



Training Playbook:

Ringworm Management

Introduction

While dermatophytosis (commonly known as ringworm) is not fatal under normal circumstances, because of its contagious nature and the prolonged period usually needed for treatment, it remains a reason for euthanasia of many cats and kittens in shelters. That doesn't have to be the case, though. It is possible to implement a lifesaving program for ringworm management in the shelter setting that successfully saves pets who have ringworm and doesn't risk spread to the rest of the population.

This playbook guides shelter staff through what that programming might look like at their organization. Because cats are most at risk when it comes to this disease, the bulk of the playbook addresses management of feline cases, followed by a brief discussion of managing canine dermatophytosis in the shelter setting.

Program Overview

While ringworm is a contagious disease, it is highly treatable, and it's possible to manage individual animals in a shelter without risking spread to other pets. Successful management requires prompt recognition, appropriate diagnostic testing, topical therapy, systemic therapy and environmental decontamination.

Through the use of foster care and volunteers, staff bandwidth can be extended and more comprehensive care provided to animals with ringworm, which frequently requires several weeks of treatment. An outreach strategy for foster caregivers, volunteers and adopters that destigmatizes the disease can also increase live outcomes.

Program Composition

What is ringworm?

Ringworm is a fungal infection of the skin, hair and/or nails, and it can affect both animals and humans. Three species of ringworm are observed in dogs and cats: *Microsporum canis*, *Microsporum gypseum* and *Trichophyton mentagrophytes*.

Factors that increase the risk of disease related to ringworm include young age (animals less than a year old are at highest risk), species (cats have a higher risk), immunocompromised status (retroviral infections, immunosuppressive drugs or medical conditions) and pre-existing skin conditions.



Ringworm on a puppy

Transmission and incubation

M. canis, the species we see in the vast majority of feline infections, is spread through direct contact with infected cats. Infection from a contaminated environment, while theoretically possible, is not thought to occur commonly. *Trichophyton* is thought to be spread through contact with rodent nests, and *M. gypseum* is acquired from contaminated soil, though both may be spread directly between animals. *M. canis* is the species of primary concern for shelters, however.

Ringworm is exceedingly hardy in the environment; spores capable of causing infection can persist for months or years. It can also be transmitted via fomites, such as staff, clothing, bedding, grooming supplies or cleaning equipment that isn't properly disinfected.

Clinical signs

The classic ringworm lesion is a circular crusted area with hair loss, but any hair loss or characteristic thinning of the hair coat in a cat warrants testing in the shelter environment. The most common locations for ringworm are the face, ears, feet and tail. Lesions may or may not have associated pruritus (itchiness).



Ringworm on a cat's ear



Small ringworm lesion on a cat's foot



Ringworm on the face of a cat anesthetized for sterilization surgery

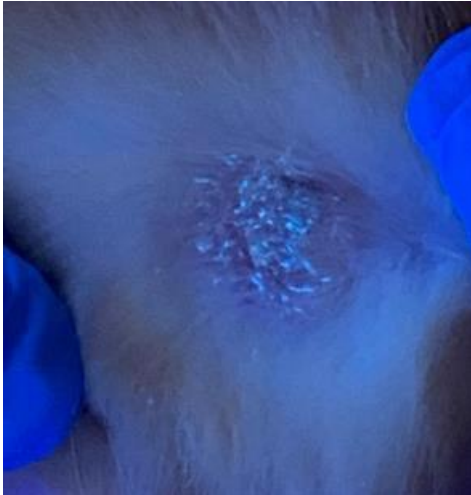
Diagnosis and testing

Lesions similar to those caused by ringworm can be associated with numerous other causes, and animals with no visible lesions may be infected with ringworm, so confirmatory testing is necessary to diagnose infection.

Wood's lamp: A Wood's lamp is an ultraviolet light with a specific wavelength that causes a classic apple-green fluorescence in most strains of *M. canis*. (The once-referenced 50% or less proportion that fluoresce has since been shown to not be the case.) In a positive lesion, the hair shaft will fluoresce, and this is distinct from skin crusts or other substances that may be present on the skin that might fluoresce. This fluorescence is caused by a metabolite of the fungus that is produced as it digests the hair; fluorescence may persist after viable fungus is gone.



Wood's lamp positive lesion in a cat (same cat as in above photo)



Factors that improve the accuracy of a Wood's lamp screening include:

- High quality Wood's lamp (not just a blacklight) with magnification, with plug-in options preferred over battery-powered
- Allow time for the examiner's eyes to adjust to the dark prior to performing the exam
- Distinguish ringworm from contaminants by attempting to wipe off the fluorescing substance; ringworm will not wipe off
- Elevate skin crusts to evaluate the hair shafts for fluorescence
- Hold the lamp no more than 5-10 cm away from the animal
- Examine the entire animal through the magnification, with special attention paid to the most commonly affected areas.

Direct microscopic exam (trichogram): A trichogram can confirm the presence of ringworm, but a negative exam does not rule it out. Hair plucked from the edge of a lesion is placed on a slide with mineral oil and examined under a microscope. Infected hairs are thicker and have lost all internal hair follicle structures. Because this test requires experience and equipment to perform correctly, many shelters do not perform trichograms. They can be useful for equivocal Wood's lamp lesions, even if they are not routinely performed for all cases.

Fungal culture

Fungal cultures can be performed in-house or can be submitted to the lab. Performing these in-house provides a few advantages and does not require extensive equipment.

For cats with lesions, use a new, clean toothbrush or disposable mascara wand (which can be purchased in bulk online) to brush the entire cat first, followed by approximately five brushes directly over the lesion. Sampling the entire cat allows for colony counts to be monitored over time. Sampling just the lesion will only provide a positive or negative result, rather than a quantitative one. For cats without lesions, the entire cat should be brushed (sampled) with the toothbrush or wand. [Watch a video on correct sampling technique here.](#)

The toothbrush or wand is then pressed into **room temperature** culture medium with the plate turned upside down. Gently imprint into the gel in several repetitions over the entire plate. Do not press the bristles deep into the media, as lack of air flow will inhibit growth.

Samples should be incubated at 80-86 degrees Fahrenheit. Commercial incubators can be purchased or [constructed from available materials](#). Cultures should be examined daily for growth and color change of the medium. Most cases of *M. canis* in **untreated** animals will grow within 10 days or less. Low or no growth in 10 days means cats can be treated topically one final time and moved out of isolation. For cats undergoing treatment, a negative culture is required that has been incubated for 14 days, as growth will be slower in treated animals.

In some situations, cats may have been recently exposed to ringworm but not actively infected. A culture (or PCR test) may still come back positive, however, due to the presence of viable spores *on* the cat's coat (rather than true infection of the hair or skin). These cats will have low colony counts on a DTM plate, however, and one of the benefits of in-house cultures is that these cats can be immediately cleared without extensive ongoing treatment. Sampling the entire cat allows for this quantitative result.

Contamination is not uncommon on plates; for a culture to be classified as positive, there must be the characteristic white fluffy growth with concurrent color change (from yellow to red) of the culture media. Slimy, dark brown or green growth is caused by contamination; these plates are interpreted as negative. Microscopic examination can be used to verify the diagnosis if there is uncertainty, but may not be routinely performed, depending on the skill



Positive DTM plate (classic white fluffy growth with concurrent red color change of the media)

level of the interpreter and available equipment. Some non-pathogenic fungi can grossly appear similar to ringworm.

Tape prep: To confirm the presence of ringworm on a DTM plate, a tape prep can be performed. Place a drop of lactophenol blue stain on a slide. Apply a piece of clear tape to the colony. Place the tape over the stain drop on the slide and examine under the microscope.

Polymerase chain reaction (PCR): PCR testing can be performed on samples collected in the same manner as samples for culture or on a sample of fluorescing plucked hairs. Submit a toothbrush or wand directly to the lab in a new sealable plastic bag; submit plucked hairs in a sterile no-additive blood tube.

PCR testing looks for the presence of fungal DNA but cannot distinguish between viable, infective fungus and inactivated or dead fungus. False positives are possible, particularly in “dust mop” cats whose fur is contaminated with viable spores (though they are not actively infected) or cats who have undergone recent treatment with dead, non-viable fungus remaining. Turnaround time for PCR is typically 2-5 days, however, so there may be situations when a rapid diagnosis is desired.

Culturing at the same time is recommended for animals who have recently undergone treatment, however, so that if a positive result is obtained, then live fungus can be confirmed (versus dead or inactivated fungus). This test is often cost-prohibitive in shelters, but the decreased labor involved and rapid turnaround time may be worth the expense in some shelters or specific situations.

[ASPCA video on sample collection and diagnostic techniques](#)

Treatment of ringworm

The most effective approach to treatment of individual cats involves a combination of topical treatment, oral (systemic) treatment and environmental decontamination performed regularly.

Topical treatment: Topical treatment options include lime sulfur dip or anti-fungal shampoos. Lime sulfur is superior due to its residual activity that is not achieved with other treatments, but because the odor is offensive, better compliance may be achieved with alternatives (especially in foster homes). Topical treatment should be performed twice weekly until cure.

Do NOT physically dip cats into tanks or tubs with lime sulfur or other topical treatments because it's extremely stressful for the cats and can lead to cross-contamination when used to treat multiple cats.

[How to lime dip a cat](#) (from Austin Pets Alive!)

Lime sulfur dip may be more difficult to acquire due to decreased manufacturing options, but it is still the preferred topical therapy in shelters because of its residual activity. While not available through some veterinary distributors, it may still be obtained through alternative sources (e.g., Revival Animal Health).

[The Association of Shelter Veterinarians guidance on lime sulfur availability](#)

An alternative option to lime sulfur is miconazole/chlorhexidine shampoos, though these must be left on the cat's coat for a 10-minute contact time, followed by a rinse. Enilconazole is also an option, but it's not available in the U.S.

Oral treatment: The primary options for oral treatment are itraconazole and terbinafine. If itraconazole is used, a commercially formulated product is recommended; compounded formulations have been shown to have less bioavailability and are suspected to be less effective. Terbinafine tablets are extremely cost-effective for adult cats and compounded terbinafine suspension has been used effectively in many shelter programs.

Pulse therapy has been recommended for itraconazole treatment in order to reduce adverse effects and cost. Studies have found, however, that ongoing therapy is safe, and pulse therapy is often difficult to institute with consistency in shelter or foster settings. Cats who do not receive adequate time on therapy will take longer to clear.

Another common reason for slow clearance is the failure to increase the dose with growth in rapidly growing kittens. Kittens should be reweighed once weekly and their oral medication dose increased accordingly.

Environmental management: In cats being treated with topical lime sulfur, environmental contamination risk is actually quite low. In the shelter setting, however, environmental contamination can lead to spore contamination of a cat's hair coat and a false positive result on culture or PCR.

Of primary importance is mechanical cleaning, followed by disinfection with an [appropriate agent applied for adequate contact time](#). Accelerated hydrogen peroxide compounds and potassium peroxymonosulfate products can be used effectively (without the risk of toxicity or respiratory irritation that bleach dilutions and quaternary ammonium compounds pose).

Daily spot-cleaning should be performed to remove large accumulations of hairs; commercial dust-collection wipes or pads may help. Deep-cleaning (including full disinfection) should be performed twice weekly. Deep-cleaning procedures and associated kennel movement are stressful for cats and can increase the risk of upper respiratory infection. Twice weekly is adequate for ringworm disinfection while minimizing the impacts of associated stress.

Laundry is adequately decontaminated through the use of higher drying temperatures and long wash and dry cycles, with maximal agitation achieved by avoiding overloading the washer. This is more effective than adding disinfectants to the wash cycle.

Diagnosing ringworm in the shelter

Wood's lamp screening can be considered for all cats, or at least those of highest risk, and is commonly performed in shelters as part of intake exams and/or prior to entry into group housing. Cats with positive Wood's lamp lesions can be confirmed with trichogram, fungal culture and/or PCR testing.

In-shelter ringworm isolation ward

To protect the rest of the population from spread and to improve the efficiency of daily oral medications and twice-weekly topical treatments, housing cats in a ringworm isolation ward makes sense operationally for most shelters.

Because cats are likely to be housed for several weeks in this ward, it is important to consider their housing. Isolation kennels should be prioritized for portals and double-compartment housing so that cats have more space, and stress should be reduced as much as possible. Because upper respiratory disease in shelter cats is related to longer stays and increased stress, it is common to see it concurrently in ringworm cats. However, this should not be a reason for euthanasia, because we can see this situation in any cat who has resided in the shelter for a long period of time. Increased upper respiratory disease in this ward should prompt the shelter to explore methods to reduce stress, increase enrichment, prioritize a foster program and reduce length of stay.

To prevent the spread of ringworm to the rest of the shelter, shoe covers or dedicated footwear are recommended for entry to and exit from the ward; footbaths are ineffective against this hardy pathogen. Gowns and gloves are recommended for handling cats in the ward. To reduce the spread of non-ringworm pathogens within the ward, gloves should be changed between individual cats. Staff should be trained in the proper donning and doffing of this personal protective equipment to avoid contaminating themselves.

It's preferable to keep cats undergoing ringworm treatment in an area that is visible to the public so that they have an opportunity to leave the shelter via fostering or adoption (with treatment continuing in the home). Shelters that have destigmatized ringworm treatment and placed these cats in public view have had success in reducing their length of stay in the shelter.

Volunteers can be engaged to participate in the management of ringworm cats, including the labor-intensive process of dipping. Many shelters have successfully implemented programs that are primarily run by trained, experienced volunteers.

Foster programming

Foster programming for ringworm cats, either as a replacement for an in-shelter ringworm ward or in conjunction with an in-shelter program, provides behavioral socialization benefits to individual cats and decreases the workload for shelter staff.

The foster cats should receive treatment that's similar to treatment for in-shelter cats (topical twice weekly, daily oral therapy, weekly fungal cultures or other testing to determine clearance of infection). Consider having foster volunteers learn how to collect samples for fungal culture. These samples can be delivered to the shelter, rather than transporting the cats to the shelter on a recurring basis.

To make cleaning and disinfection easier, foster volunteers should be advised to keep ringworm animals in a confined area that is easy to disinfect (e.g., a bathroom, large dog crate or cat tower). Daily and weekly cleaning recommendations are the same as those for shelter-housed cats (daily spot-cleaning, twice-weekly deep-cleaning in conjunction with lime sulfur dips).

For foster volunteers resistant to doing lime sulfur dips in the home, consider having the cats brought to the shelter for this treatment. Alternative products can also be considered (though they lack the residual effect of lime sulfur, so cats may take longer to clear their infection).

Clearing cats and kittens

A definitive strategy for clearing cats is using serial fungal cultures. Cultures should be collected weekly beginning at 2-3 weeks of treatment just prior to topical treatment. Cultures should be checked daily and evaluated for growth and color change. Positive cultures can be noted and discarded immediately: Further treatment is needed. Cultures can be definitively assessed as negative at 14 days.

Recent research has shown that the old approach requiring cultures grown out to three weeks is unnecessary; cats can be considered cleared when they have one culture that is negative at 14 days and a second culture concurrently negative at seven days. They should be treated topically one final time and can be moved out of ringworm isolation.

An alternative strategy that does not require serial cultures is to treat for a minimum period of time and clear cats when lesions are no longer present (gross lesions and Wood's lamp lesions). Some cats will appear Wood's lamp positive even after clearance, as the metabolite is still present in the hair shaft even though there is no viable fungus, so fungal cultures typically clear cats more rapidly than this method.

PCR may also be used for clearing cats, but false positives are common, as the DNA material of dead fungus is detected. Cats will take longer to clear on PCR for this reason. When the time to achieve negative culture (14 days) is taken into consideration,

PCR results and a negative culture often occur around the same time, but PCR is typically more expensive.

Canine dermatophytosis

Ringworm is seen less frequently in dogs than cats in shelters. In shelters, the most commonly affected dogs tend to be puppies, though adults (especially immunocompromised dogs) can become infected. The principles of management are the same and include concurrent topical treatment, oral treatment and environmental decontamination.

Housing dogs with ringworm in isolation may pose a challenge for shelters, due to their larger size. As with cats, infection from the environment is not common and contamination is minimal from animals undergoing topical treatment. While dedicated isolation space is considered ideal, lack of isolation space for large dogs with suspected lesions should not be a reason for euthanasia. Though not ideal, these dogs can be housed in a separate area of general housing while undergoing treatment. Kennels should have appropriate signage and personal protective equipment requirements, and staff must be trained in biosecurity.

Sample Procedure and Program Information Documents

Now that you have a general understanding of shelter ringworm management, the following documents can act as templates or inspiration as you implement or scale up your own program. Keep in mind that there is no exact or perfect form of implementation. Using the considerations and program composition notes above, you should use the following as guidelines or building blocks when creating your own standard operating procedures or documents (both internal and public). *All medical protocols should be designed in consultation with a veterinarian.*

If you have questions regarding the topic of ringworm management, please reach out to your [regional strategist](#), [regional director](#), or the Best Friends national shelter support team at team2025@bestfriends.org.

Sample protocols and resources:

- [Sample ringworm protocol](#)
- [Sample in-house ringworm culture \(DTM\) protocol](#)
- [Sample ringworm protocol without using cultures](#)
- [Sample DTM monitoring sheet](#)
- [Flow chart for ringworm culture interpretation \(diagnosis and monitoring\)](#)
- [Disinfectant chart \(ASPCA\)](#)

How-to videos:

- [Sample collection and diagnostic techniques \(ASPCA\)](#)
- [How to lime dip a cat](#) (Austin Pets Alive!)

Foster volunteer resources:

- [Helping Kittens with Ringworm \(The Kitten Lady\)](#)
- [Ringworm Guide for Fosters \(Maddie's Fund\)](#)