



## Dermatophytosis

### Investigating a Possible Outbreak In a MultiCat Facility

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## Acknowledgements





- Sandra Newbury, DVM DABVP, Shelter Medicine
- Rebecca Stuntebeck DVM DABVP, Shelter Medicine and
- Brenda Dines, DVM DABVP, Shelter Medicine



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## Just to be on the same page...



Superficial fungal disease

Infectious and contagious

Treatable and curable

Self-resolving

Transmitted via direct or traumatic fomite inoculation

*M. canis* infection in a kitten

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## Great treatments for people but still one of many animal acquired diseases



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## Multi Cat Groups In Disguise

- Research facilities
- Cat breeders
- Owners of >1 cat...
- Providing care or advice to local shelters
- Foster families...
- Volunteering veterinary services to rescues, breed groups, cat sanctuaries, county fairs...
- Kittens in a basket
- Participating in on line discussions....

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## A news article can get you involved in an outbreak response



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## For me, it started with our local shelter

- Open admission shelter
- Screening and treatment program
- **Examined 5644 cats over 24 months**
  - 584 culture positive cats (10.3%)
  - 381/5644 cats had skin lesions (6.75%)
  - **94/5644 were lesional, Wood's positive and culture positive (1.64%)**
  - 490/584 cats were fomite carriers (8.68%)

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## The “Ringworm Outbreak Telephone or Email”

How to be **THE HELP**  
or  
What you can do until **THE HELP** arrives

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## We got this call.....

Original Article



fms

Management of endemic  
*Microsporum canis* dermatophytosis  
in an open admission shelter:  
a field study

Sandra Newbury<sup>1</sup>, Karen Moriello<sup>2</sup>, Kimberly Coyner<sup>3\*</sup>,  
Ann Trimmer<sup>4</sup> and Darcie Kunder<sup>2</sup>

Journal of Feline Medicine and Surgery  
1-4  
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sagepub.co.uk/journalsPermissions.nav  
DOI: 10.1177/1098612X1454264  
jfm.sage.com  
SAGE

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## Step 1 Collect Case Information

- Ask what is going on **Prompt an unguided narrative or you will not get the full story**
- Is there an outbreak?
- What is an 'outbreak'?



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## Is it true disease or culture positive status? Or something else?



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## Key Questions

- What clinical signs?
- How many in population? How many affected?
- Where are affected housed? Where are unaffected housed?
- Did a veterinarian examine the animals?
- Have any been treated?
- What diagnostics were performed-when, where, and by whom?
- Was a Wood's lamp used?
- Were direct examinations of hairs performed and by whom?
- Was diagnosis based upon fungal culture, what medium, how and when incubated?
- Was it confirmed as microscopically?
- Was color change used?
- Was it reported as 'positive' or 'negative'?

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## Caller Homework

- Make a list of all animals in population
- Signalment
- Current clinical signs and health status,
- Date of entry into facility
- Current location
- Results of diagnostic tests that were performed
- Treatments and doses and frequency of use
- **Facility map-location of animals, may help with determining risk of infection, or exposure by housing location**
- Has disease been documented in care takers?

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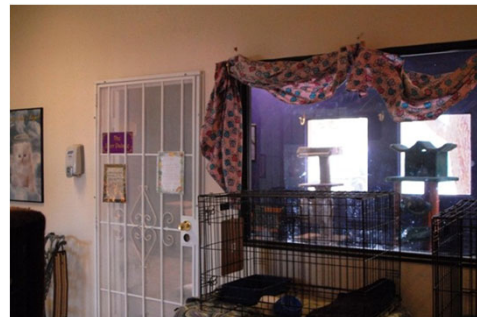
## Initial Information

- 1200 cats admitted each year
- 89% of cats on lower level were lesional and culture positive
- 40% on the upper level (adoption area) were culture positive
- FeLV/FIV positive cats
- Many needed serious medical attention
- Endemic upper respiratory disease

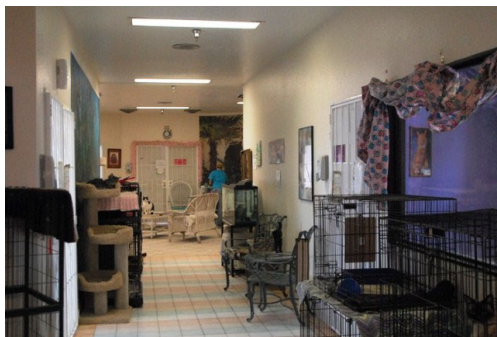
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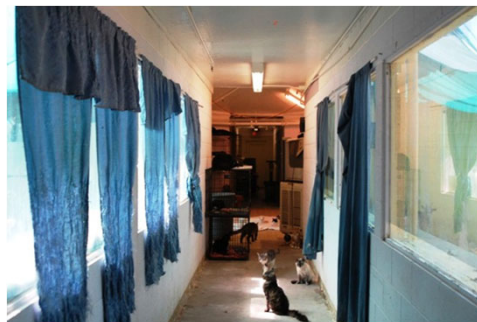
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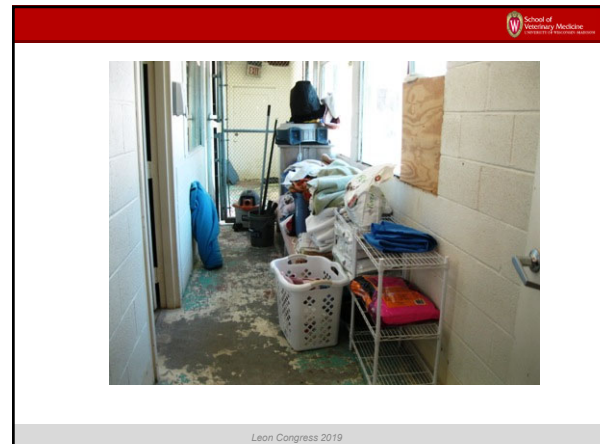
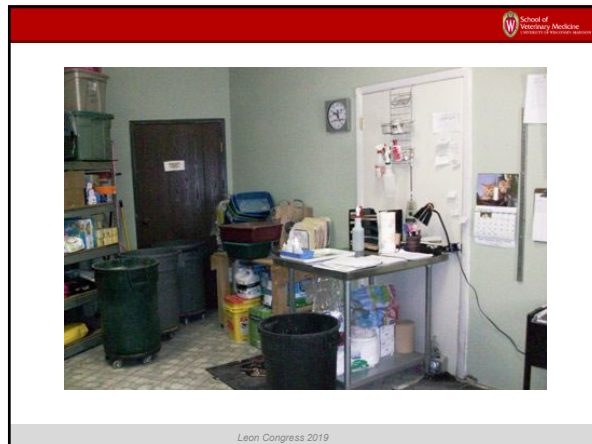
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## Step 2: Temporary Action Plan

- **Stop movement of animals into facility**
- Use an isolation area if available, otherwise hold animals 'in place'
- **Aggressively clean and disinfect the environment**

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## What does “aggressive cleaning” mean?

- Remove clutter
- Mechanical removal of debris
- Scrub with detergent and water until visibly clean
- Rinse with water
- Remove excess puddles
- THEN spray disinfectant-10 min contact time
- Disinfectant-kill spores not removed by mechanical cleaning

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Research Article  
**Kennel Disinfectants for *Microsporum canis* and *Trichophyton* sp.**

Karen A. Morille

TABLE 1: Mean number of colony forming units

	1:10	1:5
Veterin	>1000	>1000
Sodium hypochlorite 1:10	0	0
Sodium hypochlorite 1:52	0	0
Sodium hypochlorite 1:100	0	0
ALP 1:10	0	0
Enfomaxide 1:100	0	0
2% potassium peroxydisulfate	0	0
1% potassium peroxydisulfate	4 ± 3	15 ± 6
Calcium hypochlorite	>1000	>1000

Mean of the age group ± standard deviation.  
 ALP: accelerated hydrogen peroxide (Acet).

Calcium hypochlorite was not effective

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## Problems with Bleach

- Human and pet animal health hazards
- HAS “USE BY DATE”
- Rapid loss of efficacy once diluted-keep out of light
- Lacks detergency
- False sense of security
- First need to remove organic debris
- Potential to interact with other chemicals to create toxic gases
- Unpleasant odor
- Damage to hard surfaces, floors, kennels, etc.

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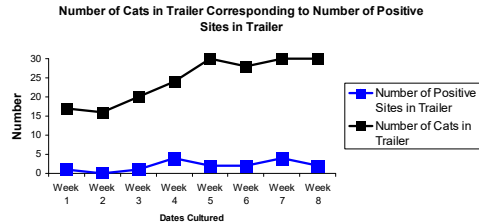
## The Problem With Rag Mops

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## Daily mechanical removal, 2x week hard clean

Number of Cats in Trailer Corresponding to Number of Positive Sites in Trailer



Week	Number of Positive Sites in Trailer	Number of Cats in Trailer
Week 1	1	15
Week 2	1	15
Week 3	1	20
Week 4	2	25
Week 5	2	30
Week 6	2	28
Week 7	3	30
Week 8	2	30

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## Routine Cleaning and Furnace Filters





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## Veterinary Dermatology

DOI: 10.1111/evl.12759

Mechanical washing of pet food bowls is effective for *Microsporum canis* decontamination


Karen A. Moriello



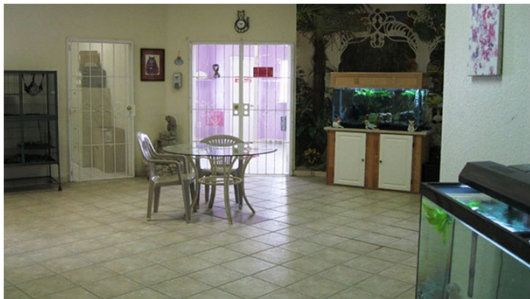
Soak in hot water for 2 min

Wash until visibly clean

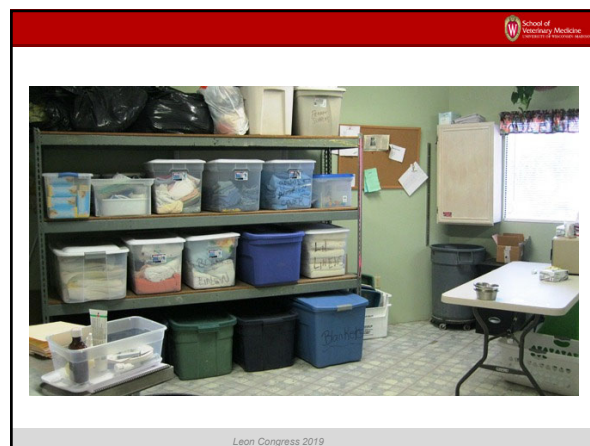
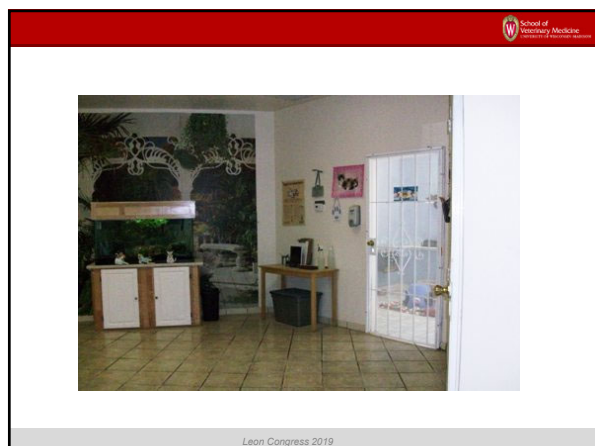
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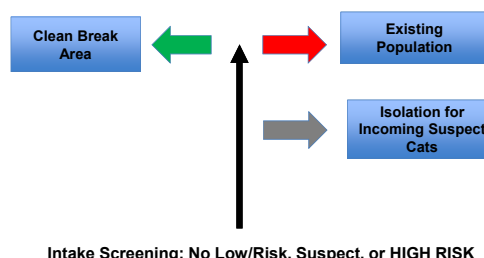


### Step 3: Establish a “Clean Break” Area

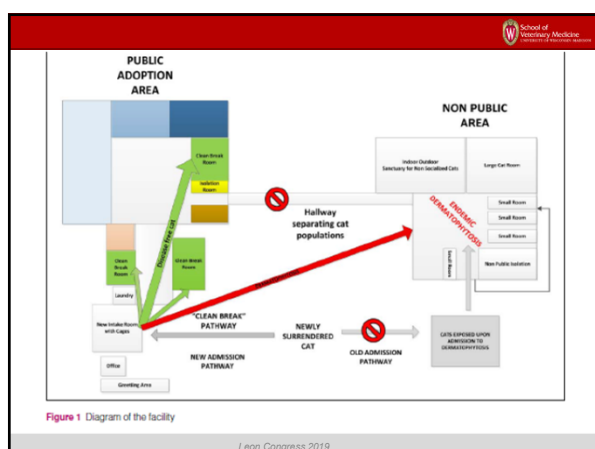
- Clear separation between “clean” and “contaminated area until cycle of transmission stops and new animals can be admitted
- Does not house any exposed animals
- If selected site housed exposed animals, clean and disinfect thoroughly
- Clean break is where new unexposed incoming animals are housed-screen for lesions with room and Wood’s lamp

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### Clean Break



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### Step 4: Initial Cat Assessment

- Goal: Sort animals by infection risk
- BEFORE examining animals assess husbandry and environmental factors
  - Crowding, Random co-mingling, Lack of separation of affected/ill animals, Inadequate housing, Problems with decontamination
- Examine any existing fungal cultures
- Not sure if there is an “outbreak”? Examine animals identified as ‘infected’

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## Point of Care

- Wood's lamp
  - 91 to 100% positive in untreated cats
  - Excellent screening TOOL to find hairs for direct examination
- Direct examination
  - Confirms infection at point of care
  - Best technique is plucking and scraping; will identify >85% of infected animals
- REMEMBER toothbrush cultures are not gold standard
  - False negatives and false positives

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## High Suspicion?

- May take several days to examine all animals
- Start examination with animals identified as 'already infected' to minimize cross contamination
- Examine with Wood's lamp and direct examination
- Targeted sampling of lesions
  - Fungal culture-toothbrush lesions
  - PCR?
  - Pros and Cons of sampling every cat
  - *(This shelter every cat was sampled multiple times)*

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## Key Use Tips

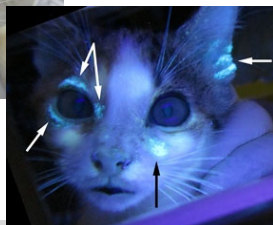
- Medical grade lamp, plug in, NOT BLACK LIGHT
- **Built in magnification, increases find 50%**
- **Hold CLOSE to skin (2-4 cm)**
- Start on head, move slowly
- **LIFT** crusts, only **hair shafts glow**
- Newly infected hairs are very short
- Worried about false fluorescence? Look at hair root

ESVD Liverpool 2019



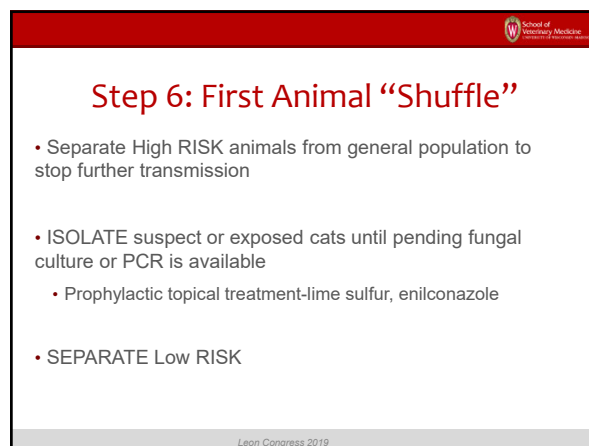
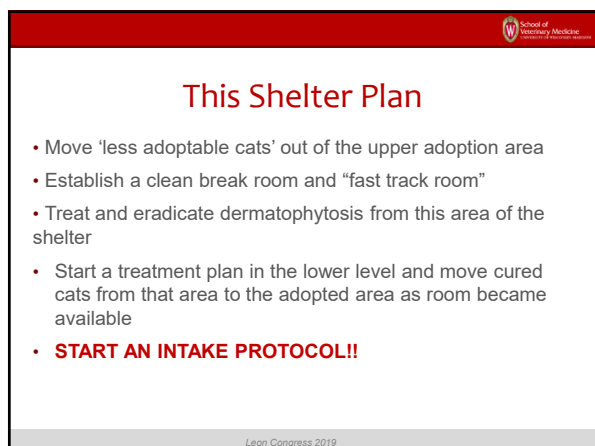
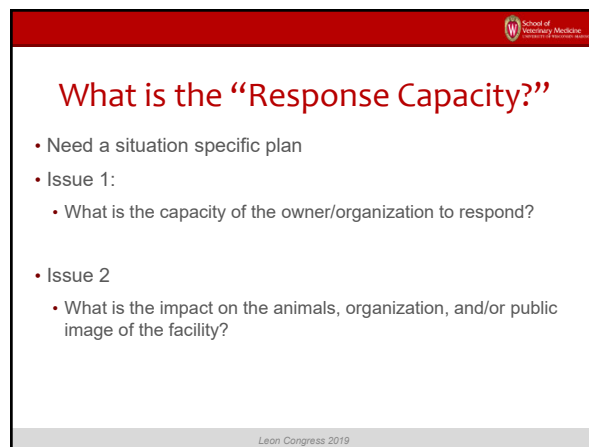
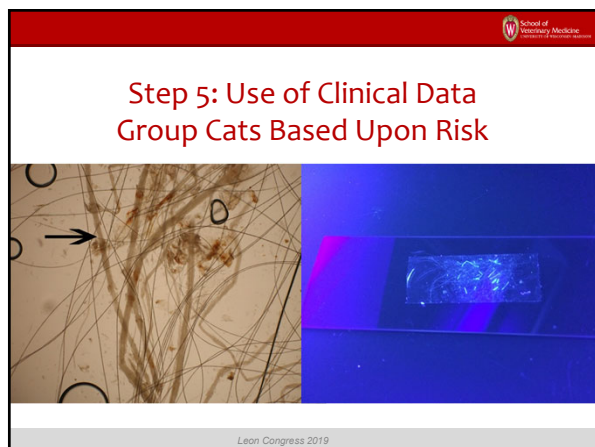
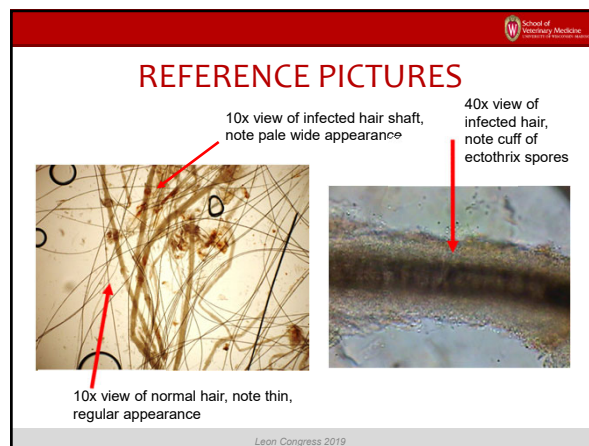
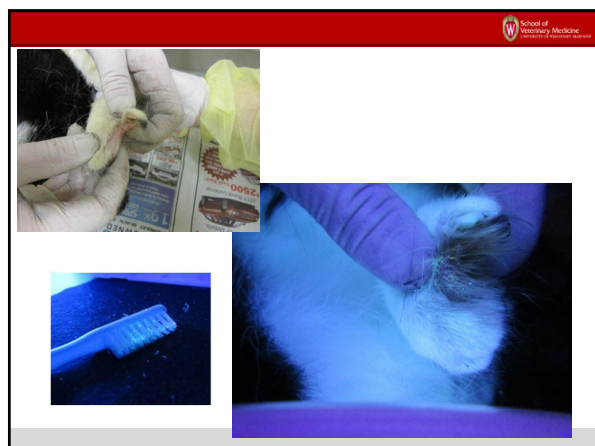
Find lesions  
otherwise  
missed in  
room light

Identifies sites  
for sampling  
and culture



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## Limited Space?

- Ideally wards or rooms
- Can be single rooms cordoned off to isolate HIGH or MODERATE risk groups
- Clean
  - Low RISK first
  - Moderate RISK
  - HIGH RISK
- USE separate cleaning supplies for each group

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## Step 7: Evaluation of Culture Results

- In House Fungal Culture Advantage
  - Daily observations
  - Monitor colony forming units (cfu/plate)
- CFU and presence or absence of lesions can help determine risk
- PCR is rapid and sensitive but lacks quantitative info

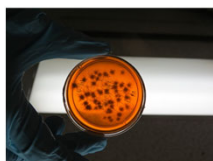
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Short Communication



### Evaluation of incubation time for *Microsporum canis* dermatophyte cultures

Rebecca Stuntebeck, Karen A Moriello and Maria Verbrugge

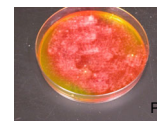
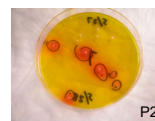
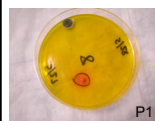


**Only need 14 days to finalize no growth cultures**

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## “Reading Cultures”

- Positive vs. Negative
- How much growth?—it matters A LOT
- Microscopic confirmation



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## Step 8: Second Animal Shuffle

- First ‘animal shuffle’-categorized on risk based on initial screening
- Second “animal shuffle” uses culture/PCR results used to confirm disease in suspect animals
  - Identify Fomite/ mechanical carriage
  - Identify HIGH risk truly infected (lesional culture positive)
  - Identify HIGH risk cats with >10 cfu/plate

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## Fomite Mechanical Carriage

- Low number of cfu/plate (less than 10)
- Re-examination in room light and with Wood’s Lamp
- No new lesions or no fluorescing hairs
  - Unlikely to be truly infected
  - Treat topically to disinfect the hair coat
- Lime sulfur, enilconazole, miconazole/chlorhexidine shampoo

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## Suspect with Positive Results

- High number of cfu/plate (>10 cfu/plate, rapid growth)
- Re-examine in room and Wood's Lamp
- Situation #1
  - No new lesions-still consider HIGH RISK due to # cfu/plate
  - Could still be fomite carrier
  - Treat as "infected"
- Situation #2
  - FIND new lesions and/or Wood's positive lesions
  - Treat as "infected"

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## Veterinary Dermatology

Vet Dermatol 2013; 24: 618-e150 DOI: 10.1111/vid.12069

### Treatment of shelter cats with oral terbinafine and concurrent lime sulphur rinses

Karen Moriello<sup>1</sup>, Kimberly Coyner<sup>1</sup>, Ann Trimmer<sup>2</sup>, Sandra Newbury<sup>3</sup> and Darcie Kunder<sup>4</sup>



30 to 40 mg/kg orally once daily for 21 days

Topical antifungal twice a weekly

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## Veterinary Dermatology

DOI: 10.1111/1365-3164.2009.00789.x

### Eradication of feline dermatophytosis in a shelter: a field study

Didier Noël Carletti<sup>1</sup>, Pauline Guinot<sup>2</sup>, Etienne Meissonnier<sup>3</sup> and Pierre-Antoine Germain<sup>4</sup>

Cat sanctuary with indoor and outdoor living areas

- **Feline oral liquid itraconazole 5 mg/kg orally on a week on/week off basis**
- **DO NOT USE COMPOUNDED ITRACONAZOLE**
- **Use twice weekly topical therapy**

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## Lesion status, Wood's, and Culture

		EXAM	WOOD's Hair Shafts	Wood's Hair Tips	Decision
M. CANIS	P1	Lesional	Pos/Neg	Pos/Neg	High Risk/Not Cured
		Nonlesional	Positive	Pos/Neg	High Risk/Not Cured
		NonLesional	Negative	Pos/Neg	Cured
	P2	Lesional	Pos/Neg	Pos/Neg	High Risk/Not Cured
		Nonlesional	Positive	Positive	High Risk/Not Cured
		NonLesional	Negative	Pos/Neg	Cured
	P3	Lesional/NonLesional	Pos/Neg	Pos/Neg	High Risk/Not Cured

### Monitoring response to treatment

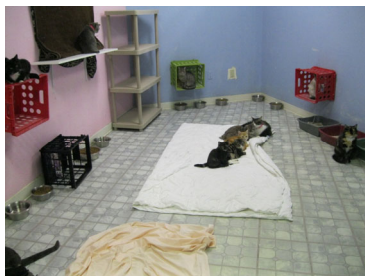
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## Step 9: Assessing Efficacy of Environmental Cleaning

- Environmental cultures assess cleaning efficacy
- Positive results suggest combination of
  - Poor cleaning
  - Presence of cats with active lesions
  - Poor adherence to topical therapy
  - Breaks in protocol

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## Resistant Ringworm Group 1 Wood's Positive Cat



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## Environmental sampling




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## Step 10: Long Term Response Plan

- Train staff to do skin examinations at the time of intake
- Organize intake room to allow for a Wood's lamp examination
- Keep a "control" slide of glowing hairs for training and reference
- Keep supplies available for fungal culture
- Have a "topical therapy plan" for suspect cats
- Focus on inflammatory lesions

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## Focused Evaluation of Skin Lesions



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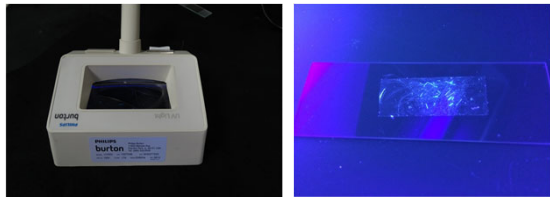
## Highest Risk Population-Kittens

- Routine Wood's lamp of kittens at time of admission
- Ears, face, chin



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For *M. canis* suspects... Use Wood's lamp to find target hairs



Make a control slide

UV light 320 to 400 nm, peak 365 nm

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## 1 year after the first phone call

- Over a 12 month periods
  - 1226 were surrendered
  - 273 (22.3%) were culture positive
  - 60/273 were lesional, culture positive, Wood's and direct positive
  - 50/60 were kittens
- Disease recurred 3x, each time in kittens introduced without Wood's examination

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## Resources

Journal of Feline Medicine and Surgery (2014) 18, 407-418

**FELINE DERMATOPHYTOSIS**  
**Steps for investigation of  
a suspected shelter outbreak**

Sandra Newbury and Karen Mortello



Outbreak Response, Kirk's Current Veterinary Therapy, Stuntebeck, R, et al  
Infectious Disease Management in Shelters, Miller and Hurley, Wiley Blackwell

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