



Maternal Health and Zoonosis

MPH Field Experience Report

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Overview

- ▶ Field Experience
 - ▶ Each section
- ▶ Discussion
- ▶ Introduce zoonosis
- ▶ Maternal health and zoonosis
 - ▶ 4 diseases of concern
- ▶ Conclusion
- ▶ Fact sheets

Field Experience

Fort Riley Army Installation,
Kansas

Department of Public
Health



Field Experience

- ▶ Completed 240 hours at Department of Public Health (DPH), Fort Riley Army Installation, KS
- ▶ DPH is part of the Irwin Army Community Hospital at Fort Riley
- ▶ Comprised of Six sections
 - ▶ Environmental Health, Industrial Hygiene, Army Wellness Center, Army Public Health Nursing, Occupational Health, and Army Hearing Program
 - ▶ Partners with Veterinary Services
- ▶ Mission of DPH “To promote health and wellness, prevent disease and injury of Soldiers and their families, military retirees, and Army Civilian employees at Fort Riley through workplace and community health.” (Fort Riley DPH pamphlet)

Environmental Health

MAIN RESPONSIBILITIES

- FOOD SERVICE INSPECTIONS AND TRAINING
- WATER QUALITY SURVEILLANCE
- DISEASE VECTOR SURVEILLANCE
- HOSPITAL WASTE MANAGEMENT
- CHILD DEVELOPMENT CENTER SANITATION INSPECTIONS

Environmental Health

- ▶ Observation and Participation of Child Development Center Inspection
 - ▶ Food service inspection
 - ▶ Environmental safety
 - ▶ Expiration dates
 - ▶ Lunchtime food service
 - ▶ Handwashing

Environmental Health

- ▶ Water Quality Surveillance
 - ▶ Test chlorine levels in different sectors
 - ▶ Water testing for coliforms
 - ▶ Ice testing for coliforms
 - ▶ Assisted in processing samples

Environmental Health

- ▶ Disease Vector Surveillance
 - ▶ Mosquitos
 - ▶ Ticks
- ▶ Regulated medical waste
- ▶ MSDS manuals

Industrial Hygiene

MAIN OBJECTIVE IS TO
PROMOTE WORKPLACE
SAFETY AT FORT RILEY

Industrial Hygiene

- ▶ Assess Ventilation systems
- ▶ Conduct noise surveys
- ▶ Air sampling for biologics
- ▶ Health Risk Assessments
- ▶ Ergonomic studies

Army Wellness Center

PERFORM HEALTH
ASSESSMENTS, PHYSICAL
FITNESS TESTING, HEALTHY
NUTRITION METABOLIC
TESTING, STRESS
MANAGEMENT, TOBACCO
EDUCATION, BEHAVIOR
CHANGE STRATEGIES

Army Wellness Center

- ▶ Observed multiple health assessments and healthy nutrition metabolic tests
 - ▶ Follow-ups
 - ▶ Body fat composition
 - ▶ Bodpod
 - ▶ Resting metabolic rate
 - ▶ Indirect Calorimeter
- ▶ Discussion regarding food choices, exercise, strategies to make healthy lifestyle changes, tobacco education
- ▶ Classes weekly on sleep and stress management

Army Public Health Nursing

MAIN RESPONSIBILITIES

- SEXUALLY TRANSMITTED INFECTION (STI) COUNSELING
- TUBERCULOSIS SCREENING
- TOBACCO CESSATION
- INSPECTION FOR THE CHILD AND YOUTH SERVICES
- COMMUNITY OUTREACH

Army Public Health Nursing

- ▶ Assisted with an inspection of a youth center
 - ▶ Records for children with food allergies
 - ▶ Medications left by parents for children
 - ▶ Random locker and backpack searches
 - ▶ First Aid kits
 - ▶ Disinfectant bottles
 - ▶ Proper hand washing

Army Public Health Nursing

- ▶ Observed Nurse Practitioner (NP)
 - ▶ Tobacco cessation
 - ▶ Tuberculosis treatment
 - ▶ Vaccine counseling
- ▶ Observed databases used to track communicable diseases
- ▶ STI counseling

Occupational Health

PROTECTS THE HEALTH OF
CIVILIAN EMPLOYEES AND
CONTRACTORS AT FORT
RILEY

Occupational Health

- ▶ Exams for civilian employees before hire, annually, and before leaving a position
- ▶ Every contractor has exam before each deployment
- ▶ Exams
 - ▶ Vitals, height, weight, hearing test, vision screening, spirometry, vaccines
- ▶ Monitor work related injuries and workers compensation claims
- ▶ Works with Industrial Hygiene, Environmental Health, and Army Hearing Program to prevent work related injuries or eliminate worksite safety concerns

Army Hearing Program

MAIN RESPONSIBILITIES

- RESPONSIBLE FOR HEARING SCREENING, HEALTH, AND CONSERVATION OF ACTIVE DUTY SOLDIERS
- COLLABORATES WITH OCCUPATIONAL HEALTH TO PRESERVE HEARING OF CIVILIAN EMPLOYEES

Army Hearing Program

- ▶ Hearing booths at processing center
 - ▶ Hearing tests at processing into Fort Riley and before and after deployment
- ▶ Training of equipment for hearing tests and science of hearing
- ▶ Appropriate hearing protection

Veterinary Services

MAIN RESPONSIBILITIES

- ANIMAL PREVENTATIVE MEDICINE
- FOOD SANITATION AND INSPECTIONS

Veterinary Services

- ▶ Not a section of the DPH, but partners at times, especially if a case with zoonotic concerns
- ▶ Wellness exams, vaccines, heartworm and fecal testing, deworming, heartworm prevention, flea and tick prevention for military family pets
- ▶ Discuss zoonotic concerns at wellness appointments
- ▶ Care for military working dogs and horses on post
- ▶ Inspect any pets at the Child Development Center
 - ▶ Proper care of animal
 - ▶ Zoonotic concerns

Veterinary Services

- ▶ Most focus of VS is on food sanitations and inspections of the commissary, food service, shopettes, and Child Development Center.
- ▶ Commissary Inspections
 - ▶ Ensure that meat and produce are displayed in a sanitary condition and at the proper temp.
 - ▶ Daily deliveries inspected for required labeling , stored correctly, packaging in good condition
 - ▶ Refrigerators, storerooms, and freezers inspected for proper temp. and sanitary conditions
- ▶ Child Development Centers
 - ▶ Inspected to see if food being stored at proper temperature and in a sanitary manner
- ▶ Off Post inspections
 - ▶ Ensure food safety on production end

Discussion

- ▶ Each individual department operates separately but also in partnership with each other to prevent injury and illness as well as promoting and protecting the health of the community at Fort Riley.
- ▶ Child Development Centers-EH, APHN, IH, VS
- ▶ Tobacco use-APHN and AWC
- ▶ Education and resources to protect hearing-IH, OH, AHP
- ▶ Previous perception of DPH
 - ▶ Vaccines
 - ▶ Birth control
 - ▶ Exams if no health insurance

Discussion

- ▶ Chance to see epidemiology in practical setting
 - ▶ Communicable disease tracking in APHN
- ▶ More perspective on the behavioral aspects of public health
 - ▶ STI and smoking cessation
- ▶ Practical aspects of bacteriology and parasitology in human health
 - ▶ vector surveillance in EH
- ▶ Biggest lesson-public health work happens in the background quietly
 - ▶ Ex. Water quality testing by EH and ergonomic studies by IH

Introduction

- ▶ What is zoonosis?
 - ▶ Defined as a disease that can be transmitted from animals, domestic or wild, to people (Kahn, p. 556)
 - ▶ Disease can be transmitted through direct contact, indirect contact, aerosols, and vectors (Wortinger, p. 1-2)

Introduction

- ▶ Why is zoonosis a big public health concern?
 - ▶ More than 800 known pathogens that are zoonotic transmitted worldwide with 20-30% carried by cats and dogs (Wortinger, p.1)
 - ▶ 75% of emerging diseases are zoonotic (Wortinger, p. 1)
 - ▶ In 2012, American Veterinary Association est. 36.5% of households in U. S. own dogs and 30.4% own cats

Introduction

- ▶ Who is at risk for infection with a zoonotic disease?
 - ▶ Young children
 - ▶ Elderly
 - ▶ Pregnant women
 - ▶ Immunocompromised
- (Weese, p.229)

Introduction

- ▶ Prevention?
 - ▶ Understanding your individual risk
 - ▶ Know what steps to take to prevent

Maternal Health and Zoonosis

- TOXOPLASMOSIS
- LEPTOSPIROSIS
- Q FEVER
- LYMPHOCYTIC
CHORIOMENINGITIS

Toxoplasmosis

- ▶ *Toxoplasma gondii*, protozoan (Acha, Vol. 3, p. 76)
- ▶ Infection can affect both fetuses and newborns (Acha, Vol. 3, p. 77)
- ▶ Infection in early stages of pregnancy may lead to miscarriage or stillbirth, but newborn may be born with congenital abnormalities such as hydrocephalus, microcephalus, or mental retardation (Brooks, p. 1)
- ▶ Not all infants with congenital infection show signs at birth, but most will develop problems with their eyes, ears and have learning and developmental problems (Weese p, 71-73)
- ▶ CDC estimates 400-4000 cases of congenital toxoplasmosis per year in the U. S. (CDC, Neglected, p. 2)

Toxoplasmosis

- ▶ Sources of infection
 - ▶ Feline feces, wild or domestic
 - ▶ Contaminated meat
 - ▶ Water or soil contaminated with infected feline feces (Weese, p. 68-69)

Toxoplasmosis

- ▶ Felines are definitive host for *T. gondii*
- ▶ Infected felines spread unsporulated oocysts in feces, which sporulates in the environment in 1-2 days which are infective to all mammals that may ingest them
- ▶ Non-feline mammals are intermediate host for *T. gondii*
 - ▶ Infective oocysts become infective cysts in the muscles and organs
 - ▶ Cysts infect any mammal that eats it-this is how cats become infected
- ▶ Cats only shed oocysts with the initial infection for about 3-10 days (Weese, p. 68-69)

Toxoplasmosis

- ▶ Clinical signs in cats
 - ▶ Usually have none
 - ▶ Maybe about 10 days of diarrhea
 - ▶ Immunosuppressed cats or kittens infected through mother's milk or through placenta
 - ▶ Fever
 - ▶ Lethargy
 - ▶ Anorexia
 - ▶ Lameness
 - ▶ Hepatitis
 - ▶ Eye problems
 - ▶ Neurologic issues

(Weese, p. 71-72)

Toxoplasmosis

- ▶ Most human cases are mild and treatment is not required
- ▶ Clinical signs in humans-may last 1-12 weeks
- ▶ About 10-15% of human infections do not show clinical signs
 - ▶ Fever
 - ▶ Lethargy
 - ▶ Sore throat
 - ▶ Muscle pain
 - ▶ Swollen lymph nodes
 - ▶ Enlarged spleen and liver

(Weese, p. 71-72)

Toxoplasmosis

- ▶ *T. gondii* is distributed worldwide (CDC, parasites)
- ▶ CDC estimates in U.S. about 22.5% of the population 12 years and older have been infected with *T. gondii*
- ▶ Not a reportable disease, so it makes it difficult to estimate the prevalence in the U.S. currently but there are about 15,000 clinical cases per year (Weese, p. 69)
- ▶ CDC estimates there are about 327 death per year and 4,428 hospital stays due to food borne toxoplasmosis (CDC, Neglected)
- ▶ There is no correlation between owning a cat and infection with *T. gondii* (Brooks, p. 2)

Toxoplasmosis

▶ Prevention

- ▶ Thoroughly cook raw meat
- ▶ Cats should not be allowed to hunt outside or eat raw meat
- ▶ Clean litter box at least once daily and then wash hands well. Pregnant women should avoid cleaning the litter box or wear gloves and wash hands well when done
- ▶ Do not dispose of cat litter in the yard
- ▶ Wear gloves when gardening
- ▶ Do not drink raw milk

(Brooks, p. 2)

Leptospirosis

- ▶ Caused by a gram-negative, spiral-shaped bacterium-*Leptospira interrogans*
- ▶ Over 200 serovars
- ▶ Can be confusing group of organisms to classify (Weese, p. 157)

Leptospirosis

- ▶ Found worldwide with a higher prevalence in in tropical climates
- ▶ About 100 cases of leptospirosis per 100,000 people in tropical climates, but in more temperate climates incidence drops to <1 case per 100,000 people (Puliyath, p. 2491)

Leptospirosis

- ▶ Outcomes if infected during pregnancy

- ▶ First trimester

- ▶ Possibility of miscarriage

- ▶ Near term

- ▶ Congenital leptospirosis-can be passed to newborn through breastmilk and placenta

- ▶ Stillbirth

- ▶ Hepatorenal failure

- ▶ Jaundice

- ▶ Developmental abnormalities

(Puliyath, p. 2492)

Leptospirosis

- ▶ Clinical signs
 - ▶ Headache, fever, chills, muscle pain, abdominal pain, vomiting, diarrhea, anorexia, enlarged lymph nodes, red throat, rash, enlarged spleen and liver (Puliyath, p. 2492)
- ▶ Similar to influenza, dengue fever, meningitis, malaria, hepatitis, and urinary tract infections
- ▶ Can lead to misdiagnosis (Puliyath, p. 2493-2494)

Leptospirosis

- ▶ Sources of infection
 - ▶ Through contact of urine of infected animals
 - ▶ Abraded skin, mucous membranes, ingestion, inhalation, healthy skin
(Puliyath, p. 2492)
 - ▶ Stagnant water, soil, or vegetation that has been contaminated with infected urine.
 - ▶ Can live in freshwater up to 16 days and in soil as long as 24 days
 - ▶ Areas of rat infestations (Puliyath, p. 2491-2492)

Leptospirosis

- ▶ High risk activities
 - ▶ Raising livestock
 - ▶ Working in slaughter houses
 - ▶ Veterinary medicine
 - ▶ Agricultural farming
 - ▶ Mining
 - ▶ Gardening
 - ▶ Aquatic sports
- (Puliyath, p. 2492)

Leptospirosis

- ▶ Prevention-focus on hygiene
 - ▶ Thoroughly wash hands
 - ▶ Wear gloves or protective clothing when participating in high risk activities
 - ▶ Drain lowlands or stagnant water if possible
 - ▶ Proper disposal of garbage
 - ▶ Control infection in domestic animals through vaccine and management
 - ▶ Do not swim in freshwater that may be contaminated (Acha, Vol. 1, p 165)

Q Fever

- ▶ Rickettsial disease caused by *Coxiella burnetii* (Acha, Vol. 2, p. 16)
- ▶ Sheep, goats, and cattle are main source of infection but dogs and cats can be a concern as well (Weese, p. 145)
- ▶ Infection in a pregnant woman can cause a spontaneous abortion, premature birth, or low birth weight (Weese, p. 146)
- ▶ Immunosuppression during pregnancy may result in chronic Q Fever infection in the mother (Weese, p. 147)

Q Fever

- ▶ Worldwide distribution (Acha, Vol. 2., p. 16)
- ▶ CDC estimates in U.S. there are approximately 50-60 cases reported each year
- ▶ Incidence of 0.28 cases per million people (CDC, Q fever)

Q Fever

- ▶ Clinical signs in people
 - ▶ Acute fever, sweating, lethargy, muscle pain, anorexia, chills, pain behind eyes, headaches, vomiting, diarrhea (Acha, Vol 2., p. 19)
 - ▶ No rash like other rickettsial diseases (Weese, p. 146)
 - ▶ May also cause pneumonia, and enlarged spleen and/or liver (Weese, p. 146)
 - ▶ Fever, hepatitis, and pneumonia are highly indicative of Q Fever (Weese, p. 146)
- ▶ Clinical signs in animals
 - ▶ Subclinical (Weese, p. 146)

Q Fever

- ▶ *C. burnetti* is highly infectious and exposure to few organisms can cause clinical disease in healthy person
- ▶ Shed in feces, urine, milk, placenta, and uterine secretions in infected animals
- ▶ Infection can be from direct contact, ingestion, and inhalation of the organism
- ▶ Most infections occur after an infected animal has given birth
- ▶ Infection from pets is from cats that have recently given birth but rarely dogs

(Weese, p. 145-146)

Q Fever

▶ Prevention

- ▶ Pregnant woman should avoid animals that are giving birth and newborn animals
- ▶ Dogs should not have contact with pregnant ruminants and should not be allowed to eat or touch placenta or fluid from the uterus
- ▶ Good hygiene if any possibility your pet has had contact with an animal that has given birth recently (Weese, p. 148)

Lymphocytic Choriomeningitis

- ▶ Caused by single stranded RNA virus, Lymphocytic Choriomeningitis Virus (LCMV)
- ▶ LCMV is an arenavirus-transmitted by rodents (Bonthius, p. 89)
- ▶ Main source of infection is wild mice, but pet hamsters and guinea pigs are a concern as well (Weese, p. 251)
- ▶ Pet rodents become infected with LCMV from exposure to wild mice at the breeder, pet store, or home (CDC, 2014)

Lymphocytic Choriomeningitis

- ▶ LCMV as a maternal health concern
 - ▶ First trimester
 - ▶ Possible fetal death
 - ▶ Second or third trimester
 - ▶ Significant birth defects
 - ▶ Eye problems
 - ▶ Developmental retardation
 - ▶ Hydrocephalous

(CDC, 2014)

Lymphocytic Choriomeningitis

- ▶ Infected mothers can transmit LCMV through placenta (Bonthius, p. 90)
- ▶ Congenital infection causes:
 - ▶ Chorioretinitis
 - ▶ Severe vision loss
 - ▶ Neurologic problems
 - ▶ Macrocephaly due to hydrocephalus
 - ▶ Microcephaly due to improper brain growth (Bonthius, p. 92)

Lymphocytic Choriomeningitis

- ▶ Congenital LCMV infection may be underdiagnosed in cases of congenital neurologic and eye disease (Bonthius, p. 90)
- ▶ TORCHS
 - ▶ *Toxoplasma gondii*
 - ▶ Rubella virus
 - ▶ Cytomeglovirus
 - ▶ Herpes simplex virus
 - ▶ syphilis
- ▶ All transmitted across placenta and cause similar damage to fetus, which makes diagnosis of LCMV difficult (Bonthius, p. 93)

Lymphocytic Choriomeningitis

- ▶ Transmission
 - ▶ Shed in infected rodent feces, urine, and saliva
 - ▶ Shed virus for 8 months
 - ▶ Inhalation of aerosolized virus
 - ▶ Bites
 - ▶ Direct contact
 - ▶ Organ transplant

(Weese, p.252)

Lymphocytic Choriomeningitis

- ▶ Clinical signs in humans
 - ▶ Most cases show no clinical signs or just mild disease (Weese, p. 252)
 - ▶ First phase 8-13 days after exposure, may last up to a week
 - ▶ Fever, lethargy, decreased appetite, muscle pain, headaches, nausea, and vomiting
 - ▶ Second phase once recovered from initial symptoms
 - ▶ Meningitis, encephalitis, meningioencephalitis
 - ▶ Fever, headache, stiff neck, tiredness, confusion, sensory and motor deficits (CDC, 2014)
- ▶ Clinical signs in rodents
 - ▶ Usually asymptomatic (Weese, p. 252)

Lymphocytic Choriomeningitis

- ▶ Prevention is aimed at sanitation, hygiene, and avoidance of rodents
 - ▶ Wild rodent populations need to be controlled in homes, pet stores, and breeding facilities
 - ▶ Do not allow pet rodents to roam free
 - ▶ Safely handle pet rodents to prevent bites
 - ▶ Always wash hands well after handling rodents, bedding and cleaning cages
 - ▶ New pet rodents should not be brought into the home of a pregnant woman
 - ▶ Pregnant woman should not have contact with any rodent area that may be contaminated with rodent feces or urine
(Weese, p. 253)

Discussion

- ▶ These 4 diseases are detrimental but preventable
- ▶ Education on disease risk and prevention reduce the risk of exposure
- ▶ Individual risk factors
 - ▶ Pet ownership-new cat or rodent
 - ▶ Exposure to pregnant goats and sheep
 - ▶ Rodent infestations
 - ▶ Gardening
 - ▶ Farming
 - ▶ Consumption of raw or undercooked meat
- ▶ Good environmental and personal hygiene important factors in preventing zoonotic diseases

Discussion

- ▶ Pregnant woman need to discuss risk factors with veterinarian and physician
- ▶ An expecting mother who is ill should see her physician and include any animal exposure in her history
 - ▶ Rule out/in zoonotic disease
 - ▶ Aid in quick diagnosis and treatment

Conclusion

- ▶ See how a DPH operates on a day-to day basis
- ▶ Hands on experience
 - ▶ Inspections at hospital and Child Development Centers
 - ▶ Water chlorine level testing
- ▶ VS worked with DPH
 - ▶ Tularemia
 - ▶ Bats

Conclusion

- ▶ No collaboration between veterinarians and human health care colleagues regarding cases of zoonosis
- ▶ Better understanding of human health and public health due to field experience
- ▶ Gap between human public health and veterinary public health regarding zoonosis
- ▶ Public health could be improved in the area zoonosis if veterinarians, physicians, and other human healthcare workers collaborated
 - ▶ Identify risk factors for zoonosis
 - ▶ Provide education on prevention
 - ▶ Aid in diagnosis so treatment can be started early

Conclusion

- ▶ Capstone Project
 - ▶ Better prepared to discuss zoonotic concerns with clients and colleagues
 - ▶ Help me to start to bridge the gap between human and veterinary public health
 - ▶ Information sheets are a great resource share with clients and colleagues
 - ▶ Website-pdf
 - ▶ Kansas Veterinary Medical Association (KVMA)

Fact Sheets

Toxoplasmosis prevention in pregnancy

Toxoplasmosis is caused by a protozoan called *Toxoplasma gondii*. Infection of a pregnant woman can lead to a miscarriage, stillbirth, or congenital abnormalities such as blindness, neurologic problems, and mental retardation.

Sources of Infection:

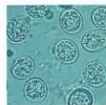
- Domestic or wild feline feces
- Contaminated meat
- Water or soil contaminated with feces from infected felines.



Clinical signs in cats:

Infected cats may have some mild diarrhea for about 10 days, but MOST cats show NO clinical signs of infection with *T. gondii*.

Figure 2



T. gondii oocysts

Clinical signs in humans:

- Fever
 - Lethargy
 - Sore throat
 - Muscle pain
 - Swollen lymph nodes
 - Enlarged spleen and liver
- Prevention:
- Thoroughly cook all raw meat
 - Do not allow cats to hunt outside or eat raw meat
 - Litter box should be cleaned at least once daily and wash hands well
 - Pregnant woman should avoid cleaning litter box or wear gloves and wash hands well when done
 - Do not dispose of cat litter in the yard
 - Wear gloves when gardening
 - Do not drink raw milk



Do I have to get rid of my cat if I am pregnant? NO. Not if you follow the prevention tips listed above you do not need to rehome your cat. Contact your veterinarian or physician with any questions.

Leptospirosis prevention in pregnancy

Leptospirosis is caused by a spiral shaped bacterium called *Leptospira interrogans*.



Figure 3

Infection of a pregnant woman can lead to miscarriage, stillbirth, liver or kidney failure of the fetus, jaundice, or developmental abnormalities. The infection can be transmitted from the mother through the placenta or breastmilk.

Sources of infection:

- Urine of infected mammals
- Stagnant water, soil, or vegetation contaminated by infected urine
- Rat infestations
- Any environment they may be contaminated with mammal urine



Infection can occur through abrasions on the skin, contact with mucous membranes, ingestion, and inhalation.

Clinical signs:

- Headache
 - Fever/chills
 - Muscle pain
 - Abdominal pain
 - Vomiting and diarrhea
 - Anorexia
 - Enlarged lymph nodes
 - Red throat
 - Rash
 - Enlarged spleen and liver
- Prevention:
- Thoroughly wash hands
 - Wear gloves or protective clothing when participating in high risk activities
 - Drain lowlands or eliminate stagnant water
 - Control rodent infestations
 - Proper garbage disposal
 - Control infection in domestic animals through vaccination and management
 - Do not swim in fresh water that may be contaminated

Contact your veterinarian or physician with any questions.



Fact Sheets

Q Fever prevention in pregnancy

Q fever is a rickettsial disease caused by *Coxiella burnetii*. Infection in pregnant woman can cause spontaneous abortion, a premature birth, or result in low birth weight. Due to immunosuppression during pregnancy, the mother may also become chronically infected.



Sources of infection:

- Cats that have recently given birth
- Ruminants (sheep and goats) that are pregnant or have just given birth
- Dogs that have eaten or touched placenta or uterine fluid after a mammal has given birth-especially sheep



Clinical signs:

- Fever
- Sweating
- Lethargy
- Muscle pain
- Anorexia
- Chills
- Pain behind the eyes
- Headaches
- Vomiting
- Diarrhea



Prevention:

- Pregnant woman should avoid animals giving birth and any newborn animals, such as stray, pregnant cats
- Prevent cats and dogs from having contact with ruminants, especially sheep that are pregnant or have just given birth
- Do not allow dogs and cats to eat or have contact with placenta or uterine fluid from ruminants
- Practice good hygiene if your pet may have had contact with and animal that has just given birth

Contact your veterinarian or physician with any questions.

Lymphocytic Choriomeningitis prevention in pregnancy

Lymphocytic choriomeningitis is a disease caused by the Lymphocytic Choriomeningitis Virus (LCMV). Infection in pregnant woman can result in fetal death or cause significant birth defects such as eye problems, developmental retardation, and neurologic problems.



Sources of infection:

- Feces, urine, and saliva
 - Wild mice
 - Pet hamsters
 - Pet guinea pigs
- Direct contact with infected rodents
- Inhalation of aerosolized virus from feces, urine, or saliva of infected rodents



Clinical signs:

- First phase
 - Fever
 - Lethargy
 - Decreased appetite
 - Muscle pain
 - Headaches
 - Nausea
 - Vomiting
- Other symptoms include: pain in throat, joints, chest, testicles, and salivary gland as well as a cough
- Second phase (full recovery for first phase)
 - Fever
 - Headache
 - Stiff neck
 - Tiredness
 - Confusion
 - Motor and sensory deficits

Prevention:

- Control wild rodent infestations
- Pregnant woman should not have contact with any rodents or area that may be contaminated with rodent feces or urine
- New pet rodents should not be brought into the home of a pregnant woman

Contact your veterinarian or physician with any questions.

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