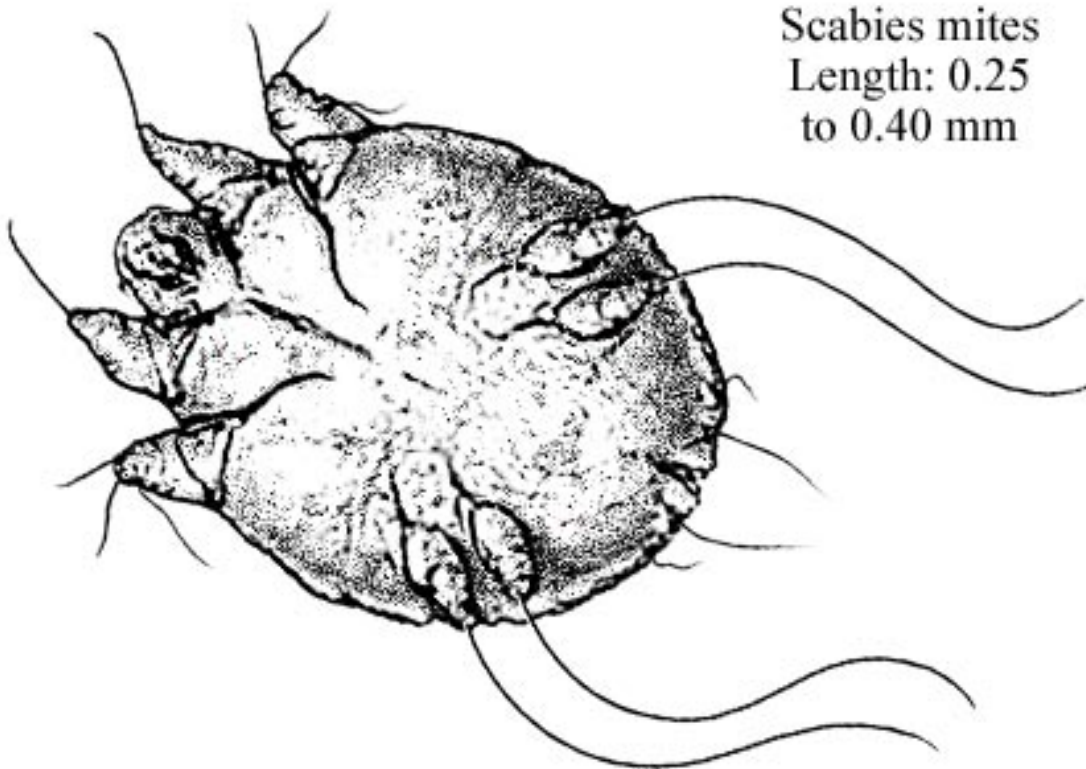




Georgia Department of Public Health

SCABIES HANDBOOK



Scabies mites
Length: 0.25
to 0.40 mm

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Introduction

Scabies is a common communicable skin infestation caused by a mite. This mite, *Sarcoptes scabiei*, is sometimes known as the human itch or mange mite due to the intense itching caused when the pregnant female mite burrows into the top layer of skin and lays eggs.

Based on archeological evidence, including Egyptian drawings depicting people afflicted with signs of scabies, scabies is estimated to have been an infestation of humans for at least 2,500 years. There are many controversial accounts of the history of discovery of the infectious agent. Prior to the 17th century, the condition of scabies was known by many names and widely believed to be a humoral disease, possibly associated with a mite. Humoral diseases were part of an ancient theory that held that health came from balance between the bodily liquids. These liquids were termed humors. Disease arose when imbalance occurred between the humors. The term scabies is believed to be derived from the Latin term scabere, which means to scratch, or possibly from the term scabs, which are secondary to bacterial infection.

It is estimated that more than 300 million cases of scabies occur worldwide every year. Anyone who has had contact with the mite can catch scabies. Scabies infestations can affect people from all socioeconomic levels without regard to age, sex, race or standards of personal hygiene. Scabies spreads rapidly under crowded conditions where there is frequent skin-to-skin contact between people, such as hospitals, institutions, child-care facilities, and nursing homes. In young, healthy persons scabies is generally considered to be more of a nuisance than a disease. In elderly persons, or those who are immunocompromised, scabies is generally not diagnosed until cutaneous (skin) lesions and symptoms are apparent. Because of the long incubation period, many people can be exposed to scabies before the infested person is diagnosed.

The purpose of this manual is to provide schools, local health departments,

Healthcare facilities, and other group settings a comprehensive guide to identify, treat, manage, and prevent scabies infestations. This handbook was designed to serve as a universal guide, providing technical information about scabies as well as a quick reference.

Biology

Life Cycle

The *Sarcoptes scabiei* mite (Figure 1) is an obligate parasite that lives in the skin. The adults are small (females 0.3 to 0.4 mm, males 0.25 to 0.35 mm in length) and rounded in shape, with tiny pointed spines on their dorsal surface that assist them in burrowing. *Sarcoptes scabiei* undergoes 4 stages in its life cycle; egg, larva, nymph and adult.

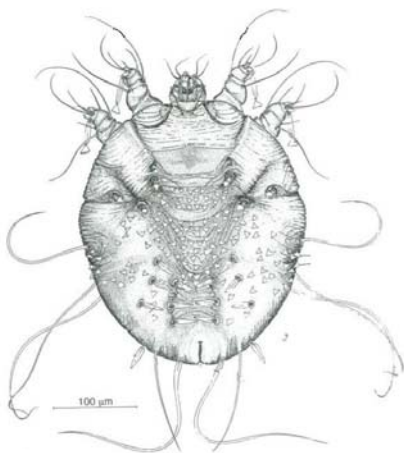


Figure 1: Scabies mite (D.S. Kettle)

The adult mites can crawl rapidly on the surface of the skin, with females traveling up to 2.5 cm/min (~1 in/min). Upon finding a suitable site, the female mite burrows into the skin, completely disappearing beneath the surface in about an hour. A saliva-like substance is secreted by the mite to aid in burrowing by dissolving the skin. Male and female mites mate within these burrows, after which the impregnated female emerges and excavates a permanent burrow in which to lay her eggs; the male mite dies. The female mite will spend the rest of her life (commonly 30-60 days) in this permanent burrow and will continue to extend the length of the burrow, usually burrowing a total length of 1 cm (~½ inch) or more.

Shortly after digging her permanent burrow, the female mite begins laying eggs, producing 2 or 3 each day. The eggs hatch in 3-4 days, and within one day of hatching, the larvae begin actively crawling out of the burrow towards the surface of the skin. They then excavate shallow burrows in which they feed and molt to nymphs

about 3 days later. The nymphs return to the skin surface or dig just beneath the surface, where they molt to adults in 3-4 days. The developmental time from egg to adult typically takes about 10 days for males and 14 days for females (Figure 2, top). Male mites live only 1-2 days and spend this time seeking out unmated females.

Although a female mite can lay as many as 180 eggs in her life time, fewer than 10% of her offspring live long enough to hatch and reach the adult stage. Most eggs are removed from the skin by bathing, scratching, or rubbing of the skin. Once away from the human body, mites do not survive more than 48-72 hours.

Sarcoptes scabiei infestation is specific to humans and is different from the mite infestations that affect dogs and other animals, which are more commonly known as mange. Mites from mange-infested animals can burrow into human skin but cannot reproduce, so they die within a few days.

Habits and Habitat

The most frequent *S. scabiei* burrow sites are in the folds of skin around the wrists and in the webbing between the fingers. Other common sites are the elbows, feet, and ankles; axillae; buttocks; genital regions; and for women, breasts (Figure 2, bottom). The location of burrows in infants and young children differs somewhat from that of adults, commonly involving the palms, sides, soles of the feet, and the head and neck region. Rashes may also occur on other parts of the body and are often caused by the burrowing of immature stages and unfertilized female mites. Unlike adults, children often develop rashes on the face, chest and back. Feeding activity and host immune system response to mite secretions and fecal matter are the sources of irritation that lead to scratching, scabbing, and subsequent secondary infections.

The severity of scabies infestation is directly related to the number of mites residing on the skin and the length of time between initial infestation and subsequent diagnosis and treatment. Fewer than 10-15 mites may be present on an infested person who is otherwise healthy.

If diagnosis and treatment are delayed, the number of live mites multiplies resulting in heavier or atypical infestations.

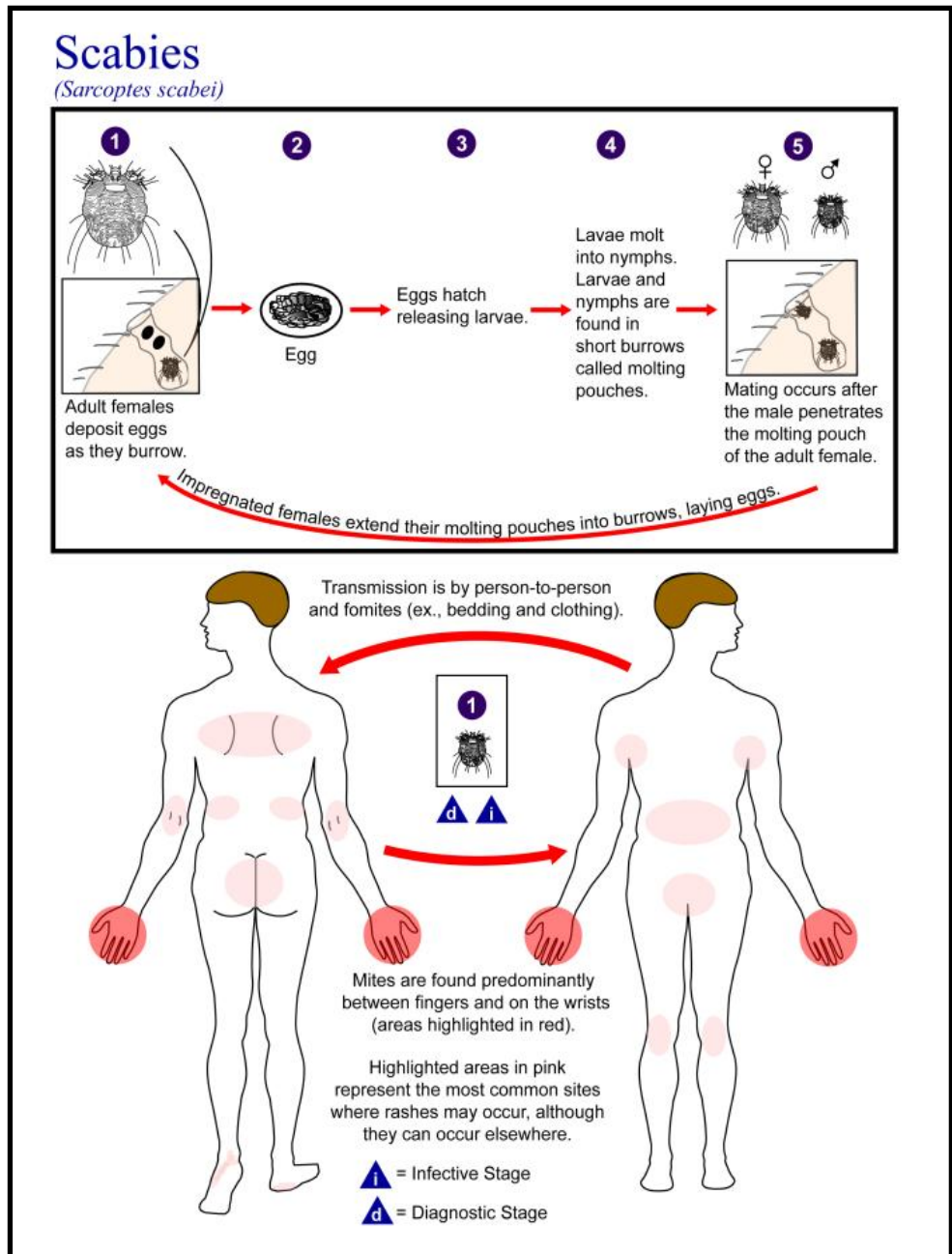


Figure 2: Scabies Life Cycle & Transmission (CDC)

Keratotic or crusted scabies, sometimes referred to as Norwegian scabies, was first described in persons diagnosed with leprosy in Norway. This severe form of scabies occurs when treatment for infestation has been delayed for many months or when a person is immunocompromised, and is characterized by thick, crusted lesions. Imbedded within these crusts are thousands to millions of live mites.

There are several physiological and immunological factors that influence the progression of infestation. Persons diagnosed with renal failure, insulin dependent diabetes, or severe mental retardation may progress from typical to atypical scabies in a shorter period of time than healthy persons. Crusted scabies is more commonly associated with persons diagnosed with acquired immunodeficiency syndrome (AIDS), T cell leukemia and those who are receiving steroids or immunosuppressive therapy.

Transmission

The most common means of scabies transmission is by direct contact between individuals when the mites are crawling on the skin surface. This contact needs to be direct, prolonged skin-to-skin contact for scabies to be transmitted (a quick handshake or hug will not usually spread the infestation). Because scabies often spreads during the close physical contact of sexual activity, it is sometimes classified as a sexually transmitted disease. However, scabies is more usually passed from person to person in settings where people live in close quarters, including hospitals, nursing homes, prisons, child care facilities, and institutions.

Scabies transmission can also occur via prolonged contact with bed linen, clothing, and other fabrics from infested hosts. The mites are able to survive 2-3 days at room temperatures when the relative humidity is more than 30%; the higher the relative humidity, the higher the survival rate. Larvae of *S. scabiei* can hatch from eggs deposited off the host and infest fomites (inanimate objects that may be contaminated with infectious organisms and serve in their transmission) for up to 7 days. Indirect transfer from fomites is not common and usually only occurs if fomites are contaminated by infested hosts immediately beforehand. The role of any inanimate objects will play little, if any, role in the transmission of scabies if the infestation is typical. However, if the infestation is atypical or has progressed to the crusted stage, the environment may harbor mites and contribute to transmission.

A person is considered infectious from the time he/she becomes infested until treatment is successfully completed. Linens and clothing are considered infectious until treatment is completed or until 2 weeks after the last known exposure. Reinfestation does occur, and after treatment a person may unknowingly become reinfested through exposure to the primary source of infestation or contact with a different infested source.

Identification, Diagnosis, and Treatment of Scabies

Identification

When a person is infested with scabies mites for the first time, there is usually little evidence of infestation for the first month (range 2 to 6 weeks). After this time, and in subsequent infestations, people can become sensitized to mites and noticeable symptoms generally occur within 1 to 4 days. The earliest and most common symptom of scabies is intense itching over most of the body, especially at night. This itching can occur in areas where mites are undetectable. The accompanying itching usually leads to scratching and excoriation of the affected areas, contributing to an eczema-like condition. Secondary bacterial infection can occur due to the excoriation of the skin.

Another obvious sign of scabies infestation is a rash of the skin that can appear as red bumps, burrows (short, wavy thread-like lines in the skin) or pimple-like irritations. In infants, the rash can present as vesicles/fluid filled blisters. The scabies rash typically affects the hands, the webbing between fingers, skin folds at the wrists, knees, elbows, underarms, waist or buttocks; the genitalia; the breasts/nipples; and the shoulder blades. In children younger than 2 years old, the rash can extend to the neck, head, palms, and soles of the feet. Due to the vigorous scratching caused by the itching, scratch marks may cover up the typical appearance of the rash.

In some cases, a person with scabies develops skin nodules rather than a rash. These nodules can be up to 5 millimeters (1/4 inch) wide, and they usually occur on skin that is covered by clothing, such as the trunk and upper legs.

Diagnosis

Most diagnoses of scabies infestation are made based upon the appearance and distribution of the rash and the presence of burrows. Some common testing methods are:

- Microscopic exam of scrapings from suspicious lesions - Scrapings are placed on a slide and examined under a microscope for *S. scabiei* mites
- Burrow Ink Test (BIT) - The suspicious area is rubbed with ink, which is then wiped off. If infestation has occurred, the characteristic zigzag or S pattern of the burrow across the skin will appear.
- Topical tetracycline solution - A topical tetracycline solution may be applied to the suspicious area as an alternative to the BIT. The excess solution is wiped off the area with alcohol and examined under a special light to identify the characteristic zigzag or S pattern of the burrow.
- Shave biopsy - A fine layer of skin is shaved off at the possible site of infestation and examined under a microscope for evidence of mite infestation.
- Needle extraction of mites - A needle is inserted into the length of the burrow and the mite is extracted with the needle and placed on a slide to be examined under a microscope.

The diagnosis of scabies can be especially difficult in elderly persons living in long term care facilities. Their skin is generally dry and scaly and there may be pre-existing, chronic dermatological conditions for which oral or topical steroids have been prescribed. Usually, the first indication that a scabies infestation is evolving is complaints of itching and new onset of a rash by one or more residents within a period of 5-12 days. Exposed health care workers, volunteers and frequent visitors may also complain of itching and rash at about the same time. Skin scrapings, when

performed properly, will almost always be positive in persons suspected of having atypical or crusted scabies. However, newly infested persons are more likely to have typical scabies and skin scrapings, even when repeated several times at different sites, may be negative. However, even if a skin scraping or biopsy is negative, it is possible that a person is still infested. Typically, there are fewer than 10-15 mites on the entire body of the infested person, which makes it easy for an infestation to be missed.

Differential Diagnoses

As the infestation progresses, the rash may mimic other dermatological conditions. These conditions include eczema, drug reaction, impetigo, folliculitis, dermatitis herpetiformis, pyoderma, tinea, pityriasis, psoriasis, syphilis, mycosis fungoides, lupus, acute urticaria, insect bites, and contact dermatitis. Excoriated skin lesions may become infected with microorganisms such as *Staphylococcus aureus* or beta hemolytic streptococci. This may contribute to the misdiagnosis of scabies because physicians may attribute the acute inflammatory condition to pyoderma as opposed to a secondary bacterial infection associated with scabies. The following diseases and conditions may have signs and symptoms similar to scabies:

- Acute urticaria: eruption of itching papules, usually systemic
- Allergies: hypersensitive reaction induced by allergen exposure
- Atopic dermatitis: inflammation of skin resulting from a genetically determined state of hypersensitivity
- Contact dermatitis: inflammation of skin resulting from direct allergen or irritant contact
- Dermatitis herpetiformis: reoccurring and chronic itching of vesicles and/or papule eruptions caused by Dühring's disease
- Eczema: generic term for inflammatory conditions of the skin
- Folliculitis: inflammation of hair follicles
- Fungal infections: unusual multiplication of molds and/or yeast organisms in or on the body

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- Impetigo: bacterial infection of the skin resulting in tiny blisters
- Insect bites: itchy bumps resulting from the bite of an insect
- Lupus “rash”: red or purple lesions of the skin
- Mycosis fungoides: cutaneous T-cell lymphoma affecting the skin
- Neurodermatitis: chronic form of scaly and/or itchy skin
- Pityriasis: large, scaly, pink skin patches of rash-like appearance
- Psoriasis: itchy, dry, cracked, and/or blistering of skin caused by a chronic autoimmune disease
- Pyoderma: infection of the skin
- Syphilis: rough, red, or reddish-brown spots or rash resulting from the secondary stage of syphilis infection
- Tinea: inflamed, scaly skin caused by a fungal infection; “ringworm”
- Vasculitis: red or purple lumps and/or rash caused by inflammation of blood vessels

Treatment

Once diagnosed, it is essential that scabies treatment is properly completed. With proper treatment, the rash and intense itching of scabies usually begins to subside within one to two days, although some milder itching can persist for a few weeks post treatment. No new burrows or rashes should appear 24-48 hours after effective treatment.

There are several prescription options for treating scabies, many in topical form. There is no nonprescription medication that can cure a scabies infestation. The choice of a specific medication is influenced by a person’s age, pregnancy status, the presence of coexisting skin conditions and medical history. When treating scabies infestations, always follow the directions provided by your physician or in the package insert. All products must be used strictly in accordance with label directions to ensure effectiveness and prevent adverse reactions from overuse or misuse. Common treatments (scabicides) are listed below:

Recommended Treatment:

- **5% permethrin cream (Elimite®)**

The recommended treatment for scabies infestation is the topical use of a 5% permethrin cream which is applied to the body from the neck down in a thin layer. The cream should then be washed off 8 to 14 hours later. Permethrin kills the scabies mite and eggs. Two (or more) applications, each about a week apart, may be necessary to eliminate all mites, particularly when treating crusted (Norwegian) scabies. This is the preferred treatment for scabies infestation in children 2 months or older.

Alternative treatments:

- **1% Lindane lotion ** USE WITH EXTREME CAUTION ****

Lindane is an organochloride that has central nervous system toxicity in humans if used incorrectly. Several cases of severe seizures in children using lindane have been reported. Lindane is only used as second line therapy when other products are not effective or are contraindicated. Lindane should not be used immediately after a bath or on broken skin. It should not be used by women who are pregnant or lactating, children under 2 years of age, people with seizure disorders or people with extensive dermatitis or known allergies to any ingredients found in Lindane.

- **Ivermectin (Stromectol®)**

Ivermectin is an oral antiparasitic agent approved for the treatment of worm infestations. Evidence suggests that oral ivermectin may be a safe and effective treatment for scabies; however, ivermectin is not FDA-approved for this use. Oral ivermectin has been reported effective in the treatment of crusted scabies; its use should be considered for patients who have failed treatment with or who cannot tolerate FDA-approved topical medications for the treatment of scabies. The dosage of ivermectin is 200 mcg/kg orally. It should be taken on an empty stomach with water. A total of two or more doses at least 7 days apart may be necessary to

eliminate a scabies infestation. The safety of ivermectin in children weighing less than 15 kg and in pregnant women has not been established.

- **Crotamiton lotion 10% and Crotamiton cream 10% (Eurax®, Crotan®)**

Crotamiton is not often prescribed due to resistance issues and subsequent treatment failure. If prescribed, apply thin layer topically from neck to toes, gently massage into skin and leave on. A second application should be applied after 24 hours. The cream should be washed off 48 hours after the last application. Crotamiton is not FDA-approved for use in children.

- **Precipitated sulfur 6% in petrolatum**

Sulfur ointment is less often prescribed because of its strong odor and messy application, although this is the oldest known treatment for scabies. It is safe and effective and the treatment of choice in infants younger than 2 months and pregnant or lactating women. To treat with the sulfur ointment, apply topically to entire trunk and extremities for 3 consecutive nights. Use caution if sulfur ointment is applied to irritated or abraded skin. Apply in patients younger than 2 years old only when supervised by physician (fatalities have been reported in infants after application to large surface areas for treatment of scabies). Always avoid contact with eyes.

It is important to note that even after effective therapy, itching can persist for up to two to four weeks due to the remnants of the dead mites and their eggs.

Antihistamines, topical steroid creams, and the liberal use of moisturizers will often help with this post therapy itching. If the scabies rash continues to spread after treatment, or if itching persists for longer than 2-4 weeks, reexamination and/or retreatment may be necessary. Topical steroid creams should not be used during treatment as this may cause the treatment to fail.

Scabicide lotion or cream should be applied to all areas of the body from the neck down to the feet and toes. In addition, when treating infants and young children,

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scabicide lotion or cream also should be applied to their entire head and neck because scabies can affect their face, scalp, and neck, as well as the rest of their body. The lotion or cream should be applied to a clean body and left on for the recommended time before washing it off. Clean clothing should be worn after treatment. The instructions contained in the box or printed on the label always should be followed carefully. Always contact a doctor or pharmacist if unsure how to use a particular medicine.

Bedding, clothing, and towels used by infested persons or their household, sexual, and close contacts anytime during the three days before treatment should be decontaminated by washing in hot water and drying in a hot dryer, by dry-cleaning, or by sealing in a plastic bag for at least 72 hours. Scabies mites generally do not survive more than 2 to 3 days away from human skin.

Treatment of Health Care Worker, Visitor and Volunteer Contacts

In addition to the infested person, treatment also is recommended for household members and sexual contacts, particularly those who have had prolonged direct skin-to-skin contact with the infested person. Both sexual and close personal contacts who have had direct prolonged skin-to-skin contact with an infested person within the preceding month should be examined and treated. All persons should be treated at the same time to prevent reinfestation.

In nursing homes and other institutional settings, symptomatic health care workers, volunteers and visitors and their contacts should be treated during the same treatment period as the symptomatic residents are treated. Health care workers should be allowed to return to work following a single application (8-12 hours) of permethrin. Follow-up treatments should not be necessary unless re-exposure occurs or symptoms persist. The following information may be useful in determining who needs to be treated.

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1. Contact with a symptomatic case has not been substantiated. No treatment is required. However, approval of one (1) application of scabicide should be granted if requested.
2. Contact with a symptomatic case is minimal such as delivering dietary trays or newspapers and books. Treatment is not necessary. However, approval for one (1) application of scabicide should be granted if requested.
3. Contact with a symptomatic case is substantial such as bed making, physical assessment or turning resident. Asymptomatic and symptomatic persons should be treated with one (1) application of permethrin. Family members, roommates and sexual partners of symptomatic cases should also be treated at the same time. Retreatment may be necessary if symptoms persist following the first treatment.

Symptomatic health care workers, volunteers and visitors should wash clothing, bedding, and towels used at home in hot water (130° Fahrenheit) and dry in a hot dryer, and thoroughly vacuum any carpet or upholstered furniture, disposing of the vacuum bag afterwards.

Prevention

Anyone who is diagnosed with scabies, as well as his or her sexual partners and persons who have close, prolonged contact with the infested person, should be treated for scabies to prevent further infestation. If family members/household contacts have been instructed to be treated, everyone should receive treatment at the same time to prevent reinfestation.

Other ways to prevent scabies include:

- Practice good hand hygiene
- Avoid sharing clothes or towels.
- If your child goes to sleepover parties, provide a sleeping bag, pillow and blanket from home.

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- Wash any clothing, bedding, towels etc used by the infested person in the 48 hours prior to treatment in hot water (130° Fahrenheit) and dry in a hot dryer.
- Items that cannot be washed should be sealed and stored for approximately one week, because scabies mites die within one to four days if not in contact with human skin.
- Thoroughly vacuum any carpet or upholstered furniture, dispose of vacuum bag afterwards.
- Fumigation or pesticide sprays are not recommended and can be harmful to people and animals.
- Abstain from intimate or sexual contact until treatment is successful.
- Infested individuals should be excluded from normal activities (day care, school, work) until 24 hours after completed treatment.

Long-term care facilities should have a scabies prevention program. This program should include an assessment of the skin, hair and nail beds of all new admissions as soon as possible following arrival. Pruritus, rashes and skin lesions should be documented and brought to the attention of the nursing supervisor and the attending physician. A skin assessment should be repeated at least every 4 weeks and any signs or symptoms suggestive of infestation should be documented and communicated to the infection control practitioner or nursing staff. When scabies is suspected, an immediate search for additional cases should be initiated.

As soon as a possible case of scabies is identified, the nursing staff or infection control practitioner should develop a contact identification list. This list should identify every resident, health care worker, visitor and volunteer who may have had direct, physical contact with the case within the previous month. If more than one symptomatic case is identified, a separate contact list for each case may be required. Initially, the contact identification list should be limited to the nursing unit where the suspect or confirmed case resides. Information to be collected should include: nursing unit, room number, name, date of onset of symptoms, results of skin scrapings, date of initial treatment, date of follow-up treatment, results of

treatments (e.g. condition resolved or not resolved) and the date and results of repeat skin scrapings, if performed. Roommates, volunteers, health care workers, and visitors who came into contact with the infested resident should be informed of their possible exposure to scabies. If an initial evaluation indicates no unusual complaints of pruritus or changes in the condition of the skin, treatment may not be indicated. However, a follow-up evaluation should be done at least every other day for four (4) weeks. After developing a contact identification list, the nursing staff or infection control practitioner should determine who should receive treatment and the treatment schedules to be followed. Resident, health care worker, visitor and volunteer contacts determined to be symptomatic should be treated as soon as possible, preferably within the first 24 - 48 hour treatment period.

Health care workers should be educated about the epidemiology of scabies and how to identify and report any unusual pruritus, rashes or skin lesions. In addition to education, health care workers, visitors and volunteers should be instructed to report any exposure to scabies in the home or the community.

The following precautions should be used to prevent further infestation:

1. Place symptomatic resident(s) on isolation precautions in their assigned rooms. Restrict resident(s) to their room(s) for the duration of the first treatment period (8-12 hours). Following bathing to remove the first application of scabicide, discontinue isolation precautions. Isolation precautions are not necessary for prophylactic treatments (e.g., follow-up treatments or treatment of asymptomatic contacts).
2. Wear cloth or disposable long sleeve gowns when applying the scabicide and for all direct resident contacts during the defined treatment period. Gowns may be reused by the same health care worker during an entire shift and then discarded.
3. Wear gloves when applying the scabicide and for all direct resident contacts during the defined treatment period. The cuff of the glove should cover the

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wrist of the gown. Gloves should be discarded immediately following the completion of any task involving skin contact during the defined treatment period.

4. Instruct visitors to wear a long sleeve gown and gloves until after the scabicide has been washed off.
5. Wash hands, wrists and lower arms following removal of gowns and gloves.
6. Bathe or shower the resident(s) prior to applying scabicide if the resident has not been bathed within the previous 24 hours. Wash hair and clip and clean resident's finger and toe nails.
7. Apply the scabicide from the hairline and ears to the soles of the feet. Use a soft brush, such as a toothbrush, and apply scabicide under the finger and toenails. Reapply the scabicide immediately after hand washing or cleansing of the perineal-rectal area following incontinence, and other areas of the body which have become moist. If the resident perspires heavily, the scabicide may have to be reapplied to the back, buttocks and the backs of the legs several times during the treatment period.
8. Place all washable personal clothes worn by the resident during the preceding week into a plastic bag, seal and send home with family members to wash and dry. Instruct family members to wash clothes in hot water and laundry detergent and to dry in a hot dryer.
9. Place all non-washable personal clothes such as shoes, coats, jackets and scarves worn by the resident during the preceding week in a plastic bag. Instruct family members to have items dry cleaned or place them into a hot dryer for 20 minutes. If this is not possible, seal the plastic bag for 5-7 days.
10. Change all bed linens including blankets and spreads following the initial application of scabicide. Remove all used towels, wash cloths and bedclothes worn by the resident. Place these items in a plastic bag and send to the laundry for processing.
11. Instruct laundry personal not to sort personal clothes, sheets, towels or bedspreads and to wash and dry these items separate from other facility laundry.

12. Change bed linens, towels and clothing after the scabicide has been washed off.
13. Disinfect mattress, pillow covers, bedside equipment and floors after scabicide has been washed off.
14. Disinfect multiple use equipment such as walking belts and blood pressure cuffs.
15. Discard any topical creams, ointments or lotions used by symptomatic cases.

Crusted (Norwegian) Scabies

Crusted (Norwegian) scabies is a severe form of scabies that is more common among immunocompromised or elderly persons. Crusted (Norwegian) scabies is characterized by vesicles and formation of thick crusts over the skin, accompanied by abundant mites but only slight itching. The mites in crusted scabies are not more virulent than in non-crusted scabies; however, they are much more numerous (up to 2 million per patient). Because they are infested with such large numbers of mites, persons with crusted scabies are very contagious to other persons. In addition to spreading scabies through brief direct skin-to-skin contact, persons with crusted scabies can transmit scabies indirectly by shedding mites that contaminate items such as their clothing, bedding, and furniture. Persons with crusted scabies should receive quick and aggressive medical treatment for their infestation to prevent outbreaks of scabies. Crusted (Norwegian) scabies is highly contagious; an undiagnosed case may lead to a large outbreak of typical scabies.

Identification

Unlike typical scabies, which tends to be found in characteristic areas of the body such as the wrists, elbows and webbing between the fingers, crusted (Norwegian) scabies may occur in any part of the body. Often crusted (Norwegian) scabies presents as scaly, crusted sores on the hands, feet, scalp, face, torso, and pressure-bearing areas such as the elbows. Facial skin may flake off, and significant hair loss can result from a crusted (Norwegian) scabies infestation.

Diagnosis

The diagnosis of crusted scabies can be difficult to make based solely on the clinical presentation, since the disease can mimic more common conditions such as psoriasis, eczema, drug eruption, and bacterial or fungal infections. Once considered as a possible diagnosis, crusted scabies is fairly easy to recognize. However, the infection is frequently overlooked because of its atypical presentations. In some situations, several months to a year may pass before the diagnosis is made. Often, the diagnosis is discovered only after classic scabies develops in close contacts. Once crusted scabies is suspected, it is relatively easy to diagnose because of the large number of mites that are present. Microscopic examination of skin scrapings from crusted lesions treated with mineral oil or 10 percent potassium hydroxide reveals multiple mites. Biopsy of the lesions, often performed when the diagnosis is unexpected, reveals mites burrowing in the stratum corneum (outermost layer) of the epidermis.

Treatment

Crusted (Norwegian) scabies is known for its slow response to treatment compared with other forms of scabies. Treatment options are the same for crusted (Norwegian) scabies as for classic scabies, however multiple treatments or combinations of treatments may be necessary to rid the mite infestation. When multiple treatments are ineffective, oral treatment with the medication ivermectin may be used. A single dose of ivermectin has been found to be highly efficacious in the treatment of scabies in HIV-infected patients. However, ivermectin treatment is still in the early stages of trial and is not FDA approved for treatment of any type of scabies.

Prevention

As with typical scabies, place symptomatic resident on contact isolation precautions in a private room until at least three (3) negative skin scrapings have been documented. However, this may take from 7-30 days or longer, depending on the severity of the infestation. Additionally, upholstered furniture should be removed from the room and covered with plastic for 7-10 days. Skin scrapings should be

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redone when the condition of the skin is noticeably improved, e.g., the crusted lesions have begun to resolve and signs and symptoms associated with scabies have improved.

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Lam S and Brennessel D. Norwegian scabies and HIV infection - Case report and literature review. *Infect Dis Clin Pract* 1993; 3:169-173

Michigan Department of Community Health Scabies Prevention and Control Manual (http://www.michigan.gov/documents/scabies_manual_130866_7.pdf)

PREVENTION AND CONTROL OF SCABIES IN CALIFORNIA LONG-TERM CARE FACILITIES
California Department of Health Services Division of Communicable Disease Control
In Consultation with Licensing and Certification
(<http://www.cdph.ca.gov/HealthInfo/discond/Pages/Scabies.aspx>)

Sargent SJ. Ectoparasites. Scabies. In: CG Mayhall, ed. *Hospital Epidemiology Infection Control*. Williams & Wilkins. 1996:465-471.

APPENDICES

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Appendix A: Scabies Frequently Asked Questions

What is scabies?

Scabies is an infestation of the skin with the microscopic mite *Sarcoptes scabiei*. Infestation is common, found worldwide, and affects people of all races and social classes. Scabies spreads rapidly under crowded conditions where there is frequent skin-to-skin contact between people, such as in hospitals, institutions, child-care facilities, and nursing homes.

What are the signs and symptoms of scabies infestation?

- Pimple-like irritations, burrows or rash of the skin, especially the webbing between the fingers; the skin folds on the wrist, elbow, or knee; the penis, the breast, or shoulder blades.
- Intense itching, especially at night and over most of the body.
- Sores on the body caused by scratching. These sores can sometimes become infected with bacteria.

How did I get scabies?

By direct, prolonged, skin-to-skin contact with a person already infested with scabies. Contact must be prolonged (a quick handshake or hug will usually not spread infestation). Infestation is easily spread to sexual partners and household members. Infestation may also occur by sharing clothing, towels, and bedding.

Who is at risk for severe infestation?

People with weakened immune systems and the elderly are at risk for a more severe form of scabies, called Norwegian or crusted scabies.

How long will mites live?

Once away from the human body, mites do not survive more than 48-72 hours. When living on a person, an adult female mite can live up to a month.

Did my pet spread scabies to me?

No. Pets become infested with a different kind of scabies mite. If your pet is infested with scabies, (also called mange) and they have close contact with you, the mite can get under your skin and cause itching and skin irritation. However, the mite dies in a couple of days and does not reproduce. The mites may cause you to itch for several days, but you do not need to be treated with special medication to kill the mites. Until your pet is successfully treated, mites can continue to burrow into your skin and cause you to have symptoms.

How soon after infestation will symptoms begin?

For a person who has never been infested with scabies, symptoms may take 4-6 weeks to begin. For a person who has had scabies, symptoms appear within several days. You do not become immune to an infestation.

How is scabies infestation diagnosed?

Diagnosis is most commonly made by looking at the burrows or rash. A skin scraping may be taken to look for mites, eggs, or mite fecal matter to confirm the diagnosis. If a skin scraping or biopsy is taken and returns negative, it is possible that you may still be infested. Typically, there are fewer than 10 mites on the entire body of an infested person; this makes it easy for an infestation to be missed.

Can scabies be treated?

Yes. Several lotions are available to treat scabies. Always follow the directions provided by your physician or the directions on the package insert. Apply lotion to a clean body from the neck down to the toes and leave on overnight (8 hours). After 8 hours, take a bath or shower to wash off the lotion. Put on clean clothes. All clothes, bedding, and towels used by the infested person 2 days before treatment should be washed in hot water and dried in a hot dryer. A second treatment of the body with the same lotion may be necessary 7-10 days later. Pregnant women and children are often treated with milder scabies medications.

Who should be treated for scabies?

Anyone who is diagnosed with scabies, as well as his or her sexual partners and persons who have close, prolonged contact to the infested person should be treated. If your health care provider has instructed family members to be treated, everyone should receive treatment at the same time to prevent reinfestation.

How soon after treatment will I feel better?

Itching may continue for 2-3 weeks, and does not mean that you are still infested. Your health care provider may prescribe additional medication to relieve itching if it is severe. No new burrows or rashes should appear 24-48 hours after effective treatment.

Appendix B: Scabies Fact Sheet

DEFINITION

Scabies is caused by a tiny mite. It is often hard to detect, and causes a fiercely itchy skin condition. Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. The condition can strike anyone of any race or age, regardless of personal hygiene.

ETIOLOGY

Scabies is caused by a microscopic mite that burrows in the skin. Within several weeks, an allergic reaction develops causing severe itching; often intense enough to keep sufferers awake all night. It may take up to a month before a person will notice the itching.

Human scabies is almost always caught from another person by close contact. Attracted to warmth and odor, the female mite burrows into the skin, lays eggs, and produces toxins that cause allergic reactions. Newly hatched mites travel to the skin surface, lying in shallow pockets where they will develop into adult mites. If the mite is scratched off the skin, it can live in bedding for up to 24 hours or more.

DIAGNOSIS

The earliest and most common symptom of scabies is itching, especially at night. Little red bumps like hives, tiny bites, or pimples appear. In more advanced cases, the skin may be crusty or scaly.

Scabies prefers warmer sites on the skin such as skin folds, where clothing is tight, between the fingers or under the nails, on the elbows or wrists, the buttocks or belt line, around the nipples, and on the penis. Mites also tend to hide in, or on, bracelets and watchbands, or the skin under rings. In children, the infestation may involve the entire body including the palms, soles, and scalp.

Bacterial infection may occur due to scratching. In many cases, children are treated because of infected skin lesions rather than for the scabies itself. Although treatment of bacterial infections may provide relief, recurrence is almost certain if the scabies infection itself is not treated.

Crusted Scabies (Norwegian)

Crusted scabies is a form of the disease in which the symptoms are far more severe. Large areas of the body, like the hands and feet, may be scaly and crusted. These crusts hide thousands of live mites and their eggs, making treatment difficult because medications applied directly to the skin may not be able to penetrate the thickened skin. This type of scabies is extremely infectious and occurs mostly among the elderly, in some AIDS patients, or in people whose immunity is decreased.

Who is most at risk?

Scabies is most common in those who have close physical contact with others, particularly children, mothers of young children, sexually active young adults, and elderly people in nursing homes.

TREATMENTS

Getting rid of the mites is critical in the treatment of scabies. Everyone in the family or group, whether itching or not, should be treated at the same time to stop the spread of scabies. This includes close friends, day care or school classmates, or nursing home residents. Bedding and clothing must be washed or dry cleaned.

PERMETHRIN: Five percent permethrin cream is applied to the skin from the neck down at bedtime and washed off the next morning. Dermatologists recommend that the cream be applied to cool, dry skin over the entire body (including the palms of the hands, under finger nails, soles of the feet, and the groin) and left on for 8 to 14 hours. A second treatment one week later may be recommended. Side effect of 5% percent permethrin cream includes mild temporary burning and stinging. Lesions heal

within four weeks after the treatment. If a patient continues to have trouble, reinfestation may be a problem requiring further evaluation by the dermatologist.

LIDANE: One percent lindane lotion is applied from the neck down at night and washed off in the morning. It may be reapplied one week later. Lindane **SHOULD NOT** be used on infants, small children, pregnant or nursing women, or people with seizures or other neurological diseases, and has been banned in the state of California.

OTHER: Ten percent sulfur ointment and crotamiton cream may be used for infants. Ivermectin is an oral medicine which may be prescribed for the difficult to treat crusted form. It is not to be used in infants or pregnant women.

Antihistamines may be prescribed to relieve itching, which can last for weeks, even after the mite is gone.

Successful eradication of this infestation requires the following:

- See a dermatologist as soon as possible to begin treatment. Remember, although you may be disturbed at the thought of bugs, scabies is no reflection on your personal cleanliness.
- Treat all exposed individuals whether obviously infested or not. Incubation time is 6-8 weeks so symptoms may not show up for a while. If you do not treat everyone, it is as if you were never treated.
- Apply treatment to all skin from neck to legs. This includes between toes, the crease between the buttocks, etc. If you wash your hands after application, you need to reapply the medication to your hands.
- Wash clothes. Do all the laundry with the hottest water possible. Items you do not wish to wash may be placed in the dryer on the hot cycle for 30 minutes, or pressed with a warm iron. Items may be dry-cleaned.
- Items may also be placed in a sealed plastic bag and placed in the garage for two weeks. If the mites do not get a meal within one week, they die.

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- Change the bedding.
- Carpets or upholstery should be vacuumed through the heavy traffic areas. Vacuum the entire house and discard the bag, just to be on the safe side.
- Pets do not need to be treated.

Additional Information:

CDC - <http://www.cdc.gov/parasites//scabies/>

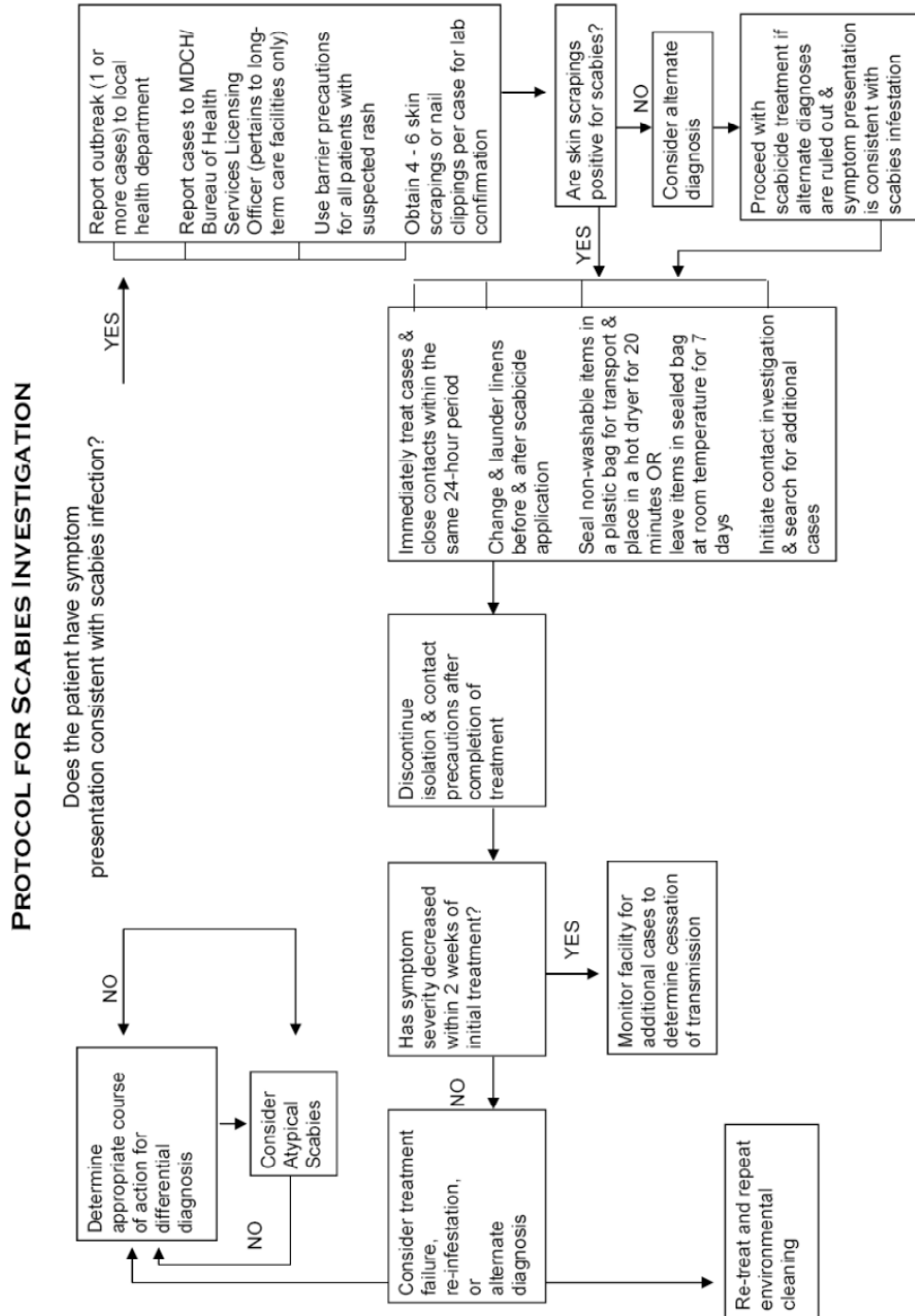
Nemours Foundation -

<http://www.kidshealth.org/parent/infections/skin/scabies.html>

American Academy of Dermatology -

- <http://www.aad.org/skin-conditions/dermatology-a-to-z/scabies>
- <http://www.aad.org/education-and-quality-care/medical-student-core-curriculum>
- <http://www.aad.org/education-and-quality-care/medical-student-core-curriculum/infestations-and-bites>

Appendix C: Treatment Flow Chart



(From: Michigan Department of Community Health Scabies Prevention and Control Manual)

Appendix D: Letter to Parent

Dear Parent or Guardian,

Subject: Scabies Notification

Your child may have been exposed to scabies. Scabies is a disease of the skin caused by burrowing of the scabies mite. The mite is transmitted through direct skin-to-skin contact or through sharing of an infested person's personal items such as clothing or bedding.

Please observe your child for intense itching (especially at night) and rash. The rash can usually be seen in the following places:

- | | |
|-------------------------------------|-------------------------------------|
| ▲ Between webs and sides of fingers | ▲ genitalia |
| ▲ wrists | ▲ lower buttocks |
| ▲ elbows | Infants may experience rash on the: |
| ▲ armpits | ▲ face |
| ▲ breasts | ▲ scalp |
| ▲ waist | ▲ palms of the hands |
| ▲ thighs | ▲ soles of the feet |

Symptoms usually appear within **two to six weeks** after coming in contact with a person who has scabies. Persons who have had scabies before may have symptoms appear within one to four days.

Treatment Recommendations

If you are concerned that your child or anyone else in your family may have scabies, please see your family doctor. Your doctor will be able to prescribe medications that can kill the scabies mite. Usually one application of a prescription scabicide is adequate to treat scabies. It is recommended that if your child has scabies, the entire family should be treated. Please discuss this with your doctor.

Cleaning & Disinfecting

Washable items such as clothing, bedding, and towels can be disinfected by washing the items in hot water and detergent. Wash water temperature should be set to the highest temperature possible. Use the hot setting on the dryer to dry the items *for at least 20 minutes*.

Non-washable items such as shoes, coats, jackets, and scarves can be disinfected in one of three ways: 1) place the items in a dryer *for at least 20 minutes* on the hot setting; or 2) seal the items in a plastic bag *for one week (7 days)* at room temperature or hotter; or 3) seal the items in a plastic bag and *freeze them for 12 hours*.

Fumigating rooms and using insecticidal sprays on furniture, infant carriers, child car seats and carpets *are not recommended for cases of common scabies*. Thorough cleaning and vacuuming of these items is sufficient.

Attendance

Children who have scabies should be excluded from school and/or extracurricular activities until the treatment has been completed.

Please refer questions to your physician or local county health department.

Sincerely,

School or Day Care Manager

Phone:

Public Health Official

(From: Michigan Department of Community Health Scabies Prevention and Control Manual)