

# SCABIES

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## **Responsibilities:**

**Hospital:** Not reportable

**Lab:** Not reportable

**Physician:** Not reportable

**Local Public Health Agency (LPHA):** No follow-up required, unless outbreak occurs

**Iowa Department of Public Health**

**Disease Reporting Hotline: (800) 362-2736**

**Secure Fax: (515) 281-5698**

## **1) THE DISEASE AND ITS EPIDEMIOLOGY**

### **A. Agent**

Scabies is caused by a parasitic infestation of the skin caused by a mite, *Sarcoptes scabiei*. The microscopic mite in the adult female stage is approximately 1/16th inch in length. The body of the mite is rounded in shape and has four pair of legs. The front two pair of legs end in suckers and the rear two pair of legs end in long trailing bristles. Adult females are largest with the greater part of the interior taken up by ovaries and developing eggs.

The adult female burrows into the epidermal layers of the skin, copulates with an entering male and lays two to three eggs per day. The eggs hatch in 2 to 3 days as larval mites with three pair of legs. After one to two days, larval mites return to the surface of the skin and reburrow elsewhere for protection and to feed. Three days later the larva molts to the nymph stage with four pair of legs and later again molts to adult male and female stages. Eggs to adult stages require 10-14 days; adult females may live for over 30 days on the host. Less than 10% of eggs give rise to adults. In fact, most otherwise healthy patients have fewer than 10 adult female mites. (Long-term care (LTC) patients often have considerably more mites than patients in good health.)

As mites initially infect a host, there is minimal tissue reaction as they penetrate the superficial layer of the skin (stratum corneum). Mites feed on intracellular lymph-like fluid rather than blood as capillaries do not reach into the epidermal layer. Subsequently discharges of the mites elicit a T-cell mediated immune reaction and, after a 2 - 6 week period, the characteristic pruritic papules develop. Pruritis itself becomes a defensive mechanism to reduce the presence of mites. For a person who has had scabies before, symptoms appear within several days. People do not become immune to an infestation.

Patients who are immunosuppressed by varying degrees often have decreased pruritis. Frequently there is no itching in crusted scabies patients with severely impaired cell-mediated immunity.

One special consideration is that healthcare staff who attend to patients with high mite burdens often are exposed to large numbers of larval and nymphal mites that burrow into the skin and cause a red papular rash. Exposure is most common on the upper arms and thighs. Most of these mites are washed off or scratched out but the longer the source patient is unrecognized, the greater the likelihood that immature forms will survive to adulthood, progress to mated female mite(s), and establish an infestation on the host.

### **B. Clinical Description**

Symptoms: Signs and symptoms of scabies infestation include:

- 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

Onset: Two to six weeks before onset of itching in people without previous exposure. People who have been previously infested develop symptoms 1 - 4 days after re-exposure.

“Norwegian” scabies differ from regular scabies simply in the number of mites present. In regular scabies the number of mites on a host at any one time is, on average 10 – 15. Persons with Norwegian or crusted scabies, will have thousands to millions of mites. Consequently, their skin manifestations are much more severe with thick, hyperkeratotic crusts that can occur on almost any area of the body.

The type of mite is exactly the same in both presentations. The difference lies with the host, with those developing Norwegian scabies usually having a compromised immune system.

Clinically, Norwegian scabies differs from regular scabies in two ways: 1. it presents with more severe skin manifestations, and 2. it is usually not very pruritic.

### **C. Reservoirs**

Common reservoirs: Humans. Sarcoptes species and other mites of animals can live on humans but do not reproduce on them.

### **D. Modes of Transmission**

Person-to-person: Transfer of parasites is by direct contact with infested skin and can be acquired during sexual contact. Transfer from undergarments and bedclothes occurs only if these have been contaminated by infested people immediately beforehand. Mites can burrow beneath the skin surface in 2.5 minutes. Persons with the Norwegian scabies syndrome are highly contagious because of the large number of mites that are present in the exfoliating scales.

### **E. Incubation period**

Two to six weeks pass before onset of itching in people without previous exposure. People who have been previously infested develop symptoms 1 - 4 days after re-exposure. 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.

### **F. Period of Communicability or Infectious Period**

Until mites and eggs are destroyed by treatment, ordinarily after 1 or occasionally 2 courses of treatment.

### **G. Epidemiology**

Scabies occurs in multi-year cyclic waves with peak incidence about every 30 years. Occasionally large numbers of cases continue to be reported in institutional settings. Typical patient groups include young children who readily transmit the mite during play, young adults where it represents an STD, and institutional populations where underlying health conditions predispose to exposures, transmission, and, once infected, heavier than usual mite numbers. Subsequent transmission to healthcare staff is frequent when caring for scabetic patients in institutions.

Institutional subgroups at risk of scabies include Down’s syndrome, transplant patients on immunosuppressive therapy, elderly residents of long-term care (LTC) facilities, AIDS patients, and cancer chemotherapy patients. Some of these patients will have very heavy mite burdens (“atypical crusted scabies”) and present a higher risk of transmission to staff and other residents. Less frequently some of these patients will develop crusted or keratotic scabies (a.k.a. Norwegian scabies) with extremely thick scaly, crusty skin lesions that appear grayish in color and often are associated with thousands to millions of mites. . These patients may not experience any pruritis as a function of depressed immunity thus permitting development of large mite populations. Exfoliated skin scales on

and around furniture, bedding, clothing and other fomites may have many live mites and pose a risk of exposure to others.

A variant form of "scabies" is pseudo- or psycho-scabies in which the patient suffers varying degrees of delusions that they are infected. Power-of-suggestion plus ordinary background itching often generates this condition. Skin scrapings are always negative. Susceptibility increases during cold months when dry skin results in increased background itching.

Severe cases should be referred to a dermatologist for evaluation.

#### **H. Bioterrorism Potential**

None.

## **2) DISEASE REPORTING AND CASE INVESTIGATION**

### **A. Purpose of Case investigation. There is no requirement for disease reporting unless an outbreak is occurring.**

- To identify whether the case may be a source of infection for other persons and, if so, to prevent further transmission.
- To identify transmission sources of public health concern and to stop transmission from such sources.

## **3) CONTROLLING FURTHER SPREAD**

### **A. Isolation and Quarantine Requirements**

None.

### **B. Protection of Contacts of a Case**

Avoid direct physical contact with people who have scabies and their belongings, especially clothing and bedding. Early proper treatment of infested persons is extremely important to stop the spread of scabies.

### **C. Managing Special Situations**

#### **Reported Incidence Is Higher than Usual/Outbreak Suspected**

Scabies infestations remain a problem in institutional settings particularly in long-term care (LTC) facilities. Introductions are almost never recognized and hands-on care promotes transmission to staff and other residents.

### **D. Preventive Measures**

Recognition and management of a scabies outbreak are challenging issues for long-term care facilities and institutions. One must recognize that all institutional populations have background skin problems, which tend to confuse staff and attending physicians. The typical lesions that suggest possible scabies are red, raised, and pruritic papules and less commonly burrows. Burrows are diagnostic for scabies but are seldom seen in patients with good hygiene.

The gold standard for scabies diagnosis is skin scrapings with microscopic examination for mites, eggs or scybala (fecal pellets). Recovering mites and eggs in scrapings requires some practice, skill, and patience, particularly from otherwise healthy patients who may have fewer than five adult female mites. However institutional populations often have heavy mite burdens and offer opportunity to recover mites without extraordinary effort.

Techniques for scraping are many and varied. The simplest technique is to obtain either a #10 or #20 sterile disposable scalpel blade attached to a plastic handle and place drops of oil on the blade or skin lesion and scrape until the oil becomes cloudy with skin debris. Standard references call for use of mineral oil that is not highly viscous. It is recommended to use type B microscopic immersion

oil since it readily adheres to the blade. The oil with superficial skin fragments is then tapped off or transferred to a slide. Oil that remains on the blade can be scraped off with the cover slip that is then dropped on the slide over the earlier transferred oil to produce a "wet mount".

Beginning in one corner of the cover slip, the preparation is screened under 4X (low power) in a methodical back-and-forth manner (e.g. like mowing a yard). The 10X objective may be used to occasionally study detail of suspect structures. Illustrations of sarcoptes mites, demodex mites, eggs and scybala are included in appendices.

Other techniques include identifying burrows with a felt tip ink pen or tetracycline technique. In the former a black or blue felt tip pen is rubbed over the suspect lesion and the ink removed with an alcohol wipe. If a burrow is present, capillary action will have drawn the ink into the burrow, which will not be removed by the alcohol wipes and will be visible through the superficial epidermis. The tetracycline technique is similar in that a small amount of soluble liquid tetracycline is applied over the suspect lesion and then removed. The lesion is then viewed under a Wood's lamp for presence of tetracycline that fluoresces in the burrow. If burrows are seen, the mite (usually an adult female) can be removed by scraping or by epidermal shave biopsy with a scalpel.

Lesions can also be examined by conventional skin biopsy however that procedure requires a clinic, physician staffing, and a technician to prepare tissue for examination. Simple skin scrapings have a lot to offer. The technique is easy to perform; usually meets with patient approval; and provides the option of immediate diagnosis on-site without delay. Equipment needed includes a light microscope with 4X and 10X objective and ideally a mechanical stage. Ideally the person doing the scrapings should read the slides. Over time, competence improves with practice. **LTC facilities are encouraged to perform their own skin scrapings.**

### **Treatment**

Infested persons and their close physical contacts should be treated at the same time, regardless of whether symptoms are present. Crusted scabies is very easily transmissible, and treatment of persons who have been minimally exposed is warranted.

There are several topical treatments available for scabies. The person should bathe before application of a scabicide to include trimming the fingernails and removing or washing out debris from under the nails. After drying the skin, the scabicide is applied to the entire body from the ears and chin downward. After the period of therapy is complete, the scabicide may be removed with another bath and the bedding changed before retiring. Briefly, all topical products available in the U.S. for treatment are available only by prescription and include:

1. 5% permethrin cream. It has low toxicity and is a very effective scabicide. A second administration one week after the first is often routinely prescribed. 5% permethrin cream is the topical treatment of choice for LTC residents.
2. Crotamiton (Eurax), 10% cream or lotion. This product applied for 24 hours than rinsed off, and then reapplied for an additional 24 hours constitutes one treatment. Many scabies experts consider this product the least effective scabicide. Its advantages are it is very non-toxic and has non-specific antipruritic qualities.
3. Lindane, 1% cream or lotion. This product is potentially neurotoxic. It should not be used on patients with neurologic conditions, infants or pregnant or breast-feeding women. It is also sometimes very irritating to skin of elderly patients. In addition, there is increasing evidence that sarcoptes mites have developed tolerance or resistance to this product. We recommend limited use of lindane to treat scabies. One 8-hour application constitutes one treatment.
4. 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 (Norwegian) 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. A total of two or more doses of ivermectin may be necessary to eliminate a scabies infestation. One treatment is one oral dose of 200 micrograms per kilogram of body weight. This is repeated two weeks after the first dose.

5. Sulphur is used as an ointment (2%-10%) and usually 6% ointment is preferred. After a preliminary bath, the sulphur ointment is applied and thoroughly rubbed into the skin over the whole body for two or three consecutive nights. Patients should apply the ointment personally, if possible, as it ensures that their hands will be well impregnated. Ointments are more useful than any other preparation. Topical sulphur ointment is messy, malodorous, and stains clothing. Sulphur should be used only in situations where adults cannot tolerate lindane, permethrin, or ivermectin as it is inferior to all these agents. Sulphur is recommended as a safe alternative for the treatment of scabies in infants, children, and pregnant women.

**Home:** Infested persons and their close physical contacts should be treated at the same time, regardless of whether symptoms are present. Persons who have contact of this nature, but not those with more casual contact, should be treated.

**Institutions:**

Scabies epidemics frequently occur in nursing homes, hospitals, residential facilities, and other communities. Control of an epidemic can only be achieved by treatment of the entire population at risk. Ivermectin can be considered in this setting, especially if treatment with topical scabicides fails.

The value of mass treatment versus select treatment of affected wards or wings is problematic. Select treatment may be employed if repeat skin scrapings are available to monitor skin problems. In any case overall treatment strategies need to be openly and thoroughly discussed by administrators, nursing staff, and medical staff.

**Environmental Measures**

The environment is exaggerated in regards to scabies. One expert states that only 1 in 200 cases of scabies are acquired from fomites and the environment. Laundering bedding and clothing worn or used by patients anytime during the 3 days before treatment, using hot cycles of both the washer and dryer, or disinfecting by storing in a closed plastic bag for a minimum of four days, or dry-cleaning will kill mites and eggs, but may not be needed for most infestations. Laundering bedding and clothing is most important for patients with crusted (Norwegian) scabies because potential for fomite transmission is high. Scabies mites generally do not survive more than 2 to 3 days away from human skin.

Rooms used by a patient with crusted scabies should be thoroughly cleaned and vacuumed after use. Environmental disinfestation using pesticide sprays or fogs is unnecessary and should be discouraged.

**Preventive Measures/Education**

Avoid direct physical contact with people who have scabies and their belongings, especially clothing and bedding. Early proper treatment of infested persons is extremely important to stop the spread of scabies.

## 4) ADDITIONAL INFORMATION

### Laboratory criteria for diagnosis

Whenever possible, scabies should be confirmed by isolating the mites, ova or feces in a skin scraping. Scrapings should be made at the burrows that have not been scratched, especially on the hands between the fingers and the folds of the wrist

### References

CDC website: [www.cdc.gov/scabies](http://www.cdc.gov/scabies)

Chosidow, O., *Scabies* The New England Journal of Medicine, 2006; 354:1718-1727

Heymann, D.L., ed. *Control of Communicable Diseases Manual, 20<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2015.

Sexually Transmitted Diseases Treatment Guidelines 2010, Centers for Disease Control and Prevention. [www.cdc.gov/std/treatment/2010/ectoparasitic.htm#a2](http://www.cdc.gov/std/treatment/2010/ectoparasitic.htm#a2)

### Additional Resources

#### Morbidity and Mortality Weekly Report (MMWR)

- Patient-Source Scabies among Hospital Personnel -- Pennsylvania (September 23, 1983 / 32(37);489-90) [www.cdc.gov/mmwr/preview/mmwrhtml/00000143.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/00000143.htm)
- Epidemiologic Notes and Reports Scabies in Health-Care Facilities -- Iowa (March 25, 1988 / 37(11);178-9) [www.cdc.gov/mmwr/preview/mmwrhtml/00051539.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/00051539.htm)