



Handout on Health: Atopic Dermatitis (A type of eczema)

This publication is for people who have atopic dermatitis (often called “eczema”), parents and caregivers of children with atopic dermatitis, and others interested in learning more about the disease. The publication describes the disease and its symptoms and contains information about diagnosis and treatment, as well as current research efforts supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) and other components of the U.S. Department of Health and Human Services’ National Institutes of Health (NIH). It also discusses issues such as skin care and quality of life for people with atopic dermatitis. If you have further questions after reading this publication, you may wish to discuss them with your doctor or your child’s pediatrician.

- What Is Atopic Dermatitis?
- Who Has Atopic Dermatitis?
- Causes of Atopic Dermatitis
- Symptoms of Atopic Dermatitis
- Stages of Atopic Dermatitis
- Diagnosing Atopic Dermatitis
- Treatment of Atopic Dermatitis
- Atopic Dermatitis and Vaccination Against Smallpox
- What Research Is Being Conducted on Atopic Dermatitis?
- Hope for the Future

Information Boxes

- Skin Features Associated With Atopic Dermatitis
- Common Irritants
- Treating Atopic Dermatitis in Infants and Children
- Controlling Atopic Dermatitis

What Is Atopic Dermatitis?

Atopic dermatitis is a chronic (long-lasting) disease that affects the skin. It is not contagious; it cannot be passed from one person to another. The word “dermatitis” means inflammation of the skin. “Atopic” refers to a group of diseases in which there is often an inherited tendency to develop other allergic conditions, such as asthma and hay fever. In atopic dermatitis, the skin

becomes extremely itchy. Scratching leads to redness, swelling, cracking, “weeping” clear fluid, and finally, crusting and scaling. In most cases, there are periods of time when the disease is worse (called exacerbations or flares) followed by periods when the skin improves or clears up entirely (called remissions). As some children with atopic dermatitis grow older, their skin disease improves or disappears altogether, although their skin often remains dry and easily irritated. In others, atopic dermatitis continues to be a significant problem in adulthood.

Atopic dermatitis is often referred to as “eczema,” which is a general term for the several types of inflammation of the skin. Atopic dermatitis is the most common of the many types of eczema. Several have very similar symptoms.

Who Has Atopic Dermatitis?

Atopic dermatitis is very common. It occurs equally in males and females and affects an estimated 30 percent of people in the United States. Although atopic dermatitis may occur at any age, it most often begins in infancy and childhood. Onset after age 30 is less common and is often caused by exposure of the skin to harsh or wet conditions. People who live in cities and in dry climates appear more likely to develop this condition.

Causes of Atopic Dermatitis

The cause of atopic dermatitis is not known, but the disease seems to result from a combination of genetic (hereditary) and environmental factors.

Children are more likely to develop this disorder if a parent has had it or another atopic disease like asthma or hay fever. If both parents have an atopic disease, the likelihood increases. Although some people outgrow skin symptoms, many children with atopic dermatitis go on to develop hay fever or asthma. Environmental factors can bring on symptoms of atopic dermatitis at any time in affected individuals.

Atopic dermatitis is also associated with malfunction of the body’s immune system: the system that recognizes and helps fight bacteria and viruses that invade the body. The immune system can become misguided and create inflammation in the skin, even in the absence of a major infection. This can be viewed as a form of autoimmunity, where a body reacts against its own tissues.

In the past, doctors thought that atopic dermatitis was caused by an emotional disorder. We now know that emotional factors, such as stress, can make the condition worse, but they do not cause the disease.

Symptoms of Atopic Dermatitis

Symptoms (signs) vary from person to person. The most common symptoms are dry, itchy skin and rashes on the face, inside the elbows and behind the knees, and on the hands and feet. Itching is the most important symptom of atopic dermatitis. Scratching and rubbing in response to

itching irritates the skin, increases inflammation, and actually increases itchiness. Itching is a particular problem during sleep when conscious control of scratching is lost.

The appearance of the skin that is affected by atopic dermatitis depends on the amount of scratching and the presence of secondary skin infections. The skin may be red and scaly or thick and leathery, contain small raised bumps, or leak fluid and become crusty and infected. The box below lists common skin features of the disease. These features can also be found in people who do not have atopic dermatitis or who have other types of skin disorders.

Skin Features Associated With Atopic Dermatitis

- **Atopic pleat (Dennie-Morgan fold)**—an extra fold of skin that develops under the eye
- **Cheilitis**—inflammation of the skin on and around the lips
- **Hyperlinear palms**—increased number of skin creases on the palms
- **Hyperpigmented eyelids**—eyelids that have become darker in color from inflammation or hay fever
- **Ichthyosis**—dry, rectangular scales on the skin
- **Keratitis pilaris**—small, rough bumps, generally on the face, upper arms, and thighs
- **Lichenification**—thick, leathery skin resulting from constant scratching and rubbing
- **Papules**—small raised bumps that may open when scratched and become crusty and infected
- **Urticaria**—hives (red, raised bumps) that may occur after exposure to an allergen, at the beginning of flares, or after exercise or a hot bath.

Atopic dermatitis may also affect the skin around the eyes, the eyelids, and the eyebrows and lashes. Scratching and rubbing the eye area can cause the skin to redden and swell. Some people with atopic dermatitis develop an extra fold of skin under their eyes. Patchy loss of eyebrows and eyelashes may also result from scratching or rubbing.

Researchers have noted differences in the skin of people with atopic dermatitis that may contribute to the symptoms of the disease. The outer layer of skin, called the epidermis, is divided into two parts: an inner part containing moist, living cells, and an outer part, known as the horny layer or stratum corneum, containing dry, flattened, dead cells. Under normal conditions the stratum corneum acts as a barrier, keeping the rest of the skin from drying out and protecting other layers of skin from damage caused by irritants and infections. When this barrier is damaged, irritants act more intensely on the skin.

The skin of a person with atopic dermatitis loses moisture from the epidermal layer, allowing the skin to become very dry and reducing its protective abilities. Thus, when combined with the abnormal skin immune system, the person's skin is more likely to become infected by bacteria or viruses.

Stages of Atopic Dermatitis

When atopic dermatitis occurs during infancy and childhood, it affects each child differently in terms of both onset and severity of symptoms. In infants, atopic dermatitis typically begins around 6 to 12 weeks of age. It may first appear around the cheeks and chin as a patchy facial rash, which can progress to red, scaling, oozing skin. The skin may become infected. Once the infant becomes more mobile and begins crawling, exposed areas, such as the inner and outer

parts of the arms and legs, may also be affected. An infant with atopic dermatitis may be restless and irritable because of the itching and discomfort of the disease.

In childhood, the rash tends to occur behind the knees and inside the elbows; on the sides of the neck; around the mouth; and on the wrists, ankles, and hands. Often, the rash begins with papules that become hard and scaly when scratched. The skin around the lips may be inflamed, and constant licking of the area may lead to small, painful cracks in the skin around the mouth.

In some children, the disease goes into remission for a long time, only to come back at the onset of puberty when hormones, stress, and the use of irritating skin care products or cosmetics may cause the disease to flare.

Although a number of people who developed atopic dermatitis as children also experience symptoms as adults, it is also possible for the disease to show up first in adulthood. The pattern in adults is similar to that seen in children; that is, the disease may be widespread or limited to only a few parts of the body.

Diagnosing Atopic Dermatitis

Each person with atopic dermatitis experiences a unique combination of symptoms, which may vary in severity over time. The doctor will base a diagnosis on the symptoms the patient experiences and may need to see the patient several times to make an accurate diagnosis and to rule out other diseases and conditions that might cause skin irritation. In some cases, the family doctor or pediatrician may refer the patient to a dermatologist (doctor specializing in skin disorders) or allergist (allergy specialist) for further evaluation.

A medical history may help the doctor better understand the nature of a patient's symptoms, when they occur, and their possible causes. The doctor may ask about family history of allergic disease; whether the patient also has diseases such as hay fever or asthma; and about exposure to irritants, sleep disturbances, any foods that seem to be related to skin flares, previous treatments for skin-related symptoms, and use of steroids or other medications.

Currently, there is no single test to diagnose atopic dermatitis. However, there are some tests that can give the doctor an indication of allergic sensitivity.

Pricking the skin with a needle that contains a small amount of a suspected allergen may be helpful in identifying factors that trigger flares of atopic dermatitis. Negative results on skin tests may help rule out the possibility that certain substances cause skin inflammation. Positive skin prick test results are difficult to interpret in people with atopic dermatitis because the skin is very sensitive to many substances, and there can be many positive test sites that are not meaningful to a person's disease at the time. Positive results simply indicate that the individual has immunoglobulin E or IgE (allergic) antibodies to the substance tested. IgE controls the immune system's allergic response and is often high in atopic dermatitis.

Common Irritants

- Wool or synthetic fibers
- Soaps and detergents
- Some perfumes and cosmetics
- Substances such as chlorine, mineral oil, or solvents
- Dust or sand
- Cigarette smoke.

Treatment of Atopic Dermatitis

The two main goals in treating atopic dermatitis are healing the skin and preventing flares. It is important for the patient and family members to note any changes in the skin's condition in response to treatment, and to be persistent in identifying the treatment that seems to work best.

Medications: A variety of medications are used to treat atopic dermatitis.

Corticosteroid creams and ointments have been used for many years to treat atopic dermatitis and other autoimmune diseases affecting the skin.

When topical corticosteroids are not effective, the doctor may prescribe a systemic corticosteroid, which is taken by mouth or injected instead of being applied directly to the skin. Typically, these medications are used only in resistant cases and only given for short periods of time.

Certain antihistamines that cause drowsiness can reduce nighttime scratching and allow more restful sleep when taken at bedtime. This effect can be particularly helpful for patients whose nighttime scratching makes the disease worse.

Topical calcineurin inhibitors decrease inflammation in the skin and help prevent flares. Barrier repair moisturizers reduce water loss and work to rebuild the skin.

Phototherapy: Use of ultraviolet A or B light waves, alone or combined, can be an effective treatment for mild to moderate dermatitis. If the doctor thinks that phototherapy may be useful to treat the symptoms of atopic dermatitis, he or she will use the minimum exposure necessary and monitor the skin carefully.

Treating Atopic Dermatitis in Infants and Children

- Give lukewarm baths.
- Apply moisturizer immediately following the bath.
- Keep child's fingernails filed short.
- Select soft cotton fabrics when choosing clothing.
- Consider using sedating antihistamines to promote sleep and reduce scratching at night.
- Keep the child cool; avoid situations where overheating occurs.
- Learn to recognize skin infections and seek treatment promptly.
- Attempt to distract the child with activities to keep him or her from scratching.
- Identify and remove irritants and allergens.

Skin care: Healing the skin and keeping it healthy are important to prevent further damage and enhance quality of life. Developing and sticking with a daily skin care routine is critical to preventing flares.

A lukewarm bath helps to cleanse and moisturize the skin without drying it excessively. Because soaps can be drying to the skin, the doctor may recommend use of a mild bar soap or nonsoap cleanser. Bath oils are not usually helpful.

After bathing, a person should air-dry the skin, or pat it dry gently (avoiding rubbing or brisk drying), and then apply a moisturizer to seal in the water that has been absorbed into the skin during bathing. A moisturizer increases the rate of healing and establishes a barrier against further drying and irritation. Lotions that have a high water or alcohol content evaporate more quickly, and alcohol may cause stinging. Creams and ointments work better at healing the skin.

Protection from allergen exposure: The doctor may suggest reducing exposure to a suspected allergen. For example, the presence of the house dust mite can be limited by encasing mattresses and pillows in special dust-proof covers, frequently washing bedding in hot water, and removing carpeting. However, there is no way to completely rid the environment of airborne allergens.

Changing the diet may not always relieve symptoms of atopic dermatitis. A change may be helpful, however, when the medical history, laboratory studies, and specific symptoms strongly suggest a food allergy. It is up to the patient and his or her family and physician to decide whether the dietary restrictions are appropriate. Unless properly monitored by a physician or dietitian, diets with many restrictions can contribute to serious nutritional problems, especially in children.

Stress Management: Stress management and relaxation techniques may help decrease the likelihood of flares. Developing a network of support that includes family, friends, health professionals, and support groups or organizations can be beneficial.

Atopic Dermatitis and Vaccination Against Smallpox

Although scientists are working to develop safer vaccines, individuals diagnosed with atopic dermatitis (or eczema) should not receive the current smallpox vaccine. According to the Centers for Disease Control and Prevention (CDC), a U.S. Government organization, individuals who have ever been diagnosed with atopic dermatitis, even if the condition is mild or not presently active, are more likely to develop a serious complication if they are exposed to the virus from the smallpox vaccine.

During a smallpox outbreak, these vaccination recommendations may change. People with atopic dermatitis who have been exposed to smallpox should consult their doctor about vaccination. They should also find out what precautions to take if they have close contact with someone who has recently received the vaccine.

Additional information about atopic dermatitis and smallpox vaccination is available from the CDC. (See the For More Information section.)

What Research Is Being Conducted on Atopic Dermatitis?

Researchers supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) and other institutes of the National Institutes of Health (NIH) are gaining a better understanding of what causes atopic dermatitis and how it can be managed, treated, and, ultimately, prevented. Some promising avenues of research are described below.

Genetics: Although atopic dermatitis runs in families, the role of genetics (inheritance) remains unclear. It does appear that more than one gene is involved in the disease.

Research has helped shed light on the way atopic dermatitis is inherited. Studies show that children are at increased risk for developing the disorder if there is a family history of other atopic disease, such as hay fever or asthma. The risk is significantly higher if both parents have an atopic disease. In addition, a person whose fraternal (nonidentical) twin has atopic dermatitis is three times more likely to have atopic dermatitis than someone in the general population. Studies of identical twins show that a person whose identical twin has atopic dermatitis is even more likely to have atopic dermatitis than someone in the general population. These findings suggest that genes play an important role in determining who gets the disease.

Also, scientists have discovered mutations in a certain gene that plays a role in the production of a protein called filaggrin. The filaggrin protein is normally found in the outermost layer of the skin and functions as a component of the skin barrier. The gene mutation disrupts filaggrin's ability to maintain a normal skin barrier and appears to be a genetic factor that predisposes people to develop atopic dermatitis and other diseases in which the skin barrier is compromised.

Researchers are hoping to answer more questions about genetics and determine what other genes are responsible for predisposing people to develop atopic dermatitis.

Skin development and maintenance: Discoveries about how the body creates and maintains skin will be helpful in searching for causes and treatments for diseases like atopic dermatitis in which the skin barrier breaks down. Investigators are trying to find out if drugs that are already on the market can help repair the skin barrier.

For babies that may be at high risk for developing atopic dermatitis, investigators are trying to find out what effects moisturizers may have if applied in infancy before symptoms appear.

Understanding itch: One of the most difficult symptoms of atopic dermatitis, itching, is being studied to determine what mechanisms trigger the sensation of itch. Researchers are studying how the nervous system and the immune system communicate to cause the inflammation, itch, and pain seen in atopic dermatitis.

Immune system imbalance: Researchers are trying to see what factors play a role in the immune response, causing inflammation like that seen in atopic dermatitis. Also, investigators are studying the skin microbiome, the microorganisms that normally live on the skin, to see how it plays a role in keeping skin healthy or contributes to atopic dematitis.

Controlling Atopic Dermatitis

- Prevent scratching or rubbing whenever possible.
- Protect skin from excessive moisture, irritants, and rough clothing.
- Maintain a cool, stable temperature and consistent humidity levels.
- Limit exposure to dust, cigarette smoke, pollens, and animal dander.
- Recognize and limit emotional stress.

More information on research is available from the following websites:

- **NIH Clinical Research Trials and You** was designed to help people learn more about clinical trials, why they matter, and how to participate. Visitors to the website will find information about the basics of participating in a clinical trial, first-hand stories from clinical trial volunteers, explanations from researchers, and links on how to search for a trial or enroll in a research-matching program.
- **ClinicalTrials.gov** offers up-to-date information for locating federally and privately supported clinical trials for a wide range of diseases and conditions.
- **NIH RePORTER** is an electronic tool that allows users to search a repository of both intramural and extramural NIH-funded research projects from the past 25 years and access publications (since 1985) and patents resulting from NIH funding.
- **PubMed** is a free service of the U.S. National Library of Medicine that lets you search millions of journal citations and abstracts in the fields of medicine, nursing, dentistry, veterinary medicine, the health care system, and preclinical sciences.

Hope for the Future

Although the symptoms of atopic dermatitis can be difficult and uncomfortable, the disease can be successfully managed. People with atopic dermatitis can lead healthy, productive lives. As scientists learn more about atopic dermatitis and what causes it, they continue to move closer to effective treatments, and perhaps, ultimately, a cure.

For More Information

**National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
Information Clearinghouse
National Institutes of Health**

1 AMS Circle
Bethesda, MD 20892-3675
Phone: 301-495-4484
Toll free: 877-22-NIAMS (877-226-4267)
TTY: 301-565-2966
Fax: 301-718-6366
Email: NIAMSinfo@mail.nih.gov
Website: <https://www.niams.nih.gov>

If you need more information about available resources in your language or another language, please visit our website or contact the NIAMS Information Clearinghouse at NIAMSinfo@mail.nih.gov.

Other Resources

National Institute of Allergy and Infectious Diseases

Website: <http://www.niaid.nih.gov/topics/eczema/Pages/default.aspx>

American Academy of Dermatology

Website: <http://www.aad.org>

American Academy of Allergy, Asthma, and Immunology

Website: <http://www.aaaai.org>

National Eczema Association

Website: <http://www.nationaleczema.org>

Food Allergy Research & Education

Website: <http://www.foodallergy.org>

Acknowledgments

The NIAMS gratefully acknowledges the assistance of the following individuals in the preparation and review of the original version of this publication: Joanne Cono, M.D., Sc.M., Centers for Disease Control and Prevention, Atlanta, GA; Kevin Cooper, M.D., Case Western Reserve University, University Hospitals of Cleveland, Cleveland, OH; Jon Hanifin, M.D., Oregon Health & Science University, Portland, OR; Donald Leung, M.D., Ph.D., National Jewish Medical and Research Center, Denver, CO; Alan Moshell, M.D., NIAMS/NIH; Amy Paller, M.D., Children's Hospital of Chicago, Chicago, IL; Hugh Sampson, M.D., Mount Sinai School of Medicine, New York, NY; Maria Turner, M.D., National Cancer Institute, NIH; and LaDonna Williams, Inflammatory Skin Disease Institute, Newport News, VA.

The mission of the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), a part of the U.S. Department of Health and Human Services' National Institutes of Health (NIH), is to support research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases; the training of basic and clinical scientists to carry out this research; and the dissemination of information on research progress in these diseases. The NIAMS Information Clearinghouse is a public service sponsored by NIAMS that provides health information and information sources. Additional information can be found on the NIAMS website at www.niams.nih.gov.

For Your Information

This publication contains information about medications used to treat the health condition discussed here. When this publication was developed, we included the most up-to-date (accurate) information available. Occasionally, new information on medication is released.

For updates and for any questions about any medications you are taking, please contact

U.S. Food and Drug Administration

Toll free: 888-INFO-FDA (888-463-6332)

Website: <http://www.fda.gov>

For additional information on specific medications, visit Drugs@FDA at <http://www.accessdata.fda.gov/scripts/cder/daf/>. Drugs@FDA is a searchable catalog of FDA-approved drug products.

For updates and questions about statistics, please contact

Centers for Disease Control and Prevention, National Center for Health Statistics

Toll free: 800-232-4636

Website: <http://www.cdc.gov/nchs>

This publication is not copyrighted. Readers are encouraged to duplicate and distribute as many copies as needed.

Additional copies of this publication are available from:

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) Information Clearinghouse National Institutes of Health

1 AMS Circle

Bethesda, MD 20892-3675

Phone: 301-495-4484

Toll free: 877-22-NIAMS (877-226-4267)

TTY: 301-565-2966

Fax: 301-718-6366

Email: NIAMSinfo@mail.nih.gov

Website: <https://www.niams.nih.gov>

NIH Publication No. 16-4272