Case Study
Ringworm Outbreak at Kitchener-Waterloo Humane Society
Dr LeeAnn Sealey DVM, Medical Director
Time Line

Week 1

July 20 – Cat A arrives by animal control officer

Cat A - Malificent
Stray kitten female
8 weeks
Natural Response by Shelter Staff

Woods Lamp Positive

PCR test result in 24 hours positive for Microsporum

Treatment plan
Isolation
Itraconazole
H2O2 baths
2 Weeks Go By
## Time Line

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### Cat B - Michael

- Kitten 8 weeks old
- Housed in shelter since July 12
- Litter of 5 plus mom
- All adopted except him
- Held back for Chronic Herpes in eye
- Lesion found by RVT’s after weekend during rounds.

[OSMA logo]
INVESTIGATE and PLAN

Exposure
Mom and littermates =5
Every kitten housed in kitten room July 12-20 plus
Adoption Pod for July 20 – Aug 2
Hospital July 13 and July 21

= A LOT OF CATS WITH MOST ADOPTED ALREADY

Plan – In Shelter
Screen with PCR cats in Pod with Michael =3 cats
Screen remaining cats from surgery days = 1
Collect cats into “dirty rooms” who have been in shelter
Scrub down empty rooms to make “Clean” rooms for new intakes.
Notify Staff and Volunteers

Plan - Adopted
✓ Through locations and dates – ID all in contact animals both Cat A and Cat B
✓ Notify all adopters of an exposure
✓ Offer PCR screen for anyone concerned about their new pet.

Plan – Treatment
Call A Friend for Help
THS – Dr. Linda Jacobson
Treatment Plan

- Kittens – itraconazole 5mg/kg
  - 21 day treatment, then pulse every other week
  - Forms – Sporanox or Itrafungual

- Adult Cats and Dogs – terbenafine 30mg/kg
  - 21 day treatment, then pulse
  - Form – compounded by Summit, Apotex product

- Baths – lime sulfur
  - Twice weekly
  - Residual action
Challenge 1
Quest for Lime Sulfur

- **Sources are hard to find in Canada**
  - Consider EDR from US.
    - Pro – proper route  Con – takes a long time, paper work
  - Garden supply
    - Pro – easily accessible  Con – questionable source, off label, purity, dilution
  - Other routes – Amazon ?!?!?!?
    - Pro – easy to order, fast delivery once route established
    - Con – slightly less than “proper”

- **Imaverol (Enilconazole)**
  - Pro – available, does not smell
  - Con – quite a bit more expensive
  - Not Labelled for cats
Testing Plan

- PCR for diagnosis/ screening
  - IDEXX – fast turn around for volume = 1 day
  - Typical 1-3 day return
  - False positives

- Cultures
  - Culture must be taken the day of the dip, prior to the dip – best time to have no residual lime sulfur on fur
  - Tooth brush – make sure to collect a good sample
  - Test after 1 week (7 days meds and 2 dips)
  - Repeat weekly culture until 2 negatives
  - Two week turn around at IDEXX for neg.
Good News!!!!!!

Point of Origin from Michael is discovered and it is not a spread within the Shelter

Bad News!!!!!!!

New Case Found
**Time Line**

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<td>14 days A to B?</td>
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</tr>
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</tr>
<tr>
<td></td>
<td>Aug 4 PCR - Microsporum</td>
</tr>
<tr>
<td></td>
<td>27 days A to Dog?</td>
</tr>
<tr>
<td></td>
<td>13 + days B to Dog?</td>
</tr>
<tr>
<td>3</td>
<td>August 16 –</td>
</tr>
<tr>
<td></td>
<td>Dog shows lesion</td>
</tr>
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<td>Aug 16 PCR - Microsporum</td>
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**Nova**

4 year old Rott mix
RACL repair by TPLO July 17th
Physiotherapy by RVT
Lesion on inner thigh noted at recheck rads
PCR positive - Microsporum
Treatment – Isolation, Terbinafine and lime sulfur baths
Challenge 2
Tracking Transmission

With a known in shelter spread,
Tracking the route of transmission was critical

Who?
What?
Where?
When?

- RVT
- Rehab exercises
- On her stifle
- Immediately after treating Michael
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<td>3</td>
<td>August 16</td>
<td>Dog shows lesion</td>
</tr>
<tr>
<td></td>
<td>Aug 16</td>
<td>PCR - Microsporum</td>
</tr>
<tr>
<td>4</td>
<td>August 24</td>
<td>Cat C lesion found at SECOND LOCATION</td>
</tr>
<tr>
<td></td>
<td>Aug 25</td>
<td>PCR - Microsporum</td>
</tr>
</tbody>
</table>

Cat C – Templeton - SPHS
DSH 2 yrs old
Housed in shelter since July 10
Chronic Herpes virus in eye requiring enucleation
Lesion in axilla well developed found at rounds
PCR positive – Microsporum
Treatment – isolation and itrafungal, lime sulfur
The Spread ...........
Surgery July 20
Catheter removal July 21
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<tr>
<td>3</td>
<td>August 16</td>
<td>Dog shows lesion</td>
</tr>
<tr>
<td>4</td>
<td>August 24</td>
<td>Cat C lesion found</td>
</tr>
<tr>
<td>5</td>
<td>Sept 14</td>
<td>Cat D lesion found</td>
</tr>
</tbody>
</table>

Cat D – Nub Nub  
Kitten 8 weeks old intake August 28  
Tail amputation with degloved chin repair  
Chronic herpes  
Lesion – tiny bit of alopecia noted on toes by foster at recheck  
Response – Sheer Disbelief  
UNTIL
PCR positive – Trichophyton
Treatment – foster and itrafunga, lime sulfur

WHOLE NEW PLAN !!!!!!!

- Two shelters now exposed
- Foster home exposed
- New isolation needed**
- Start identifying and screening in contact cats
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</tr>
<tr>
<td>5</td>
<td>August 24</td>
<td>Cat C lesion found</td>
</tr>
<tr>
<td>7</td>
<td>Sept 14</td>
<td>Cat D lesion found</td>
</tr>
<tr>
<td>10</td>
<td>Sept 18</td>
<td>Cat E found during screening</td>
</tr>
</tbody>
</table>

Cat E
- Baby kitten not responding to treatment
- Chronic herpes
- Lesion – none
- Sampled in screening
- PCR positive – Trichophyton
- Treatment – opted to say Good bye
Challenge 3
Isolation Challenges

- How do you isolate animals for so many weeks????

- Nova – dedicated volunteer

- Kittens – isolation room
  - Separate cages?
  - Or let them out loose in the room together

- Trichophyton kitten
<table>
<thead>
<tr>
<th></th>
<th>Kitten A</th>
<th>Kitten B</th>
<th>Nova</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aug 18 sample – positive</td>
<td>Aug 29 sample – positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 29 sample – positive</td>
<td>Sept 6 sample - positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 6 sample – positive</td>
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</tbody>
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Lime sulfur arrives Aug 28th

Aug 18th and 29th sample explained

Disappointment for the Sept 6th samples.

Quickly returned as positive WHY????
Challenge 4
Who is giving the baths??

- Not a nice job
- Volunteers??
- Staff??

Protocol Change
Made
1st week of Sept.
RVT’s bath animals
## Culture Results

<table>
<thead>
<tr>
<th>Culture</th>
<th>Sample Dates</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maleficent - A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 18 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Aug 29 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Sept 6 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Sept 12 sample</td>
<td>negative</td>
</tr>
<tr>
<td><strong>Michael - B</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 29 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Sept 6 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Sept 12 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Sept 18 sample</td>
<td>negative</td>
</tr>
<tr>
<td><strong>Nova - C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 29 sample</td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>Sept 8 sample</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Sept 15 sample</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Sept 18</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Sept 25</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Oct 3</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Sept 25</td>
<td>negative</td>
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<tr>
<td></td>
<td>Oct 3</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Sept 22</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Sept 29</td>
<td>negative</td>
</tr>
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When it works!

<table>
<thead>
<tr>
<th>Templeton</th>
<th>Nub Nub</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aug 24(^{th}) diagnosis</strong></td>
<td><strong>Sept 14(^{th}) diagnosis</strong></td>
</tr>
<tr>
<td><strong>August 24(^{th}) start meds and baths</strong></td>
<td><strong>Sept 14(^{th}) start meds and baths</strong></td>
</tr>
<tr>
<td><strong>Samples sent</strong></td>
<td><strong>Samples sent</strong></td>
</tr>
<tr>
<td>- Sept 9 sample – negative</td>
<td>- Sept 23 sample – negative</td>
</tr>
<tr>
<td>- Sept 16 sample – negative</td>
<td>- Sept 30 sample – negative</td>
</tr>
<tr>
<td>- Sept 27 sample – negative</td>
<td>- Oct 7 sample – negative</td>
</tr>
</tbody>
</table>
Time Lines

Maleficent – A
Shelter entry – July 20
PCR confirmed – July 21
Cleared – Oct 10
Length of Treatment – 11 weeks
Adopted – Oct 15
Length of Stay – 12 weeks

Michael - B
Shelter entry – July 12
PCR confirmed – Aug 3
Cleared – Oct 10
Length of Treatment – 10 weeks
Adopted – Oct 11
Length of Stay – 13 weeks

Nova
Shelter entry - June 23
PCR confirmed – Aug 16
Cleared – Sept 29
Length of Treatment – 6 weeks
Adopted - ?????  TPLO #2 – Oct 4
Length of Stay - ?????

Templeton - C
Shelter entry – July 10
PCR confirmed – Aug 24
Cleared – Oct 2
Length of Treatment – 5.5 weeks
Adopted – Oct 11
Length of Stay – 13 weeks

NubNub - D
Shelter entry – Aug 28
PCR confirmed – Sept 14
Cleared – Oct 13
Length of Treatment – 4 weeks
Adopted – Oct 13
Length of Stay – 6.5 weeks
Testing and Costs

Michael – B
-exposed 25 cats
-tested 3 from pod
+ 1 from sx. day
+ 1 skin lesion dog
+ 2 from family returned
-7 cats all neg.

Templeton - C
-exposed 12 cats
-from surgery already checked
+ 2 cats in isolation
- tested 2 with skin lesions
- 4 cats all neg.

NubNub – D
-exposed over 30 cats
-both locations including 2 kitten rooms, clinic and intake
-tested 12 KW + 3 SP kittens still in care – one positive

Nova
-Exposed 1 dog
-Tested neg

Total PCR tests = 35 (6 cases + 27 in contacts + 2 repeats)
@ $34.75 = $1216.25

Total Cultures = 24
@ $50.20 = $1204.80
Summary

- Not an outbreak
  - 3 different sources
  - Each spread to only one animal

- Watch Immunocompromised individuals

- Isolate, Test, Implement Treatment quickly

- Track, Examine, then Test only those you really need to

- Not every animal needs the same outcome

- Hand washing is not enough!!!!!

- Be upfront and honest with staff, volunteers and adopters.