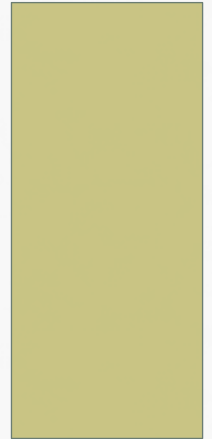


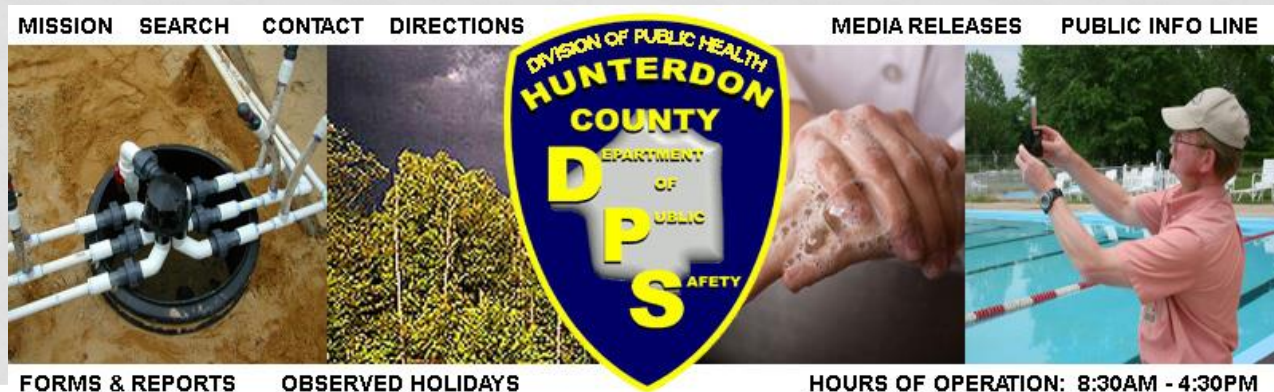
A LOOK INTO THE EMPHASIS PHYSICIANS,
VETERINARIANS, AND PREGNANCY EDUCATORS PLACE
ON PROVIDING TOXOPLASMOSIS INFORMATION FOR
PREGNANT PATIENTS OR CLIENTS

CAITLIN TIMMINS
MPH CANDIDATE



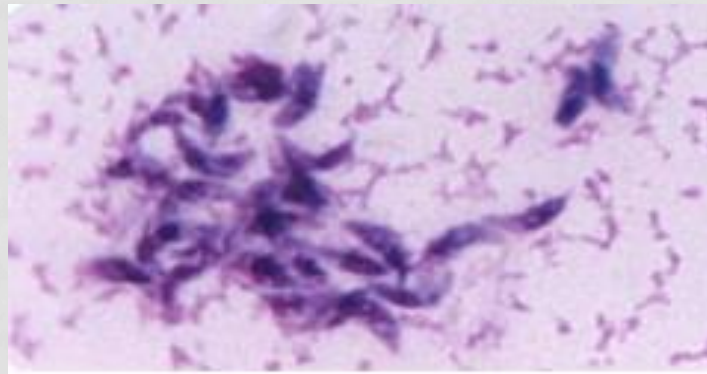
INTRODUCTION

- Hunterdon County Health Department
 - Flemington, NJ
 - Karen Demarco, MPH
- Evaluation of the knowledge of *Toxoplasma gondii* in health professionals interacting with pregnant women
 - OBGYN
 - Veterinarian
 - Pregnancy educator/nurses

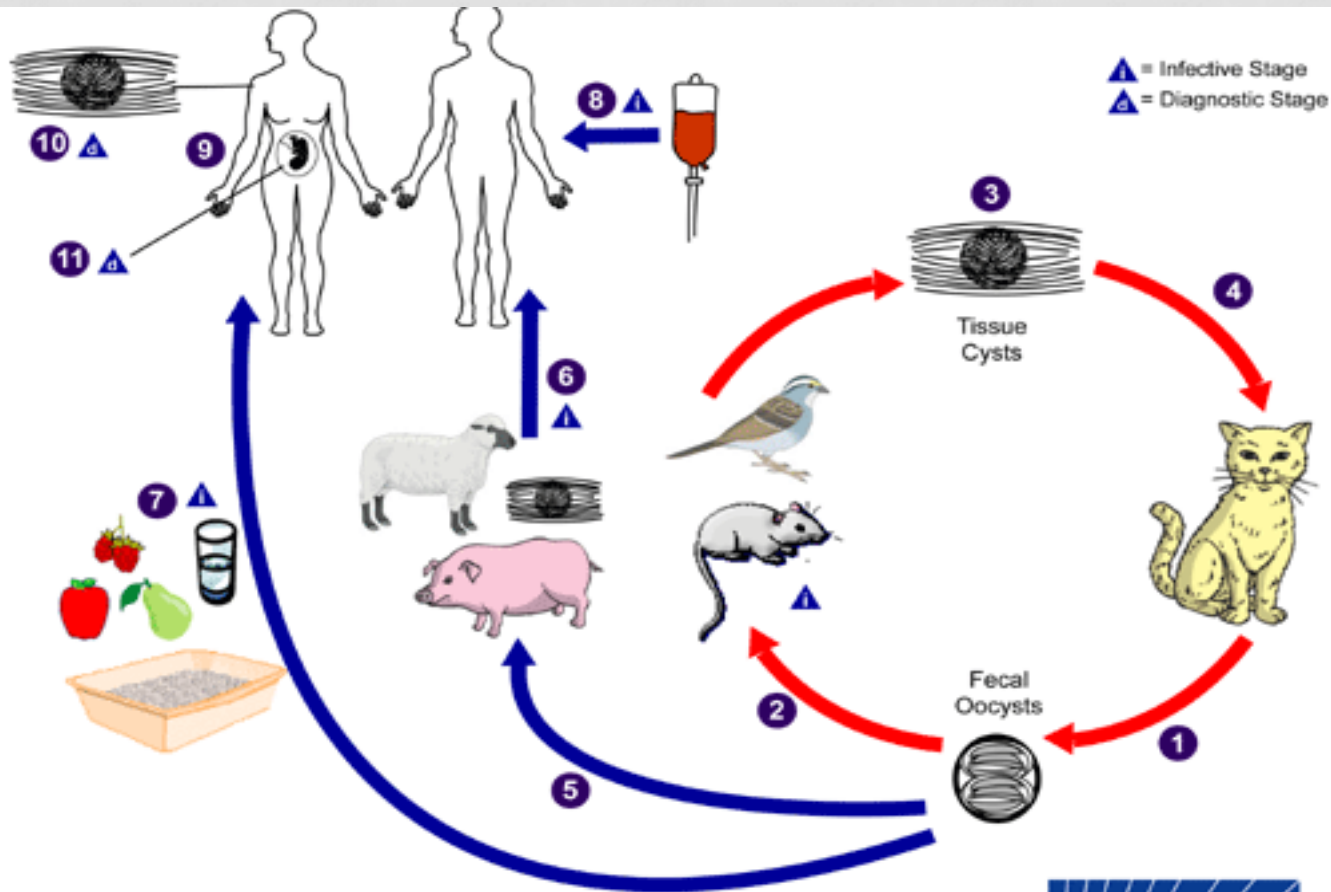


LITERATURE REVIEW

- *Toxoplasma gondii*
 - Single celled parasitic organism
 - Worldwide
- 3 lifecycle stages
 - Sexual phase – produces infective oocysts in the intestine
 - Tachyzoites – rapidly dividing phase within cells of host
 - Bradyzoites – encysted phase within the tissues



LITERATURE REVIEW

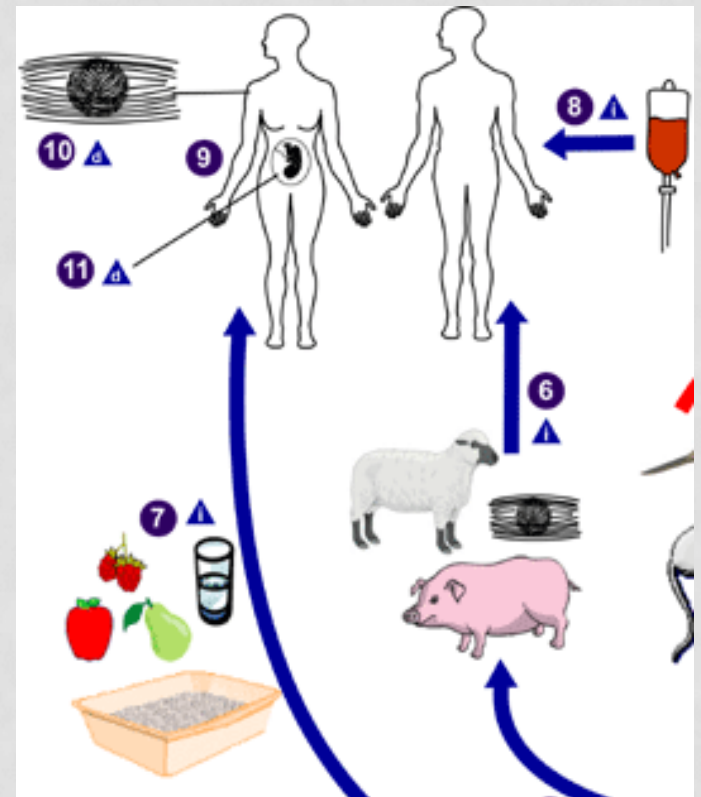


LIFE CYCLE

- Oocysts are shed by the cat
- Become infective in 1-5 days
- Remain infecting in soil for up to 18 months
- Ingested by rodents, livestock, wildlife, cats, or humans
- Transforms into tachyzoites in host after ingestion and later form tissue cysts (bradyzoites)
- Cats can become infected from ingestion of intermediate hosts
- Humans
 - Eating undercooked contaminated meat
 - Food or water contaminated with cat feces or contaminated environmental samples
 - Blood transfusion or organ transplantation
 - Transplacentally from mother to fetus

LITERATURE REVIEW

- Transmission
 - Ingestion of contaminated undercooked meat products
 - Commonly mutton, pork, and venison
 - Most common route
 - Handling of contaminated meat and vegetables without proper hand washing
 - Contact with contaminated cat feces in a litter box or garden
 - Contaminated water sources
 - Transplacentally from mother to fetus
 - Blood transfusion or organ transplantation - rare
- Estimated that 22.5% of the US population over 12 years old have been infected



LITERATURE REVIEW

- Jones et al. 403 pregnant women surveyed
 - 48% had seen information about toxoplasmosis
 - 7% were aware they had been tested
- Berriel da Silva et al. surveyed 61 physicians and 56 nurses
 - 97.5% recognize cats are a potential source of infection
 - 51.7% believed dogs were as well
- Kravetz and Federman 102 OBGYNs, internists and family practitioners
 - OB's more likely to advise against undercooked meat and gardening without gloves than internists or family practitioners

LITERATURE REVIEW

Toxoplasmosis Symptoms

- Parasites infect tissue cysts commonly skeletal muscle, myocardium, brain, and eyes
- Usually mild to moderate flu-like symptoms, possibly no symptoms
 - Swollen lymph nodes
 - Achy muscles
- More severe in immunocompromised
 - Lymphadenitis
 - Chorioretinitis
 - Encephalitis
 - Reactivated infection

Toxoplasmosis Symptoms

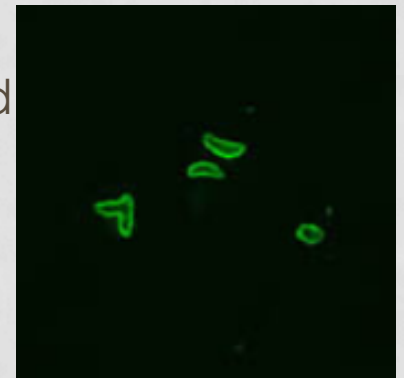
- Severe toxoplasmosis
 - Occurs when a previous infection becomes reactivated because of immune depression
 - Damage to the eyes, brain, and other organs
- Ocular toxoplasmosis (<2%)
 - Reduced or blurred vision
 - Redness of the eye
 - Tearing
 - Eye pain
 - Sensitivity to light
 - Blindness with reactivation

LITERATURE REVIEW

- Toxoplasmosis in pregnant women
 - Naïve women contracting toxoplasmosis while pregnant can pass to child in utero
 - Mental disability
 - Blindness – choreoretinitis (20-80% by adulthood)
 - Seizures
 - Often don't show signs at birth
 - Develop later in life
 - Prevention of vertical transmission
 - Spiramycin
 - Sulphonamide
 - Pyrimethamine/sulfadiazine
 - Inconsistent findings

LITERATURE REVIEW

- Diagnosis
 - Serology
 - IgG used to determine if people have been infected
 - IgM used to estimate time of infection – important for pregnant women
 - Immunofluorescence
 - Direct observation of parasite in stained tissues and CSF
 - PCR - Can be isolated from blood but this is difficult
 - Unborn Child
 - PCR - Detection of parasite DNA in amniotic fluid
 - Ocular disease
 - Typical lesions in the eye
 - Symptoms
 - Course of disease
 - Serologic testing



LITERATURE REVIEW

- Toxoplasmosis prevention
 - Cook all meat to safe temperatures
 - For whole cuts of meat, cook to at least 145 F at the center of the thickest point. Then allow the meat to rest for 3 minutes before consumption. For ground meat, cook to at least 165 F. For poultry, cook to at least 165 F and let whole poultry rest for 3 minutes. Freezing meat to temperature below 0 F before cooking greatly reduces the change of infection
 - Wash or peel fruits and vegetables
 - Don't drink unpasteurized goats milk
 - Do not eat raw or undercooked oysters, mussels, or clams
 - Wash cutting boards, dishes, counters, utensils, and hands
 - Wear gloves while gardening
 - Wear gloves while changing litter box
 - Change litter box daily
 - Have someone else to change litter box if pregnant

ACTIVITIES PERFORMED

- Creation and distribution of survey
- Attending entomology lecture and wet lab
- Setting mosquito traps, sorting mosquitos, and inputting data
- Attending senior citizen “Lunch and Learn” session
- Shadowing public health nurses
 - House calls to check on new mother clients
 - Help with making doctors appointments, checking on health, addressing concerns
- Creating an informative brochure on toxoplasmosis
- Creating an informative PowerPoint on toxoplasmosis for use in “Lunch and Learn” settings

SURVEY OBJECTIVES

- The objective of this study was to survey health professionals having contact with pregnant patients. The questions were aimed at knowledge of the life cycle, routes of transmission, and proper recommendations made to clients on prevention of the disease, in order to evaluate their understanding of toxoplasmosis, the priority they place on toxoplasmosis education, and overall toxoplasmosis awareness.
 - 6 Pregnancy educators/nurses
 - 17 Veterinarians
 - 10 OBGYNs

SURVEY

Is Toxoplasmosis a Serious Threat to the Health of Pregnant Women?

My name is Caitlin Timmins. I am a Master of Public Health program and Doctor of Veterinary Medicine student at Kansas State University. As part of my MPH, I am required to complete 240 hours of field experience in the public health field. I have chosen to undertake research regarding the priority and knowledge of toxoplasmosis to the community that educates pregnant women on this disease. It is my goal to utilize the data from this survey to develop public health awareness tools to educate pregnant women on the dangers of toxoplasmosis and on prevention measures. Please fill out the following survey as honestly as possible. Your responses are key to this research and are greatly appreciated.

Introduction Survey

Which of the following best describes your profession?

- ☐ Obstetrician/ Gynecologist
- ☐ Physicians Assistant
- ☐ Nurse
- ☐ Pregnancy Educator
- ☐ Veterinarian

Do you own or have you ever owned a cat?

- ☐ Yes
- ☐ No

In your experience, which of the following have you observed to be the most common mode of contracting toxoplasmosis?

- ☐ Gardening in soil contaminated with cat feces
- ☐ Contact with infected fecal material from a cat
- ☐ Contaminated raw or undercooked meat
- ☐ Contaminated water source
- ☐ Other _____

Which situation do you think poses the greatest risk for toxoplasmosis transmission?

- ☐ A feral cat using a sand box as a litter box
- ☐ A strictly indoor pet house cat
- ☐ An indoor-outdoor pet cat
- ☐ A newly adopted kitten
- ☐ Other _____

SURVEY

Is toxoplasmosis a disease that you regularly discuss with pregnant patients?

☐ Yes ☐ No

Please rate the priority you place on discussing toxoplasmosis with pregnant patients (1 being the least priority and 10 being the highest priority).

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

Do you recommend toxoplasmosis testing to your patients who are pregnant or may become pregnant?

☐ Yes ☐ No

What percentage of patients do you think are aware of the disease toxoplasmosis?

☐ 0% ☐ 25% ☐ 50% ☐ 75% ☐ 100%

Which of the following do you recommend to patients to prevent infection with *Toxoplasma gondii*?

- ☐ Hand washing
- ☐ Daily cleaning of litter boxes
- ☐ Wearing gloves during gardening
- ☐ Cooking meat completely in accordance with CDC

recommendation

- ☐ Washing all produce thoroughly
- ☐ Re-homing any pet cats
- ☐ Other _____

What is your recommendation to patients concerned about the risks associated with their pet cat?

- ☐ To re-home the cat
- ☐ To avoid contact with cat feces
- ☐ To switch the cat to an all outdoor lifestyle
- ☐ Other _____

In your experience, how long does it take for *Toxoplasma gondii* oocysts to become infective?

- ☐ 24 hours
- ☐ 3-5 days
- ☐ 10 days

In your experience, how long do viable *Toxoplasma gondii* oocysts remain infective in the soil environment?

- ☐ 24 hours
- ☐ Up to 18 months
- ☐ More than 5 years

SURVEY

Wrap-up Survey

What age range do you fall into?

☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ 61-70 ☐ 71-80

Do you regard toxoplasmosis as a disease worth discussing with your patients?

☐ Yes ☐ No

Would you utilize an informative brochure or other education aid regarding toxoplasmosis if it were available?

☐ Yes ☐ No

Do you think this survey might increase the likelihood of discussing the risks of toxoplasmosis with pregnant women or women planning to become pregnant?

☐ Yes ☐ No

RESULTS

Regular Discussion of Toxoplasmosis With Clients

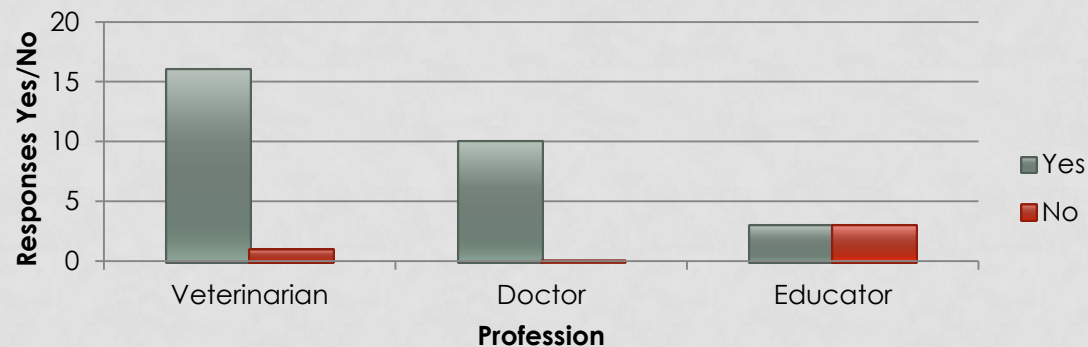
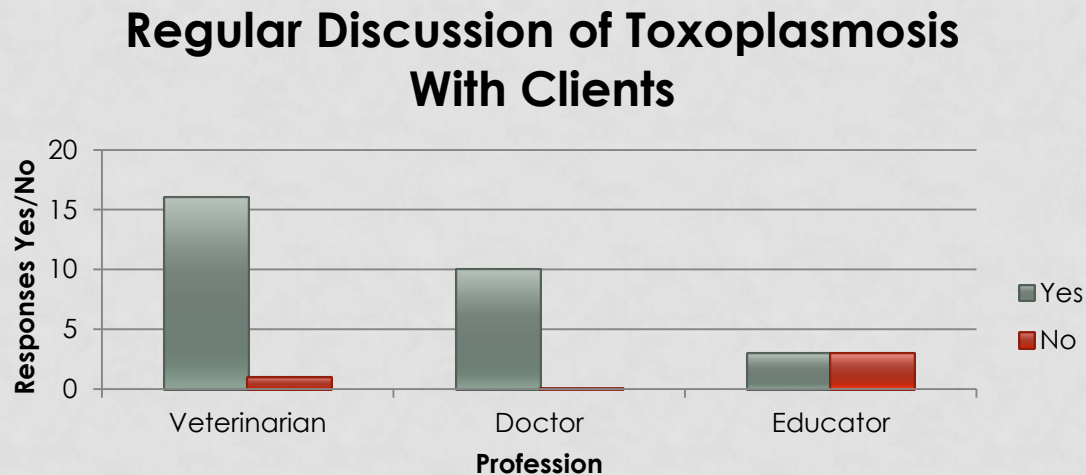


Figure 2.1. Physicians, veterinarians, and pregnancy educators were asked if they regularly discussed toxoplasmosis with pregnant clients. The above graph describes the number of yes and no responses to the previous question.

RESULTS

- Figure 2.1
 - Veterinarians and physicians more likely to speak with pregnant clients regarding toxoplasmosis
 - Pregnancy educators/nurses split 50/50



RESULTS

Prioroity Placed on Discussing Toxoplasmosis With Clients

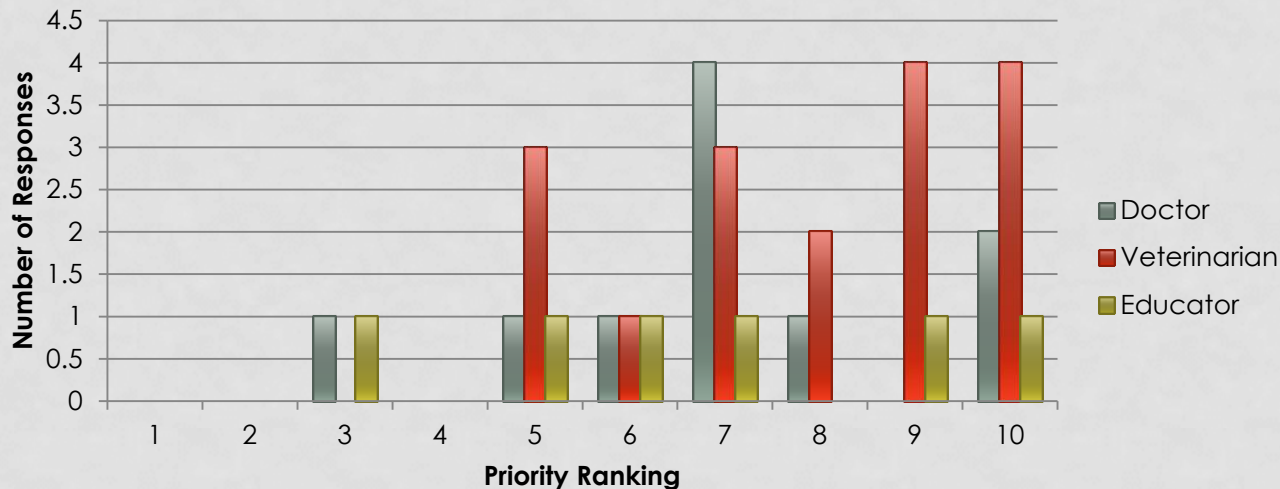
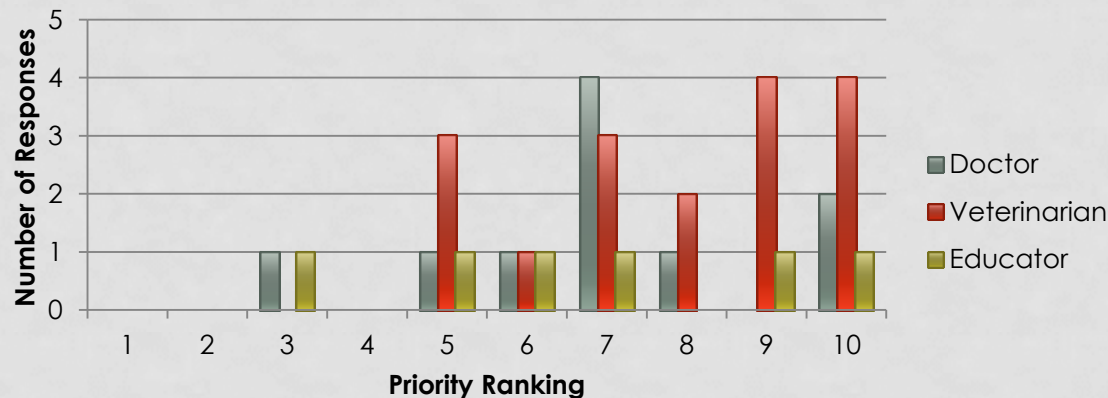


Figure 2.2. Physicians, veterinarians, and pregnancy educators were asked to rank the priority they place on discussing toxoplasmosis with clients with 1 being not important and 10 being very important. The number of responses by profession are listed under each priority ranking.

RESULTS

- Figure 2.2
 - Veterinarians rankings fell between 5-10
 - More ranking 8, 9, and 10 than any other profession
 - Physicians and pregnancy educators fell between 3-10
 - Physicians – most ranked at 7/10
 - Pregnancy educators – evenly spread

**Priority Placed on Discussing
Toxoplasmosis With Clients**



RESULTS

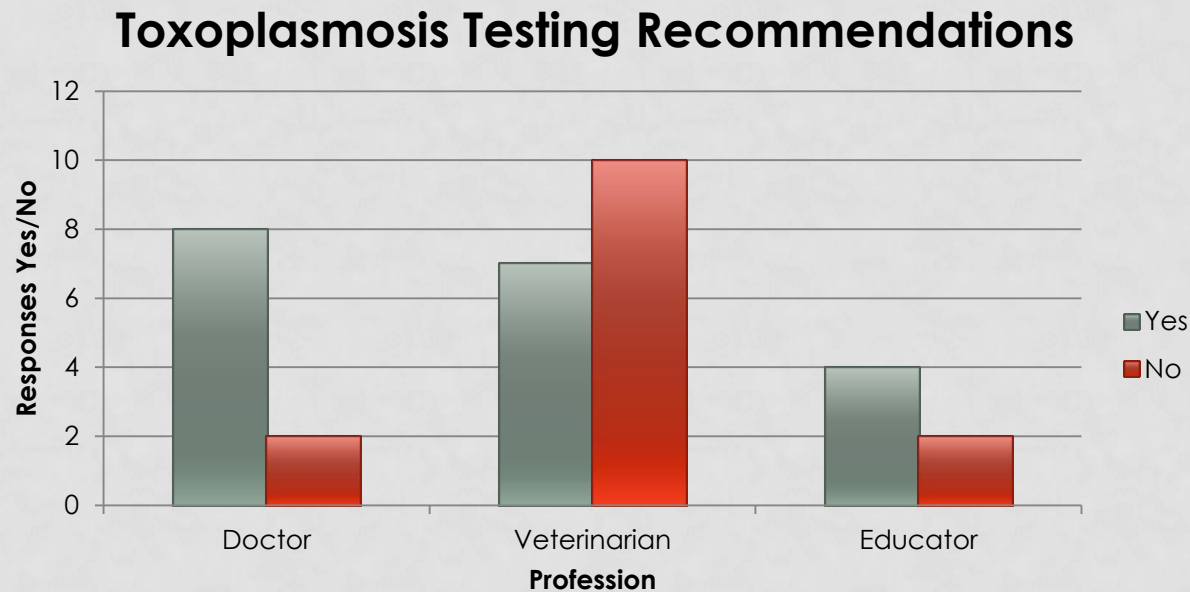
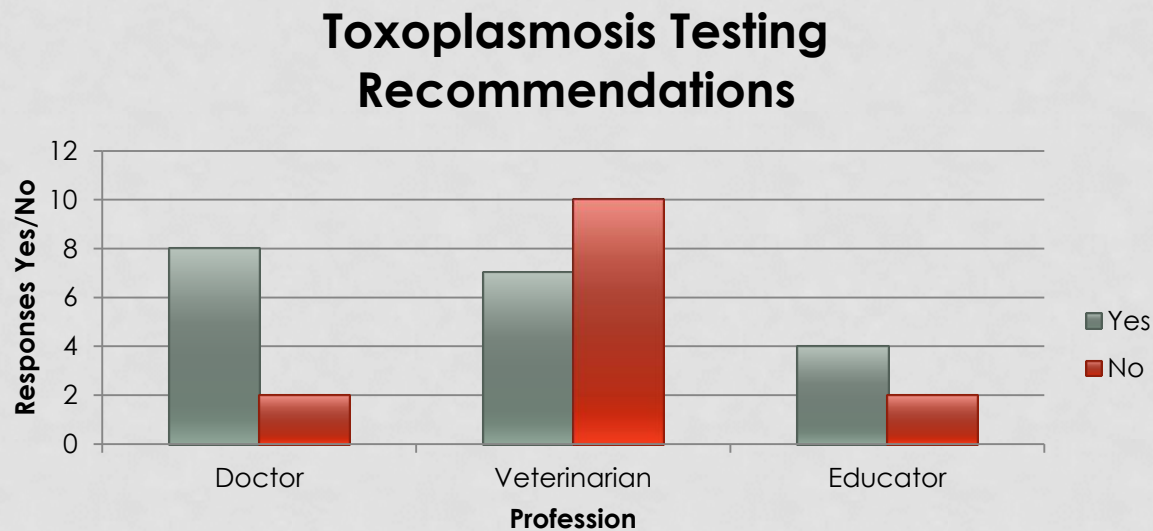


Figure 2.3. Physicians, veterinarians, and pregnancy educators were asked if they recommend testing for toxoplasmosis to their pregnant clients. The number of yes/no responses are described by profession.

RESULTS

- Figure 2.3

- Physicians are more likely (8/10) to suggest testing. (2/10) did not
- Majority of veterinarians (10/17) do not suggest testing. 7/17 do.
- 4/6 pregnancy educators suggest testing, 2/6 do not



RESULTS

Are Clients Aware of Toxoplasmosis?

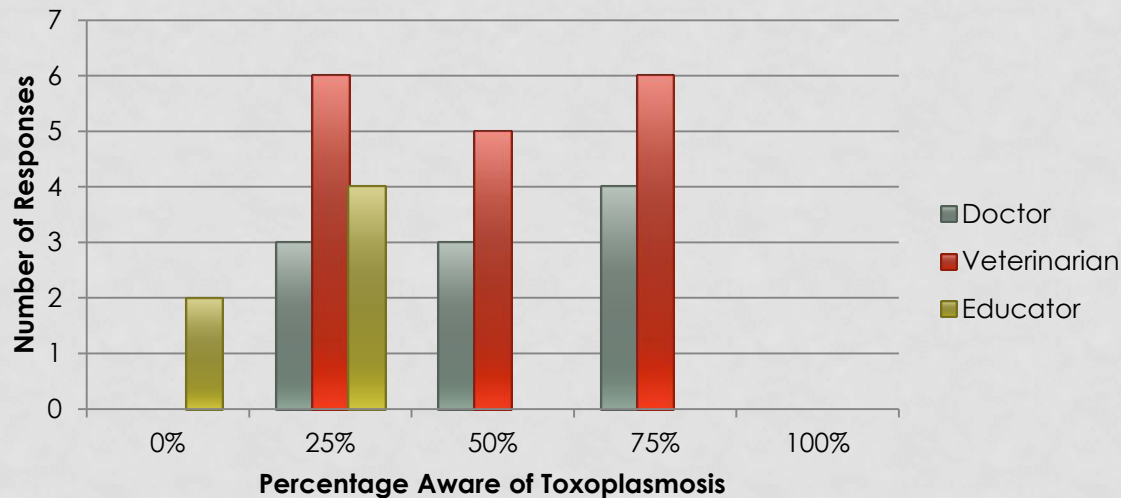
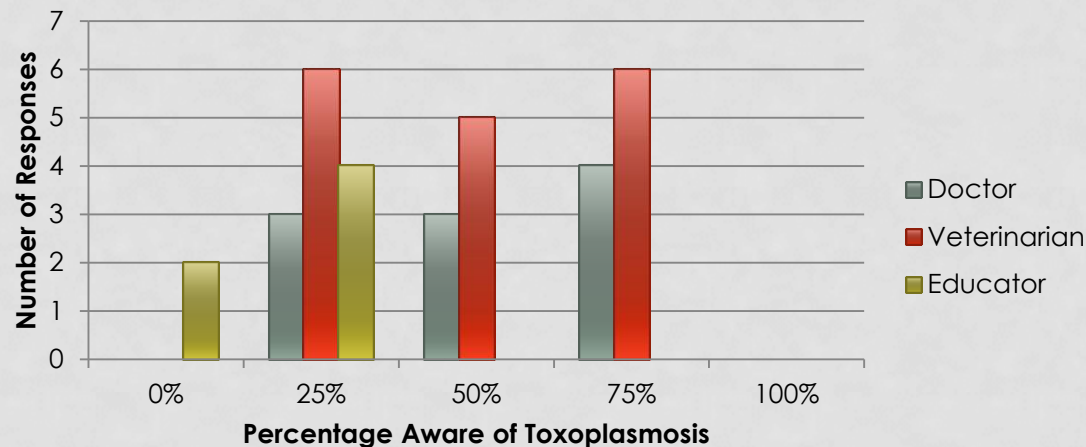


Figure 2.4. Physicians, veterinarians, and pregnancy educators were asked what percentages of pregnant clients were aware of how toxoplasmosis could affect them. The number of responses are listed per profession for each percentage category.

RESULTS

- Figure 2.4
 - Those that seek pregnancy educators for guidance are least likely to have knowledge of toxoplasmosis
 - Between 25-75% of pregnant women discussing toxoplasmosis with physicians or veterinarians were aware of the disease

Are Clients Aware of Toxoplasmosis?



RESULTS

How Long *Toxoplasma gondii* Is Viable in Soil?

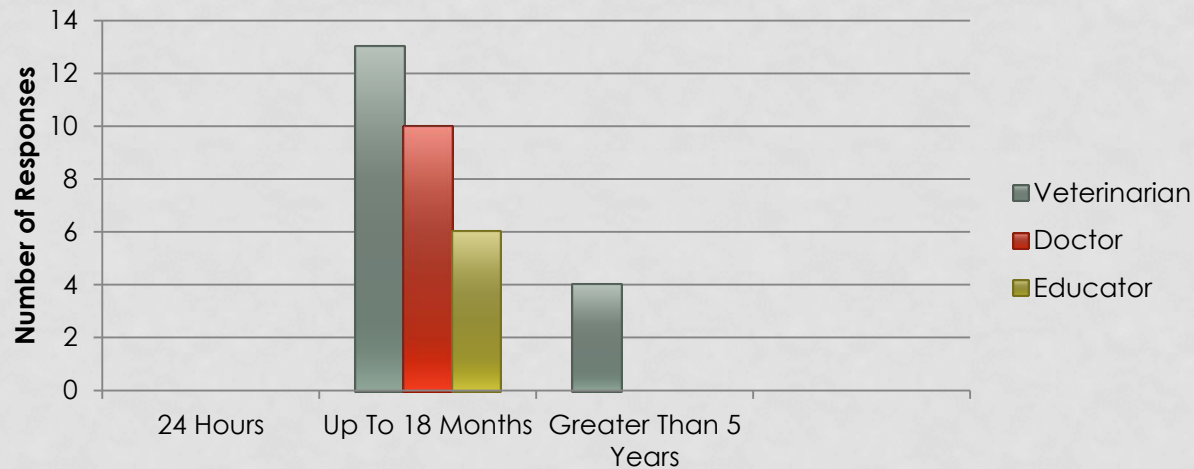


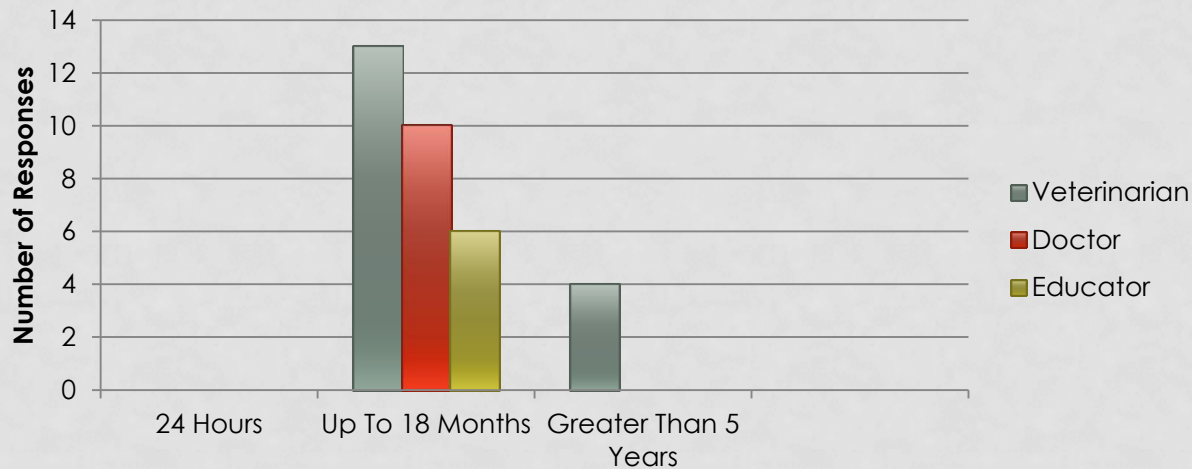
Figure 2.5. Physicians, veterinarians, and pregnancy educators were asked how long *Toxoplasma gondii* is viable in the soil to assess their knowledge of the disease. The number of responses for each category described above by profession.

RESULTS

- Figure 2.5

- The majority of survey takers correctly said *Toxoplasma gondii* oocysts were viable in the soil for 18 months
- 4/17 veterinarians said they were viable for greater than 5 years

How Long *Toxoplasma gondii* Is Viable in Soil?



RESULTS

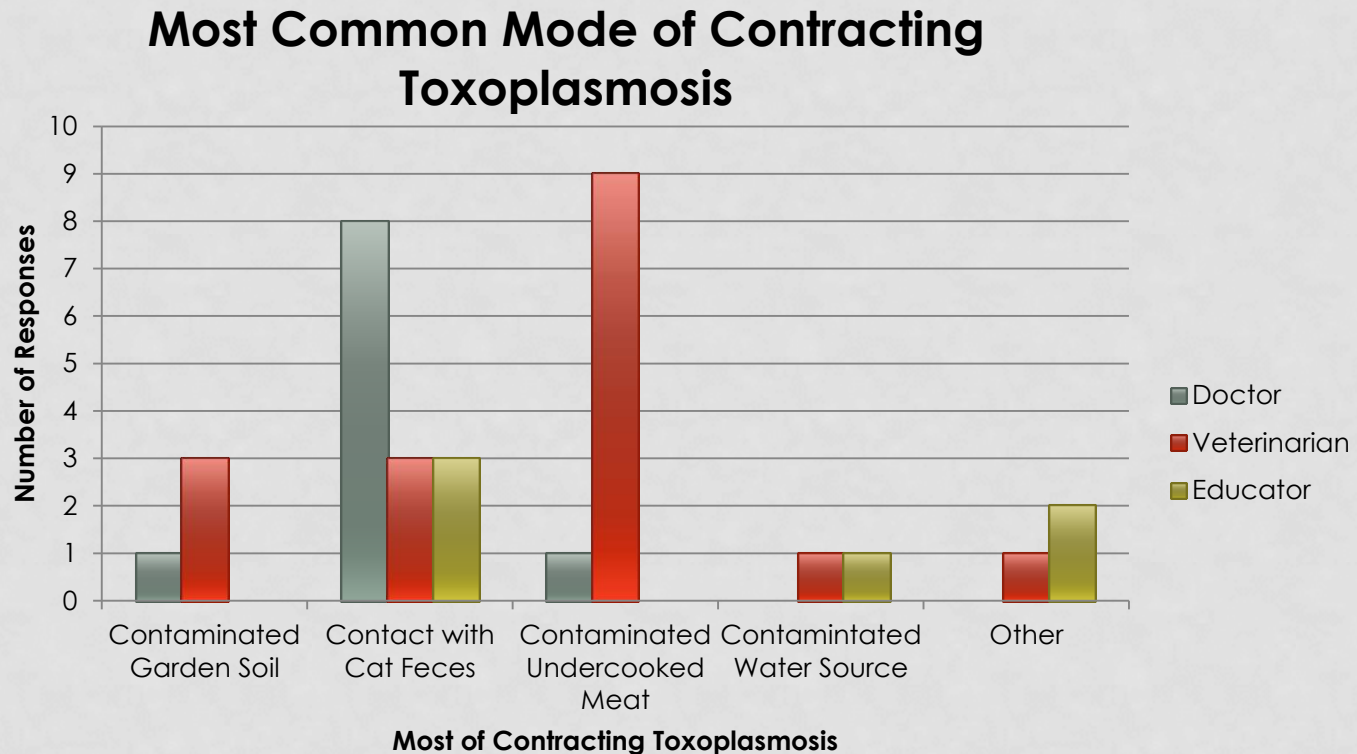
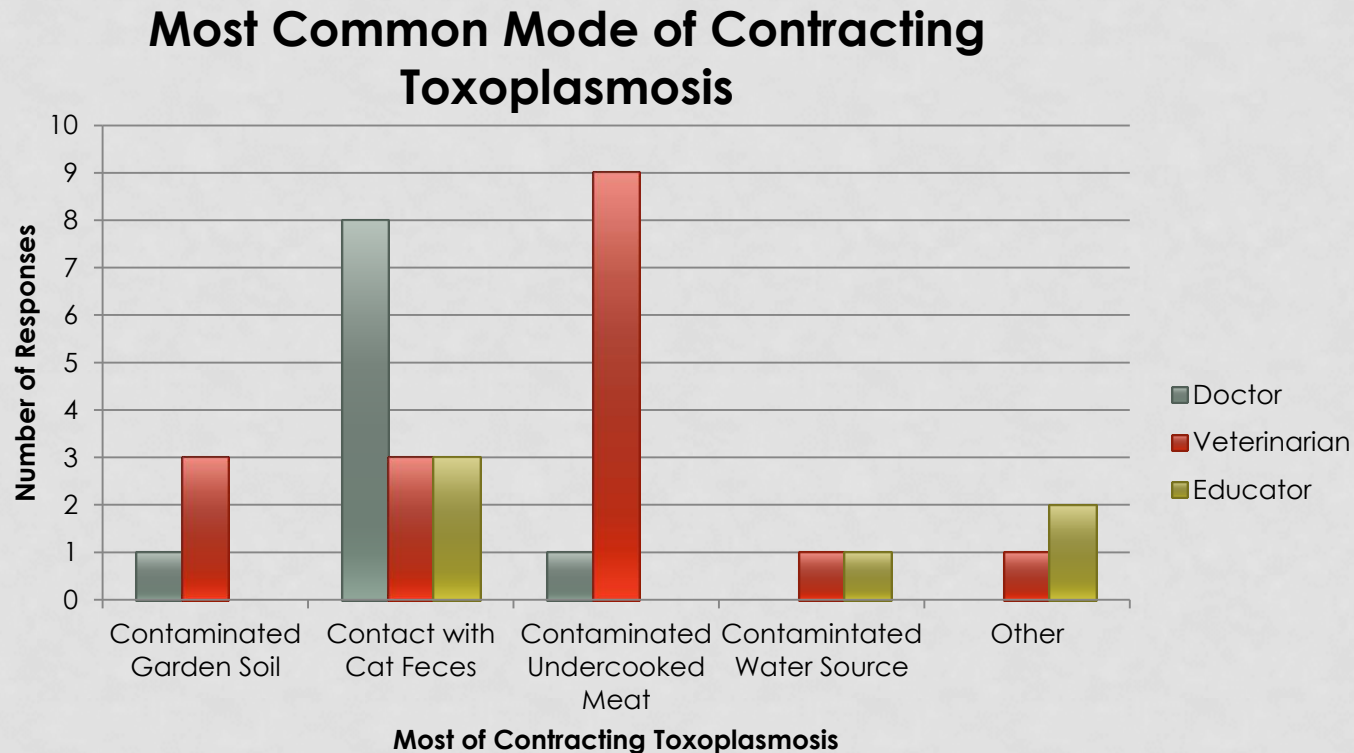


Figure 2.6. Physicians, veterinarians, and pregnancy educators were asked what they thought was the most common mode of contracting toxoplasmosis. The number of responses per profession are described by each category.

RESULTS

- Figure 2.6
 - Veterinarians were more likely to correctly identify undercooked contaminated meat as the main source of infection
 - Answers were widely distributed – commonly cat feces



RESULTS

How Long for *Toxoplasma gondii* Oocysts to Become Infective?

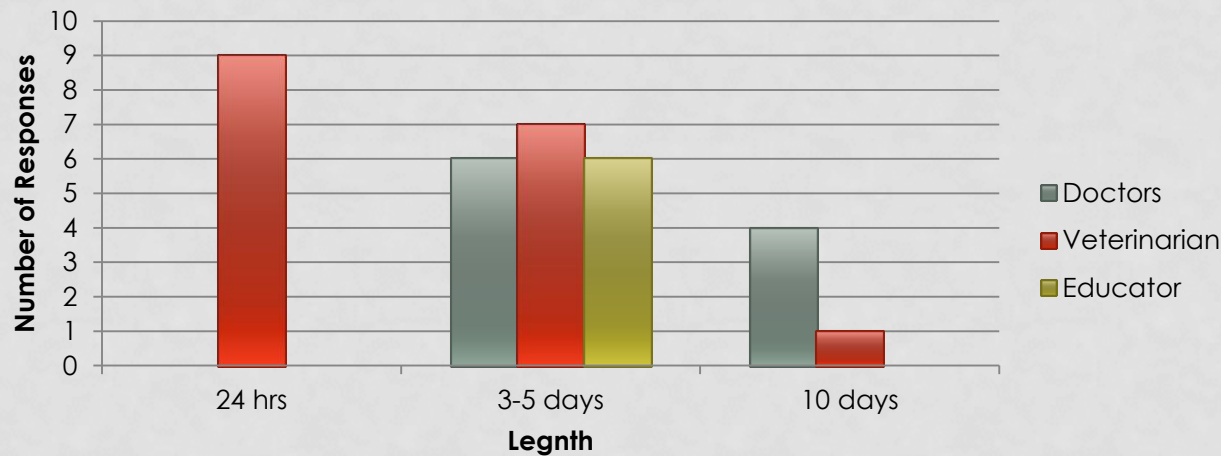
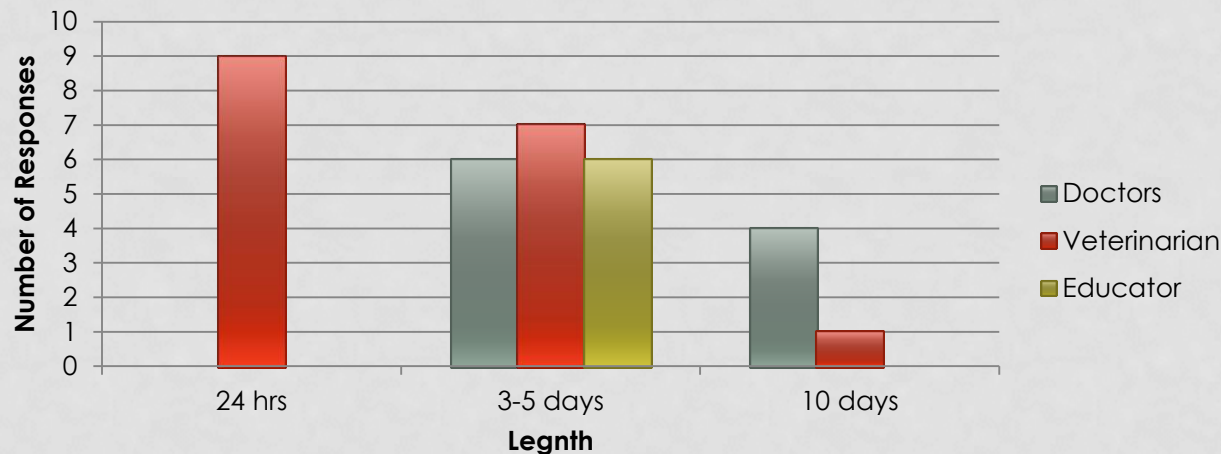


Figure 2.7. Physicians, veterinarians, and pregnancy educators were asked how long it takes *Toxoplasma gondii* oocysts to become infective. The number of responses per profession are described for each length of time.

RESULTS

- Figure 2.7
 - Veterinarians were the only populations to choose the correct answer – 24 hours

How Long for *Toxoplasma gondii* Oocysts to Become Infective?



RESULTS

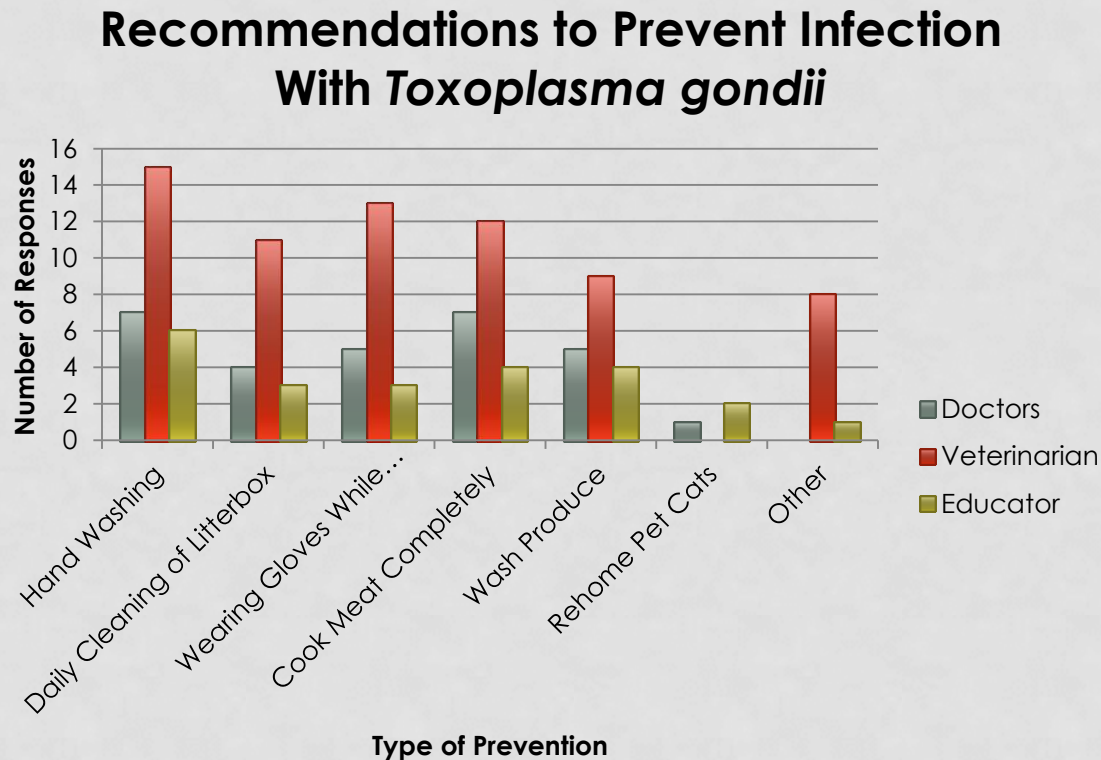
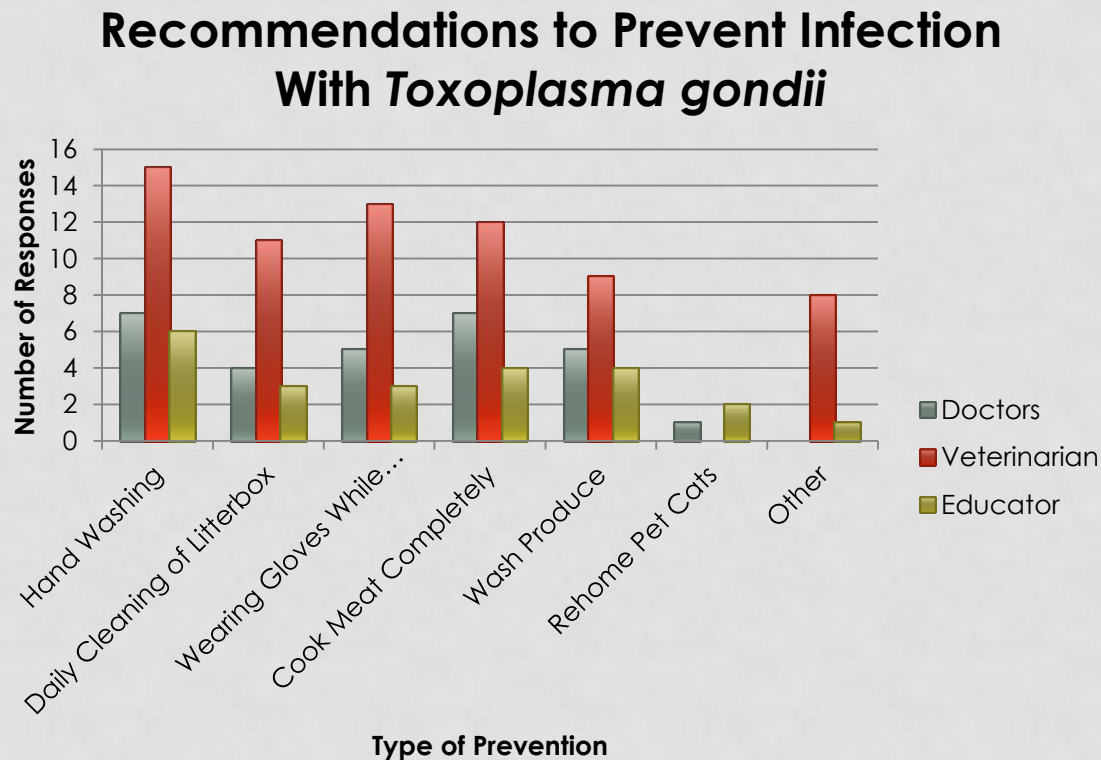


Figure 2.8. Physicians, veterinarians, and pregnancy educators were asked what recommendations they make to their pregnant clients in preventing *Toxoplasma gondii* infection. The number of responses are listed per profession under each category.

RESULTS

- Figure 2.8
 - Many correct answers with one incorrect answer
 - Rehoming cats is unnecessary - 1/10 physicians and 2/6 pregnancy educators



RESULTS

Recommendations to Clients With Pet Cats

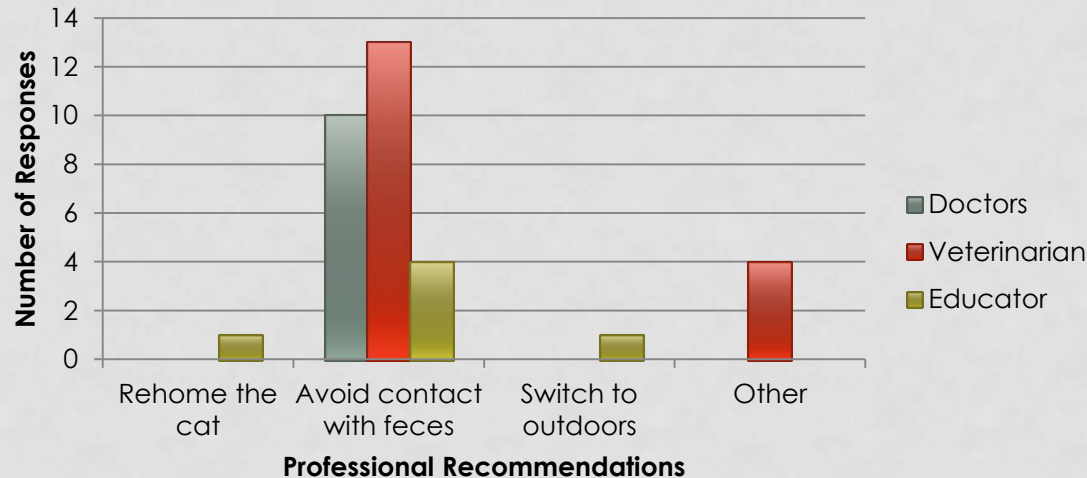
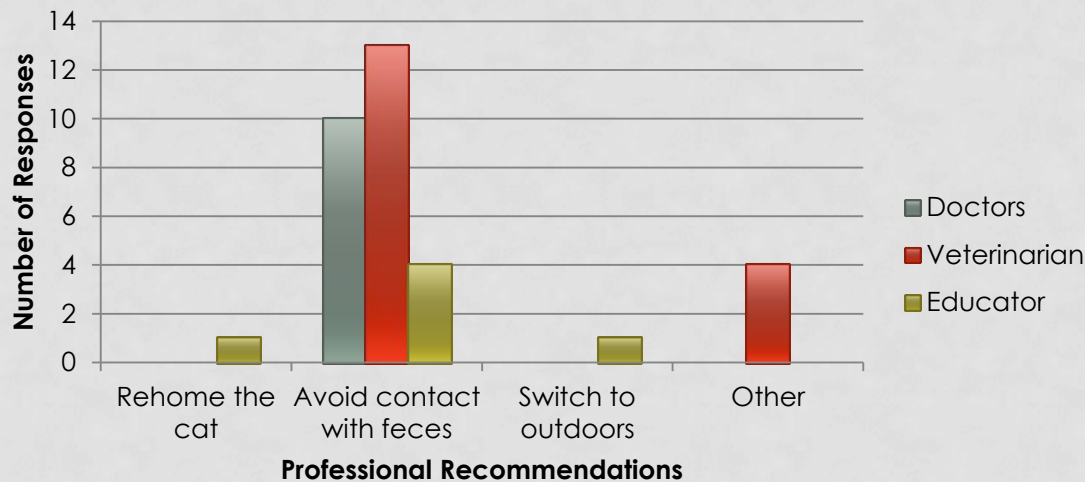


Figure 2.9. Physicians, veterinarians, and pregnancy educators were asked what their recommendations to pregnant clients were on how to manage a pet cat in the household. The number of responses per profession are described for each recommendation.

RESULTS

- Figure 2.9
 - 1/6 pregnancy educators suggest rehoming cats
 - 1/6 pregnancy educators suggest making cat an outdoor cat – greater risk for cat to become infected
 - Physicians and veterinarians correctly suggest avoiding cat feces

Recommendations to Clients With Pet Cats



CONCLUSIONS

- Re-homing family pets can be a concern
 - Minority (3/33) suggested re-homing
 - Not a necessary recommendation
- Avoiding contact with cat feces
 - 31/33 recommend
- Veterinarians more likely to identify undercooked contaminated meat as the most common cause (11/17)
 - 0/6 pregnancy educators and 1/10 physicians
- Veterinarians more likely to be aware that oocysts take 24 hours to become infective (9/17)
 - 1/6 pregnancy educators and 0/10 physicians
 - Important for sanitary recommendations

CONCLUSIONS

- All well informed on how long oocysts remain in soil
 - 6/6 pregnancy educators
 - 13/17 veterinarians
 - 10/10 physicians

CONCLUSIONS

- Medical professionals interacting with pregnant clients are well informed on the recommendations to make to those clients to prevent transmission, especially with regards to cats
- Education of toxoplasmosis transmission is lacking with regards to most common routes of transmission and information related to the parasites life cycle

CONCLUSIONS

- Disconnect between toxoplasmosis education both within and between professions
 - Veterinarians seem most current on data but least likely to discuss with clients
- It is the responsibility of the health professionals to take a One Health approach to zoonotic diseases
 - Share equal responsibility

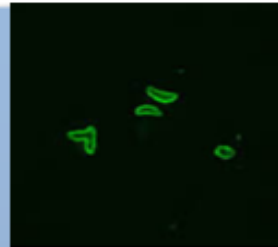
PRODUCTS DEVELOPED

- Informative brochure
 - Hand out
 - Place in waiting area
- Informative PowerPoint
 - “Lunch and Learn” setting

BROCHURE

What is toxoplasmosis?

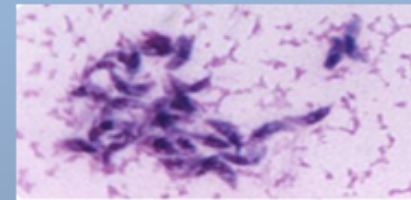
The cause of toxoplasmosis is a single-celled parasite called *Toxoplasma gondii*. It can be found anywhere in the world. Toxoplasmosis is the second deadliest food-borne illness known. The most common way to contract toxoplasmosis is by eating raw or undercooked meat contaminated with *Toxoplasma gondii*. This especially applies to pork, mutton, and venison. *Toxoplasma gondii* also resides in the feces of infected cats. Cats only shed the parasite in their feces for about 2 weeks. Therefore, there is a small window of opportunity to contract toxoplasmosis from a pet cat. On the other hand, the parasite can survive in the soil for up to 18 months, making gardening a common mode of contracting toxoplasmosis.



www.cdc.gov

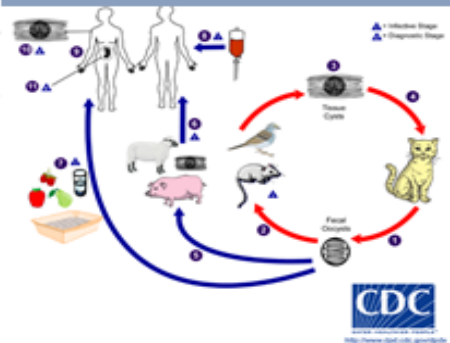
Can I be tested for toxoplasmosis?

Testing for antibody titers to *Toxoplasma gondii* are available to those who are pregnant or planning on becoming pregnant. If the test comes back positive, then at some point you have been infected with the parasite. This means that you have developed an immune response to keep the infection in check and there is little concern of passing the infection to your child. If the test comes back negative then the proper precautions must be taken to avoid infection before and during pregnancy.



www.cdc.gov

Toxoplasmosis



The Facts for
Pregnant Women

BROCHURE



www.cdc.gov

How can I prevent toxoplasmosis?

Cook all meat to safe temperatures. Freezing meat to temperature below 0°F before cooking greatly reduces the chance of infection. Be sure to wash or peel fruits and vegetables, do not drink unpasteurized goats milk, and do not eat raw or undercooked oysters, mussels, or clams. Be sure to thoroughly wash cutting boards, dishes, counters, utensils, and hands if they have come into contact with raw or undercooked meat. Wearing gloves while gardening will reduce the risk of transmission via contaminated soil. If you have a cat, be sure the litter box is changed daily. *Toxoplasma gondii* becomes infectious 1-5 days after it has been shed in the cat feces. If you are immunosuppressed or pregnant, avoid changing the cat litter if at all possible.

Who is at risk?

Anyone can contract toxoplasmosis. Most people have a healthy immune system that is able to fight off the infection. Those at an increased risk for complications are those with suppressed immune systems. This includes the young, elderly, cancer patients undergoing chemotherapy, AIDS patients, and pregnant women. It is particularly of concern to pregnant women as they can pass it to their unborn child causing abortion or birth defects.



www.cdc.gov

If you must change litter, be sure to wear disposable gloves to prevent hand contamination and wash your hands thoroughly afterwards. Keeping cats indoors will lower the cat's risk of becoming infected. Do not adopt a new cat while pregnant or immunosuppressed, especially a kitten. Do not feed cats raw or undercooked meats. Keep any outdoor sandboxes covered as stray cats may use them as a litter box.

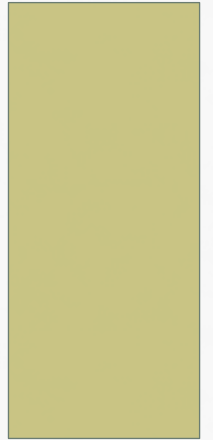
What are the signs and symptoms?

For people with well-developed immune systems, an infection with *Toxoplasma gondii* may cause flu-like symptoms for a few days or no symptoms at all. More serious complications occur in those with compromised immune systems. Most are unaware they have become infected or may only experience flu-like symptom. These include swollen lymph nodes and achy muscles that can persist for a month or more.

There is a form of severe toxoplasmosis, which is a result of reactivation of a previous infection. This causes damage to the eyes, brain, and other organs. The infection is usually reactivated when the host's immune system becomes depressed for some reason. Another form of toxoplasmosis is called ocular toxoplasmosis. Symptoms include reduced or blurred vision, pain associated with bright lights, redness of the eye, and tearing. Infants born with toxoplasmosis usually don't show signs at birth but will develop symptoms later in life. Rarely, newborns will have serious eye or brain damage at birth.

TOXOPLASMOSIS – EDUCATIONAL TOOL

TOXOPLASMA GONDII



POP QUIZ

- Which of the following is the most common mode of contracting toxoplasmosis?
- ☐ Gardening in soil contaminated with cat feces
- ☐ Contact with infected fecal material from a cat
- ☐ Contaminated raw or undercooked meat
- ☐ Contaminated water source

POP QUIZ

- Which situation do you think poses the greatest risk for toxoplasmosis transmission?
- ☐ A feral cat using a sand box as a litter box
- ☐ A strictly indoor pet house cat
- ☐ An indoor-outdoor pet cat
- ☐ A newly adopted kitten

POP QUIZ

- Which of the following can help to prevent infection with *Toxoplasma gondii*?
 - ☐ Hand washing
 - ☐ Daily cleaning of litter boxes
 - ☐ Wearing gloves during gardening
 - ☐ Cooking meat completely in accordance with CDC recommendation
 - ☐ Washing all produce thoroughly
 - ☐ Re-homing any pet cats

POP QUIZ

- What should you do if you are concerned about the risks associated with *Toxoplasma gondii* and owning a pet cat?
- ☐ To re-home the cat
- ☐ To avoid contact with cat feces
- ☐ To switch the cat to an all outdoor lifestyle

POP QUIZ

- How long does it take for *Toxoplasma gondii* oocysts to become infective?
- ☐ 24 hours
- ☐ 3-5 days
- ☐ 10 days

POP QUIZ

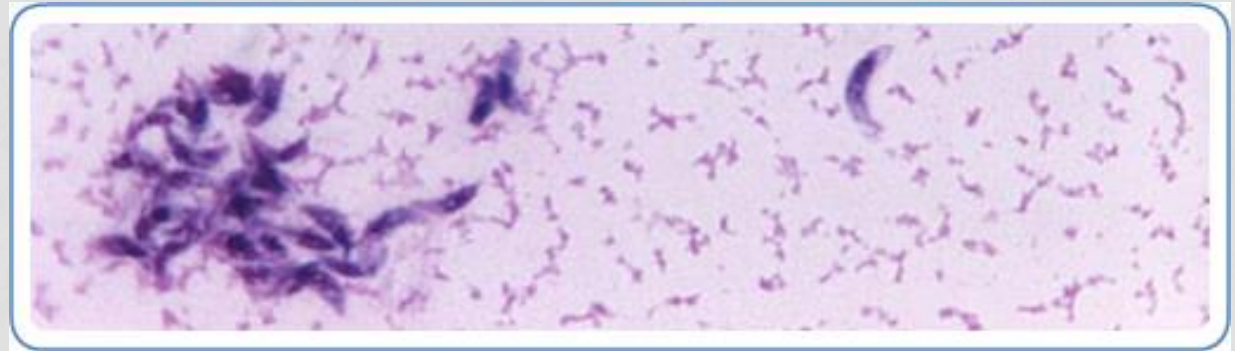
- How long do viable *Toxoplasma gondii* oocysts remain infective in the soil environment?
- ☐ 24 hours
- ☐ Up to 18 months
- ☐ More than 5 years

POP QUIZ

- For how long do cats shed *Toxoplasma gondii* oocysts in their feces?
 - ☐ For life
 - ☐ 6 months
 - ☐ 2 weeks

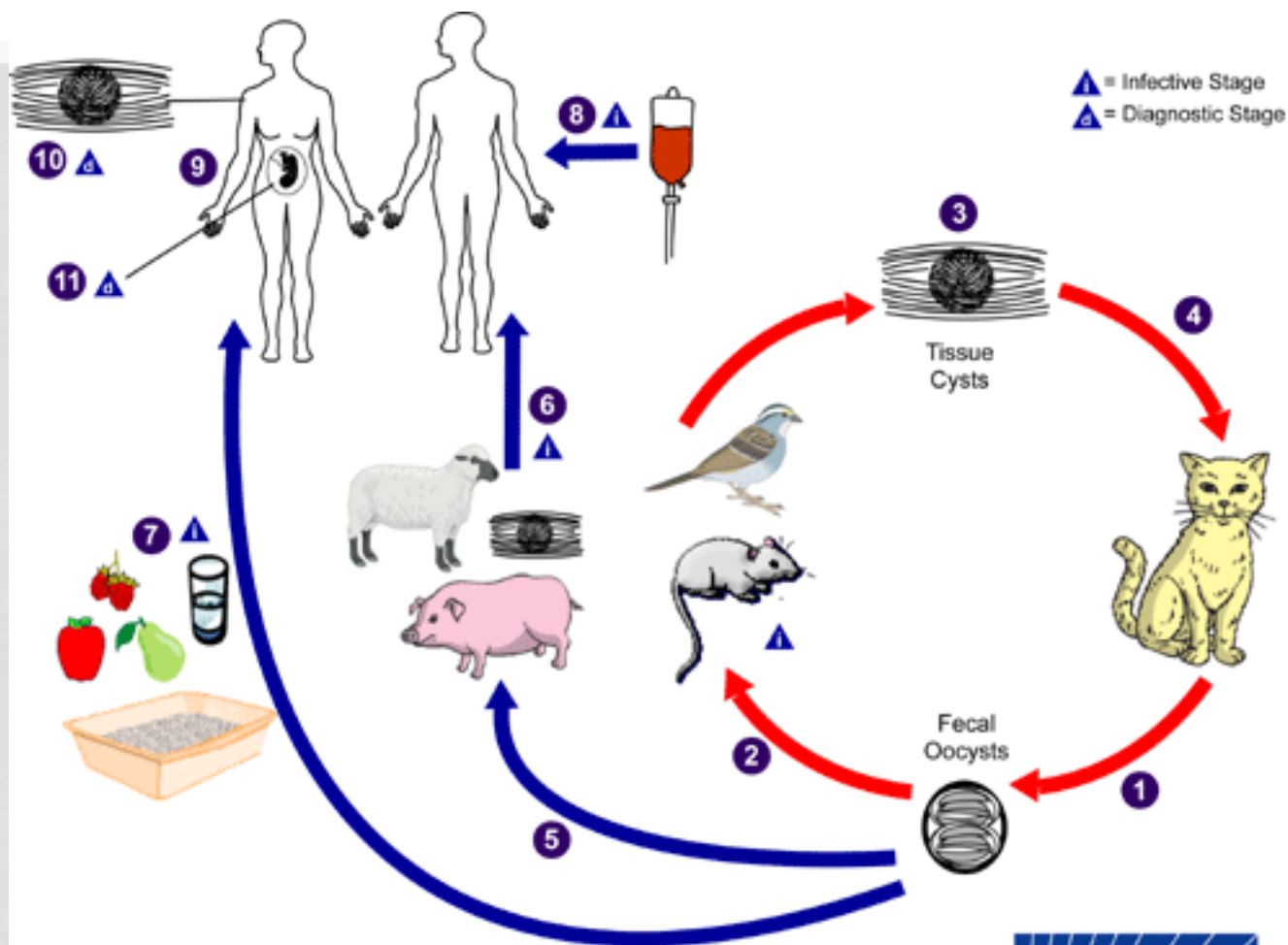
WHAT IS TOXOPLASMOSIS?

- Caused by *Toxoplasma gondii*
 - A single-celled parasite
- Second most deadly foodborne illness known
- Can be found throughout the world^{3,4}



<http://www.cdc.gov/parasites/toxoplasmosis/>

LIFE CYCLE



HOW DO I GET TOXOPLASMOSIS?

- Most commonly contracted by eating raw or undercooked meat
 - Especially pork, mutton, and venison⁴
- Feces of cats
 - Small window to become infected
 - Shed in feces for two weeks only⁴
- Unwashed vegetables⁴
- Contaminated utensils⁴



<http://www.cdc.gov/parasites/toxoplasmosis/epi.html>

HOW DO I GET TOXOPLASMOSIS?

- Unpasteurized goats milk⁴
- Raw or undercooked oysters, mussels, or clams⁴
- Gardening
 - Feral cats use garden beds as litter box
 - Toxoplasma gondii oocysts remain in soil for up to 18 months⁴



<http://paleo-diet-info.com/goats-milk-the-paleo-diet/>

WHO IS AT RISK?

- Those with compromised immune systems
 - Pregnant women
 - Unborn child at risk
 - Immunosuppressed
 - AIDS patients
 - Chemotherapy patients
 - Young children and elderly^{3,4}
- What about a healthy immune system?
 - Immune system is able to fight the infection
 - May experience no symptoms to flu-like symptoms for a few days to months^{3,4}

WHAT ARE THE SIGNS/SYMPTOMS?

- Flu-like symptoms
 - Swollen lymph nodes
 - Achy muscles⁴
- Severe toxoplasmosis
 - Occurs when a previous infection becomes reactivated because of immune depression
 - Damage to the eyes, brain, and other organs⁴
- Ocular toxoplasmosis
 - Reduced or blurred vision
 - Redness of the eye
 - Tearing⁴

TREATMENT

- There is debate over whether treatment for toxoplasmosis is effective
- Medications used
 - Spiramycin^{4,5}
 - Pyrimethamine/sulfadiazine^{4,5}
- Spiramycin or Pyrimethamine/sulfadiazine are generally recommended for women who contract toxoplasmosis during pregnancy^{4,5}

HOW DOES TOXOPLASMOSIS AFFECT PREGNANT WOMEN?

- Mothers who become infected with Toxoplasma during or just before pregnancy are at risk of transmitting the parasite to their unborn child
- Infections early in pregnancy are less likely to be transmitted to the fetus than infections later in pregnancy
 - BUT...
- Early fetal infections are more likely to be clinically severe
- Can cause abortion or serious eye and brain defects⁴

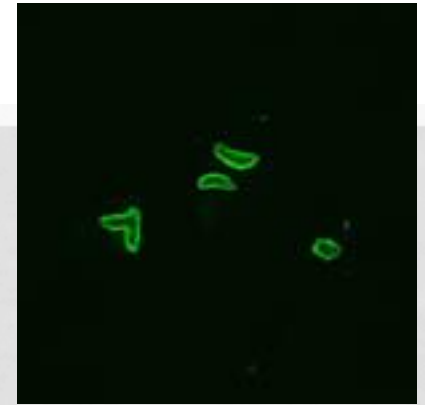
HOW CAN WE PREVENT TOXOPLASMOSIS?

- Cook all meat to safe temperatures
 - For whole cuts of meat, cook to at least 145 F at the center of the thickest point. Then allow the meat to rest for 3 minutes before consumption. For ground meat, cook to at least 165 F. For poultry, cook to at least 165 F and let whole poultry rest for 3 minutes. Freezing meat to temperature below 0 F before cooking greatly reduces the chance of infection
- Wash or peel fruits and vegetables
- Don't drink unpasteurized goats milk
- Do not eat raw or undercooked oysters, mussels, or clams
- Wash cutting boards, dishes, counters, utensils, and hands
- Wear gloves while gardening
- Wear gloves while changing litter box
- Change litter box daily
- Get someone else to change litter box if pregnant^{1,4}



<http://www.cdc.gov/parasites/toxoplasmosis/epi.htm>

CAN I BE TESTED?



<http://www.cdc.gov/parasites/toxoplasmosis/epi.htm>

- Yes!
- Tests for antibody titers
 - If you have an antibody titer it means your immune system has been exposed before and made memory antibodies to fight the infection^{2,4}
- Positive test means your immune system is keeping the infection in check
 - Are not at risk of passing toxoplasmosis to an unborn child^{2,4}
- Negative test means you have never been exposed^{2,4}

POP QUIZ - ANSWERS

- Which of the following is the most common mode of contracting toxoplasmosis?
- ☐ Gardening in soil contaminated with cat feces
- ☐ Contact with infected fecal material from a cat
- ☒ Contaminated raw or undercooked meat
- ☐ Contaminated water source

POP QUIZ - ANSWERS

- Which situation do you think poses the greatest risk for toxoplasmosis transmission?
- ☒ A feral cat using a sand box as a litter box
- ☐ A strictly indoor pet house cat
- ☐ An indoor-outdoor pet cat
- ☐ A newly adopted kitten

POP QUIZ - ANSWERS

- Which of the following can help to prevent infection with *Toxoplasma gondii*?
 - ☒ Hand washing
 - ☒ Daily cleaning of litter boxes
 - ☒ Wearing gloves during gardening
 - ☒ Cooking meat completely in accordance with CDC recommendation
 - ☒ Washing all produce thoroughly
 - ☐ Re-homing any pet cats

POP QUIZ - ANSWERS

- What should you do if you are concerned about the risks associated with *Toxoplasma gondii* and owning a pet cat?
 - ☐ To re-home the cat
 - ☒ To avoid contact with cat feces
 - ☐ To switch the cat to an all outdoor lifestyle

POP QUIZ – ANSWERS

- How long does it take for *Toxoplasma gondii* oocysts to become infective?
- ☒ 24 hours
- ☐ 3-5 days
- ☐ 10 days

POP QUIZ - ANSWERS

- How long do viable *Toxoplasma gondii* oocysts remain infective in the soil environment?
- ☐ 24 hours
- ☒ Up to 18 months
- ☐ More than 5 years

POP QUIZ - ANSWERS

- For how long do cats shed *Toxoplasma gondii* oocysts in their feces?
 - ☐ For life
 - ☐ 6 months
 - ☒ 2 weeks

REVIEW OF FIELD EXPERIENCE

- Variety of learning opportunities
 - Entomology
 - Lecture by Dr. John Wallace, Millersville University
 - Hands on wet lab – deer carcass and insect collection
 - Mosquito vector
 - Sorting mosquitos
 - Setting traps
 - Data entry
 - Lunch and Learn
 - Observation of setting
 - Answering public health questions
 - Public health nursing
 - Visiting with current clients
 - Answering questions, ensuring health, making appointments
- Struggles
 - Learning to put together a solid survey
 - Obtaining high rate of survey return
 - Guidance

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REFERENCES

- Amin, T. T. et al. "Toxoplasmosis preventive behavior and related knowledge among Saudi pregnant women: an exploratory study." Global Journal of Health Science. Vol. 5, No. 5 (2013): 131-143. Web.
- Berriel da Silva, Laura et al. "Knowledge of toxoplasmosis among doctors and nurses who provide prenatal care in an endemic region." Infectious disease in obstetrics and gynecology. Volume 2011, Article ID 750484. 6 pages.
- Dunn, D. et al. "Mother-to-child transmission of toxoplasmosis: risk estimates for clinical counselling." The Lancet. 9167. 353 (1999):pg. 1829. Web.
- Jones, Jeffery L, et al. "Toxoplasmosis-related knowledge and practices among pregnant women in the United States." Infectious Diseases in Obstetrics and Gynecologist. 2003. ProQuest Research Library. Pg. 139.
- Kravets,, J D, Frederman, D G. "Prevention of toxoplasmosis in pregnancy: Knowledge of risk factors." Infectious Diseases in Obstetrics and Gynecology. Sep 2005. ProQuest Research Library. Pg 161.
- Lappin, Michael R. "Feline toxoplasmosis raises health concerns for humans." DCM; Jun 2002; ProQuest Research Library. Pg 40.
- Montoya, J. G., Liesenfeld, O. "Toxoplasmosis." The Lancet. Vol. 363. 9425 (2004): pg. 1965. Web.
- "Parasites - Toxoplasmosis (*Toxoplasma* infection)." Centers for Disease Control and Prevention. 10 Jan 2013. Web. 14 July 2014.
- Wallon, M. et al. "Congenital toxoplasmosis: systemic review of evidence of efficacy of treatment in pregnancy." British Medical Journal. Zvol 318, 7197 (1999): pg. 1511. Web.