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Veterinary Services

National Animal Health Monitoring System

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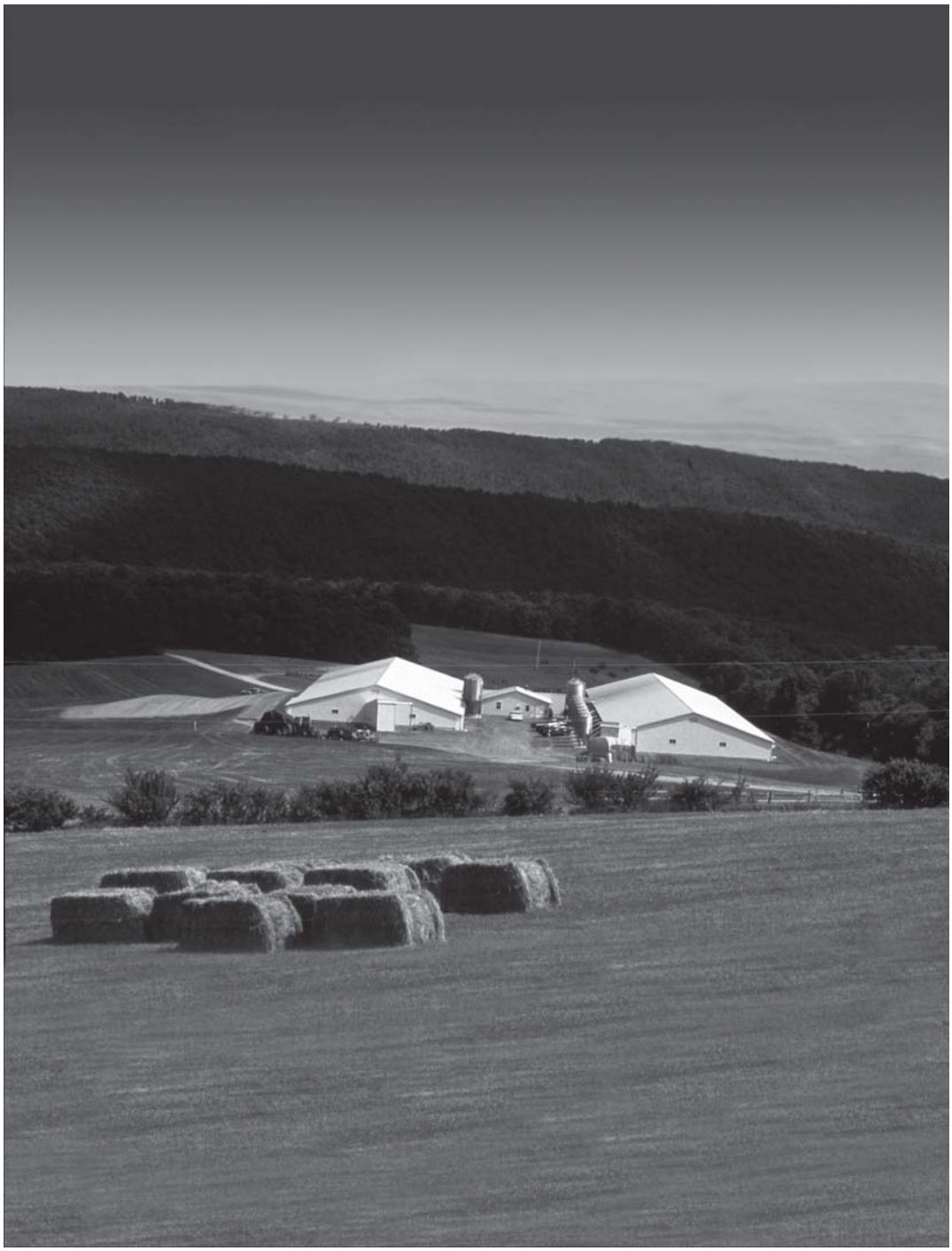
Swine 2006

Part II: Reference of Swine Health and Health Management Practices in the United States, 2006



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Acknowledgments

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The Swine 2006 study was a cooperative effort between State and Federal agricultural statisticians, animal health officials, university researchers, extension personnel, owners, and operators. We want to thank the industry members who helped determine the direction and objectives of this study.

Thanks to the State and Federal veterinary medical officers (VMOs), and animal health technicians (AHTs) who visited the operations and collected the data. Their hard work and dedication to the National Animal Health Monitoring System (NAHMS) are invaluable. The roles of the producer, area veterinarian in charge (AVIC), NAHMS coordinator, VMOs, AHTs, and National Agricultural Statistics Service enumerators were critical in providing quality data for Swine 2006 reports. Thanks also to the personnel at the Centers for Epidemiology and Animal Health (CEAH) for their efforts in generating and distributing valuable reports from Swine 2006 data.

All participants are to be commended, particularly the producers whose voluntary efforts made this report possible.

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Introduction

In 1983, promoters of the concept that would become the USDA's National Animal Health Monitoring System (NAHMS) envisioned a program that would monitor changes and trends in national animal health and management, thereby providing periodic snapshots of the U.S. food-animal industries. With these industry overviews, members could identify opportunities for improvement, provide changing foundations for research and special studies, and detect emerging problems.

NAHMS first national study of the swine industry, the 1990 National Swine Survey, provided a snapshot of animal health and management that would serve as a baseline from which to measure industry changes in animal health and management. NAHMS conducted the 1990 National Swine Survey in 18 States, with a target population of operations with at least one sow. The sample represented 95 percent of the U.S. swine population. National estimates generated from this study are reported in Morbidity/Mortality and Health Management of Swine in the United States (November 1991).

NAHMS second national swine study was Swine '95 and was conducted in the top 16 swine States, which represented 91 percent of the U.S. swine population. The target population for the first phase of Swine '95 was producers with at least one pig. National estimates generated from this study are reported in Swine '95 Part I: Reference of 1995 Swine Management Practices (October 1995). The second phase of Swine '95 was conducted on sites with at least 300 market pigs. National estimates generated from this study are reported in Part II: Reference of 1995 Grower/Finisher Health and Management (May 1996).

Swine 2000 was designed to provide both participants and the industry with information on the U.S. swine herd on operations with 100 or more pigs. The National Agricultural Statistics Service (NASS) collaborated with Veterinary Services to select a producer sample statistically designed to provide inferences to the Nation's swine populations on operations with 100 or more pigs. Included in the study were 17 of the major pork-producing States that accounted for 94 percent of the U.S. pig inventory and 92 percent of U.S. pork producers with 100 or more pigs. Results from this study are reported in Part I: Reference of Swine Health and Management, 2000 (August 2001); Part II: Reference of Swine Health and Management, 2000 (March 2002); Part III: Reference of Swine Health and Environmental Management, 2000 (September 2002); and Part IV: Changes in the U.S. Pork Industry, 1990-2000 (August 2005).

The Swine 2006 study is NAHMS' fourth national study of the U.S. swine industry. Seventeen States participated in the Swine 2006 study (see map below). These States accounted for 94 percent of swine operations and inventory on operations with 100 or more pigs. A random sample of 5,000 swine producers was selected to be visited by representatives from NASS between July 17 and September 15, 2006. An onsite questionnaire was administered by NASS enumerators during this visit. Results from the first data collection period of this study were presented in Swine 2006 Part I: Baseline reference of Swine Health and Management, 2006.

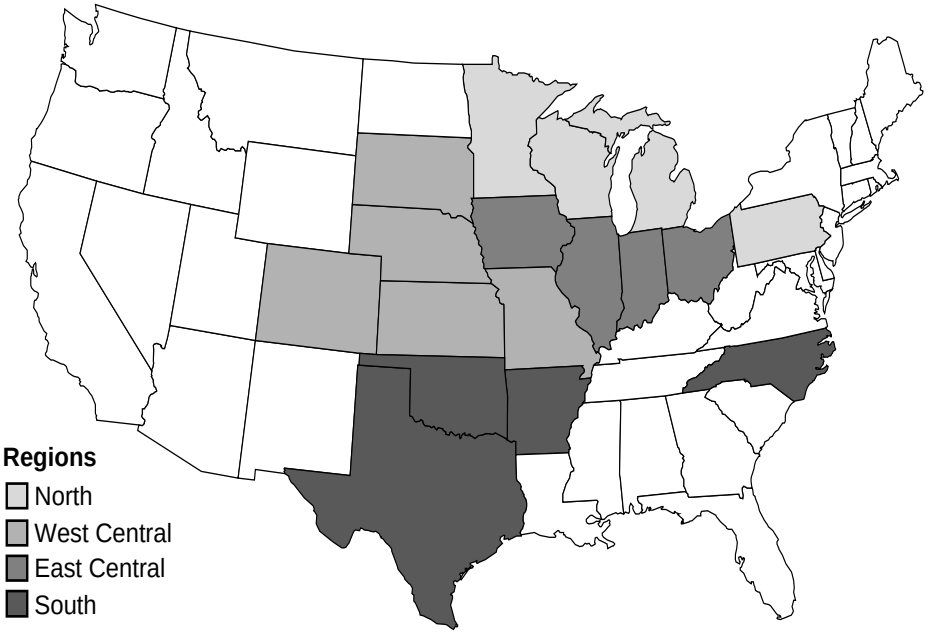
Producers that chose to continue in the study were visited twice by veterinary medical officers (VMOs), who administered questionnaires and took biological/ environmental samples.

Part II: Reference of Swine Health and Health Management in the United States, 2006 is the second of a series of reports from the NAHMS Swine 2006 study. Data for Part II were collected from 514 swine production sites between September 5, 2006 and March 15, 2007.

Methodology and number of respondents can be found at the end of this report.

All NAHMS swine study reports are accessible online at http:// nahms.aphis.usda.gov.

Swine 2006 Participating States



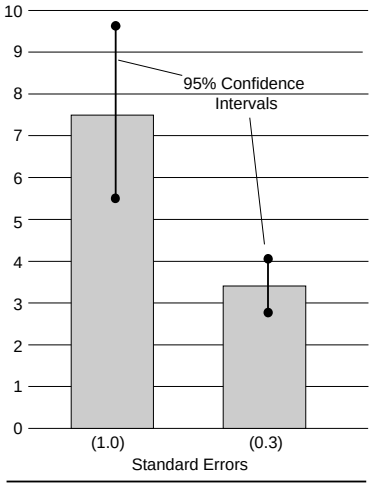
Terms Used in This Report

Average: For ***site average*—**a single value for each operation summed over all sites reporting divided by the number of operations reporting (see average age that nursery-age pigs are first vaccinated against *Mycoplasma* p 28). For a ***pig-level average —***a single operation value multiplied by the number of animals on that operation; then values are summed across sites and divided by total number of animals on all operations (see average age of ileitis onset on p 25).

Operation: The overall business and top-level management unit for a swine-rearing facility, which might consist of one or more sites. An operation can encompass all production phases of swine rearing (e.g., gestation, farrowing, nursery, and grower/finisher) on one or more sites (geographic locations), each devoted to a different production phase or combination of phases (see also "Site").

Percent sites: The number of sites with a certain attribute divided by the total number of sites. Percentages will sum to 100 where the attributes are mutually exclusive (i.e., percentage of sites located within each region). Percentages will not sum to 100 where the attributes are not mutually exclusive (i.e., the percentage of sites using treatment methods where sites may have used more than one method). The "percent sites" estimates primarily reflect the smaller producers, since they make up the majority of sites.

Examples of a 95% Confidence Interval



Population estimates: Estimates in this report are provided with a measure of precision called the standard error. A 95-percent confidence interval can be created with bounds equal to the estimate, plus or minus two standard errors. If the only error is sampling error, the confidence intervals created in this manner will contain the true population mean 95 out of 100 times. In the example to the left, an estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in limits of 2.8 and 4.0. Alternatively, the 90-percent confidence interval would be created by multiplying the standard error by 1.65 instead of 2. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported (0.0). If there were no reports of the event, no standard error was reported (—).

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

Sample profile: Information that describes characteristics of the operations and sites from which Swine 2006 data were collected.

Separate site: This term can mean that a facility is at a completely separate geographical location or in the same location but physically separated (no livestock runways or paths joining to other production facilities). It also might be managed as its own site, with separate procedures, biosecurity measures, and workers, for example.

Size of site: Size groupings were based on total number of swine present on June 1, 2006. Size of site was categorized as small (fewer than 2,000), medium (2,000-4,999), and large (5,000 or more). For tables relating to sow and gilt management, size of site was based on the number of sows and gilts on-site: small (fewer than 250), medium (250 to 499), and large (500 or more).

Site: One geographic location or address that functions as a unit to produce one or more production phases in swine rearing. An example would be a gestation/farrowing site or a nursery site. A site can encompass more than one production phase, such as a “farrow to finish” site, which has gestation, farrowing, nursery, and grower/finisher hogs all at the one location. A site can be a part of an operation or it can be the whole operation, if the operation has only one site. (See also “Operation.”)

Total Inventory: All swine present on the site on June 1, 2006.

Section I: Population Estimates

A. Site Classification by Pig Type

1. Pig types present

Four of five sites (82.2 percent) had grower/finisher pigs during the previous 12 months, and 40.2 percent had breeding females. Nine of 10 sites (90.4 percent) had weaned pigs, either nursery or grower/finisher.

Percentage of sites that had the following types of swine during the previous 12 months, by size of site:

Percent Sites

Size of Site (Total Inventory)

	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Swine Type	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Breeding females	47.8	(3.9)	19.1	(3.6)	33.9	(5.7)	40.2	(2.7)
Nursery-age pigs	61.4	(3.8)	39.2	(4.6)	49.4	(5.7)	55.4	(2.7)
Grower/finisher pigs	84.1	(2.8)	78.2	(3.7)	78.6	(5.3)	82.2	(2.1)
Weaned market pigs (nursery or grower/finisher	90.4	(2.4)	90.3	(3.1)	90.6	(3.2)	90.4	(1.7)

B. Breeding Female and Preweaned Pig Morbidity

Note: All tables and graphs in sections B, C, and D represent sites that had any breeding females during the 12 months before the interview.

1. Breeding females

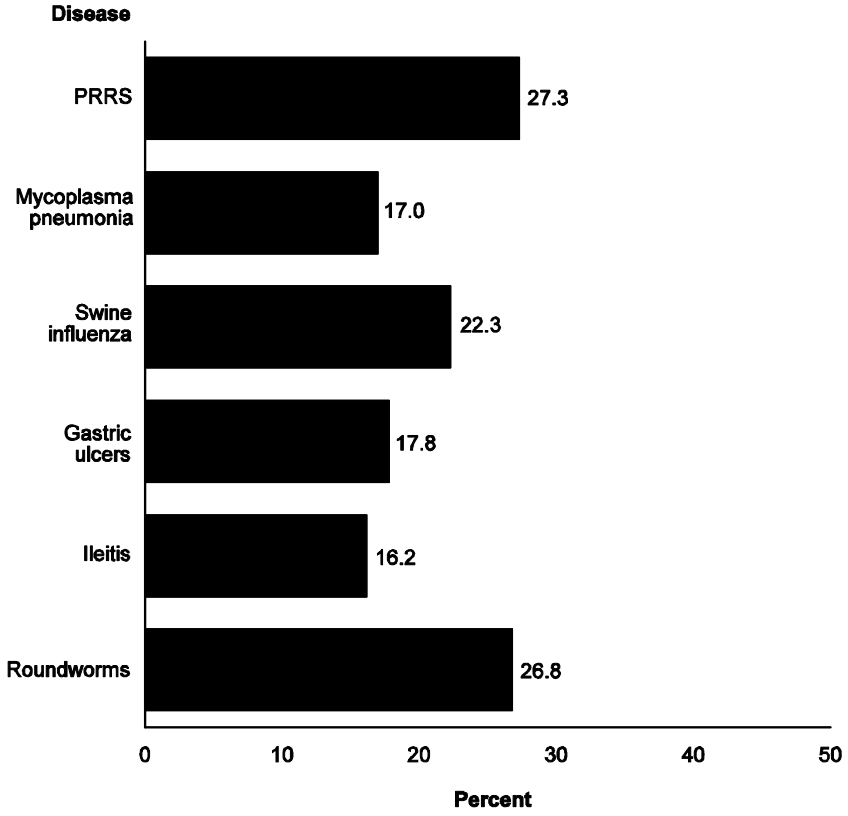
Over 20 percent of sites reported sickness or mortality in breeding females due to porcine reproductive and respiratory syndrome (PRRS), swine influenza, and roundworms (27.3, 22.3, and 26.8 percent of sites, respectively) during the previous 12 months. A higher percentage of large sites reported problems with swine influenza, gastric ulcers, and ileitis compared to small sites. Only 0.2 percent of producers believed they had a problem related to pseudorabies, although there were no veterinary or laboratory confirmations.

a. Percentage of sites where the following disease problems were known or suspected to have caused sickness or mortality in one or more breeding females during the previous 12 months, by size of site:

	Percent Sites*							
	Size of Site (Sow and Gilt Inventory)							
	Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or More)		**All Sites**	
Disease	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
APP (*Actinobacillus pleuropneumoniae*)	5.3	(2.8)	2.0	(1.9)	2.3	(2.1)	4.2	(1.9)
PRRS (porcine reproductive and respiratory syndrome)	22.5	(5.8)	29.8	(11.6)	38.7	(7.0)	27.3	(4.3)
Mycoplasma pneumonia	14.2	(4.1)	24.0	(10.3)	21.5	(6.0)	17.0	(3.2)
Swine influenza	14.6	(4.6)	27.6	(11.9)	40.6	(7.7)	22.3	(3.9)
Salmonella	8.8	(3.7)	0.0	(--)	1.5	(1.5)	6.1	(2.5)
Swine dysentery	2.2	(2.1)	2.4	(2.3)	0.3	(0.3)	1.7	(1.4)
TGE (transmissible gastroenteritis)	2.2	(2.1)	0.0	(--)	2.3	(1.9)	2.0	(1.5)
Gastric ulcers	8.3	(2.8)	18.4	(7.8)	42.3	(7.4)	17.8	(3.1)
Pseudorabies	0.3	(0.3)	0.0	(--)	0.1	(0.1)	0.2	(0.2)
Ileitis (*Lawsonia intracellularis*)	11.0	(3.8)	14.9	(7.5)	30.6	(7.3)	16.2	(3.3)
Leptospirosis	4.6	(2.4)	6.2	(4.5)	7.3	(3.2)	5.5	(1.8)
Parvovirus	5.1	(2.6)	0.0	(--)	6.8	(3.0)	5.0	(1.9)
Erysipelas	8.5	(4.0)	2.0	(1.9)	5.4	(4.6)	7.1	(2.9)
Glasser's disease (*Haemophilus parasuis*)	1.5	(1.5)	7.0	(4.6)	13.5	(3.8)	5.0	(1.4)
Roundworms	26.7	(5.2)	33.2	(12.1)	24.6	(7.6)	26.8	(4.1)
Other	8.2	(3.4)	3.0	(1.8)	3.0	(2.2)	6.4	(2.3)

*This table reflects producer opinion, which may or may not have been confirmed by a veterinarian or laboratory diagnosis.

Percentage of Sites Where the Following Disease Problems were Known or Suspected to have Caused Sickness or Mortality in One or More Breeding Females Duirng the Previous 12 Months



Nearly half of sites that reported problems with swine influenza in breeding females did not know whether the problems were due to swine influenza H3N2 or H1N1.

b. For sites where swine influenza was a problem in breeding females during the previous 12 months, percentage of sites where swine influenza H3N2 and H1N1 were problems:

	Percent Sites						
	Yes		No		Don't Know		
Influenza Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Total
H3N2	29.8	(9.0)	23.8	(8.4)	46.4	(10.2)	100.0
H1N1	36.3	(9.2)	18.0	(8.2)	45.7	(10.2)	100.0

A veterinary or laboratory diagnosis was obtained by approximately half the sites that reported problems with *Mycoplasma* pneumonia, swine influenza, gastric ulcers, and ileitis in breeding females, and by over two-thirds of sites that reported problems with PRRS.

c. For sites that reported the following disease problems in breeding females during the previous 12 months, percentage of sites where the disease was diagnosed by a veterinarian or laboratory:

Disease*	Percent Sites	Standard Error
PRRS (porcine reproductive and respiratory syndrome)	69.2	(10.5)
Mycoplasma pneumonia	51.8	(10.2)
Swine influenza	47.9	(10.0)
Gastric ulcers	52.8	(8.9)
Ileitis (*Lawsonia intracellularis*)	48.3	(11.1)
Roundworms	9.7	(5.3)

*Estimates not reported for other diseases due to small sample size.

2. Preweaned pigs

The most common problems reported in preweaned pigs were colibacillosis, navel infections, and *Streptococcus suis* (47.4, 43.1, and 38.5 percent of sites, respectively). One in four small sites (25.0 percent) reported problems with *Streptococcus suis* meningitis, compared to approximately two-thirds of medium and large sites (63.4 and 66.2 percent, respectively).

a. Percentage of sites where the following disease problems were known or suspected to have caused sickness or mortality in one or more preweaned pigs during the previous 12 months, by size of site:

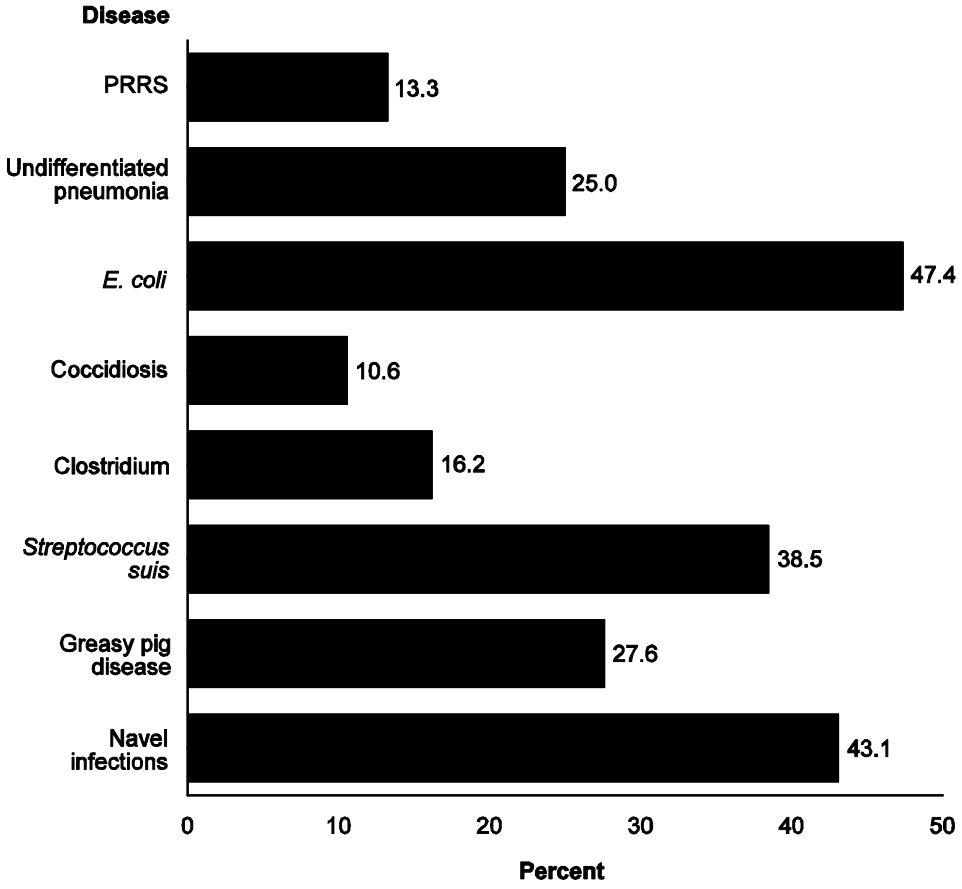
Percent Sites*

Size of Site (Sow and Gilt Inventory)

	Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or More)		**All Sites**	
Disease	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
PRRS (porcine reproductive and respiratory syndrome)	7.2	(3.1)	18.9	(9.9)	28.1	(7.2)	13.3	(2.9)
Undifferentiated pneumonia	26.4	(5.2)	22.3	(9.7)	22.2	(5.6)	25.0	(3.8)
TGE (transmissible gastroenteritis)	2.3	(2.1)	0.0	(--)	2.5	(2.1)	2.1	(1.5)
Rotavirus	1.4	(1.0)	3.2	(1.4)	24.0	(6.1)	6.9	(1.7)
E. coli (colibacillosis)	43.8	(6.1)	30.8	(10.4)	64.6	(7.1)	47.4	(4.6)
Coccidiosis	7.3	(3.3)	9.5	(4.9)	20.2	(5.7)	10.6	(2.6)
Clostridium	8.4	(3.0)	14.2	(6.0)	39.1	(6.7)	16.2	(2.8)
Streptococcus suis (meningitis, polyserositis, arthritis)	25.0	(5.3)	63.4	(10.2)	66.2	(7.0)	38.5	(4.4)
Greasy pig disease (*S. hyicus*)	16.3	(4.5)	33.0	(10.4)	57.6	(7.0)	27.6	(4.0)
Navel infections	36.7	(5.5)	52.4	(11.6)	57.0	(7.4)	43.1	(4.3)
Other	11.8	(4.3)	0.0	(--)	6.8	(6.3)	9.5	(3.2)

*This table reflects producer opinion, which may or may not have been confirmed by a veterinarian or laboratory diagnosis.

Percentage of Sites where the Following Disease Problems were Known or Suspected to Have Caused Sickness or Mortality in One or More Preweaned Pigs During the Previous 12 Months



Over one-half of sites with problems in preweaned pigs due to PRRS, rotavirus, coccidiosis, and clostridium had the disease diagnosed by a veterinarian or laboratory.

b. For sites that reported the following disease problems in preweaned pigs during the previous 12 months, percentage of sites where the disease was diagnosed by a veterinarian or laboratory:

Disease*	Percent Sites	Standard Error
PRRS (porcine reproductive and respiratory syndrome)	57.7	(12.9)
Undifferentiated pneumonia	13.8	(5.5)
Rotavirus	79.0	(9.8)
E. coli (colibacillosis)	44.0	(6.4)
Coccidiosis	75.6	(11.3)
Clostridium	57.8	(8.8)
Streptococcus suis (meningitis, polyserositis, arthritis)	34.4	(6.5)
Greasy pig disease (*S. hyicus*)	37.8	(8.2)
Navel infections	21.5	(5.3)

*Estimates not reported for other diseases due to small sample size.

C. Vaccinations in Breeding Females

1. Vaccination practices

Over 80 percent of sites vaccinated breeding females against *Leptospirosis*, parvovirus, and erysipelas. In general, vaccination practices were similar across size categories for all diseases shown.

Percentage of sites that usually vaccinated breeding females against the following diseases, by size of site:

Percent Sites

Size of Site (Sow and Gilt Inventory)

Disease	Small (Fewer than 250) Pct.	Small (Fewer than 250) Std. Error	Medium (250-499) Pct.	Medium (250-499) Std. Error	Large (500 or More) Pct.	Large (500 or More) Std. Error	All Sites Pct.	All Sites Std. Error
APP (*Actinobacillus pleuropneumoniae*)	5.4	(2.3)	6.2	(4.5)	1.1	(0.7)	4.4	(1.6)
Salmonella	2.7	(1.8)	2.0	(1.9)	1.5	(1.5)	2.3	(1.2)
Swine dysentery	0.7	(0.4)	0.0	(--)	0.0	(--)	0.4	(0.3)
TGE (transmissible gastroenteritis)	9.3	(3.7)	7.5	(5.4)	6.1	(3.5)	8.4	(2.6)
Pseudorabies	5.4	(3.1)	0.0	(--)	0.8	(0.8)	3.8	(2.0)
Leptospirosis	82.9	(4.8)	98.1	(1.8)	88.4	(6.2)	85.7	(3.5)
Parvovirus	81.8	(5.0)	98.1	(1.8)	93.5	(2.9)	86.4	(3.4)
Erysipelas	81.3	(4.9)	83.6	(10.7)	94.1	(2.6)	84.7	(3.5)
Glasser's disease (*Haemophilus parasuis*)	8.3	(3.4)	6.2	(4.5)	17.1	(4.2)	10.3	(2.5)
Other (not including *Mycoplasma*, PRRS, or influenza)	28.8	(5.6)	40.0	(11.0)	38.5	(7.0)	32.3	(4.2)

2. *Mycoplasma* pneumonia

The percentage of sites that usually vaccinated breeding females against *Mycoplasma* pneumonia ranged from 23.7 percent of small sites to 62.5 percent of large sites. Overall, about one in three sites (34.9 percent) vaccinated breeding females against *Mycoplasma* pneumonia.

a. Percentage of sites that usually vaccinated breeding females against *Mycoplasma* pneumonia:

Percent Sites

Size of Site (Sow and Gilt Inventory)

Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or more)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
23.7	(5.2)	39.7	(10.9)	62.5	(6.8)	34.9	(4.2)

The most common reproductive time period that sites vaccinated breeding females against *Mycoplasma* pneumonia were prior to entering the breeding herd and as gilts entering the breeding herd (84.4 and 57.3 percent of sites that vaccinated, respectively).

b. For sites that vaccinated breeding females against *Mycoplasma* pneumonia, percentage of sites that usually vaccinated during the following time periods:

Time Period	**Percent Sites**	**Standard Error**
Prior to entering the breeding herd	84.4	(5.4)
As gilts at time of entering the breeding herd	57.3	(7.2)
During gestation up to 4 weeks before farrowing	10.7	(4.0)
During the last 4 weeks of gestation	21.5	(5.1)
From farrowing to weaning	3.9	(2.2)
After weaning through breeding/mating	11.8	(4.9)
At regular intervals, regardless of reproductive stage	5.3	(2.5)

3. PRRS

About one in four sites (27.3 percent) usually vaccinated breeding females against PRRS.

a. Percentage of sites that usually vaccinated breeding females against PRRS, by size of site:

Percent Sites							
Size of Site (Total Sow and Gilt Inventory)							
Small (Fewer than 250)		**Medium** (229-499)		**Large** (500 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
24.4	(5.0)	28.6	(10.8)	34.0	(7.2)	27.3	(3.9)

About two-thirds of sites that vaccinated breeding females against PRRS (69.2 percent) did so as gilts entering the breeding herd, and nearly half of sites (47.0 percent) vaccinated breeding females at regular intervals, regardless of reproductive stage.

b. For sites that vaccinated breeding females against PRRS, percentage of sites that usually vaccinated during the following reproductive time periods:

Time Period	Percent Sites	Standard Error
Prior to entering the breeding herd	38.1	(8.4)
As gilts at time of entering the breeding herd	69.2	(7.9)
During gestation up to 4 weeks *before* farrowing	10.9	(4.5)
During the last 4 weeks of gestation	3.5	(1.9)
From farrowing to weaning	6.8	(3.5)
After weaning through breeding/mating	28.2	(8.7)
At regular intervals, regardless of reproductive stage	47.0	(8.6)

About one in five sites that usually vaccinated breeding females against PRRS (20.6 percent) used more than one brand or type of vaccine.

c. For sites that usually vaccinated breeding females against PRRS, percentage of sites that used more than one brand or type of PRRS vaccine during the previous 12 months in breeding females:

Percent Sites	Standard Error
20.6	(6.9)

Overall, 72.5 percent of sites that vaccinated breeding females against PRRS used a commercial vaccine, accounting for 61.7 percent of breeding females on sites that vaccinated.

d. For sites that usually vaccinated breeding females against PRRS, percentage of sites by type of PRRS vaccine used during the previous 12 months, and percentage of breeding females on those sites:

PRRS Vaccine Type	Percent Sites	Standard Error	Percent Breeding Females	Standard Error
Commercial modified live or killed	72.5	(7.0)	61.7	(9.4)
Autogenous	30.6	(7.7)	35.2	(8.9)
On-farm serum exposure	9.0	(5.8)	25.8	(11.1)

The most common measures of controlling PRRS in breeding females were using only PRRS-negative semen or boars, closing the herd to new gilt introductions, and obtaining replacement gilts from PRRS-negative sources (59.4, 44.5, and 33.0 percent of sites, respectively). A higher percentage of large sites obtained replacement gilts from PRRS-negative sources and tested replacement gilts for PRRS, compared to medium and small sites.

e. Percentage of sites by measures ***specifically*** used to control or prevent PRRS in breeding females and by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or More)		**All Sites**	
Control Measure	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Obtain replacement gilts from PRRS-negative source	19.0	(4.5)	27.8	(9.5)	71.7	(6.3)	33.0	(4.0)
Test replacement gilts for PRRS	4.0	(1.7)	15.0	(5.0)	57.9	(7.4)	18.5	(2.8)
Expose incoming gilts to PRRS	5.6	(2.6)	13.2	(8.9)	20.9	(6.8)	10.2	(2.6)
Herd closed to new gilt introduction	48.2	(6.4)	35.8	(10.9)	38.1	(6.8)	44.5	(4.7)
Use only PRRS-negative semen or boars	50.5	(6.3)	63.7	(12.1)	81.0	(5.7)	59.4	(4.6)
Other measures not including vaccination	11.0	(4.2)	14.2	(4.9)	12.5	(4.0)	11.7	(2.9)
Any of above	69.1	(5.5)	73.9	(12.2)	92.2	(4.7)	75.3	(4.0)

4. Swine influenza

The percentage of sites that vaccinated against swine influenza increased as size of site increased.

About one in four sites (26.4 percent) vaccinated breeding females against both swine influenza H1N1 and H3N2. The percentage of sites that vaccinated against both types of swine influenza was nearly the same as the percentage that vaccinated against either type, indicating that if a site vaccinated against one it vaccinated against both.

a. Percentage of sites that usually vaccinated breeding females against swine influenza H1N1 and/or H3N2, by size of site:

Percent Sites

Size of Site (Sow and Gilt Inventory)

	Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or More)		**All Sites**	
Vaccinated Against . . .	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Swine influenza H1N1	11.5	(3.8)	33.2	(10.3)	69.3	(6.4)	27.9	(3.8)
Swine influenza H3N2	12.8	(3.9)	33.6	(10.4)	65.2	(6.7)	27.8	(3.8)
Both H1N1 and H3N2	11.5	(3.8)	29.7	(10.0)	64.5	(6.8)	26.4	(3.7)
Either H1N1 or H3N2	12.8	(3.9)	37.1	(10.6)	70.0	(6.4)	29.3	(3.9)

The most common reproductive time periods that sites vaccinated breeding females against swine influenza H1N1 were prior to entering the breeding herd and as gilts at time of entering the breeding herd.

b. For sites that vaccinated breeding females against swine influenza H1N1, percentage of sites that usually vaccinated during the following time periods:

Time Period	Percent Sites	Standard Error
Prior to entering the breeding herd	64.7	(7.4)
As gilts at time of entering the breeding herd	67.9	(6.9)
During gestation up to 4 weeks before farrowing	27.4	(7.0)
During the last 4 weeks of gestation	25.0	(6.3)
From farrowing to weaning	3.5	(2.2)
After weaning through breeding/mating	8.7	(4.4)
At regular intervals, regardless of reproductive stage	21.6	(6.1)

A commercial killed vaccine was used by 81.3 percent of sites that vaccinated breeding females against swine influenza H1N1, accounting for 80.2 percent of breeding females on sites that vaccinated.

c. For sites that usually vaccinated breeding females against swine influenza H1N1, percentage of sites and percentage of breeding females on those sites by type of vaccine used during the previous 12 months:

Swine Influenza H1N1 Vaccine Type	Percent Sites	Standard Error	Percent Breeding Females	Standard Error
Commercial killed	81.3	(5.9)	80.2	(6.4)
Autogenous	22.2	(6.1)	28.1	(7.2)

As with swine influenza H1N1, the most common reproductive times that sites vaccinated breeding females against swine influenza H3N2 were prior to entering the breeding herd and as gilts at time of entering the breeding herd.

d. For sites that vaccinated breeding females against swine influenza H3N2, percentage of sites that usually vaccinated during the following time periods:

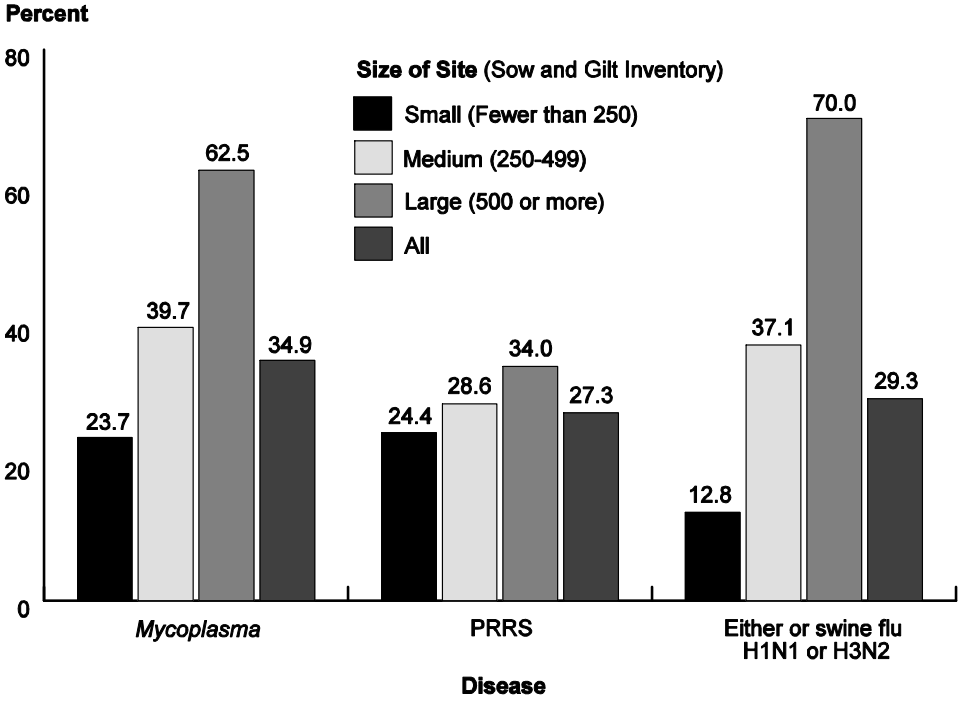
Time Period	Percent Sites	Standard Error
Prior to entering the breeding herd	63.0	(7.4)
As gilts at time of entering the breeding herd	68.8	(6.8)
During gestation up to 4 weeks before farrowing	33.0	(7.7)
During the last 4 weeks of gestation	25.9	(6.4)
From farrowing to weaning	4.3	(2.3)
After weaning through breeding/mating	8.7	(4.4)
At regular intervals, regardless of reproductive stage	21.7	(6.1)

A commercial killed vaccine was used by 79.7 percent of sites that vaccinated breeding females against swine influenza H3N2.

e. For sites that usually vaccinated breeding females against swine influenza H3N2, percentage of sites and percentage of breeding females on those sites, by type of vaccine used:

Swine Influenza H3N2 Vaccine Type	Percent Sites	Standard Error	Percent Breeding Females	Standard Error
Commercial killed	79.7	(6.1)	79.0	(6.6)
Autogenous	22.3	(6.1)	29.1	(7.4)

Percentage of Sites that Usually Vaccinated Breeding Females Against the Following Diseases, by Size of Site



D. Use of Antimicrobials in Breeding Females

1. To treat disease conditions

The percentage of sites that used an antimicrobial to treat a disease condition in breeding females increased from small to large sites (67.1 and 93.6 percent, respectively).

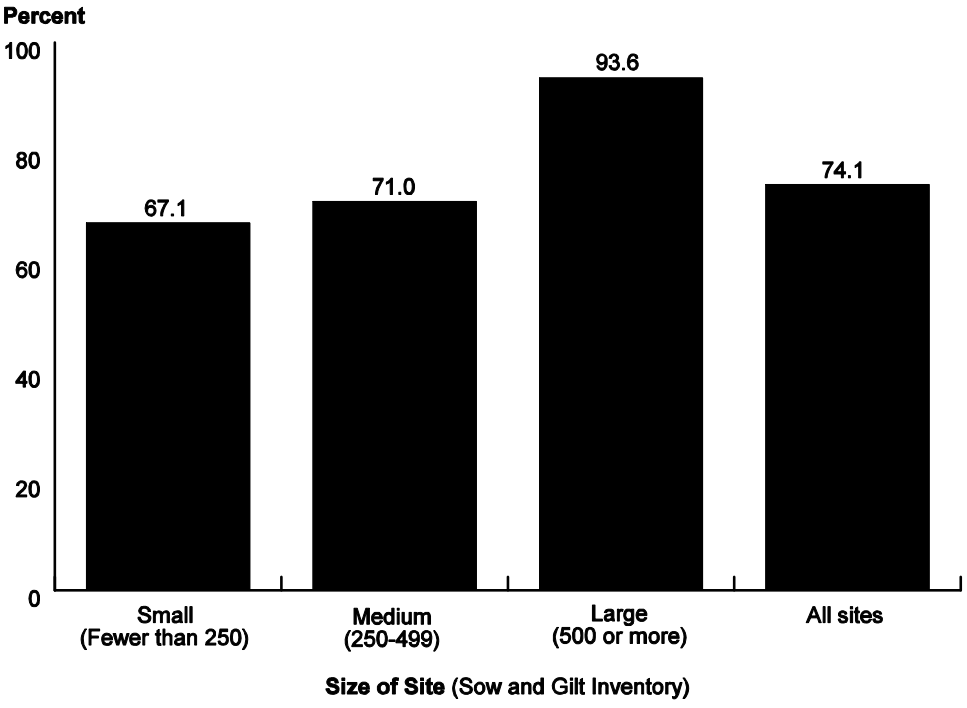
Percentage of sites that gave at least one breeding female an antimicrobial during the previous 12 months to a treat disease condition, by size of site:

Percent Sites

Size of Site (Sow and Gilt Inventory)

Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
67.1	(5.4)	71.0	(12.1)	93.6	(2.1)	74.1	(3.9)

Percentage of Sites that Gave at Least One Breeding Female an Antimicrobial During the Previous 12 Month to Treat a Disease Condition, by Size of Site



2. Primary decision-maker

On nearly all small sites (95.3 percent), the owner of the operation decided which antimicrobials to use when treating sick breeding females, compared to 76.8 percent of medium sites and 29.5 percent of large sites. Large sites were more likely than small sites to use a farm manager or company nutritionist/veterinarian to make antimicrobial decisions.

Percentage of sites by person primarily responsible for deciding which antimicrobials were used to treat sick breeding females, by size of site:

Percent Sites

Size of Site (Sow and Gilt Inventory)

	Small (Fewer than 250)		**Medium** (250-499)		**Large** (500 or More)		**All Sites**	
Primary Decision-Maker*	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Owner of operation	95.3	(2.1)	76.8	(7.6)	29.5	(6.8)	76.9	(3.2)
Farm manager, not the owner	0.9	(0.5)	6.0	(4.5)	22.9	(7.1)	7.0	(2.2)
Local veterinary practitioner	1.4	(1.3)	6.8	(4.9)	11.8	(4.0)	4.5	(1.4)
Consulting or second-opinion veterinarian	1.3	(1.3)	0.0	(--)	8.2	(4.9)	2.9	(1.5)
Company veterinarian or company nutritionist	0.8	(0.8)	5.7	(2.0)	22.6	(4.7)	6.8	(1.3)
Service manager who oversees more than one site	0.0	(--)	4.7	(2.1)	4.6	(1.4)	1.6	(0.4)
Other	0.0	(--)	0.0	(--)	0.4	(0.4)	0.1	(0.1)
Did not use antimicrobials for sickness in breeding females	0.3	(0.3)	0.0	(--)	0.0	(--)	0.2	(0.2)
Total	100.0		100.0		100.0		100.0	

*The owner and farm manager categories do not reflect whether or not antimicrobial decision protocols were developed with veterinary input.

E. Weaned Pig Morbidity

1. Nursery-age pigs

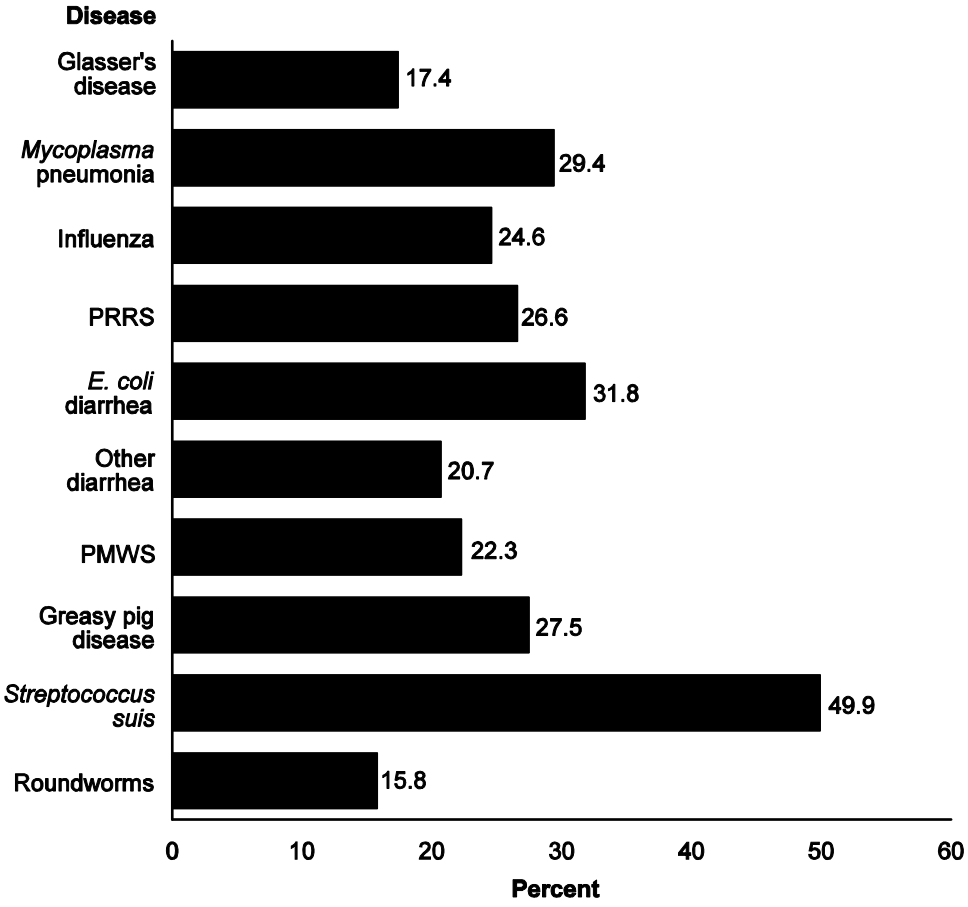
Nearly half of sites with nursery-age pigs (49.9 percent) reported sickness in these pigs due to *Streptococcus suis* meningitis during the previous 12 months. The percentage of sites reporting sickness due to PRRS ranged from 18.6 percent of small sites to 61.6 percent of large sites. Small sites were more likely to have problems due to roundworms compared to medium and large sites. A higher percentage of large sites (39.6 percent) reported porcine circovirus associated diseases (PCVAD)—formerly known as postweaning multisystemic wasting syndrome (PMWS)—than medium sites (12.5 percent).

a. For sites with nursery-age pigs during the previous 12 months, percentage of sites where the following disease problems were known or suspected to have caused sickness or mortality in one or more nursery-age pigs during the previous 12 months, by size of site:

	Percent Sites [1]							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		Medium (2,000-4,999)		Large (5,000 or More)		All Sites	
Disease [2]	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
APP (*Actinobacillus pleuropneumoniae*)	1.2	(0.5)	6.2	(3.0)	9.6	(4.9)	2.9	(0.8)
Glasser's disease (*Haemophilus parasuis*)	12.5	(3.6)	23.2	(5.0)	42.0	(8.9)	17.4	(3.0)
Mycoplasma pneumonia	30.8	(4.9)	29.1	(6.3)	20.6	(6.5)	29.4	(3.8)
Influenza	22.2	(4.9)	21.7	(5.7)	43.9	(9.1)	24.6	(3.9)
PRRS (porcine reproductive and respiratory syndrome)	18.6	(3.9)	40.6	(7.7)	61.6	(8.1)	26.6	(3.5)
Salmonella	8.6	(3.0)	12.9	(5.1)	6.1	(4.1)	8.9	(2.4)
Swine dysentery	4.9	(2.6)	2.2	(1.5)	6.9	(4.6)	4.8	(2.0)
TGE (transmissible gastroenteritis)	2.0	(1.6)	0.0	(--)	2.9	(2.8)	1.8	(1.2)
E. coli diarrhea	27.8	(5.1)	45.5	(6.9)	41.0	(8.9)	31.8	(4.0)
Other diarrhea	21.4	(4.0)	15.1	(4.4)	23.5	(7.2)	20.7	(3.2)
Edema disease	8.8	(3.3)	13.8	(4.9)	4.7	(3.0)	9.0	(2.6)
PCVAD (porcine circovirus associated diseases) [3]	21.5	(4.0)	12.5	(4.3)	39.6	(8.6)	22.3	(3.2)
PDNS (porcine dermatitis and nephropathy syndrome)[4]	3.3	(1.7)	0.0	(--)	3.4	(3.2)	2.9	(1.3)
Greasy pig disease (*S. hyicus*)	17.9	(4.0)	55.4	(7.3)	54.7	(8.7)	27.5	(3.5)
Streptococcus suis (*S.* meningitis)	42.3	(5.2)	72.0	(7.3)	71.5	(7.9)	49.9	(4.2)
Roundworms	20.7	(4.1)	2.8	(2.0)	0.0	(--)	15.8	(3.1)
Lice	14.6	(3.6)	0.0	(--)	0.0	(--)	10.8	(2.7)
Other	12.4	(3.6)	4.3	(2.2)	5.8	(3.4)	10.5	(2.7)

[1]This table reflects producer opinion, which may or may not have been confirmed by a veterinarian or laboratory diagnosis.
[2]Approximately 4 to 5 percent of sites reported "Don't Know."
[3]Formerly known as PMWS. Survey question read ". . . postweaning multisystemic wasting syndrome (PMWS aka PCVAD)."
[4]PDNS is currently believed to be a component of PCVAD.

Percentage of Sites* Where the Following Disease Problems Were Known or Suspected to have Caused Sickness or Mortality in One or More Nursery-Age Pigs During the Previous 12 Months



*Sites with nursery-age pigs during the previous 12 months

Over half of sites with sickness or mortality in nursery-age pigs due to influenza (54.6 percent) reported that the problem was due to H1N1, while about 4 in 10 (39.6 percent) did not know which type of influenza caused the illness.

b. For sites where swine influenza was a problem in nursery-age pigs during the previous 12 months, percentage of sites where swine influenza H3N2 and H1N1 were problems:

	Percent Sites						
	Yes		No		Don't Know		
Influenza Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Total
H3N2	22.4	(6.7)	38.0	(9.8)	39.6	(9.1)	100.0
H1N1	54.6	(9.3)	5.8	(3.8)	39.6	(9.1)	100.0

Over 7 of 10 sites that reported sickness in nursery age pigs due to Glasser's disease (73.4 percent) and 8 of 10 sites that reported sickness due to PRRS (80.7 percent) obtained a veterinary or laboratory diagnosis.

c. For sites that reported the following disease problems in nursery-age pigs during the previous 12 months**,** percentage of sites where the disease was diagnosed by a veterinarian or laboratory:

Disease*	Percent Sites	Standard Error
Glasser's disease (*Haemophilus parasuis*)	73.4	(7.1)
Mycoplasma pneumonia	42.7	(7.6)
Influenza	46.1	(9.3)
PRRS (porcine reproductive and respiratory syndrome)	80.7	(5.8)
E. coli diarrhea	53.7	(8.0)
Other diarrhea	8.8	(3.2)
PCVAD (porcine circovirus associated diseases)**	58.1	(8.5)
Greasy pig disease (*S. hyicus*)	32.2	(6.4)
Streptococcus suis (*S.* meningitis)	43.4	(5.5)
Roundworms	13.4	(7.8)
Lice	8.2	(7.7)

*Estimates not reported for other diseases due to small sample size.
**Formerly known as PMWS. Survey question read ". . . postweaning multisystemic wasting syndrome (PMWS aka PCVAD)."

Photo courtesy of National Pork Board

2. Grower/finisher pigs

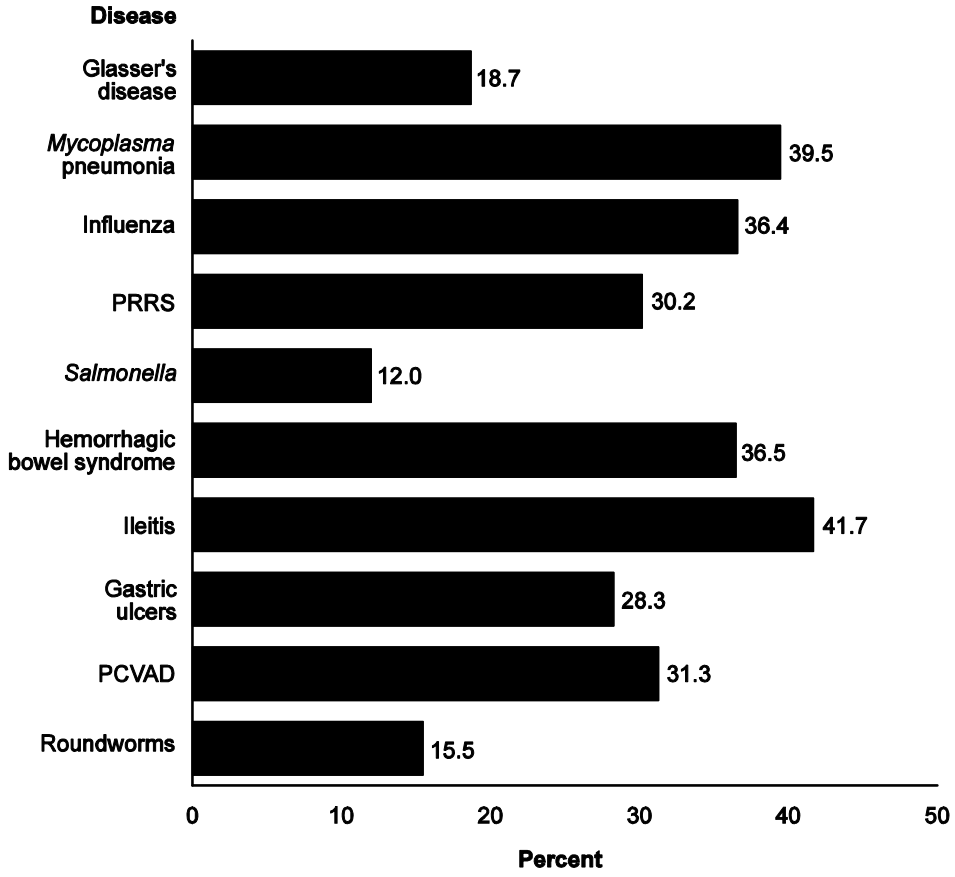
Over 60 percent of large sites with grower/finisher pigs reported sickness or mortality in these pigs due to *Mycoplasma* pneumonia, influenza, PRRS, or ileitis during the previous 12 months. No sites reported sickness in grower/finisher pigs due to pseudorabies. The prevalence of two emerging diseases, PCVAD and PDNS, varied by size of site. The percentages of sites that reported sickness in grower/finisher pigs due to PCVAD increased steadily from small to large sites (ranging from 25.0 percent of small sites to 59.9 percent of large sites). The percentages of sites with sickness due to PDNS also differed by size—particularly between small and medium sites (1.6 and 10.4 percent, respectively).

a. For sites with grower/finisher pigs during the previous 12 months, percentage of sites where the following disease problems were known or suspected to have caused sickness or mortality in one or more grower/finisher pigs during the previous 12 months, by size of site:

	Percent Sites*							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or more)		**All Sites**	
Disease	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
APP (*Actinobacillus pleuropneumoniae*)	7.4	(2.3)	10.0	(3.1)	12.9	(4.8)	8.5	(1.8)
Glasser's disease (*Haemophilus parasuis*)	11.7	(3.6)	33.9	(5.1)	34.1	(7.1)	18.7	(2.9)
Mycoplasma pneumonia	32.6	(4.6)	47.2	(5.4)	66.1	(6.9)	39.5	(3.5)
Influenza	27.4	(4.7)	53.3	(5.2)	60.6	(6.7)	36.4	(3.6)
Porcine reproductive and respiratory syndrome (PRRS)	19.2	(4.0)	46.3	(5.2)	66.9	(6.3)	30.2	(3.2)
Salmonella	7.1	(3.3)	17.6	(3.9)	31.1	(6.8)	12.0	(2.5)
Pseudorabies	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Atrophic rhinitis	6.1	(1.8)	5.0	(2.4)	4.1	(2.7)	5.7	(1.3)
Hemorrhagic bowel syndrome	29.5	(4.7)	54.9	(5.4)	47.0	(6.9)	36.5	(3.5)
Ileitis (Lawsonia intracellularis)	33.1	(4.7)	58.7	(5.3)	63.7	(6.6)	41.7	(3.6)
Swine dysentery (bloody scours)	2.0	(1.1)	6.4	(2.8)	2.3	(2.1)	2.8	(0.9)
Gastric ulcers	18.5	(3.5)	49.7	(5.6)	49.6	(7.2)	28.3	(3.0)
Erysipelas	3.1	(1.6)	4.9	(1.9)	7.0	(2.8)	4.0	(1.2)
PCVAD (porcine circovirus associated diseases)**	25.0	(4.3)	35.4	(4.9)	59.9	(6.9)	31.3	(3.3)
PDNS (porcine dermatitis and nephropathy syndrome)***	1.6	(1.2)	10.4	(3.1)	23.9	(5.9)	6.0	(1.3)
Roundworms	19.4	(4.0)	7.5	(2.7)	6.6	(3.1)	15.5	(2.8)
Mange	12.0	(3.7)	0.0	(--)	0.0	(--)	8.2	(2.6)
Other disease problems in grower/finisher pigs	11.0	(2.7)	26.7	(4.9)	10.5	(4.5)	14.0	(2.2)

*This table reflects producer opinion, which may or may not have been confirmed by a veterinarian or laboratory.
**Formerly known as PMWS. Survey question read ". . . postweaning multisystemic wasting syndrome (PMWS aka PCVAD)."
***PDNS is currently believed to be a component of PCVAD.

Percentage of Sites* Where the Following Disease Problems were Known or Suspected to Have Caused Sickness or Mortality in One or More Grower/finisher Pigs During the Previous 12 Months



*Sites with grower/finisher pigs during the prevous 12 months

Swine influenza H1N1 was a problem for about half the sites (48.0 percent) that reported sickness in grower/finisher pigs due to swine influenza, while a similar percentage of sites did not know which type of influenza was the problem.

b. For sites where swine influenza was a problem in grower/finisher pigs during the previous 12 months, percentage of sites where swine influenza H1N1 and H3N2 were problems:

	Percent Sites						
	Yes		No		Don't Know		
Influenza Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Total
H3N2	26.8	(5.0)	26.2	(6.0)	47.0	(6.6)	100.0
H1N1	48.0	(6.5)	5.5	(2.2)	46.5	(6.6)	100.0

In general, the majority of sites obtained a veterinary or laboratory diagnosis for grower/finisher pigs that had the problems listed in the table below.

c. For sites that reported the following disease problems in grower/finisher pigs during the previous 12 months, percentage of sites where the disease was diagnosed by a veterinarian or laboratory:

Disease*	Percent Sites	Standard Error
APP (*Actinobacillus pleuropneumoniae*)	59.6	(10.9)
Glasser's disease (*Haemophilus parasuis*)	60.2	(9.2)
Mycoplasma pneumonia	57.9	(5.3)
Influenza	54.7	(6.6)
Swine influenza H3N2	79.1	(9.1)
Swine influenza H1N1	70.9	(9.7)
Porcine reproductive and respiratory syndrome (PRRS)	79.2	(4.8)
Salmonella	60.9	(13.1)
Atrophic rhinitis	23.6	(10.6)
Hemorrhagic bowel syndrome	53.3	(6.1)
Ileitis (*Lawsonia intracellularis*)	60.4	(5.7)
Gastric ulcers	51.9	(5.5)
PCVAD (porcine circovirus associated diseases)**	69.7	(6.6)
PDNS (porcine dermatitis and nephropathy syndrome)***	79.5	(8.6)
Roundworms	23.1	(11.7)

*Estimates not reported for other diseases due to small sample size.
**Formerly known as PMWS. Survey question read ". . . postweaning multisystemic wasting syndrome (PMWS aka PCVAD)."
***PDNS is currently believed to be a component of PCVAD.

For sites that had grower/finisher pigs with ileitis, the average earliest age of onset was 13.1 weeks, and average latest age of onset was 21.9 weeks.

d. For sites that had grower/finisher pigs with ileitis during the previous 12 months, earliest and latest average age (in weeks) that pigs first showed symptoms:

Time of Onset	**Average Age** (Weeks)	**Standard Error**
Earliest	13.1	(0.5)
Latest	21.9	(0.6)

3. Porcine circovirus associated diseases (PCVAD)*

Approximately one in three sites with weaned market pigs (either nursery or grower/finisher pigs) reported PCVAD in these pigs during the previous 12 months, ranging from 29.7 percent of small sites to 59.9 percent of large sites.

a. For sites with weaned market pigs, percentage of sites that reported one or more weaned pigs with PCVAD during the previous 12 months, by size of site:

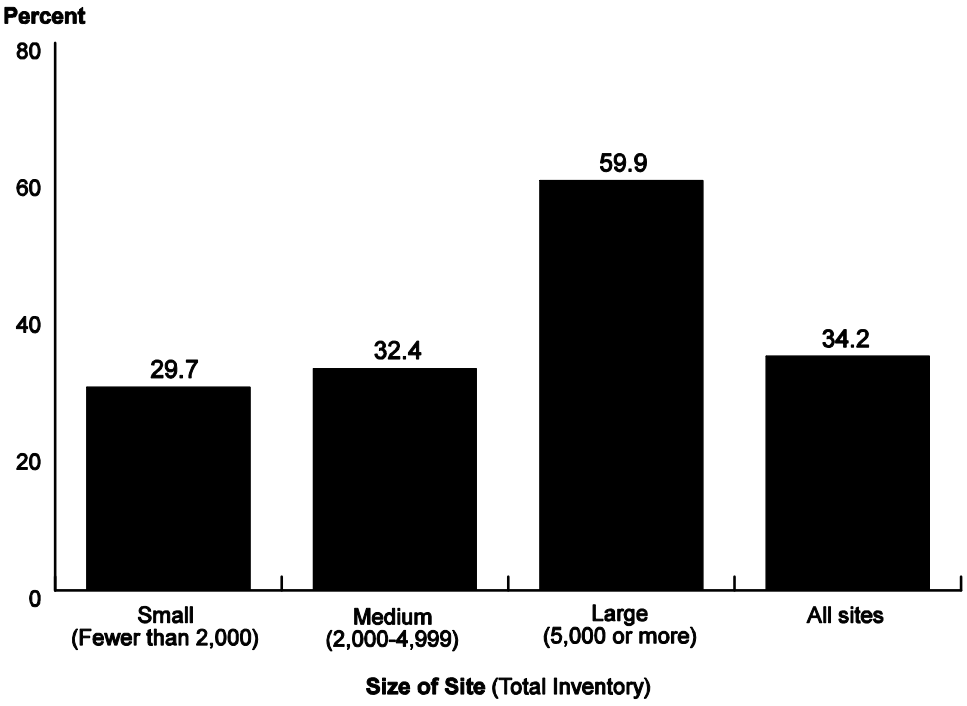
Percent Sites

Size of Site (Total Inventory)

Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
29.7	(4.3)	32.4	(4.5)	59.9	(7.5)	34.2	(3.2)

*Formerly known as PMWS. Survey question read ". . . postweaning multisystemic wasting syndrome (PMWS aka PCVAD)."

For Sites with Weaned Market Pigs, Percentage of Sites that Reported One or More Weaned Pigs with PCVAD* During the Previous 12 Months, by Size of Site



*Formerly known as PWMS. Survey question read ". . . postweaning multisystemic wasting syndrome (PMWS aka PCVAD)."

On sites that reported PCVAD in weaned market pigs, 15.4 percent of these pigs were affected.

b. For sites that reported one or more weaned market pigs with PCVAD during the previous 12 months, percentage of weaned pigs affected by PCVAD, by size of site:

Percent Pigs*							
Size of Site (Total Inventory)							
Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
7.7	(1.5)	13.7	(5.2)	19.8	(6.0)	15.4	(3.4)

*As a percentage of weaned pig inventory on day of interview.

For sites that reported PCVAD in weaned market pigs, the average earliest age of onset was 8.9 weeks and average latest age of onset was 16.3 weeks.

c. For sites that reported one or more weaned market pigs with PCVAD during the previous 12 months, average earliest and average latest age that pigs first showed symptoms:

Time of Onset	**Average Age** (Weeks)	**Standard Error**
Earliest	8.9	(0.6)
Latest	16.3	(0.6)

Over 90 percent of sites that reported weaned market pigs with PCVAD observed clinical signs of rapid weight loss, pigs off feed, and death. Nearly half the sites (44.8 percent) had pigs with enlarged lymph nodes in affected pigs, although another 23.3 percent did not know if lymph nodes were enlarged.

d. For sites that reported one or more weaned market pigs with PCVAD, percentage of sites where pigs showed any of the following clinical signs:

Clinical Sign	Percent Sites	Standard Error
Difficulty breathing	75.1	(4.8)
Rapid weight loss (wasting)	98.1	(1.0)
Enlargement of mandibular or inguinal lymph nodes	44.8*	(5.9)
Diarrhea	77.2	(5.1)
CNS signs (including behavior changes)	39.6	(6.4)
Yellowing of skin	37.1	(5.4)
Off feed	90.4	(3.1)
Death	96.8	(1.7)

*Note: One in four respondents (23.3 percent) did not know if lymph nodes were enlarged.

4. Disease signs

Note: This section discusses symptoms that might be consistent with foreign animal and domestic diseases. However, at this time no foreign animal disease is present in U.S. pigs.

No sites observed blisters on the snouts of weaned pigs, and very few sites observed lame pigs with reddened areas above the hooves. About one in five sites with weaned market pigs (20.8 percent) reported unusually high numbers of pigs that died during the previous 12 months.

a. For sites with weaned market pigs, percentage of sites where these pigs showed any of the following signs during the previous 12 months, by size of site:

Percent Sites

Size of Site (Total Inventory)

Sign	**Small** (Fewer than 2,000) Pct.	Std. Error	**Medium** (2,000-4,999) Pct.	Std. Error	**Large** (5,000 or More) Pct.	Std. Error	**All Sites** Pct.	Std. Error
Combination of skin blotches, matted eyes, and diarrhea	13.3	(3.7)	17.5	(3.8)	18.1	(5.5)	14.7	(2.8)
Unusually high number of pigs unwilling to eat or stand up*	3.5	(1.2)	17.5	(4.2)	12.8	(4.4)	7.3	(1.4)
Unusually high number of pigs that had died*	17.3	(3.9)	29.2	(4.9)	27.4	(6.3)	20.8	(2.9)
Difficulty breathing	27.1	(4.3)	31.1	(5.1)	40.6	(7.3)	29.5	(3.3)
Lame pigs with reddened areas above the hooves	1.7	(0.9)	5.5	(2.4)	1.6	(1.2)	2.4	(0.8)
Blisters on snouts	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Any of the above	34.2	(4.5)	47.3	(5.3)	49.0	(7.9)	38.5	(3.5)

*In excess of what was considered normal for each individual herd.

On sites with unusually high mortality, 11.8 percent of weaned pigs were affected.

b. For sites where weaned market pigs showed any of the following signs, percentage of pigs affected:

Sign*	Percent Pigs	Standard Error
Combination of skin blotches, matted eyes, and diarrhea	9.0	(2.9)
Unusually high number of pigs unwilling to eat or stand up**	20.9	(4.1)
Unusually high number of pigs that have died**	11.8	(1.3)
Difficulty breathing	11.2	(1.9)

*Estimates for other signs not reported due to small sample size.
**In excess of what was considered normal for each individual herd.

Over three-fourths of sites with unusually high mortality in weaned market pigs (76.1 percent) sought veterinary or diagnostic lab assistance, and 62.1 percent of sites with unusually high numbers of pigs unwilling to eat or stand up did so as well.

c. For sites where weaned market pigs showed any of the following signs, percentage of sites by highest level of response taken:

	Percent Sites								
	Level of Response								
	Did Nothing		Self-treated on Site		Sought Nonveteri-narian Assistance Off Site*		Sought Veterinarian or Diagnostic Lab Assistance		
Sign**	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Total
Combination of skin blotches, matted eyes, and diarrhea	23.3	(7.6)	44.4	(10.3)	4.9	(2.5)	27.4	(7.9)	100.0
Unusually high number of pigs unwilling to eat or stand up***	0.0	(--)	33.0	(8.5)	4.9	(3.5)	62.1	(8.8)	100.0
Unusually high number of pigs that have died***	2.0	(1.3)	8.7	(3.6)	13.2	(4.6)	76.1	(5.8)	100.0
Difficulty breathing	1.5	(1.0)	52.2	(6.6)	5.9	(2.8)	40.4	(6.8)	100.0

*e.g., field manager.
**Estimates for other signs not reported due to small sample size.
***In excess of what was considered normal for each individual herd.

Symptoms responded to antimicrobial treatment on over half (53.5 percent) of sites where weaned market pigs showed the signs in table c. Antimicrobials were not given on 3.6 percent of sites with signs.

d. For sites where weaned market pigs showed any of the signs in table c, outcome of antimicrobial treatment:

Outcome	Percent Sites	Standard Error
Symptoms responded positively with antimicrobials	53.5	(5.6)
Symptoms unresponsive to antimicrobials	42.1	(5.7)
Antimicrobials not given	3.6	(1.5)
Don’t know if treated with antimicrobials	0.8	(0.8)
Total	100.0	

F. Vaccinations in Weaned Pigs

1. *Mycoplasma* pneumonia

Over half the sites with nursery-age pigs vaccinated nursery pigs against *Mycoplasma* pneumonia, ranging from 46.3 percent of small sites to 81.2 percent of large sites.

a. For sites with nursery-age pigs during the previous 12 months, percentage of sites that usually vaccinated pigs against *Mycoplasma* pneumonia while in the nursery phase, by size of site:

Percent Sites

Size of Site (Total Inventory)

Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
46.3	(5.3)	62.2	(7.7)	81.2	(7.0)	52.6	(4.2)

On average, sites first vaccinated nursery-age pigs against *Mycoplasma* pneumonia at 4.4 weeks of age.

b. For sites that usually vaccinated pigs against *Mycoplasma* pneumonia while in the nursery phase, site average age that nursery-age pigs are first vaccinated against *Mycoplasma* pneumonia:

Site Average (Weeks)	**Standard Error**
4.4	(0.3)

Vaccinating pigs against *Mycoplasma* pneumonia was less common during the grower/finisher phase than the nursery phase, with only 4.1 percent of sites with grower/finisher pigs vaccinating against *Mycoplasma* pneumonia.

c. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that usually vaccinated pigs against *Mycoplasma* pneumonia while in the grower/finisher phase, by size of site:

Percent Sites

Size of Site (Total Inventory)

Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
2.9	(1.4)	6.3	(2.5)	7.8	(3.9)	4.1	(1.2)

2. PRRS

Less than 10 percent of sites with nursery-age pigs vaccinated them against PRRS.

a. For sites with nursery-age pigs during the previous 12 months, percentage of sites that usually vaccinated pigs against PRRS while in the nursery phase, by size of site:

Percent Sites

Size of Site (Total Inventory)

Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
7.9	(3.1)	9.8	(4.3)	13.6	(7.9)	8.8	(2.6)

No sites vaccinated grower/finisher pigs against PRRS.

b. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that usually vaccinated pigs against PRRS while in the grower/finisher phase, by size of site:

Percent Sites

Size of Site (Total Inventory)

Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)

3. Swine influenza

One in 10 sites with nursery-age pigs (10.8 percent) vaccinated nursery-age pigs against either H1N1 or H3N2 swine influenza.

a. For sites with nursery-age pigs during the previous 12 months, percentage of sites that usually vaccinated pigs against swine influenza H1N1 and/or H3N2 while in the nursery phase, by size of site:

Percent Sites

Size of Site (Total Inventory)

Vaccinated Against . . .	**Small** (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
	Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Swine influenza H1N1	6.7	(2.9)	22.1	(5.5)	20.0	(6.6)	10.4	(2.4)
Swine influenza H3N2	6.0	(2.8)	19.7	(5.0)	20.0	(6.6)	9.6	(2.3)
Both H1N1 and H3N2	6.0	(2.8)	17.5	(4.6)	20.0	(6.6)	9.2	(2.3)
Either H1N1 or H3N2	6.7	(2.9)	24.4	(5.8)	20.0	(6.6)	10.8	(2.4)

Only 4.3 percent of sites with grower/finisher pigs vaccinated grower/finisher pigs against either H1N1 or H3N2 swine influenza.

b. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that usually vaccinated pigs against swine influenza H1N1 and/or H3N2 while in the grower/finisher phase, by size of site:

Percent Sites

Size of Site (Total Inventory)

Vaccinated Against . . .	**Small** (Fewer than 2,000) Pct.	Std. Error	**Medium** (2,000-4,999) Pct.	Std. Error	**Large** (5,000 or More) Pct.	Std. Error	**All Sites** Pct.	Std. Error
Swine influenza H1N1	1.7	(0.9)	6.1	(2.7)	15.1	(4.8)	4.2	(1.0)
Swine influenza H3N2	1.9	(0.9)	4.2	(2.0)	15.1	(4.8)	3.9	(0.9)
Both H1N1 and H3N2	1.7	(0.9)	4.2	(2.0)	15.1	(4.8)	3.8	(0.9)
Either H1N1 or H3N2	1.9	(0.9)	6.1	(2.7)	15.1	(4.8)	4.3	(1.0)

The majority of sites that vaccinated nursery-age pigs against swine influenza H1N1 (86.2 percent) used a commercial killed vaccine.

c. For sites that usually vaccinated pigs against swine influenza while in the nursery phase, percentage of sites (and percentage of nursery-age pigs on those sites) by type of vaccine used during the previous12 months:

Swine Influenza H1N1 Vaccine Type	Percent Sites	Standard Error	Percent Nursery-Age Pigs	Standard Error
Commercial killed	86.2	(6.7)	89.2	(7.8)
Autogenous	9.1	(5.1)	9.1	(7.3)

On average, sites first vaccinated nursery-age pigs against swine influenza H1N1 at 6.0 weeks of age.

d. For sites that usually vaccinated pigs against swine influenza H1N1 while in the nursery phase, average age that nursery-age pigs were first vaccinated against H1N1:

Average Age (Weeks)	**Standard Error**
6.0	(0.4)

Nine of 10 sites that vaccinated nursery-age pigs against swine influenza H3N2 used a commercial killed vaccine.

e. For sites that usually vaccinated pigs against swine influenza H3N2 while in the nursery phase, percentage of sites (and percentage of nursery-age pigs on those sites) by type of vaccine used during the previous 12 months:

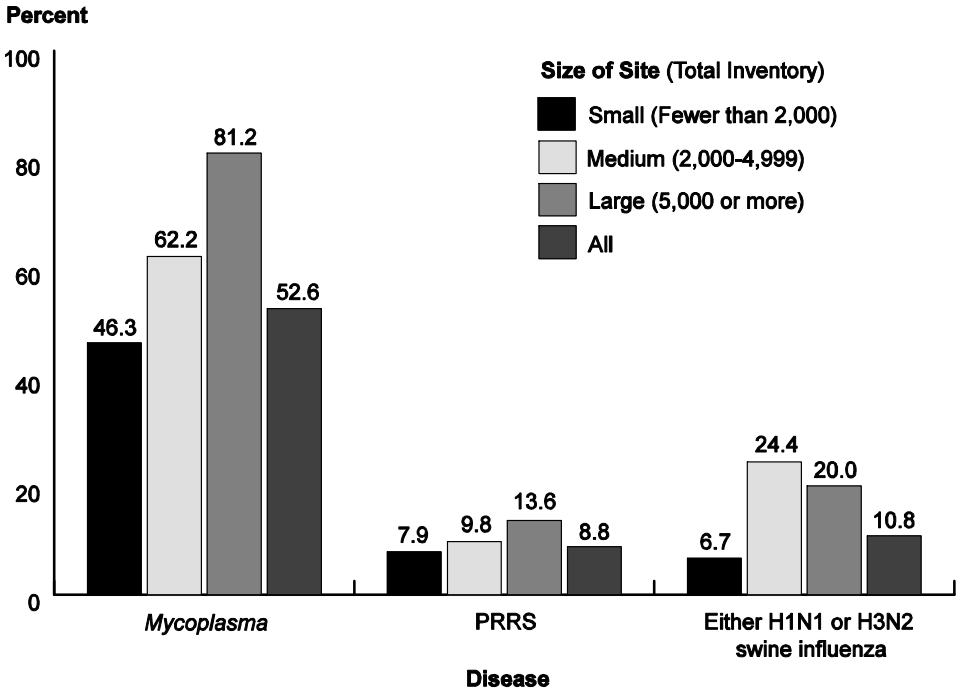
Swine Influenza H3N2 Vaccine Type	**Percent Sites**	**Standard Error**	**Percent Nursery-age Pigs**	**Standard Error**
Commercial killed	90.0	(5.6)	90.2	(8.0)
Autogenous	10.0	(5.6)	9.8	(8.0)

On average, sites first vaccinated nursery-age pigs against swine influenza H3N2 at 6.1 weeks of age.

f. For sites that usually vaccinated nursery-age pigs against swine influenza H3N2, average age that nursery-age pigs were first vaccinated against H3N2:

Average Age (Weeks)	**Standard Error**
6.1	(0.4)

Percentage of Sites* that Usually Vaccinated Pigs Against the Following Diseases While in the Nursery Phase, by Size of Site



*Sites with nursery-age pigs during the previous 12 months.

G. Use of Antimicrobials, Parasite Treatments, or Feed Additives in Weaned Pigs

1. Nursery-age pigs

One in three sites with nursery-age pigs (32.9 percent) reported no clinical respiratory disease in these pigs during the previous 12 months. The percentage of sites that did not observe clinical respiratory disease in nursery pigs varied by size of site, ranging from 6.3 percent of large sites to 39.9 percent of small sites. The most common actions taken for pigs with clinical respiratory disease were to administer antimicrobials to all pigs in the entire room with clinically ill pigs (39.6 percent of sites) or to treat only clinically ill pigs (23.4 percent of sites).

a. For sites with nursery-age pigs during the previous 12 months, percentage of sites that used the following courses of action for their most recent occurrence of respiratory disease in nursery-age pigs, by size of site:

Percent Sites

Size of Site (Total Inventory)

Action	**Small** (Fewer than 2,000) Pct.	Std. Error	**Medium** (2,000-4,999) Pct.	Std. Error	**Large** (5,000 or More) Pct.	Std. Error	**All Sites** Pct.	Std. Error
Did not treat any pigs with antimicrobials	3.4	(1.5)	2.7	(2.6)	0.0	(--)	2.9	(1.2)
Treated only clinically ill pigs with antimicrobials	24.0	(4.5)	29.8	(7.4)	11.0	(4.8)	23.4	(3.6)
Treated all pigs in same pen with clinically ill pigs with antimicrobials	1.4	(1.2)	0.0	(--)	0.0	(--)	1.0	(0.9)
Treated all pigs in same pen and adjacent pens with antimicrobials	0.2	(0.2)	0.0	(--)	0.0	(--)	0.2	(0.1)
Treated all pigs in entire room with clinically ill pigs with antimicrobials	31.1	(4.9)	49.9	(7.4)	82.7	(5.8)	39.6	(4.0)
Have not had clinical respiratory disease	39.9	(5.4)	17.6	(4.8)	6.3	(3.4)	32.9	(4.2)
Total	100.0		100.0		100.0		100.0	

The percentage of sites where the owner of the operation was the primary decision maker regarding antimicrobial use in sick nursery-age pigs decreased as size of site increased. A higher percentage of large and medium sites relied on a company nutritionist or company veterinarian compared to small sites.

b. For sites with nursery-age pigs during the previous 12 months, percentage of sites by person primarily responsible for deciding which antimicrobials were used to ***treat*** sick nursery-age pigs, by size of site:

Percent Sites

Size of Site (Total Inventory)

	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Primary Decision-Maker*	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Owner of operation	75.8	(4.5)	46.3	(7.6)	35.0	(8.2)	67.0	(3.8)
Farm manager, not the owner	8.2	(3.1)	9.1	(3.7)	16.1	(8.2)	9.2	(2.5)
Local veterinary practitioner	6.1	(2.2)	9.8	(4.1)	14.2	(5.7)	7.6	(1.8)
Consulting or second-opinion veterinarian	0.3	(0.3)	3.5	(3.4)	5.2	(2.8)	1.3	(0.6)
Company veterinarian or company nutritionist	4.4	(2.4)	22.4	(5.9)	20.0	(6.1)	8.7	(2.1)
Service manager who oversees more than one site	2.5	(1.8)	4.9	(2.0)	9.5	(5.0)	3.7	(1.5)
Other	1.6	(1.6)	1.3	(0.9)	0.0	(--)	1.4	(1.2)
Did not use antimicrobials for sickness in nursery-age pigs	1.1	(0.7)	2.7	(2.6)	0.0	(--)	1.1	(0.6)
Total	100.0		100.0		100.0		100.0	

*The owner and farm manager categories do not reflect whether or not antimicrobial decision protocols were developed with veterinary input.

As was the case for treating sick pigs (table b), the owner of the operation was the primary decision-maker on the majority of sites regarding which antimicrobials to use for growth promotion in nursery-age pigs. Overall, 8.2 percent of sites did not use antimicrobials for growth promotion in nursery age pigs.

c. For sites with nursery-age pigs during the previous 12 months, percentage of sites by person primarily responsible for deciding which antimicrobials were used in nursery-age pigs for ***growth promotion,*** by size of site:

Percent Sites

Size of Site (Total Inventory)

	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Primary Decision-Maker*	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Owner of operation	75.7	(4.5)	43.0	(7.6)	37.4	(8.2)	66.7	(3.8)
Farm manager, not the owner	3.3	(1.7)	5.7	(3.2)	0.0	(--)	3.3	(1.4)
Local veterinary practitioner	3.2	(1.5)	5.3	(3.0)	17.9	(6.5)	5.1	(1.4)
Consulting or second-opinion veterinarian	0.0	(--)	3.5	(3.4)	3.3	(2.4)	0.9	(0.6)
Company veterinarian or company nutritionist	6.7	(3.2)	28.6	(6.4)	34.7	(8.7)	13.0	(2.8)
Service manager who oversees more than one site	1.9	(1.1)	4.4	(2.0)	5.8	(3.8)	2.7	(1.0)
Other	0.0	(--)	0.6	(0.5)	0.0	(--)	0.1	(0.1)
Did not use antimicrobials for growth promotion in nursery-age pigs	9.2	(2.7)	8.9	(3.5)	0.9	(0.9)	8.2	(2.1)
Total	100.0		100.0		100.0		100.0	

*The owner and farm manager categories do not reflect whether or not antimicrobial decision protocols were developed with veterinary input.

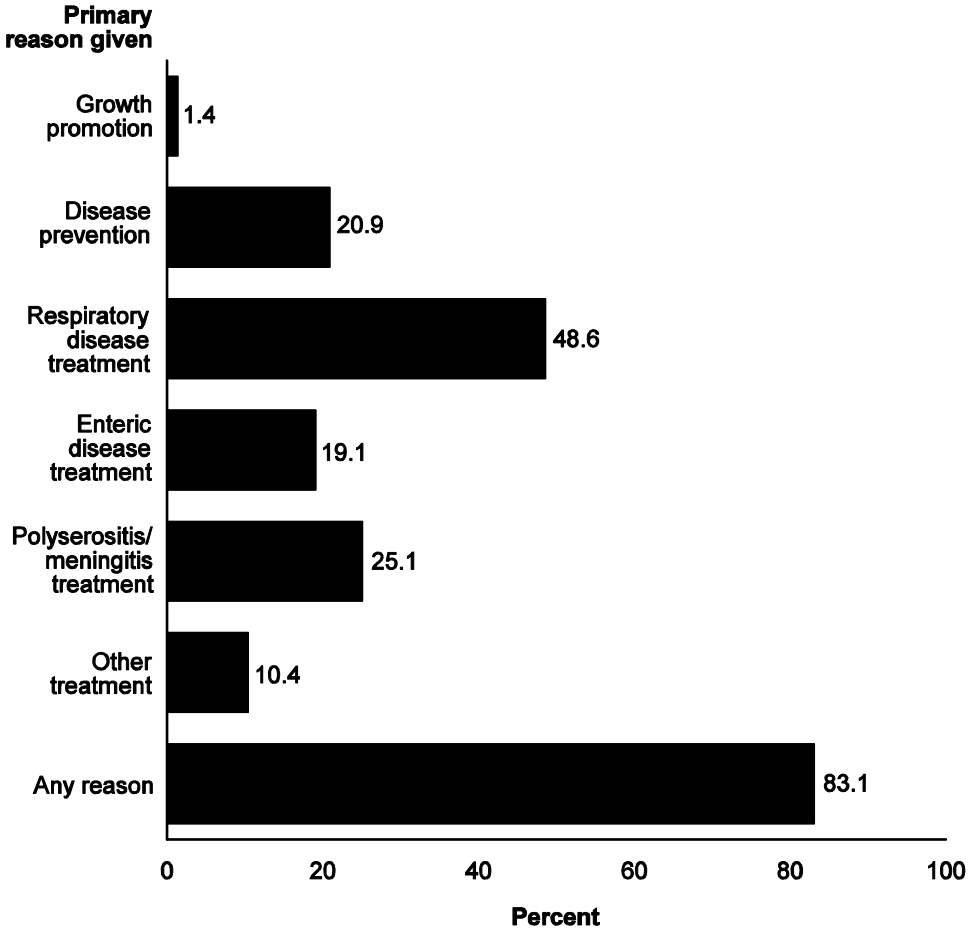
The most common antimicrobials given by injection to nursery-age pigs for any reason were ceftiofur and procaine penicillin G (43.0 and 43.9 percent of sites with nursery-age pigs, respectively). About half of sites with nursery-age pigs (48.6 percent) used an injectable antimicrobial to treat respiratory disease during the previous 6 months.

d. For sites with nursery-age pigs during the previous 12 months, percentage of sites that gave any nursery-age pigs the following antimicrobials or parasite treatments by ***injection*** during the previous 6 months, by primary reason given:

	Percent Sites																	
	Primary Reason Given																	
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Polysero-sitis/ Meningitis Treatment		Parasite Treatment		Other Reason		Any Reason	
Active Ingredient	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Antimicrobial																
Ampicillin	0.0	(--)	1.7	(1.0)	2.0	(0.9)	0.3	(0.2)	3.0	(0.9)	0.0	(--)	2.2	(1.0)	9.2	(1.9)
Amoxicillin	0.3	(0.3)	1.3	(1.1)	0.7	(0.5)	0.3	(0.3)	2.0	(0.9)	0.0	(--)	0.0	(--)	4.6	(1.6)
Ceftiofur	0.2	(0.2)	3.6	(1.4)	30.2	(3.8)	2.5	(1.3)	4.0	(1.0)	0.0	(--)	2.5	(1.3)	43.0	(4.1)
Erythromycin	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Florfenicol	0.0	(--)	0.3	(0.2)	5.9	(2.0)	0.5	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	6.7	(2.0)
Gentamycin	0.0	(--)	0.7	(0.6)	0.5	(0.3)	6.4	(2.0)	0.1	(0.1)	0.0	(--)	0.0	(0.0)	7.7	(2.1)
Lincomycin	0.0	(--)	2.1	(0.9)	4.5	(1.8)	1.3	(0.9)	1.7	(0.8)	0.0	(--)	1.4	(1.0)	11.0	(2.5)
Oxytetracycline	0.0	(--)	6.5	(3.1)	11.7	(2.7)	0.0	(--)	0.4	(0.3)	0.0	(--)	1.4	(1.0)	19.9*	(3.9)
Procaine penicillin G	0.2	(0.2)	7.5	(2.2)	18.0	(3.3)	0.8	(0.4)	14.1	(3.6)	0.0	(--)	3.2	(1.2)	43.9*	(4.2)
Penicillin benzathine	0.0	(--)	2.9	(1.2)	5.1	(2.0)	0.2	(0.2)	3.7	(1.5)	0.0	(--)	4.7	(1.7)	16.5*	(3.0)
Spectinomycin	0.0	(--)	0.5	(0.5)	1.0	(0.8)	2.3	(1.0)	0.3	(0.3)	0.0	(--)	0.0	(--)	4.0*	(1.4)
Tulathromycin	0.2	(0.2)	1.6	(0.7)	9.0	(2.3)	0.0	(--)	0.3	(0.3)	0.0	(--)	1.6	(1.0)	12.7	(2.6)
Tylosin	0.8	(0.8)	1.2	(0.7)	6.3	(2.1)	9.2	(2.4)	1.1	(0.8)	0.0	(--)	1.1	(0.9)	19.6*	(3.4)
Any of the above antimicrobials	1.4	(0.8)	20.9	(3.8)	48.6	(4.2)	19.1	(3.1)	25.1	(3.8)	0.0	(--)	10.4	(2.2)	83.1	(3.0)
Parasite treatment																
Doramectin	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.8	(0.4)	0.0	(--)	0.8	(0.4)
Ivermectin	0.0	(--)	0.8	(0.7)	0.0	(--)	0.0	(--)	0.0	(--)	16.5	(3.0)	0.0	(--)	17.3	(3.0)
Levamisole	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Any of the above parasite treatments	0.0	(--)	0.8	(0.7)	0.0	(--)	0.0	(--)	0.0	(--)	17.3	(3.0)	0.0	(--)	18.1	(3.0)
Other antimicrobial or parasite treatment	0.0	(--)	0.0	(--)	0.0	(--)	1.4	(0.9)	0.1	(0.1)	0.5	(0.3)	0.0	(--)	1.9*	(1.0)

*Total may not sum to “Any Reason” estimate due to rounding of specific antimicrobials by reason.

Percentage of Sites* that Gave Any Nursery-Age Pigs An Antimicrobial by Injection During the Previous 6 Months, by Primary Reason Given



*Sites with nursery-age pigs during the previous 12 months

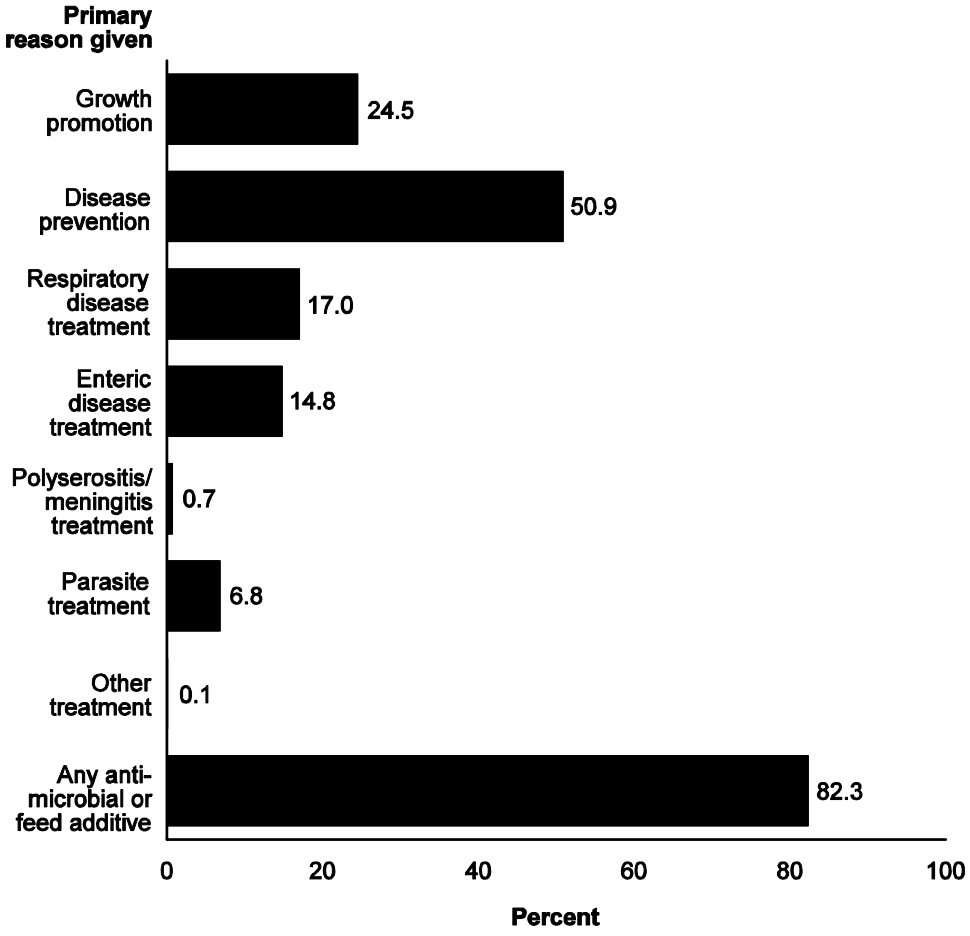
For sites with nursery-age pigs, 43.2 percent of sites administered chlortetracycline via feed during the previous 6 months. In addition, 31.1 percent of sites administered carbadox and 25.9 percent administered tiamulin via feed during the previous 6 months. The most common reason for giving antimicrobials in feed was disease prevention (50.9 percent of sites).

e. For sites with nursery-age pigs during the previous 12 months, percentage of sites that gave the following antimicrobials or feed additives to any nursery-age pigs via ***feed*** during the previous 6 months, by primary reason given:

	Percent Sites																	
	Primary Reason Given																	
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Polysero-sitis/ Meningitis Treatment		Parasite Treatment		Other Reason		Any Reason	
Antimicrobial or Feed Additive	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Amoxicillin	0.0	(--)	0.0	(--)	0.0	(--)	0.4	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	0.4	(0.4)
Arsanilic acid	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Bacitracin	4.8	(2.8)	0.8	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	0.1	(0.1)	0.0	(--)	5.7	(2.8)
Bacitracin zinc	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Bambermycin	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Carbadox	3.5	(1.5)	19.3	(3.3)	1.1	(0.6)	7.1	(1.7)	0.0	(--)	0.0	(--)	0.1	(0.1)	31.1	(3.7)
Chlortetracycline	10.0	(2.8)	21.4	(3.7)	11.3	(2.5)	0.5	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	43.2	(4.2)
Chlortetracycline/ sulfathiazole/ penicillin	0.6	(0.3)	4.3	(1.5)	2.2	(1.4)	1.5	(1.0)	0.0	(--)	0.0	(--)	0.0	(--)	8.5*	(2.3)
Chlortetracycline/ sulfamethazine/ penicillin	0.9	(0.7)	3.7	(1.4)	2.8	(1.6)	0.0	(--)	0.3	(0.3)	0.0	(--)	0.0	(--)	7.8*	(2.2)
Florfenicol	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Lincomycin	1.1	(0.8)	5.2	(1.8)	2.1	(0.8)	0.4	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	8.9*	(2.1)
Neomycin and Terramycin®	5.2	(2.9)	1.8	(1.0)	0.2	(0.2)	0.8	(0.5)	0.0	(--)	0.0	(--)	0.0	(--)	8.0	(3.1)
Oxytetracycline	0.8	(0.5)	1.0	(0.7)	2.4	(1.5)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	4.2	(1.7)
Ractopamine	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Roxarsone	0.3	(0.3)	0.2	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.5	(0.3)
Tiamulin	1.8	(1.0)	18.0	(3.6)	0.7	(0.5)	5.1	(2.0)	0.3	(0.3)	0.0	(--)	0.0	(--)	25.9	(3.9)
Tilmicosin	0.5	(0.5)	5.1	(1.6)	3.4	(1.6)	1.2	(1.1)	0.1	(0.1)	0.0	(--)	0.0	(--)	10.3	(2.5)
Tylosin	1.9	(1.0)	7.6	(2.2)	0.5	(0.5)	3.4	(1.5)	0.0	(--)	0.0	(--)	0.0	(--)	13.4	(2.8)
Tylosin and sulfamethazine	1.4	(0.8)	4.0	(1.9)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	5.4	(2.1)
Virginiamycin	0.3	(0.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	1.0	(1.0)	0.0	(--)	1.3	(1.0)
Other	1.0	(1.0)	2.8	(1.3)	0.1	(0.1)	0.1	(0.0)	0.0	(--)	5.7	(1.9)	0.0	(--)	9.7	(2.5)
Any antimicrobial or feed additive	24.5	(4.0)	50.9	(4.2)	17.0	(2.9)	14.8	(2.8)	0.7	(0.4)	6.8	(2.2)	0.1	(0.1)	82.3	(3.2)

*Sum of specific antimicrobials by reason may not sum to "Any Reason" estimate due to rounding.

Percentage of Sites* that Gave Any Nursery-Age Pigs an Antimicrobial or Feed Additive Via Feed During the Previous 6 Months, by Primary Reason Given



*Sites with nursery-age pigs during the previous 12 months

Antimicrobials were administered via feed to nursery-age pigs for growth promotion for an average of 32.4 days, while respiratory disease was treated for an average of 20.2 days.

f. For sites that gave any nursery-age pigs an antimicrobial or feed additive via ***feed*** during the previous 6 months, site average number of days given, by primary reason given:

Site Average (Days)

Primary Reason Given												
Growth Promotion		**Disease Prevention**		**Respiratory Disease Treatment**		**Enteric Disease Treatment**		**Polysero-sitis/ Meningitis Treatment**		**Parasite Treatment**		**Other Reason**	
Avg.	**Std. Err.**	**Avg.**	**Std. Err.**	**Avg.**	**Std. Err.**	**Avg.**	**Std. Err.**	**Avg.**	**Std. Err.**	**Avg.**	**Std. Err.**	**Avg.**	**Std. Error**
32.4	(3.2)	28.6	(1.6)	20.2	(2.0)	26.1	(3.8)	*		*		*	

*Estimate not reported due to small sample size.

The average number of days antimicrobials were administered to nursery-age pigs via feed ranged from 18.5 days for lincomycin to 32.8 days for tilmicosin.

g. For sites that gave the following antimicrobials to nursery-age pigs via ***feed*** during the previous 6 months, site average number of days given:

Antimicrobial*	**Site Average** (Days)	**Standard Error**
Carbadox	28.4	(2.2)
Chlortetracycline	29.4	(2.2)
Chlortetracycline/ sulfathiazole/ penicillin	23.7	(3.9)
Chlortetracycline/ sulfamethazine/ penicillin	21.5	(4.0)
Lincomycin	18.5	(2.7)
Tiamulin	27.8	(2.6)
Tilmicosin	32.8	(4.0)
Tylosin	25.7	(3.8)

*Estimates not reported for other antimicrobials due to small sample size.

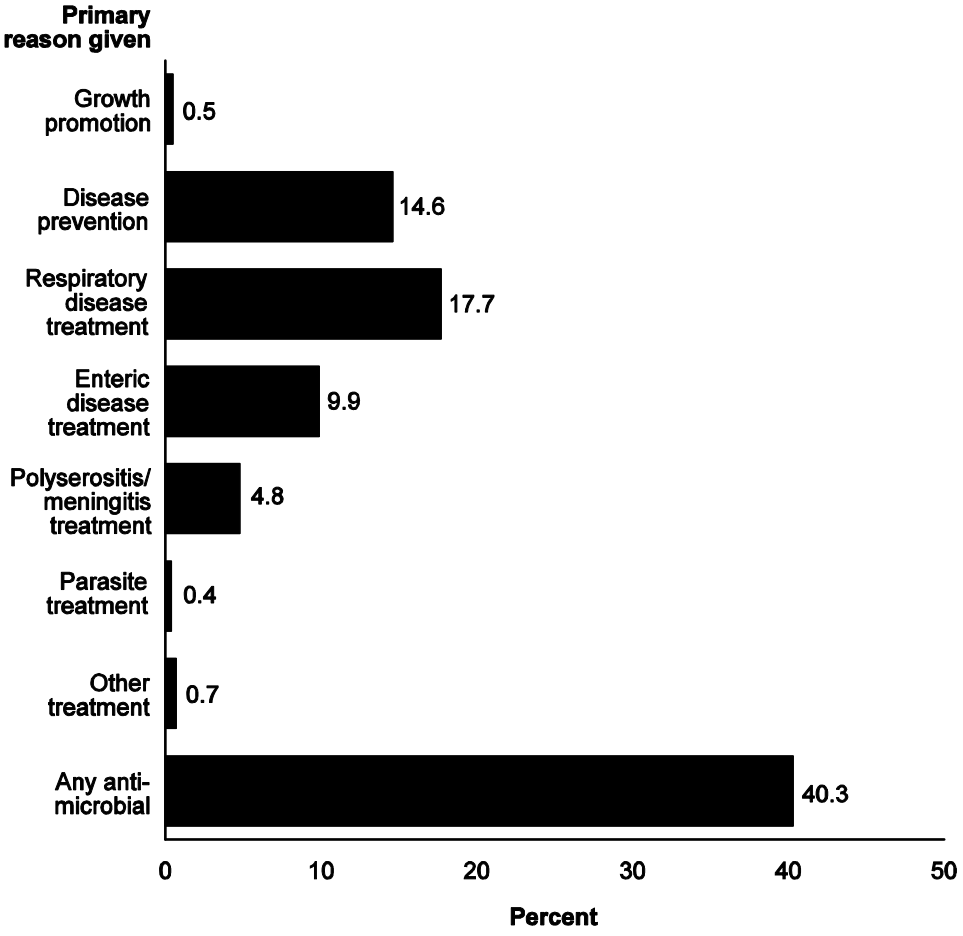
Overall, 40.3 percent of sites with nursery-age pigs administered an antimicrobial via water during the previous 6 months. Amoxicillin was the most common antimicrobial administered via water (19.1 percent of sites). Amoxicillin was given primarily for disease prevention (8.1 percent of sites), respiratory disease treatment (5.8 percent of sites), and polyserositis/meningitis treatment (4.4 percent of sites).

h. For sites with nursery-age pigs during the previous 12 months, percentage of sites that gave any nursery-age pigs the following antimicrobials via ***water*** during the previous 6 months, by primary reason given:

	Percent Sites															
	Primary Reason Given															
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Polyserositis/ Meningitis Treatment		Parasite Treatment		Other Reason		Any Reason	
Antimicrobial	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Amoxicillin	0.2	(0.2)	8.1	(2.2)	5.8	(2.1)	0.4	(0.2)	4.4	(1.4)	0.0	(--)	0.2	(0.2)	19.1	(3.1)
Bacitracin	0.2	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.2	(0.2)
Chlortetracycline	0.0	(--)	0.3	(0.3)	5.0	(1.8)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	5.4*	(1.8)
Chlortetracycline/ sulfathiazole/ penicillin	0.0	(--)	0.0	(--)	0.3	(0.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.3	(0.3)
Chlortetracycline/ sulfamethazine/ penicillin	0.0	(--)	0.5	(0.4)	0.0	(--)	0.6	(0.6)	0.0	(--)	0.0	(--)	0.0	(--)	1.1	(0.7)
Florfenicol	0.0	(--)	0.3	(0.3)	0.4	(0.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.7	(0.4)
Lincomycin	0.0	(--)	1.3	(0.6)	0.4	(0.4)	0.7	(0.7)	0.0	(--)	0.0	(--)	0.2	(0.1)	2.5*	(1.0)
Neomycin and terramycin	0.0	(--)	2.4	(1.3)	1.3	(0.7)	2.9	(1.4)	0.0	(--)	0.0	(--)	0.0	(--)	6.5*	(2.0)
Oxytetracycline	0.0	(--)	0.5	(0.3)	3.7	(1.5)	0.9	(0.9)	0.0	(--)	0.0	(--)	0.0	(--)	5.1	(1.7)
Tiamulin	0.0	(--)	0.2	(0.2)	1.0	(0.6)	1.9	(1.4)	0.0	(--)	0.0	(--)	0.0	(--)	3.2*	(1.5)
Tylosin	0.0	(--)	0.0	(--)	0.3	(0.3)	0.6	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	0.9	(0.5)
Tylosin and sulfamethazine	0.0	(--)	0.1	(0.1)	1.7	(1.6)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	1.8	(1.6)
Other	0.1	(0.1)	4.1	(1.5)	3.2	(1.3)	3.3	(1.3)	1.3	(0.9)	0.4	(0.4)	0.4	(0.4)	12.9*	(2.5)
Any antimicrobial*	0.5	(0.3)	14.6	(2.8)	17.7	(3.2)	9.9	(2.3)	4.8	(1.5)	0.4	(0.4)	0.7	(0.4)	40.3	(4.0)

*Sum of specific antimicrobials-by-reason may not sum to “Any Reason” estimate due to rounding.

Percentage of Sites* that Gave Any Nursery-Age Pigs An Antimicrobial Via Water During the Previous 6 Months, by Primary Reason Given



*Sites with nursery-age pigs during the previous 12 months

Antimicrobials were administered to nursery-age pigs via water to prevent disease for an average of 13.6 days, to treat respiratory disease for an average of 12.5 days, and to treat enteric disease for an average of 8.3 days.

i. For sites that gave any antimicrobials or feed additives to any nursery-age pigs via ***water*** during the previous 6 months, site average number of days given, by primary reason given:

Site Average (Days)

Primary Reason						
Growth Promotion	**Disease Prevention**	**Respiratory Disease Treatment**	**Enteric Disease Treatment**	**Polysero-sitis/ Meningitis Treatment**	**Parasite Treatment**	**Other Reason**
Std. Avg. Error	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**
*	13.6 (2.4)	12.5 (2.2)	8.3 (1.0)	*	*	*

*Estimate not reported due to small sample size.

When amoxicillin was administered to nursery-age pigs via water, it was given an average of 16.6 days.

j. For sites that gave the following antimicrobials to any nursery-age pigs via ***water*** during the previous 6 months, site average number of days given:

Antimicrobial*	**Site Average** (Days)	**Standard Error**
Amoxicillin	16.6	(2.2)
Chlortetracycline	9.8	(3.2)

*Estimates not reported for other antimicrobials due to small sample size.

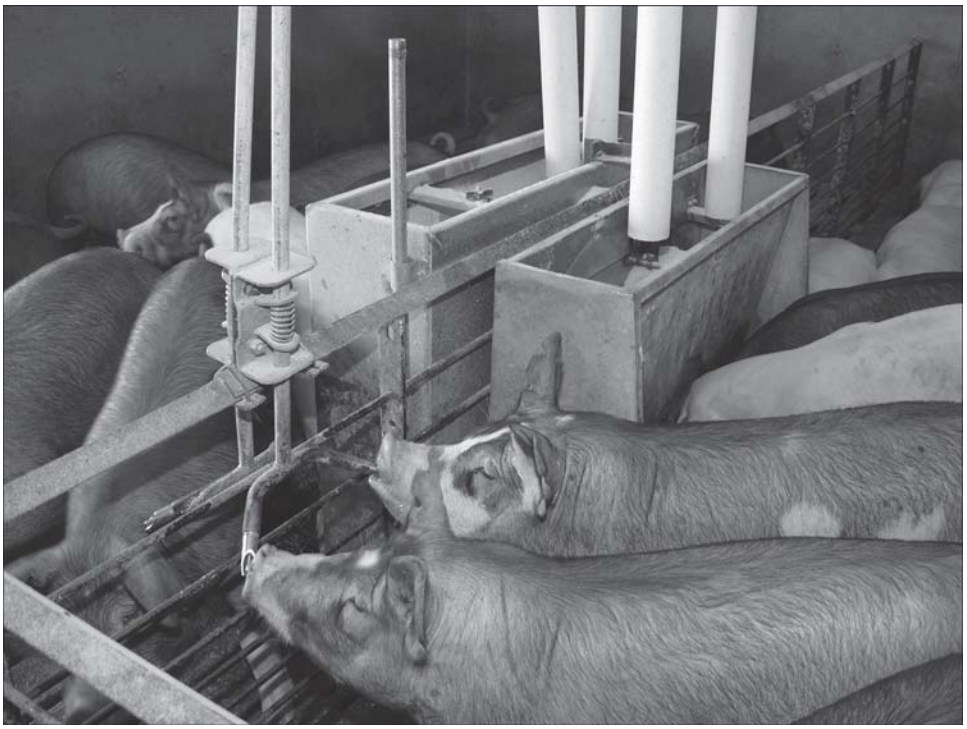


Photo courtesy of National Pork Board

2. Grower/finisher pigs

Overall, 20.1 percent of sites with grower/finisher pigs did not have clinical respiratory disease in these pigs during the previous 12 months. For grower/finisher pigs affected by respiratory disease, the most common course of action was to give all pigs in the entire room antimicrobials.

a. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that used the following courses of action for their most recent occurrence of respiratory disease in grower/finisher pigs during the previous 12 months, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Action	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Did not treat any pigs with antimicrobials	5.4	(2.2)	3.3	(2.0)	0.0	(--)	4.3	(1.5)
Treated only clinically ill pigs with antimicrobials	27.9	(4.1)	22.8	(4.8)	30.7	(6.6)	27.3	(3.2)
Treated all pigs in same pen with clinically ill pigs with antimicrobials	2.8	(1.4)	4.5	(3.2)	0.8	(0.7)	2.9	(1.2)
Treated all pigs in same pen and adjacent pens with antimicrobials	3.0	(1.6)	0.3	(0.3)	0.0	(--)	2.1	(1.1)
Treated all pigs in entire room with clinically ill pigs with antimicrobials	34.8	(4.9)	65.1	(5.5)	57.6	(7.0)	43.3	(3.6)
Have not had clinical respiratory disease	26.1	(4.1)	4.0	(1.6)	10.9	(3.8)	20.1	(2.9)
Total	100.0		100.0		100.0		100.0	

The owner of the operation was the primary decision-maker regarding antimicrobial usage in sick grower/finisher pigs on 67.9 percent of small sites and 29.0 percent of large sites. Large sites were more likely than small sites to use a company nutritionist or company veterinarian for antimicrobial decisions.

b. For sites with grower/finisher pigs during the previous 12 months, percentage of sites by person primarily responsible for deciding which antimicrobials were used to ***treat*** sick grower/finisher pigs, by size of site:

Percent Sites

Size of Site (Total Inventory)

Primary Decision-Maker*	Small (Fewer than 2,000) Pct.	Std. Error	Medium (2,000-4,999) Pct.	Std. Error	Large (5,000 or More) Pct.	Std. Error	All Sites Pct.	Std. Error
Owner of operation	67.9	(4.4)	40.1	(5.4)	29.0	(6.2)	57.7	(3.5)
Farm manager, not the owner	7.9	(2.7)	14.4	(5.1)	8.9	(5.2)	9.3	(2.5)
Local veterinary practitioner	7.5	(2.2)	8.2	(2.7)	11.0	(4.0)	8.1	(1.7)
Consulting or second-opinion veterinarian	2.7	(1.8)	3.7	(2.2)	3.8	(1.8)	3.0	(1.3)
Company veterinarian or company nutritionist	6.6	(2.2)	17.2	(3.7)	28.8	(6.3)	11.4	(1.9)
Service manager who oversees more than one site	6.6	(2.3)	16.1	(3.5)	18.5	(5.4)	9.9	(1.8)
Other	0.0	(--)	0.3	(0.3)	0.0	(--)	0.1	(0.1)
Did not use antimicrobials for sickness in grower/finisher pigs	0.8	(0.5)	0.0	(--)	0.0	(--)	0.5	(0.4)
Total	100.0		100.0		100.0		100.0	

*The owner and farm manager categories do not reflect whether or not antimicrobial decision protocols were developed with veterinary input.

As was the case with sick pigs (table b), the owner of the operation was the primary decision-maker on the majority of sites regarding which antimicrobials to use for growth promotion in grower/finisher pigs.

c. For sites with grower/finisher pigs during the previous 12 months, percentage of sites by person primarily responsible for deciding which antimicrobials were used in grower/finisher pigs for ***growth promotion,*** by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Primary Decision-Maker*	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Owner of operation	67.0	(4.5)	41.8	(5.4)	33.9	(6.4)	58.1	(3.6)
Farm manager, not the owner	6.1	(2.5)	9.1	(4.3)	0.6	(0.6)	6.0	(2.2)
Local veterinary practitioner	3.8	(1.7)	3.6	(1.8)	7.5	(3.4)	4.2	(1.3)
Consulting or second-opinion veterinarian	1.2	(0.9)	3.6	(2.2)	1.2	(0.8)	1.7	(0.8)
Company veterinarian or company nutritionist	12.9	(3.2)	24.6	(4.3)	49.9	(6.8)	19.7	(2.6)
Service manager who oversees more than one site	2.0	(1.3)	4.7	(1.8)	4.6	(2.5)	2.8	(1.0)
Other	0.3	(0.3)	1.6	(1.3)	0.0	(--)	0.5	(0.3)
Did not use antimicrobials for growth promotion in grower/finisher pigs	6.7	(1.9)	11.0	(3.7)	2.3	(1.8)	7.0	(1.5)
Total	100.0		100.0		100.0		100.0	

*The owner and farm manager categories do not reflect whether or not antimicrobial decision protocols were developed with veterinary input.

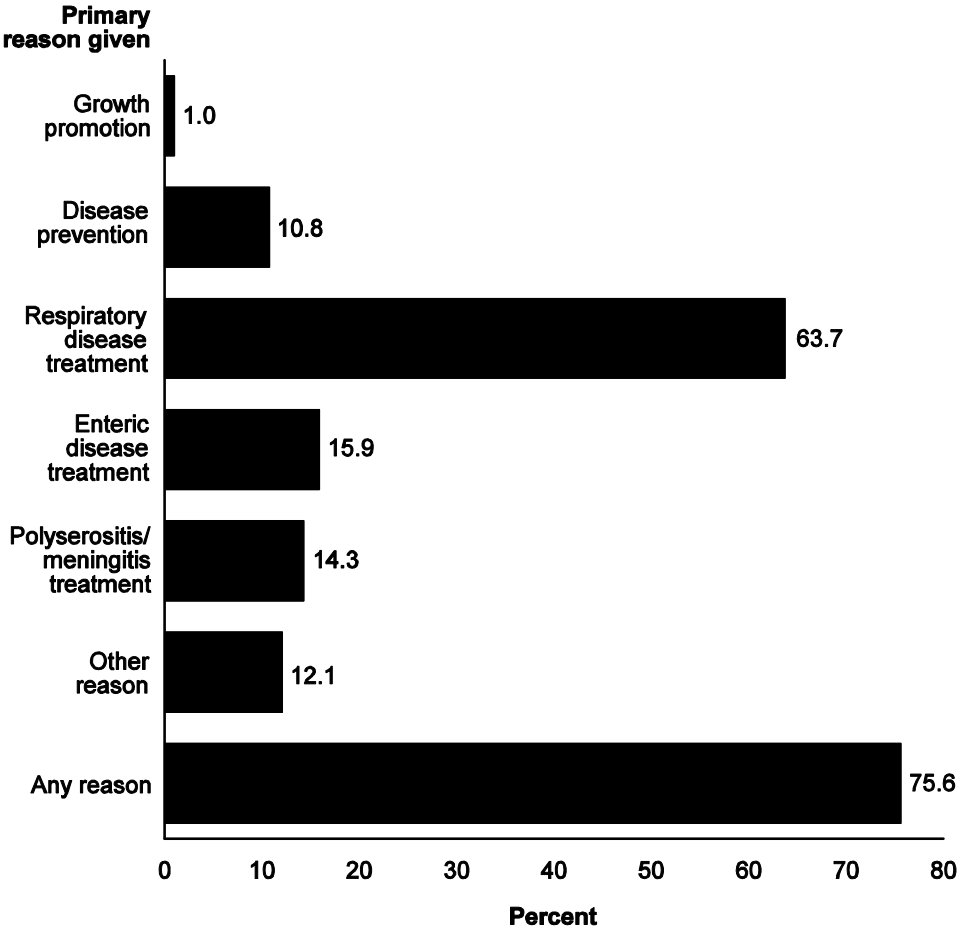
The most common antimicrobials given by injection to grower/finisher pigs were procaine penicillin G (46.6 percent of sites) and ceftiofur (42.1 percent of sites). The most common reason for administering injectable antimicrobials to grower/finisher pigs was to treat respiratory disease (63.7 percent of sites).

d. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that gave any grower/finisher pigs the following antimicrobials or parasite treatments by ***injection*** during the previous 6 months, by primary reason given:

	Percent Sites															
	Primary Reason Given															
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Polysero-sitis/ Meningitis Treatment		Parasite Treatment		Other Reason		Any Reason	
Product Given	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Antimicrobial																
Ampicillin	0.0	(--)	0.9	(0.6)	2.5	(1.0)	0.1	(0.1)	3.0	(1.1)	0.0	(--)	0.5	(0.3)	6.9*	(1.6)
Amoxicillin	0.0	(--)	0.6	(0.5)	5.4	(1.9)	0.5	(0.5)	1.4	(0.7)	0.0	(--)	0.6	(0.4)	8.5	(2.2)
Ceftiofur	0.0	(--)	3.4	(1.8)	36.3	(3.2)	0.4	(0.4)	1.9	(0.8)	0.0	(--)	0.1	(0.1)	42.1	(3.5)
Erythromycin	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Florfenicol	0.0	(--)	0.1	(0.1)	5.9	(1.5)	0.0	(--)	1.3	(1.2)	0.0	(--)	0.0	(--)	7.3	(1.9)
Gentamycin	0.0	(--)	0.0	(0.0)	1.2	(0.7)	2.0	(1.3)	0.0	(--)	0.0	(--)	0.0	(--)	3.2	(1.4)
Lincomycin	0.0	(--)	0.9	(0.5)	7.0	(1.6)	1.1	(0.7)	2.8	(1.1)	0.0	(--)	2.4	(1.1)	14.2	(2.3)
Oxytetracycline	0.0	(--)	1.1	(0.7)	18.8	(2.8)	0.2	(0.1)	0.2	(0.2)	0.0	(--)	0.1	(0.1)	20.4	(2.9)
Procaine penicillin G	0.0	(--)	4.1	(1.4)	31.1	(3.4)	0.1	(0.1)	5.1	(1.6)	0.0	(--)	6.2	(1.5)	46.6	(3.6)
Penicillin benzathine	0.0	(--)	2.1	(1.0)	8.1	(2.5)	0.3	(0.2)	1.6	(0.9)	0.0	(--)	1.9	(1.2)	13.9*	(3.0)
Spectinomycin	0.0	(--)	0.0	(--)	2.9	(1.1)	1.9	(1.1)	0.6	(0.6)	0.0	(--)	0.0	(--)	5.4	(1.8)
Tylosin	1.0	(0.6)	1.1	(0.5)	5.6	(1.6)	12.9	(2.4)	0.6	(0.4)	0.0	(--)	2.5	(1.2)	23.7	(3.0)
Tulathromycin	0.0	(--)	0.6	(0.3)	10.2	(2.1)	0.0	(--)	0.0	(--)	0.0	(--)	0.3	(0.3)	11.0*	(2.1)
Any of the above antimicrobials	1.0	(0.6)	10.8	(2.5)	63.7	(3.6)	15.9	(2.7)	14.3	(2.5)	0.0	(--)	12.1	(2.3)	75.6	(3.3)
Parasite treatment																
Doramectin	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.7	(0.4)	0.0	(--)	0.7	(0.4)
Ivermectin	0.0	(--)	0.5	(0.5)	0.3	(0.3)	0.0	(--)	0.0	(--)	6.9	(2.4)	0.0	(--)	7.7	(2.5)
Levamisole	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	2.9	(2.1)	0.0	(--)	2.9	(2.1)
Any of the above parasite treatments	0.0	(--)	0.5	(0.5)	0.3	(0.3)	0.0	(--)	0.0	(--)	7.5	(2.4)	0.0	(--)	8.0	(2.5)
Other antimicrobial or parasite treatment	0.0	(--)	0.2	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	0.3	(0.3)	0.0	(--)	0.5	(0.3)

*Sum of specific antimicrobials by reason may not sum to "Any Reason" estimate due to rounding.

Percentage of Sites* that Gave an Antimicrobial by Injection to Any Grower/ Finisher Pigs During the Previous 6 Months, by Primary Reason Given



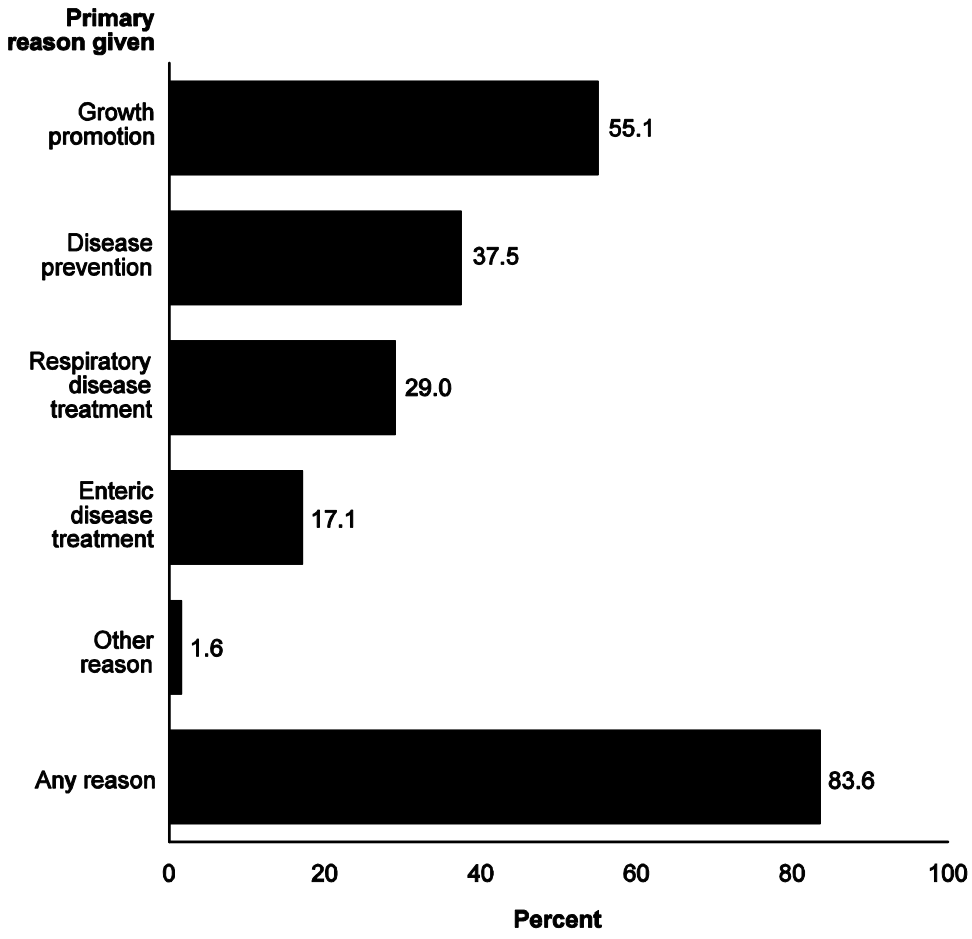
*Sites with grower/finisher pigs during the previous 12 months

Parasite treatments were administered to grower/finisher pigs via feed on 19.9 percent of sites, the most common being fenbendazole. About half of sites with grower/finisher pigs (55.1 percent) administered an antimicrobial or feed additive via feed for growth promotion. The most common products administered via feed to grower/finisher pigs were chlortetracycline (52.6 percent of sites), tylosin (44.2 percent of sites), bacitracin (29.1 percent of sites), and ractopamine (28.0 percent of sites).

e. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that gave the following antimicrobials, parasite treatments, or feed additives to any grower/finisher pigs via ***feed*** during the previous 6 months, by primary reason given:

	Percent Sites															
	Primary Reason Given															
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Polysero-sitis/ Meningitis Treatment		Parasite Treatment		Other Reason		Any Reason	
Product	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Antimicrobial or feed additive																
Amoxicillin	0.0	(--)	0.9	(0.9)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.9	(0.9)
Arsanilic acid	0.0	(--)	0.3	(0.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.3	(0.3)
Bacitracin	25.7	(3.5)	1.5	(0.9)	0.6	(0.5)	1.4	(0.7)	0.0	(--)	0.0	(--)	0.0	(--)	29.1*	(3.6)
Bacitracin zinc	0.5	(0.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.5	(0.3)
Bambermycin	0.5	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.5	(0.4)
Carbadox	4.4	(1.1)	3.6	(1.1)	0.0	(--)	3.4	(1.8)	0.0	(--)	0.0	(--)	0.0	(--)	11.4	(2.3)
Chlortetracycline	11.5	(2.4)	18.5	(2.6)	22.3	(3.4)	0.3	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	52.6	(3.6)
Chlortetracycline/ sulfathiazole/ penicillin	0.1	(0.1)	0.7	(0.4)	2.1	(1.1)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	2.8*	(1.1)
Chlortetracycline/ sulfamethazine/ penicillin	0.8	(0.6)	0.2	(0.2)	1.2	(0.9)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	2.2	(1.1)
Florfenicol	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Hygromycin B	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Lincomycin	0.7	(0.5)	2.8	(0.8)	1.6	(0.6)	2.4	(1.2)	0.0	(--)	0.0	(--)	0.0	(--)	7.5	(1.6)
Neomycin and Terramycin	1.6	(0.8)	2.7	(0.7)	0.8	(0.6)	1.7	(0.6)	0.0	(--)	0.0	(--)	0.7	(0.7)	7.4	(1.4)
Oxytetracycline	0.7	(0.4)	2.2	(1.1)	2.2	(1.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	5.1	(1.7)
Ractopamine	27.9	(3.5)	0.0	(--)	0.0	(--)	0.1	(0.1)	0.0	(--)	0.0	(--)	0.0	(--)	28.0	(3.5)
Roxarsone	0.3	(0.3)	0.0	(--)	0.6	(0.5)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.8*	(0.6)
Tiamulin	2.3	(1.8)	4.9	(1.5)	2.0	(0.8)	1.0	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	10.1*	(2.4)
Tilmicosin	0.0	(--)	5.1	(1.7)	1.4	(0.6)	0.5	(0.5)	0.0	(--)	0.0	(--)	0.0	(--)	7.0	(2.0)
Tylosin	13.3	(2.4)	13.0	(2.2)	4.9	(1.3)	11.3	(2.8)	0.0	(--)	0.0	(--)	1.6	(1.1)	44.2*	(3.6)
Tylosin and sulfamethazine	0.5	(0.4)	0.2	(0.1)	0.8	(0.5)	1.5	(0.8)	0.0	(--)	0.0	(--)	0.0	(--)	2.9*	(1.1)
Virginiamycin	4.4	(1.2)	2.9	(0.7)	0.0	(--)	0.1	(0.0)	0.0	(--)	0.0	(--)	0.0	(--)	7.4	(1.3)
Any of the above antimicrobial or feed additive	55.1	(3.6)	37.5	(3.4)	29.0	(3.5)	17.1	(3.2)	0.0	(--)	0.0	(--)	1.6	(1.1)	83.6	(2.5)
Parasite treatment																
Dichlorvos	0.1	(0.1)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.1	(0.1)
Fenbendazole	0.0	(--)	0.1	(0.1)	0.0	(--)	0.1	(0.1)	0.0	(--)	12.2	(3.0)	0.0	(--)	12.3*	(3.0)
Ivermectin	0.0	(--)	1.5	(0.9)	0.0	(--)	0.1	(0.1)	0.0	(--)	2.9	(1.0)	0.0	(--)	4.5	(1.3)
Levamisole	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Pyrantel tartrate	0.1	(0.1)	0.0	(--)	0.0	(--)	0.1	(0.1)	0.0	(--)	4.8	(2.0)	0.0	(--)	4.9*	(2.0)
Any of the above parasite treatments	0.2	(0.1)	1.6	(0.9)	0.0	(--)	0.1	(0.1)	0.0	(--)	18.0	(3.4)	0.0	(--)	19.9	(3.5)
Other antimicrobial, feed additive, or	0.5	(0.4)	0.8	(0.6)	0.4	(0.4)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	1.6*	(0.8)

Percentage of Sites* that Gave an Antimicrobial or Feed Additive to Any Grower/Finisher Pigs Via Feed During the Previous 6 Months, by Primary Reason Given



*Sites with Grower/Finisher Pigs During the Previous 12 Months

Parasite treatments were administered to grower/finisher pigs via feed for an average of 16.1 days, while medications for growth promotion were administered for an average of 62.3 days.

f. For sites that gave an antimicrobial, parasite treatment, or feed additive to any grower/finisher pigs via ***feed*** during the previous 6 months, site average number of days given, by primary reason given:

Site Average (Days)

Primary Reason Given						
Growth Promotion	**Disease Prevention**	**Respiratory Disease Treatment**	**Enteric Disease Treatment**	**Polysero-sitis/ Meningitis Treatment**	**Parasite Treatment**	**Other Reason**
Std. Avg. Error	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**
62.3 (4.0)	38.4 (3.6)	27.3 (3.7)	40.8 (6.4)	NA*	16.1 (2.9)	NA*

*Estimate not reported due to small sample size.

When bacitracin or virginiamycin were administered to grower/finisher pigs via feed, they were given for more than 70 days on average.

g. For sites that gave the following antimicrobials, parasite treatments, or feed additives to any grower/finisher pigs via ***feed*** during the previous 6 months, site average number of days given:

Antimicrobial, Feed Additive, or Parasite Treatment*	**Site Average** (Days)	**Standard Error**
Bacitracin	76.8	(5.9)
Carbadox	37.2	(10.3)
Chlortetracycline	41.5	(4.3)
Fenbendazole	14.7	(3.5)
Lincomycin	22.7	(3.6)
Neomycin and Terramycin	18.2	(2.5)
Ractopamine	32.6	(2.4)
Tiamulin	35.6	(6.5)
Tylosin	48.8	(4.1)
Virginiamycin	75.2	(6.8)

*Estimates for other antimicrobials not reported due to small sample size.

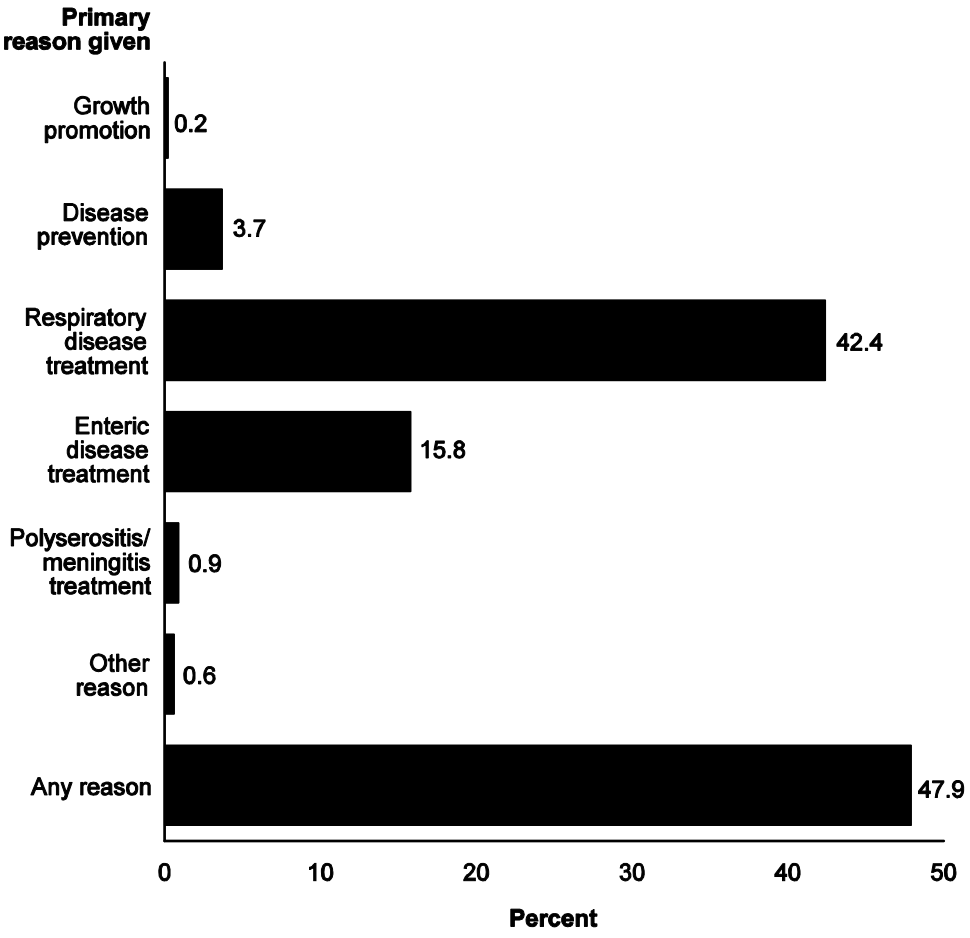
The most common reasons sites with grower/finisher pigs used antimicrobials in water were to treat respiratory disease (42.4 percent of sites) followed by treating enteric disease (15.8 percent of sites).

h. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that gave the following antimicrobials or parasite treatments to any grower/finisher pigs via ***water*** during the previous 6 months, by the primary reason given:

	Percent Sites															
	Primary Reason Given															
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Polysero-sitis/ Meningitis Treatment		Parasite Treatment		Other Reason		Any Reason	
Product	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Antimicrobial																
Bacitracin	0.0	(--)	0.0	(--)	0.0	(--)	0.3	(0.3)	0.3	(0.3)	0.0	(--)	0.0	(--)	0.5*	(0.4)
Chlortetracycline	0.0	(--)	1.4	(0.5)	17.4	(2.4)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	18.8	(2.5)
Florfenicol	0.0	(--)	0.2	(0.2)	0.8	(0.5)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	1.0	(0.6)
Lincomycin and Spectinomycin	0.0	(--)	0.5	(0.3)	3.8	(1.6)	1.1	(0.7)	0.0	(--)	0.0	(--)	0.0	(--)	5.4	(1.7)
Neomycin	0.0	(--)	0.9	(0.5)	2.8	(1.8)	7.0	(1.3)	0.0	(--)	0.0	(--)	0.0	(--)	10.7	(2.2)
Oxytetracycline	0.0	(0.0)	0.8	(0.4)	12.9	(2.2)	2.0	(1.7)	0.0	(--)	0.0	(--)	0.4	(0.3)	16.2*	(2.6)
Penicillin G potassium	0.0	(--)	0.3	(0.3)	3.3	(1.2)	0.0	(0.0)	0.7	(0.4)	0.0	(--)	0.0	(--)	4.4*	(1.5)
Spectinomycin	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Sulfachlorpyri-dazine	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)
Sulfadimethoxine	0.0	(--)	0.0	(--)	3.9	(1.4)	0.2	(0.1)	0.0	(--)	0.0	(--)	0.4	(0.3)	4.5	(1.4)
Sulfamethazine	0.0	(--)	0.0	(--)	6.4	(1.3)	0.0	(--)	0.0	(--)	0.0	(--)	0.1	(0.1)	6.5	(1.3)
Tetracycline	0.0	(--)	0.7	(0.4)	7.3	(1.7)	0.6	(0.6)	0.0	(--)	0.0	(--)	0.0	(--)	8.6	(1.8)
Tiamulin	0.0	(--)	0.0	(--)	1.8	(0.7)	4.9	(1.9)	0.0	(--)	0.0	(--)	0.0	(--)	6.7	(2.0)
Tylosin	0.1	(0.1)	0.6	(0.3)	2.2	(1.5)	9.1	(1.9)	0.0	(--)	0.0	(--)	0.0	(--)	12.0	(2.4)
Any of the above antimicrobials	0.2	(0.1)	3.7	(0.9)	42.4	(3.5)	15.8	(2.7)	0.9	(0.5)	0.0	(--)	0.6	(0.4)	47.9	(3.6)
Parasite treatment																
Levamisole	0.0	(--)	0.0	(0.0)	0.0	(--)	0.0	(--)	0.0	(--)	0.2	(0.1)	0.0	(--)	0.2	(0.1)
Piperazine	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	1.5	(0.7)	0.0	(--)	1.5	(0.7)
Any of the above parasite treatments	0.0	(--)	0.0	(0.0)	0.0	(--)	0.0	(--)	0.0	(--)	1.7	(0.7)	0.0	(--)	1.8*	(0.7)
Other	0.1	(0.1)	0.7	(0.4)	5.4	(1.5)	1.4	(0.8)	1.1	(0.6)	0.0	(--)	0.0	(--)	8.7	(1.8)

*Sum of specific antimicrobials by reason may not sum to “Any Reason” estimate due to rounding.

Percentage of Sites* that Gave an Antimicrobial to Any Grower/Finisher Pigs Via Water During the Previous 6 Months, by Primary Reason Given



*Sites with Grower/Finisher Pigs During the Previous 12 Months

On average, antimicrobials were administered to grower/finisher pigs via water to treat respiratory disease for 10.1 days, while enteric disease was treated for 6.4.

i. For sites that gave any antimicrobials or parasite treatments to grower/finisher pigs via ***water*** during the previous 6 months, site average number of days given, by primary reason given:

Site Average (Days)

Primary Reason						
Growth Promotion	**Disease Prevention**	**Respiratory Disease Treatment**	**Enteric Disease Treatment**	**Polysero-sitis/ Meningitis Treatment**	**Parasite Treatment**	**Other Reason**
Std. Avg. Error	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**	**Std. Avg. Error**
*NA	10.4 (2.3)	10.1 (0.9)	6.4 (0.7)	*NA	*NA	*NA

*Estimates not reported due to small sample size.

Tylosin, which was used most frequently to treat enteric disease (table h), was administered to grower/finisher pigs via water for a shorter average number of days than oxytetracycline, which was used most frequently to treat respiratory disease.

j. For sites that gave the following antimicrobials to grower/finisher pigs via ***water*** during the previous 6 months, site average number of days given:

Antimicrobial*	**Site Average** (Days)	**Standard Error**
Chlortetracycline	8.8	(1.0)
Neomycin	6.9	(1.1)
Oxytetracycline	11.5	(1.4)
Penicillin G	4.6	(0.6)
Sulfamethazine	7.3	(1.3)
Tetracycline	7.4	(0.9)
Tiamulin	6.5	(1.6)
Tylosin	5.8	(0.6)

*Other antimicrobials not reported due to small sample size.

H. Other management practices

1. Split-sex feeding

Split-sex feeding in the nursery occurred on 9.3 percent of sites with nursery-age pigs. There were no differences in split sex feeding by size of site, when considering the relatively large standard errors.

a. For sites with nursery-age pigs during the previous 12 months, percentage of sites that practiced split-sex feeding* in the ***nursery phase,*** by size of site:

Percent Sites

Size of Site (Total Inventory)							
Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
6.9	(3.0)	9.9	(3.7)	24.2	(7.1)	9.3	(2.4)

*Most nursery-age males and females are fed different rations.

On average, split-sex feeding in the nursery was initiated when pigs were 3.7 weeks of age.

b. For sites that practiced split-sex feeding in ***nursery phase,*** site average age (in weeks) when split-sex feeding started:

Site Average (Weeks)	**Standard Error**
3.7	(0.5)

Split-sex feeding was a more common practice used for grower/finisher pigs than for nursery-age pigs; 29.6 percent of sites with grower/finisher pigs practicing split-sex feeding compared to 9.3 percent of sites with nursery-age pigs (table a). A higher percentage of medium sites practiced split-sex feeding compared to small sites (45.7 and 22.9 percent, respectively). Large sites did not differ from medium and small sites, when considering the relatively large standard error.

c. For sites with grower/finisher pigs during the previous 12 months, percentage of sites that practiced split-sex feeding in the ***grower/finisher phase,*** by size of site:

Percent Sites							
Size of Site (Total Inventory)							
Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
22.9	(3.9)	45.7	(5.5)	42.0	(6.8)	29.6	(3.1)

Split-sex feeding in the grower/finisher phase started at 9.9 weeks of age on average.

d. For sites that practiced split-sex feeding in the ***grower/finisher phase,*** site average age (in weeks) when split-sex feeding started:

Site Average (Weeks)	**Standard Error**
9.9	(0.4)

2. Re-sorting pigs

Overall, 31.1 percent of sites with grower/finisher pigs re-sorted the pigs at least once. A smaller percentage of large sites (10.1 percent) re-sorted pigs compared to small and medium sites (34.2 and 33.3 percent, respectively).

For sites with grower/finisher pigs during the previous 12 months, percentage of sites by the number of times pigs were usually re-sorted from 60 pounds until market weight, by size of site:

Percent Sites

Size of Site (Total Inventory)

Number Times Re-sorted	Small (Fewer than 2,000)		Medium (2,000-4,999)		Large (5,000 or More)		All Sites	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
0	65.8	(4.3)	66.7	(5.5)	89.9	(4.1)	68.9	(3.2)
1	22.1	(3.7)	22.6	(5.3)	4.4	(3.3)	20.0	(2.9)
2	7.3	(2.0)	6.2	(2.5)	5.7	(2.6)	6.9	(1.5)
3 or more	4.8	(1.9)	4.5	(2.0)	0.0	(--)	4.2	(1.3)
Total	100.0		100.0		100.0		100.0	

3. Feed supplements

Nearly all sites with grower/finisher pigs (96.1 percent) supplemented feed with soybean meal or other vegetable protein sources. A higher percentage of large and medium sites supplemented feed with animal and/or vegetable fat compared to small sites.

Percentage of sites that included the following supplements or feed types in any of the grower/finisher diets, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Supplement	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Fish meal*	9.6	(2.5)	13.9	(3.2)	16.7	(5.4)	11.3	(2.0)
Meat or bone meal	17.7	(3.9)	23.0	(5.0)	11.6	(4.1)	18.0	(2.9)
Soybean meal or other vegetable protein source	95.8	(1.9)	98.2	(0.6)	94.1	(2.6)	96.1	(1.4)
Other protein sources**	10.1	(2.7)	16.8	(4.1)	9.5	(4.1)	11.3	(2.1)
Bakery/food manufacture byproducts (not table waste)***	7.3	(2.1)	29.9	(4.6)	20.7	(5.6)	13.2	(1.9)
Animal and/or vegetable fat	41.8	(4.9)	66.9	(5.4)	66.8	(6.5)	49.7	(3.7)
Distillers' dried grain	30.5	(4.7)	41.7	(5.3)	39.1	(6.8)	33.7	(3.5)

*13.6 percent "Don't Know."
**9.6 percent "Don't Know."
***74. percent "Don't Know."

Section II: Methodology

A. Needs Assessment

During the needs assessment phase of the NAHMS Swine 2006 study, input was sought from stakeholders regarding the critical swine production and health information needs of the swine industry. These stakeholders included producers, industry associations, researchers, and government agencies. A needs assessment questionnaire was developed to facilitate input by a variety of groups. The primary sources utilized in the needs assessment were the National Pork Board (NPB) and the American Association of Swine Veterinarians (AASV).

The NPB needs assessment questionnaire for NAHMS Swine 2006 was included in the October 20, 2005, Pork Leader Letter. This letter and a questionnaire were distributed by conventional mail and by e-mail to 2,800 and 5,000 subscribers, respectively.

The AASV needs assessment questionnaire for NAHMS Swine 2006 was included in the November 2, 2005, AASV newsletter. This newsletter was also distributed by mail and by e-mail to approximately 440 practitioners and 700 newsletter subscribers.

In addition, between November 1 and 30, 2005, a letter of introduction and questionnaire were e-mailed to government contacts at the Centers for Disease Control; APHIS in Riverdale, MD; National Veterinary Services Laboratories; Centers for Epidemiology and Animal Health; regional epidemiologists; area veterinarians in charge; and the Food Safety Inspection Service. Overall, there were 528 responses to the Needs Assessment questionnaire.

1. Number of respondents, by respondent type

Nearly half respondents (46.4 percent) characterized themselves as producers:

Respondent Type	Frequency	Percent Respondents
Producer	245	46.4
Practitioner	206	39.0
Researcher	22	4.2
Federal or State government	16	3.0
Other allied industry	21	4.0
Unknown	18	3.4
Total	528	100.0

B. Sampling and Estimation

1. State selection

A goal for NAHMS' national studies is to include States that represent at least 70 percent of the animal and producer population in the United States. This study focuses on operations with 100 or more hogs. Information from the National Agricultural Statistics Service (NASS) December 28, 2004, "Hog and Pig" report for numbers of hogs and pigs and the January 1, 2005, "Farms and Land in Farms" report for number of operations with 100 or more hogs was used to select States. The NASS hog and pig estimation program collects data quarterly from producers in 17 States* and annually in all States. These 17 States accounted for 94.0 percent of the December 1, 2004, U.S. swine inventory for operations with 100 or more hogs and 94.2 percent of U.S. operations with 100 or more hogs (See Appendix II for data on individual States, updated to June 1, 2006, inventory and number of operations in 2006.) An additional advantage of selecting these 17 States is that NASS' list frame is more complete due to the more frequent contact with producers.

2. Operation selection

In the Swine 2000 and 2006 surveys, an evaluation of the U.S. total inventory and number of operations revealed that operations with 1 to 99 pigs accounted for 60.3 percent of pig operations in the 17 participating States but just 1.0 percent of total pig inventory. Because this segment of the industry represented such a small percentage of the total U.S. inventory, it was ineligible for the study. Therefore, larger operations representing 99.0 percent of the pig inventory were selected.

NASS chose a stratified random sample of 5,006 operations selected from their list sampling frame comprised of independent and contract producers. Stratification was based on State and herd size. Larger operations were selected with a higher probability of being included in the sample in order to reduce variability. Operations with 100 or more pigs were eligible for an on-site interview. At the first interview, if operations had multiple production sites under different day-to-day management, a maximum of three sites were randomly selected (one with breeding animals and two with weaned pigs).

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

3. Population inferences

Inferences cover the population of swine operations with 100 or more total pigs in the 17 participating States for all phases of data collection. Appendix II shows that these States accounted for 93.6 percent of operations with 100 or more pigs and 94.2 percent of the U.S. pig inventory on operations with 100 or more pigs (based upon the June 1, 2006, inventory and 2006 number of operations). All respondent data were statistically weighted to reflect the population from which they were selected. The inverse of probability of selection for each operation was the initial selection weight. This selection weight was adjusted for nonresponse within each region and size group to allow for inferences back to the original population from which the sample was selected. This weight was adjusted further for the number of separate sites each operation had, relative to the number of sites that responded to the survey.

C. Data Collection

1. General Swine Farm Report, July 17 – September 15, 2006

NASS enumerators administered the General Swine Farm Report questionnaire in person with each selected producer that agreed to participate in the study. The interview took approximately 1 hour. For producers that had 100 or more head on June 1, 2006, NASS enumerators asked permission for veterinary medical officers (VMOs) to contact the producer and discuss additional phases of data collection.

2. Initial VS Visit, September 5, 2006 - March 15, 2007

State and Federal VMOs contacted producers to solicit participation in this phase of the study. A producer agreement that explained data confidentiality and indicated producer intentions for biological sampling was signed by respondents. A face-to-face interview was conducted to complete the Initial VS Visit questionnaire, which took approximately 1 hour.

D. Data Analysis

1. Validation and estimation

a. General Swine Farm Report

Initial data entry and validation for the General Swine Farm Report (results reported in Swine 2006, Part I) were performed in individual NASS State offices. Data were entered into a SAS data set, followed by the execution of the edit and validation program. NAHMS national staff performed additional data validation on the entire data set after data from all States were combined. The statistical estimation was done using SUDAAN. SUDAAN uses a Taylor series expansion to estimate appropriate variances for the stratified/clustered, weighted data.

b. Initial VS Visit Questionnaire

After completing the Initial VS Visit Questionnaire, data collectors sent them to the State NAHMS coordinators where they were manually reviewed for errors and accuracy, then forwarded to CEAH. Data entry and validation were performed by NAHMS staff. Data were entered into a SAS data set, followed by the execution of the data entry edit and validation program. NAHMS staff performed additional data validation on the entire data set after data from all States were combined. The statistical estimation was done using SUDAAN. SUDAAN uses a Taylor series expansion to estimate appropriate variances for the stratified/clustered, weighted data.

E. Sample Evaluation

1. General Swine Farm Report

The purpose of this section is to provide various performance measurement parameters. Historically, the term “response rate” was used as a catch-all parameter, but there are many ways to define and calculate response rates. Therefore, the table to the right presents an evaluation based upon a number of measurement parameters, which are defined with an “x” in those categories that contribute to the measurement. Of the 5,006 operations selected, 3,071 (61.3 percent) provided usable inventory information. Note, the comparable weighted rate was calculated at 65.7 percent usable operations. There were 2,079 operations (41.5 percent) of the sample that provided “complete” information for the questionnaire. About 9 of 10 operations (87.9 percent) were actually contacted for the study.

1a. Operation level response

Response Category	Number Operations	Percent Operations	Evaluation Parameters	
			Contacts	Usable 1/
Survey complete 2/	2,079	41.5	x	x
No pigs on June 1, 2006	696	13.9	x	x
Out of business	296	5.9	x	x
Out of scope (prison and research farms, etc.)	13	0.3		
Refusal of GSFR	1,327	26.5	x	
Office hold (NASS elected not to contact)	315	6.3		
Inaccessible	280	5.6		
Total	5,006	100.0	4,398	3,071
Percent of total operations			87.9	61.3
Percent of total operations weighted 3/			90.7	65.7

[1]Useable operation – respondent provided answers to inventory questions for the operation (either zero or positive number on hand).
[2]Survey complete operation – respondent provided answers to all or nearly all questions for at least one site.
[3]Weighted response – the rate was calculated using the initial selection weights.

Survey complete operations were subdivided if multiple production sites existed. A maximum of three sites were randomly selected. Overall, 2,230 site questionnaires were completed for essentially the entire questionnaire, and 45.1 percent of the sites agreed to be contacted by APHIS for discussion about participation in further phases of the study.

1b. Site level response

Response Category	Number Sites*	Percent Sites
Survey complete and VMO consent	1,005	45.1
Survey complete and refused VMO consent	1,225	54.9
Total	2,230	100.0

*There were 1,005 sites with survey complete and consent for the APHIS or VMO phase of the study, which originated from 912 selected operations. Similarly, there were 1,225 sites that completed the survey but declined the VMO phase, which came from the rest of the original 2,079 selected operations or 1,167 selected operations.

Appendix I: Sample Profile

A. Responding Sites

1a. Total inventory

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit
Size of Site (Total Inventory)	**Number Responding Sites**	**Number Responding Sites**
Fewer than 2,000	1,157	260
2,000 to 4,999	724	176
5,000 or more	349	78
Total	2,230	514

1b. Sow inventory

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit
Size of Site (Total Sows and Gilts)	**Number Responding Sites**	**Number Responding Sites**
No sows and gilts	1,353	278
Fewer than 250	468	100
250 to 499	102	37
500 or more	307	99
Total	2,230	514

2. Type of site

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit
Type of Site	**Number Responding Sites**	**Number Responding Sites**
Contract producer	1,027	237
Independent—market own pigs	1,086	246
Independent—market through cooperative	105	30
Other	12	1
Total	2,230	514

3. Regions

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit
Region	**Number Responding Sites**	**Number Responding Sites**
North	499	96
West Central	456	135
East Central	888	156
South	387	127
Total	2,230	514

4. Production phase

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit
Production Phase Combination	**Number Responding Sites**	**Number Responding Sites**
All four phases	502	120
Gestation, farrowing, and nursery	81	14
Nursery and grower/finisher	357	74
Gestation and farrowing	226	83
Nursery only	217	44
Grower/finisher only	809	170
Other combination	38	9
Total	2,230	514

Appendix II: U.S. Swine Population and Operations

Number of Pigs on June 1, 2006, and Number of Operations in 2006

		Number Pigs (Thousand Head)		Number Operations in 2006	
Region	**State**	**All Operations**	**Operations with 100 or More Head***	**All Operations**	**Operations with 100 or More Head**
East Central	Illinois	4,200	4,179	2,900	2,080
	Indiana	3,200	3,171	2,800	1,500
	Iowa	16,600	16,550	8,700	7,670
	Ohio	1,620	1,539	4,000	1,300
	Total	25,620	25,439	18,400	12,550
North	Michigan	980	965	2,100	560
	Minnesota	6,800	6,766	4,800	3,600
	Pennsylvania	1,100	1,067	3,100	800
	Wisconsin	430	400	2,200	660
	Total	9,310	9,198	12,200	5,620
West Central	Colorado	840	834	750	60
	Kansas	1,840	1,827	1,400	540
	Missouri	2,700	2,673	2,000	1,070
	Nebraska	2,950	2,929	2,500	1,700
	South Dakota	1,470	1,455	1,100	730
	Total	9,800	9,718	7,750	4,100
South	Arkansas	280	272	750	150
	North Carolina	9,600	9,590	2,300	1,510
	Oklahoma	2,370	2,346	2,600	300
	Texas	970	941	3,700	168
	Total	13,220	13,149	9,350	2,128
Total (17 States)		57,950 (93.9% of U.S.)	57,504 (94.2% of U.S.)	47,700 (72.8% of U.S.)	24,398 (93.6% of U.S.)
Total U.S. (50 States)		61,687	61,070	65,540	26,058

*Derived from NASS publication Farm, Land in Farms, and Livestock Operations, February 2007.

Appendix III: Study Objectives and Related Outputs

1. Describe swine management practices used during the gestation, farrowing, nursery, and grower/finisher phases of production.

- Part I: Reference of Swine Health and Management Practices in the United States, 2006, October 2007
- **Part II, Reference of Swine Health and Health Management in the United States, 2006, December 2008**
- Part III, Reference of Swine Health, Productivity and General Management, expected winter 2007
- Info sheets, expected fall and winter 2007

2. Determine the prevalence and risk factors for a variety of pathogens found in nursery and grower/finisher pigs.

- **Part II, Reference of Swine Health and Health Management in the United States, 2006, December 2007**
- Part III, Reference of Swine Health, Productivity and General Management, expected winter 2007
- Info sheets, expected fall and winter 2007

3. Examine vaccination and antimicrobial use practices.

- **Part II, Reference of Swine Health and Health Management in the United States, December 2007**

4. Provide an overview of the changes in U.S. swine management and health from 1990 through 2006.

- Part IV: Changes in the U.S. Pork Industry, 1990-2006, expected early 2008
- Info sheets, expected early 2008