I. PURPOSE

Infestations with parasites are fairly common among the community and healthcare facilities and can be responsible for infections of the epidermis or external layer of the skin. Healthcare-associated transmission has been reported with scabies, lice, and maggots.

II. POLICY

The attending physician is responsible for ordering patient treatment.

The Infection Prevention and Control Department, Facilities Management, and Environmental Services shall be notified of all cases to assure that proper isolation and disinfecting procedures are completed to avoid transmission to other patients, personnel or visitors.

III. PROCEDURE

A. Sarcoptes scabiei (Scabies)

1. Characteristics
   a. The adult mite has a round body and four pairs of legs.
   b. The adult female is attracted to human skin predominantly by human odor and burrows in the upper layer of the epidermis, where she lays two to three eggs each day.
   c. The eggs require 10 days to progress through larval and nymph stages to form adult mites, which have a life span of approximately 1 to 2 months.

2. Epidemiology
   a. Mites are transmitted through direct contact with infected persons; less frequently, transmission may occur through contact with clothing or bedding (fomites).
   b. Spread of the mite to a different part of the body can occur by manual transfer or scratching.

3. Clinical Presentation
   a. The incubation period (exposure to onset of symptoms) for primary infestation occurs as early as 10 days but is typically 4 to 6 weeks. Because of previous sensitization, symptoms in patients with reinfection usually appear in 1 to 3 days.
   b. Approximately two-thirds of cases have burrow-type pruritic lesions on hands, webs of fingers, wrists, and extensor surfaces of elbows and knees, as well as outer surfaces of feet, armpits, buttocks, and waist.
   c. Dermatological manifestations include burrows, papules, scales, vesicles, bullae, crusts, pustules, nodules, and excoriations.

4. Treatment
   a. Treatment for scabies is usually a topical scabicide applied to the neck, trunk, and all extremities, including beneath the fingernails.
   b. In infants, treatment may also require application to the scalp. Elderly patients frequently require facial and scalp application to eliminate the infestation.
c. The drug of choice is one to two applications of 5 percent permethrin cream, which is left on the skin for 8 to 14 hours before thoroughly washing off. Treatment may be repeated in approximately 5 days.

5. Prevention and Control Measures
   a. Patients should be placed in Contact Precautions until 24 hours after treatment. In person with crusted scabies, the duration of isolation time is often longer.
   b. Because scabies transmission can occur during the lengthy egg incubation period, household members and intimate contacts should be treated preemptively.
   c. It may also be prudent to treat asymptomatic healthcare workers (HCW) who have had close contact with infested patients during such activities as bathing and applying topical lotions or massages.
   d. Immediately DOUBLE BAG ALL patient belongings (i.e. clothing, underwear, wig, shoes, bags, etc.) in belongings bags and SEAL the bags with tape or tie the bags tightly.
   e. If patient has their own wheelchair then wheelchair must also be contained by securing with large clear bags tightly taped.
   f. Patient valuables (i.e. wallet, pocketbook etc.) should be placed in separate DOUBLE BAGS, also SEAL the bags with tape or tie the bags tightly. If the patient does not have a family member or friend to pick up their belongings, please keep patient valuables with patient’s other belongings in the room with the patient.
   g. Remove and DOUBLE BAG ALL potentially contaminated linen (i.e. disposable liners, sheets, blankets etc.) and do not throw the linen on the floor, immediately put linen in blue linen bags and SEAL the bags with tape or tie the bags tightly.
   h. If possible, send all patient valuables and belongings home with a family member or friend.
   i. Clothing and linen of the patient should be washed by machine in the hot cycle for 10 minutes (50°C or 122°F), then tumbled in a hot dryer for 20 minutes or bagged for 10 days.
   j. Small disposable items such as creams and lotions should be discarded because of the risk of transmission.

B. Pediculosis (Lice)

1. Characteristics
   a. Lice are visible wingless parasites with three pairs of lateral legs ending in “claws”.
   b. Eggs are laid by the fertilized adult and appear as oval “nits” on hairs of fibers of clothing.
   c. After 7 to 10 days, small nymphs emerge from eggs and must feed on blood within 24 hours.

2. Epidemiology
   a. Humans are the only natural reservoirs of body, head, and pubic lice.
   b. Head lice are transmitted through direct contact with the louse or contact with personal items such as hats, helmets, headset earphones, brushes, combs, or bedding. Head lice die within 24 to 48 hours after leaving a host.
   c. Body lice are transmitted through direct contact with the louse or through contact with clothing or bedding. The lice cling to clothing, especially seams. With heavy infestation, eggs (nits) may attach to hairs.
   d. Pubic lice are transmitted by direct contact with the louse through close physical contact, especially sexual intercourse. Transmission may also occur via clothing or bedding.

3. Treatment
   a. There are four main pediculicide options for treating head lice and pubic lice: pyrethroids, pyrethrins, malathion, and lindane.
   b. Pyrethroids, such as permethrin 1 percent cream, are often considered to be the drug of choice because a single dose provides a residual effect lasting several days.
c. Regardless of which specific topical agent is used, application should be repeated in 1 week to eliminate newly hatched nymphs unless all nits have been removed with a nit comb or hair removal.

d. Application of pediculicides to patients with body lice is usually not necessary.

4. Prevention and Control Measures
   a. Patients should be placed in Contact Precautions until 24 hours after treatment. Isolation of patients can be discontinued after treatment and proper disinfection or removal of clothing, bedding, and other contaminated personal items.
   b. Treatment of family members and HCW is only indicated if infestation is detected. The only exception is sexual contacts of patients with pubic lice; these individuals may be treated simultaneously without examination.
   c. Immediately DOUBLE BAG ALL patient belongings (i.e. clothing, underwear, wig, shoes, bags, etc.) in belongings bags and SEAL the bags with tape or tie the bags tightly.
   d. If patient has their own wheelchair then wheelchair must also be contained by securing with large clear bags tightly taped.
   e. Patient valuables (i.e. wallet, pocketbook etc.) should be placed in separate DOUBLE BAGS, also SEAL the bags with tape or tie the bags tightly. If the patient does not have a family member or friend to pick up their belongings, please keep patient valuables with patient’s other belongings in the room with the patient.
   f. Remove and DOUBLE BAG ALL potentially contaminated linen (i.e. disposable liners, sheets, blankets etc.) and do not throw the linen on the floor, immediately put linen in blue linen bags and SEAL the bags with tape or tie the bags tightly.
   g. If possible, send all patient valuables and belongings home with a family member or friend.
   h. There are several methods for fomite (hair brushes, caps, coats, etc.) disinfection. The simplest method for clothing or bedding disinfection is washing and drying at relatively high temperature (60°C or 140°F for 5 to 10 minutes). Heating by ironing or dry cleaning is also an option.
   i. For items that cannot be heated, placing them in a freezer for 12 to 24 hours may be effective.
   j. Nonwashable items can also be sealed in a leak-proof plastic bag. Items that harbor pubic lice should remain sealed for 7 days, whereas items with head lice should be sealed for 10 to 14 days. Articles with body lice require even longer storage because eggs may survive for up to 30 days.
   k. After discharge, Environmental Services shall be notified to spray the entire room with a lice spray. Areas of particular concern are beds, chairs, mattresses, furniture and carpet if any. Do not use lice spray in food processing, preparation, storage, or serving areas. Vacate room after treatment and ventilate before reoccupying.
   l. Environmental Services will do a thorough cleaning of the room after the patients and environments are treated.

C. Myiasis (Maggots)

1. Characteristics
   a. Myiasis is defined as human infestation by larvae (maggots) of a large variety of dipterous flies.
   b. Eggs are laid by mature female flies on skin, wounds, mouth, nose, and ears.

2. Epidemiology
   a. Healthcare-associated myiasis often occurs in debilitated patients with necrotic wounds or fecal discharge who are subject to neglected nursing care, especially during the summertime.

3. Clinical Presentation
a. Parasitic myiasis results from larval invasion of unbroken skin or periorificial tissue, producing an abscess-type lesion that may drain purulent material.
b. Larvae burrow into skin, causing dermatitis, and may also migrate to other organs (e.g., ear, nose, eye, brain), causing serious illness or death.

4. Treatment
   a. Involves removal of fly larvae. This is often accomplished by covering the wound, which contains the breathing orifice of the insect, with a thick impermeable layer of petrolatum ointment.
   b. Liquid paraffin, beeswax, or chewing gum has also been used for this purpose.

5. Prevention and Control Measures
   a. Use simple physical barriers to prevent fly entry into the environment.
   b. Appropriate waste disposal and location of waste receptacles are also important to prevent flying insects from entering patient care areas.
   c. Adequate insect control programs using pyrethrin aerosol, other insecticide repellents, or insect extermination lamps may be required in summer months.

D. *Cimex lectularius* (Bed Bugs)

1. Characteristics
   a. Bed Bugs are small, reddish brown, flattened, wingless insects that feed solely on the blood of humans and other warm-blooded animals, usually at night.
   b. Bed bugs grow up to 7mm in length with a life span ranging from 4 months to 1 year.

2. Epidemiology
   a. Bed bugs form nests in cracks, furniture seams, bed frames, and mattresses.
   b. These insects can survive for several months without feeding and can hide within crevices and other small recessed spaces. These locations include walls, headboards, baseboards, mattress seams, areas of clutter, and undersides of furniture, especially in adjoining apartments, homeless shelters, and hotels.
   c. A characteristic finding is small drops of blood on bed sheets or pillows caused by engorged bed bugs that were crushed. Bed bug infestations also emit an odor caused by dark oily excrement.

3. Clinical Presentation
   a. Bed Bugs cause pruritic macules in previously unexposed patients. In patients with repeated bites, there may be papules, urticaria, or bullae resulting from a hypersensitivity reaction.

4. Treatment
   a. Treatment is primarily symptomatic, consisting of anti-inflammatory topical corticosteroid preparations, oral antihistamines, and antibacterial agents for secondary infection.
   b. The major intervention is environmental control, with recognition if infestation and use of pesticides such as malathion or pyrethrins. Approved lightly sprayed pesticides should be administered by a licensed exterminator to all places of harbor.

5. Prevention and Control Measures
   a. Patient does not require isolation; however, gown and gloves can be worn by staff until bed bugs are contained.
   b. Confine the patient to one area, preferably an area with no fabric furniture or carpet.
   c. Avoid putting patients potentially infested with bed bugs in a waiting room, common areas or cohorting with another patient until bed bugs are contained.
   d. Have the patient shower and change into disposable scrubs, hospital gown, or other clean hospital clothing.
   e. If patient unable to shower, please provide a comfort bath for patient and examine patient’s body for bed bug bites. Document bites.
f. Immediately **DOUBLE BAG ALL** patient belongings (i.e. clothing, underwear, wig, shoes, bags, etc.) in belongings bags and **SEAL** the bags with tape or tie the bags tightly.

g. If patient has their own wheelchair then wheelchair must also be contained by securing with large clear bags tightly taped.

h. Patient valuables (i.e. wallet, pocketbook etc.) should be placed in separate **DOUBLE BAGS**, also **SEAL** the bags with tape or tie the bags tightly. If the patient does not have a family member or friend to pick up their belongings, please keep patient valuables with patient’s other belongings in the room with the patient.

i. Remove and **DOUBLE BAG ALL** potentially contaminated linen (i.e. disposable liners, sheets, blankets etc.) and do not throw the linen on the floor, immediately put linen in blue linen bags and **SEAL** the bags with tape or tie the bags tightly.

j. If possible, send all patient valuables and belongings home with a family member or friend.

k. Be on the lookout for bed bugs and inspect areas where suspected infested patients visited for signs of bed bugs.

l. After handling patient belongings, valuables, bed linens, etc. please ensure that bed bugs did not crawl onto your pants and/or shoes. They are considered hitchhikers and can crawl, albeit slow, to another source.

m. If bug(s) are seen, please try to capture the bug and put into a container such as a specimen cup. Hold for Infection Prevention and Control and/or exterminator to examine.

n. If bugs are identified during **evening, night or weekend shifts please follow protocol listed above** and contact **Nursing Supervisor**.

o. At patient discharge: 1. Block room off 2. Notify Engineering to call Pest Control.

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**BED BUG CYCLE**  **ADULT BED BUG-UNFED**  **ADULT BED BUG - FED**  **ROACH CYCLE for Comparison**

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**References**

*Joint statement on bed bug control in the United States from the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Environmental Protection Agency (EPA).* Atlanta, Ga.: U.S. Dept. of Health and Human Services, Centers for Disease Control and Prevention; 2010. Print.