PUBLIC HEALTH RISKS IN ANIMAL SHELTERS

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OVERVIEW

1. Learning Objectives
2. Overview of Methods
3. Public health consults
   a. Shelter A
   b. Shelter B
4. Ringworm case outbreak
5. Protocols
6. Public health risks in shelters
   a. Zoonoses
   b. Animal-related injuries
   c. Personal safety
7. Conclusion
LEARNING OBJECTIVES

1. To understand the role a shelter veterinarian plays in protecting public health
2. To go through the entire process of a public health consult of an animal shelter
3. To recognize public health hazards in a shelter setting and to work with shelter staff to reduce risks
4. To learn the most effective way to make recommendations for improvement
5. To specifically investigate the public health implications of ringworm in a shelter setting and make recommendations for minimizing risk of human and animal infection
OVERVIEW OF METHODS

• Public health assessments
  • Shelter A
  • Shelter B
• Ringworm outbreak
• Protocols
PUBLIC HEALTH ASSESSMENTS OF 2 ANIMAL SHELTERS

- Association of Shelter Veterinarians: Guidelines for Standards of Care in Animal Shelters
- Preparation
- On-site checklist
  - Personal safety
  - Animal-related injuries
  - Zoonoses
- Report write up
- Recommendations
PREPARATION

• Written infection control document?
• Rabies vaccines for staff
• Local jurisdictional regulations for reporting and managing dog and cat bites and/or scratches to humans
  • Quarantine requirements
• Reportable dog and cat diseases in California
REPORTABLE COMMUNICABLE DISEASES AND CONDITIONS
CALIFORNIA CODE OF REGULATIONS
Section 2500, 2641.5-2643.20 Reporting to the Local Health Authority

Acquired Immune Deficiency Syndrome (AIDS) (EIA test required, see "Human Immunodeficiency Virus") Acidemia
Ampharososis/Lenticularis Anemia, human or animal
Adenolymphoma* Arthritis, viral or rickets
Botulism (Inhaled, Foodborne, Wound, Other)* Bubonic Plague, human
Brucellosis, animal (except infections due to Brucella abortus)* Brucellosis, human
Campylobacteriosis* Chancroid
Chickpea (Vacuolum) (only hospitalization and death)* Chlamydia trachomatis infections, including Trachoma and
Chlamydia nonvenereal (LGV)* Cholera
Ciguatera Fish Poisoning* Coxiella burnetii
Creutzfeldt-Jakob Disease (CID) and Other Transmissible Spongiform Encephalopathies (TSE)
Cryptosporidiosis* Cysticercosis or Taeniasis
Dengue* Diphtheria*
Dermatitis Acid Poisoning (Anesthetic Shellfish Poisoning)* Ebstein–Anatonmannual Syndrome
Ehrlichia, Spirochete Yersiniosis: Viral, Bacterial, Fungal, Parasitic* Ehrlichia chaffeensis (Kills Thrombocytopenic Thrombocytopenia and Friends) (Bacterial)*
Foodborne Disease* Glomerulonephritis
Gonorrhea Gonococcal Infections
Haemophilus influenzae, invasive Disease (report an incident of <15 years of age)*
Hantavirus Infections*
Hepatitis A, acute influenza*
Hepatitis B (specific acute case or chronic)
Hepatitis C (specific acute case or chronic)
Hepatitis D (HDAV) (specific acute case or chronic)
Hepatitis E, acute infection
Human Immunodeficiency Virus (HIV) 1 (2641-2463). See Note 1
Influenza, deaths in laboratory-confirmed cases for age 0-64 years
Influenza, novel strain (Swine*)
Legionellosis Leptospirosis
Lyme Disease
Malaria* Masleos (Rubella)* Measles
Meningitis, Sporadic Encephalitis, Viral, Bacterial, Fungal, Parasitic* Meningococcal Infections*
Mumps* Paralytic Shellfish Poisoning* Pelvic Inflammatory Disease (PID)
Pneumonia* (Streptococcal Pneumonia)* Plague, Human or Animal* Poliovirus Infection*
Pneumonia* Q Fever* Rabies, Human or Animal*
Relapsing Fever* Rheumatic Fever, Acute Rocky Mountain Spotted Fever, including Typhus and Typhoid-like Illnesses* Rocky Mountain Spotted Fever Respiratory Syncytial Virus (RSV)* Rubella (German Measles)* Rubella Syndrome, Congenital Salmonellosis* (Not Typhoid Fever) Scombroid Fish Poisoning* Severe Acute Respiratory Syndrome (SARS)* Shigellosis Smallpox (Varicella)* Staphylococcal aureus Infections, Severe* Staphylococcal Infections* (Outbreaks of any type and individual cases in food handlers and dairy workers only)
Syphilis*Tetanus Tissue Shock Syndrome Trichinosis Tuberculous Tularia, animal Tularaemia, human* Typhoid Fever, Classic and Classical* Viral Hemorrhagic Fever, human or animal* (e.g., Crimean-Congo, Ebola, Lassa, and Marburg Viruses)
West Nile Virus (WNV) Infection* Yellow Fever* Yeastosis

* Occurrence of Any One Disease - a rare disease or emerging disease or syndrome of uncertain etiology which possibly be caused by a transmissible infectious agent or microbial toxin.
* Outbreak of Any Disease - occurrence of cases of a disease above the expected level over a given amount of time, in a geographic area or facility, or in a specific population group, including diseases not listed in Section 2500.
ON-SITE CHECKLIST

Personal Safety

- Does staff wear PPE during sanitation of animal housing areas (smock, apron, gown, boots, gloves, eye protection)?
- Are the animal housing areas well-ventilated during sanitation or are fumes from the cleaners/disinfectants noticeable?
- Does staff change gloves after handling animal waste and handling animals?
- Does staff remove PPE when leaving the animal housing area?
- Does staff wear PPE (gown, gloves, eye protection, face shield) when making solutions of concentrated stocks of cleaners and disinfectants?
- Are MSDS sheets for each chemical available?
- Ask staff if they know the potential hazards of the chemicals and steps to follow to prevent exposure to harmful levels?
- Are written protocols posted in the area to provide directions if staff is contaminated?
- Observe the preparation of a cleaning solution and disinfectant solutions. Are the dilutions appropriate?
- Are cleaning products and disinfectants mixed together?
- Are wet floors anywhere in the facility appropriately marked by signage to warn about slipping hazards?
- Are hand-washing sinks and/or hand sanitizers available in each animal housing or handling area, human food preparation/eating area, employee and public bathrooms, public areas?
- Is there soap, disposable paper towels, and garbage can at each sink?
- Do the hand sanitizers contain at least 60% alcohol?
- Is there signage at each hand sanitation stations to encourage staff, volunteers, and visitors about hand sanitation?
- Observe if staff, volunteers, and visitors sanitize their hands after leaving an animal housing area, handling animals, before eating/drinking/touching face?
- Observe (and before the hand-washing procedures performed by staff and others)
- Do people eat or drink in animal housing areas or smoke in the shelter?
- Are sharps (syringes with needles, surgical needles and blades, broken medication vials, etc.) placed in approved sharps boxes with biohazard labels?
- Are there sharps boxes in animal intake areas, animal treatment areas, anesthesia areas, surgery preparation areas, and operating rooms?
- Observe staff in intake and medical services areas using sharps. Does staff remove needle caps with their mouth or recap needles? Are needles removed from the syringe bare-handed? Do they dispose of the syringe/needle in a sharps box?
- Observe disposal of used surgical needles and surgical sharps. Are these handled bare-handed? Are they put in a sharps box?
- Are the sharps boxes too full?
- Observe disposal of animal waste, secretions/excretions, tissues and blood-contaminated supplies. Is there an approved biohazard bag for disposal?
- Is there a scavenger system for anesthesia gases?
- Can you smell gases when the anesthesia machines are in use?
- If a scavenger canister is used, is it properly set up?
- Is the weight and date written on the canister?
- Does staff know when to replace the canister?

Zoonoses

- Ask the personnel or operations manager and the volunteer coordinator if staff and volunteers receive training on potential zoonotic pathogens, particularly those commonly seen in shelters.
- Is there a proposed list and description of zoonotic pathogens that staff and volunteers can refer to?
- Is there a protocol for handling of animals with potential zoonotic infections?
- Where are animals with potential zoonotic infections housed?
- Is this housing commonly marked with a warning or limited access signage?
- Who is allowed access to the housing area?
- Observe staff and volunteers providing care to animals with potential zoonotic infections.
- Are they wearing appropriate PPE?
- Ask if they know what they need to report to if they are accidentally exposed.
- Are information sheets on zoonotic diseases given to visitors, adaptors, and foster-care providers?
- Do these sheets contain information about increased risk for immunocompromised people, children, and pregnant women with the recommendation to discuss pet selection with their healthcare provider?
- Is signage about zoonotic diseases posted in the lobby, adoption sections, intake areas, housing areas, meet-n-greet areas, medical services areas, staff lounges, locker rooms, etc.
- Does signage and/or handouts inform without creating undue alarm?
ANIMAL-RELATED INJURIES

According to the AVS Guidelines, animal shelters should provide policies, training, and equipment necessary to prevent and minimize risk of animal-related injuries.

Strengths Observed

- Sanitation of housing units for dogs and cats does not always require animal handling. Guillotine-style kennels for large dogs and divider slots for cat cages allow for sanitation of housing with little to animal handling. However, some of the cat cages had malfunctioning divider slots which prohibited sectioning of animals.
- Dangerous animals are sufficiently separated from the shelter accessible to volunteers and the public. Dangerous animals and rabbits quarantined animals are housed in the back of the shelter in a room clearly marked "Quarantined." This room is locked and only certain staff members have key access. However, some rabbits quarantined animals were also housed in the isolation room in cages that are not clearly marked. The room is not locked.
- Meet & Greet areas are supervised by staff. Staff oversees animal introductions to visitors within the animal housing areas.
- Safety equipment is available for handling fractious animals, including central poles, muzzles, leather gloves, nets, and feral cat boxes. All animal handling equipment is kept in the medical room.
- The shelter vaccinates animals for rabies prior to adoption. If an animal is adopted prior to 12 weeks of age, the shelter requires that the animal be vaccinated after adoption when it is old enough.

Concerns Identified

- There is no posted policy for handling animals, including those with behavioral concerns that may pose a risk to human injury. The untrained volunteers and caregivers handling animals with behavioral issues; however, this is not readily available to everyone in the shelter, including visitors. Some identification cards are marked with a red cross, but there is no posted information about what this means.
- Employees that handle dogs, cats, and wildlife are not all vaccinated against rabies. The shelter only requires that animal control officers are vaccinated against rabies, and yet employees and volunteers are often the ones taking care of these animals or preparing rabbits test submissions and are therefore most at risk.

Recommendations

1. An animal handling policy should be clearly posted for staff, volunteers, and visitors to see. In addition, the Safety Manual should provide information for staff and volunteers about handling animals with behavioral concerns. Animals with behavioral issues should have clearly marked signage on their cages that can be understood by everyone. Dangerous animals should only be handled by trained staff members, preferably animal control officers.
2. Every employee or volunteer that handles potentially rabid animals should be vaccinated against rabies. Only vaccinated staff should be allowed to perform intake exams on animals with unknown histories, as well as handle any wildlife brought into the shelter. Only trained, vaccinated staff members should be allowed to care for quarantined animals. The most common reason for quarantines in California is bat, so special precautions should be taken when handling live or dead bats brought to the shelter. The Advisory Committee on Immunisation Practices advises that all people who routinely work with companion animals on wildlife receive pre-exposure vaccinations against rabies.
3. Quarantined animals should be housed in a separate part of the shelter so that only properly vaccinated and trained staff have access to them. Additionally, animals in isolation due to infectious diseases should be housed separately from quarantined animals. "Due Out" dates on quarantined animals (10 days in San Bernardino) should be acknowledged and animals should be removed from quarantine when their 10 days is up.
4. The written Safety Manual should include a policy about animal-related injuries. Animal-related injuries, such as bites and scratches, pose a serious risk to staff, volunteers, and visitors at the shelter. In areas reporting compliance and documentation of injuries at the shelter. Staff and volunteers should be made aware of what to do in the event of a bite or scratch so appropriate measures can be taken.
5. Staff and volunteers should be provided adequate training in basic animal handling. Training opportunities to refresh and improve animal handling skills should be offered at various times throughout the year. Training should include recognition of dangerous animals, proper use of equipment to handle dangerous animals (for designated personnel only), and techniques to minimize animal-human contact when handling cages.
SHELTER B

Zoonotic Disease

According to the AVS Guidelines, animal shelters are responsible for training staff about zoonotic conditions, protecting the public from diseased animals, and informing visitors, adopters, and foster-care providers of zoonotic disease risks.

Strengths Observed

☐ Staff and volunteers receive some verbal information about zoonoses (i.e., Why do we wash our hands?) but not always depending on position within the shelter. If there is a disease outbreak in the shelter, a staff meeting will be held where animal handling staff will be reminded to wear personal protective equipment.

☐ If an animal had a zoonotic disease, it was typically housed in the technician room where it received treatment. Notes on the animal's paperwork indicated which disease the animal had and advised appropriate PPE that should be worn. It is recommended to add the word "zoonotic" to the notes so staff members who are not aware of which diseases are zoonotic can remain informed and safe. The public does not have access to this room.

☐ Animals are prophylactically dewormed upon intake. Dogs and cats are administered Pyrantel pamoate during their intake exam, which controls for ascarids.

Concerns Identified

☐ There is no written infection control protocol for the shelter. The protocols for infection control were verbal only. For ringworm specifically, all cats are Wood's lamp examined upon intake. If a cat illuminates, it will be lime-sulfur dipped and moved to the gray room, where it is then euthanized. If the Wood's lamp examine is not conclusive, a trichogram is completed. If a cat has something other than a UR, it will be moved to the "tech" room where it is treated. Recently MRSA was cultured from several kittens in the kitten nursery, which is located in a portable unit adjacent to the shelter. Specific handling instructions were given to staff members caring for these kittens, including gown and gloves. One of the MRSA-infected kittens was moved into foster care.

☐ Staff and volunteers do not receive enough training on how to respond to zoonotic disease exposure. While they do receive some verbal information about zoonotic diseases, information about what to do in the event of a possible exposure are not communicated. Training should inform staff of how to respond when a zoonotic disease is suspected.

Recommendations

1. Develop a written infection control protocol with special consideration given to zoonotic disease outbreaks. Written guidelines of how to manage a zoonotic disease outbreak would help guide staff to take proper steps to ensuring the best infection control possible. While a verbal protocol is currently in place, written policies can increase consistency and adherence. Human safety should be the priority, and staff, volunteers, and the public should be adequately informed on how to protect their own health.

2. Implement a zoonotic disease training program for staff and volunteers. In addition to the verbal information given to staff and volunteers about zoonotic diseases, an official training program should be in place to educate staff about prevention and management of zoonotic diseases in shelters. Educating staff and volunteers about zoonotic diseases can help decrease animal-to-human disease transmission as well as decrease severity of disease outbreaks by means of early detection. Training should include recognition of clinical signs, modes of transmission, and species affected.

3. Educational material should be posted throughout the shelter to educate staff, volunteers, and visitors about the risks of zoonotic diseases in animal shelters. Signs should be posted near animal handling areas, such as the adoption room and meet n' greet areas. Signs should include information about commonly transmitted zoonotic diseases in companion animals, precautions to take to prevent transmission of disease, and clinical signs to look for.

4. Information about zoonotic diseases should be provided to visitors, adopters, and foster parents. Informational pamphlets should be readily available in the reception area of the shelter. New adopters and foster parents should be educated about zoonotic disease risks their animals may present to humans in the household.
RINGWORM CASE REPORT

- Background information
- Etiology and susceptibility
- Timeline of investigation
- Outbreak management recommendations
- Initial assessment of feline population
- Case management and treatment
- Case outcomes
- Preventative measures
• Shelter A
  • Non-profit organization
  • City’s animal control officers
  • WesternU
  • Petco
ETIOLOGY AND SUSCEPTIBILITY

Dermatophytosis (ringworm) is caused by a fungal infection with dermatophytes
- *Microsporum canis* → 95% of all feline ringworm
- *Microsporum gypseum*
- *Trichophyton mentagrophytes*

Factors that increase susceptibility to ringworm:
- Age
- Immunosuppression
  - Pregnancy
  - Lactation
  - Infection
- Parasitic infestation
- Stress

TIMELINE OF INVESTIGATION

RVT noticed hairless lesion on kitten's face during surgery. Kitten is Wood's lamp +

Risk assessment of feline population: isolate suspect cats
  • collect diagnostic samples

Staff notices lesions on faces and limbs of 2 kittens being housed in the lobby

Create clean break

Educate staff

Treat infected and exposed animals

Decontaminate shelter

Re-shuffle cats based upon culture results

5 kittens returned to shelter because of RW infection

Long term response plan to prevent future outbreaks

DAY 0

DAY 3

DAY 3

DAY 3+

DAY 3+

DAY 0+

DAY 3+

DAY 7+

DAY 41

DAY 70

ZOONOTIC SPREAD IN FOSTER HOME

ZOONOTIC SPREAD TO PUBLIC
OUTBREAK MANAGEMENT RECOMMENDATIONS

- Immediate action is very important in shelter setting
  - Prevent spread of infection
  - Reduce panic amongst staff
  - Educate about zoonoses
- Written infection control protocol?
- Trace back investigation → foster home
  - Advised foster home to treat cats and environment
  - Do not bring exposed/infected foster cats back to shelter until they are cleared of RW
Every cat was classified into low, moderate, or high risk groups based upon:

- Presence of skin lesions
- Wood’s lamp exam
- Age

<table>
<thead>
<tr>
<th></th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>&gt;1 year</td>
<td>3 months-1 year</td>
<td>&lt;3 months</td>
</tr>
<tr>
<td><strong>Lesions</strong></td>
<td>No lesions visible</td>
<td>Lesions visible</td>
<td>Lesions visible</td>
</tr>
<tr>
<td><strong>Wood’s Lamp Exam</strong></td>
<td>Wood’s lamp negative</td>
<td>Wood’s lamp negative</td>
<td>Wood’s lamp positive</td>
</tr>
<tr>
<td><strong>Other disease status (upper respiratory infection, fleas)</strong></td>
<td>No upper respiratory infection, no fleas</td>
<td>Moderate upper respiratory infection, fleas</td>
<td>Severe upper respiratory infection, fleas</td>
</tr>
<tr>
<td><strong>Culture results; pathogen scores</strong></td>
<td>P1= &lt;4 colonies</td>
<td>P2= 5-9 colonies</td>
<td>P3= &gt;9 colonies</td>
</tr>
</tbody>
</table>
RISK ASSESSMENT FLOW CHART

Skin lesion?

YES

Wood's lamp?

Positive

HIGH RISK/INFECTED

<6 months of age

HIGH RISK/INFECTED

>6 months of age

MODERATE RISK

NO

Wood's lamp?

Positive

HIGH RISK/INFECTED

<6 months of age

MODERATE RISK

>6 months of age

LOW RISK

Negative

<6 months of age

HIGH RISK/INFECTED

>6 months of age

LOW RISK
High and moderate risk cats were cultured on dermatophyte test media (DTM) plates using the toothbrush technique.

Cultures were initially checked daily for color change and growth.

Microscopic exams looked for presence of hyphae and macroconidia and a pathogen score was assigned to each plate:

<table>
<thead>
<tr>
<th>Pathogen Score</th>
<th># of colonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0-4 colonies</td>
</tr>
<tr>
<td>P2</td>
<td>5-9 colonies</td>
</tr>
<tr>
<td>P3</td>
<td>&gt;9 colonies</td>
</tr>
</tbody>
</table>
ALTER MOVEMENT OF CATS

- Isolate high and moderate risk cats
  - High risk → Room C
  - Moderate risk → Room E
- Low risk → left in current housing. Some left in Room D due to lack of space
- Limit movement of animals within the shelter
- Clean break = protect unexposed cats from exposure by altering the flow pattern for cats entering the shelter

EDUCATE STAFF

- Medical management
- Environmental control
- Zoonoses education
### MEDICAL MANAGEMENT

<table>
<thead>
<tr>
<th>Weight range (kg)</th>
<th>Dose</th>
<th>Weight range (kg)</th>
<th>Dose</th>
<th>Weight range (kg)</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2.8</td>
<td>1/4 tablet (62.5 mg)</td>
<td>2.8-5.5</td>
<td>1/2 tablet (125 mg)</td>
<td>&gt;5.5</td>
<td>1 tablet (250 mg)</td>
</tr>
</tbody>
</table>

- **HIGH RISK**
  - Perform dermatophyte test media cultures weekly until 2 consecutive negative cultures
  - Lime-sulfur dips (1:16) every 3 days until cleared from isolation
  - Oral terbinafine once per day

- **MODERATE RISK**
  - Perform dermatophyte test media cultures weekly until 2 consecutive negative cultures
  - Lime-sulfur dips (1:16) every 3 days until cleared from quarantine

- **LOW RISK**
  - Lime-sulfur dip (1:16) once

ENVIRONMENTAL CONTROL

• Triple cleaning technique:
  1. Mechanical removal of hair, dirt, debris
  2. Washing affected area with detergent, followed by thoroughly rinsing
  3. Disinfect with 1:32 bleach, allowing 10 min of contact time

• A detailed cleaning protocol was given to the shelter staff, which included daily cleaning, bi-weekly deep cleaning, laundry cleaning, and foster home disinfection
HOW TO BE SAFE AROUND RINGWORM

1. Always wear PPE (personal protective equipment) when handling ringworm cats and cleaning their cages – gloves, gown, booties over shoes.
2. Change your gloves between EACH kennel.
3. Do not touch cats between cages or between rooms without changing gloves.
4. CLEAN, CLEAN, AND CLEAN AGAIN!
   a. Wipe down all surfaces ringworm cats have had contact with first with wet towel to get hairs, then with BLEACH (1:32 dilution).
   b. Let bleach sit for 10 minutes before wiping out cage again with wet towel.
   c. NEVER mix bleach with ammonia or acids (many cleaning agents contain ammonia and acids) – these mixtures will create dangerous toxic gases.
5. Do not move cats between cages, unless new cats are found to be positive, and then they should be moved to the isolation room.
6. Avoid touching your face or skin while wearing your gloves.
7. Remove your PPE and throw it away in the garbage INSIDE the isolation room.
8. Wash your hands before leaving the isolation room (or immediately after leaving if there is no sink).
9. Ringworm is easily transmitted if proper precautions are not taken – keep yourself and the animals protected.

RINGWORM FACT SHEET

WHAT IS RINGWORM?
- Ringworm (dermatophytosis) is a fungal infection affecting the skin, hair, and occasionally the nails of animals and humans.

WHO IS AT RISK AROUND RINGWORM?
- Any person coming in contact with ringworm-infected cats and humans
- Particularly infants in households having a ringworm case

WHAT IS IT LOOKING LIKE?
- Scaly, ring-like rash on the skin or nails
- Infected fur may be dull and dry

WHAT IS IT NOT LOOKING LIKE?
- Ringworm can look like other skin conditions, so it’s important to seek professional advice if you suspect ringworm.

HOW IS IT SPREAD?
- Direct contact with infected animals
- Indirect contact with infected materials or contaminated environments

HOW TO TREAT RINGWORM?
- Antifungal medications prescribed by a veterinarian
- Home remedies may not be effective

WHAT TO EXPECT?
- Complete recovery
- Potentially recurrent infections

PREVENTION TIPS:
- Keep your environment clean and free of moisture
- Use durable materials for cat litter boxes
- Regularly check your cat for signs of ringworm
- Consult a veterinarian if you suspect your cat may be infected

ZOO SENSES EDUCATION

- Authorized personnel only
- Personal protective equipment (PPE)
- Informative signs
- Handouts for the public
- Waivers for new adopters
- Foster education
RE-SHUFFLE CATS BASED UPON CULTURE RESULTS

- Moderate and high risk cats were cultured until 2 consecutive cultures were achieved
- Ongoing process…
  - Day 32: a positive cat was found in Room D (quarantine) → moved him to Room E
  - Raised concerns over staff compliance with disinfection protocol because this kitten (and his littermate) had 2 consecutively negative cultures prior to the appearance of the lesion
  - Room E (moderate risk initially) became another isolation room after 5 more kittens had positive cultures
    - Environment culture: negative
    - Suspected lack of compliance with sanitation protocol and proper use of PPE
FLEXIBLE TIMELINE

6 kittens RW positive in quarantine room

DAY 32
Risk assessment of feline population: isolate suspect cats
- collect diagnostic samples
- Culture environment

DAY 35
Treat infected and exposed animals
Shelter manager suddenly removed from position

DAY 38
Decontamination of shelter
1 kitten returned to shelter upon suspicion of RW

DAY 39
Re-shuffle cats based upon culture results

DAY 41
4 kittens returned to shelter upon suspicion of RW

DAY 75
Last kitten is cleared of RW

ZOONOTIC SPREAD!
CASE OUTCOMES

- Total # of cats cultured: 84 (71 in shelter, 13 in foster)
- Ringworm positive cats: 47 (34 in shelter, 13 in foster)
  - Incidence of ringworm in the shelter over a 15 week period = 41%
  - Incidence of ringworm in the shelter & foster care over a 15 week period = 49%
- Total # of humans infected: 5
- Total # cats returned to shelter due to RW: 5
- Duration of outbreak: 75 days
PREVENTATIVE MEASURES

- Intake exams
  - Wood's lamp exam
- Staff education and training \(\rightarrow\) zoonotic diseases!
- Communication
- Staffing capacity
- Personal protective equipment
- Cat housing
  - Locations (lobby, hallways)
  - Appropriate enrichment
- Lack of developed foster program
PROTOCOLS

Appendix C - Zoonotic disease protocol

PROTOCOL FOR HANDLING ANIMALS SUSPECTED OF ZOONOTIC DISEASE INFECTION

1. Any animal suspected of having a zoonotic disease (see list below) should be identified upon admission. If rubbish is suspected, the animal should not be handled and the animal control officer should be the sole person responsible for this animal until veterinary quarantine is cleared.

2. The suspected infectious animal(s) should be placed in isolation housing, separate from the general population of animals at the shelter.

3. Adequate signage should be placed on entry ways to the isolation room and on individual animal cages prohibiting unauthorized persons from entering. Only trained staff members should be authorized to enter the isolation room.

4. Proper personal protective equipment (PPE) must be worn when handling animals in isolation. PPE should be donned before entering the isolation room and removed and disposed of at the doorway immediately before leaving the isolation room.
   a. Gloves
   b. Disposable long-sleeved gown
   c. Shoe covers
   d. Facial protection

5. Any item in contact with suspected infectious animal should be considered contaminated and should be cleaned or disposed of only by authorized personnel wearing appropriate PPE. All household supplies for isolation animals should be cleaned and stored within the isolation room.

6. Hands should be washed immediately after removal of PPE.

Zoonotic diseases of concern in animal shelters include:

1. Brucellosis
2. Tuberculosis
3. Rabies
4. Canine distemper
5. Canine parvovirus
6. Canine adenovirus
7. Parvovirus
8. Lymphosarcoma
9. Toxoplasmosis
10. Rabies
11. Rabies
12. Salmonellosis
13. Salmonella
14. Toxoplasmosis
15. Toxoplasmosis

Key point: isolation
Key point: adequate signs
Key point: personal protective equipment
Key point: hand hygiene
Key point: immediate first-aid

Key point: medical attention if necessary

Key point: isolate biting animal

Key point: report the incident

Key point: bite investigation
Public health risks in animal shelters can be divided into three major categories:

1. Zoonoses
2. Animal-related injuries
3. Personal Safety
ZOOONES

- Transmission
- Direct
- Indirect
- Shelter design
FACTORS TO CONSIDER REGARDING DISEASE TRANSMISSION

- Incubation periods
- Shedding period
- Clinical signs – easily recognizable?
- Stability or resistance of the pathogen
- Population density
- Vector control
SHELTER DESIGN & ZOONOSES

- Isolation
- Animal stress
- Materials that are easy to disinfect
- Barriers
- Health check system
- Ventilation
- Flow through the shelter
Zoonotic Diseases of Importance in Shelters

- American trypanosomiasis
- Bartonellosis
- Brucellosis
- Bubonic plague
- Campylobacteriosis
- Cutaneous larval migrans
- Dermatophytosis
- Giardiasis
- Leptospirosis
- Lyme borreliosis
- Rabies
- Rickettsioses
- Salmonellosis
- Scabies
- Toxocariasis
- Toxoplasmosis
- Tularemia
# Zoonotic Diseases of Companion Animals

## By Animal Species

### Dogs
- Brucellosis
- Campylobacteriosis
- Dermatophilosis (ringworm)
- Endoparasites: fleas, ticks
- Ectoparasites: lice
- Leptospirosis
- Larva Migrans
- Hookworms
- Roundworms
- Whipworms
- Mange (acariasis)
- Rabies
- Salmonellosis

### Cats
- Campylobacteriosis
- Cat Scratch Disease
- Cryptococcosis
- Dermatophilosis (ringworm)
- Endoparasites: fleas, ticks
- Leptospirosis
- Larva Migrans
- Mange (acariasis)
- Plague
- Q fever
- Rabies
- Salmonellosis
- Sporotrichosis
- Toxoplasmosis

### Ferrets and Rabbits
- Campylobacteriosis
- Dermatophilosis (ringworm)
- Endoparasites: fleas, ticks
- Influenza
- Rabies
- Roundworms
- Salmonellosis
- Tuberculosis
- Yersinia
- Pasteurellosis
- Salmonellosis
- Tularemia
- Yersinia

### Rodents
- Gerbils
- Endoparasites: lice
- Lepthospirosis
- Salmonellosis
- Tularemia
- Guinea Pigs
- Campylobacteriosis
- Chlamydiosis
- Dermatophilosis (ringworm)
- Endoparasites: lice
- Lepthospirosis
- Mycoplasmic
- Pasteurellosis
- Salmonellosis
- Tularemia
- Yersinia
- Mice and Rats
- Endoparasites: lice
- Leptospirosis
- Lymphocytic choriomeningitis
- Salmonellosis
- Tularemia
- Yersinia

### Pet Birds
- Campylobacteriosis
- Cryptococcosis
- Endoparasites: lice
- Mycoplasmic
- Newcastle disease
- Pasteurellosis
- Salmonellosis
- Tuberculosis

### Reptiles and Amphibians
- Campylobacteriosis
- Mycobacteriosis
- Salmonellosis

### Aquarium Fish
- Chlamydiosis
- Cryptosporidiosis
- Erysipelas
- Mycobacteriosis
- Myeloidosis
- Salmonellosis
Figure 1. Reasons that an intensively housed environment, like a shelter, can contribute to the emergence of novel pathogens, to novel hosts targeted by a pathogen, or to altered virulence.
ZOONOSES PREVENTION

1. Hand hygiene
2. Proper use of personal protective equipment (PPE)
3. Zoonotic disease training for staff
2010 study → assessed zoonoses knowledge of shelter workers before and after implementation of a zoonotic disease training session

The results of the study showed a statistically significant difference between pre-test and post-test scores for:

- species susceptibility
- clinical signs
- routes of transmission
- zoonotic disease transmission

No association was observed between test scores and role in the shelter or years experience working in shelters

Take away message → educational training in zoonotic diseases improves knowledge of shelter workers

ANIMAL-RELATED INJURIES

• Bites and scratches
  • Pasteurella
  • Capnocytophaga
• Minimize risks ➔ prevention through design
  • Guillotine-style housing
  • Partitions in cat cages
  • Feral cat boxes
  • Other equipment
  • Appropriate identification of dangerous animals
  • Monitored visitor interactions
  • Behavior training for staff and volunteers
PERSONAL SAFETY

Physical hazards
- Wet floors
- Loud noises
- Accidental needle sticks

Chemical hazards
- Cleaning agents
- Hazardous drugs
- Latex
- Waste anesthetic gases
- Pesticides
CONCLUSIONS & OBJECTIVE ANALYSIS

1. To understand the role a shelter veterinarian plays in protecting public health
2. To go through the entire process of a public health consult of an animal shelter
3. To recognize public health hazards in a shelter setting and to work with shelter staff to reduce risks
4. To learn the most effective way to make recommendations for improvement
5. To specifically investigate the public health implications of ringworm in a shelter setting and make recommendations for minimizing risk of human and animal infection
REFERENCES


QUESTIONS?