



Hand Dermatitis – Contact Dermatitis

David E. Cohen, M.D., M.P.H.
 Charles and Dorothea Harris Professor
 and Vice Chairman for Clinical Affairs
 Director of Allergic, Occupational and Environmental Dermatology
 New York University School of Medicine Department of Dermatology

IEC 2021 Hand Eczema Virtual Symposium

NYU Grossman School of Medicine NYU Langone Health

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David E Cohen has declared the following financial interests:

- Consultant and Honorarium:
 - Ferrndale Laboratories,
 - Asana
 - Medimetrix
 - Leo
 - UCB
 - Cutanea [past]
 - Ferrer [past]
 - Celgene [past]
 - Novartis
 - Dermavant
 - FSJ
- FIDE: (FIDE receives industry sponsorship from AbbVie, Almirall, Amgen, Bausch and Lomb, Bristol-Myers Squibb, Celgene Dermavant, Dermira, Janssen, Kyowa Hakkō Kirin, LEO, Lilly, Novartis, Ortho Dermatologics, Pfizer, Sanofi Genzyme, Sun Pharma, UCB, Valsart)
- Cosmetic Ingredient Review (CIR)
- Stock or stock options: Dermira [past], Medimetrix [past], Brickell Biotech, Kadmon, Evimmune, Timber
- Board of Directors: Kadmon, Timber, Evimmune, [Dermira-Past]

I will discuss non-FDA approved patch test allergens, and emerging therapies

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Hand Dermatitis

- General population prevalence is 5% to 10%
 - Health care workers, exposed to wet work, frequent hand washing, and AD.
 - Atopic dermatitis (AD) is recognized as the top risk factor Causes:
- **Exogenous: Irritant and Allergic Contact Dermatitis**
- Endogenous: Psoriasis, Dyshidrosis, Atopic Dermatitis, Nummular
- **ID**
- **HYBRID**
- Spectrum for eczematous disease is vesicular and eroded to hyperkeratotic and fissured
- Hand Psoriasis may have higher rates of allergic contact dermatitis.


Int J Occup Environ Health. 2018 Jan 23;1-10. Ther Clin Risk Manag. 2020 Dec 31;16:1319-1332. doi: 10.2147/TCRM.S292504.eCollection 2020
 Contact Dermatitis. 2014 Jan;70(1):44-55. Pieter-Jan Coenraads. N engl j med 367:19 nejm.org november 8, 2012
 Indian Dermatol Online J. 2012 Sep;3(3):177-81. Dermatology (2011) 29, 273-277

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Characteristic	Primary, n (%)	Total of Up to 3 Listed, n (%)*	Final diagnoses	N = 55705	N = 5597
Dermatitis sites†	n = 5591†	n = 5597	Allergic	2798 (50.2)	3251 (58.1)
→ Hand	1230 (22.0)	1440 (25.7)	Other dermatitis	813 (14.6)	905 (16.2)
Scattered generalized	995 (17.8)	1358 (24.3)	Atopic dermatitis	672 (12.0)	984 (17.6)
Face	946 (16.9)	1329 (23.7)	Other dermatoses	447 (8.0)	566 (10.1)
Eyelids	535 (9.6)	695 (12.4)	Irritant	446 (8.0)	820 (14.7)
Trunk	307 (5.5)	691 (12.3)	Psoriasis	150 (2.7)	226 (4.0)
Lips	274 (4.9)	368 (6.6)	Nummular dermatitis	67 (1.2)	84 (1.5)
Arm	230 (4.1)	739 (13.2)	Subacute dermatitis	59 (1.1)	82 (1.5)
Scalp	225 (4.0)	377 (6.7)	Photodermatitis	55 (1.0)	73 (1.3)
Leg	207 (3.7)	535 (9.6)	Pompholyx	31 (0.6)	37 (0.7)
→ Foot	120 (2.1)	279 (5.0)	Contact urticaria	21 (0.4)	31 (0.6)
			Stasis dermatitis	19 (0.3)	24 (0.4)

DERMATITIS, Vol 29 • No 6 • November/December, 2018



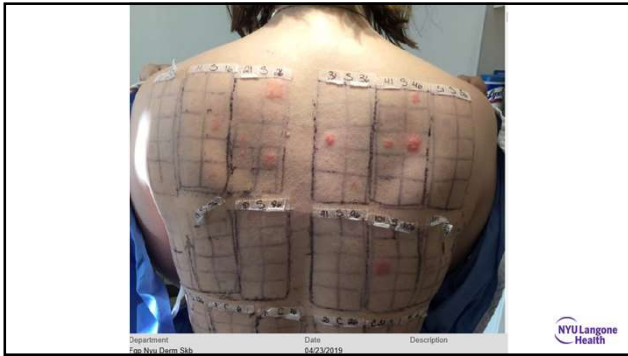
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Hand Eczema and ACD

HE was associated with significantly higher odds of positive patch test reactions to the 25 most common allergens, including preservatives, metals, topical medications, and rubber accelerators.

The five most common clinically relevant allergens were methylisothiazolinone, nickel, formaldehyde, quaternium-15 and fragrance mix I.

J Am Acad Dermatol . 2020 Nov 28;50:190-9622(20)33103-0.
doi: 10.1016/j.jaad.2020.11.054.

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Hand Eczema in Children - 2000-2016

- 14.5% of 1,634 pediatric patients referred for patch testing had involvement of the hands.
 - Diagnosis rendered - allergic contact (49.4%), atopic (37.1%)
 - irritant contact dermatitis (16.9%).
 - The five most common (relevant) allergens were nickel, methylisothiazolinone, propylene glycol, decyl glucoside and lanolin.

Br J Dermatol. 2021 Jan 16.doi:10.1111/bjd.19818. Online ahead of print.

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Predictive factors of self-reported hand eczema in adult Danes


- 5 year follow-up study in the general population, aged 18-72 years (N = 2270)
 - 'Never', 'incident', 'non-persistent', or 'persistent'
 - **atopic dermatitis (AD)** was associated with **both persistent** (odds ratio (OR) = 9.0; 95% confidence interval (CI) 5.6-14.4) and **incident hand eczema** (OR = 3.0; CI 1.7-5.2)
 - **contact sensitization** (23 allergens without nickel) was also associated with **persistent hand eczema** (OR = 2.5; CI 1.2-5.0), independently of an atopic phenotype.
 - **fragrances and isothiazolinones**

Br J Dermatol. 2016 Feb 13. doi: 10.1111/bjd.14476. [Epub ahead of print] 

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Occupational Dermatitis in Health Care Workers Evaluated for Suspected Allergic Contact Dermatitis

- 685 HCWs assessed - 81.0% diagnosed with Oc Skin Dis.
 - Irritant contact dermatitis (ICD) 79.1%
 - Allergic contact dermatitis (ACD) 49.7%.
 - **rubber glove** chemicals (thiuram mix and tetraethylthiuram disulfide),
 - **preservatives** (formaldehyde, formaldehyde releasers, and isothiazolinones),
 - excipients in **hand cleansers**.

Contact Dermatitis. 2016 Oct;75(4):213-22. 

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Occupational Contact Dermatitis in Mechanics and Repairers Referred for Patch Testing

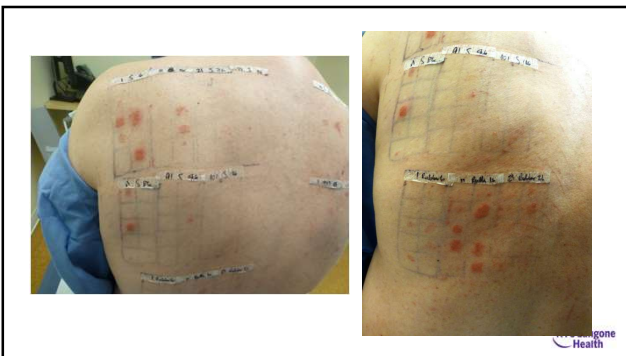
- 691 mechanics/repairers patch tested.
 - Male sex (93.5%)
 - Hand involvement (59.5%)
- Occupationally relatedness
 - Vehicle and mobile equipment mechanics/repairers (52.7%)
 - Mechanics/repairers (41.4%)
 - Electrical/electronic equipment mechanics/repairers (21.3%).
- **Carba mix, thiuram mix, and MCI/MI** - most common relevant allergens
- Gloves, automotive vehicles, solvents, oils, lubricants, and fuels were the most common sources of responsible allergens.

Dermatitis. 2017 Jan/Feb;28(1):47-57. 

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Rubber

- Five main families of accelerants are used in rubber-derived gloves: **thiurams, dithiocarbamates (CM), benzothiazoles, guanides, and thioureas.**
- Carbamates were used in 90.5% of gloves, whereas thiurams were used in 5.8%.



1994-2016: 49,758 patients were tested to both carbamate mix [CM] and thiuram mix [TM].

6.9% had positive reactions to CM and/or TM
 CM+ only 40.8%, TM+ only 31.0%, or both 28.1%.

Male sex, occupationally related dermatitis, and hand involvement were risks.

More than 80% of CM+/TM+ reactions were considered currently relevant.

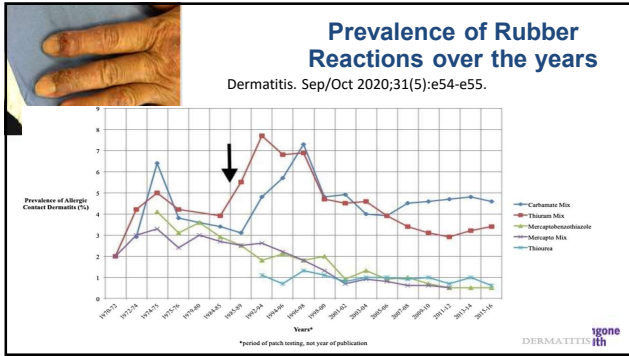
Gloves were the most common source of CM and TM as well as clothing and footwear.

Dermatitis. 2020 Dec 1. doi: 10.1097/DER.0000000000000648. Online ahead of print.
 Dermatitis. 2020 May/Jun;31(3):229. doi: 10.1097/DER.0000000000000608.
 Dermatitis: March/April 2018 - Volume 29 - Issue 2 - p 66-76

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Methylisothiazolinone
2013 ALLERGEN OF THE YEAR

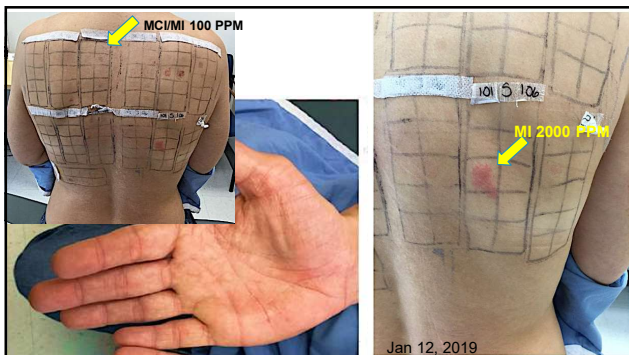
- 2009-2010 [2.5%] 2011-2012 [5%] 2017 [11%] 2019 [13.4%]
- Testing with MCI/methylisothiazolinone (Kathon CG), not adequate – 33–60% of false-negative for MI allergy!
- Patch testing to higher concentrations of MI is necessary to detect allergy. [0.2%]
- Banned in leave on products in Europe in 2014 and recent reports demonstrates a halving of reactivity in the few years subsequently.
- Other isothiazolinones such as dichloro-octylisothiazolinone, butyl-benzisothiazolinone, and methyl-benzisothiazolinone are increasingly being recognized.
- Nearly all water based house paints have MI or derivatives

Contact Dermatitis. 2019 Apr 12. doi: 10.1111/ced.13289.
Dermatitis. 29(6):332-338, November/December 2018.
Clin Exp Dermatol 2018 Sept 21 Epub ahead of print

Contact Dermatitis 2017;76(5):301–302.
Dermatitis. 2017 May/June;28(3):204-209.
Dermatitis. 2017 Sep/Oct;28(5):317-322. doi: 10.1097

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Fragrance

2007-2017: **22.7%** of 24,246 patients were reactive to fragrance and botanical extract allergens


Fragrance sensitive patient are more likely to be female, older than age 40 years, White and have face, leg, or anal/genital dermatitis.

- Top allergens included fragrance mix I (FMI, 10.6%), Myroxylon pereirae (balsam of Peru [BOP], 8%, and fragrance mix II (FMII, 4.9%).
- Concomitant reactions occur to botanical related items like propolis, colophony, and Compositae mix.

Fragrances are present in 98.5% of men's moisturizers

Common individual sensitizers include **linalool and limonene hydroperoxides**, hydroxyisohexyl 3-cyclohexene carboxaldehyde, tree-moss and oakmoss absolute, isoeugenol, cinnamyl alcohol, and cinnamal.

Dermatitis. 2020 Dec 1. doi: 10.1097/DER.0000000000000661. Online ahead of print.
 Dermatitis. 2020 Feb 21. doi: 10.1097/DER.0000000000000661.
 Dermatitis. 2020 Jan - Volume 31 - Issue 1 - p 13-35.
 Contact Dermatitis. 2019 Feb;80(2):94-100.
 Dermatitis. 29(6):324-331, November/December 2018.

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Contact Dermatitis from cleansers

- Skin cleanser allergy was associated with high frequencies of **hand and arm dermatitis**
- More than 50 allergens were associated with SCs including
 - quaternium-15 (11.2%), **cocamidopropyl betaine (9.5%)**, methylchloroisothiazolinone/methylisothiazolinone (8.4%), **coconut diethanolamide (7.9%)**, fragrance mix I (7.7%), Myroxylon pereirae (5.9%)
- In 2017 Alkyl Glucosides were named AOY.

Dermatitis. 2017 Dec 18. doi: 10.1097/DER.0000000000000661.
 J Eur Acad Dermatol Venerol. 2017 Jun 19. doi: 10.1111/jdv.14423.
 JAMA Dermatol. 2017 Feb 22. doi: 10.1001/jamadermatol.2016.2111.
 Dermatitis. 2016 Oct 21.
 Dermatitis. 2017 Jan/Feb;28(1):3-4.

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Systemic contact dermatitis (SCD)

- Cutaneous reaction from systemic exposure to an allergen in a sensitized person often refractory to conventional therapies.
 - oral, intravenous, intramuscular, inhalational, trans-mucosal, or transcutaneous
 - Attributable to drugs and foods
- Often to common sensitizers
 - nickel**, balsam of Peru, trace metals, propylene glycol, urushiol, and Compositae Plants (chamomile, Echinacea), Corticosteroids.

Cutis 2019 Dec;104(6):337-340.
 Clinical Reviews in Allergy & Immunology (2019) 56:9-18
 Curr Allergy Asthma Rep. 2014 Oct;14(10):463.

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Current 2018-20 data for North America

TOP 10	11-21	Bottom 3
1. Nickel 2.5%	11. Cobalt	68. Clobetasol-17-propionate 0.23%
2. Methylisothiazolinone 2000 PPM	12. Fragrance mix 2	69. HC 17-butyrate 0.16%
3. Fragrance mix 1	13. Carba Mix	70. Desoximetasone 0.14%
4. Formaldehyde 2%	14. Lanolin/Amerchol 50%	FYI:
5. MCI/MI 100 PPM	15. Propylene Glycol 100%	30. tixocortol 2%
6. Balsam of Peru	16. Iodopropnyl butylcarbamate	49. Budesonide 0.84%
7. Neomycin	17. Cinnamic aldehyde	
8. Bacitracin	18. Quaternium 15	
9. Formaldehyde 1%	19. Oleamidopropyl dimethylamine	
10. 4-Phenylenediamine 1%	20. Methyltribromoglutaronitrile/phenoxyethanol	DERMATITIS, Vol 29 • No 6 • November/December, 2018
	21. Thiuram mix	NYU Langone Health

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Conclusion

- Hand dermatitis is a heterogeneous group of disorders that results in consequential in loss of capacity to perform activities of routine daily living and work.
- Treatment rests in diagnosis and detection of potentially causative or aggravating factors.
- **Patch testing can be an important tool in the workup of such patients.**



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Thank you

david.cohen@nyumc.org
david.cohen@earthlink.net
1-212-263-5889



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