Health Risks Related to Animal Exposure and Contact: Evaluation and Management of Animal Exposures in a College Health Service
ACHA 2014, San Antonio (SA1-224)

• Thomas J. Ferguson, M.D., Ph.D.
• Medical Director, Student Health and Wellness Center University of California, Davis
• Associate Clinical Professor, Internal Medicine and Public Health
• Deputy County Health Officer, Yolo County Health Department
Objectives

• Review general principles of wound management
• Focus on management of animal bites/exposures
  – Wound evaluation and management,
    » Review of some myths/literature supporting best practices
  – Risk management- Patient Centered Communication
• Review infectious Diseases that providers may not be accustomed to thinking about when caring for animal handlers and veterinarians:
  – Rabies
  – Q Fever
  – Cryptosporidiosis
  – Psittacosis
  – Plague
  – Simian Herpes
  – Fungal infections
  – Orf
  – Cat Bites
  – And others….
Veterinary Student Returning From Montana with ‘Flu’ Like Symptoms

- 24 yo female had been on a large animal rotation at a ranch in Montana during Spring quarter. While there she had been assisting Spring lambing. There had been some ewes with placentitis and spontaneous abortion that required direct intervention.

- Toward the end of her rotation she developed fever, chills, headache and myalgia. No cough or SOB. She was otherwise healthy.

- What bacterial illness might explain her symptoms?
- What past medical history might be of importance to ascertain more information?
- How should she be evaluated?
- Should she be empirically treated?
Case of the Postgraduate Cowboy

- 24 yo postgraduate researcher was working at the Sierra Nevada Field Station collecting conjunctival specimens from cattle. This necessitated his restraining the head of the cattle while using a swab to collect the specimen. He developed a small scaley patch of skin on his wrist which increased in size over 7 days and has become erythematous, indurated, boggy and painful.
He shaved the hair off at the site and began using Bacitracin and then Lotrimen cream without relief. His family physician started him on Cephalexin one week ago. He was advised by the field station manager that the cattle carry ‘ring worm’ and recalls that many had patches of scale on their necks. He wore gloves and a lab coat but no protection at the wrists. He comes to the employee health clinic for evaluation.
Primate Center Employee

You are asked to evaluate a 27 yo cage cleaner from the primate center who was bitten on a finger by a rhesus macaque today from ‘infectious housing’. The animal care supervisor from the primate center calls you to advise that the animal is part of a research protocol and is infected with an experimental retrovirus (‘SHIV’).

What potential infections are you concerned about?
What are your resources for consultation?
What care is indicated?
The Case of the Coughing Veterinarian

- 24 yo female veterinarian developed a flu like syndrome a few days after evaluating an ill pigeon in Animal Resources Services facility in Meyer Hall. Her symptoms included cough, myalgia, fever and headache.

- Her patient (pigeon) did not respond to treatment and at necropsy was infested with round worms.

- 1. What should be included in your differential diagnosis?

- 2. What further testing should be done?

- 3. What environmental investigation is indicated?
Returning Traveler

• 18 yo female returns to campus after traveling with family to India. While staying with her uncle she was bitten by the family dog while playing catch. The uncle advises that his dog has had vaccinations. She was seen at a local hospital and treatment for Rabies was started. She has received three ‘shots’ over a 5 day period. Her uncle has emailed today that the dog is doing fine and appears normal while chasing the ball (10 days post bite). The wound appears to be healed.

• Is there a rabies risk?
• What if any treatment is indicated?
• What are your resources for consultation?
Veterinary Student with Diarrhea

- 24 yo female second year veterinary student presents with one week history of diarrhea. She has nausea but hasn’t vomited. She recalls working on a dairy caring for calves with ‘scours’. She has cramping lower abdominal pain and diarrhea 6-10 times daily. She knows that two other students rotating on large animal service with her at the dairy have similar symptoms. A stool specimen was obtained and Acid Fast stain is shown on next slide.

- What is the likely diagnosis?
- What treatment if any is indicated?
Occupational Medicine Case

• 58 yo male veterinarian living in rural Northern California experienced sudden onset of fever to 104F with left axillary lymphadenitis. He consulted a local family doctor who obtained a CBC which showed leukocytosis with left shift. He treated with ceftriaxone and tetracycline with resolution of the fever.

• He does recalls very recently draining a large abscess on neck of an outdoor cat living at his ranch. The cat died a few days after the surgery.

• What exposure history might be helpful to obtain?
• What zoonotic infection could cause this?
Veterinary Student with ‘Sore Finger’

- 24 yo right handed veterinary student assigned to the sheep barn has developed a swollen purple ‘blister’ on her left thumb. She has been caring for ewes and lambs diagnosed with ‘sore mouth’. The ewes have similar lesions about their teats and the lambs have lesions on oral mucosa.
Non-healing Ulcerative Skin Lesion in a Veterinary Student
Non-Healing Ulcerative Skin Lesion

• Several weeks earlier had been working with a kitten with an ulcerative lesion on face several weeks previously. Unfortunately, the owner unable to afford diagnostic workup and kitten euthenized. The vet student noted slowly enlarging skin lesion for about 4 weeks. There is a palpable subcutaneously feeling cord extending cephalid from wound margin.

• What diagnostic procedure might be of help in further evaluation?
Cat bite

- Animal science student presents with swollen red finger after being bitten last night by her cat at home (6 hrs). A red streak extends up her forearm from the wound
- What is likely pathogen?
- How should this wound be managed?
Wounds: Mammalian Bites

- Common reason to visit a medical provider
  - 80% Dogs
  - 10% Cats
  - 10% other (rodents, monkeys, horses, marine animals)
- CDC 1994 = 4.5 million dog bites/yr!
  - 800,000 seek medical attention
  - 31,000 reconstructive surgeries (2006)
  - 15 deaths
- Peak Incidence is in Children
  - Boys age 5-9
- Wild or Untraceable animals only 3-15%
Overview of Bites

- Management Depends Upon Many Factors
  - Location of Wound
  - Type of Wound
  - Patient Risk Factors
  - Species
  - Availability of Follow-up Care
  - Need for Post Exposure Prophylaxis
    - Rabies
    - Antibiotics
Risk Management Wounds

• 10 million wounds (all types) are cared for in urgent care or emergency room setting per year
  – 3-7% post repair infection rate
  – Translates into 500,000 infections per year!
  – 25% of all Malpractice Claims:
    » Failure to Dx Foreign Body
    » Failure to Dx Nerve/Tendon Injury
    » Failure to Identify Infection Prone Wounds
    » Bite wound infections
  – 90% Hands/Feet (mostly hands)
Risk Management: Problem Areas

1. Documentation of Circumstances and Mechanism
   - Fracture Potential?
   - Contamination Issue (animal/human bite/closed fist?)
   - Foreign Body Potential?
   - Time of Injury

2. Documentation of Physical Examination
   - Assess Depth of Penetrating Wound
   - Palpate adjacent bones (especially if not x-rayed)
   - Foreign Body? Palpation and ask if FB sensation!
   - Partial tendon laceration?
     » ‘Full ROM’ = NOT ADEQUATE DOCUMENTATION!
     » Tendon lacs often painful with resistance to active movement
   - Neurovascular - 2 point sensation should be assessed.
   - Proximity to Joint/Joint integrity considered?
3. Poor Communication Often Central to Malpractice Claims
   - KEY TO PREVENTION = Establish a good treatment alliance

   “Now Mr. Smith, I’m letting you know that statistics show no matter how careful I am in cleaning and suturing this type of wound, there is about 5% risk of developing an infection. The risk of side effects or problems from antibiotics is higher than the benefit for this type of wound but if you do develop problems we can take care of them. So you need to come back at the first sign of redness, pain, swelling or discharge.”

   Communicating this up front can set up the expectation that ‘He/She told me this might happen’ instead of ‘that quack should have treated me with antibiotics to prevent this!’

   Document specific follow-up instructions and consider standard practice of arranging a ‘recheck’ 1-2 days post repair = Team member messages or telephones or may see patient.
Antibiotic prophylaxis: Host Factors

RISK FACTORS FOR POST REPAIR WOUND INFECTION:
• AGE: Greater than 50 or less than 2
• Asplenic
• Chronic Alcoholic
• Diabetes
• Immunosuppressed (medications, DM, etc.)
• Peripheral vascular disease
• Prosthetic heart valves
• Chronic liver disease

Infection Risk: Type of Wound

- Delay in evaluation
  - Don’t close if greater than 6-8 hours?
    » Paucity of data about this ‘RULE” few articles-data from third world low rates infection with delayed closure if healthy patient. Plenty of data from randomized control trials.
    » Wound cleaning and assess risk factors – involve patient in considering repair pros/cons.
- Puncture wounds = High Risk
  - Cannot adequately irrigate (cat bite almost always = puncture!)
  - Often on extremity
- Macerated wounds = Highest Risk
  - Prospective and retrospective studies support selective debridement and antibiotics reduce risk for infection
Infection Risk: Species Related Risks

- Human bites (reliable stats on infection rate lacking?)
  - Most common sites: extremities, breast and genitals
  - *Eikinella corrodens* (PCN sensitive but not cephalexin)
  - Staph, Strep, anaerobes
- Dogs (5-7% become infected)
  - 30 different genera of bacteria have been documented!
  - *Staph aureus*, *Staph epidermidis*, and *Enterobacter* sp are common
  - *Pasturella multocida* in some studies (15-50%?)
  - Rare cases ‘Dysgonic Fermentor’ (aka *Capnocytophaga canimorsus*) especially patients who are immune compromised or have liver disease – rare but often fatal
- Cats (30-80% become infected!)
  - *Pasturella multocida* common pathogen
  - Often history of cellulitis developing overnight!
Infection Risk: Species Related Risks

- Non-Human Primates
  - Research animals – Rhesus macaques, Chimpanzees
  - Very strong/powerful animals!
  - Bite and scratch risk for
    - Old World Monkeys – Rhesus Macaques
    - Monkey pox
    - Simian herpes virus (previous Herpes B Virus)
  - Chimpanzees research colonies
    - Hepatitis B infection model-experimentally infected
Infection Risk: Species Risk Continued

- **Horses/Cattle**
  - *Actinobacillus* species have been isolated
  - Dirty and complex (risks macerated, extremity location, dirty)
- **Reptiles**
  - Think enterics in addition to typical Gram positives
- **Birds**
  - Scratches can become infected – think enterics
  - Psittacosis associated with parrots, pigeons, and others.
- **Sheep/Goats**
  - Similar flora to horse from bite risk
  - Also orthopox virus="Orf" ulcerative lesion on extremity
  - Placentitis Brucellosis, Q fever and *Chlamydia psittaci*
Wound Management: Irrigation

• “Dilution is the Solution to Pollution”
  – Data support wound irrigation

• **Soaking** is a very common practice but studies show **not effective** for decontamination.

• Pressure Irrigation is likely ‘best practice’ (5-10 psi)
  – 18 gauge needle or catheter attached to a 35 cc syringe, or
  – Sterile saline bottle with irrigation top (5psi) , or
  – High volume clean tap water (20-50 psi) shown to work as well as sterile saline for most wounds - IF you can get body part under the tap !.

Antibiotic Prophylaxis - WHEN?

- Prophylaxis Supported for **High Risk** Wounds
  - Puncture or crush (cat bite = always puncture!)
  - Treatment delay 8 hours or more
  - On extremity or over a joint
  - Bite wounds you have sutured
  - Patient age less than 2 yrs or older than 50 yrs
  - Scalp or face of infant
  - Immune compromised (steroids, diabetes, EtOH, etc.)

Prophylactic Antibiotic Use

• If indicated, give First Dose EARLY
  – Consider giving IM dose of ceftriaxone for very high risk wounds (data?)
  – Select an oral agent likely to be effective for usual pathogens
    » Amoxicillin/Clavulanate (twice daily dosing)
    » Penicillin alone may be almost as effective as amox/clav
    » Don’t use first generation cephalosporins for cat/human punctures (Cephalaxin is out)
  – Only until first wound check at 3-5 days, if no sign of infection then can discontinue.

• Penicillin Allergic Patients
  – Consider Doxycycline or Quinolones
  – Not great anaerobe coverage but will get most Pasturella multocida, Eikinella corrodens, and Staphylococcus sp.
  – Consider Clindamycin plus quinolone for very severe (ID consult?)

Other Consideration

• **X-rays for Large Animal Bites**
  - Horse bites some long bone fracture from stallion bites
  - Dog bites can puncture skull of young children
  - Dog bites and retained foreign body

• **Rabies** –
  - Species of origin can be determined
  - Domesticated animals in USA – VERY RARELY
  - Mostly bats but dog reported (usually origin outside USA)
    » Mexico, India, Philippines USA cases in returning travelers
  - **Bats**
    » Most human rabies from bat strains – Known exposure only 20%
  - Local health department is a resource for treatment decision
    » Discuss with health officer (you have TIME!)
    » Can access experts at State and CDC
Rabies Surveillance USA, 2008-12
Bat Rabies USA 2008-2012
Rabies in California 1993-2002

- Skunk 1683
- Bat 1491
- Fox 58
- Dog 27 (12 Placer & El Dorado)
- Cat 18
- Cattle 17
- Raccoon 5
- Opossum 5
- Sheep/goat 3
- Horse 1
- Human 7

Source: Calif Dept Health Services, Veterinary Public Health Section
Human Rabies Typical Case

- 29 yo male inmate of a correctional institution in Richmond, VA developed fever and back pain. Sent to hospital where had fever to 103F, hallucinations, muscle tremor right arm and difficulty walking. Progressive neurologic symptoms including hypersalivation and encephalitis led to consideration of rabies. Testing confirmed diagnosis of rabies. Died approximately 10 days later from rabies virus identified as originating from bat. Of note is that inmate had worked on prison farm but no known contact with bats.
Changing Epidemiology of Rabies

• 1990-2002 There were 36 cases of human rabies in USA
  • 28 were Bat Associated Rabies (rabies virus variant)
    – Only three out of 28 had definite history of bat bite
  • Since 2002
    – 21/24 Human Rabies Cases in USA were linked to Bats

Bat Rabies Different Clinical Features?


- Bat acquired human rabies cases symptoms differ: Tremor, myoclonus, cranial nerve, motor or sensory deficits
- Sensory deficits commonly reported so perhaps this indicates that spread is different?
- Authors postulate that perhaps bat rabies may spread directly or INDIRECTLY from superficial tissue to local sensory ganglion root so see more initial peripheral neurologic findings.
Management of Rabies Exposure
Take Home Points

• Bat exposure should be investigated closely and you should maintain a low threshold for prophylaxis in this setting
• Contact your County Health Department for assistance and recommendations:
  – Public Health/Animal Control will investigate source
  – County Health Officer has experience and can connect you with true ‘experts’ at State Health Dept who regularly evaluate such exposures.
Occupational Medicine Case

- 22 yo female research assistant at Yerkes Primate Center Emory University in Atlanta was splashed in her eye with unknown monkey body fluid while participating in “round up” of rhesus macaques. She wiped her eye and irrigated but did not seek further care. About 10 days later she developed redness and swelling of the eye. She was evaluated by an emergency room physician who referred to an ophthalmologist. Eventually she was hospitalized and while initial improvement with antivirals she subsequently worsened and died of encephalitis.

- What zoonotic infection from old world monkeys could cause this?
In Thailand, a macaque uses a statue of an orangutan as a perch.
Herpes B Virus

- Cercopithecine herpes virus (*Herpesvirus simiae*)
- Enzootic among Old World macaques (70-80% have AB)
- Minimal or undetectable morbidity in natural host
- Humans in contact may become infected through bites, scratches, contaminated needlesticks or other routes.
- Most common presentation is rapidly ascending encephalomyelitis after nonspecific febrile prodrome.
- About 40 known human infections case fatality 70-80%.
Management of Primate Exposures

- **First Aid**
  - Mechanical scrubbing and irrigation for at least 15 minutes.

- **Specimen Collection**
  - Collect only where results will affect future treatment
  - Animal should be assessed for infection
  - Cultures/antibody studies take 2-3 weeks for results

- **Prophylaxis with Antivirals**
  - Valacyclovir 1 gram po Q 8 hours for 14 days. Alternative is Acyclovir 800 mg 5 X daily for 14 days.
  - Benefit unknown as no randomized controlled studies
  - Consensus panel assembled to review in 1995 and 2002 (CDC)
  - NIH Guidelines 2003
When to Offer Prophylaxis?

- **Recommended:**
  - Skin exposure or mucous membrane exposure where integrity compromised to a high risk source animal.
  - Inadequately cleaned skin exposure or mucosal exposure.
  - Laceration of the head, neck or torso.
  - Deep puncture bite.
  - Puncture or laceration after exposure to objects contaminated with fluid from monkey oral, genital, CNS tissues or known to contain B virus.
  - Post cleansing culture positive.

- **Prophylaxis considered:**
  - Mucosal or laceration adequately cleaned
  - Needlestick involving blood from high risk animal.
  - Puncture or laceration occurring after exposure to objects contaminated with body fluid or potentially infected cell culture.

Returning Traveler

• 18 yo female returns to campus after traveling with family to India. While staying with her uncle she was bitten by the family dog while playing catch. The uncle advises that his dog has had vaccinations. She was seen at a local hospital and treatment for Rabies was started. She has received three ‘shots’ over a 5 day period. Her uncle has emailed her that the dog is doing fine and appears normal (8 days post bite). The wound appears to be healed.

• Is there a rabies risk? **Foreign country higher prevalence**
• What if any treatment is indicated? **Maybe but 10 days out now**
• What are your resources for consultation? **County Health/State**
The Case of the Coughing Veterinarian

24 yo female veterinarian developed a flu like syndrome a few days after evaluating an ill pigeon in Animal Resources Services facility in Meyer Hall. Her symptoms included cough, myalgia, fever and headache.

Her patient (pigeon) did not respond to treatment and at necropsy was infested with round worms.

1. What should be included in your differential diagnosis?

2. What further testing should be done?

3. What environmental investigation is indicated?
Emperic Treatment and Further Evaluation

- Emperic antibiotic treatment was started (Doxycycline 100mg BID)
- Serologic testing was performed and was positive for *Chlamydia psittaci* (IgM 1/8; IgG 1/512)
- Touch prep from spleen of pigeon was positive for *Chlamydia* by immunofluorescence technique
- Subsequent investigation determined that a group of 60 pigeons brought to campus were infected. One other human infection identified at time of investigation. This was a lab assistant who had been handling birds and developed similar illness. His *Chlamydia psittaci* antibody was positive IgM and IgG.
Psittacosis

• ‘Parrot fever’ (aka ornithosis)
• CDC data from 1998-2002 = 923 human cases
  – Mostly from pet birds (cockateils, parakeets, parrots and macaws)
• Infected birds shed bacteria in feces and nasal discharge
• Humans infected through contact with infected material which can remain infective for weeks and birds may appear healthy.
• Diagnosis commonly by serologic methods acute and convalescent antibody titers.
• Treatment tetracyclines

Psittacosis Public Health Concerns

- Very infectious so others likely to be exposed.
  - Epidemiology – ‘shoe leather’ epidemiologic investigation
  - Go out to the environment
  - concentric circle investigation
- Found one other case in laboratory worker handling these birds. Symptoms had already resolved but had positive serology.
- Change in campus quarantine procedure for pigeons coming to campus for research
Occupational Medicine Case

• 24 yo right handed veterinary student assigned to the sheep barn has developed a swollen purple ‘blister’ on her left thumb. Her recent assignment involves working with ewes and lambs diagnosed with ‘sore mouth’. The ewes have lesions about their teats and the lambs have lesions on oral mucosa.
Orf Skin Lesion (Contagious Pustular Dermatitis)

- Skin lesion typical in location and ulcerated appearance
- Probably 10-14 days since pustule first appeared
- These lesions resolve slowly over 2-3 weeks without any specific treatment
- Photo Courtesy of Dr. Lyndon Oshiro, State Health Dept.
Sore Mouth Lesions
Orf Virus

- Very thick protein envelope survives desiccation in environment.

Scanning Electron Micrograph of typical skin lesion.

Courtesy of Dr. Lyndon Oshiro, California State Health Department, Berkeley
Human Orf

- Typically those infected had contact with infected sheep but may occur in goats, alpaca, camels, and sometimes dogs.
- Persistence in environment:
  - Fomite transmission well documented
- Incubation period 3-7 days.
- Most lesions on hands or fingers
- Diagnosis clinical although recent PCR developed

Case of the Postgraduate Cowboy

- 24 yo postgraduate researcher was working at the Sierra Nevada Field Station collecting conjunctival specimens from cattle. This necessitated his restraining the head of the cattle while using a swab to collect the specimen. He developed a small scaley patch of skin on his wrist which increased in size over 7 days and has become erythematous, indurated, boggy and painful.
• He shaved the hair off at the site and began using Bacitracin and then Lotrimen cream without relief. His family physician started him on Cephalexin one week ago. He was advised by the field station manager that the cattle carry ‘ring worm’ and recalls that many had patches of scale on their necks. He wore gloves and a lab coat but no protection at the wrists. He comes to the employee health clinic for evaluation.
Fungal Infections

- **Anthropophilic** (infection from other humans)
  - *Microsporum audouini*
  - *Trichophyton tonsurans*
  - *T. violaceum*

- **Zoophilic fungals species** (infection from animals or other infected humans)
  - *Microsporum canis* (cat, dog, monkey)
  - *Trichophyton mentagrophytes* (dog, rabbit, guinea pig, monkey)
  - *T. verrucosum* (cattle)
Trichophyton verrucosum

- Potassium hydroxide preparation of “plucked hair”
- Chains of large spores inside and on the surface of the hair shaft and visible at low power
Trichophyton verrucosum
Trichophyton fungal infections

- Zoophylic fungal skin infection
- *T. verrucosum* from cattle may produce a highly inflammatory skin condition.
- Typically round intensively inflamed lesion with uniform elevated, red, boggy, pustular surface.
- Infection involves penetration into the hair follicles and secondary bacterial infection is common.
- Treatment requires oral antifungals for 1-3 months
Zoonotic Infection

- 23 year old brick mason with a boggy crusted area on his upper lip.
- NEJM Volume 338 page 735(1998)
Zoonotic Infection

- He reports that his dog a Bull Mastiff has a similar lesion on his face (alopecia on snout for 5 months)
- NEJM Vol 338; page 735 (1998)
Zoonotic Fungal Infection

- Microscopic examination of culture from wound revealed spiral, tightly coiled hyphae and microconidia in grape like clusters
- Pet owner treated with ketoconazole
Veterinary Student Returning From Montana with ‘Flu’ Like Symptoms

- 24 yo female had been on a large animal rotation in Montana during Spring quarter. While there she had been assisting Spring lambing. There had been some ewes with placentitis and spontaneous abortion that required direct intervention.
- Toward the end of her rotation she developed fever, chills, headache and myalgia. No cough or SOB. She was otherwise healthy.

- What bacterial illness might explain her symptoms?
- What past medical history might be of importance to ascertain more information?
- How should she be evaluated?
- Should she be empirically treated?
Query Fever

- ‘Q Fever’ causative agent = *Coxiella burnetii* easily spread via aerosol from infected placental or bedding material from goats/sheep/cattle who are infected.
- Inhalation felt most likely course although sometimes linked to ingestion of unpasteurized milk.
- National seroprevalence is quite high 3.1%
- Two antigenic phases of infection.
- Typical acute symptoms are of a nonspecific febrile illness but may see hepatitis and pneumonia.
- Incubation period 2-3 weeks and typical course with resolution without sequelae.
- Asymptomatic infection may occur in up to 60%.

From: Diagnosis and Management of Q Fever-USA 2013. MMWR 62(3): 1-29
Q Fever
Evaluation and Management

- Evaluation of acute illness in Q Fever suspects:
  - Careful physical examination – Heart murmur for SBE risk
  - Blood count, liver function and chest xray
  - Serology-draw for acute and convalescent titer for IgM and IgG (phase I and phase II)

- Serologic testing is important for epidemiology but not for CLINICAL diagnosis ACUTE Q Fever

- If clinical suspicion is high for Acute Q Fever then recommended to TREAT

- Doxycycline 100mg BID for 14 days.

- Watch for chronic disease but seems rare unless compromised host (UCSF cases).
*Chlamydia psittaci* in a Pregnant Montana Sheep Rancher

- *Chlamydia psittaci* is known world wide as the leading cause of abortion in sheep.
- Isolated in oral, conjunctival, respiratory, fecal and urine specimens.
- Other risks include Brucella and Q fever but neither of these flu like illnesses typically associated with abortion.
- Recommend educating and consider recommending restricting pregnant patients from working around placenta or birth fluids.
Non-healing Ulcerative Skin Lesion in a Veterinary Student

- What diagnostic procedure is next best step in diagnosis?
Lymphocutaneous Sporotrichosis

- *Sporothrix schenckii* is a dimorphic fungus found worldwide in soil, decaying material, sphagnum moss, etc.
- Often immune compromised host but not always
- Had worked with kitten with ulcerative lesion of face 6 weeks earlier.
- Skin punch biopsy quick dx.

- Dissemination may occur (immune comp)
- IDSA Treatment Guidelines
  - Itraconazole 200mg daily for 2-4 weeks AFTER clearing
  - SSKI may be used second line.
Occupational Medicine Case

- 58 yo male veterinarian living in rural Northern California experienced sudden onset of fever to 104°F with left axillary lymphadenitis. He consulted a local family doctor who obtained a CBC which showed leukocytosis with left shift. He treated with ceftriaxone and tetracycline. Serum later obtained showed high titer IgG for *Yersinia pestis* and also IgM titer positive.

- In reconstructing exposure history the veterinarian recalled caring for a sick domestic cat who had a large abscess in the submandibular region. The cat lived on a rural ranch where there were abundance of squirrels.
Plague

• Common among rodents in rural areas throughout California foothill and mountain areas.
• Most common during May thru October.
• Commonest presentation is fever and painful lymphadenopathy (bubo)
• Most commonly after recreational activities in campgrounds with squirrel/flea infestation.
• State Health Dept recommendations:
  – Avoid sick or dead rodents
  – Do not feed rodents or have food for them.
  – Do not place tents or sleep near or on rodent burrows.
  – Use insect repellents
  – Leave pets at home or keep them on leashes and use flea powder.
Veterinary Student with Diarrhea

• 24 yo female second year veterinary student presents with one week history of diarrhea. She has nausea but hasn’t vomited. She recalls working with cattle on a dairy caring for calves with ‘scours’. She has cramping lower abdominal pain and diarrhea 6-10 times daily. She knows that two other students rotating on large animal service with her at the dairy have similar symptoms. A stool specimen was obtained and Acid Fast stain is shown on next slide.

  – What is the likely diagnosis?
  – What treatment if any is indicated?
Acid Fast Stain Stool
An outbreak of human cryptosporidiosis occurred among previously healthy persons in a veterinary medical teaching hospital. Human illness began after admission of calves from a farm which had been experiencing an epizootic of neonatal diarrhea due to Cryptosporidium. The clinical syndrome in humans was characterized by watery diarrhea, abdominal cramping, flatulence in four persons, three of whom had been responsible for the care and treatment of infected calves. A fourth patient had washed her husband's soiled clothing and appeared to have been infected indirectly through fomite contamination. Among 112 persons surveyed, 26 (23.2 percent) had a diarrheal illness during the outbreak and nine met the case definition of a diarrheal illness lasting at least three days. These persons were more likely to have had contact with a calf with diarrhea than were 52 referents who did not become ill during the outbreak.
Treatment for Cryptosporidiosis

Most people who have healthy immune systems will recover without treatment. Diarrhea can be managed by drinking plenty of fluids to prevent dehydration.

Those who have weakened immune systems are at higher risk for more severe and prolonged illness.

Young children and pregnant women may be more susceptible to dehydration resulting from diarrhea and should drink plenty of fluids while ill.

With known outbreaks facility should be posted and keep children out of animal care areas.
Treatment for Cryptosporidiosis

• Metronidazole ineffective

• Nitazoxanide (Alinia) has been FDA-approved for treatment of diarrhea caused by Cryptosporidium in people with healthy immune systems and is available by prescription. Shortens course of symptoms by 2-3 days.

Dosing Nitazoxanide 500mg BID x 3 days
UCD Genetic Research

• Biotechnology research at UCD has yielded some interesting results but has led to some very unusual occupational exposures for staff, students and faculty.
You are asked to evaluate a 27 yo cage cleaner from the primate center who was bitten on a finger by a rhesus macaque today from ‘infectious housing’. The animal care supervisor from the primate center calls you to advise that the animal is part of a research protocol and is infected with an experimental retrovirus (‘SHIV’).

What potential infections are you concerned about?
What are your resources for consultation?
What care is indicated?
Management of Retrovirus Exposures

- SHIV is a hybridization of Human and Simian retroviruses used in vaccine studies
- Retrovirus exposure is managed similarly and you should consult Post Exposure Prophylaxis Prophylaxis Hotline: 888-448-4911
- PEP Clinical Staff Can Assist in exposure assessment.
- Typical 3 drug Regimen when PEP indicated (April 2014): Truvada™ 1 PO Once Daily [Tenofovir DF (Viread®; TDF) 300mg + emtricitabine (Emtriva™; FTC) 200mg] PLUS Raltegravir (Isentress®; RAL) 400mg PO Twice Daily
- 28 days with monitoring for side effects (mostly GI) with blood count and chemistry panel baseline and two weeks.
Approach to Unusual Case

• Keep an open mind!
  – ‘Chance favors the prepared mind’

• Timing of symptoms?

• Associated symptoms?

• Unusual occupation, hobby or exposure?

• Others in same environment similar symptoms?

• Animal Contact?
  – Trauma
  – Allergy
  – Infection

• Who can help me with diagnosis?
Evaluation and management of wounds should take into account mechanism of injury, source risk factors and host risk factors.

Wound management decisions should involve patient input and be well documented in the medical record.

Do not have to have a bite wound to have zoonoses!

Animal handlers may have unique risks related to unique exposures and host factors.

Exotic exposures – Enlist some help!
  - Your County Health Officer is there to help you – and has quick access to many State Health and CDC resources.
  - Post exposure prophylaxis line
  - Academic center infectious disease/occupational medicine specialists