Seroprevalence *of Trichinella* and *Toxoplasma* in U.S. Grower/Finisher Pigs, 2006

Background

Toxoplasma gondii is a protozoan parasite capable of infecting most warm-blooded animals, including humans. It is estimated that 60 million people in the United States are infected with *T. gondii*, although few demonstrate symptoms, as competent immune systems prevent clinical disease (toxoplasmosis).[1]

Toxoplasma can be a threat to public health. Infections in pregnant women may result in the birth of blind and mentally disabled children. Immune-suppressed adults can also suffer damage to the eyes and brain due to reactivation of a latent *Toxoplasma* infection.

Cats are a reservoir for *Toxoplasma* and once infected shed oocysts in their feces for approximately 1 to 2 weeks.[2] Animals and humans can be infected by ingesting soil, water, or plant material contaminated with the oocysts. Humans can also be infected by consuming undercooked meat, such as pork and lamb, infected with *Toxoplasma*.

Toxoplasma is of concern to the pork industry. Clinical toxoplasmosis can cause respiratory disease in nursing pigs and reproductive problems in sows, including mummified fetuses or stillborn piglets. Few pigs display disease signs associated with *Toxoplasma* infections, even though the parasite can persist in the edible tissues of the pigs for the life of the animals. *Toxoplasma* in meat is readily destroyed by cooking to certain temperatures, freezing, or irradiation.

Controlling *Toxoplasma* infections in pigs consists of keeping cats and their feces away from pig and feed storage areas, preventing cannibalism of dead pigs, controlling rodents, and not feeding uncooked garbage to pigs.

Swine 2006 study

In 2006, the USDA's National Animal Health Monitoring System (NAHMS) conducted a study on swine health and management practices from a random sample of swine production sites in 17 States in 4 regions.* These sites represented over 90 percent of operations with 100 or more pigs in the United States and nearly 94 percent of the U.S. pig inventory. One goal of the Swine 2006 study was to estimate the prevalence of *Toxoplasma* and *Trichinella* on U.S. swine operations.

Producers participating in the NAHMS Swine 2006 study were asked to submit up to 35 blood samples from grower/finisher pigs to be tested for antibodies to *Toxoplasma* and *Trichinella*. From September 5, 2006, through March 15, 2007, 6,238 samples were collected from 185 swine sites and tested at the Beltsville Agricultural Research Center using an enzyme-linked immunosorbant assay test.

This information sheet presents *Trichinella* results and compares prevalence of *Toxoplasma* at the pig level and herd level.

Trichinella prevalence

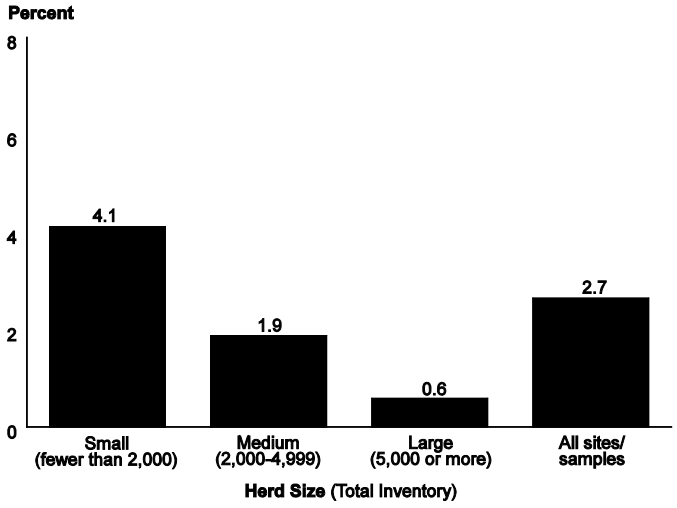
Sera samples were tested in duplicate for the presence of antibodies to *Trichinella* using a commercial ELISA as recommended by the manufacturer (SafePath Laboratories, Carlsbad, CA). The sera were tested at a 1:200 dilution, and positive and negative control pig sera supplied by the manufacturer were included on each ELISA plate. All 6,235 samples tested were negative.

* **Regions:**
North: Michigan, Minnesota, Pennsylvania, and Wisconsin
West Central: Colorado, Kansas, Missouri, Nebraska, and South Dakota
East Central: Illinois, Indiana, Iowa, and Ohio
South: Arkansas, North Carolina, Oklahoma, and Texas

Toxoplasma prevalence—pig-level

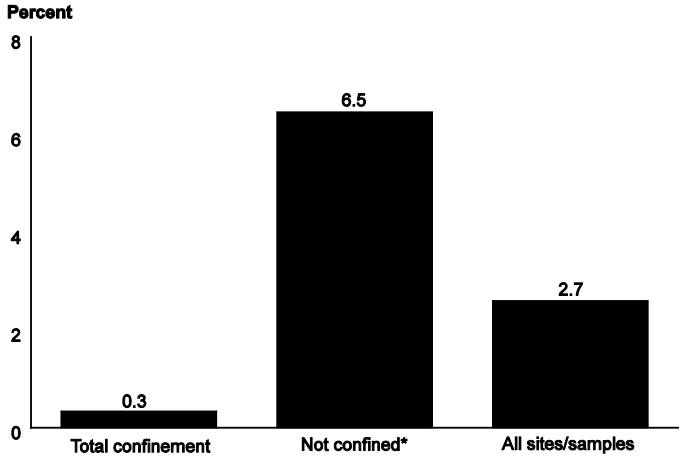
Overall, 2.7 percent of grower/finisher pigs tested positive for *Toxoplasma* antibodies in 2006. The percentage of positive samples by herd size is shown in figure 1. Small sites had a higher percentage of samples positive for *Toxoplasma* than medium and large sites, and medium sites had a higher percentage of positive samples than large sites.

Figure 1. Percentage of Grower/Finisher Pigs that Tested Positive for *Toxoplasma* Antibodies, by Herd Size



Facility type was related to percentage of grower/finisher pigs that tested positive for *Toxoplasma* antibodies. A lower percentage of grower/finisher pigs in total confinement tested positive for *Toxoplasma* antibodies compared with grower/finisher pigs not confined (figure 2).

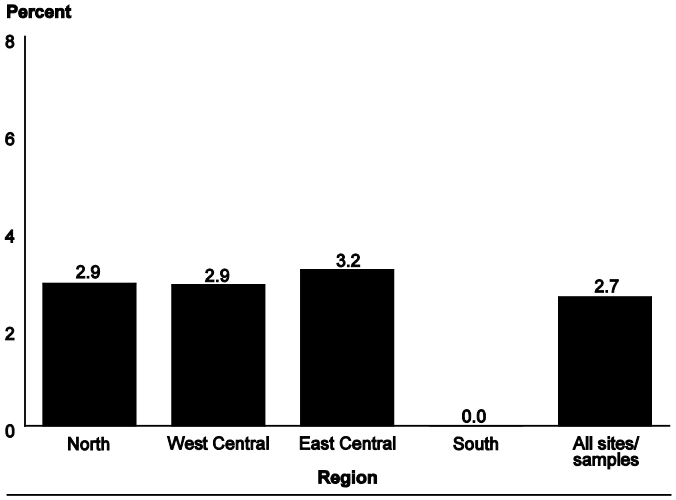
Figure 2. Percentage of Grower/Finisher Pigs that Tested Positive for *Toxoplasma* Antibodies, by Facility Type



*Open building with no outside access; open building with outside access; lot with hut or no building; pasture with hut or no building

No grower/finisher pigs from the South region tested positive for *Toxoplasma* antibodies. For the other regions, there was little difference in the percentage of grower/finisher pigs that tested positive for *Toxoplasma* antibodies (figure 3).

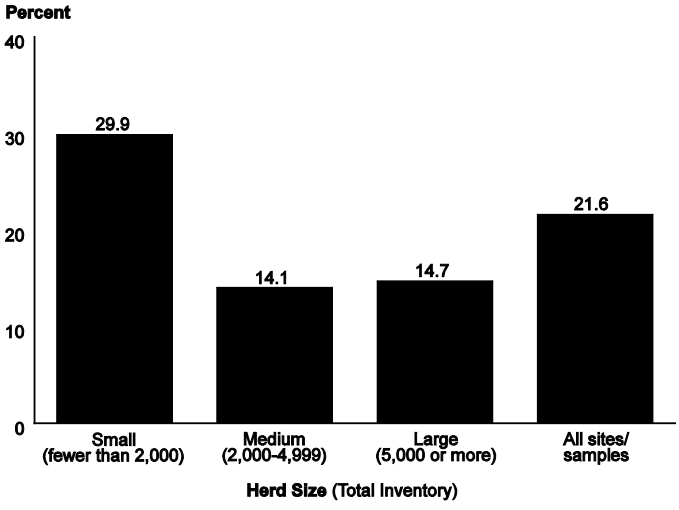
Figure 3. Percentage of Grower/Finisher Pigs that Tested Positive for *Toxoplasma* Antibodies, by Region



Toxoplasma prevalence—herd-level

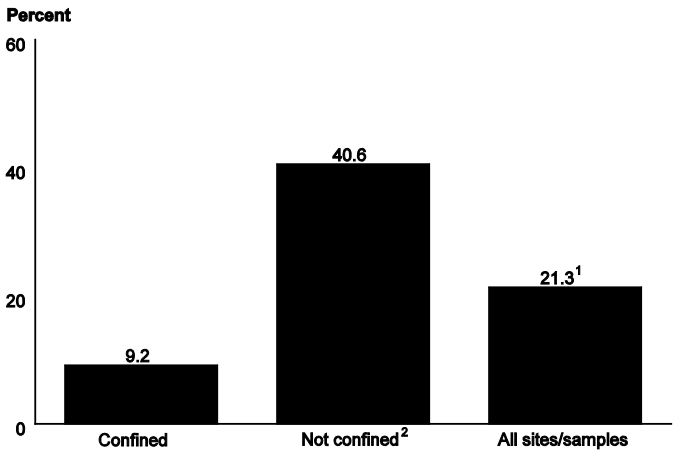
A site was classified as positive if it had at least one grower/finisher pig test positive for *Toxoplasma* antibodies. Overall, 21.6 percent of sites were positive in 2006. A higher percentage of small sites were positive compared with medium sites and large sites. The average within-herd prevalence in positive sites was 12.5 percent but ranged from 2.9 to 62.9 percent.

Figure 4. Percentage Sites with at Least One Pig that Tested Positive for *Toxoplasma* Antibodies, by Herd Size



Sites that housed grower/finisher pigs in total confinement were less likely to be positive than sites that did not (figure 5).

Figure 5. Percentage of Sites with at Least One Pig that Tested Positive for *Toxoplasma* Antibodies, by Facility Type

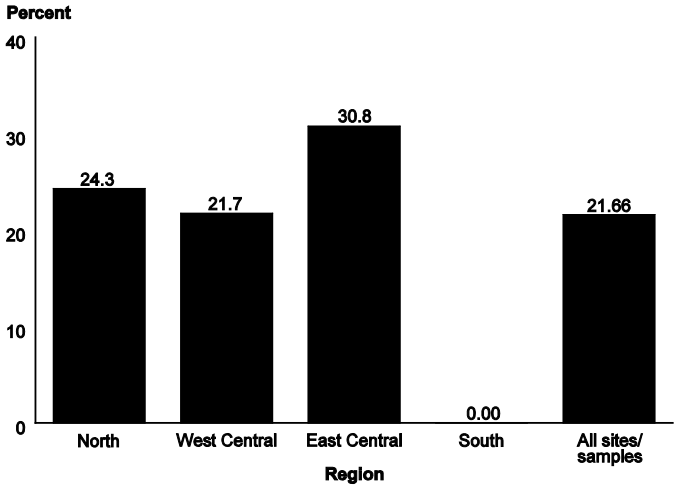


[1] Percentage differs from that shown in figures 4 and 5 (21.6) because some farms did not answer question on confinement

[2] Open building with no outside access; open building with outside access; lot with hut or no building; pasture with hut or no building

For the North, West Central, and East Central regions, there was no substantial difference in the percentage of positive sites. The South region had no positive sites (figure 6).

Figure 6. Percentage of Sites with at Least One Pig that Tested Positive for *Toxoplasma* Antibodies, by Region



Conclusions

Site size and facility type appear to impact the percentage of pigs and sites positive for *Toxoplasma* antibodies. Small sites may lack sufficient controls to prevent exposure of pigs to *Toxoplasma* oocysts from various sources, including cats and rodents. The prevalence of *Trichinella* in U.S. swine is extremely low.

References

1 Centers for Disease Control and Prevention, Division of Parasitic Diseases. Toxoplasmosis. Available at: www.dpd.cdc.gov
2 Centers for Disease Control and Prevention. Toxoplasmosis Fact Sheet. Available at: www.cdc.gov

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