



Sample Dermatophytosis (Ringworm) Protocol

Purpose

Provide guidelines for the diagnosis and treatment of dermatophytosis (ringworm) in dogs and cats.

Responsibilities

- All staff and volunteers are responsible for reporting clinical signs consistent with dermatophyte infection.
- All medical staff are responsible for screening animals for dermatophytosis at intake, performing diagnostic testing, and monitoring response to treatment.
- Staff veterinary technicians/nurses can make a preliminary diagnosis of dermatophytosis and initiate diagnostics and treatment per the directions in this protocol.
- Staff veterinarians are responsible for confirming the diagnosis of dermatophytosis, considering the overall clinical picture, and developing the appropriate plan in the context of the wellbeing of the individual animal and the shelter population.
- Staff veterinarians and program leadership are responsible for monitoring capacity for care regarding treatment of dermatophytosis and planning intake and individual case management accordingly.

Diagnosis/Screening

All medical staff will be trained in the appropriate diagnostic techniques to screen for and make a preliminary diagnosis of dermatophytosis. If you are uncertain of your diagnostic findings at any time, please contact a more senior staff member or a staff veterinarian.

Intake Screening

Physical examination

All incoming animals should receive a thorough intake examination, including noting any abnormalities to the skin or fur coat. Clinical signs that are highly suggestive of dermatophytosis include fur loss around the eyes, muzzle, ears, or paws.

Wood's lamp examination

Any dogs with suggestive clinical signs and all cats should receive a Wood's lamp examination at the time of their intake examination.

Wood's lamp positive animals

- When possible, confirm results with a staff veterinarian or veterinary technician/nurse.
- See below (candidacy for treatment) to determine whether intake is appropriate, where an intake decision is discretionary.

- If proceeding with intake:
 - Complete the remainder of the intake protocol.
 - Set the animal up either in a room designated for ringworm isolation (cats) or in general holding with signage to utilize gloves, a Tyvek suit, caps, and shoe covers for handling inside the enclosure (dogs). The shelter veterinarian or shelter leadership will determine a walking and elimination plan for ringworm positive dogs that minimizes the risk of contagion while still meeting the dog's physical and behavioral needs.
 - If they are not already informed, alert a staff veterinarian or veterinary technician/nurse of the positive Wood's lamp examination.
 - Sanitize all areas the animal came in contact with. See full sanitation protocol for details. Any person who came in contact with the animal(s) should change any exposed clothing and thoroughly wash their hands prior to moving on to any other tasks.

Wood's lamp negative animals

- No clinical signs: proceed with intake as per normal.
- Clinical signs (not highly suggestive) AND no history of exposure: proceed with intake as per normal and notify the veterinary team of the concerns noted on the intake examination.
- Clinical signs (highly suggestive) OR known history of exposure: begin a DTM culture or submit a sample for PCR if in-house culture is not an option; ok to house in the general population with signage to utilize gloves and protective outerwear for handling.
- Littermate is Wood's lamp positive: begin a DTM culture or submit a sample for PCR if in-house culture is not an option and treat as though Wood's lamp positive pending further diagnostic results.

Clinical Signs Identified After Intake

Animals already set-up in the shelter or in foster care may have clinical signs consistent with dermatophytosis that were either missed at the intake examination or have developed during their shelter stay.

In-Shelter

If clinical signs are noted on an animal currently in the shelter, a Wood's lamp examination should be performed as soon as possible. Follow the steps as outlined above based on clinical signs and Wood's lamp examination results.

Foster Care

If suggestive clinical signs are observed by a foster caregiver, an appointment should be made with a staff veterinarian or veterinary technician/nurse. The foster caregiver should be advised that, pending the appointment, they should keep the animal in an easily disinfected area and wear gloves or wash hands thoroughly after handling the animal. Any exposed clothing should be changed after interaction with the animal.

Diagnosis

The four main diagnostic testing options for dermatophytosis are: Wood's lamp examination, DTM culture, PCR, and trichogram. Diagnostics should be performed on each individual animal in a litter or group.

- Wood's lamp examination – most cats and dogs with dermatophytosis can be identified based on a positive Wood's lamp examination.
- Trichogram – microscopic examination of plucked fluorescing hairs can identify dermatophytosis if the Wood's lamp examination is equivocal or if further confirmation of a positive Wood's lamp examination is desired.

- DTM culture – a **DTM culture combined with microscopic identification should be performed in all cases undergoing treatment** to confirm infection, identify the dermatophyte species, and monitor response to treatment.
 - Dermatophytosis is diagnosed when a DTM culture has a p-score of 2 or 3 and macroconidia are identified on microscopic identification. P-scoring:
 - Negative = no colonies
 - P1 = 1–4 colonies
 - P2 = 5–9 colonies
 - P3 = 10 or more colonies
 - DTM cultures should be held for at least 14 days. However, positive results are often present by day 5–7.
 - Holding DTM cultures for 21 days is preferable if *M. gypseum* or *Trichophyton* is suspected.
- Ringworm PCR – PCR can be utilized as a tool for diagnosis in animals with a negative Wood’s lamp examination but highly suggestive clinical signs. Because of the (typically) faster results relative to fungal culture, PCR is best utilized when highly suggestive clinical signs are present and an expedient answer regarding the animal’s ringworm status is necessary. PCR testing is not the ideal method to determine mycologic cure.

The recommendations from this point on are applicable to a diagnosis of *Microsporum canis*, the most common cause of dermatophytosis in dogs and cats. For animals diagnosed with other dermatophytes, such as *Microsporum gypseum*, treatment and management decisions should be made on a case-by-case basis based on the history and clinical signs.

Management and Husbandry

It is the responsibility of shelter leadership and the shelter veterinarians to continually assess the shelter’s capacity for care to determine a responsible plan for the management of dermatophytosis. While every effort will be made to provide treatment for medically and behaviorally appropriate candidates, it is our responsibility to ensure that appropriate housing and staffing resources are available for the animals in our care.

Candidacy for Treatment

Treatment for dermatophytosis, particularly for cats, requires prolonged confinement and frequent handling for topical and oral treatment. As such, proceeding with treatment is not a safe or humane choice for all animals. Because the capacity of the shelter to treat dermatophytosis is limited, thoughtful decisions must be made to select the appropriate candidates. Animals for whom a live outcome is not anticipated should not be treated for dermatophytosis unless treatment is necessary to reduce in-shelter transmission (e.g., for animals who cannot be euthanized due to legal holds.)

Husbandry

Animals should be housed in a manner that considers their individual socialization needs. Whenever possible, based on foster capacity, animals should be placed in foster care for the duration of treatment. When treatment in-shelter is necessary, kittens nearly always benefit from co-housing and every effort should be made to pair or group singleton kittens in stable groupings for the duration of their ringworm treatment. All co-housing, aside from pre-existing groupings or litters, should be done after consultation with the staff veterinarian.

Husbandry In-Shelter

Cats

- All cats undergoing treatment for dermatophytosis in-shelter must be housed in a designated ringworm treatment room.

- Anyone entering the room should wear gloves, a Tyvek suit, shoe covers, and a cap (orange PPE level).
- Enclosures should be spot cleaned during regular cleaning times.
- The enclosure should be sanitized using the ringworm sanitation protocol at least once weekly while the cat is receiving topical treatment. Bedding should be removed and compiled with other ringworm bedding for laundering. Fresh bedding should be placed in the enclosure once the cat has dried (following application of the topical treatment).

Dogs

- The staff veterinarian will decide based on signalment, behavior, and clinical signs the best walking/elimination plan and whether the dog can be managed with less PPE requirements (i.e., gloves and gown or other protective outer layer). The contagion level will then be continually evaluated and further adjusted with response to treatment.

Husbandry in Foster Care

Foster caregivers should be informed of ringworm's zoonotic potential.

All foster cats being treated for ringworm should be confined to an easily sanitized area such as a large dog crate or bathroom. Any area of the home exposed to the animal prior to diagnosis should be thoroughly cleaned using repeated mechanical cleaning and disinfection. Any exposed bedding should be laundered separately from other household laundry and any exposed toys or scratching surfaces that cannot be thoroughly cleaned (e.g., any cloth or feather toys) should be disposed of.

Any dogs being treated for ringworm while in foster care should have an individualized plan for confinement, elimination and walks based on the overall circumstances and severity of clinical signs.

Treatment and Monitoring

The treatment plan for each animal is ultimately at the discretion of the staff veterinarian and may deviate from the guidelines below based on individual circumstances.

Treatment for Cats

Oral Treatment

- Daily therapy should be prescribed using oral Itrafungol solution once daily for a total of 21 days. If no cure after 21 days, medication can be pulsed weekly, alternating on and off weeks, until cure. Refer to veterinarian for dosing. *Compounded itraconazole should not be used due to efficacy concerns.*
- Offer medications with a small meal of canned food to enhance absorption.
- Kittens should be weighed weekly to accurately adjust their Itrafungol dosage and to monitor for any potential side effects.
- Alternatively, programs may consider Terbinafine once daily for a total of 21 days. This medication may be easier to administer to larger cats and is very affordable. Refer to veterinarian for dosing.

Topical Treatment

In foster care

- Cats should be bathed with a miconazole/chlorhexidine shampoo for a 3–5-minute contact time (or apply a miconazole mousse if bathing is not tolerated) twice weekly until the cat or kitten is cleared.

- Although often less tolerated by foster parents, lime sulfur dips continue to be the best currently available topical treatment that ensures the quickest time to clearance. Foster programs should consider discussing this option with foster parents when foster capacity is low and an expedited treatment plan is needed.

In-shelter

- The default topical treatment for cats housed in-shelter will be twice weekly lime sulfur, diluted at 8oz of lime sulfur per gallon solution (twice the concentration recommended on the label), and left to air dry after application.
- If lime sulfur is unavailable or bathing is not tolerated, treatment as above with miconazole/chlorhexidine shampoo or mousse can be used as an alternative.

Treatment Monitoring

- All individual animals should have in-treatment DTM cultures started weekly. Sampling for the first in-treatment DTM should begin one week after the onset of treatment.
- Foster caregivers can be given new, sealed toothbrushes to utilize at home for sampling. Caregivers should place the used toothbrush in a sealed plastic bag, thoroughly wash their hands, and then place that bag in another sealed bag. This double-bagged toothbrush can then be brought into the shelter for culture.
- Any DTM plates with suggestive fungal growth should be assigned a p-score at the time that growth is first identified.
- Microscopic identification is not necessary for all treatment monitoring cultures. However, it can be a useful tool to identify dermatophyte growth versus contaminate growth.
- The cat should receive a recheck veterinary examination once two consecutive P1 or negative cultures are obtained. However, it may be appropriate in select cases or circumstances to discontinue treatment after just one negative culture (at which point most cats are mycologically cured).
- If no reason for concern is identified on the veterinary examination, the cat should receive a miconazole/chlorhexidine bath and then can be cleared and moved into the general population. Treatment can be discontinued.
- Littermates or co-housed cats are cleared as individuals.

Treatment for Dogs

Dogs with dermatophytosis are typically less contagious compared to cats and infection can often be more readily cleared. The following are general guidelines but the treatment and management plan for dogs with dermatophytosis will vary based on the severity of clinical signs and individualized circumstances.

Oral Treatment

Dogs with dermatophytosis should be treated with terbinafine orally once daily for 21 days. Monitoring weight and for any adverse effects should be performed as described above for cats.

Topical Treatment

The default topical treatment for dogs is bathing or localized topical treatment with a miconazole/chlorhexidine topical product (depending on the severity of the lesions), continuing until the dog is cleared. Lime sulfur (used as above) can be considered as an alternative in specific circumstances if there is a higher concern for transmission or need for expedited treatment plan.

Treatment Monitoring

Fungal cultures should be collected and monitored in the same manner as described above for cats.

Appendix: Feline Dermatophytosis Cheat Sheet

Dermatophyte diagnosis: positive Wood's lamp exam, DTM culture (with microscopic ID), or PCR

1. If not already run, start pre-treatment DTM culture.
2. Place in foster care or move to ringworm treatment room.
3. Rx: Itrafungol PO daily for a total of 21 days of treatment.
4. Rx: topical treatment twice weekly.
 - a. Treatment in foster care (default) - Rx: Miconazole/chlorhexidine shampoo or mousse twice weekly.
 - b. Treatment in-shelter - Rx: Lyme sulfur 8oz/gallon twice weekly if available and tolerated.
5. Perform DTM culture once weekly once treatment is started.
 - a. Two consecutive negative or P1 DTM cultures (default) – final miconazole/chlorhexidine bath then clear and discontinue treatment
 - b. Capacity constraints or other need to expedite treatment course – clear after one negative DTM culture