

***Trichinella* Antibody Seroprevalence in U.S. Swine, 1990–2012**

Background

Trichinella spiralis is a small parasitic roundworm that causes trichinellosis—a disease of public health importance—in many warm-blooded animals, including pigs and humans. Typically, a new host is infected by consuming insufficiently cooked meat containing encysted larvae, or trichinae. Larvae in meat can be rendered noninfective via sufficient cooking, freezing, curing, or irradiation.¹

At one time, estimates indicated that nearly one in six U.S. residents was infected with trichinae. After decades of detection and control programs aimed at reducing *T. spiralis* prevalence in commercial swine, trichinellosis in humans is now a rare disease. Today, cases in humans are often associated with eating raw or undercooked meat from horses; wildlife such as wild boars, bears, or walrus; or swine raised outdoors and processed at home.¹

Producers can prevent *Trichinella* infection in swine by prohibiting their consumption of uncooked garbage or wildlife carcasses, keeping them from having contact with wildlife, controlling rodents using methods other than cats, and maintaining good biosecurity and hygiene. USDA's National Trichinae Certification Program was designed to provide commercial pork producers a way to document their adherence to production practices that prevent their pigs from being exposed to *T. spiralis*.¹

NAHMS national swine studies

The USDA's National Animal Health Monitoring System (NAHMS) conducted national studies on swine health and management practices in 1990, 1995, 2000, 2006, and 2012. During each of these studies, swine blood samples were collected to test for antibodies to *T. spiralis*. All blood samples were sent first to USDA's National Veterinary Services Laboratories for processing and then to USDA's Beltsville Agricultural Research Center for *Trichinella* antibody testing by ELISA.

National Swine Survey, 1990

The 1990 swine study was conducted in 24 States, which accounted for about 95 percent of the U.S. pig inventory and 84 percent of U.S. pork producers with

one or more sows. Overall, 712 swine production sites participated in the multiple study interviews from December 1989 through January 1991.

A total of 3,048 blood samples were collected from sows and gilts on 393 sites. On each site, up to 15 blood samples were collected.

Five sows—all from different herds—tested positive for *Trichinella* antibodies. These herds were in Illinois, Indiana, North Carolina, Ohio, and Pennsylvania. All five herds were farrow-to-finish operations, and four of the herds indicated they used cats for rodent control. One herd raised grower/finisher pigs in an outdoor lot.²

NAHMS Swine '95 study

The Swine '95 study was conducted in 16 States, which accounted for about 91 percent of the U.S. pig inventory and 75 percent of U.S. pork producers with 300 or more grower/finishers. Overall, 418 swine production sites participated in the 3 interviews, conducted from June 1, 1995, through January 16, 1996.

Blood samples were collected from late finishers and/or sows and gilts on 286 sites. On each site, up to 15 blood samples were collected from late finisher pigs and up to 15 from sows and gilts. A total of 7,987 blood samples were tested for *Trichinella* antibodies.

There were 3,236 samples from sows and gilts and 4,751 samples from late finishers. One sow tested positive from an operation in Kansas. This farrow-to-finish herd used cats for rodent control and housed grower/finisher pigs in an outdoor lot. No late finisher pigs tested positive.²

NAHMS Swine 2000 study

The Swine 2000 study was conducted in 17 States, which accounted for about 94 percent of the U.S. pig inventory and 92 percent of U.S. pork producers with 100 or more pigs. Overall, 799 swine production sites participated in 3 interviews, conducted from June 1, 2000, through February 28, 2001.

Blood samples were collected from late finishers and/or sows and gilts on 506 sites. On each site, up to 15 blood samples were collected from late finisher pigs

and up to 30 from sows and gilts. A total of 14,328 samples were collected.

Of the 8,466 samples from sows and gilts and the 5,862 samples from late finishers, no samples were positive for *Trichinella* antibodies.³

NAHMS Swine 2006 study

The Swine 2006 study was conducted in 17 States, which accounted for about 94 percent of the U.S. pig inventory and 90 percent of U.S. pork producers with 100 or more pigs. Overall, 435 swine production sites participated in 3 interviews, conducted from July 17, 2006, through March 15, 2007.

Blood samples were collected only from late finishers on 185 sites. On each site, up to 35 blood samples were collected. A total of 6,238 samples were collected. No samples tested positive for antibodies to *Trichinella*.⁴

NAHMS Swine 2012 study

The Swine 2012 study was conducted in 13 States, which accounted for about 91 percent of the U.S. pig inventory and 89 percent of U.S. pork producers with 100 or more pigs. Overall, 474 swine production sites participated in 2 interviews conducted from July 16, 2012, through February 1, 2013.

Blood samples were collected from late finishers and/or sows and gilts on 185 sites. On each site, up to 30 blood samples were collected from late finisher pigs and up to 30 from sows and gilts.

A total of 5,705 blood samples were collected—3,933 samples from late finishers on 137 sites and 1,772 samples from sows and gilts on 68 sites. One 20-week-old finisher pig tested positive from a herd in Nebraska. This small herd used cats for rodent control and housed gestating sows and grower/finisher pigs in open buildings with outside access.

Trends across NAHMS national swine studies

Since 1990, NAHMS studies have shown a steady decline in the prevalence of *Trichinella* antibodies in U.S. swine. Exposure of swine to *Trichinella* might have been curtailed largely because during that same time period, there were declines in the use of cats for rodent control (figure 1) and in the use of housing facilities with outdoor access for breeding females or finishers (figure 2).

Figure 1. Percentage of sites that used cats for rodent control, by NAHMS study year

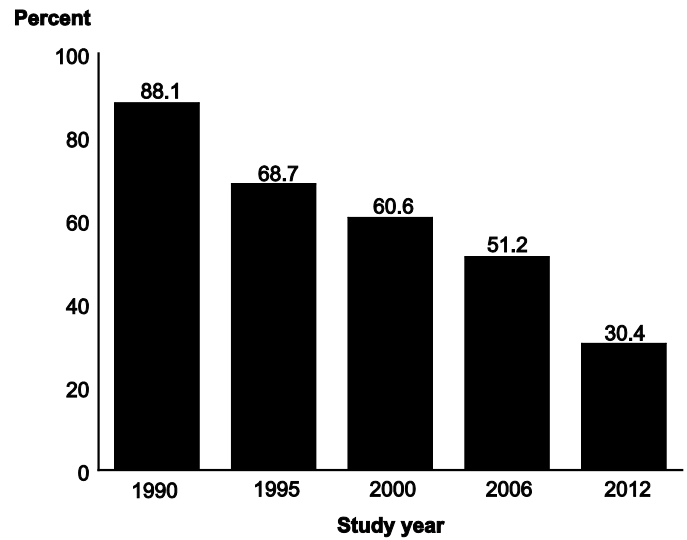
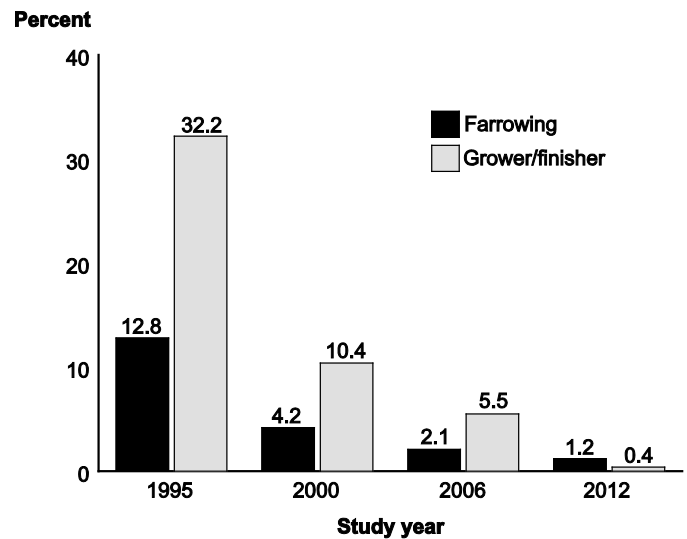


Figure 2. Percentage of breeding females and finisher pigs that were housed with outdoor access, by NAHMS study year



References

1. Gamble HR, Hill D. 2013. Trichinella. National Pork Board, Pork Safety Fact Sheet. Available at: <http://www.pork.org/wp-content/uploads/2010/04/trichinella.pdf>
2. Gamble HR, Bush EJ. 1999. Seroprevalence of Trichinella infection in domestic swine based on the National Animal Health Monitoring System's 1990 and 1995 swine surveys. *Vet Parasitol* 80(4):303–310.
3. Bush EJ, et al. 2002. Prevalence of food-borne pathogens of swine from the NAHMS Swine 2000 study. AASV 33rd Annual Meeting, Kansas City, Missouri.
4. USDA–APHIS–VS. 1997. Seroprevalence of Trichinella and Toxoplasma in U.S. grower/finisher pigs, 2006. Available at: https://www.aphis.usda.gov/animal_health/nahms/swine/downloads/swine2006/Swine2006_is_trich.pdf

For more information, contact:
USDA–APHIS–VS–CEAH–NAHMS
NRRRC Building B, M.S. 2E7
2150 Centre Avenue
Fort Collins, CO 80526-8117
970.494.7000
<http://nahms.aphis.usda.gov>
#739.0218

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