



AN ONGOING CE PROGRAM  
of the University of Connecticut School of  
Pharmacy

## EDUCATIONAL OBJECTIVES

After completing the continuing education activity, pharmacists will be able to

- Recognize contact dermatitis types, signs and symptoms, and common treatments
- Identify common topical allergens associated with contact dermatitis
- Characterize over-the-counter products that are allergen-containing and allergen-free

After completing the continuing education activity, pharmacy technicians will be able to

- Recognize contact dermatitis types, signs and symptoms, and common treatments
- Identify common topical allergens associated with contact dermatitis
- Differentiate over-the-counter products that are allergen-containing and allergen-free



The University of Connecticut School of Pharmacy is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

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# You Asked for it! CE



## Itching for Relief: Understanding Contact Dermatitis

**TARGET AUDIENCE:** Pharmacists and pharmacy technicians who have an interest in dermatology and patient self-care.

**ABSTRACT:** Contact dermatitis (CD) is a common inflammatory skin condition affecting approximately 15% to 20% of the population and accounting for the majority of occupational skin disease cases. Pharmacy teams can help patients recognize symptoms, identify potential triggers, and select appropriate treatment options. This continuing education (CE) activity provides an in-depth review of contact dermatitis, with a focus on the two main subtypes: irritant contact dermatitis and allergic contact dermatitis. Participants will examine clinical presentation, common causative agents, and diagnostic approaches used to identify allergens, such as patch testing. This course outlines evidence-based management strategies, including topical corticosteroids, emollients, antihistamines, nonpharmacologic interventions, and prevention methods to reduce recurrence. Additionally, participants will learn to identify common allergens in personal care and household products to guide patients toward allergen-free alternatives. This CE will equip learners with knowledge to provide effective care to patients with CD and to support improved dermatologic health outcomes through patient education and preventive counseling.

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**FACULTY DISCLOSURE:** The author has no financial relationships with an ineligible company.

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## INTRODUCTION

Imagine you're working a late shift at your local pharmacy when a mother rushes in with her child, whose hands are red and covered in small, weeping lesions. The child says they itch constantly, and the mother explains the pediatrician mentioned "contact dermatitis," but mom's unsure how to help. She didn't know who else to turn to but hopes you could provide some suggestions on what products can help her child.

While skin conditions aren't necessarily the pharmacy staff's bread and butter, your expertise can still make a difference. You can scrutinize the affected area and ask some guided questions to decide what products may help the child.

**PAUSE AND PONDER:** What questions may help determine the best remedy for this child?

Before recommending products, it's important to first understand what contact dermatitis is, how it develops, and the most effective treatment options.

## WHAT IS CONTACT DERMATITIS?

Contact dermatitis is a form of eczema (a group of inflammatory skin conditions that cause dry skin, itchiness, rashes, scaly patches, blisters, and skin infections) that occurs when a substance comes into contact with the skin and causes irritation or an allergic reaction.<sup>1,2</sup> Contact dermatitis occurs in 15% to 20% of people. Contact dermatitis is the most common form of reported occupational skin disease accounting for approximately 90% to 95% of cases.<sup>1,3</sup> Although contact dermatitis has no cure, patients can manage symptoms effectively with topical treatments and by identifying and avoiding the triggering substance.

It's important to note many different clinical patterns of contact dermatitis exist. Some common patterns include<sup>4-10</sup>

- Erythema multiforme—lesions present as macules (flat, distinct spot on the skin that's a different color than the surrounding area but doesn't impact the skin's texture or thickness), papules (red bumps), bullae (blisters filled with clear fluid), or urticarial eruptions (itchy welts), often demonstrating a characteristic 'target lesion' pattern predominantly affecting the extremities
- Urticarial papular plaques—skin lesions that appear as itchy papules and raised patches, often appearing in lines or clusters
- Lichen-planus—presents as shiny red, purple, gray, or brown bumps that may merge into plaques, commonly on wrists, arms, legs, or lower back; may cause mild to intense itching
- Purpuric petechial reactions—skin or mucous membrane discoloration as a result of hemorrhage from small blood vessels. Lesions are often 1 mm to 2 mm across
- Pustular reactions—a rash consisting of small pustules (bumps) less than 5 mm to 10 mm that are filled with pus
- Pigmentation disturbances
- Pemphigoid—present as large fluid-filled blisters that rupture and form crusted erosions

## Types of Contact Dermatitis

Contact dermatitis has two main presentations: irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD). **Table 1** (on the following page) provides more information on these two presentations.

## PAUSE AND PONDER: How does ICD differ from ACD?

Apart from these two main types of contact dermatitis, other less common presentations can develop. Photoallergic and photoirritant contact dermatitis are reactions primarily affecting sun-exposed areas including the face, back of the hands, arms, upper chest, and lower legs.<sup>11</sup>

Photoallergic contact dermatitis requires ultraviolet radiation to activate the allergic agent to trigger an allergic reaction. The most common causative agents are chemicals found in sunscreens. Benzophenones (most commonly oxybenzone) are common sunscreen components and chemical triggers. Other agents include ethylhexyl methoxycinnamate (octinoxate), butyl methoxydibenzoylmethane (avobenzene), ethylhexyl dimethyl (padimate O), and octocrylene. A less common cause implicated in photoallergic contact dermatitis reactions is ketoprofen, a topical nonsteroidal anti-inflammatory drug.<sup>11</sup>

Photoirritant (phototoxic) contact dermatitis requires ultraviolet radiation to activate the irritant and cause cellular damage. It occurs after contact with plants that contain furocoumarins or psoralens (e.g., lime, lemon, parsnips, parsley, celery, hogweed, rue [*Ruta graveolens*], meadow-grass, fig tree). Due to its association with limes and sunlight, photoirritant contact dermatitis is commonly referred to as "Margarita dermatitis."<sup>11</sup>

Protein contact dermatitis is caused by exposure to high-molecular-weight proteins often found in foods, latex, and other biologic material. Common foods involved include vegetables, animal proteins, spices, wheat, and milk. Most cases are occupation-related with food handlers frequently developing this form of dermatitis.<sup>11</sup>

Systemic allergic contact dermatitis, also known as hematogenous contact dermatitis, occurs when an individual who has been previously sensitized to an allergen through skin contact later encounters the same substance through a systemic route (e.g., ingestion, injection, inhalation, implantation, or suppository use). Common triggers include metals (most



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**Table 1. The Main Types of Contact Dermatitis and their Characteristics.**<sup>1,2-4,11-14</sup>

Irritant contact dermatitis	Allergic contact dermatitis
<ul style="list-style-type: none"> <li>• Makes up approximately 80% of contact dermatitis cases.</li> <li>• Mechanism: Involves a chemical or substance causing damage and inflammation to the skin. Damage occurs over time and with repeated exposure to the irritant.</li> <li>• Reaction type: Non-immune mediated reaction. Damage is limited to the place where the chemical or substance is absorbed.</li> <li>• Onset: Reactions occur within minutes to hours.</li> <li>• Defining characteristics: Occurs as a dose-dependent inflammatory reaction. Harsher agents or more vigorous abrasions produce more severe injury.</li> <li>• Clinical manifestations: Clinical features of acute ICD include erythema (redness), vesicles (small fluid filled bumps), edema, bullae, and oozing. Patients often experience burning, stinging, and pain. Clinical features of chronic ICD include erythema, lichenification (hyperpigmentation, skin thickening), scaling, hyperkeratosis (skin thickening), and fissuring (small cracks in dry, thickened skin). Patients often experience burning and pain more than itchiness.</li> <li>• Causative factors:             <ul style="list-style-type: none"> <li>• Highly irritating chemicals (e.g., acids, bases, oxidizing or reducing agents)</li> <li>• Mild irritants (e.g., water, detergents, weak cleaning agents, soaps)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Makes up approximately 20% of contact dermatitis cases.</li> <li>• Mechanism: Involves the body producing an allergic reaction to a chemical or allergen the skin has absorbed.</li> <li>• Reaction type: Immune mediated reaction.</li> <li>• Onset: Can be a delayed reaction that occurs more than 24 hours past exposure.</li> <li>• Defining characteristics: Improves more slowly than ICD and recurs faster when exposure is re-established.</li> <li>• Clinical manifestations: Acute ACD has clinical features including thin, erythematous, scaly, and eczematous plaques. Lesions may also be vesicular (small bubble-like sacs formed when fluid is trapped under the epidermis) or bullous (hive-like welts or large, fluid-filled blisters). Chronic ACD has clinical features including indurated and scaly lesions. Over time, the skin may become lichenified. Other features of the rash are sensations of burning, redness, stinging, swelling, oozing, crusting, and flaking.</li> <li>• Causative factors:             <ul style="list-style-type: none"> <li>• Poison ivy and other plants</li> <li>• Commercial chemicals (e.g., toluene-2,5-diamine sulfate, panthenol, cetrimonium chloride and bromide, chlorphenesin)</li> <li>• Industrial compounds (e.g., metals, epoxy, acrylic resins, rubber additives)</li> <li>• Agrochemicals (e.g., pesticides, fertilizers)</li> </ul> </li> </ul>
<p><b>ABBREVIATIONS:</b> ICD, irritant contact dermatitis; ACD, allergic contact dermatitis</p>	

commonly nickel); medications (e.g., aminoglycoside antibacterials, corticosteroids, and aminophylline); chemicals (e.g., parabens, formaldehyde, and propylene glycol); certain foods (e.g., soy, chocolate, nuts, and spices); and plants. Common plant sources include those in the *Compositae* family (known as the “daisy” family such as dandelions, sunflowers, and ragweed) and *Anacardiaceae* family (known as the “cashew” family, such as cashews, mango, and sumac), garlic, and balsam of Peru.<sup>11,13,15-17</sup>

### Pathogenesis of Allergic Contact Dermatitis

The difference in mechanism between ACD and ICD results in their distinct pathogenic pathways. See the **SIDEBAR** on page 4 for definitions on the immune cells involved in contact dermatitis’ pathogenesis.

Pathogenesis of ACD can be broken down into three stages: sensitization, elicitation, and resolution.<sup>13</sup>

Sensitization occurs during initial allergen exposure. The skin absorbs the allergen (antigen) which then binds to dendritic cells (immune cells that present antigens to T-cells and help drive adaptive immunity) and migrate to lymph nodes.<sup>23</sup> In the lymph nodes, these allergens trigger the development of allergen-specific T-cells. The T-cells then differentiate into T-effector cells

and T-memory cells and recirculate into the blood and skin. This process may take up to 15 days. Patients may not develop active dermatitis during this phase.<sup>13</sup>

Elicitation occurs upon allergen re-exposure. The allergen binds to the dendritic cells and is presented to the antigen-specific T-cells. This triggers a rapid inflammatory response cascade that releases pro-inflammatory cytokines and recruits inflammatory cells. This process occurs hours to days after the exposure and manifests as an itchy rash at the contact site. The dermatitis response can last days to weeks following exposure.<sup>13</sup>

Resolution occurs post-exposure. A large population of T-memory cells replace T-effector cells. This ensures that if individuals experience subsequent exposures, the immune reaction to the allergen is of increasing intensity. As a result, patients may experience a worsening severity of symptoms with repeated exposures due to the increasing population of T-memory cells in the skin.<sup>13</sup>

### Pathogenesis of Irritant Contact Dermatitis

ICD’s pathogenesis is less clearly understood than ACD’s pathogenesis; however, experts have determined a few key mechanisms involved. These mechanisms include disruption of

## SIDEBAR: Overview of Immunomodulatory Cells Involved in the Pathogenesis of Contact Dermatitis<sup>18-22</sup>

- **T-effector cells:** Activated T-cells that migrate to infection sites to eliminate pathogens. These cells develop through antigen recognition (following presentation by antigen-presenting cells), leading to T-cell proliferation and differentiation to effector cells.
- **T-memory cells:** Form of activated T-cells that become long-lived memory cells. These cells rapidly expand and mount a stronger immune response upon re-exposure to the same antigen.
- **Interleukin-1 alpha (IL-1 $\alpha$ ):** A pro-inflammatory cytokine found in most cell types, especially barrier tissues. It's released during cell injury or stress to trigger local inflammation, recruit immune cells, and promote tissue repair.
- **Interleukin-1 beta (IL-1 $\beta$ ):** A pro-inflammatory cytokine produced by activated immune cells that requires inflammasome processing (enzymatic activation of an inactive precursor by intracellular immune complexes) to become active. It mediates systemic inflammation, fever, and leukocyte recruitment.
- **Interleukin-1 receptor antagonist (IL-1RA):** A natural inhibitor that blocks IL-1 $\alpha$  and IL-1 $\beta$  from receptor binding, preventing excessive inflammation and maintaining immune balance.
- **Interleukin-10 (IL-10):** An anti-inflammatory cytokine that suppresses pro-inflammatory cytokine production and limits tissue damage by controlling immune cell activation.
- **Interleukin-6 (IL-6):** A multifunctional cytokine produced during infection or stress that activates immune cells, induces acute-phase responses, and contributes to systemic inflammation and metabolic changes.
- **Tumor necrosis factor-alpha (TNF- $\alpha$ ):** A key inflammatory cytokine—secreted mainly by macrophages—that regulates immune responses, promotes inflammation, and influences metabolism and tissue repair.
- **Chemokine ligand 20 (CCL20):** A chemokine that binds CCR6 (C-C chemokine receptor type 6) to attract lymphocytes and dendritic cells to inflamed or infected tissues. It plays a central role in Th17-driven inflammation and autoimmune disease.
- **Chemokine ligand 21 (CCL21):** A chemokine that binds CCR7 (C-C chemokine receptor type 7) to direct T-cells and dendritic cells to lymphoid organs, supporting immune cell organization and adaptive immune responses.
- **Chemokine ligand 8 (CXCL8)/Interleukin-8 (IL-8):** A chemokine that binds CXCR1 (C-X-C motif chemokine receptor 1) and CXCR2 (C-X-C motif chemokine receptor 2) to recruit neutrophils to infection sites, contributing to inflammation, angiogenesis, and tissue remodeling.
- **Intercellular adhesion molecule 1 (ICAM-1):** An adhesion molecule on endothelial cells and leukocytes that mediates immune cell attachment and migration during inflammation and supports T-cell activation.

the epidermal barrier (the stratum corneum) and the loss of lipids, damage to keratinocyte cell membranes, cytotoxic effect on keratinocytes, inflammatory cytokine release from keratinocytes, and activation of innate immunity.<sup>12</sup>

Previous experimental studies show that disruption of the epidermal barrier by occlusion or by physical/chemical irritation results in increased skin permeability, transepidermal water loss, and reduced natural moisturizing factor. These steps are considered the initiation event of ICD. ICD's pathogenesis also varies depending on whether the condition is acute or chronic.<sup>12</sup>

In acute ICD, studies using both human and animal models show that acute damage to the epidermal barrier (such as that caused by sodium lauryl sulfate, a surfactant used in many cleaning and hygiene products) triggers the release of preformed cytokines from keratinocytes, including interleukin (IL)-1 $\alpha$ , IL-1 $\beta$ , IL-6, and tumor necrosis factor (TNF)- $\alpha$ . IL-1 $\alpha$  and TNF- $\alpha$  serve as key mediators, initiating the release of additional pro-inflammatory cytokines (e.g., CCL20, CCL21, CXCL8) that recruit mononuclear and polymorphonuclear cells to the irritation site. TNF- $\alpha$  stimulates the expression of ICAM-1 on keratinocytes, facilitating leukocyte migration to the epidermis. Concurrently, the body produces anti-inflammatory mediators such as IL-10 and IL-1RA in response to irritant exposure, helping to regulate and resolve the inflammatory process.<sup>12</sup>

Researchers don't fully understand the underlying mechanisms of chronic ICD yet. One proposed theory suggests repeated exposure to mild irritants or persistent wet work (occupations that involve frequent or prolonged contact with water or other liquids; e.g., healthcare, hairdressing, or construction). Continuous exposure leads to downregulation of the inflammatory response while promoting keratinocyte proliferation and differentiation. Studies comparing normal skin with areas repeatedly exposed to irritants, such as sodium lauryl sulfate, have shown decreased levels of pro-inflammatory cytokines (IL-1 and TNF- $\alpha$ ) and increased levels of IL-1RA in chronically affected skin.<sup>12</sup>

Additionally, ICD appears to involve unique gene expression changes within the skin that distinguish it from ACD. Some individuals develop a tolerance to chronic irritant exposure, a process referred to as the "hardening phenomenon." Although the exact mechanisms remain unclear, structural and biochemical adaptations—such as epidermal thickening (acanthosis [patches of thickened, velvety, darkened skin that appear within body folds and creases] and hyperkeratosis), alterations in stratum corneum lipid composition, changes in barrier permeability, and modulation of inflammatory mediator expression may contribute to this adaptive response.<sup>12,24</sup>

## Risk Factors

Risk factors for contact dermatitis are a mix of circumstantial and inherent traits. For example, a circumstantial trait is cosmetic preference. A woman partial to perfumes or jewelry has a greater risk of contact dermatitis than a woman who is not. An example of inherent risk is skin type; individuals with thin skin, for instance, are at an increased risk of contact dermatitis. **Table 2** describes additional risk factors.

In addition to these risk factors, higher dermal absorption may increase an individual's risk for contact dermatitis.<sup>26</sup> Factors that impact dermal absorption include skin integrity, absorption location, the chemical's physical and chemical properties, chemical concentration, absorption time of the chemical, and the surface area of skin that absorbs the chemical.<sup>1</sup>

## Signs and Symptoms

Signs and symptoms of contact dermatitis depend on whether the reaction is acute or chronic. An acute reaction, such as contact with poison ivy, can cause the skin to appear red and swollen and may have small vesicles. However, a chronic reaction caused by repeated reactions is more akin to a presentation of eczema with a rash that appears to thicken, scale, or crack.<sup>3,13</sup>



The symptom location will also vary depending on the substance's contact location. For example<sup>3</sup>

- A reaction to a skin care product's ingredient may be localized to the face or eyes
- A reaction to poison ivy may be localized to the legs or hands
- A reaction to jewelry may be centralized around the neck or wrists

Common symptoms of contact dermatitis include<sup>1,2</sup>

- Dry, flaking, scaly skin (may crack, ooze clear fluid, or crust)
- Inflamed skin (may look pink, red, brown, purple, or gray depending on skin tone)
- Itching (may lead to intense scratching and even bleeding)
- Pain
- Redness
- Small blisters or wheals (itchy, red circles that have a white center)
- Swelling

**PAUSE AND PONDER:** What over-the-counter products are appropriate to suggest to a patient with a poison ivy rash?

## Diagnosis

Contact dermatitis often resolves once patients identify the trigger and avoid the substance going forward. With acute examples such as poison ivy, symptoms may resolve prior to a doctor's visit.

However, for persistent symptoms that warrant an office visit, clinicians diagnose contact dermatitis by evaluating symptoms based on appearance and duration. They consider factors such as

**Table 2. Common Risk Factors of Contact Dermatitis.**<sup>4,11,25</sup>

Characteristic	Those at Increased Risk
<b>Age</b>	<ul style="list-style-type: none"> <li>• Young children and infants. Contact dermatitis affects close to 20% of children.</li> </ul>
<b>Occupation</b>	<ul style="list-style-type: none"> <li>• Occupations with more exposure to irritants                             <ul style="list-style-type: none"> <li>• Cleaners</li> <li>• Construction/metal work</li> <li>• Cosmetology/hairdressing</li> <li>• Electronic industry</li> <li>• Farming</li> <li>• Food production/handling</li> <li>• Forestry/landscaping/florists</li> <li>• Healthcare</li> <li>• Mechanics</li> </ul> </li> </ul>
<b>Skin type</b>	<ul style="list-style-type: none"> <li>• People with red hair or thin skin (e.g., reduced thickness of epidermis/dermis, reduced keratinocytes, increased risk of skin tearing).</li> </ul>
<b>Comorbidities</b>	<ul style="list-style-type: none"> <li>• Other skin conditions, such as atopic dermatitis or psoriasis.</li> <li>• Genetic factors, such as the TNF-<math>\alpha</math> (-308 G/A) single nucleotide polymorphism or loss-of-function mutations in the FLG gene.</li> </ul>

**ABBREVIATIONS:** TNF- $\alpha$ , tumor necrosis factor-alpha; FLG, filaggrin

occupation and hobbies and use patch testing to confirm allergens.<sup>26</sup> Clinicians can perform skin biopsies to rule out additional skin conditions such as psoriasis and seborrheic dermatitis among others.<sup>2</sup>

During testing, clinicians apply small amounts of diluted allergens to the patient’s back under paper tape patches. After 48 hours, they remove the patches and evaluate the skin for signs of a reaction; the evaluation is repeated 72 to 96 hours later. A patch test helps identify chemicals or substances a patient is allergic to so they can be avoided in the future. The baseline patch test (baseline patch testing panels vary by geographic location, depending on the allergens available in each region) finds approximately 70% of allergens.<sup>2,3,28</sup>

The American Contact Dermatitis Society (ACDS) updated their “Core Allergen Series” in 2020 to increase the chances of finding the responsible agent in contact dermatitis cases. This series is a patch-test panel designed to provide clinicians a tool to identify clinically relevant allergens beyond the standard baseline series.<sup>29</sup>

Since job-specific allergies are common, patch testing is available for certain industries. For example, dermatologists and allergy specialists can use patches specific for florists or dental technicians. This expanded patch testing finds approximately 80% of allergens. Additional series may be applied based on the site of dermatitis, the suspected allergen exposure, and if patients bring their own products to be tested (may require dilution).<sup>27,28</sup>

Reactions to patch testing are graded for each allergen on a spectrum as seen in **Table 3**.

Positive reactions can be further classified based on their relevance or potential risk. A *current relevance* reaction indicates the identified allergen explains the patient’s present dermatitis. A *past relevance* reaction reflects an allergen responsible for a previous episode but not the current one. A *future relevance* reaction suggests sensitization to an allergen the patient is likely to encounter again. An *uncertain relevance* reaction identifies an allergen whose significance remains unclear until further investigation or inspection of the patient’s personal care or occupational exposures. Finally, a *potential cross-reaction* indicates that sensitivity to one allergen may cause a reaction to related substances.<sup>28</sup>

## TREATMENT OF CONTACT DERMATITIS

### Pharmacologic Treatment

Currently, no cure for contact dermatitis exists. However, a variety of over-the-counter (OTC) and prescription products can provide patients with symptom relief.

Clinicians tailor treatment based on contact dermatitis type, location, severity, and classification (acute versus chronic). Clinicians classify cases as extensive, severe, or disabling if they

involve over 20% of the total body surface area or involve the face, hands, feet, or genitalia.<sup>32</sup>

While pharmacologic treatment provides rapid symptom control, prevention is the mainstay of management for both ACD and ICD. ACD treatment usually involves topical corticosteroids or tacrolimus with added emollients, while ICD treatment focuses on consistent emollient use and topical corticosteroids (when necessary to control irritation).<sup>12,32</sup>

Providers must recognize that while topical corticosteroids may be used in ICD, evidence supporting their ability to restore the epithelial barrier remains limited. However, they may be prescribed for their anti-inflammatory properties. In ICD, ointments are generally preferred over creams as they are more occlusive. Formulations of products ordered from most to least occlusive are ointment, creams, lotions, and oils.<sup>12,33</sup> See the **SIDEBAR** on the following page for information on the uses and products that fall under each corticosteroid group.

For acute, localized ACD affecting the hands, feet, and nonflexural areas (areas of the body that do not naturally bend; e.g., the torso), treatment is a group I to III corticosteroid used once or twice daily for two to four weeks (treatment may be shorter if symptoms resolve).<sup>32</sup>

For acute, localized ACD affecting the face or flexural areas (areas of the body that naturally form folds; e.g., the elbow or knee joints), treatment is a group IV to VI corticosteroid used once or twice daily for one to two weeks and then tapered off over two weeks. If treatment duration must be longer than two weeks, topical tacrolimus is used twice daily until improvement and is then tapered off. If the contact dermatitis is resistant to other treatments, topical ruxolitinib is used once daily until symptom resolution.<sup>32</sup>

For extensive, severe, or disabling ACD, treatment is systemic corticosteroids. Prednisone is dosed at 0.5 mg/kg per day (or an equivalent dose, with a max daily dose of 60 mg/kg) for seven

**Table 3. Grading and Interpreting Results to a Patch Test**<sup>28,30,31</sup>

Symbol	Reaction	Presentation
-	Negative	No reaction
?	Doubtful	Faint erythema only
+	Weak positive reaction	Mild reaction: erythema, infiltration, and possible papules
++	Strong positive reaction	Strong reaction: erythema, infiltration, papules, and vesicles
+++	Extreme positive reaction	Very strong reaction: intense erythema, infiltration, blisters, and coalescing vesicles
IR	Irritant reaction	Irritant reaction of different types

## SIDEBAR: Groups of Corticosteroids<sup>34</sup>

Topical corticosteroids are grouped into seven classes based on their potency, ranging from superpotent (Group I) to least potent (Group VII). Potency affects both therapeutic efficacy and risk of adverse effects, making appropriate selection essential for safe and effective treatment.

- Group I (superpotent): used for thick, resistant plaques (e.g., clobetasol propionate 0.05%, halobetasol propionate 0.05%).
- Group II to III (high to medium-high potency): commonly used for less severe lesions or shorter treatment courses (e.g., betamethasone dipropionate 0.05%, fluocinonide 0.05%, triamcinolone acetonide 0.5%).
- Group IV to V (medium potency): appropriate for most body areas and moderate conditions (e.g., triamcinolone acetonide 0.1%, mometasone furoate 0.1%).
- Group VI to VII (low to least potent): preferred for sensitive areas such as the face, groin, or intertriginous areas (e.g., hydrocortisone 1%, desonide 0.05%).

days. This dose is then reduced by 50% for five to seven days and then tapered off over two weeks.<sup>32</sup>

For chronic ACD localized to the hands, feet, and nonflexural areas, treatment is a group I to III corticosteroid once daily for seven to 10 days, then once every other day.

For chronic ACD localized to the face and intertriginous (area where two skin areas may touch or rub together e.g., between digits or the armpit) areas and resistant to topical corticosteroids, treatment is topical tacrolimus used once or twice daily until symptom resolution. If it is resistant to other therapies, topical ruxolitinib is used once daily until symptom resolution.<sup>32</sup>

Last, for chronic ACD that is resistant to topical treatments, phototherapy (bath psoralen plus ultraviolet A photochemotherapy or narrowband ultraviolet B has demonstrated clinical improvement in chronic hand eczema cases), or systemic immunosuppressive medication (such as oral methotrexate, cyclosporine, mofetil, azathioprine, mycophenolate) are used.<sup>32</sup>

For mild, non-facial ICD, treatment is a group II or III corticosteroid that is used once or twice daily for two to four weeks. For severe, non-facial ICD, treatment is a group I corticosteroid used once or twice daily for two to four weeks. For facial or flexural ICD, treatment is a group IV to VI corticosteroid used once or twice daily for one to two weeks. Last, for chronic ICD with lichenification, treatment is petroleum jelly with or without a medium potency (group IV to V) corticosteroid overnight (under occlusion) for a few days.<sup>12</sup>

## Over-the-Counter Treatment

In addition to prescription products, patients can use several OTC options to manage ACD or ICD. OTC products are chosen based on the symptoms the patient wants to treat.

Cold compresses or antihistamines (such as cetirizine, diphenhydramine, or loratadine) may reduce itching. Pharmacists and pharmacy technicians can recommend calamine lotion or aluminum acetate to dry oozing lesions. Alternatively, patients can take oatmeal baths; this is helpful in cases where the lesions are widespread over the body. Emollients and moisturizers effectively reduce irritation and improve the skin barrier. Additionally, hydrocortisone cream or ointment can decrease inflammation.<sup>3,4,12</sup>

While people use the terms emollients and moisturizers interchangeably, knowing the distinction can prove useful when recommending products. Moisturizers help hydrate and maintain the skin's moisture balance. Emollients help soften and smooth the skin by forming a protective layer that reduces water loss. Often, emollients can be used as an ingredient in the formulation of a moisturizer.<sup>33</sup>

The two main types of emollients are occlusives and humectants. Occlusives create a lipophilic ("water-repelling") film on the skin's surface that acts as a barrier, helping to prevent moisture from evaporating from the outermost layer of the epidermis. Occlusives help skin retain moisture, but don't provide additional moisture. Examples of occlusives include petroleum jelly, lanolin, oil (mineral or vegetable), beeswax, ceramides, and liquid paraffin.<sup>12,33,35</sup> However, some patients may experience "lanolin allergy," which is a separate condition from contact dermatitis. Lanolin was the ACDS's 2023 "Allergen of the Year" and some patients should avoid this ingredient.<sup>36</sup>

Humectants are hydrophilic ("water-attracting") and draw in and hold moisture within the stratum corneum, functioning in a way similar to the skin's natural moisturizing factors found in corneocytes. Examples of humectants include glycerin, hyaluronic acid, urea, sorbitol, and propylene glycol.<sup>12,33,35</sup>

Consistent application throughout the day improves the efficacy of emollients. Reapplication after handwashing and before bedtime especially help maintain the skin barrier and prevent flare-ups.<sup>12</sup>

Moisturizers reduce skin dryness, scaling, and transepithelial water loss which helps maintain skin integrity, flexibility, and barrier function.<sup>33</sup> Moisturizers are primarily comprised of emollients, occlusives, and humectants but may contain additional ingredients such as fragrances, surfactants (cleansers), and preservatives. Some special formulations may include ingredients with antimicrobial, anti-itch, and anti-inflammatory functions.

Choosing the ideal product for a patient depends on the target allergies, the skin's condition and characteristics (inherent risk factors), and personal preference. Patients using a combination of prescription and OTC products may see symptom resolution within as early as one to two weeks.

## Prevention

Prevention is the mainstay treatment for both ACD and ICD. Patients can take several actions to help prevent contact dermatitis.

First, patients should identify and avoid known allergens and irritants to prevent possible reactions. Making lifestyle choices such as selecting hypoallergenic jewelry, changing hair or skin care products, and putting cloth covers on metal fasteners (e.g., a jean button) can minimize reactions.<sup>13,37</sup>

Patients can also improve and protect their skin barrier by continuously moisturizing and hydrating their skin. Various OTC products with different formulations allow patients to find a regimen that works best for their skin.<sup>12,37</sup>

Patients should wash skin exposed to the allergen or irritant immediately after exposure to remove the irritant (e.g., poison ivy, poison oak) that cause the reaction. Products like Tecnu cleanser, Zanfel cleanser, and Cutter scrub effectively remove urushiol oil (the component of poison ivy and poison oak that causes the red, itchy rash patients experience). Urushiol oil binds to skin proteins within 10 to 15 minutes so immediate use of these products is vital.<sup>13,37,38</sup>

Patients should also be mindful of pets. Sometimes, allergens can be carried from outside into the house by clinging to a pet's fur. If patients suspect their pet encountered an allergen (such as poison ivy), they should bathe the animal to reduce the risk of spreading it to people.<sup>13,37</sup>

Wearing gloves or protective clothing provides an excellent alternative for patients to avoid contact with irritants. This is especially vital for many occupational contact dermatitis cases. Barrier creams are another alternative that function to protect

skin from irritants. Barrier creams prevent penetration of hazardous materials into the skin. These products contain compounds such as glycerin, silicones, ceramides, squalene, petrolatum, and other water repelling compounds. Barrier creams should be applied to exposed skin two to three times per day.<sup>12,37</sup>

## ALLERGENS IN CONTACT DERMATITIS Common Causes of Allergic Contact Dermatitis

ACD is caused by a variety of common chemicals and substances. Common causes include<sup>11,13,32,37,39-43</sup>

- Excipients (propylene glycol, lanolin)
- Fragrances (limonene, linalool, fragrance mix 1, fragrance mix 2)
- Glues (acrylates)
- Hair dyes and hair care products (toluene-2,5-diamine sulfate, para-phenylenediamine, cetrimonium chloride, cetrimonium bromide)
- Latex (balloons)
- Medications (antibiotics, glucocorticoids, topical antihistamines)
- Metals (nickel, cobalt, and gold); commonly used in jewelry, buckles, clasps, buttons, etc.
- Personal care products such as body washes, cosmetics, and skin care products (panthenol, chlorphenesin, parabens, balsam of Peru, colophony [rosin])
- Plants (Toxicodendron genus is the most common; includes poison ivy, poison oak, and poison sumac)
- Preservatives (benzisothiazolinone, formaldehyde, methylisothiazolinone, quaternium-15)
- Surfactants (cocamidopropyl betadine, decyl glucosides)

This list is not exhaustive but serves as a strong starting point for identifying products or substances that may trigger ACD. As new cases are reported, experts continue to identify potential allergens, reflecting evolving exposure patterns and improving diagnostic awareness. Notably, toluene-2,5-diamine sulfate, a chemical commonly used in hair dye, was named the 2025 Allergen of the Year, highlighting its emerging significance in contact dermatitis.<sup>39</sup>



## Common Causes of Irritant Contact Dermatitis

ICD can be caused by a range of common chemicals and substances. Common causes include<sup>11,12,37,40</sup>

- Acids and alkalinizing agents (sulfuric acid, sodium hydroxide, ammonia)
- Adhesives
- Bleach, detergents, and solvents (benzene, toluene)
- Cosmetics
- Dust
- Fertilizers and pesticides
- Hair products
- Oxidizing agents (sodium hypochloride)
- Paints and varnishes
- Perfumes
- Personal care products
- Plant parts (thorns)
- Plastics
- Rubber gloves
- Soap
- Water

Pharmacy staff should recognize that certain products, such as hair and personal care items, can cause both ACD and ICD reactions. However, the underlying mechanisms and nature of the reactions differ between the two conditions.

## ALLERGEN ALTERNATIVES

Once an allergen has been identified, the most effective management strategy is avoidance. Because many ingredients appear under multiple names, careful review of product labels is essential. For example, balsam of Peru has several names including, but not limited to, *Balsamum peruvianum*, Black balsam, China oil, Indian balsam, *Myroxylon pereirae* Klotzsch resin, *Myroxylon pereirae* Klotzsch oil, and *Toluifera Pereira* balsam.<sup>44</sup>

Patients may need guidance selecting products that provide the desired symptom relief while avoiding their allergens. Many items contain suitable substitute ingredients and pharmacy staff can support patients by reviewing product labels for potential allergens.

For example, toluene-2,5-diamine sulfate is frequently used in hair dyes as a primary intermediate (main reactive dye precursor).<sup>45</sup> An alternative to this chemical is paraphenylenediamine.<sup>39</sup> Other strategies include replacing nickel-containing jewelry with sterling silver or titanium; selecting products preserved with phenoxyethanol or benzyl alcohol instead of chlorphenesin or parabens; choosing formulations that minimize preservatives through plant-derived alternatives or hydrosols; and opting for fragrance-free products to avoid balsam of Peru.<sup>46,47</sup>

It is also important that pharmacy staff understand various terminology used to describe products that would be better

suited for patients with allergies. Currently, no Food and Drug Administration regulated definition for the term “hypoallergenic” exists.<sup>48</sup> Therefore, terms such as “fragrance-free,” “noncomedogenic,” and “dermatologist-tested” are indicators of products that may be better suited for patients with allergies. Pharmacists and pharmacy technicians should notify patients that products with these terms may be more expensive. These products are often placed on lower shelves as they tend to sell slower compared to other popular, branded items.

Additionally, pharmacy staff can recommend swatch testing new products before use to minimize risk of a reaction. Patients can apply a quarter-sized amount of the new product on a spot of their skin where the product won't be washed away or rubbed off, such as the underside of the arm or the bend of the elbow. Patients should follow the instructions of the product to determine how long the product would normally stay on the skin (if the product [e.g., a cleanser] has no specific instructions, leave on the skin for five minutes). The product should be applied to this test spot twice daily for seven to ten days. If there is no reaction after this period, the patient can safely use the new product.<sup>49</sup>

## Common Allergen-Free Over-the-Counter Products

Finding allergen-free products or brands can be tricky, however online resources can alleviate this burden.

One helpful resource is the Contact Allergen Management Program (CAMP) created by the ACDS. CAMP is a web-based tool designed to help patients manage ACD and find personal care products that are safe for them to use. However, CAMP is an exclusive tool for ACDS members and their patients, so access may be limited for some healthcare providers.

In addition to using this resource, pharmacists and pharmacy technicians should counsel patients to always read and scrutinize product labels. One tool to navigate product labels and ingredients is [skinsafeproducts.com](https://www.skinsafeproducts.com). This website allows patients, providers, and pharmacy teams to scan barcodes or search products to determine if they contain ingredients a patient would react to. It's important to note this website does not have a filter for every possible allergen.



For example, consider Alvin, a 35-year-old man allergic to parabens and various fragrance mixes. He asks for help finding an aftershave and body lotion. Using the SkinSAFE website (skinsafeproducts.com) you identify that “Clubman Pinaud Reserve Aftershave, Whiskey Woods” is paraben-free and “Minimalist Body Lotion, Niacinamide 0.5%” is fragrance-free.

Pharmacy staff should always consider recommending a switch in product. For instance, if a patient has a small cut, pharmacists and pharmacy technicians can recommend petrolatum over bacitracin. Bacitracin was named the Contact Allergen of the Year for 2003 by the ACDS and patients have an increased risk of reaction with this product.<sup>50</sup> Pharmacy staff have the unique opportunity to help patients make safe and informed product changes.

One thing to keep in mind is that formulations change! A product may be safe the first time a person uses it, but it may not be safe the next time. It’s essential to ensure healthcare providers and pharmacy staff always verify the accuracy of all information they provide to each unique patient!

## CONCLUSION

Now that you’ve reviewed the key concepts of contact dermatitis, let’s revisit our opening case. To start, ask the patient clarifying questions such as

- When did the rash appear?
- Have you done anything out of the ordinary recently?
- Has your child started any new products?

You then discover the family went camping over the weekend. When this information is combined with the child’s current symptoms, poison ivy is the likely culprit. Suggesting OTC products such as calamine lotion (for lesions) and a cold compress or antihistamine (for itching) can help the manage the patient’s symptoms. However, it’s important to advise the mother to bring her child to the pediatrician if symptoms persist or worsen.

By identifying likely triggers, recommending appropriate symptomatic relief, and knowing when to refer the patient to seek additional medical attention, pharmacy staff can improve outcomes for patients with contact dermatitis.

**Figure 1** summarizes key points to remember.

**Figure 1. Working Well with Patients who have Contact Dermatitis**

**Best**

- ① **Be COMMUNITY CHAMPIONS** and whenever possible, talk about seasonal contact dermatitis risks with patients and community groups
- ② **Use online resources** like [skinsafeproducts.com](http://skinsafeproducts.com)
- ③ **Make it a point to look at the ACDS Contact Allergen of the Year** In January or February—it's a great way to keep learning!

**Better**

- ① **Remember that symptoms can't be cured** but they can be managed, so manage patient expectation
- ② **Always consider OTC and prescription drugs** as culprits, but don't forget plants and chemicals!
- ③ **Know your corticosteroids** and ask providers to step up to a stronger corticosteroid if patients need more relief

**Good**

- ① **Review the signs and symptoms** of contact dermatitis periodically to stay aware
- ② **Ask patients who have rashes or itching** what has changed in their routines or exposures
- ③ **Look at your shelves** and make a mental note of products that contain common allergens

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