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Ringworm Outbreak Management

Feline Dermatophytosis



A word about recognizing and treating infectious disease with zoonotic potential in a shelter setting.

*The information in these talks is intended to help shelters work **with veterinarians** to design cost effective systems to screen, treat, and monitor for dermatophyte infections.

***Please, don't try to go it alone!**



Outbreak Response Preview

- * Identification / Diagnosis of primary agent
- * Assessment of capacity to respond
- * Assess impact of possible response plans



Outbreak Response Basics

- * Evaluation of history and clinical signs (organization level)
- * **Clean break**
- * Evaluation of clinical signs (individual animal level)
- * Risk categorization
- * Quarantine / treatment or removal of affected or high risk animals



Dermatophytosis: The Rules

- * Pleomorphic presentation
- * Many species of dermatophytes – *M. canis* is the most commonly implicated in clinical problems
- * Lesions may not be “obvious”
- * Wood’s lamp exam highlights fluorescence from *M. canis*
- * Fungal culture is the gold standard for diagnosis



Dermatophytosis: The Rules

- * DTM (dermatophyte test media) is standard growth media
- * Red color change and white (ish) fluffy growth indicates need for micro exam
- * Positive id required for diagnosis
- * Direct exam of Wood's positive hairs is like a SNAP test for dermatophytosis
- * Healthy, adult cats are difficult to infect in research settings



Case One



First email



Second email (2 days later)



What's wrong with the picture so far?

“unfortunately we’ve had a few cultures come back +ve. I am sending out those cultures to be ID’ed by a lab, which will take at least 7 days if not longer”



Adding things up



+



+



Hello Kitty Microscope!

+



= POS



When considering depopulation...

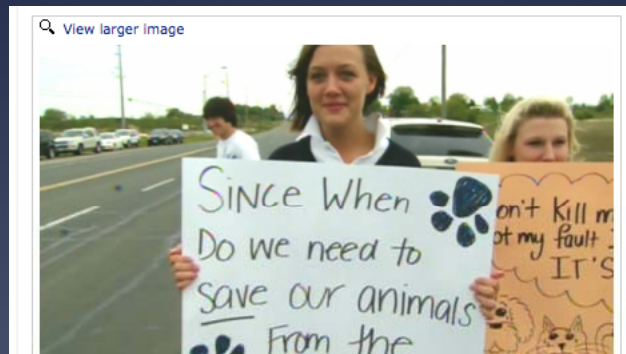
... many factors including transmission, morbidity, mortality, and public health should be taken into account.

Along with shelter administration, board members and staff/community veterinarians, it is recommended that shelter medicine experts or related professionals be contacted for opinions and advice before making a final decision.

All other avenues should be fully examined and depopulation viewed as a last resort.
– Association of Shelter Veterinarians



ringworm outbreak to be investigated by external experts



Evaluation

- * In house cultures had growth but microscopic id revealed various contaminants
- * No positive id from any diagnostic lab
- * All animals reported to be Wood's positive had faintly glowing yellow sebum on the skin
- * All cultures and reports of positives from private practice were based on red color change alone and were identified by the diagnostic labs as contaminants
- * Reported human cases had no diagnostic testing but were based on history of exposure to the outbreak.
- * No evidence of fungal infection was found in any species



Diagnostic results

ID#									
Name	Age	Sex	Color	Pattern	Test	Result	Date	Lab	Notes
Alvin	9621609	c1	no growth	Y	5/20/10	6/3/10	ng	ng	
Benji	10072609	c1	negative	Y	5/19/10	6/3/10	c	c	
Astro	Berta	Aqua	10027683	E1	negative	Y	5/27/10	6/3/10	c
Alise	Cott	Ashley	10215229	E1	no growth	Y	5/27/10	6/3/10	ng
Betty	Sam	Avery	10262268	E1	negative	Y	5/27/10	6/3/10	ng
Cassi	Gole	Sandit	10119185	E1	negative	Y	5/28/10	6/3/10	ng
Chloe	Hone	Bianca	10076102	E1	negative	Y	5/28/10	6/3/10	c
Cola	Jolie	Blue	10262257	E1	negative	Y	5/27/10	6/3/10	ng
Elaine	Mick	Callie	10044134	E1	negative	Y	5/28/10	6/3/10	c
Felle	Paw	Callisto	10425628	E1	no growth	Y	5/26/10	6/3/10	ng
Gabby	Pres	camron	10215202	E1	negative	Y	5/27/10	6/3/10	c
JJ	Prin	cat	10044511	E1	no growth	Y	5/20/10	6/3/10	ng
Match	Sale	Christopher	10215217	E1	negative	Y	5/27/10	6/3/10	c
Murph	Scot	connor	10029908	E1	negative	Y	5/28/10	6/3/10	c
Sydel	Stee	cotton	9412527	E1	negative	Y	5/27/10	6/3/10	c
Tony	Tash	dallas	9412475	E1	no growth	Y	5/28/10	6/3/10	ng
Zahan	Ashli	destiny	8203344	E1	negative	Y	5/28/10	6/3/10	c
Acir	Ashley	james	10425689	E2	no growth	Y	5/26/10	6/3/10	ng
Apollo	Burt	jewels	10215138	E2	negative	Y	5/27/10	6/3/10	c
Blas	Burt	kiki	10140368	E2	negative	Y	5/28/10	6/3/10	c
Bill	Chad	Lisa	93778129	E2	negative	Y	5/27/10	6/3/10	ng
Blommy	Dan	Marley	9597504	E2	negative	Y	5/27/10	6/3/10	c
Buffy	Flo	Minnie	9557110	E2	negative	Y	5/27/10	6/3/10	c
Carson	Gail	Momma	9997995	E2	negative	Y	5/28/10	6/3/10	ng
Charlie	Hot	Nabisco	10191147	E2	no growth	Y	5/20/10	6/3/10	ng
Dellah	Kip	Ozzy	10425705	E2	no growth	Y	5/26/10	6/3/10	ng
Dora	Levi	Pearl	9557095	E2	negative	Y	5/27/10	6/3/10	c
Ethel	Mar	Penry	9127261	E2	no growth	Y	5/27/10	6/3/10	ng
Jammi	Ma	Spike	10425675	E2	no growth	Y	5/26/10	6/3/10	ng
Jason	Mia	Sweetie	9576522	E2	negative	Y	5/28/10	6/3/10	c
Jenna	Nika	Tango	10425665	E2	no growth	Y	5/26/10	6/3/10	ng
Lilac	Paul	Tinkerbell	10128549	E2	no growth	Y	5/20/10	6/3/10	ng
Ullah	Ty		10262252	E2	negative	Y	5/27/10	6/3/10	c

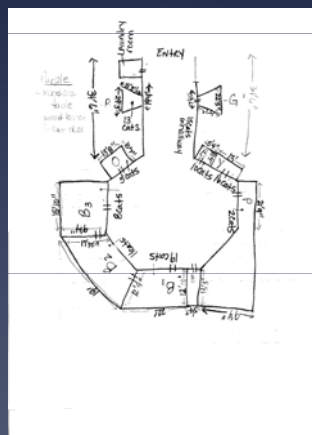


Results

- * Damaging to reputation
- * Increased scrutiny
- * BUT...
- * Increased internal evaluation
- * Dramatically improved operations



Case Two



Culture Results



Diagnostic results

	Family	Name	Results	Lesion	DC	DI	wk 1	wk2	wk3	P-score	other	culture comments
Iso	201504	Downstairs	Amadeus	M canis	Y	8/19/11	8/26/11	suspect	M canis		2	7 colonies
Iso	201243	H3	Asia	M canis	Y		8/8/11	suspect	M canis		3	TNTC
Iso	200960	H3	Bailey	M canis	Y		8/8/11	suspect	M canis		3	TNTC
Iso		H3	Bindi	no growth	N		8/8/11	ng	ng	ng		
Iso	200962	H3	Daily	M canis	Y		8/8/11	suspect	M canis		2	7 large colonies
Iso	200934	H3	Greyson	M canis	Y		8/8/11	suspect	M canis		3	About 10 colonies
Iso	201132	H3	Hoppy	M canis	Y		8/8/11	suspect	M canis		3	TNTC, poor sporulation
Iso	201126	H3	Jamie	M canis	Y		8/8/11	suspect	M canis		3	About 10 colonies
Iso	20627	H3	Jerry	M canis	Y		8/8/11	suspect	M canis		3	Lesions, About 15 colonies
Iso		H3	Jillit	M canis	Y		8/8/11	suspect	M canis		2	7 colonies
Iso	201359	H3	Lily Mae	M canis	Y		8/8/11	suspect	M canis		3	About 25 colonies
Iso	201354	H3	Mel	M canis	Y		8/8/11	suspect	M canis		3	About 10 colonies
Iso	200908	H3	Mishi	M canis	Y		8/8/11	suspect	M canis		3	About 25 colonies
Iso	201094	H3	Safari	M canis	Y		8/8/11	suspect	M canis		2	5 colonies
Iso	200948	H3	Sassy	M canis	Y		8/8/11	suspect	M canis		3	About 25 colonies
Iso	200730	H3	Shifty	M canis	Y		8/8/11	suspect	M canis		1	Lesions, 3 colonies
Iso	201363	H3	Tia	M canis	Y		8/8/11	suspect	M canis		3	About 25 colonies
Iso	201125	H3	Trisha	M canis	Y		8/8/11	suspect	suspect M canis		3	TNTC
Iso	201023	H3	Whetto	M canis	Y		8/8/11	suspect	M canis		3	About 25 colonies
Iso 40	201355	H3	William	M canis	Y		8/8/11	suspect	suspect M canis		3	Large color change to red, many colonies, very poor sporulation
Iso	201495	Downstairs	Miranda	M canis	Y	8/26/11	9/2/11	suspect	M canis		2	8 colonies
Iso	201503	Downstairs	Mozart	M canis	Y	8/26/11	9/2/11	suspect	M canis		3	10 colonies
Iso	201502	Downstairs	Wolfgang	M canis	Y	8/26/11	9/2/11	suspect	M canis		3	About 15 colonies



Go: Initial contact

- * Somebody thinks there's an outbreak
- * Who?
- * Why?
- * Which animals are involved?
- * Leads to step one: Collecting history and "clinical signs"



Step One: Initial Evaluation

What has already been done?

- * Collecting history and “clinical signs”
- * Is disease present?
- * Is it an outbreak?
 - * Severity of disease
 - * Other clinical signs?
 - * Species / Ages affected
 - * Numbers affected
 - * Husbandry PRACTICES
 - * Reported disease at source
- * Individual illness
- * Group signs **



Diagnostic Testing?

- What testing has already been done?
ie red color?
- Veterinary screening for lesions?
- Wood's lamp and direct exam of fluorescing hairs?
- Fungal Culture?
- Microscopic identification?



Outbreak Response?



Key Concept:

- * Stop the cycle of transmission.

Problems:

- * Long diagnostic period
- * Ease of transmission
- * Clinical signs overlap with many skin conditions
- * Environmental Contamination



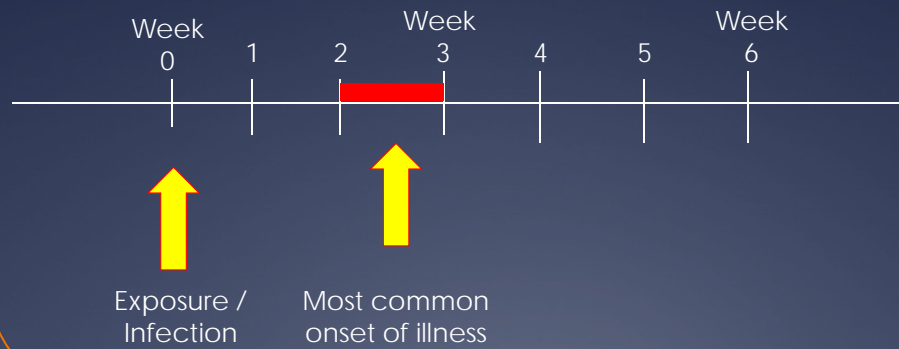
Transmission



- * Highly contagious!
 - * Undiagnosed is highest risk
 - * Environment, stress and health
- * Routes of infection
 - * Direct
 - * Fomite
 - * Environment
 - * Zoonosis



2-3 week Incubation



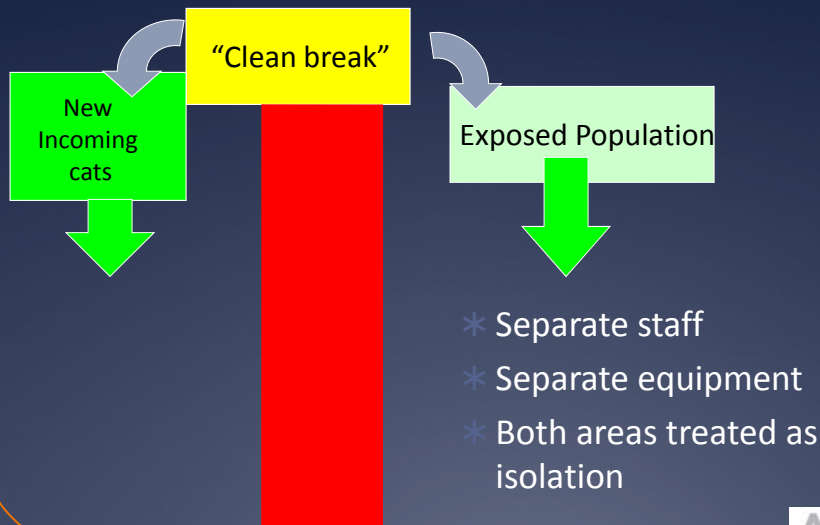
Step Two: Planning



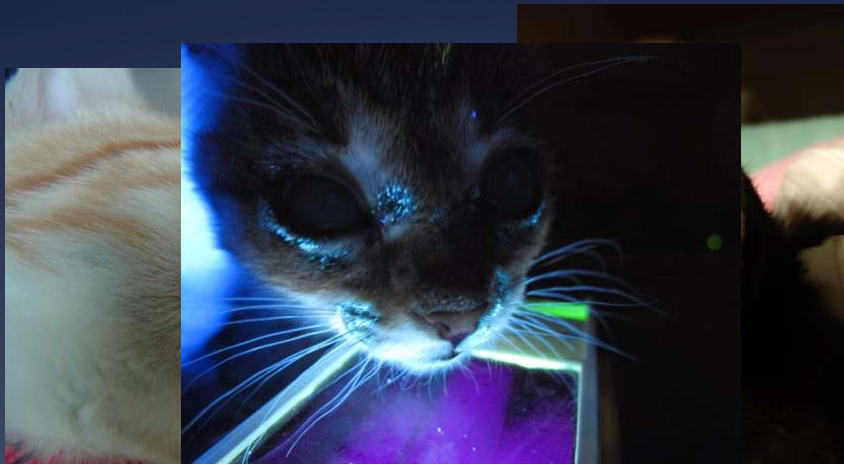
- * What needs to be included in the plan:
- * "Clean Break"
- * Evaluate clinical signs
- * Diagnostics!
- * Initial Risk Assessment
- * Diagnostic results

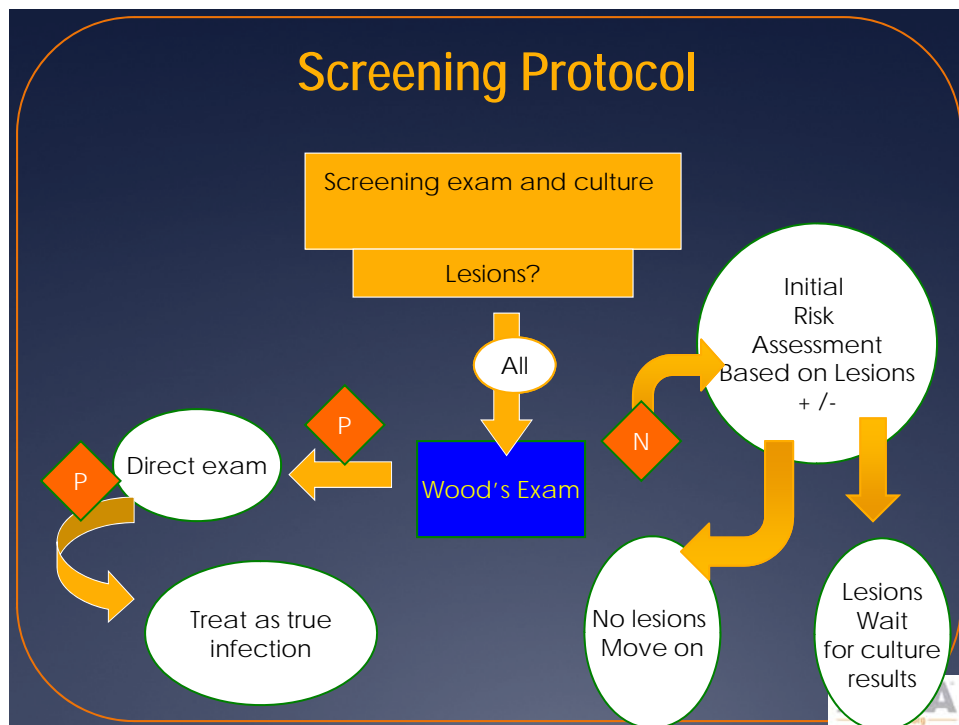
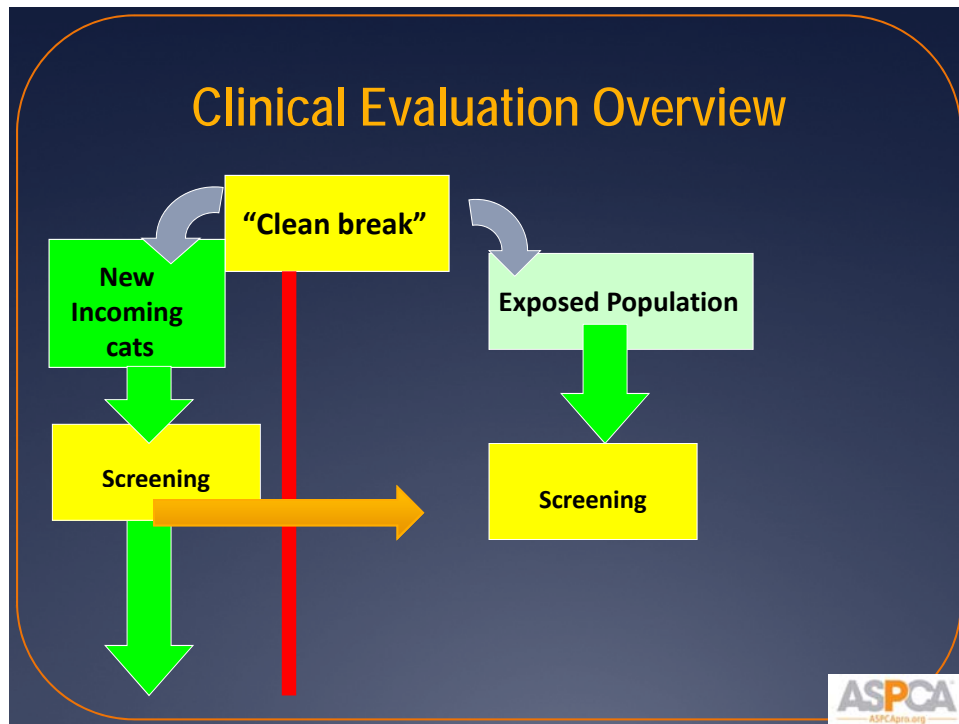


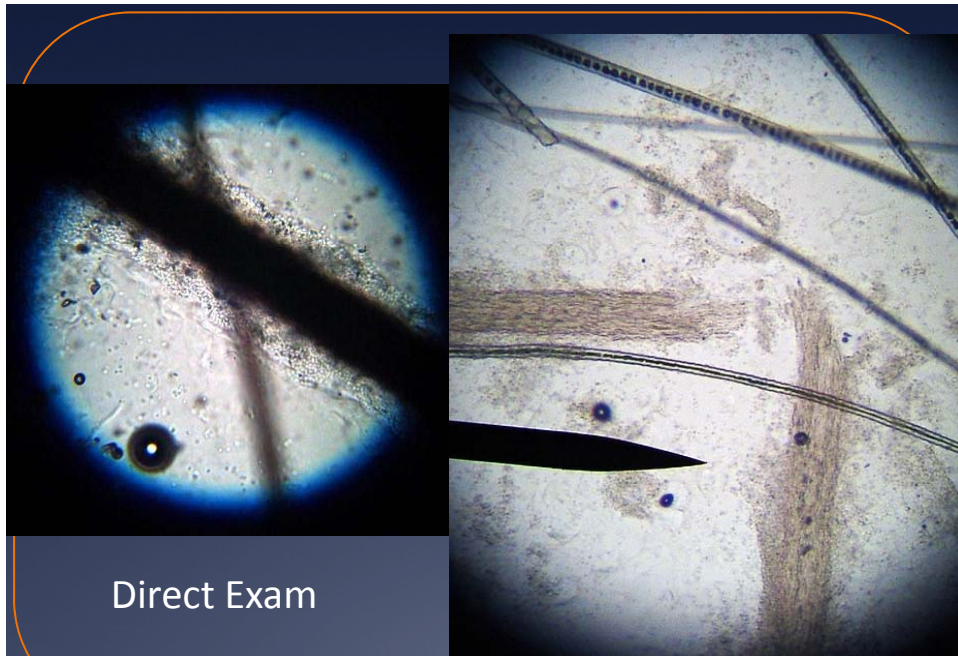
Step Three: Clean Break



Step Four: Evaluate clinical signs








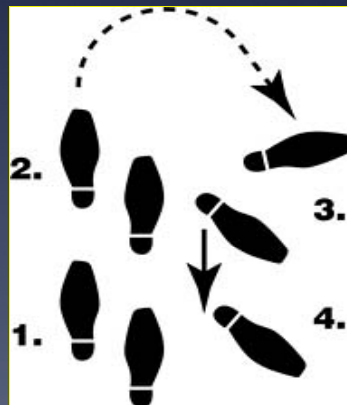
Direct Exam

As close as we get to a SNAP test for dermatophytosis.



Step Five: Shuffle One Wood's Lamp Dance Initial Risk assessment

- ❖ Based on step 4 results
- ❖ Remove identified **positive** animals from general population
- ❖ Isolate / Separate **suspect** animals (lesional)
- ❖ **Non-lesional, Wood's negative** cats
- ❖ Base intervention on clinical assessment
- ❖ +/- Dip and Go
- ❖ +/- Follow up with culture results



Step Six: Evaluate Risk

- * How high is the risk?
- * Initial results of first clinical assessment
 - * Intake practices?
 - * Sanitation practices?
 - * Co-mingling practices?
 - * Level of current disease?
 - * Age?
- * Not Stray vs. Surrender



Step Seven: Environmental Sampling

- * Areas where hair and dust collect
- * Difficult areas / articles to disinfect
- * Pre-cut cloths in zip top bags
- * Label each area
- * Cloth should appear slightly soiled
- * Inoculate as usual



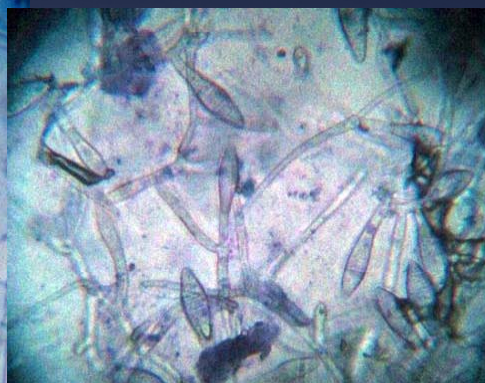
Step Eight: Culture results



Microscopic identification of fungal growth from culture



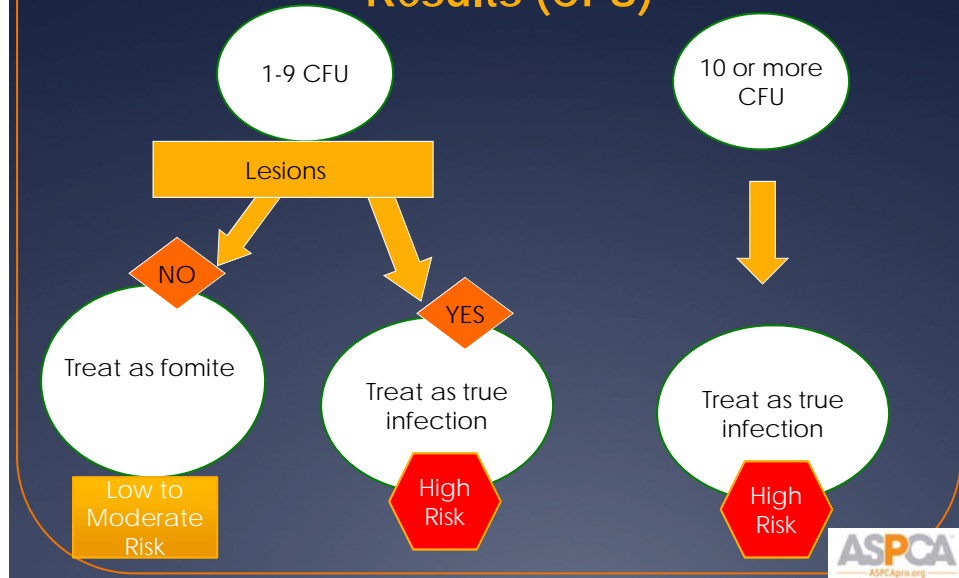
M. canis



M. gypseum



Response Based on Pathogen Score Results (CFU)



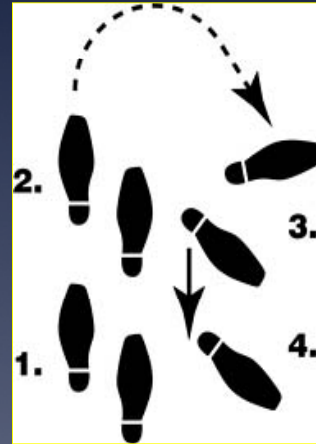
Culture results include environmental samples

Room	Home	Results	FINAL	DC	DI	wk 1	wk2	wk3	P-score	other	culture comments
Laundry Room Shelf		negative	N		5/3/11	c					
Center Room		M canis	Y	4/23/11	4/29/11	M canis			3		HEAVY growth
Fish bowl		suspect	N	4/23/11	4/29/11	suspect					suspect growth
Fish bowl		suspect	N	4/23/11	4/29/11	suspect					suspect growth
ISO 1		suspect	N	4/23/11	4/29/11	suspect					suspect growth
ISO 2		suspect	N	4/23/11	4/29/11	suspect					suspect growth
ISO 3		suspect	N	4/23/11	4/29/11	suspect					suspect growth

Step Nine: Shuffle again

Remove positives from
the general population

Clean like heck!



Can you safely send them somewhere else?



- * **What is safe?**
- * Effective treatments
- * Include topical treatment
- * Away from other pets, children, IC humans
- * Easily disinfected area
- * Resilient, compliant humans
- * No uninformed adopters
- * In shelter isolation area



Treatment Area?



Step Ten: Long Term Response Plan

- * Eliminate risk factors
- * Screen ON INTAKE
 - * Visual
 - * Wood's exam
 - * Culture inflammatory lesions
- * Screen before re-housing
- * Protect the kittens
- * Isolate or separate suspect or affected cats
- * Treat with effective topicals
- * Monitor, monitor, monitor
- * Treatment improves volunteer and staff reporting



Lime sulfur and itraconazole

Published clinical research with shelter animals has:

- * Demonstrated rapid times to cure (+/-14 days) for true infections (P3)
- * Demonstrated excellent control of environmental contamination even after the first treatment
- * Demonstrated that adverse reactions are very rare (did not occur).
- * **No other product or combination has yet been shown to have equivalent efficacy.**



Treatment

- * Lime sulfur topical (8 oz. / gallon) before entering the treatment area
- * Oral itraconazole for 21 days
- * Lime sulfur topical twice weekly until cure is defined
- * Culture weekly just before topical treatment

WITH THIS PROTOCOL:

- * Cure is defined as two consecutive negative cultures taken at one week intervals



Defining cure

WITH THIS PROTOCOL:

- * Cure is defined as two consecutive negative cultures taken at one week intervals
- * Hairloss may not be resolved
- * First culture called at 21 days
- * Second culture called at 14 days

negative	Y	9/2/11	9/9/11	ng	ng	ng	0	0	0
negative	Y	8/26/11	9/2/11	ng	ng	ng	0	0	0
M canis	Y	8/19/11	8/26/11	M canis	0	0	2	0	7 colonies
M canis	Y	8/12/11	8/26/11	suspect M canis	0	3	0		About 15 colonies
M canis	Y	8/6/11	8/16/11	M canis	0	0	3	0	Lesions, TNTC
M canis	Y	7/20/11	7/27/11	M canis	0	0	3	0	TNTC
M canis	Y	1/0/00	8/8/11	suspect M canis	0	3	0		TNTC



Intake Quarantine?

- * 2-3 week requirement!
- * Can you really quarantine?
- * What if one develops clinical signs?
- * **Use excellent monitoring as an alternative!**
- * Not usually recommended
- * Balance risks and population dynamics
- * Consider impact on capacity and crowding
- * Consider maintenance of health and emotional well-being



Summary

- * Exam screening is a powerful tool for prevention
 - * Cheap
 - * Fun
 - * Easy
- * Outbreak response can be devastating and costly.
- * BUT...outbreaks can be managed AND ended.
- * Lives can be saved IF you use a systematic approach.



Thanks for caring...



THANKS!

Ken: Our first customer

...and thanks to the ASPCA for making my position possible



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A Few Coming Attractions from ASPCApro

www.aspcapro.org/webinars

- Starting a TNR Program in Your Community (10/17)
- Beating Ringworm: Yes, You Can! (10/23)
- Let's Talk Fungus! (10/24) *new Q&A session*
- Canine Assessment: SAFER Overview & Research (11/28)
- Helping Adopted Dogs Adjust to New Homes (12/06)

