American Contact Dermatitis Society Core Allergen Series: 2017 Update

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The American Contact Dermatitis Society Core Allergen Series was introduced in 2012. After 4 years of use, changes in our recommended allergens are necessary. For the updated series, we have reordered the first 4 panels to approximately mirror the current TRUE Test and removed parthenolide, triclosan, glutaraldehyde, and jasmine. Polymyxin B, lavender, sodium benzoate, ethylhexylglycerin, and benzoic acid are new additions to the American Contact Dermatitis Society series.

In 2012, the American Contact Dermatitis Society (ACDS) published a core allergen series.[1] The goal of this series was to assist in logically expanding patch testing allergen series beyond the TRUE Test (TT; SmartPractice, Phoenix, Ariz) standard allergens, currently with 34 allergens and 1 negative control. Allergens 36–39 and 4 subsequent panels of 10 allergens are presented. The goal of the core allergen series is not to produce an "ACDS 80" allergen series to be used on every single patient but to give patch testers who are currently using the TT as their baseline series a logical and graded tool to increase the number of allergens tested. This hopefully will increase the yield of relevant and useful positive tests for our patients.

After 4 years of use, we feel that updating the ACDS Core Allergen Series is necessary. The first 35 allergens are primarily based on the TT panels 1.3, 2.3, and 3.3. Since 2012, TT has updated their allergen series, changing the order of allergens tested as well as making changes in the standard allergens tested. We have chosen to substitute allergens in some cases for those not using the TT in the first 35 allergens and updated our additional recommended allergens in allergens 36–80. The updated panels 1 through 8 of the ACDS Core Allergen Series are presented in Table 1. The changes from the 2012 Core Allergen Series are summarized in detail in Table 2.

In 2012, we recommended replacing several allergens for those not using TT. Caine mix was replaced with lidocaine, benzocaine, and dibucaine. Thimerosal (TT #23) and quinoline mix (TT #26) were replaced with 2-bromo-2-nitropropane-1,3-diol and benzocaine, respectively. We do not feel that a negative control is necessary.

From the new TT series, we are removing dibucaine (2012 allergen #9) and moving methylisothiazolinone into its place. TRUE Test tests parthenolide (TT #34) routinely. When testing with a more extended series, the screening substances sesquiterpene lactone mix (#57) and compositae mix II (#65) cover parthenolide, and thus, we recommend its optional removal to allow for other allergens in its place.

In addition to the TT changes, 3 allergens were removed. Glutaraldehyde was not felt to be a high-yield allergen. Even though jasmine and lavender have similar rates of contact allergy, contact allergy to lavender is more frequently reported in the literature, thus the removal of jasmine.[2,3] Triclosan is a chlorophenol-based biocide used in consumer soaps/washes and in some oral hygiene products. At baseline, it is an infrequent allergen, although it was included in 2012 because of its extensive use in the United States.[4] Triclosan was recently prohibited from use in consumer antiseptic washes, effective in September 2017, by the United States Food and Drug Administration.[5] This should lower the prevalence of allergy from triclosan even further.

The group decided to replace the open slots on the tray with 5 new allergens: polymyxin B sulfate 3% petrolatum (pet) at #39, lavender absolute 2% pet at #47, sodium benzoate 5.0% pet at #62, ethylhexyl glycerin 5.0% pet at #70, and benzoic acid 5% pet at #77. Each of these additions will be considered briefly hereafter.

Polymyxin B is an antibiotic, which is found commonly in topical antibiotic ointments and creams. Patients commonly refer to "triple antibiotic" that, in addition to polymyxin B, includes the allergens bacitracin and neomycin. In its own right, polymyxin B is an allergen, and in a recent series of 795 patients, it had a prevalence of 2.3%.[6] The commercial allergen is available from allergEAZE (SmartPractice, Calgary, Alberta, Canada).

Lavender oil is derived from the plant *Lavandula angustifolia*. It is added to personal care products because of its light floral scent. In addition to fragrant properties, it also has antimicrobial properties as well as many other less proven traditional/alternative uses.[7,8]

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TABLE 1. The ACDS Core Allergen Series 2017 Draft 2

Core allergen panel I
(1) Nickel sulfate 2.5% pet.*
(2) Lanolin alcohol (Amerchol 101) 50% pet * (TT = wool alcohol)
(3) Neomycin 20% pet.*
(4) Potassium dichromate 0.25% pet.*†
(5) DMDM hydantoin 1% pet.
(6) Fragrance mix I 8% pet.*†
(7) Colophony 20% pet.*
(8) Paraben mix 12% pet.*
(9) Methylisothiazolinone 0.2% aq.
(10) Balsam Peru (*Myroxylon pereirae*) 25% pet.*
Core allergen panel II
(11) Ethylenediamine dihydrochloride 1% pet.*
(12) Cobalt chloride 1% pet.*†
(13) *p-tert*-Butylphenol formaldehyde resin 1% pet.*
(14) Epoxy resin 1% pet.*
(15) Carba mix 3% pet.*†
(16) Black rubber mix 0.6% pet.*
(17) Methylchlorisothiazolinone/methylisothiazolinone 100 parts per million aq.*
(18) Quaternium 15 2% pet.*
(19) Methyldibromoglutaronitrile 0.5% pet. *
(20) *p*-Phenylenediamine 1% pet.*
Core allergen panel III
(21) Formaldehyde 1% aq.*†
(22) Mercapto mix 1% pet.*
(23) 2-Bromo-2-nitropropane-1,3-diol 0.5% pet.
(24) Thiuram mix 1% pet.*
(25) Diazolidinyl urea 1% pet.*
(26) Benzocaine 5% pet.‡
(27) Tixocortol-21-pivalate 1% pet.*
(28) Gold sodium thiosulfate 2% pet.*
(29) Imidazolidinyl urea 2% pet.*
(30) Budesonide 0.1% pet.*
Core allergen panel IV
(31) Hydrocortisone-17-butyrate 1% pet.*
(32) Mercaptobenzothiazole 1% pet.*
(33) Bacitracin 20% pet.*
(34) Fragrance mix II 14% pet.
(35) Disperse Blue 106/124 mix 1.0% pet.*§
(36) Lidocaine 15% pet.
(37) Propylene glycol 30% aq.
(38) Iodopropynyl butylcarbamate 0.1% pet.†
(39) Polymyxin B sulfate 3% pet.
(40) Cocamidopropyl betaine 1% aq.†
Core allergen panel V
(41) Mixed dialkyl thioureas 1% pet.
(42) 3-(Dimethylamino)-propylamine 1% aq.
(43) Hydroxyethyl methacrylate 2% pet.
(44) Oleamidopropyl dimethylamine 0.1% aq.
(45) Decyl glucoside 5% pet.
(46) Methyl methacrylate 2% pet.
(47) Lavender absolute 2% pet.
(48) Cinnamic aldehyde 1% pet.

TABLE 1. *(Continued)*

(49) D/L-α-Tocopherol 100%
(50) Ethyl acrylate 0.1% pet.
Core allergen panel VI
(51) Tea tree oil 5% pet.
(52) Chlorhexidine digluconate 0.5% aq.
(53) Propolis 10% pet.
(54) Chloroxylenol (PCMX) 1% pet.
(55) 2-Hydroxy-4-methoxybenzophenone (benzophenone-3) 10% pet.
(56) Tosylamide formaldehyde resin 10% pet.
(57) Sesquiterpene lactone mix 0.1% pet.
(58) Cocamide DEA 0.5% pet.
(59) 4-Chloro-3-cresol (PCMC) 1% pet.
(60) Benzalkonium chloride 0.1% pet.†
Core allergen panel VII
(61) 2-Hydroxy-4-methoxybenzophenone-5-sulfonic acid (benzophenone-4) 2% pet.
(62) Sodium benzoate 5% pet.
(63) Sorbic acid 2% pet.
(64) Ylang-ylang 2% pet.
(65) Compositae mix II 5% pet.
(66) Ethyleneurea melamine-formaldehyde 5% pet.
(67) Sorbitan sesquioleate 20% pet.
(68) *n*,*n*-Diphenylguanidine 1% pet.
(69) Cetyl steryl alcohol 20% pet.
(70) Ethylhexylglycerin 5% pet.
Core allergen panel VIII
(71) Triamcinolone 1% pet.
(72) Clobetasol-17-propionate 1% pet.
(73) Amidoamine 0.1% aq.
(74) Ethyl cyanoacrylate 10% pet.
(75) Phenoxyethanol 1% pet.
(76) Disperse Orange 3 1% pet.
(77) Benzoic acid 5% pet.
(78) 2,6-Ditert-butyl-4-cresol (BHT) 2% pet.
(79) 2-Ethylhexyl-4-methoxycinnamate 10.0 pet.
(80) Benzyl alcohol 10% soft

**TT allergen.*
†Interpret reactions with caution, mild irritant, and/or low clinical relevancy.
‡Caine mix (containing benzocaine) is the TT allergen.
§Disperse blue 106 is the TT allergen.
aq indicates aqueous; pet, petrolatum.

Rates of allergy were reported to be between 1.1% and 13.9% for an 8-year period, with an overall prevalence of 3.7% in a Japanese study.[8] Lavender is available from Chemotechnique (Vellinge, Sweden) as lavender absolute 2% pet and from allergEAZE as *L. angustifolia* oil (lavender oil) 2% pet.

Sodium benzoate and benzoic acid are related chemicals, with both preservative and fragrant properties. Benzoic acid is naturally found in many fruits as well as having extensive industrial synthesis. Sodium benzoate is produced synthetically by adding "natural" benzoic acid to sodium hydroxide. Potassium and calcium benzoate are closely related salts of benzoic acid. They are commonly added to acidic food and beverages (benzoic acid [E210], sodium benzoate [E211]), as preservatives, having bactericidal

TABLE 2. 2017 ACDS Core Allergen Series Changes

TT changes by the manufacturer
- •TT deleted 2-bromo-2-nitropropane-1,3-diol 0.5% pet.
- •Reordered allergens on panels 1.3, 2.3, and 3.3 (#1-#35)

ACDS changes to TT panels
- •Delete caine mix (TT #5)—replace with benzocaine and lidocaine
- •Delete negative control (TT #9)
- •Delete dibucaine (2012 tray #9)
- •Delete thimerosal (TT #23)
- •Delete quinoline mix (TT #26)
- •Delete parthenolide (TT #34)—new change in panel IV. Screeners sesquiterpene lactone mix (#57) and compositae mix II (#65) remain in the tray
- •Keep 2-bromo-2-nitropropane-1,3-diol 0.5% pet., moved to #23

ACDS additional allergens (tray #36-#80)—changes for 2017

Deleted:
- •#62 Triclosan
- •#70 Glutaraldehyde
- •#77 Jasmine

Added:
- •Polymyxin B sulfate 3% pet. at #39
- •Lavender absolute 2% pet. at #47
- •Sodium benzoate 5.0% pet. at #62
- •Ethylhexylglycerin 5.0% pet. at #70
- •Benzoic acid 5% pet. at #77

Moved:
- •Methylisothiazolinone 0.2% aq. to #9
- •Fragrance mix II 14% pet. to #34
- •Propylene glycol 30% aq. to #37
- •D/L-α-Tocopherol 100% to #49
- •Switched places of #53 Chloroxylenol (PCMX) and #54 Propolis
- •Amidoamine 0.1% aq. to #73

aq indicates aqueous; pet, petrolatum.

properties as well as mold and yeast inhibition. In addition to causing allergic contact dermatitis, cutaneous contact may produce nonimmunologic contact urticaria limited to the skin.[9] Sodium benzoate 5.0% pet and benzoic acid 5% pet are available from Chemotechnique and allergEAZE.

Ethylhexylglycerin is a recently introduced synthetic emollient and antimicrobial, derived from plants/grains.[10] It is used in cosmetics and personal care products as an alternative preservative, replacing parabens. Allergy rates are still low, but its use is increasing. The North American Contact Dermatitis Group added it to their tray for testing in 2014.[11] Ethylhexylglycerin 5.0% pet is available from Chemotechnique.

It is our goal to recommend useful and appropriate testing recommendations for evaluation of our suspected dermatitis patients. Using the ACDS Core Allergen Series will allow the clinician to extend the patch test screening logically to incorporate common, rare, and emerging allergens.

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