	no	no	no	no
	Bex™ 60 (PVC)	no	no	no	no	no	no	no
	Best® Master® 700 (latex)	no	yes	yes	no	no	no	yes
	Black Knight® 7703 (PVC)	no	no	no	no	no	no	no
	Best® Butyl 878 (butyl and viton)	no	yes	no	no	no	no	no
	Nitri Master® (nitrile)	no	yes	yes	no	no	no	no
	Best® Neoprene 5122	no	yes	yes	no	no	no	no
	N-DEX Free® Ultimate (nitrile)	no	no	no	no	no	no	no
	N-DEX NightHawk® (nitrile)	no	no	no	no	no	no	no
N-DEX NightHawk® (nitrile, 11", 6 MIL)	no	no	no	no	no	no	no	
MAPA Spontex, Inc. 100 Spontex Drive Columbia, TN 38401 Information: (800) 537-2897 <a href="mailto:sales@mapaglove.com">sales@mapaglove.com</a> <a href="http://www.mapaglove.com">www.mapaglove.com</a>	TopChem®/345 (polyvinyl alcohol)	no	yes	yes	?	?	?	yes
	Optinit®/472 (nitrile)	no	yes	yes	?	?	?	no
	Chem-Ply™/N-360 (neoprene)	no	yes	?	?	?	?	?
	Trident™/286 (latex)	no	yes	yes	?	?	?	yes
North Safety Products 2000 Plainfield Pike Cranston, RI 02921 Information: (800) 430-4110 <a href="mailto:marketing@northsafety.com">marketing@northsafety.com</a> <a href="http://www.northsafety.com">www.northsafety.com</a>	CS113B Chem-Soft Nitrile Glove	no	yes	no	no	no	no	no
	PNLB1815/O Natural Rubber Glove	no	yes	yes	no	no	no	no
	LA172G Nitri-Guard Nitrile Glove	no	yes	no	no	no	no	no
	SSG29 Silver Shield 4H Glove	no	no	no	no	no	no	no
	B131 North Butyl Glove 13 MIL 11"	yes	yes	yes	no	no	no	no
	F101 North Viton Glove 10 MIL 11"	no	no	no	no	no	no	no

Abbreviations: TH, Thiuram Mix; CM, Carbamates; MB, Mercaptobenzothiazole; MM, Mercapto Mix Components other than Mercaptobenzothiazole; DT, Mixed Dialkyl Thioureas; BR, Black Rubber Mix; PF, Powder-Free; PVC, Polyvinyl Chloride; DP, Diphenylthiourea; ?, information on this allergen was omitted by the manufacturer.

\*Indicates chemicals of this group were used in manufacturing, but were not present in detectable levels in the final product. #Data for these gloves was estimated by an Ansell representative based on the formulations for numerous thick natural rubber gloves.

## Thiuram Mix

The thiurams are accelerators of vulcanization used in various natural and synthetic rubbers.<sup>131-133</sup> Worldwide patch test data indicate that thiurams may be the most common cause of rubber allergy.<sup>1</sup> In a review of 686 cases of Type IV allergy to rubber additives confirmed by patch testing between 1978 and 1988, Conde-Salazar and coworkers reported sensitization to thiuram mix in 82.9% of these patients.<sup>134</sup> The most recent patch test results from the NACDG (2003–2004) found that thiuram mix was the most common rubber sensitizer, with 4.6% of tested patients having positive patch tests.<sup>135</sup> The NACDG thiuram mix consists of four compounds, each at 0.25% pet.: tetramethylthiuram monosulfide (TMTM), tetramethylthiuram disulfide (TMTD), tetraethylthiuram disulfide (TETD), and dipentamethylene thiuram disulfide (PTD). Van Ketel reported good correlation between reactions to the mix and its individual

**TABLE 11.** Footwear alternatives for patients with rubber allergies

CLOGS/SANDALS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Klogs-USA 400 Ramsey Street Sullivan, MO 63080 Information: (888) 388-5564 info@Klogs.com Ordering: www.klogs.com	Dusty (PU) Biscayne (PU) Laguna (PU) Springfield (PU) Key Largo (PU) Kory (PU) Kremes (PU) Malibu (PU)	no	no	no	no	no	no	no
Medimex GE Medical Systems Accessories & Supplies GmbH Falkenried 88, D-20251 Hamburg	Plogs (PU) MediPlogs (PU) EasyPlogs (EVA)	no	no	no	no	no	no	no
Rawganique.com Ordering: 1.877.729.4367 www.rawganique.com	Hemp Clogs	PO	PO	PO	PO	PO	PO	PO
Sandals24-7.com Ordering: www.Sandals24-7.com	Sandak Sandals (PVC)*	no	no	no	no	no	no	no
Birkenstock Distribution Inc P.O. Box 6140 Novato, CA 94948	Birkenstock Shoes and Sandals	no	no	no†	?	?	?	?
PVC INDUSTRIAL BOOTS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Servus Products 1136 2nd Street Rock Island, IL 61201 Ordering: (800) 790-9297 info@nspusa.com	12" White Knee Boot 16" Economy Safety Knee Boot 6" Black Iron Tuke with safety toe	no	no	no	no	no	no	no
Onguard Industries 1850 Clark Rd Havre de Grace, MD 21078 Ordering: (800) 365-2282 www.onguardindustries.com	PVC boots*	PO	PO	PO	PO	PO	PO	PO
Galeton Ordering: 800-221-0570 www.galeton.com	PVC Work Boots	PO	PO	PO	PO	PO	PO	PO
Lehigh Safety Shoes 39 E. Canal St. Nelsonville, Oh 45764 Ordering: (800) 444-4086 www.lehighsafety.com	16" Black Steel Toe PVC Boot Style : 2745	PO	PO	PO	PO	PO	PO	PO

TABLE 11. Continued ...

		INSOLES							
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL	
FLA Orthopedics, Inc. P.O. Box 277810 Miramar, FL 33027-7810 Information: (800) 327-4110 <a href="http://www.flaorthopedics.com">www.flaorthopedics.com</a>	Soft Point® Full Insoles (silicone)	PO	PO	PO	PO	PO	PO	no	
Magister Corp. 310 Sylvan Street Chattanooga, TN 37405 USA Information: (423) 265-3574 <a href="mailto:sales@magistercorp.com">sales@magistercorp.com</a> <a href="http://www.magistercorp.com">www.magistercorp.com</a>	Cambion (PU)	no	no	no	no	no	no	no	
Bauerfeind USA Inc. 55 Chastain Road, Suite 112 Kennesaw, GA 30144 Information: (800) 423-3405 <a href="mailto:info@bauerfeindusa.com">info@bauerfeindusa.com</a> Ordering: <a href="http://www.bauerfeindusa.com">www.bauerfeindusa.com</a>	Viscoheel® (medical grade silicone) ViscoSpot® (medical grade silicone) ViscoPed® (medical grade silicone) ViscoPed S® (medical grade silicone)	PO	PO	PO	PO	PO	PO	no	

Abbreviations: TH, Thiuram Mix; CM, Carbamates; MB, Mercaptobenzothiazole; MM, Mercapto Mix Components other than Mercaptobenzothiazole; DT, Mixed Dialkyl Thioureas; BR, Black Rubber Mix; PVC, Polyvinyl Chloride; PU, Polyurethane; EVA, Ethyl Vinyl Acetate; ?, information on this allergen was omitted by the manufacturer; PO, Probably OK, presence of allergens unconfirmed, but materials incorporated generally thought to be free of rubber allergens found in the NACDG standard series.

\*Many styles available.

†MBT not used in soles.

components, suggesting that the mix is a good screen.<sup>136</sup> Reported prevalence rates for sensitization to the individual components of thiuram mix have differed geographically,<sup>131</sup> possibly secondary to different use patterns in rubber industries between countries.<sup>132</sup>

The use of thiuram chemicals in specific consumer products is difficult to determine as this information is usually not provided by manufacturers. Rubber gloves and shoes have been cited as the most frequent sources of exposure leading to thiuram sensitization.<sup>137</sup> Thiurams have been reported to be the most common sensitizers in rubber glove contact dermatitis.<sup>131,137</sup> However, in the two most recently published chemical analyses of accelerator content in commercially available rubber gloves, no thiurams were detected in any of the numerous brands sampled.<sup>138,139</sup> Geier and coworkers also noted that thiurams have recently been replaced by carbamates and mercaptobenzothiazole (MBT) in the manufacture of many rubber gloves, although their findings indicated that thiurams remained the most common sensitizers in patients with suspected

**TABLE 12.** Custom shoemakers with services for patients with contact allergies

<b>Custom shoemakers</b>	<b>Services provided for patients with rubber allergies</b>
<p>Cordwainer Gallery of Fine Crafts Village Shoppes of Bedford 176 Route 101 Bedford, NH 03110 Ordering: (603) 472-3131 <a href="mailto:info@cordwainercraftgallery.com">info@cordwainercraftgallery.com</a></p>	<p>Local shoemaker that is able to make all-leather shoes. The uppers are hand-sewn with minimal glue for attachment of uppers to leather sole. Leather samples for patch-testing available on request.</p>
<p>Eneslow Shoes 470 Park Avenue South New York, NY 10016 Ordering: (212) 477-2300 (800) ENESLOW</p>	<p>Custom shoemaker in Manhattan who has occasionally made shoes for patients with allergies. Able to make shoes with specific materials, including various rubbers (including neoprene). All-leather shoes available. Samples for patch-testing available on request.</p>
<p>Lair's Shoes 155 1 Ave SW Ste 20 Rochester, MN 55902 Information: (507) 282-3141</p>	<p>Located in Rochester, MN, this store specializes in orthotics and specialty services. They indicated they would be able to help find shoes for patients with specific allergies, including rubber allergies.</p>
<p>Loveless Custom Boots and Shoes 4400 SW 21st Street Oklahoma City, OK 73108 Ordering: (405) 631-9731</p>	<p>Custom shoemakers who have experience providing shoes for patients with contact allergies. They have made shoes for patients with chromate and rubber allergies. Men's and women's casual styles and cowboy boots available. They also have experience lining athletic shoes with "hypoallergenic" leather for patients with allergies (shoes must be one size larger for lining). Samples for patch-testing available on request.</p>
<p>P.W. Minor 3 Treadeasy@ Avenue P.O. Box 678 Batavia, NY 14021-0678 Ordering: (585) 343-1500 (800) PWWINOR</p>	<p>Custom shoemakers who have provided shoes for patients with allergies, mostly to latex. Able to make all-leather shoes from vegetable-tanned leather. Any of the shoes in their catalog can be made rubber-free at a charge of \$45-\$55 over the catalog price for the custom version. The order should be sent to the custom department, Attn: Margy (ext. 651), and should state "no rubber, rubber cement, latex or rubber backers." P.W. Minor has also made athletic shoes for patients with allergies by lining with leather.</p>
<p>Wesco 52828 NW Shoe Factory Lane PO Box 607 Scappoose, OR 97056-0607 Ordering: 800-326-2711 503-543-7114 <a href="mailto:boots@westcoastshoe.com">boots@westcoastshoe.com</a></p>	<p>Custom shoemakers who have previously made chromate-free and rubber cement-free footwear for patients with allergies. All-leather shoes made from vegetable-tanned leather are available. Samples for patch-testing available on request.</p>

**TABLE 13.** Clothing alternatives for patients with rubber allergies

SPANDEX								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
INVISTA 4123 East 37th Street North Wichita, KS 67220 Information: (877) 446-8478	Lycra®	no	no	no	no	no	no	no
Asahi Kasei Spandex America Inc. 1566 Bushy Park Rd. Goose Creek, SC 29445 Information: (843) 820-6574 <a href="mailto:hal.martens@dorlastan.com">hal.martens@dorlastan.com</a>	Dorlastan®	no	no	no	no	no	no	no
RadiciSpandex Corporation 3145 Northwest Boulevard Gastonia, NC 28052 Email: <a href="mailto:info@radicispandex.com">info@radicispandex.com</a>	RadiciSpandex	no	no	no	no	no	no	no
UNDERGARMENTS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Blue Canoe P.O. Box 543 Garberville, CA 95542 Ordering: (888) 923-1373 <a href="http://www.bluecanoe.com">www.bluecanoe.com</a>	Bra Top*	PO	PO	PO	PO	PO	PO	no
	V Bra*	PO	PO	PO	PO	PO	PO	no
	Cropped Legging*	PO	PO	PO	PO	PO	PO	no
	Basic Leggings*	PO	PO	PO	PO	PO	PO	no
	Jane's Bra Top*	PO	PO	PO	PO	PO	PO	no
	String Bikini*	PO	PO	PO	PO	PO	PO	no
	High Cut Panty*	PO	PO	PO	PO	PO	PO	no
Men's/Unisex Short*	PO	PO	PO	PO	PO	PO	no	
Decent Exposures 12554 Lake City Way NE Seattle, WA 98125 Ordering: (800) 524-4949 <a href="http://www.decentexposures.com">www.decentexposures.com</a>	Original UnBra®	no	no	no	no	no	no	no
	Front Closure Unbra®	no	no	no	no	no	no	no
	Strapless Unbra®	no	no	no	no	no	no	no
	Nursing Flap Unbra®	no	no	no	no	no	no	no
	Bikini Underpants	no	no	no	no	no	no	no
	French Hipster Underpants	no	no	no	no	no	no	no
	Hipster Underpants	no	no	no	no	no	no	no
	Full Brief Underpants	no	no	no	no	no	no	no
French Brief Underpants	no	no	no	no	no	no	no	
Men's and Boy's Underpants	no	no	no	no	no	no	no	
CottonfieldUSA Ordering: (888) 954-1551 <a href="http://www.cottonfieldusa.com">www.cottonfieldusa.com</a>	Men's Boxer*	PO	PO	PO	PO	PO	PO	no
	Men's Boxer Brief*	PO	PO	PO	PO	PO	PO	no
	Classic Brief*	PO	PO	PO	PO	PO	PO	no
	Women's Bikini Underpants*	PO	PO	PO	PO	PO	PO	no
	Women's Bra Top*	PO	PO	PO	PO	PO	PO	no
Women's Misses Panty*	PO	PO	PO	PO	PO	PO	no	
Leading Lady Companies 24050 Commerce Park Beachwood, OH 44122 Ordering: (800) 321-4804 <a href="http://www.leadinglady.com">www.leadinglady.com</a>	No. 600 Cotton Softcup Bra*	PO	PO	PO	PO	PO	PO	no
LatexFreeUndies.com 68 Spencer Road Basking Ridge, N.J. 07920 Ordering: <a href="http://www.latexfreeundies.com">www.latexfreeundies.com</a>	Classic Hip-Hugger	no	no	no	no	no	?	no



TABLE 13. Continued ...

UNDERGARMENTS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Brooks Brothers 350 Campus Plaza PO Box 4016 Edison, NJ 08818-4016 Ordering: (800) 274.1815	Men's Frenchback Boxer (elastic-free, 100% cotton)	PO	PO	PO	PO	PO	PO	PO
	Men's Tieback Boxer (elastic-free, cotton)	PO	PO	PO	PO	PO	PO	PO
<a href="http://www.vermontcountrystore.com">www.vermontcountrystore.com</a> Ordering: 1-802-362-8460 <a href="mailto:customerservice@vermontcountrystore.com">customerservice@vermontcountrystore.com</a>	French-Back Boxers (elastic-free, pima cotton)	PO	PO	PO	PO	PO	PO	PO
Vintage Skivvies, LLC 10045 W. Dartmouth Ave. Loft 301 Lakewood, Colorado 80227 Ordering: 303-987-3511 <a href="http://www.vintageskivvies.com">www.vintageskivvies.com</a>	Men's Tie Sides (elastic-free, 100% cotton)	PO	PO	PO	PO	PO	PO	PO
	Men's 2 Tones (elastic-free, 100% cotton)	PO	PO	PO	PO	PO	PO	PO
Jockey International, Inc. 2300 60th Street P.O. Box 1417 Kenosha, WI 53141-1417 USA Ordering: 1-800-Jockey1 <a href="http://www.jockey.com">www.jockey.com</a>	Women's No Panty Line Promise® undergarments*	PO	PO	PO	PO	PO	PO	no
SWIMWEAR								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Decent Exposures	Two Piece Suit (Nylon/Lycra)	no	no	no	no	no	no	no
	Tank Suit (Nylon/Lycra)	no	no	no	no	no	no	no
	Tankini (Nylon/Lycra)	no	no	no	no	no	no	no
Rawganique.com Ordering: 1.877.729.4367 <a href="http://www.rawganique.com">www.rawganique.com</a>	100% Organic Hemp Bikini Swim & Bra Tops	PO	PO	PO	PO	PO	PO	PO
	100% Hemp Boxers (removable elastic)	PO	PO	PO	PO	PO	PO	PO
	Hemp Swim Trunks (removable elastic)	PO	PO	PO	PO	PO	PO	PO
SOCKS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Dr. Leonard's Healthcare Corp. PO Box 7821 Edison, NJ 08818-7821 Ordering: (800) 785-0880 <a href="http://www.drleonards.com">www.drleonards.com</a>	Non-Binding Cotton Socks (99% cotton, 1% nylon)	PO	PO	PO	PO	PO	PO	PO
	Men's Non-Binding Socks (99% cotton, 1% nylon)	PO	PO	PO	PO	PO	PO	PO
<a href="http://www.diabetic-footcare.com">www.diabetic-footcare.com</a> Joseph E. Gallagher P.O. Box 4 Mechanicsville, PA 18934 Ordering: (800) 229-6691	TechSpun Socks*	PO	PO	PO	PO	PO	PO	no
<a href="http://www.vermontcountrystore.com">www.vermontcountrystore.com</a> Ordering: (802) 362-8460 Information: 1-802-362-8499	Non-Elastic Crew Socks (99% cotton, 1% nylon)	PO	PO	PO	PO	PO	PO	PO
	Buster Brown Cotton Ankle Socks (100% cotton, elastic-free)	PO	PO	PO	PO	PO	PO	PO
<a href="http://www.haband.com">www.haband.com</a> <a href="mailto:service@haband.net">service@haband.net</a>	Stay-Up Socks (elastic-free)	PO	PO	PO	PO	PO	PO	PO

Abbreviations: TH, Thiuram Mix; CM, Carbamates; MB, Mercaptobenzothiazole; MM, Mercapto Mix Components other than Mercapto-benzothiazole; DT, Mixed Dialkyl Thioureas; BR, Black Rubber Mix; ?, information on this allergen was omitted by the manufacturer; PO Probably OK, presence of allergens unconfirmed, but materials incorporated generally thought to be free of rubber allergens found in the NACDG standard series.

\*Clothing contains spandex for elasticity and likely does not contain NACDG rubber allergens, but we were unable to confirm that the spandex in these clothing items is not reinforced with rubber elastics.

**TABLE 14.** Home medical product alternatives for patients with rubber allergies

CONDOMS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
SSL Americas 3585 Engineering Drive Suite 200 Norcross, Georgia 30092-2820 Information: (770) 582-2222 <a href="http://www.durex.com">www.durex.com</a>	Durex Avanti (PU)	no	no	no	no	?	no	no
Church & Dwight Co., Inc. Consumer Relations Department 469 N. Harrison Street Princeton, NJ 08543 Information: (800) 524-1328 <a href="http://www.trojancondoms.com">www.trojancondoms.com</a>	Trojan Supra® (PU)	PO	PO	PO	PO	PO	PO	no
Church & Dwight Global Protection Corp. 12 Channel Street Boston, MA 02210 Information: (617) 946.2800 <a href="mailto:info@globalprotection.com">info@globalprotection.com</a> Ordering: <a href="http://www.globalprotection.com">www.globalprotection.com</a>	Naturalamb® (lamb caecum) Pleasure Plus® (latex) ONE Condoms® (latex) Night Light® (latex) Atlas® (latex)	no	no	no	no	no	no	no
		no	yes	no	no	no	no	yes
		no	yes	no	no	no	no	yes
		no	yes	no	no	no	no	yes
		no	yes	no	no	no	no	yes
The Female Health Company Information: (800) 635-0844 <a href="mailto:info@femalehealth.com">info@femalehealth.com</a> <a href="http://www.femalehealth.com">www.femalehealth.com</a>	FC (PU)	no	no	no	no	no	no	no
DIAPHRAGMS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
FemCap 14058 Mira Montana Drive Del Mar CA 92014 <a href="mailto:contact@femcap.com">contact@femcap.com</a> Information: (858) 922-7673 <a href="http://www.femcap.com">www.femcap.com</a>	FemCap (silicone)	no	no	no	no	no	no	no
Milex Products, Inc. 4311 N. Normandy Chicago, IL 60634 Information: (800) 621-1278 <a href="http://www.milexproducts.com">www.milexproducts.com</a>	WIDE-SEAL® Silicone Diaphragms	PO	PO	PO	PO	PO	PO	no

TABLE 14. Continued ...

DIAPHRAGMS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Yama, Inc. 650 Liberty Avenue Union, New Jersey 07083 Information: (800) 699-8130 <a href="mailto:info@leasshield.com">info@leasshield.com</a> <a href="http://www.leasshield.com">www.leasshield.com</a>	Lea's Shield® (silicone)	PO	PO	PO	PO	PO	PO	no
ADHESIVE BANDAGES AND ATHLETIC TAPE								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Kendall	Curity Bandages	no	no	no	no	no	no	no
Tyco Healthcare / Kendall 15 Hampshire Street Mansfield, Massachusetts 02048 Information: (800) 962- 9888 <a href="http://www.kendallhealthcare.com">www.kendallhealthcare.com</a>	Curity Flexible Bandages	no	no	no	no	no	no	no
	SHER-LIGHT Elastic Adhesive Athletic Tape	no	no	no	no	no	no	no
	ULTRA-LIGHT Elastic Adhesive Athletic Tape	no	no	no	no	no	no	no
DIAPERS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
P & G Information: 1-800-726- 7377	Luvs®	PO	PO	PO	PO	PO	PO	no
	Pampers®	PO	PO	PO	PO	PO	PO	no
FEMININE HYGIENE								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Kotex Information: <a href="http://www.kotex.com">www.kotex.com</a>	Regular Tampons	no	no	no	no	no	no	no
Kimberly-Clark	Super Tampons	no	no	no	no	no	no	no
	Super Plus Tampons	no	no	no	no	no	no	no
	Thin Maxi	no	no	no	no	no	no	no
	Regular Maxi Pads	no	no	no	no	no	no	no
	Regular with Wings Maxi Pads	no	no	no	no	no	no	no
	Curved Maxi Pads	no	no	no	no	no	no	no
	Long Super Maxi Pads	no	no	no	no	no	no	no
	Long Super with Wings Maxi Pads	no	no	no	no	no	no	no
	Overnight Maxi Pads	no	no	no	no	no	no	no
	Overnight with Wings Maxi Pads	no	no	no	no	no	no	no
	Ultra-Compact Regular Pads	no	no	no	no	no	no	no
	Ultra-Compact Regular Pads	no	no	no	no	no	no	no
	Ultra-Compact Regular with Wings	no	no	no	no	no	no	no
	Ultra-Compact Regular with Wings Scented	no	no	no	no	no	no	no
	Regular – Unscented Pantiliners	no	no	no	no	no	no	no
	Regular – Deodorant Pantliners	no	no	no	no	no	no	no
	Odor Absorbing Pantliners	no	no	no	no	no	no	no
	Long – Unscented Pantliners	no	no	no	no	no	no	no
	Extra Coverage – Odor Absorbing	no	no	no	no	no	no	no

TABLE 14. Continued ...

FEMININE HYGIENE								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Natracare LLC 14901 E. Hampden Avenue Suite 190 Aurora, CO 80014 Information: (303) 617-3476 <a href="http://www.natracare.com">www.natracare.com</a>	Regular/Super absorbency tampons	no	no	no	no	no	no	no
	Regular/Super/Super Plus absorbency tampons w/o applicator	no	no	no	no	no	no	no
	Natracare Curved Regular Pad	no	no	no	no	no	no	no
	Natracare Pads in Slender/Super/Night time	no	no	no	no	no	no	no
	Natracare Ultra Pads with wings in Regular and Super	no	no	no	no	no	no	no
	Natracare original, Breathable liner	no	no	no	no	no	no	no
	Natracare Curved liner	no	no	no	no	no	no	no
	Natracare Tanga liner	no	no	no	no	no	no	no
SUPPORTS/BRACES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Cropper Medical, Inc. Information: (800) 541-2455 <a href="http://www.bioskin.com">www.bioskin.com</a>	Bio Skin® supports/braces (PU and Lycra – free of neoprene and latex)	PO	PO	PO	PO	PO	PO	no
Bauerfeind USA Inc. 55 Chastain Road, Suite 112 Kennesaw, GA 30144 Information: (800) 423-3405 Ordering: <a href="http://www.bauerfeindusa.com">www.bauerfeindusa.com</a>	Venotrain® compress hosiery line (Nylon/Lycra®/Cotton)	PO	PO	PO	PO	PO	PO	no
Nexcare 3M Center St. Paul, MN 55144-1000 Information: (888) 364-3577 <a href="http://www.nexcare.com">www.nexcare.com</a>	Nexcare™ Carpal Tunnel Brace with Breath-O-Prene® (PU foam)	PO	PO	PO	PO	PO	PO	no
	Nexcare™ Wrist Support with Splint with Breath-O-Prene® (PU foam)	PO	PO	PO	PO	PO	PO	no
	Nexcare™ Adjustable Elbow Support with Breath-O-Prene® (PU foam)	PO	PO	PO	PO	PO	PO	no
	Nexcare™ Slip-On Knee Support with Breath-O-Prene® (PU foam)	PO	PO	PO	PO	PO	PO	no
	Nexcare™ Adjustable Ankle Support with Breath-O-Prene® (PU foam)	PO	PO	PO	PO	PO	PO	no
	Nexcare™ Back Support with Breath-O-Prene® (PU foam)	PO	PO	PO	PO	PO	PO	no

Abbreviations: TH, Thiuram Mix; CM, Carbamates; MB, Mercaptobenzothiazole; MM, Mercapto Mix Components other than Mercaptobenzathiazole; DT, Mixed Dialkyl Thioureas; BR, Black Rubber Mix; PU, Polyurethane; ?, information on this allergen was omitted by the manufacturer; PO = Probably OK, presence of allergens unconfirmed, but materials incorporated generally thought to be free of rubber allergens found in the NACDG standard series.

**TABLE 15.** Sports equipment alternatives for patients with contact allergies.

SWIM GOGGLES								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Speedo USA 6040 Bandini Blvd. Los Angeles, CA 90040 Information: (888) 4-SPEEDO Ordering: <a href="http://www.speedousa.com">www.speedousa.com</a>	Hydrosplex series (undisclosed polymer)	?	?	?	?	?	?	no
TYR Sport, Inc. 15391 Springdale Street Huntington Beach, CA 92649 Information: (714) 897-0799 Ordering: <a href="http://www.tyr.com">www.tyr.com</a>	Velocity (silicone) Velocity Metallized (silicone) Femme T-72® Ellipse Metallized (silicone) Femme T-72® Petite (silicone) Qualifier™ (silicone) Swimple™ (silicone) Hydrovision (silicone) Boundary (silicone)	PO	PO	PO	PO	PO	PO	PO
SWIM CAPS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Speedo TYR Skyline Northwest 117 Foothills Lake Oswego, OR. 97034 Ordering: (800)547-8664	Silicone swim caps Silicone swim caps Silicone swim caps	PO	PO	PO	PO	PO	PO	PO
MOUTHGUARDS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
Shock Doctor, Inc. 3405 Annapolis Lane North Suite 200 Plymouth, MN 55447 Information: (800) 233-6956 <a href="mailto:miller@shockdoc.com">miller@shockdoc.com</a> Ordering: <a href="http://www.shockdoc.com">www.shockdoc.com</a>	Braces Mouthguard (silicone)	PO	PO	PO	PO	PO	PO	PO
EARPLUGS								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
McKeon Products, Inc. 25460 Guenther, Warren, MI 48091 Information: (586) 427-7560	Pillow Soft Earplugs - Kids Silicone Earplugs Pillow Soft Earplugs - Adult Silicone Earplugs Shooter's Putty Earplugs - Adult Silicone Earplugs	no	no	no	no	no	no	no
E.A.R Inc. Ordering: <a href="http://www.earinc.com">www.earinc.com</a>	Insta-Putty Silicone Earplugs	no	no	no	no	no	no	no

TABLE 15. Continued ...

PROTECTIVE EQUIPMENT								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
All-Star Sports Equipment Ampac Enterprises, Inc. ALL-STAR Division, P.O. Box 1356 1 Main Street Shirley, MA 01464 Information: (800) 777-3810 <a href="http://www.all-starsports.com">www.all-starsports.com</a>	Eliminator II Series Youth Shoulder Pad SP100L	no	no	no	no	no	no	no
	JV - Series Shoulder Pads SP1617M	no	no	no	no	no	no	no
	Quarter Back/ Wide Receiver Shoulder Pads SP3000	no	no	no	no	no	no	no
	Running Backs, Defensive Backs and General Purpose Shoulder Pads SP3200	no	no	no	no	no	no	no
	Enforcer I Series Varsity Shoulder Pads SP3100	no	no	no	no	no	no	no
	Enforcer II Series Varsity Shoulder Pads SP3500	no	no	no	no	no	no	no
	MVP Head Gear – Scholastic MVP2200F catcher's helmet	no	no	no	no	no	no	no
	MVP Head Gear – Scholastic MVP2210F catcher's helmet	no	no	no	no	no	no	no
	MVP Head Gear – Scholastic MVP3000SL catcher's helmet	no*	no*	no*	no*	no*	no*	no
	MVP Head Gear – Scholastic MVP2200 catcher's helmet	no*	no*	no*	no*	no*	no*	no
	MVP Head Gear – Scholastic MVP2210 catcher's helmet	no*	no*	no*	no*	no*	no*	no
	MVP Head Gear – Scholastic MVP2300 catcher's helmet	no*	no*	no*	no*	no*	no*	no
	MVP Head Gear – Scholastic MVP2310 catcher's helmet	no*	no*	no*	no*	no*	no*	no
	MVP Head Gear – Scholastic MVP1000 catcher's helmet	no*	no*	no*	no*	no*	no*	no
	Cool Lids BH6100 baseball batter's helmet	no	no	no	no	no	no	no
	Cool Lids BH6110 baseball batter's helmet	no*	no*	no*	no*	no*	no*	no
	Cool Lids BH6100ST baseball batter's helmet	no*	no*	no*	no*	no*	no*	no
	Cool Lids BH6110ST baseball batter's helmet	no*	no*	no*	no*	no*	no*	no
	Cool Lids BH510 baseball batter's helmet	no*	no*	no*	no*	no*	no*	no
	Cool Lids BH610 baseball batter's helmet	no*	no*	no*	no*	no*	no*	no
	Cool Lids BH586 baseball batter's helmet	no*	no*	no*	no*	no*	no*	no

TABLE 15. Continued ...

PROTECTIVE EQUIPMENT								
Company	Product (material)	TH	CM	MB	MM	DT	BR	NL
	Jr Lite Youth Football Helmets FHY1NOP	no*	no*	no*	no*	no*	no*	no
	Jr Lite Youth Football Helmets FHY1TB	no*	no*	no*	no*	no*	no*	no
	Jr Lite Youth Football Helmets FHY10P	no*	no*	no*	no*	no*	no*	no

Abbreviations: TH, Thiuram Mix; CM, Carbamates; MB, Mercaptobenzothiazole; MM, Mercapto Mix Components other than Mercaptobenzathiazole; DT, Mixed Dialkyl Thioureas; BR, Black Rubber Mix; ?, information on this allergen was omitted by the manufacturer; PO, Probably OK, presence of allergens unconfirmed, materials incorporated generally thought to be free of rubber allergens.

\*The shell of these helmets contains butadiene-acrylonitrile rubber mixed in the plastic, but the lining foam is made of polyurethane and is free of the NACDG rubber allergens.

rubber glove ACD.<sup>140</sup> Rubber sources of thiuram sensitization reported less frequently than gloves include adhesives, make-up applicators, eyelash curlers, condoms and diaphragms, medical devices, rubber pillows and sheets, underwear, and swim gear. Thiuram chemicals may also be found in fungicides, germicides, insecticides, pesticides, insect repellents, plastics, putty, soaps, shampoos, and the medication disulfiram.<sup>137</sup>

Once thiuram allergy is confirmed via patch testing, products known or likely to contain these chemicals must be avoided or substituted with safe alternatives. Although vinyl gloves are a viable alternative for patients with thiuram allergy, vinyl is more prone to incurring fine breaks and may be inadequate for some high risk exposures. Many examples of currently available rubber and synthetic gloves for medical, industrial, and household applications are listed in Table 10.

Shoe allergy can be a difficult problem, and some general suggestions useful for most types of shoe allergy are listed below. Shoe alternatives include molded plastic footwear or wooden clogs.<sup>137</sup> Handmade leather shoes<sup>141</sup> and PVC industrial boots<sup>142</sup> have been used previously with success in patients with both thiuram and MBT allergy. If the person's soles are exclusively involved, replacement of the shoe insole may be all that is required. The adhesive used to adhere the insole to the shoe may contain allergens and should be carefully scraped out. The new alternative insole can then be inserted using Elmer's Glue All. Alternative insoles are listed in Table 11, and leather or cork insoles may also be used. If the tops of the feet are involved, this implies allergy to the shoe uppers. One strategy for allergy to shoe uppers is to wear only plastic shoes until the

dermatitis clears and then to re-add shoes one pair each week. Any shoes which cause a flare-up should be discarded. In some cases, it may be necessary to obtain customized shoes. Alternatively, it may be worth trying Gore-Tex socks as a barrier (Cabela's 13" Insulated Gore-Tex Sock). Gore-Tex was previously shown to be effective as a barrier for rubber glove allergy caused by rubber accelerators.<sup>143</sup> Use of aluminum chloride hexahydrate 6.25% or 20% solution to reduce hyperhidrosis can also prevent leaching of allergens through socks in some patients.

Examples of alternative footwear are presented in [Table 11](#), and a list of several regional custom shoemakers and the services they offer are listed in [Table 12](#).

Spandex has been recommended as an excellent elastic substitute in patients sensitive to rubber additives,<sup>144</sup> and we have confirmed that thiurams are not used in the manufacture of Lycra® (INVISTA, Wichita, KS), Dorlastan® (Asahi Kasei Spandex America Inc., Goose Creek, SC), or Radici (RadiciSpandex, Gastonia, NC) spandex. Elastic-free clothing may also be worn. [Table 13](#) contains examples of men's and women's undergarments, swimwear, and socks that are either elastic-free or made with spandex instead of elastic. It was previously reported that rubber Trojan condoms were manufactured using carbamate accelerators but not other rubber additives (thiurams, MBT, or antioxidants),<sup>145</sup> but this information could not be confirmed with the current manufacturers. Several styles of thiuram-free condoms were identified, however, and Lambskin condoms (Naturalamb), polyurethane condoms, and silicone diaphragms represent alternatives to latex contraceptive devices ([Table 14](#)). Importantly, condoms made from lamb caecum do not protect against sexually transmitted diseases such as HIV and therefore should only be used for contraception. Polyurethane condoms do protect against HIV. Sports equipment alternatives, including swimming goggles, swim caps, ear plugs, and mouthguards, are made of silicone or other synthetic polymers and are presented in [Table 15](#).

## *Carba Mix*

Carba mix includes two carbamates, zinc diethyldithiocarbamate (ZDC) and zinc dibutyldithiocarbamate (ZBC), as well as diphenylguanidine (DPG), which are fast and medium accelerators of vulcanization, respectively.<sup>131</sup> In their review, Conde-Salazar and coworkers found carba mix to be the second most prevalent reaction in those with rubber allergies.<sup>134</sup> Cronin reported that simultaneous reactions to thiuram mix and carba mix were not infrequent, likely because of the chemical similarity between compounds in each group. She also observed that DPG was often the



offending allergen in cases of reaction to carba mix only.<sup>146</sup> Similarly, Conde-Salazar and coworkers reported that 75% of carba-positive patients also reacted to thiuram, whereas the converse was true in only 20%.<sup>134</sup> Carba mix also has a higher rate of irritant reactions compared with other rubber allergens,<sup>132</sup> which must be considered when interpreting patch test results.

As with thiurams, information on the presence of carba mix allergens in specific products is typically not available. Whereas the dithiocarbamates are used for production of consumer products such as gloves, adhesives, clothing, and condoms, DPG is typically used in heavy industrial-grade rubber products such as rubber tubing and hoses.<sup>137</sup> Glove dermatitis has been less commonly attributed to carba mix allergens, but this might be expected to change as dithiocarbamates and MBT are now among the most frequently mentioned accelerators in glove ingredient lists.<sup>140</sup> The rubber products containing carba mix allergens are similar to those outlined for thiurams. In addition, non-rubber sources of carba allergens include: disinfectants, repellants, fungicides, insecticides, adhesives, cement, sealants, soaps, and shampoos.<sup>137</sup>

In allergic patients, strategies for avoidance of carba mix allergens follow those for the thiurams, with the caveats discussed below. Carba mix allergens were nearly ubiquitous in the brands of latex gloves included in [Table 10](#), but several carba-free options, including synthetic rubber and vinyl gloves, are provided. Alternatively, certain glove liners may reduce or block exposure to some rubber accelerators found in gloves.<sup>143</sup> In terms of clothing elastic alternatives, the spandex brands mentioned previously are manufactured without the use of carba mix allergens, and are likely a safe alternative, provided there is no secondary reinforcement with rubber elastic. All of the latex condoms in [Table 14](#) use carbamates as accelerators, but alternative contraceptive options are identified, including the Avanti polyurethane condom by Durex. Bolhaar and Ginkel presented a case of DPG allergy, presumably from a neoprene brace, that was effectively treated by lining the brace with leather.<sup>147</sup> Other alternative medical supports/braces for patients with carba mix allergies are presented in [Table 14](#).

### *Mercaptobenzothiazole and Mercapto Mix*

Mercaptobenzothiazole (MBT) and its derivatives are the largest-volume organic accelerators used in rubber production.<sup>139</sup> These chemicals are also used in mining processes and many nonrubber products as well.<sup>148</sup> Both MBT and mercapto mix are widely tested in standard trays, including the NACDG standard series, but allergy to these compounds is

relatively uncommon and appears to be declining.<sup>148</sup> MBT is tested in the NACDG standard tray both individually at 1% pet. and as part of the mercapto mix at 0.25% pet. Mitchell and coworkers originally showed that the concentration of MBT in the mercapto mix was too low and occasionally missed cases of MBT allergy detected by MBT test alone.<sup>149</sup> The other components of the mercapto mix currently used by the NACDG include: morpholinyl mercaptobenzothiazole (MOR), N-cyclohexyl-2-benzothiazyl sulfonamide (CBS), and dibenzothiazyl disulfide (MBTS), each at 0.25% pet.<sup>148</sup> Despite numerous studies on the subject, controversy remains regarding the optimal mix for detecting allergy to these compounds. The mercapto compounds are closely related and may be considered a group allergy,<sup>148</sup> with a thiazole group and benzene ring reportedly essential for sensitization.<sup>150</sup> Additionally, Hanson and Argup demonstrated that these compounds are interconvertible via oxidation reactions and the major component remaining in mercapto mix after 3 weeks at room temperature was MBTS.<sup>151</sup> This suggests that, despite careful formulation, the composition of mercapto mixes may vary.

The products likely to contain the mercapto compounds are similar to those mentioned for carbamates and thiurams. Gloves, especially nitrile, and shoes are the most common sources of sensitizing exposure.<sup>137</sup> As mentioned above, Geier and coworkers stated that MBT and carbamates are replacing thiurams in glove production and are now the most frequent accelerators in glove ingredient lists.<sup>140,152</sup> MBT and its derivatives are among the most common sensitizers in cases of contact dermatitis to shoes.<sup>137,148</sup> Athletic shoes may be the most common culprit.<sup>131</sup> Interestingly, spandex (a polyurethane elastomer) in brassieres was reported as a source of MBT sensitization in over 40 cases of ACD from 1966 to 1973.<sup>147</sup> Fisher, however, reported that the four major US manufactured brands of spandex at that time, including Lycra® (Dupont), did not contain MBT. He indicated that certain British manufacturers had used MBT in the manufacture of spandex and that some American spandex might be reinforced with MBT containing rubber.<sup>153</sup> To our knowledge, however, no recent cases of spandex as a source of MBT sensitization have been reported. Nonrubber sources of exposure include veterinary and pet products, cutting oils, antifreeze, disinfectants, adhesives, cements, greases, and photographic emulsions.<sup>137</sup>

Avoidance of MBT and the mercapto mix allergens is also similar to the other accelerators. Many gloves, both latex and synthetic, and free of both MBT and mercapto mix allergens, are presented in [Table 10](#). PVC work boots<sup>142</sup> and handmade leather shoes<sup>141</sup> have reportedly been successfully used in patients with MBT allergy. Athletic shoes have been

mentioned as a frequent source of MBT sensitization,<sup>131</sup> and unfortunately, many of the alternative shoes previously discussed are not suitable for athletic endeavors. Two custom shoemakers, Loveless Custom Boots and Shoes and P.W. Minor, will line athletic shoes with “hypoallergenic” leather and vegetable tanned leather, respectively (Table 12). With regard to clothing, we have confirmed that Lycra® continues to be manufactured without the use of MBT. Dorlastan® and Radici spandex are also free of MBT. Although we could not confirm that Trojan brand latex condoms continue to be manufactured without MBT,<sup>145</sup> several contraceptive options free of mercapto compounds, including some styles of latex condoms, are presented in Table 14.

### *Mixed Dialkyl Thioureas*

The final group of accelerators tested in the NACDG standard tray is the mixed dialkyl thioureas (MDTU), consisting of diethylthiourea (DETU) and dibutylthiourea (DBTU). The thioureas are used as accelerators for neoprene<sup>154</sup> and other rubbers that contain chlorine as reactive cross-linking sites.<sup>133</sup> Added to the standard tray in 1991 in response to the appearance of case reports of allergy to thioureas in rubber materials,<sup>132</sup> contact allergy to these compounds is now widely recognized. A total of 1.0% of patients patch tested by the NACDG from 2003 to 2004 had reactions to MDTU.<sup>135</sup> Several thiourea compounds in addition to those included in MDTU are known to cause ACD.<sup>155</sup> A recent review of the literature by McCleskey and Swerlick suggested that up to 25% of cases of thiourea-induced ACD might be missed by screening with only MDTU.<sup>156</sup>

The sources of sensitization to MDTU vary somewhat from the rubber accelerators already discussed as these compounds are more typically found in the synthetic rubber neoprene (polychloroprene).<sup>154</sup> In fact, thioureas have accounted for the vast majority of reported cases of neoprene-induced ACD.<sup>157</sup> Neoprene or other rubber products reported as sources of sensitization to the components of MDTU (DETU and DBTU) include: wetsuits,<sup>158-161</sup> orthopedic braces/supports,<sup>154,156,162-167</sup> weather strips used in car manufacturing,<sup>168</sup> keyboard wrist supports,<sup>156,169,170</sup> continuous positive airway pressure (CPAP) device strapping,<sup>156,171,172</sup> athletic shoes/insoles,<sup>173</sup> swim goggles,<sup>174</sup> rubber safety shoes,<sup>175</sup> boots,<sup>176</sup> and protective eyewear.<sup>162</sup> Nonrubber sources reported to contain MDTU allergens include: adhesive,<sup>156,160</sup> commercial paint and glue remover,<sup>177,178</sup> acidic detergent,<sup>179</sup> and a phonecard thermocoating.<sup>180</sup> Ethylbutylthiourea was verified to be a source of allergic contact

dermatitis from the neoprene adhesive used in Spenco insoles, but this is not a MDTU allergen (DETU and DBTU were not found in the adhesive).

Little is known about which thioureas are used in the various grades of neoprene or their use in other rubber products, which makes selective avoidance of these allergens difficult. No glove products in our sampling of brands contained MDTU allergens. Diphenylthiourea (DPTU) was used in a few neoprene glove styles and is indicated by a DP in [Table 10](#), but cross-reactivity between DPTU and the MDTU allergens is unlikely.<sup>157</sup> In cases of MDTU, allergy to neoprene-containing insoles, the Cambion polyurethane insole manufactured by Magister Corporation, may be used ([Table 11](#)). Additionally, the lining of athletic shoes by custom shoemakers, as mentioned for MBT allergy, may be effective ([Table 12](#)). The Bioskin line of orthopedic supports and 3M's Nexcare® braces/supports are free of neoprene ([Table 14](#)), and Bolhaar and Ginkel successfully treated neoprene brace-induced thiourea allergy by lining the brace with leather.<sup>147</sup> Sports equipment alternatives, such as silicone gasket swim goggles, are provided in [Table 15](#).

### *Black Rubber Mix*

The black rubber mix allergens are the only rubber allergens in the NACDG standard tray that are not vulcanization accelerators. Rather, the black rubber mix chemicals (p-phenylenediamines) are the most common class of antioxidants used to protect elastomers, such as rubber, from oxidation as well as ozone degradation.<sup>181</sup> This prevents drying and cracking in the final product.<sup>131,137</sup> Conde-Salazar found black rubber mix to be the third most common rubber allergen in their review of rubber ACD,<sup>134</sup> though in some series of industrial ACD, these chemicals were found to be the most common rubber sensitizers.<sup>131</sup> The chemicals tested in the black rubber mix include: N-phenyl-N/-cyclohexyl-p-phenylenediamine (CPPD), N-isopropyl-N/-phenyl-p-phenylenediamine (IPPD), and N,N/-diphenyl-p-phenylenediamine (DPPD). The most common sensitizer in this group is IPPD.<sup>132,137</sup> The NACDG briefly discontinued testing with black rubber mix in 1998 and IPPD alone was added to the standard series. IPPD, however, may reportedly miss 10% of rubber contact allergies when tested alone.<sup>182</sup> The NACDG is currently using black rubber mix, rather than IPPD alone, in its standard tray.

The black rubber mix chemicals are widely used in rubber production. They are colored and are therefore typically used in black-colored rubber products for industrial applications, such as tires, tubes, pipes, gaskets, flanges, cushions, mail sorters, and heavy black rubber gloves and boots.<sup>137</sup> Consumer product exposures include: squash balls (no other

sports balls implicated), eyelash curlers, face masks, rubber boots, shoes with soles made of used tires, earphones, pens with grippers, walking-stick handles, and elasticized clothing such as underwear, diving suits, and leg support bandages.<sup>137</sup> There were also recent reports of ACD from black rubber mix chemicals in the black rubber eyepieces of a microscope<sup>183</sup> and a dental container.<sup>184</sup> In addition, cross-reactions occur to the related chemicals p-phenylenediamine<sup>131,132,137</sup> and paraminodiphenylamine,<sup>132,137</sup> which are found in some hair dyes as well as certain textile dyes, such as the disperse dyes.<sup>132</sup>

Patients allergic to black rubber mix should avoid contact with black or dark rubber products, but some sources are not easily identifiable by their color, such as elastic in clothing.<sup>137</sup> A wide variety of medical, industrial, and household gloves were found to be free of black rubber mix chemicals. The general footwear recommendations outlined for the accelerators hold true for black rubber mix allergy as well. PVC work boots safe for industrial settings are provided in [Table 11](#). The spandex brands already identified as free of accelerators are also free of black rubber mix chemicals. Clothing items using Lycra®, Dorlastan®, and/or Radici spandex without rubber elastic reinforcement are likely safe alternatives. Examples of clothing lines offering such products are provided in [Table 13](#). Silicone swim goggles identified in [Table 15](#) are likely safe, although chemical content could not be verified.

### *Natural Rubber Latex*

Natural rubber latex is the milky fluid obtained from the sap of the *Hevea brasiliensis* tree. Unlike the rubber allergens already discussed, latex allergy occurs to natural rubber proteins, rather than chemical additives, and clinically presents as urticaria, rhinitis, conjunctivitis, asthma, and/or anaphylaxis (immediate hypersensitivity type I), rather than allergic contact dermatitis.<sup>131,132,185,186</sup> The increase in type I latex allergy over the last several decades is likely due to multiple factors, including the institution of universal precautions by the Centers for Disease Control and the resultant influx of poorly made latex devices.<sup>132,185,186</sup> Although the prevalence of latex sensitivity in the general population has been estimated to be less than 2%,<sup>185,186</sup> predisposing factors include atopy, frequent glove use, hand eczema, and history of multiple surgeries (eg, spina bifida patients).<sup>132</sup> The allergenic proteins in latex are multiple and are likely to be affected by many factors related to harvesting and processing,<sup>132,185</sup> which complicates diagnosis and treatment. Diagnosis is typically made based on clinical findings associated with a combination of procedures including radioallergosorbent test

(RAST), prick, and use tests.<sup>132,185,186</sup> Type IV sensitivity to natural rubber latex has also been reported.<sup>132,185,186</sup>

Latex products are widespread in occupational, industrial, and consumer products. The most widely used latex product, gloves, are not surprisingly the product most commonly associated with sensitization.<sup>186</sup> Other consumer products known to contain natural rubber latex include balloons, adhesives, condoms, diaphragms, rubber bands, rubber toys, bandages, balls, erasers, paints, hot water bottles, whoopee cushions, pacifiers, carpet backings, shoes, sports equipment, rubber clothing, stretch textiles, and clothing elastic.<sup>185,186</sup> There are numerous other sources of latex exposure related to medical devices and industrial exposures,<sup>185-188</sup> but the focus of this review is consumer products.

Information on the presence of latex in products is more readily available than for the other rubber allergens discussed. In 1997, the U.S. Food and Drug Administration initiated requirements for latex medical devices to be labeled with a caution about the potential for latex to cause allergic reactions.<sup>186</sup> Other products, however, may contain latex without such cautionary labeling. Tables 10–15 contain many products currently available to consumers that are latex-free. Medical, consumer, and industrial glove alternative products made from various synthetic materials are listed in Table 10. Latex-free footwear options are included in Table 11, with references to custom shoemakers who can accommodate persons with latex allergy. Many latex-free clothing items are currently marketed (Table 13). Latex-free condoms include Avanti (Durex), Supra (Trojan), and Naturalamb (Trojan). Several silicone diaphragms are currently available, with others in clinical trials (Table 14). Latex-free sports equipment is also available to consumers (Table 15). Finally, mylar balloons are latex-free. There are many resources for patients with latex allergy, including online resources such as the following Web sites: <http://www.latexallergyresources.org> and <http://www.sbaa.org>, which provide more comprehensive listings of latex-free products.

### *Synthetic Alternatives to Rubber Products*

Several synthetic polymers, including polyurethane, polyvinyl chloride, and silicone rubber, have already been mentioned as alternative materials in many products that are traditionally manufactured with natural rubber (eg, medical gloves, condoms, footwear, etc). Polyurethane (PU) is made by reacting diisocyanates and polyhydroxyl compounds.<sup>189</sup> Allergic contact dermatitis from occupational exposure to diisocyanates has been reported,<sup>190,191</sup> but completely polymerized PU products usually do not cause skin problems.<sup>189</sup> Spandex fiber is a synthetic elastomer comprised

of polyurethane.<sup>144</sup> Polyvinyl chloride (PVC) is synthesized by polymerization of vinyl chloride.<sup>189</sup> Products made of PVC<sup>137,142</sup> have been recommended for patients with rubber allergies, and although diphenylthiourea was reported as a sensitizer in PVC adhesive tape backing,<sup>192</sup> the components of mixed dialkyl thioureas were not implicated. Finally, silicone rubber has a siloxane (-O-Si-O-) backbone with methyl, vinyl, or phenyl groups attached<sup>193</sup> and is typically vulcanized with peroxides.<sup>133</sup> Of products made from these synthetic polymers where chemical contents could be confirmed, none contained the NACDG standard series rubber allergens (Tables 10-15). We have included additional products made from PU, PVC, and silicone rubber where specific chemical contents were unable to be confirmed (indicated by PO, for “probably okay,” in Tables 10-15), as these products are also likely to be free of the discussed rubber allergens. One manufacturer (Zotefoams PLC) of polyethylene foam (plastazote) and ethylenevinyl acetate foams (evazote) confirmed that these items, which may be used for insoles, do not contain rubber additives.

## Part V: Allergens in Clothing and Leather Apparel

### *Potassium Dichromate*

Potassium dichromate is the screening allergen for chromate allergy. Because it is tested near its irritancy threshold, some reactions may be false-positive, and relevance is therefore lower than with many other allergens. Chromium is allergenic in the trivalent and hexavalent states.<sup>194</sup> Chromates are found in tanned leather (untanned leather is rawhide) and may cause foot dermatitis from leather shoes. Like other allergens that cause foot dermatitis, chromates are most likely to leach through socks if the patient’s feet perspire heavily. Tanned leather is also used for suede and in upholstery and garments.

Chromate is also found in cement and causes dermatitis in bricklayers and construction workers. Dried cement and the dust from dried cement is not allergenic. Metal-platers may have occupational dermatitis from chromates, and welders may have airborne exposure from chromium in electrorods.<sup>195</sup> Occupational chromate dermatitis often becomes lichenified, is notorious for chronicity, and may persist even after the worker discontinues occupational chromate exposure. Ingestion of dietary supplements, such as chromium picolinate, and even foods high in chromium, such as potatoes, other vegetables, canned fruits, apple peel, spices, tea, beer, wine, and chocolate, may also exacerbate chromate dermatitis.<sup>196</sup>

Chromium oxide is used as a pigment in artists’ paints and ceramics,<sup>195</sup>



and chromates are used as pigments in cosmetics as chromium oxide greens or chromium hydroxide green.<sup>197</sup> Chromium oxide greens are most commonly used in eye cosmetics including eye shadow and eyeliner, and also in concealers, foundations, and powder. Cosmetics free of chromium oxide are shown in Table 16. Chromium green pigments are also found in a few skin care products including Eucerin Redness Relief Soothing Anti-Aging Serum, Irish Spring Bar Soap (Aloe and Micro Clean), Clean and Clear Morning Burst Facial Cleanser and Scrub, and Clean and Clear Oxygenating Facial Scrub.

Some potassium dichromate allergic patients can tolerate leather footwear by minimizing pedal hyperhidrosis with topical application of aluminum chloride hexahydrate or use of iontophoresis devices. Basic guidelines for dealing with shoe allergy have already been discussed in the section on rubber (thiuram) allergy. Alternatives to leather-tanned shoes include shoes made of vinyl; these are usually labeled “man-made materials.” Inexpensive polyvinylchloride boots are available at Wal-Mart; polyvinyl chloride work boots with a safety toe are made by Tingley (Tingley Rubber Corp, South Plainfield, NJ) and available through industrial suppliers such as those listed in Table 11. Some canvas tennis shoes like the classic Keds® (Richmond, IN; <http://www.keds.com>) are free of leather. Vegetable tanned leather, which is tanned with tree bark or other plants instead of chromate salts, is another alternative to tanned leather. Vegetable tanned leather is often used for shoe soles, belts, wallets, and purses. Custom shoe-makers can craft a leather upper of untanned leather for shoes or boots. Aluminum can also be used to tan leather such as for laces.<sup>199</sup> Sources for custom shoes including vegetable tanned leather are shown in Table 12 along with those for rubber-free shoes. In addition, Birkenstock sandals and shoes do not use hexavalent chromium to tan leather (personal communication, Matthew Zirwas, May 2007). Manufacturers marketing to vegans also sell leather-free shoes (Moo Shoes; <http://www.mooshoes.com> or the vegetarian shoe section of <http://www.zappos.com>).

### *Glutaral (Glutaraldehyde)*

Although glutaraldehyde is also used to tan leather, there are no reports of shoe dermatitis due to this agent. Most allergic contact dermatitis from glutaraldehyde is occupationally related. It is used at >2% for cold sterilization (killing of all microbial life). Glutaraldehyde is also commonly used at lesser dilutions for disinfection (killing of all microbial life except bacterial endospores). Glutaraldehyde is most often used for these purposes in dentistry, in veterinary medicine, and in dialysis units and



**TABLE 16.** Cosmetics free of chromium oxide<sup>198\*</sup>

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Avon Perfect Wear Eyewriter Waterproof Liquid Eyeliner
Clinique Advanced Concealer, Estee Lauder
Clinique Concealing Stick, Estee Lauder
Clinique Gentle Light Powder, Estee Lauder
Clinique Glow Crazy Loose Powder, Estee Lauder
Clinique Line Smoothing Concealer, Estee Lauder
Clinique Quick Corrector, Estee Lauder
Clinique Soft Finish Makeup, Estee Lauder
Clinique Soft Finish Pressed Powder, Estee Lauder
Clinique Stay Matte Sheer Pressed Powder, Estee Lauder
Clinique True Bronze Pressed Powder, Estee Lauder
Clinique Work-Out Makeup All Day Wear, Estee Lauder
Estee Lauder Aeromatte Ultrucent Pressed Powder, Estee Lauder
Estee Lauder Brilliant Shimmer All-Over Powder, Estee Lauder
Estee Lauder Bronze Goddess Soft Matte Bronzer, Estee Lauder
Estee Lauder Country Mist Liquid Makeup, Estee Lauder
Estee Lauder Double Matte Oil Control Makeup spf 15, Estee Lauder
Estee Lauder Double Wear Stay-in-Place Concealer spf 10, Estee Lauder
Estee Lauder Lucidity Translucent Loose Powder, Estee Lauder
Estee Lauder Platinum Illuminator All-Over Powder, Estee Lauder
La Mer Loose Powder, Max Huber, Estee Lauder
Mary Kay Crème-to-Powder Foundation, Mary Kay Inc.
Mary Kay Day Radiance Cream Foundation, Mary Kay Inc.
Mary Kay Dual-Coverage Powder Foundation, Mary Kay Inc.
Mary Kay Eyesicles Eye Color, Mary Kay Inc.
Mary Kay Full-Coverage Foundation, Mary Kay Inc.
Mary Kay Medium-Coverage Foundation, Mary Kay Inc.
Mary Kay MK Signature Bronze Highlighting Powder, Mary Kay Inc.
Mary Kay MK Signature Brow Liner, Mary Kay Inc.
Mary Kay MK Signature Classic Blonde Brow Definer Pencil, Mary Kay Inc.
Mary Kay MK Signature Concealer, Mary Kay Inc.
Mary Kay MK Signature Eyeliner, Mary Kay Inc.
Mary Kay MK Signature Facial Highlighting Pen, Mary Kay Inc.
Mary Kay MK Signature Lip Liner, Mary Kay Inc.
Mary Kay MK Signature Liquid Eyeliner, Mary Kay Inc.
Mary Kay MK Signature Loose Powder, Mary Kay Inc.
Mary Kay Timewise Age-Fighting Lip Primer, Mary Kay Inc.
Neutrogena Healthy Defense Bronzer spf 30, Neutrogena, Johnson & Johnson
Neutrogena Healthy Skin Liquid Makeup - spf 20, Neutrogena, Johnson & Johnson
Neutrogena Healthy Skin Loose Powder, Neutrogena, Johnson & Johnson
Neutrogena Healthy Skin Pressed Powder, Neutrogena, Johnson & Johnson
Neutrogena Healthy Skin Smoothing Stick, Neutrogena, Johnson & Johnson
Neutrogena Liquid Neutrogena - Fragrance Free, Neutrogena, Johnson & Johnson
Neutrogena Liquid Neutrogena, Neutrogena, Johnson & Johnson
Neutrogena Makeup Correcting Stick, Neutrogena, Johnson & Johnson
Neutrogena Mineral Sheers for Eyes, Neutrogena, Johnson & Johnson
Neutrogena Skin Clearing Concealer, Neutrogena, Johnson & Johnson
Neutrogena Skin Clearing Liquid Makeup, Neutrogena, Johnson & Johnson
VMV Hypoallergenic Skin Savvy 60 Ultra-High Protection, Creamy Protection, Liquid-Crème Foundation

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\*This table courtesy of CARD, reprinted with permission. This document may not be distributed or used except under the supervision and assistance of a locally licensed physician experienced in diagnosing and treating contact dermatitis. The possibility exists that a product listed in this document may inadvertently contain the chemical which you have been instructed to avoid. Information provided to Mayo by the manufacturer may be accidentally incomplete, or the manufacturer may fail to notify us of a change in product formula. We will do our best to insure that the list of chemicals within the products in our database is accurate and up-to-date. Neither Mayo, nor the American Contact Dermatitis Society makes any warranty or guaranty as to the accuracy of this information. The information in this database was graciously provided by the skin care products companies on a voluntary basis. Mayo and the American Contact Dermatitis Society do not endorse or specifically recommend any of the products listed in this document. The sole purpose of the document is to serve as a guide to products that are likely to be free of the designated allergen. Although effort is made to keep the listing current, companies can change products without notifying Mayo or the American Contact Dermatitis Society. Therefore, patients should keep in close contact with their physician regarding their medical condition. If you have any concerns or questions about the timeliness or accuracy of the information contained on this list, you should contact the manufacturer of the product directly.

endoscopy for tubing; hairdressers may also use glutaraldehyde disinfection for their scissors. Cidex (acidic glutaraldehyde) is a widely used hospital disinfectant. Automation of x-ray film processing has reduced exposure in the radiology setting.

The INCI name for glutaraldehyde is glutaral, and this name will be used in hair care products such as Suave Moisturizing Hot Oil (Unilever) and some facial products such as Ultima II CHR cream and lotion concentrates, CHR cream cleanser, CHR Procollagen face and throat, and Double action facial toner (all by Revlon).

Glutaraldehyde may be both a respiratory and cutaneous irritant. Patch tests to glutaraldehyde may also be false-positive due to irritation and require careful examination with comparison of strength of reaction at early and late readings. Glyoxal is a dialdehyde also used as a disinfectant that cross-reacts with glutaraldehyde. Many patients with positive patch tests to glutaraldehyde also have positive patch tests to formaldehyde.

Alternatives to glutaraldehyde for sterilization and disinfection depend on the heat and chemical tolerance of the material to be treated as well as the medical need for absolute sterilization as opposed to disinfection or cleaning. For sterilization, autoclaving (steam under pressure) can be used for heat-stable items; ethylene oxide is compatible with most materials but is toxic and flammable; hydrogen peroxide gas plasma and peracetic acid vapor with gas plasma can be used on instruments of specific size and composition. For disinfection, hydrogen peroxide is an alternative but may damage the appearance of metal instruments; peracetic acid alone can be used at point-of-use but not for long-term storage of instruments. Ortho-phthalaldehyde (Cidex OPA®, Advanced Sterilization Products, Johnson and Johnson, NJ) is compatible with many materials and can be used for cold sterilization of endoscopes, but it stains skin and clothing.<sup>198</sup> Glutaraldehyde solutions (Cidex®) are sometimes used for simple cleaning of medical surfaces. Cleaning medical surfaces should kill common bacteria, but may not kill all viruses and mycobacteria. Alternatives for this purpose include benzalkonium chloride (Zephiran®, Sanofi-Aventis, Bridgewater, NJ) and various Lysol Brand products which contain one or more of either benzalkonium chloride, ethanol and/or isopropyl alcohol, or bleach (Reckitt Benckiser, Berkshire, UK).

Glutaraldehyde penetrates most types of gloves. Penetration time depends on the glutaraldehyde concentration and length of exposure, but double gloving with nitrile gloves should be sufficient for tasks lasting around an hour.<sup>200</sup>

## *Textile Dermatitis*

Patients allergic to textile dyes, resins, and certain cross-linking agents will have dermatitis accentuated in areas of tight clothing and perspiration, especially the axillary lines sparing the vault, the antecubital and popliteal fossae, and the medial thighs. These areas are also a common site for atopic dermatitis in adult patients, perhaps due to commensal yeast where friction from clothing enhances skin penetration.<sup>201</sup>

Textile chemical allergy can cause chronic, generalized dermatitis. Patients may also react to formaldehyde-releasing preservatives in personal care products and therefore have involvement of the face and hands. Dimethylol dihydroxyethyleneurea (Fixapret CPN) and a mixture of ethylene urea and melamine formaldehyde are used to screen for textile resins and cross-linking agents on the standard screening series.

## *Textile Resins*

Urea formaldehyde, melamine formaldehyde, and ethylene urea/melamine formaldehyde are textile resins, meaning that cross-links are formed between the polymers when formaldehyde reacts with either urea or melamine. In easy-care fabrics, the resin fills the pores of cotton fibers or other cellulose fibers such as rayon and cotton blends as the fabric is pulled through the reaction bath. Urea formaldehyde and melamine formaldehyde resins are rarely found on apparel fabrics today because of the high concentration of formaldehyde off-gassed from the fabric. These may still be present in very stiff fabrics such as upholstery and draperies.

Urea and melamine formaldehyde resins may also be used to bind pigments to fibers. Pigments are water insoluble and are fixed to the textile fiber by a resin such as urea or melamine formaldehyde. When the textile fabric is pulled through a bath containing pigment, urea or melamine, and formaldehyde, the fabric is pigment dyed. When a solution containing pigment, formaldehyde, and either melamine or urea is applied to selected areas of fabric, the fabric is said to be pigment printed and the design may be visible only from one side. Pigments are often used on non-cellulosic fibers that would not be treated for wrinkle resistance, such as polypropylene (Olefin), because the fiber does not take dyes well. Although there are almost no reported cases, textile resin allergic patients may react to the pigment dyed or pigment printed portion of a fabric.<sup>202</sup> Although methylolacryamides can also be used as resins for binding pigment to fabric, there is no way for the consumer to discern whether pigment printing or dyeing used a formaldehyde-related resin.

Pigment printing is often used for sheets, and patients can be advised to

avoid sheets with pattern on only one side, which is typical of pigment printing. If a pattern or logo is desired, patients should look for items where colored yarns were used to knit the pattern rather than printing the pattern onto fabric; however, textile resin allergic patients should avoid cotton-rich knits that may be finished with textile resins (personal communication, Kathryn Hatch, University of Arizona, July 2007). Additionally, urea formaldehyde and melamine formaldehyde may be used to bind fibers together in nonwoven textiles.

Pigment dyed fabrics look “soft and muted.” Often sweat pants and tops or T-shirts may be labeled “pigment dyed” as this is desirable to consumers in the marketplace. Pigment dyeing imparts a “weathered” or “pre-washed” look to garments that may also be described as “soft and powdery.” Patients should avoid fleece garments and T-shirts with this appearance, but denim is not pigment dyed and there is no need to avoid weathered appearing denim as this look is accomplished for denim with the use of enzymes (personal communication, Kathryn Hatch, University of Arizona, July 2007).

Dimethylol dihydroxyethyleneurea (DMDHEU) (Fixapret CPN) is a cross-linking agent that forms a chemical bridge between polymers within cellulosic fibers such as cotton. DMDHEU is a formaldehyde-releasing cross-linking agent very commonly used to treat cellulosic fibers in apparel and also used on cotton knits for shrink resistance and on chintz to maintain high gloss and to fix reactive dyes to polyester blended fabrics.<sup>203</sup> Dimethylol dihydroxyethyleneurea releases less formaldehyde than the former, older agents, and is currently the best screening test for the current United States market.<sup>204</sup> All of these resins are now less common causes of allergic contact dermatitis in Japan and much of Europe, where their use in apparel is regulated. Textile dyes are now the most common cause of clothing dermatitis in Europe.<sup>205</sup> Melamine formaldehyde and urea formaldehyde may still be used for very stiff fabrics such as upholstery and draperies.

In the United States, textile resins are still sometimes relevant to clothing dermatitis from fabrics containing cotton and/or rayon fibers (especially durable press finishes). Formaldehyde-releasing textile resins are less expensive than the newer alternatives, and give a better result on cotton. As lower formaldehyde-release textile resins have been introduced over the past several decades, sensitization from textiles is less common; many of the patients with textile resin dermatitis are occupationally sensitized to formaldehyde and then react to their clothing.<sup>206</sup>

Melamine-formaldehyde resin is used in very stiff fabrics such as upholstery. Patients reacting to upholstery finish will have dermatitis in

exposed areas such as the extensor forearm and posterior legs, rather than the classic textile clothing pattern. This resin is also used in composite dental molds and to impregnate cellulosic materials in fiberboard.<sup>207</sup> Keep this in mind for the occasional patient who reacts to this antigen but has hand dermatitis rather than rash in the axillary line and skin folds typical of textile allergy.

Avoidance of textile resins is challenging because fabric labels generally do not list the presence or type of resins applied. The manufacturer may obtain fabric from overseas and often cannot provide information on the resins used by the vendors. Patients are best advised to use fabrics that are not finished, such as 100% polyester, silk, acrylic, or nylon. Denim jeans are also not finished.

Products that MAY be unfinished include 100% wool and linen that wrinkles easily. Peach touch finishing uses a wet mechanical treatment that produces a fiber that does not require a textile resin. Tencel is a cellulosic fiber that requires less resin than rayon and cotton. Tencel LF is manufactured with a cross-linking additive that does not contain formaldehyde; Tencel A100 uses a cross-linker that can produce formaldehyde as a breakdown product (personal communication, T. Burrow, Lenzing Fibers, Austria, March 22, 2007).

Rayon is often highly finished, as are permanent press garments made of cotton/polyester blends. Uniforms made of shrink proof wool or twill are usually heavily finished as well. Work uniforms, laboratory coats, and military uniforms in particular may still contain formaldehyde-releasing textile resins.

Stain resistance uses non-formaldehyde resin technology. Some stain-resistant fabrics are created with use of polymers that could retain some unpolymerized isocyanates, but no relevant cases are reported in the literature. Nanotechnology can also create a wrinkle-free and stain-resistant product without use of chemical polymers (Dockers® Go-Khaki®) (personal communication, Robert Reitschel, July 6, 2007).

As with shoe dermatitis, heavy perspiration and tight fit increase antigen penetration to the skin. In cool weather, use of a silk or 100% polyester undergarment may allow an allergic patient to wear some finished clothing.

Because other countries have formaldehyde release standards not required in the United States, companies that market abroad are a good source of formaldehyde-resin-free garments. In Europe, the Oekotex label on a garment certifies that the material releases no or low amounts of formaldehyde and dyes and is manufactured using environmentally sound methods (<http://www.oeko-tex.com/en/main.html>.)

Several U.S. clothing stores also monitor the resins used by their

manufacturers, and any items purchased at these stores should be safe for textile resin allergic patients. These include stores run by the GAP (including GAP, Old Navy, Banana Republic) and Eddie Bauer. Other sources of chemical-free clothing and bedding are shown in [Table 17](#).

## *Textile Dyes*

Disperse dyes are used to color polyester fabrics and blends; reactive dyes are used to color cotton or cotton blend fabrics.<sup>208</sup> Disperse dyes are the most common allergenic textile dyes, and disperse blue 106 and 124 are included on the 2007 NACDG standard series.<sup>209</sup> Some patients with disperse dye allergy also react to para-phenylenediamine; in fact, para-phenylenediamine in a temporary black henna tattoo sensitized a patient who then reacted to clothing dye.<sup>210</sup> Other disperse blue, orange, yellow, and red dyes are tested with a specialty textile patch test series.

Disperse dyes are released from synthetic fabrics such as polyester, acetate, and nylon. Disperse blue dyes are commonly found in black or navy blue acetate liners of dress clothing, or in dark-colored polyester velour and in children's diapers. Because perspiration encourages dye release, dark-colored synthetic exercise garments should be considered as a source of textile pattern dermatitis. Compared with acetate and polyester, disperse dyes are more color-fast on nylon, but nylon stockings can be the culprit in dermatitis of the posteromedial thighs in women sensitized to disperse dyes. Disperse dyes sometimes cause dermatitis of unusual morphology with a pigmented purpuric quality.<sup>211-213</sup>

As with textile resin allergy, avoidance of textile dyes is very difficult as there is no product labeling of the dyes used in the United States. There is poor correlation between positive patch tests to disperse dyes and presence of those dyes in the garments that patients suspect as the cause of their symptoms.<sup>214</sup> Patients allergic to a disperse dye should be instructed to avoid polyester and acetate fabrics (and nylon, if possible) that could contain the color in question. True white (not off-white) synthetic fabrics would be the safest choice for these patients; dark synthetic liners can be removed from dress clothing and replaced with white liners. One hundred percent cellulosic fabrics such as cotton, rayon, or Tencel ®, or 100% silk, linen, or wool of any color are also good choices. Dyes are water soluble, and washing clothing before use may be of some benefit in removing dye.<sup>215</sup>

In Europe, fabrics certified by Oeko-Tex are not dyed with Disperse Blues 1, 3, 7, 26, 35, 102, 106, 124; Disperse Yellows 1, 3, 9, 39, 49; Disperse Orange 1, 3, 37/76, and Disperse Reds 1, 11, 17.<sup>208</sup> Oeko-Tex certification for baby products, next-to-skin products, outer garments, and

**TABLE 17.** Sources of chemical-free clothing and bedding\*

**Note: Not all products sold by these companies are chemical-free. Also, some companies use the word 'organic' to mean cotton grown without pesticides. Contact the company to be sure whether a specific item utilizes textile finish chemicals.**

Ahappyplant.com	1-888-424-2779	cotton undergarments, bedding
Allergvasthmatech.com	1-800-621-5545	bedding
Aventuraclothing.com	1-800-921-1655	clothing
Bedbathbeyond.com	1-800-Go-Beyond	bedding
Bluecanoe.com	1-888-923-1373	clothing
Bollorganic.com	1-877-814-6507	dress shirts
Conservastore.com	1-800-805-9207	hemp clothing
Cottonfieldusa.com	1-888-954-1551	clothing/home goods (only CottonGrown and Natural)
Decentexposures.com	1-800-524-4949	bras, underwear
Devalifewear.com	1-800-222-8024	clothing
Ecobaby.com	1-888-ECOBABY	baby clothing/bedding
Esperanzathreads.com	1-800-397-0045	look for chem sensitive logo
Faeriesdance.com	1-(866) 492-4841	clothing
Fhnaturals.com	1-800-343-6639	loungewear
Garudainternational.com		clothing
Goodhumans.com	1-866- 420-4208	clothing
Grassrootsnaturalgoods		clothing/home goods
Greentextile.com	1-864-576-3730	fabric for sewing own garments
Greenfibres.com	(UK)	clothing, bedding
Haenow.com	1-888-423-6698	clothing
Hipandzen.com	1-888-447-6936	clothing
Indigoclothing.com	(UK)	will print custom tees/garments
Itournature.com	888-535-7448	clothing
Jascouniform.com	1.800.222.4445	"Soft as silk" medical uniforms
Kappler.com	1-800-600-4019	"Provent" medical uniforms, scrubs
Kasperorganics.net	1-888-875-2233 Pin#0266	clothing, bedding
Kassimports.com	1-800-397-4070	bedding, socks
Lifekind.com	1-800-284-4983	bedding, linens
Lotusorganics.com	1-641 472-7184	clothing, bedding
Mamasearch.com	1-800-620-7388	clothing, bedding
Naturewearorganics.com	1-508-248-3116	clothing
Natureusa.net	1-310-667-9030	clothing
Nearseanaturals.com	1-877-573-2913	fabrics for upholstery, sewing
Oftheearth.com		links to natural clothing sites
Organicattire.com	1-707 459-1207	clothing
Organicclothes.com	1-800-609-8593	clothing
Organic-matters.com	1-360-466-4012	clothing, bedding
Organicselections.com	1-888-216-9917	clothing, bedding
Rawganique.com	1-877-729-4367	clothing, bedding
Spiritofnature.com	(UK)	clothing, baby products
Tomorrowsworld.com	1-800-229-7571	clothing, bedding
Underthecanopy.com	1-888-226-6799	clothing, bedding
Uniform Advantage	1-800-283-8708	Silkyfiber scrubs for women

decorator fabrics also requires excellent color-fastness when the fabric is rubbed under dry conditions and fair color-fastness when rubbed under wet conditions. Reactive dyes are more color-fast than disperse dyes and therefore rarely cause contact allergy.<sup>208</sup>

## **Part VI: Allergens in Adhesives and Metals**

### *Adhesives: Colophony, Epoxy Resin, Ethyl Acrylate, Methyl Methacrylate, Paratertiary Butylphenol Formaldehyde Resin*

The NACDG standard tray contains several adhesive screening allergens. These include colophony, epoxy resin, ethyl acrylate, methyl methacrylate, and paratertiary butylphenol formaldehyde resin. Even when limiting concern only to potential household exposures, patients may be exposed to a number of allergenic products. Table 18 provides a partial overview of household adhesives and their general composition in order to help find alternatives for various functions. The indication for a particular adhesive depends on its characteristics. Some considerations include the types of materials to be bonded and the strength of the bond required. Other qualities to consider include time to complete bonding, water resistance, weather resistance, final appearance when solidified, toxicity, and clean-up. With multiple options, patients should be able to find alternate adhesives for most purposes.

To complicate matters, many of the adhesive products on store shelves don't list ingredients. Patients may need to seek further information from the manufacturer's website. Another reference is the Household Product Database, which has information on many categories of household products. The database is available online at the United States National Library of Medicine (<http://householdproducts.nlm.nih.gov>). Some products will list all ingredients, but some will only list information from the MSDS (Material Safety Data Sheets). This can limit its usefulness when evaluating contact allergy, as most allergens are not listed as hazardous ingredients. For patients seeking further advice on household glues, Elmer's Glue Guide, available on the website <http://www.elmers.com>, provides adhesive options based on what types of materials need to be bonded, and based on the desired characteristics. Product descriptions and material safety and data sheets are available on this website as well.

### *Colophony*

Colophony, also known as rosin, is derived from the sticky sap of pine trees or other plants, particularly conifers. When heated, the volatile



**TABLE 18.** Household adhesives

Polyvinyl acetate based adhesive (PVAC)	Elmer's Glue-All-all purpose white glue used for paper, wood, fabric
Cyanoacrylate	Krazy Glue-quick-setting, strong adhesive Liquid Super Glue Loctite Super Glue
Acrylates	Elmer's Craft Bond Ceramic and Glass Cement Elmer's Redi-Spax lite repair compound-used for spackling/wall repair
Polyurethane glues	Gorilla Glue-extremely strong and can adhere to dissimilar surfaces Elmer's Ultimate Glue Loctite Sumo Glue
Rubber based	Elmer's Craft Bond rubber cement-used for artwork and photos Elmer's Craft Bond acid-free multi-purpose spray-used for multiple surfaces, can make a permanent or temporary bond
Synthetic rubber	Elmer's Professional contact cement-"Neoprene contact cement"-used for laminates, plastics, metal, rubber, tile, wood and leather. Elmer's Heavy Grip Cement-"synthetic rubber solution"-heavy duty mounting adhesive that bonds to metal, ceramic, wood, porcelain, brick, concrete and most plastics.
Epoxy	Elmer's Fiberglass Repair system- epichlorohydrin-bisphenol A resin-strong, waterproof bond popular in marine industry Elmer's Wood Repair system-epichlorohydrin-bisphenol A resin Elmer's Superfast epoxy cement-epoxy resin compound- can use on most plastics, woods, and metals-two-part formula with hardener Loctite Quick-set Epoxy

liquids evaporate, leaving behind a solid, semi-transparent material known as resin or rosin. Gum rosin, wood rosin, and tall oil are types of colophony derived by different methods. Colophony and its derivatives are found in a number of personal use products, medical products, and household products, in addition to a variety of industrial exposures. Colophony is a complex mixture, with over 100 distinct chemical compounds present.<sup>216</sup> Resin acids are the major constituent, and therefore patients searching labels need to avoid abietic acid, dihydroabietic acid, and dehydroabietic acid. Although abietic acid itself is not allergenic, compounds formed from its oxidation are allergenic and are the probable reason for reactions to this ingredient.<sup>217</sup> Therefore, patients must also avoid abietyl alcohol and abitol. Abitol is a mixture of hydroabietyl alcohols and is the most common modified colophony used in cosmetics.<sup>216</sup>

In the standard series, unmodified colophony rosin is used to screen for colophony allergy. However, colophony is often modified, as in ester gum resin, to adapt it for different uses. Testing to unmodified colophony alone often does not reveal allergy to derivatives of modified colophony.<sup>218-220</sup> Allergens in modified colophony include glyceryl abietate, glyceryl hydrogenated rosin, and triethylene glycol rosin, and these names may be listed on labels.

## *Rosin*

Rosin is commonly used in order to increase friction, so in sports it is used to reduce slipping or for additional grip. It has been used by ballet dancers, baseball pitchers, bowlers, bull riders, and rock climbers. Chalk or Zeasorb powder are alternatives. Rosin may be used on the bows of stringed instruments such as violins, although there is no clear alternate for this use.

## *Colophony Adhesives*

Colophony has been used in various adhesive tapes, including some Scotch tapes. Elmer's Glue-All may be used as a substitute for most adhesive tapes. [Table 18](#) lists multiple adhesives for household use.

Colophony derivatives are also found in shoe adhesives, particularly as a tackifier in the rubber cements that are used for sole attachment or for attaching layers below the insole.<sup>221</sup> This problem can often be solved by removing the old insole, scraping out the old adhesive, and inserting a new insole using Elmer's Glue-All. If the shoe uppers appear to be the problem, custom shoes can be obtained ([Table 12](#)).

## *Colophony in Medical Products*

Colophony and its derivatives are found in bandages, adhesive tapes, plasters, and wound dressings, due to its ability to add tackiness. Unfortunately, the composition of these types of items (unlike cosmetics) is not required on labels and can be difficult to determine.<sup>222</sup>

Older types of medical adhesive tapes frequently contained rubber and rosin allergens. Newer tapes, labeled "hypoallergenic," are based on acrylate types of adhesives. Dermicel, Micropore, and Scanpor tapes would therefore be acceptable for use.<sup>223</sup> The manufacturer of BandAid Sheer Strips states that this product does not contain colophony.

Colophony is a common sensitizer in patients with leg ulcers.<sup>220,224</sup> Reports have described allergy due to the use of modified colophony in hydrocolloid dressings. These include reactions to DuoDERM CGF and DuoDERM Extra Thin CGF,<sup>222,225</sup> and Granuflex hydrocolloid dress-

ings.<sup>220,226</sup> An alternate would be the original DuoDERM wound dressing.<sup>225</sup>

Colophony may also be found in a number of medicated creams and ointments and may be found in plasters. One report described two patients who reacted to colophony found in a formulation of flexible collodion BP (British Pharmacopeia) used as the vehicle for a salicylic acid wart paint. Flexible collodion USP (United States Pharmacopeia) does not contain colophony.<sup>227</sup>

### *Colophony in Personal Use Products*

Colophony and its derivatives are found in many types of cosmetics, including lipsticks, blush, mascara, and eyeshadows. Patients reading labels must avoid all of the chemical names listed above. [Table 1](#) lists the major allergens found in cosmetic products, including colophony. To avoid cosmetic, skin care, and hair care products with colophony, choose products on [Table 1](#) without the abbreviation R.

Colophony has also triggered contact dermatitis from its use in epilating wax, both from salon use and home use.<sup>218,228</sup> In waxing, the hair is pulled out by the root with a wax that grips the hair. Major types of wax ingredients include rosin, beeswax, and sugar formulations. Some are preformed in “cold” strips, whereas other waxes must be heated. Colophony may be found in both types. Colophony itself, or substances found in modified colophony, may be the allergens in these products. Allergen names such as colophony, gum rosin, glyceryl hydrogenated rosinate, and triethylene glycol rosinate may be listed on product labels. A good alternative is sugar wax, which forms a thick substance similar to caramel. Another alternate would be use of depilatory creams and lotions based on thioglycolate salts, which disrupt the disulfide bonds in hair. [Table 19](#) lists commonly available products in each of these categories.

Another potential source of exposure to colophony is diapers and feminine hygiene products. In one study examining levels of colophony in different diaper brands, detectable levels were found in both the top layer of the diaper and in the absorbent “fluff” layer. It was felt that the glue used for the top layer may have been one source of the allergens, and the mechanical wood pulp used in the fluff layer was another source.<sup>229</sup> Cloth diapers are an acceptable alternative. Another study found that feminine hygiene products also contain colophony, and some in levels similar to that in mascaras and thus probably at levels sufficient to elicit allergy.<sup>230</sup> One case described contact dermatitis to colophony in a sanitary pad.<sup>231</sup> Cloth feminine hygiene products are an alternative. (<http://www.allnaturalmamas.com>, <http://www.diaperware.com>).

**TABLE 19.** Colophony and hair removal products

Hair wax products with colophony or colophony derivatives	Some salon hot wax products Andrea natural wax hair remover Nair roll-on hair remover wax Nair wax strips Sally Hansen extra-strength all-over smart wax hair remover kit Veet ready to use wax strips
Alternates-depilatory creams with thioglycolate salts	Nair hair remover face cream Nair hair remover lotion for body Sally Hansen Crème Hair Remover Veet hair removal gel cream
Alternates-sugaring waxes	Nads no-heat hair removal gel Nair microwave wax

## *Colophony in Dental Products*

Patients may be exposed to colophony via dental work, as colophony and its derivatives are used in periodontal dressings, fluoride varnishes, dental cements, impression pastes, and in the materials used to make intermediate dental prostheses.<sup>232</sup> The section on acrylate dental materials also provides detailed information on colophony dental cement alternatives.

## *Miscellaneous Personal and Household Products with Colophony*

Paper products are a major use of colophony, as it adds water resistance. It may be found in cardboard, glossy paper, photographic paper, or labels on cans. One study found that the highest analyzed amounts of rosin compounds came from paper produced from mechanical pulps. Mechanical pulps are replacing chemical pulps in more paper products because of environmental and economic concerns. Commonly used in newsprint and magazine paper, they are now also used in a wide assortment of printing-grade papers and paper products such as tissues.<sup>233</sup> Rosin derivatives are frequently found in recycled paper products.<sup>234</sup> Patients may need to wear cotton gloves when handling any of these paper products. This technique has been demonstrated to improve hand eczema.<sup>235</sup>

In the household, colophony may be used in laundry soaps (particularly yellow laundry bar soap) and in household cleaning and repair products. These include such diverse items as polishes (including shoe, floor, car, and furniture polish), varnishes, paints, and caulk. Therefore, patients should be advised to wear latex or nitrile gloves when doing household

cleaning or repair. Some leather cleaners and some cleaners used to remove grease from clothes may also contain colophony.

## *Epoxy Resin*

Epoxy is a synthetic resin that hardens, or “cures,” by a chemical reaction between components, typically two components. Epoxies are used in the manufacture of plastic objects. They can be malleable or “plastic” and thus formed into objects, films, or fibers. These high-performance, high-strength adhesives can also be modified to meet almost any application. They can be made flexible or rigid, transparent or opaque, fast-setting or slow-setting and are extremely heat and chemical resistant. Because of these properties, epoxies are used widely in industrial applications and in the manufacture of many consumer products.

Epoxy polymers are made by cross-linking monomer molecules. This process results in hardening. The commonly used monomers are diglycidyl ethers. The most commonly used monomer is made by combining bisphenol A and epichlorohydrin. When the monomer is combined with a curing agent, or hardener, it polymerizes into a solid. Other additives may be used in the production of the final product. In 90% of cases, contact dermatitis to epoxy is due to sensitization to the epoxy monomer.<sup>236</sup>

When counseling patients, it is important to note that completely cured epoxy resin is non-allergenic. Therefore, even though epoxies may be used in the production of many plastics, or may be found in the adhesive used in many consumer products, the finished product should not be a cause for concern. However, there are case reports of allergy to epoxy in consumer products thought to be due to incomplete curing of the epoxy. Epoxy-fixed knee patch jeans resulted in an outbreak of allergic contact dermatitis in children.<sup>237</sup> Case reports have also described contact dermatitis to eyeglass frames, handbags, necklaces, and vinyl gloves.<sup>238</sup> Vinyl gloves are not felt to be an adequate barrier and should not be used by individuals allergic to epoxy as protection. Silver Shield/4H gloves may be used instead to provide protection against epoxy resin (<http://www.allerderm.com> and <http://www.northsafety.com>).

In the home, some patients may be exposed by way of epoxy household glues, which are two-part products consisting of a monomer and hardener. Epoxies penetrate rubber gloves, so these should not be suggested as a protective measure. [Table 18](#) on household glues provides more information on alternates.

As epoxies are frequently used in dentistry, patients must inform their

dentist of this allergy. The section on acrylates contains more extensive information on allergens in dentistry.

### *Ethyl Acrylate and Methyl Methacrylate*

Acrylates, as a group, are chemical monomers that can combine to form plastic substances. The monomers may be in the form of a powder, liquid, or gel that can be easily manipulated. For example, monomers can be poured into a mold, used for filling a cavity, or applied between objects. Then the mixture can be hardened, a process known as curing. Thus, acrylates may be used to form acrylic nails, hearing aids, or dental fillings. They can serve as adhesives in a number of different settings, including as bone cement. Different acrylic polymers may exhibit a number of different properties, such as flexibility or hardness. Therefore, they also serve a number of different industrial applications.

In the process of curing, the monomers undergo polymerization. Some acrylates are “self-curing,” and polymerization occurs after addition of a catalyst. In other cases, curing can be initiated by ultraviolet light, heat, or the absence of oxygen. It is the lower molecular weight monomers that serve as the allergens. Once full polymerization occurs, the object is no longer allergenic. A hardened object does not translate to full polymerization, however. For example, residual monomers have been identified with denture materials.<sup>239</sup> Self-cured acrylates typically contain much more residual monomer,<sup>240</sup> although monomers may persist after other types of curing as well. Self-curing acrylates are often used to create temporary crowns or fillings, or to perform denture repair, making contact dermatitis more likely in these settings.

Sood and Taylor reviewed exposures of 56 patients who tested positive to at least 1 methacrylate. Acrylic nails were the most common source of exposure, with 25 patients describing exposure, both occupational and non-occupational. Occupational exposure to dental materials was the next most common exposure, followed by exposure to adhesives. An additional 6 patients were exposed via dental work. Single cases were described for UV paint and a hearing aid, and 8 cases were of undetermined exposure.<sup>241</sup>

Techniques for avoidance of acrylates can be difficult. Acrylate monomers can cross-react, making a switch from one particular monomer to another unreliable. Most gloves are ineffective barriers, as acrylates penetrate rubber and vinyl gloves. For orthopedic surgeons, avoidance becomes very difficult, as acrylate monomers from bone cement penetrate latex rubber gloves within minutes. One study found that methyl methacrylate penetrated ordinary surgical rubber gloves in less than 60

seconds.<sup>242</sup> Latex-free surgical gloves can be problematic as well; one report described holes in the latex-free Allergard surgical gloves used when handling polymethyl methacrylate (PMMA). The authors did not find such destruction with Biogel Neotech and Duraprene latex-free gloves.<sup>243</sup> The Silver Shield/4H gloves have been shown to provide hours of protection against acrylates. Other options are the Barrier Chemical Resistant Gloves (<http://www.ansellpro.com>) and polyvinyl alcohol (PVA) gloves (<http://www.grainger.com> and <http://www.airgas.com>).<sup>244</sup>

## *Dental Methacrylates*

Individuals who are allergic to acrylates or epoxies must discuss this allergy with their dentist prior to any dental work. As the field of dental materials becomes increasingly complex, finding appropriate solutions for dental patients can be a challenge. Although some materials may be appropriate from an allergy standpoint, issues of function, durability, appearance, cost, and ease of manipulation must also be considered. In some cases, patients should consult with a prosthodontist, a dentist with special training in making replacements for missing teeth or other structures of the oral cavity.

Acrylates are an important and well-studied allergen in dental professionals. They are also relevant to dental patients. In one study from Sweden, positive patch tests to (meth)acrylate allergens were seen in 2.3% of the dental patients studied and in 5.8% of the dental personnel.<sup>245</sup>

For acrylate and epoxy allergic patients undergoing dental work, the main concerns are with the materials used in dental restorations or dental cements. Dental restorations replace missing or damaged tooth structures with artificial materials. They include fillings used in dental cavities. They also include permanent restorations, such as crowns and bridges, and removable restorations, such as dentures. Temporary restorations, such as the temporary crowns used for weeks before the permanent crown is available, are a particular source of allergenic unpolymerized monomers, and their use may result in severe symptoms.<sup>246</sup>

One study examined the presence of acrylates in commercial dental restorative materials using gas chromatography. Surprisingly, information about methacrylates in the safety data sheets was only provided for about half of the products that actually contained methacrylates by chemical analysis.<sup>247</sup> This provides obvious difficulties in choosing materials. Among the bonding materials, the most frequently occurring methacrylates were hydroxyethyl methacrylate and bisphenol A glycidyl methacrylate (Bis-GMA). In the composite resins, triethyleneglycol dimethacrylate and bis-GMA were the most frequently occurring.<sup>247</sup> Bis-GMA is

a combination of bisphenol A, found in epoxy resin, and glycidyl methacrylate.

Composite resin fillings are also known as “white” or “plastic” fillings. A composite is any material that consists of hard filler particles surrounded by a matrix which binds these filler particles together. Composite dental fillings contain a resin “binder” that can polymerize, along with an inorganic “filler” that adds strength. These fillers can include quartz, silica, or barium. The first dental composites consisted of a methacrylate monomer system, with silica powder acting as the filler material to stabilize the polymer.

Many commercial dental composites still use derivatives of the methacrylate monomer system. Bis-GMA is one of the predominant monomer systems in use, with other methacrylates incorporated as well.<sup>248</sup> Earlier studies have demonstrated high levels of residual monomers in composite resin fillings,<sup>248,249</sup> although newer formulations are being developed that lead to less residual monomers.<sup>250</sup> A case report described a patient with a painful red mouth with allergy to 2-hydroxyethyl methacrylate (HEMA) in a denture. Prolonged boiling of the denture resulted in resolution of the symptoms, presumably due to curing of residual acrylate monomers.<sup>251</sup> Patients should be counseled, however, that dentures should be taken to a denture lab to be boiled. The dentures must be in a rigid mold while being boiled, as otherwise they are likely to warp.

With respect to fillings, amalgam fillings have a long history of use, and are alternatives for patients allergic to acrylates or epoxies. Dental amalgams consist of a mix of mercury and an alloy powder, usually composed of silver, zinc, tin, copper, or palladium. This mix is placed into the dental cavity and adjusted before it hardened. A technique of making cuts in the tooth can lock the filling in place without the use of dental cement. Other filling substances include metals, such as nickel, cobalt chrome alloy, and gold. Porcelain fillings can also be used in limited settings. However, since they are hard and brittle, they can cause wear on other teeth, and they are therefore not recommended on molars.

Composite resins are also used to create veneers, crowns, or to repair portions of broken teeth. In the case of veneers, which are shells affixed to the tooth to improve appearance, porcelain may be used instead of composite resins. However, they still need to be bonded in place. Alternative bonding materials are discussed below. In the case of crowns, alternates would include porcelain or metals. The metals include the aforementioned nickel, cobalt chrome alloys, or gold. Again, it is important to realize that even if the crown or bridge is made of an acceptable material, it still needs to be cemented in place. Dental cements



of all types frequently make use of acrylic resins. For example, one type of cement that contains acrylates, known as resin modified glass ionomer cement, is a common material used to cement metal based crowns and bridges onto prepared teeth. Therefore, attention must be paid to the dental cement as well.

When a permanent dental cement is required, one alternative is zinc phosphate cement. This is one of the oldest dental materials, and is still used for cementing cast metal crowns or in orthodontics. For those dentists lacking experience with its use, though, it can be difficult to work with (Ormco Orthodontics, <http://www.ormco.com>).

Temporary cements are used to cement temporary crowns and bridges, or for trial cementing of restorations. Zinc oxide eugenol cement (unmodified), can also be used as a base under a filling, as a cavity lining, as a root canal sealant, or as a temporary filling. Brands include Sedanol (may purchase at <http://www.dentsply.com>) and Temrex (1-800-645-1226).

TempBond is another temporary bonding alternative (ingredients: eugenol, colophony, carnauba wax, and zinc oxide). It can be ordered through Kerr Dentistry (<http://kerrdental.com>). For those allergic to eugenol, TempBond NE (non-eugenol) is available (ingredients: colophony, benzoic acid, carnauba wax, and octanoic acid). Be careful when ordering, as TempBond Clear contains acrylates. RelyX temporary cements offer “strong adhesion and easy removal.” These are made by 3M ESPE dental products, and come in both a eugenol and non-eugenol formula: RelyX temporary cement eugenol (ingredients: eugenol, colophony, silica, oleic acid, and di-tert-butyl-p-cresol) and RelyX Temp NE (non-eugenol) temporary cement (ingredients: zinc oxide, modified rosin, nonanoic acid, and silane treated silica). Again, patients must use caution, as other cements in the RelyX brand contain acrylate resins (may order through <http://pattersondental.com>).

Dentures can also be an issue for patients allergic to metal and to acrylates. Removable partial dentures (RPD) may have a metal framework or metal clasps to hold them in place in the mouth. Denture bases, which are the pink portion of the denture in which artificial teeth are embedded, are typically made of acrylic resins. Valplast resin is an alternate; it is used to make RPDs that are flexible and require no metal components. It is described as a thermoplastic nylon which the manufacturer certifies to be free of acrylic monomer and metal (<http://www.valplast.com>).

One study of denture bases from Germany compared a standard acrylic resin with four other denture base materials said to be hypoallergenic. The

authors found residual methyl methacrylate monomer identifiable by gas chromatography when examining the denture base made of a standard acrylic resin.<sup>239</sup> Two modified methacrylate denture base resins were shown to exhibit significantly lower levels of residual MMA monomer. Promysan and Microbase did not contain any detectable residual MMA, making them appropriate substitutes for German patients allergic to acrylates. Promysan is enterephthalate-based, whereas Microbase is polyurethane-based.<sup>239</sup>

### *Methacrylates in Artificial Nails*

Sculptured nails, or acrylic nails, are formed from acrylates and molded onto a template that is fitted over the natural nail. The acrylates can consist of a gel, or of a liquid monomer mixed with a powder acrylate polymer. The mixture is molded onto the template, and then polymerization occurs at room temperature. In the case of photobonded nails, UV irradiation is used to achieve polymerization. Although methyl methacrylate monomer was prohibited by the FDA in 1974, patients may still react to the alternative acrylates, which include ethyl, butyl, and other acrylates.<sup>252</sup>

One alternative is to use preformed plastic nails, although they are recommended for short-term use only. They are applied with cyanoacrylate glues, which are not believed to cross-react with methyl methacrylate.<sup>253</sup> Cyanoacrylates are rare sensitizers, but ethyl cyanoacrylate have been identified as an allergen, mainly from its use as a nail cosmetic.<sup>254</sup>

Another alternative is the use of silk, linen, or fiberglass nail wraps. In this process, a silk (or other material) cloth is wrapped over the nail plate and then hardened in place with a layer of acrylate resin or a cyanoacrylate glue. Instructions for homemade silk wraps use cyanoacrylate glues and some salons use them as well. However, if applied in a salon, the patient must first confirm that the product used employs cyanoacrylate adhesive and that other acrylates are not used.

### *Other Exposure to Methacrylates*

In a study from Scandinavia, 22 patients who wore hearing aids and had chronic dermatitis of the ear canal were studied. Six patients reacted to methylmethacrylate or related allergens.<sup>255</sup> As an alternate, a silicone hearing aid could be used,<sup>255</sup> or a patient could try a hearing aid with a silicone earpiece worn behind the ear.<sup>256</sup>

## *Para-Tertiary Butylphenol Formaldehyde Resin (PTBFR)*

This resin, made by reacting formaldehyde with phenol, is used primarily as an adhesive. It is frequently used in the construction of leather products, particularly shoes, and also serves as an adhesive in handbags, hats, belts, and watchstraps. This adhesive is also used in the repair of leather shoes and is a major occupational allergen among shoemakers.

Although most allergy to this adhesive is from its use on leather, it is also sometimes used to bind rubber and synthetic surfaces in shoes, belts, handbags, watchstraps, automobile upholstery, and diapers. Furthermore, it is used in disinfectants, deodorants, varnishes, printing inks, fiberglass, plywood, and motor oil additives.

For leather watchbands, alternatives are easy to find; metal watchstraps may be substituted for leather.

For shoe allergy, alternatives are more difficult. It is best to keep products with PTBFR dry since moisture causes the chemicals to degrade and release the allergen. Therefore, regular changing of socks is recommended to keep shoes from becoming damp. For reactions to PTBFR on the soles, remove the insole, scrape out the old adhesive and apply a new insole using Elmer's Glue-All. Adhesive in shoe leather uppers, unfortunately, is not as easily removed. When unsure of which shoe uppers are problematic, patients may perform use tests. Patients are instructed to wear only canvas Keds, plastic shoes, or Birkenstock shoes (the manufacturer of Birkenstock sandals and dress shoes states that their shoes do not contain PTBFR) until all dermatitis resolves, and then add back one pair of shoes every week. Any shoes which cause a flare-up should be discarded. Another alternative is to have shoes made by a custom shoemaker (Table 12).

## *Nickel*

Nickel is widely used in many metallic objects, as it is durable yet inexpensive. Nickel remains the number one allergen in patients undergoing patch testing. The NACDG found that 16.7% of their patients had positive reactions to nickel during the 2001–2002 study period.<sup>124</sup> Higher rates of nickel allergy are seen in women, and several studies have confirmed a link to ear piercing, which provides disruption of the skin barrier.<sup>257</sup> Presumably, the current trend of multiple body piercings may lead to an even higher risk of sensitization. Higher rates of nickel allergy are seen in men who have undergone piercing, and the rates of allergy correlate with the number of piercings.<sup>258</sup>

Avoidance can be difficult, as appearance alone does not indicate whether nickel is present in an object. Nickel test kits can aid in identification of jewelry or other objects that release large amounts of nickel. These kits contain dimethylglyoxime. In the presence of nickel (or palladium), a cotton swab soaked with ammonium hydroxide and dimethylglyoxime will turn pink. Of importance to patients, the tests do not harm the object being tested. Standard kits may be ordered from Allerderm (<http://www.allerderm.com>) or Delasco (<http://www.delasco.com>). These tests will detect many, although not all, nickel-containing objects.

Simple avoidance measures can help many patients, such as limiting friction and pressure. For example, a loose bracelet may not cause problems, whereas a snug ring will. Limiting perspiration can help as well, as sweating aids the transfer of nickel salts to the skin.

Barrier methods are another avoidance technique. In the case of patients reacting to the buttons or snaps on their jeans, use of a sewn cloth backing or an iron-on patch can protect the skin. Barrier creams can be helpful in milder reactions. Creams containing propylene glycol, petrolatum, and lanolin have been shown to reduce the absorption of nickel through the skin.<sup>259</sup> Several coats of clear nail polish can be applied to a metal object to provide a barrier. Nickel Guard is a similar product, but was formulated without the typical allergens in nail polish that can lead to secondary contact dermatitis. The product Nickel Solution contains Nickel Guard with a nickel test kit (<http://www.nickelsolution.com>).

Chelating agents may also be considered for nickel-allergic patients. Caution must be used with clioquinol, as clioquinol toxicity may occur in infants and children.<sup>260</sup> However, a cream containing 3% clioquinol and 1% hydrocortisone prevented dermatitis when applied under nickel objects, such as earrings.<sup>261</sup> Ala-Quin cream (3% clioquinol + 1% hydrocortisone) is available from Del Ray Labs (<http://www.delrayderm.com>). Another future option may be diethylenetriaminepentaacetic acid (DTPA), which has shown effectiveness in clinical studies.<sup>262</sup>

Nickel is frequently used in alloys. An alloy is a combination of metals that is used to create a new metal with different properties. For example, gold is typically combined with other metals to enhance its durability. Unless a particularly alloy is patented and trademarked, such as Argantium silver™, the metal content of a particular alloy may vary, especially depending on its intended use.

Several alloys are generally acceptable for patients allergic to nickel. Brass is an alloy that consists primarily of copper and zinc. The website <http://www.matweb.com> is a useful resource for those interested in alloys,

polymers, ceramics, and other engineering materials. It is a searchable database of engineering materials, with most of the information derived from the testing done by manufacturers. Each sheet lists the data source. A review of this database for brass alloys found that virtually none of them contain nickel. A typical listing for yellow brass lists 65% copper, 32% zinc, and small amounts of iron and lead. However, one listing for “high-strength yellow brass” did contain a maximum of 1% of nickel. Therefore, although some brass alloys may contain nickel, this appears to be unusual.

Pewter may also be acceptable for nickel-allergic patients. It contains primarily tin, with lead and antimony added. Occasionally, small amounts of nickel, copper, zinc, or bismuth may be added. Although there are no government regulations, the American Pewter Guild uses an industry standard of 92% tin, 7% antimony, and 1% copper. Bronze is another typically acceptable alloy, as most bronze is an alloy of copper and tin, with small amounts of other metals. Notable exceptions include nickel bronze, which can contain up to 30% nickel, and sea water bronze, which also has high nickel content. Nickel bronze is also known as nickel silver, and can be found in jewelry. In summary, brass, pewter, and bronze (in general) are acceptable for nickel-allergic patients. Patients would be advised to use a nickel test kit on these objects.

Another alloy that is frequently discussed in nickel allergy is stainless steel. Stainless steel may contain up to 20% nickel, but it is so tightly bound that it typically doesn't cause dermatitis in nickel-allergic patients. An exception to this is some stainless steel which contains a higher sulfur content, which then releases more nickel.<sup>263</sup> Stainless steel can also release enough nickel to cause allergy with prolonged exposure and sweating, and also when used internally, such as in orthopedics and other implants. Chrome also typically contains nickel and can cause contact allergy to nickel.

Additional metals which do not contain nickel are platinum, most yellow gold, most sterling silver, pure copper (as used in copper piping), and many titanium alloys (although some titanium alloys do contain nickel). These are discussed below in the sections on orthopedic and jewelry metals.

An interesting issue in nickel avoidance is the potential role of nickel in food. In systemic nickel dermatitis, ingestion of nickel may result in flares of dermatitis. Hand dermatitis of the pompholyx type, with the acute onset of blisters, is felt to be a particular manifestation of systemic nickel dermatitis. Chronic hand dermatitis, and involvement of other areas of the

body, has been described as well. Several types of experimental studies support this association.

Studies have documented flares of dermatitis with ingestion of nickel in capsule form. In one double-blind, placebo-controlled trial, nickel-sensitive persons were compared to non-nickel sensitive controls. Among patients sensitive to nickel, a dose-response was seen, with more patients developing cutaneous reactions at high oral nickel doses. However, some patients reacted to levels which would be expected in a normal daily diet. None of the controls reacted to high nickel doses or to placebo.<sup>264</sup> Other studies have evaluated this issue from an avoidance standpoint, and have shown that compliance with a low-nickel diet leads to skin improvement.<sup>265</sup> Lastly, use of oral disulfiram, which is able to chelate nickel and increase its excretion, can aid in symptoms. In Fowler's study of nickel-sensitive patients with hand eczema, eight of nine patients improved significantly after treatment with disulfiram, whereas none improved with placebo treatment.<sup>266</sup>

Counseling on avoidance of dietary nickel can be difficult, however. Nickel content of foods can vary regionally and can be altered by factors such as soil components and use of fungicides.<sup>267</sup> Tap water from different regions of the country has demonstrated a wide variation in the levels of nickel.<sup>268</sup> Nickel content of water may vary with temperature as well as flow duration.<sup>269</sup> For example, the first liter flushed through in the morning is likely to contain the highest level of nickel. Complicating matters, absorption of nickel from food and water can also vary significantly.

Table 20 provides guidelines for a low nickel diet.<sup>270-275</sup> A trial of avoidance for at least four weeks is recommended.<sup>270</sup> In patients with dyshidrotic eczema and nickel allergy who do not improve with a low-nickel diet, some may show benefit from oral disodium cromoglycate, which may reduce nickel absorption.<sup>276</sup>

## *Nickel in Orthopedic Implants*

Nickel may also be found in orthopedic implants. Common metals used for implants include stainless steel, titanium and titanium alloys, and vitallium, an alloy containing cobalt, chromium, and molybdenum ("chrome moly"). In some cases, orthopedic surgeons choose to avoid nickel- or cobalt-containing implants in allergic patients. A number of studies have evaluated this issue; some have found higher rates of sensitivity to metal allergens and methacrylate bone cement in patients with nontraumatic failure of their prostheses, although causality has not been established.<sup>277</sup> Allergic contact dermatitis due to static metal

**TABLE 20.** Low nickel diet<sup>270-275</sup>

Grains	Avoid	Whole wheat bread, multigrain breads, multigrain cereals, wheat bran, wheat germ, whole wheat pasta, oats, oatmeal, buckwheat, seeds
	May eat	Rice, rice cakes, corn, popcorn, cornflakes, cornmeal, rye
	May eat in moderation	White flour, white bread, white pasta
Vegetables	Avoid	Beans, lentils, peas, soy beans, soy products (tofu, soy sauce), bean sprouts, kale, lettuce, spinach, vegetable juices, canned vegetables
	May eat	Other fresh or frozen vegetables
Fruits	Avoid	Dates, figs, pineapples, plums, raspberries, canned fruits
	May eat	Other fresh or frozen fruits
Milk & Dairy	Avoid	Chocolate milk
	May eat	Milk, yogurt, butter, cheeses, cream
Meat	Avoid	Shellfish, processed meats with fillers or coatings, canned meats or fish
	May eat	Beef, chicken, eggs, fish, turkey

Other sources of dietary nickel to avoid:

1. Chocolate and cocoa powder
2. All nuts
3. All seeds
4. Black tea
5. Dried soup powder
6. Baking powder in larger amounts
7. Commercial salad dressings
8. Canned foods in general
9. Stainless-steel cooking vessels used for the first time for acid fruits (subsequent uses, even for these foods, are acceptable)
10. The first quart of tap water in the morning
11. Vitamins containing nickel

Note: The outline of food groups is based on the 2007 USDA (United States Department of Agriculture) Food Pyramid.

implants may also occur, but is rare. It is felt to be more likely if a patient develops an eczematous eruption after surgery which starts near the implant or is located near the implant, and if the implant is of the static type, such as a screw.<sup>278</sup> Although these reactions are rare and controversial, orthopedic surgeons may opt to avoid nickel or cobalt in allergic patients.

If metal allergy is suspected, prior to implantation, a patient can be tested to an orthopedic metal tray which includes nickel, cobalt, chromium and (if possible) aluminum, titanium, molybdenum, and vanadium. Although reactions to metal implants are relatively uncommon, medicolegally it is unwise to implant a device containing a known patient allergen. It is much more difficult to decide whether to remove an implant which is causing pain,

swelling, or discomfort. Although a patient may have a positive patch test reaction to a metal in their implant, it is not a certainty that replacement of their implant with an alternative metal will alleviate their problem. Ultimately, the metal allergy should simply be one factor in the decision about whether to replace an implant, and the final decision should be made by the surgeon.

Zimmer is one manufacturer of implant metals and provides a full breakdown of the composition of their implants. For patients with metal allergies, the company uses several alternate alloys. Protasul<sup>TM</sup> is a titanium alloy, whereas Tivanium<sup>TM</sup> is a titanium/aluminum/vanadium alloy. They also have a titanium/aluminum/niobium alloy. These are each free of nickel (<http://www.zimmer.com>). Zimmer produces a trabecular metal hip implant with a ceramic femoral head which is free of both nickel and cobalt.

DuPuy is another manufacturer of implants (DePuy Inc. 574-267-8143). Titanium, aluminum, and vanadium alloy implants are used in their Ace screws and plates, hip prosthesis in the hip stem, and PFC Sigma Total Knee Replacement in the tibial tray. The hip prosthesis femoral head uses a chromium, cobalt, and molybdenum alloy, or a ceramic head can be substituted. For knee replacements, the femoral component contains nickel but can be customized with a titanium, aluminum and vanadium alloy (DePuy custom department 574-372-7014, fax 574-372-7187; x-rays with magnification required). Custom knee replacements require approximately 6 weeks for manufacture. For implantation of orthopedic pins, Ortho-Sorb Resorbable Pins are made of poly-p-dioxanone (DePuy Trauma and Extremities, Karen, 574-372-7444). Another alternative is the Oxinium Knee Implant (Smith & Nephew, [www.strongasanox.com](http://www.strongasanox.com)) made of zirconium, niobium and ceramic.

## *Dental Exposure to Nickel*

Please also see the allergen section acrylates, and specifically the dental materials section, for further suggestions on avoidance of nickel in dental materials. It is interesting to note that, even in nickel-allergic patients, nickel in dental materials may be well-tolerated. In one study, patients known to be nickel-allergic received crowns or bridges containing 66% nickel. These did not produce adverse reactions in 16 patients followed for 3 years.<sup>279</sup> Nickel and cobalt chrome alloys are used to make some fillings and crowns. Different alloys are available as a substitute. These include gold, and some gold alloys. Some alloys of gold, palladium, platinum, and silver are nickel-free (Argen, <http://www.argen.com>; Dorado Dental Supply, <http://www.doradodentalsupply.com>).

Nickel has been used in dental implants. These consist of posts embedded



**TABLE 21.** Nickel in jewelry

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May use	18 kt gold and higher Medical grade plastic earrings Simply Whispers nickel-free costume jewelry Sterling silver made by James Avery Sterling silver, Argentium™
Probably acceptable	Aluminum Brass Bronze (most, but not all, types) Pure copper 14 kt yellow gold and rose gold TruPd™ (95% palladium) Pewter (especially if certified by the American Pewter Guild) Platinum Stainless steel (can sometimes cause problems with prolonged exposure and sweat or if implanted) Sterling silver Titanium alloys (some, but not all)
Avoid	Plated jewelry Most costume jewelry Alpaca 14 kt white gold (unless specifically noted to be nickel-free) German silver Nickel bronze Nickel silver Sea water bronze

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into the jaw which serve as a structure for an artificial tooth. While the posts can be made of nickel, cobalt chrome alloys, or other alloys, surgical grade titanium is an option as well (Zimmer Dental, <http://www.zimmerdental.com>). For patients seeking nickel-free braces that lack metal wires, the Invisalign system (<http://www.invisalign.com>) uses a series of clear, custom-molded, removable aligners to reposition teeth. Another alternative for orthodontics is use of nickel-free Legacy M brackets and NEXalloy archwires ([www.nexadental.com](http://www.nexadental.com)).

### *Nickel in Jewelry*

Jewelry is a common source of exposure to nickel. For patients purchasing jewelry, there are now a number of companies that make nickel-free jewelry. These are summarized in [Table 21](#). For patients allergic to jewelry of sentimental value (such as a wedding ring), the simple avoidance measures such as a barrier cream or clear nail polish may be useful. Another option is platinum, which is stronger and rarer than gold. For patients allergic to wedding bands, a platinum coating along the inner surface of a ring can provide an effective barrier. A jeweler can perform this task, although

platinum is expensive. In several of the groups of patients, a coating of rhodium, which is less expensive than platinum, has been used to successfully provide protection. Rhodium is a platinum-group metal, and is extremely hard and corrosion-resistant, thus providing a barrier between the skin and the nickel. Flash plating, which is often used to provide a white finish to jewelry, results in a very thin coating which can wear off with use. Proper rhodium plating would be recommended to provide a true barrier (with re-plating approximately every 6-8 months for regularly washed and worn jewelry). In the case of patients wishing to wear a particular pair of earrings, individual components of the piece may be replaced. Simply Whispers sells nickel-free earring posts, for example (<http://www.simplywhispers.com>).

It is important to recognize that there is not yet a U.S. standard to define the term “nickel-free.” In contrast, the European standard requires that items labeled nickel-free not contain more than 0.05% nickel.

In the U.S., in some cases, manufacturers define “nickel-free” as free of nickel in the plating or top layer, although the base metal may still contain a nickel alloy. When this plating wears thin over time, nickel may be released. Therefore, as a general rule, patients allergic to nickel should avoid plated jewelry. Patients who wear “nickel-free” jewelry and who develop reactions over time may be exhibiting this phenomenon. A search of the Internet will reveal multiple companies selling nickel-free jewelry. Simply Whispers (<http://www.simplywhispers.com>) is one company that provides a mailed catalog and an online catalog.<sup>280</sup>

Patients will often ask if silver is an acceptable alternate. The term “silver” itself doesn’t actually guarantee silver content, and may instead refer to the color. “German silver” and “alpaca” are other names for “nickel silver,” which is an alloy of copper, nickel, and zinc that does not actually contain any silver. Sterling silver, typically stamped 0.925, contains at least 92.5% silver. The most common alloy is 92.5% silver and 7.5% copper, although other materials may be used. James Avery certifies that their sterling silver jewelry contains no nickel. Argentium<sup>TM</sup> sterling, a tarnish resistant trademarked brand of sterling silver, contains 1.2% germanium, 6.3% copper, and 92.5% silver.

Gold jewelry may be acceptable for nickel-allergic patients. Pure gold is 24kt, meaning 24 of 24 parts are gold. Since 24kt gold is too soft to be useful, gold is typically alloyed with other materials to enhance durability. Gold may be alloyed with silver, copper, nickel, zinc, tin, palladium, and/or manganese. In the case of 14kt yellow gold, the object typically contains 14/24 parts pure gold (or 58.3% pure gold) and 25% silver and 17% copper. Varying the composition of the alloy will change the color of the gold. Jewelry styles go

through cyclical trends, and rose gold has become popular recently.<sup>281</sup> The addition of the red hues of copper, and some silver, results in the rose color. In order to create white gold, either nickel or palladium is used in the alloy to lighten the color. Since there is no standard for the composition of white gold, nickel allergic patients are advised to avoid white gold. The only exception would be an item identified as a nickel-free alloy of 14kt palladium white gold.

Jewelry manufacturers may also utilize nontraditional metals. Titanium Era (1-800-656-6564) sells jewelry made of “aircraft grade titanium,” which consists of an alloy composed of 90% titanium, 6% aluminum, and 4% vanadium. Another harder alloy has tin as well. It is important to recognize, though, that products made of “titanium” are not necessarily good alternatives, as many titanium alloys include nickel.

“Medical plastic” earrings are manufactured by Blomdahl and contain “0% nickel” (<http://www.allergymatters.com>). Palladium is also being used by jewelry manufacturers. TruPd™ is 95% palladium and is available to jewelers. However, many patients allergic to nickel are also allergic to palladium, and patch testing to palladium is important.

### *Other Exposures to Nickel*

Nickel eyeglass frames frequently cause problems for nickel-allergic patients, and most optometry stores now sell “hypoallergenic” or nickel-free frames. As with jewelry, however, a nickel-free plating may wear with time, enough to expose the nickel base beneath. Walsh and Wilkinson from the UK describe spectacle frames marketed as “hypoallergenic,” in which one brand, Monel, consisted principally of nickel and other “titanium memory alloys,” which “may have a nickel content of 40% or more.”<sup>282</sup> Therefore, patients should still use caution with these types of frames.

Although titanium frames are often recommended for nickel-allergic patients, they may sometimes be plated with nickel. Alternatives include plastic frames with minimal metal components which do not contact the skin or nickel-free titanium frames confirmed with a nickel test kit.

There are numerous case reports that describe a number of other household and personal items which can trigger nickel dermatitis. Recognition of these objects may be the only advice necessary, as patients can then avoid them or handle them differently. Brushed nickel fixtures and chrome fixtures in the home may exacerbate hand dermatitis, and avoidance may be necessary. Patients may ask if avoidance of stainless steel kitchen tools, flatware, and door handles is necessary. Stainless steel objects are usually only a problem with prolonged exposure and sweat, so the brief exposure of kitchen objects should not be an issue.

Keys are a common source of nickel and can be avoided with the use of plastic guards available at hardware stores or alternately having keys cut in brass. Patients with dermatitis on the thighs should be instructed to avoid carrying metal items, such as coins, keys, pocket knives, etc., in their pants pockets. With cell phones, patients should use cell phone covers. With buttons and snaps, the barrier methods described in the introductory section should be used. For bra snaps, patients should buy ones with a plastic coating. For bras with metal underwires, substitutions include support bras made of newer fabrics and marketed as “non-underwire” support. For scissors and other tools, particularly in occupations such as hairdressing, rubber or plastic handles may suffice. Non-metal pens and pencils are readily available. In the case of eyelash curlers, tweezers, and nail clippers, patients should purchase stainless steel versions from better department stores. For razors, patients are advised to use the nickel test kit on razor blades and electric razor screens.

## *Cobalt*

Cobalt is a metal used in alloys to add strength, and it is found in many types of metallic objects. Cobalt is frequently combined with nickel, and this may explain the fact that cosensitivity to these two metals is common. Although isolated cobalt allergy occurs, these reactions are less likely to have known clinical relevance compared with other allergens.<sup>283</sup> In a recent study, isolated cobalt reactions represented 30% of all patients allergic to cobalt.<sup>283</sup>

Avoidance of cobalt-containing items is best accomplished by avoidance of nickel-containing objects. Nickel-plated objects are said to be the most common source of exposure to cobalt.<sup>284</sup> Cobalt-containing alloys may be used in dentistry or found in joint implants and dental implants, and further information on alternates in these areas is available in the previous respective sections on nickel avoidance. In addition, cobalt salts are colored and thus may be used to impart a blue color to porcelain, enamels, glass, and pottery. They may also be found as impurities in eyeshadows. Although levels were high enough in some brands studied to cause allergic symptoms, as an impurity it would not be identified on labels.<sup>285</sup>

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