United States Department of Agriculture

Animal and Plant Health Inspection Service

Veterinary Services

National Animal Health Monitoring System

March 2008

Swine 2006

Part III: Reference of Swine Health, Productivity, and General Management in the United States, 2006

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#N478.0308

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Acknowledgments

This report was prepared from material received and analyzed by the U.S. Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS) during a study of animal health and health management on swine operations.

The Swine 2006 study was a cooperative effort among 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 by participating in focus groups.

Thanks also 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, 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 for their help 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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Suggested bibliographic citation for this report:
USDA. 2008. Swine 2006, Part III: Reference of Swine Health, Productivity, and General Management in the United States, 2006
USDA:APHIS:VS, CEAH. Fort Collins, CO
#N478.0308

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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, Swine '95, was conducted in 16 of the Nation's top swine-producing States. These States 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).

NAHMS' third national swine study, 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, which 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). 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 on-site 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.

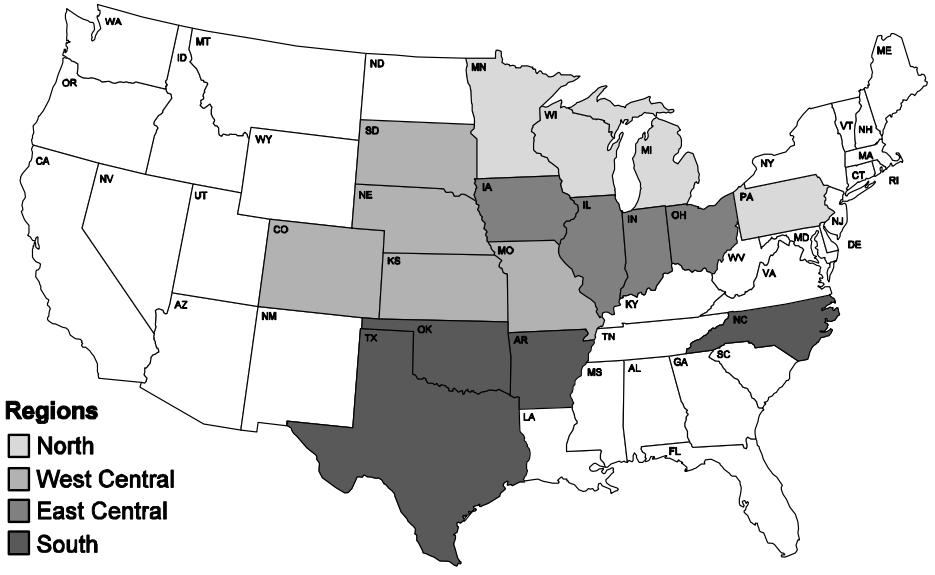
Part II: Reference of Swine Health and Health Management in the United States, 2006 is the second of a series of reports from the NAHMS Swine 2006 study. Data for Part II were collected from 514 swine production sites between September 5, 2006, and March 15, 2007.

Part III: Reference of Swine Health, Productivity, and General Management in the United States, 2006 is the third of a series of reports from the NAHMS Swine 2006 study. Data for Part III were collected from 435 swine production sites between December 4, 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

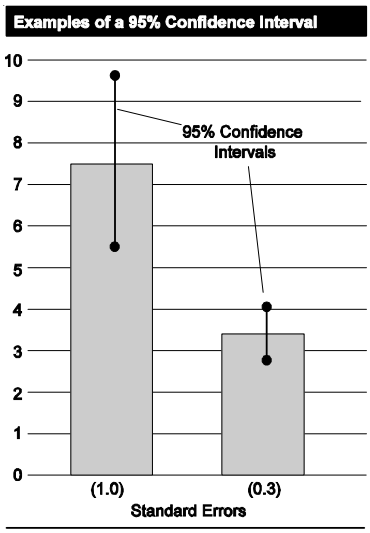


Terms Used in This Report

Average: A site average is used to describe a site-level practice. A pig average is used to describe an animal-level average. **Unless specified as a site average, all averages in this report are pig-level averages.**
For ***site average—***a single value for each operation summed over all operations reporting divided by the number of operations reporting (see site average number of animals per holding unit, p 25).
For ***pig average—***a single operation value multiplied by the number of animals on that operation; then values are summed across operations and divided by total number of animals on all operations (see average age of pigs entering or leaving the nursery, p 13).

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.



Population estimates: Estimates in this report are provided with a measure of precision called the standard error. A 95-percent confidence interval can be approximated 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 geographical 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. 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 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. Sow and Gilt Management

1. Inventory

About 40 percent of all sites had breeding-age females.

Percentage of sites that had breeding-age females from June through November 2006, by region:

Percent Sites

Region

North		West Central		East Central		South		All Sites	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
36.8	(6.1)	48.7	(5.8)	39.5	(4.7)	37.3	(6.9)	40.2	(3.0)

2. Culling and death loss

The number of breeding-age females that died or were culled from June through November 2006 was calculated as a percentage of the December 1, 2006, sow and *bred* gilt inventory in the breeding herd. Overall, 28.7 percent of breeding-age females (note large standard error) were culled and 4.7 percent died.

a. Breeding-age females that died or were culled from June through November 2006, as a percentage of the December 1, 2006, breeding inventory of sows and gilts*, by size of site:

Percent Breeding Females

Size of Site (Sow and Gilt Inventory)

	Small (Fewer than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Reason Removed	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Died	2.5	(0.3)	2.4	(0.4)	5.0	(0.9)	4.7	(0.8)
Culled	14.2	(1.6)	12.1	(1.9)	31.3	(9.9)	28.7	(8.5)

*Sows and bred gilts for breeding plus unmated gilts in the breeding herd.

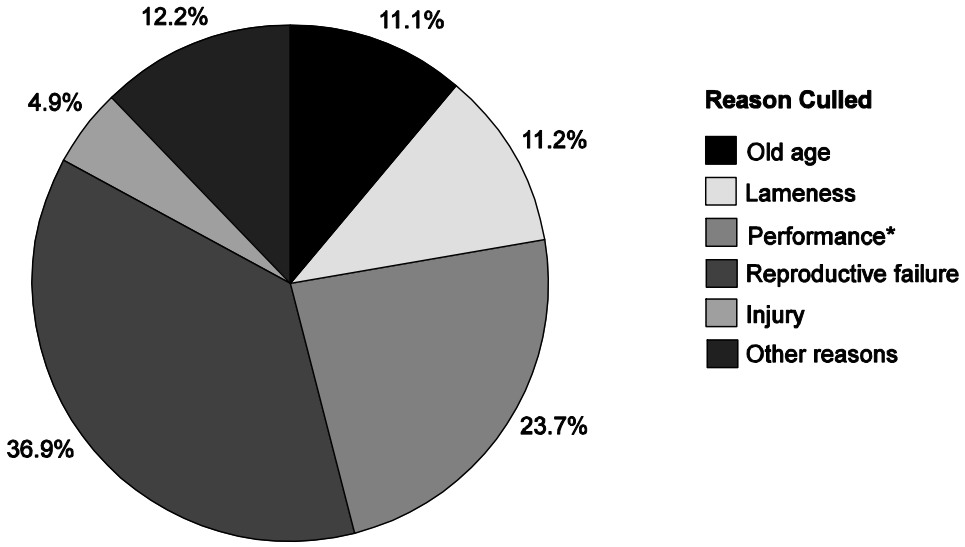
Reproductive failure and performance were the two most common reasons breeding-age females were culled (36.9 and 23.7 percent of culled females, respectively). Reproductive failure and performance accounted for 60.6 percent of all culled females. The most common “other reasons” included management practices and genetic improvement.

b. Percentage of culled breeding-age females from June through November 2006, by reason culled:

Reason Culled	Percent Culled Females	Standard Error
Old age	11.1	(3.9)
Lameness	11.2	(1.4)
Performance*	23.7	(3.1)
Reproductive failure	36.9	(5.1)
Injury	4.9	(1.7)
Other reasons	12.2	(4.6)
Total	100.0	

*Small litter size, high preweaning mortality, or low birth weight.

Percentage of Culled Breeding-age Females from June Through November 2006, by Reason Culled



***Small litter size, high preweaning mortality, or low birth weight.**

B. Farrowing and Weaning Productivity

1. Farrowing productivity and death loss

The total number of piglets born and born alive per litter is a measure of reproductive performance. Overall, 11.9 piglets were born per litter, of which 10.9 were born alive and 9.5 were weaned.

a. Average per-litter productivity from June through November 2006:

	Average Per Litter Productivity			
Measure (Per Litter)	**Number**	**Std. Error**	**Percent**	**Std. Error**
Stillbirths and mummies	1.0	(0.1)	8.1	(0.5)
Born alive	10.9	(0.1)	91.9	(0.5)
Total born	11.9	(0.1)	100.0	
Preweaning deaths	1.4	(0.1)	12.9	(1.0)
Weaned	9.5	(0.1)	87.1	(1.0)
Total born alive	10.9	(0.1)	100.0	

The number of pigs born alive per litter varied by size of site, ranging from 9.4 on small sites to 11.0 on large sites. Large sites also averaged one more weaned piglet per litter than small sites.

b. Average per-litter productivity from June through November 2006, by size of site:

	Average Per Litter Productivity											
	Size of Site (Sow and Gilt Inventory)											
	Small (Fewer than 250)				**Medium** (250-499)				**Large** (500 or More)			
Measure (Per Litter)	**No.**	**Std. Error**	**Pct.**	**Std. Error**	**No.**	**Std. Error**	**Pct.**	**Std. Error**	**No.**	**Std. Error**	**Pct.**	**Std. Error**
Stillbirths and mummies	0.8	(0.1)	8.3	(0.8)	1.0	(0.1)	9.2	(1.0)	1.0	(0.1)	8.1	(0.5)
Born alive	9.4	(0.2)	91.7	(0.8)	10.4	(0.3)	90.8	(1.0)	11.0	(0.1)	91.9	(0.5)
Total born	10.2	(0.2)	100.0		11.4	(0.3)	100.0		12.0	(0.1)	100.0	
Preweaning deaths	0.8	(0.1)	8.8	(0.8)	1.3	(0.2)	12.2	(1.6)	1.4	(0.1)	13.2	(1.0)
Weaned	8.6	(0.2)	91.2	(0.8)	9.1	(0.2)	87.8	(1.6)	9.6	(0.1)	86.8	(1.0)
Total born alive	9.4	(0.2)	100.0		10.4	(0.3)	100.0		11.0	(0.1)	100.0	

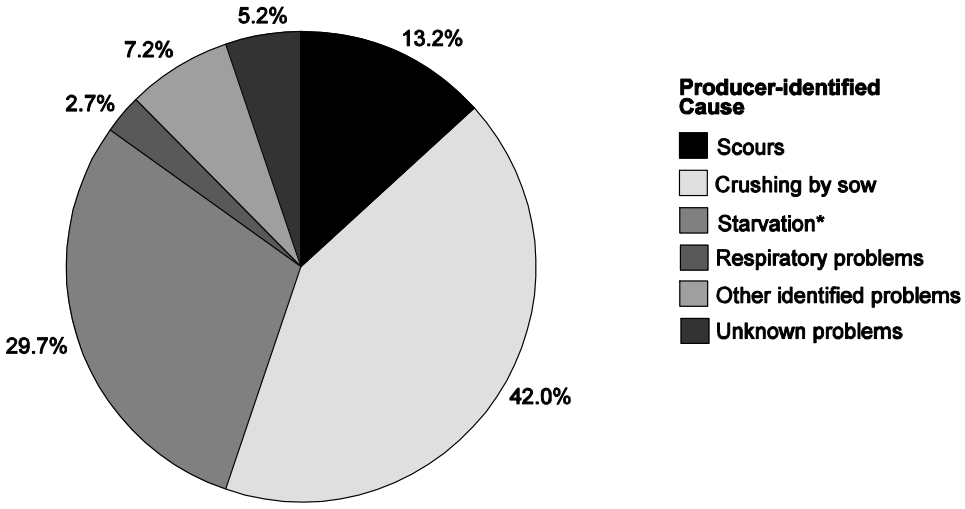
Crushing by sow and starvation accounted for approximately 7 of 10 (71.7 percent) preweaning deaths from June through November 2006. Disease-related causes such as scours and respiratory problems led to 15.9 percent of preweaning deaths. Low viability was the most common “other” identified cause.

c. Percentage of preweaning deaths from June through November 2006, by producer-identified cause:

Producer-Identified Cause	Percent Preweaning Deaths	Standard Error
Scours	13.2	(4.6)
Crushing by sow (laid on)	42.0	(6.8)
Starvation*	29.7	(7.9)
Respiratory problems (e.g., PRRS, rhinitis)	2.7	(2.4)
Other identified problems	7.2	(3.3)
Unknown problems	5.2	(2.3)
Total	100.0	

*Starvation implies that pigs did not eat, not that they were not fed.

Percentage of Preweaning Deaths from June Through November 2006, by Producer-Identified Cause



*Starvation implies that pigs did not eat, not that they were not fed

2. Weaning

The average piglet weaning age was 19.4 days.

a. Average age of piglets at weaning from June through November 2006:

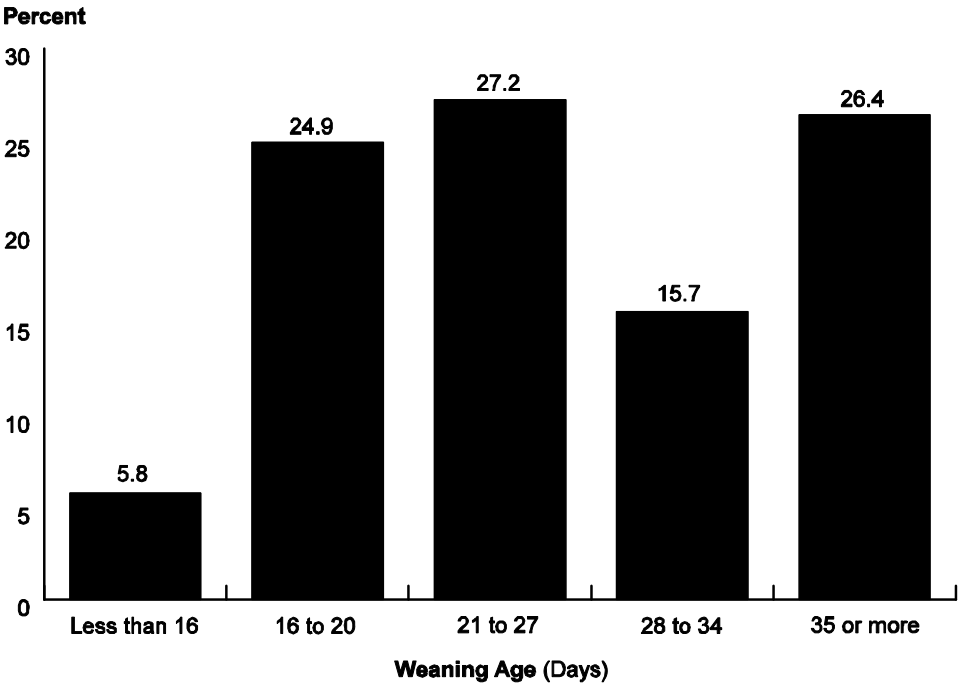
Average Age (Days)	**Standard Error**
19.4	(0.6)

Nearly 8 of 10 large sites (78.2 percent) and over 6 of 10 medium sites (64.3 percent) weaned piglets at 16 to 27 days of age, compared to approximately 4 of 10 small sites (41.4 percent). More than half of small sites (57.9 percent) weaned at 28 or more days, compared to 35.7 and 0.0 percent of medium and large sites, respectively. Note the large standard errors for some estimates.

b. Percentage of sites by age piglets were weaned 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**	
Weaning Age (Days)	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Less than 16	0.7	(0.6)	0.0	(--)	21.8	(9.1)	5.8	(2.7)
16 to 20	10.5	(3.7)	52.6	(15.5)	56.3	(8.8)	24.9	(3.8)
21 to 27	30.9	(6.3)	11.7	(7.1)	21.9	(7.0)	27.2	(4.7)
28 to 34	19.1	(5.3)	35.7	(15.4)	0.0	(--)	15.7	(3.9)
35 or more	38.8	(6.8)	0.0	(--)	0.0	(--)	26.4	(5.0)
Total	100.0		100.0		100.0		100.0	

Percentage of Sites by Age Piglets Were Weaned



C. Nursery Productivity

1. Production phase

Over half of all sites (56.1 percent) had any nursery-age pigs from June through November 2006. Approximately one-third of sites in the South region (34.9 percent) had nursery pigs. The East Central and West Central regions had similar percentages of sites with nursery pigs at (62.4 and 62.1 percent, respectively).

Percentage of sites with any nursery-age pigs* from June through November 2006, by region:

Percent Sites

Region

North		West Central		East Central		South		All Sites	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
48.5	(5.8)	62.1	(5.7)	62.4	(5.6)	34.9	(7.6)	56.1	(3.2)

*Pigs from weaning to approximately 60 pounds.

2. Nursery death loss

There were no substantial differences in the percentages of nursery-pig deaths by size of site from June through November 2006.

a. Percentage of nursery pigs that died in the nursery phase* from June through November 2006, by size of site:

Percent Nursery 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
3.4	(0.5)	4.1	(1.5)	4.0	(0.5)	3.9	(0.4)

*As a percentage of pigs that entered the nursery phase.

The percentage of deaths by producer-identified cause did not differ substantially by size of site. Respiratory problems accounted for the highest percentage of all nursery deaths (53.7 percent).

b. Percentage of nursery-pig deaths from June through November 2006, by producer-identified cause and by size of site:

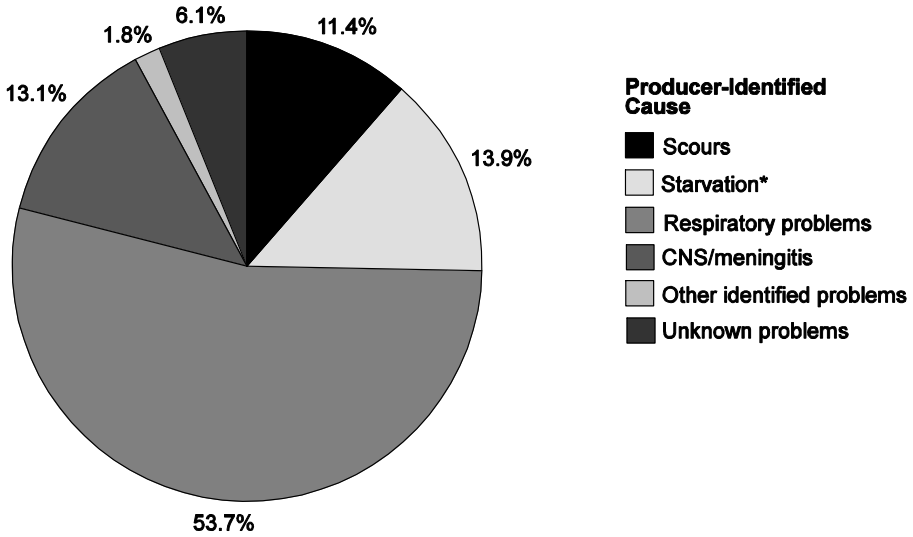
Percent Nursery Deaths

Size of Site (Total Inventory)

Producer-Identified Cause	Small (Fewer than 2,000) Pct.	Small Std. Error	Medium (2,000-4,999) Pct.	Medium Std. Error	Large (5,000 or More) Pct.	Large Std. Error	All Sites Pct.	All Sites Std. Error
Scours	7.7	(2.2)	8.1	(3.9)	13.2	(3.1)	11.4	(2.1)
Starvation*	9.4	(3.0)	10.1	(2.9)	16.0	(5.6)	13.9	(3.7)
Respiratory problems	54.6	(8.3)	48.9	(11.6)	54.9	(9.0)	53.7	(6.7)
CNS/meningitis	13.8	(2.8)	19.5	(2.3)	11.0	(1.7)	13.1	(1.9)
Other identified problems	3.7	(2.4)	1.5	(1.1)	1.6	(1.3)	1.8	(1.0)
Unknown problems	10.8	(2.8)	11.9	(5.9)	3.3	(2.0)	6.1	(2.4)
Total	100.0		100.0		100.0		100.0	

*Starvation implies that pigs did not eat, not that they were not fed.

Percentage of Nursery-Pig Deaths from June Through November 2006, by Producer-Identified Cause



*Starvation implies that pigs did not eat, not that they were not fed

3. Age entering and leaving the nursery

There was no substantial difference by size of site in the average age of pigs entering or leaving the nursery phase. Piglets weaned on small sow sites do not necessarily enter small nursery sites.

a. Average age of pigs entering and leaving the nursery, by size of site:

	Average Age (Days)							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
	Avg.	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**
Entering nursery	21.4	(1.0)	18.7	(0.4)	20.2	(0.5)	20.1	(0.4)
Leaving nursery	67.3	(1.9)	66.4	(1.7)	67.8	(2.3)	67.4	(1.6)

Overall, pigs spent an average of 47.3 days in the nursery phase.

b. Average number of days pigs spent in the nursery, by size of site:

Average Number of Days							
Size of Site (Total Inventory)							
Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Avg.	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**
45.9	(1.7)	47.7	(1.8)	47.6	(2.0)	47.3	(1.4)

D. Grower/Finisher Productivity

1. Production phase

Over 8 of 10 sites (82.7 percent) had a grower/finisher phase.

Percentage of sites with any grower/finisher pigs* from June through November 2006, by region:

Percent Sites									
Region									
North		West Central		East Central		South		All Sites	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
88.5	(3.8)	80.6	(5.7)	86.3	(3.8)	57.9	(7.0)	82.7	(2.4)

*Pigs from approximately 60 pounds to market weight.

2. Grower/finisher death loss

As with nursery-pig deaths, there was no substantial difference by size of site in the percentage of deaths during the grower/finisher phase, when considering the standard errors.

a. Percentage of grower/finisher pigs that died in the grower/finisher phase* from June through November 2006, 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
4.3	(0.7)	4.8	(0.4)	7.8	(1.3)	6.0	(0.7)

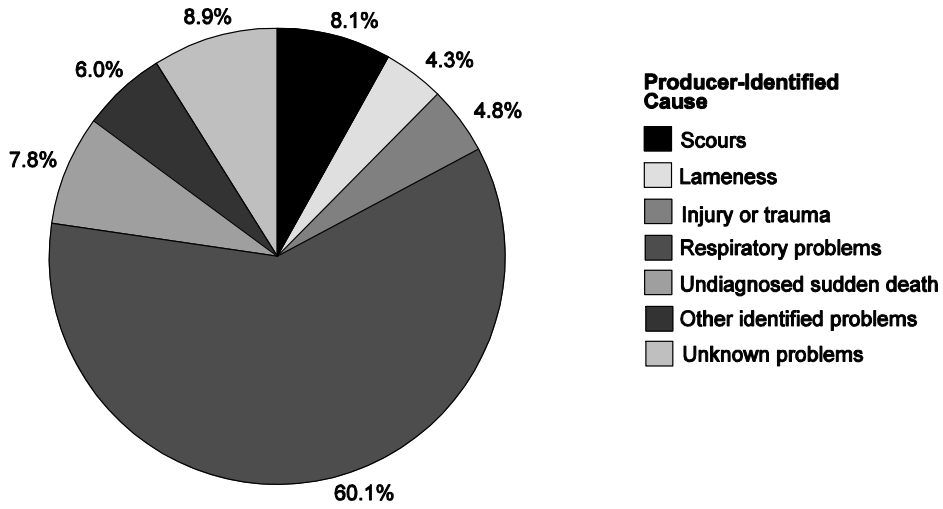
*As a percentage of pigs that entered the grower/finisher phase.

The majority of grower/finisher deaths (60.1 percent) were due to respiratory problems—as identifed by producers. Gastrointestinal problems—such as ulcers or ileitis-related diseases— accounted for the majority of producer-identified deaths attributed to “other” causes. For all producer-identified causes, the percentage of grower/finisher deaths did not differ substantially by size of site.

b. Percentage of grower/finisher pig deaths from June through November 2006, by producer-identified cause and by size of site:

	Percent Deaths							
	Size of Site (Total Inventory)							
	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Producer-identified Cause	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Scours	10.9	(3.6)	8.9	(1.2)	7.0	(1.7)	8.1	(1.3)
Lameness	4.3	(0.9)	3.3	(0.4)	4.6	(1.5)	4.3	(0.9)
Injury or trauma	4.5	(1.1)	5.4	(1.3)	4.7	(1.5)	4.8	(0.9)
Respiratory problems	55.9	(3.8)	60.6	(3.6)	61.1	(5.1)	60.1	(3.1)
Undiagnosed sudden death	11.1	(3.1)	9.6	(1.9)	6.1	(1.5)	7.8	(1.2)
Other identified problems	3.0	(1.2)	3.1	(0.9)	8.2	(5.6)	6.0	(3.3)
Unknown problems	10.3	(1.6)	9.1	(2.0)	8.3	(2.4)	8.9	(1.5)
Total	100.0		100.0		100.0		100.0	

Percentage of Grower/Finisher Pig Deaths from June Through November 2006, by Producer-Identified Cause



3. Age entering and leaving the grower/finisher phase

There was no substantial difference by size of site in the average age of pigs entering or leaving the grower/finisher phase. Not all nursery-age pigs enter the grower/finisher phase.

a. Average age of pigs entering and leaving the grower/finisher phase from June through November 2006, by size of site:

Average Age (Days)

Size of Site (Total Inventory)

	Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
	Avg.	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**
Entering grower/finisher phase	65.5	(1.6)	65.0	(1.0)	65.7	(1.7)	65.4	(0.9)
Leaving grower/finisher phase	180.8	(3.5)	181.9	(1.4)	187.5	(2.2)	184.1	(1.3)

b. Average number of days pigs spent in the grower/finisher phase, by size of site:

Average Number of Days							
Size of Site (Total Inventory)							
Small (Fewer than 2,000)		**Medium** (2,000-4,999)		**Large** (5,000 or More)		**All Sites**	
Avg.	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**	**Avg.**	**Std. Error**
115.3	(3.3)	116.9	(1.7)	121.8	(2.6)	118.7	(1.4)

Photo courtesy of National Pork Board

E. Production Phase Management

1. Production phases

Only 4 of 10 sites had gestation or farrowing phases, while over 8 of 10 sites had a grower/finisher phase.

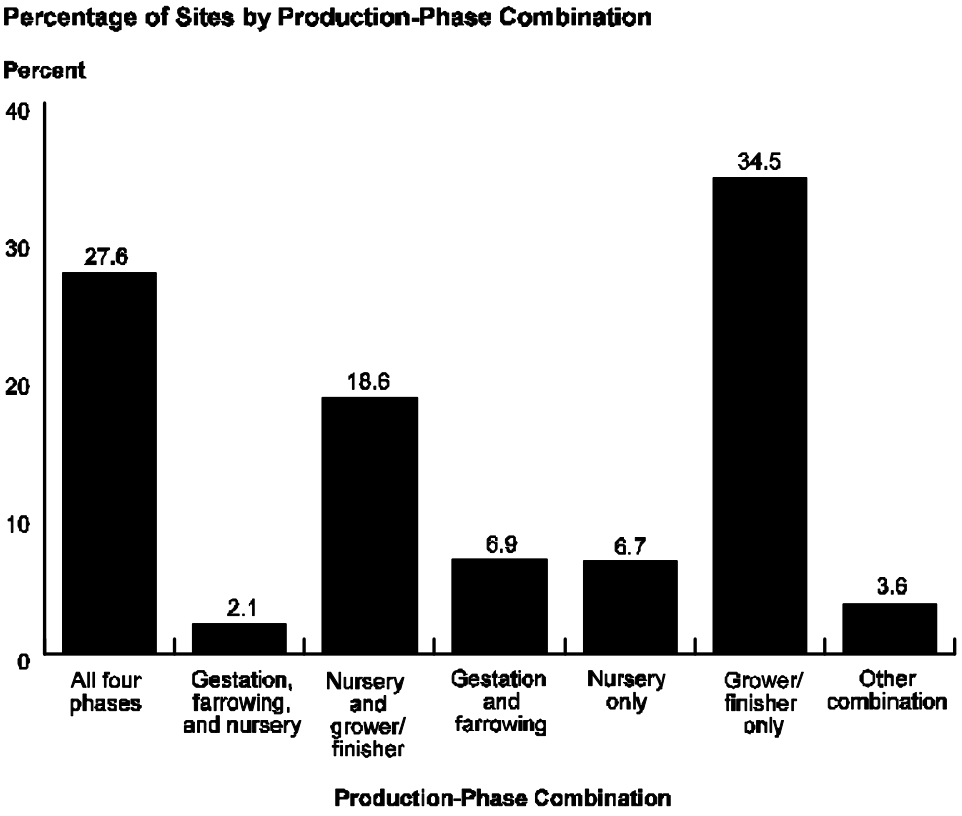
a. Percentage of sites where any animals entered the following production phases from June through November 2006, by region:

	Percent Sites									
	Region									
	North		West Central		East Central		South		All Sites	
Production Phase	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Gestation	36.8	(6.1)	48.7	(5.8)	37.9	(4.6)	37.3	(6.9)	39.4	(3.0)
Farrowing	36.8	(6.1)	44.6	(5.6)	37.4	(4.5)	37.0	(6.9)	38.4	(2.9)
Nursery	48.5	(5.8)	62.1	(5.7)	62.4	(5.6)	34.9	(7.6)	56.1	(3.2)
Grower/finisher	88.5	(3.8)	80.6	(5.7)	86.3	(3.8)	57.9	(7.0)	82.7	(2.4)

More than one-quarter of all sites (27.6 percent) had all four production phases (gestation, farrowing, nursery, and grower/finisher). Only 11.6 percent of sites in the South region had all four phases.

b. Percentage of sites by production-phase combination and by region:

	Percent Sites									
	Region									
	North		West Central		East Central		South		All Sites	
Production Phase Combination	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
All four phases	31.4	(6.0)	35.9	(6.5)	26.7	(4.8)	11.6	(6.5)	27.6	(3.0)
Gestation, farrowing, and nursery	0.7	(0.7)	1.1	(0.7)	2.1	(1.7)	7.0	(4.4)	2.1	(1.0)
Nursery and grower/finisher	7.9	(3.3)	15.4	(4.0)	28.6	(4.5)	0.0	(--)	18.6	(2.5)
Gestation and farrowing	2.2	(0.9)	5.6	(2.4)	6.9	(2.5)	18.4	(4.2)	6.9	(1.4)
Nursery only	8.5	(3.7)	9.1	(3.4)	3.0	(1.3)	16.4	(5.7)	6.7	(1.4)
Grower/finisher only	46.8	(5.6)	26.8	(5.1)	28.8	(5.1)	46.3	(7.2)	34.5	(3.1)
Other combination	2.5	(2.1)	6.1	(3.5)	3.9	(2.2)	0.3	(0.3)	3.6	(1.4)
Total	100.0		100.0		100.0		100.0		100.0	



2. Pigs entering production phases

From June through November 2006, 83.7 percent of sites with a gestation phase brought sows and gilts already on-site into their gestation phase. Nearly two of three sows and gilts entering the gestation phase (65.6 percent) originated from on-site.

a. For sites where sows or gilts entered the gestation phase from June through November 2006, percentage of sites that brought sows and gilts into the gestation phase, and percentage of sows and gilts entering the gestation phase, by source of sows and gilts:

Source	Percent Sites	Std. Error	Percent Pigs	Std. Error
On-site (e.g., gestation units on same site)	83.7	(3.4)	65.6	(10.5)
Another site belonging to same operation	12.1	(4.7)	4.1	(1.6)
Other pig producers (e.g., farm-to-farm, contract, noncontract)	19.2	(3.9)	22.3	(8.8)
Auction, sale barn, or livestock market	0.1	(0.1)	0.0	(0.0)
Another source	3.6	(2.2)	8.0	(4.9)
Total			100.0	

The majority of sites with a farrowing phase (89.3 percent) obtained sows from on-site. Over 8 of 10 sows and gilts entering the farrowing phase (82.4 percent) originated from on-site.

b. For sites where sows or gilts entered the farrowing phase from June through November 2006, percentage of sites that brought sows and gilts into their farrowing phase, and percentage of sows and gilts entering the farrowing phase, by source of sows and gilts:

Source	Percent Sites	Std. Error	Percent Pigs	Std. Error
On-site	89.3	(2.8)	82.4	(8.1)
Another site belonging to same operation	4.9	(2.7)	1.3	(1.0)
Other pig producers (e.g., farm-to-farm, contract, noncontract)	14.8	(3.7)	16.3	(7.9)
Auction, sale barn, or livestock market	0.1	(0.1)	0.0	(0.0)
Another source	0.0	(--)	0.0	(--)
Total			100.0	

From June through November 2006, 55.8 percent of sites with a nursery phase brought pigs already on-site into the nursery phase. Over half of pigs entering the nursery phase (52.3 percent) originated from on-site.

c. For sites where pigs entered the nursery phase from June through November 2006, percentage of sites that brought or placed pigs into the nursery phase, and percentage of pigs that entered the nursery phase, by source of pigs:

Source	Percent Sites	Std. Error	Percent Pigs	Std. Error
On-site (e.g., farrowing units on same site)	55.8	(4.4)	52.3	(16.9)
Another site belonging to same operation (e.g., farrowing or nursery units belonging to same operation)	17.5	(3.5)	20.3	(8.3)
Other pig producers (e.g., farm-to-farm, contract, noncontract)	27.5	(3.9)	27.1	(10.5)
Auction, sale barn, or livestock market	0.2	(0.1)	0.2	(0.2)
Another source	0.4	(0.4)	0.1	(0.1)
Total			100.0	

Seventy-six percent of sites using off-site sources to fill the nursery used just one source.

d. For sites that obtained any nursery pigs from off-site, percentage of sites by number of different sources:

Number of Sources	Percent Sites	Standard Error
1	76.0	(5.3)
2	12.0	(3.8)
3	1.5	(1.1)
4 to 5	6.2	(3.2)
6 or more	4.3	(2.6)
Total	100.0	

Only 20.9 percent of sites with off-site sources immediately placed new nursery pigs with existing pigs.

e. For sites that obtained any nursery pigs from off-site, percentage of sites that immediately placed these pigs in the same building or area with existing pigs:

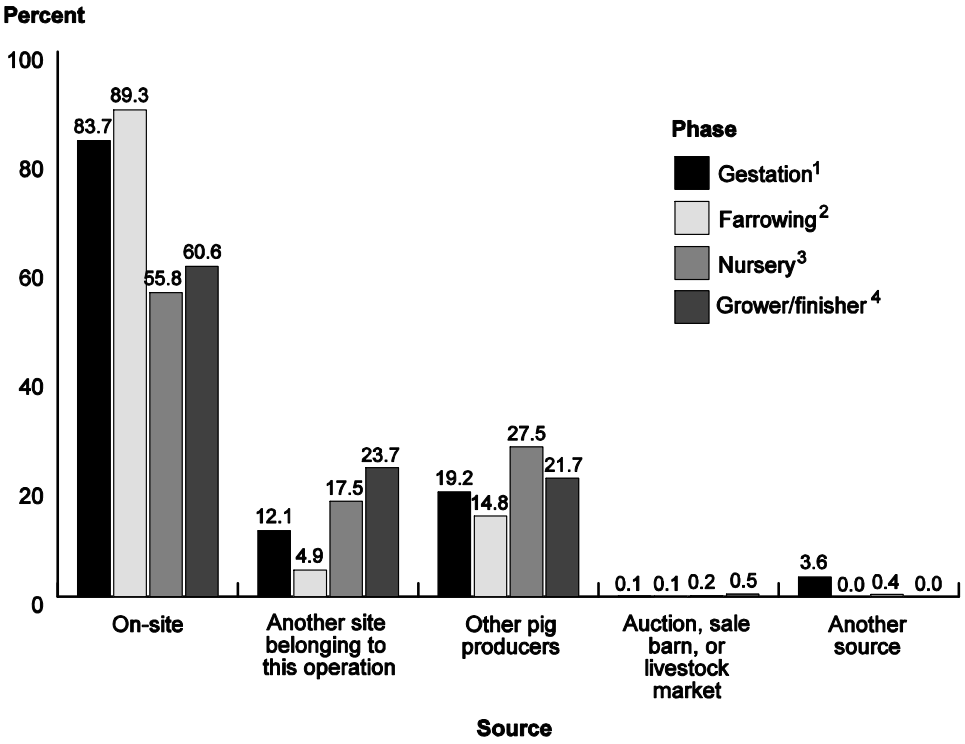
Percent Sites	Standard Error
20.9	(5.3)

From June through November 2006, 60.6 percent of sites with a grower/finisher phase brought pigs already on-site into the grower/finisher phase. Over 60 percent of pigs that entered the grower/finisher phase came from off-site.

f. For sites where pigs entered the grower/finisher phase from June through November 2006, percentage of sites that brought or placed pigs into the grower/finisher phase, and percentage of pigs that entered the grower/finisher phase, by source of pigs:

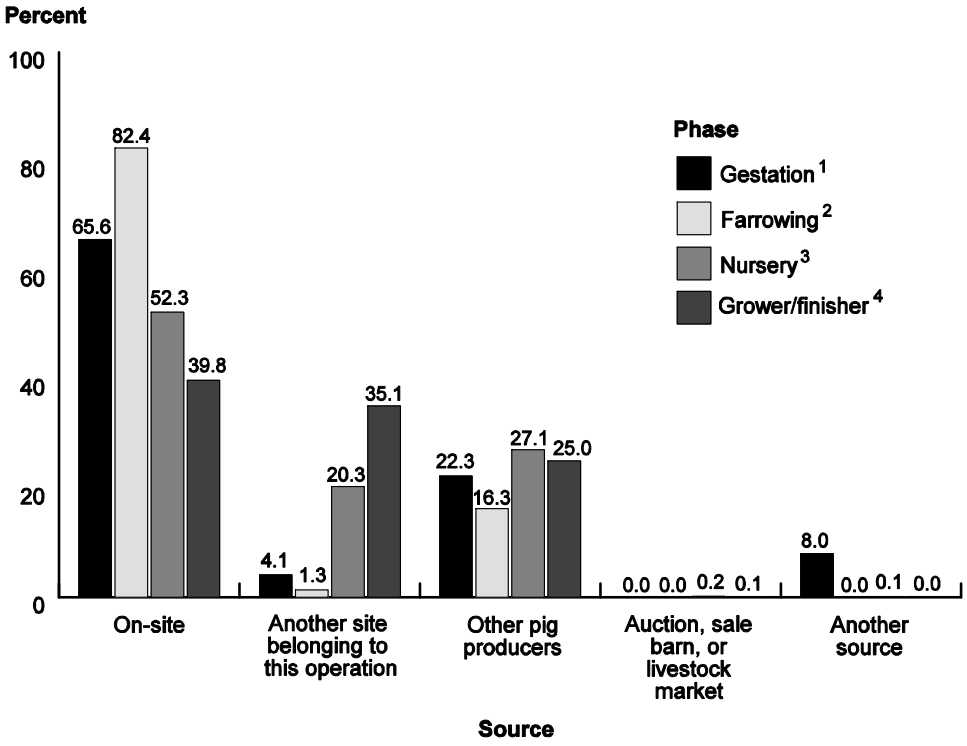
Source	Percent Sites	Std. Error	Percent Pigs	Std. Error
On-site (e.g., nursery phase/units on same site)	60.6	(3.5)	39.8	(4.6)
Another site belonging to same operation (e.g., nursery units belonging to same operation)	23.7	(2.9)	35.1	(5.4)
Other pig producers (e.g., farm-to-farm, contract, noncontract)	21.7	(3.0)	25.0	(4.7)
Auction, sale barn, or livestock market	0.5	(0.4)	0.1	(0.0)
Another source	0.0	(--)	0.0	(--)
Total			100.0	

Percentage of Sites that Brought Pigs into the Following Phases from June Through November 2006, by Source of Pigs



[1] Estimates taken from table 2a, p 19. [2] Estimates taken from table 2b, p 20.
[3] Estimates taken from table 2c, p 20. [4] Estimates taken from table 2f, p 22.

Percentage of Pigs that Entered the Following Phases from June Through November 2006, by Source of Pigs



[1]Estimates taken from table 2a, p 19. [2]Estimates taken from table 2b, p 20.
[3]Estimates taken from table 2c, p 20. [4]Estimates taken from table 2f, p 22.

Over three of four sites that obtained grower/finisher pigs off-site (76.5 percent) received pigs from one source. About one-third of large sites (33.8 percent) used 3 or more sources.

g. For sites that obtained any grower/finisher pigs from off-site from June through November 2006, percentage of sites by number of different sources and by size of site:

Percent Sites

Size of Site (Total Inventory)

Number of Sources	Small (Fewer than 2,000) Pct.	Small Std. Error	Medium (2,000-4,999) Pct.	Medium Std. Error	Large (5,000 or More) Pct.	Large Std. Error	All Sites Pct.	All Sites Std. Error
1	83.7	(5.1)	76.0	(6.3)	56.2	(10.5)	76.5	(4.2)
2	10.8	(4.5)	15.6	(4.6)	10.0	(6.2)	11.6	(3.1)
3	1.9	(1.2)	6.6	(4.7)	11.3	(5.5)	4.8	(1.7)
4 to 5	2.3	(1.8)	0.0	(--)	13.6	(7.2)	4.2	(1.9)
6 or more	1.3	(1.3)	1.8	(1.2)	8.9	(7.7)	2.9	(1.8)
Total	100.0		100.0		100.0		100.0	

Roughly one-quarter of sites that obtained pigs off-site (24.4 percent) immediately placed new grower/finisher pigs with existing pigs.

h. For sites that obtained any grower/finisher pigs from off-site from June through November 2006, percentage of sites that immediately placed these pigs in the same building or area with existing pigs:

Percent Sites	Standard Error
24.4	(4.8)

For sites with total confinement housing, square feet per animal ranged from 3.5 in the nursery to 53.6 in the gestation facility.

i. For sites with the following production phases and total confinement housing, site average number of animals per holding unit, and site average square feet per animal:

	Site Average			
Phase	**Typical Number of Animals per Holding Unit**	**Standard Error**	**Typical Square Feet per Animal**	**Standard Error**
Gestation	8.9	(3.0)	53.6	(29.0)
Farrowing[1]	1.3	(0.3)	24.5	(1.4)
Nursery[2]	31.9	(3.7)	3.5	(0.3)
Grower/finisher[2]	55.8	(9.1)	7.7	(0.2)

[1]Does not include piglets.
[2]Typical number when first placed in the production phase.

F. Disease Prevention—All Phases

1. Disease prevention and treatment

From June through November 2006, 74.7 percent of sites dewormed sows and gilts and 64.0 percent dewormed boars. In preweaned piglets, administration of iron (usually administered at 7 to 10 days of age) was given by 82.1 percent of sites. Over 8 of 10 nursery sites (85.3 percent) and grower/finisher sites (81.2 percent) used antibiotics in feed.

a. For sites with the specified pig types, percentage of sites that regularly gave the following treatments from June through November 2006:

	Percent Sites									
	Pig Type									
	Sows/Gilts		Boars		Piglets Before or at Weaning		Nursery-age Pigs		Grower/ Finisher Pigs	
Practice	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Deworm	74.7	(4.5)	64.0	(5.3)	30.0	(5.0)	33.4	(4.9)	30.6	(4.0)
Mange/lice treatment	46.5	(5.4)	43.5	(5.5)	23.0	(4.6)	24.4	(4.7)	12.7	(3.2)
Iron (orally or through injection)	NA		NA		82.1	(4.1)	NA		NA	
Antibiotics in feed	47.4	(5.4)	37.2	(5.8)	43.5	(5.2)	85.3	(3.1)	81.2	(2.8)
Antibiotics in water	3.3	(2.3)	1.3	(1.3)	7.6	(2.9)	40.4	(4.4)	38.6	(3.7)
Antibiotics (oral)	5.0	(2.6)	4.8	(2.7)	14.9	(4.2)	4.2	(1.9)	2.8	(1.0)
Antibiotics (injection)	47.9	(4.9)	27.5	(4.7)	54.9	(5.2)	53.8	(4.6)	56.6	(4.0)

Over 60 percent of sows and boars were on sites that regularly practiced deworming. Over half of nursery and grower/finisher pigs were on sites that gave these animals antibiotics, whether in feed, water, or by injection. Over 90 percent of piglets were on sites that administered iron before or at weaning.

b. For sites with the specified pig types, percentage of pigs on sites that regularly gave the following treatments from June through November 2006:

Percent Pigs

Pig Type

	Sows/Gilts[1]		Boars[2]		Piglets Before or at Weaning[3]		Nursery-age Pigs[4]		Grower/ Finisher Pigs[5]	
Practice	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Deworm	60.2	(6.1)	67.8	(5.2)	3.5	(1.8)	5.2	(2.1)	13.3	(2.3)
Mange/lice treatment	13.4	(3.3)	44.7	(6.3)	1.3	(0.5)	2.3	(0.9)	3.1	(1.0)
Iron (orally or through injection)	NA		NA		92.3	(5.2)	NA		NA	
Antibiotics in feed	38.8	(7.0)	30.7	(5.6)	8.7	(3.7)	94.9	(2.8)	86.4	(3.0)
Antibiotics in water	2.7	(2.6)	0.5	(0.5)	2.6	(1.6)	76.2	(8.9)	65.7	(4.5)
Antibiotics (oral)	4.7	(2.5)	3.1	(2.3)	41.5	(17.9)	5.1	(4.6)	5.2	(3.7)
Antibiotics (injection)	35.6	(6.9)	21.2	(4.4)	85.6	(6.3)	76.4	(9.2)	68.4	(4.7)

[1]As a percentage of sow and bred gilt inventory on December 1, 2006.
[2]As a percentage of boar inventory on December 1, 2006.
[3]As a percentage of pigs born alive (6 months).
[4]As a percentage of pigs entering nursery (6 months).
[5]As a percentage of pigs entering grower/finisher phase (6 months).

From June through November 2006, 38.5 percent of sites gave breeding females occasional, short-term treatments via injections of antibiotics.

c. For sites with the specified pig types, percentage of sites that used antibiotics in feed, water, or by injection from June through November 2006, by route of administration and by treatment type:

Percent Sites

Treatment Type

		Occasional Short-Term Treatment		Occasional, Short-term Prevention (Pulse Dosing)		Occasional Individuals or Groups		Continuously	
Pig Type	**Route**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Breeding females									
	Feed	17.3	(3.6)	30.7	(4.8)	7.0	(2.2)	10.8	(5.0)
	Water	6.8	(2.4)	2.4	(1.6)	3.0	(1.5)	0.1	(0.1)
	Injection	38.5	(5.1)	4.5	(1.5)	35.7	(4.9)	NA	
Boars									
	Feed	10.3	(3.0)	15.6	(3.8)	6.1	(2.2)	9.8	(3.8)
	Water	3.6	(1.6)	0.1	(0.1)	3.2	(1.6)	0.1	(0.1)
	Injection	18.6	(3.7)	1.9	(0.9)	26.1	(4.4)	NA	
Piglets									
	Feed	14.7	(4.1)	6.0	(1.8)	4.2	(1.8)	28.4	(4.9)
	Water	6.7	(2.8)	8.2	(3.1)	3.5	(2.1)	0.9	(0.5)
	Injection	37.3	(5.1)	18.8	(3.7)	39.9	(5.0)	NA	
Nursery-age pigs									
	Feed	11.8	(3.2)	34.2	(4.7)	2.1	(0.8)	53.8	(4.8)
	Water	32.9	(4.2)	21.6	(3.5)	9.0	(2.4)	0.7	(0.4)
	Injection	31.2	(4.2)	4.4	(1.5)	42.6	(4.4)	NA	
Grower/ finisher pigs									
	Feed	31.1	(4.1)	37.8	(3.7)	8.6	(1.9)	32.8	(4.1)
	Water	41.7	(3.6)	9.2	(1.8)	10.8	(2.1)	0.1	(0.1)
	Injection	30.6	(3.6)	0.6	(0.3)	49.5	(4.0)	NA	

2. Veterinary contact for mortality

On average, a producer would contact a veterinarian when 4.2 percent or more of grower/finisher pigs died.

Site average percentage of pig mortality before a veterinarian would be contacted, by production phase:

Production Phase	Site Average Percent	Standard Error
Breeding herd	5.8	(0.9)
Preweaned piglets	12.4	(1.6)
Nursery-age pigs	5.3	(0.6)
Grower/finisher pigs	4.2	(0.5)

G. General Management

1. Swine housing

Nearly all sites had buildings to house swine.

a. Percentage of sites that had at least one building to house swine, 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**
98.5	(1.2)	100.0	(--)	100.0	(--)	99.0	(0.8)

Photo courtesy of National Pork Board

For sites with at least one building used to house swine, over 60 percent of sites indicated that all buildings used to house swine were constructed and maintained to keep out birds, cats, and dogs. A higher percentage of large and medium sites housed swine in buildings that kept out birds, cats, rats, mice, and dogs than did small sites.

b. For sites with at least one building used to house swine, percentage of sites in which either none, some, or all buildings used for swine were constructed and structurally maintained to keep out the following types of animals, 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**	
Animal Type	**Number of Buildings**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Birds									
	None	24.3	(4.9)	2.6	(1.4)	2.8	(2.6)	17.2	(3.5)
	Some	26.4	(4.1)	12.2	(3.3)	5.9	(2.8)	20.8	(2.8)
	All	49.3	(5.4)	85.2	(3.5)	91.3	(3.8)	62.0	(3.9)
	Total	100.0		100.0		100.0		100.0	
Rats and mice									
	None	50.8	(5.5)	25.4	(5.6)	23.8	(5.7)	42.2	(4.1)
	Some	13.1	(3.0)	4.3	(1.6)	6.5	(3.1)	10.5	(2.1)
	All	36.1	(5.4)	70.3	(5.6)	69.7	(6.2)	47.3	(4.1)
	Total	100.0		100.0		100.0		100.0	
Cats									
	None	25.0	(4.4)	2.2	(1.4)	0.4	(0.3)	17.3	(3.1)
	Some	24.5	(4.0)	9.2	(2.8)	4.8	(2.6)	18.8	(2.8)
	All	50.5	(5.5)	88.6	(3.0)	94.8	(2.7)	63.9	(3.9)
	Total	100.0		100.0		100.0		100.0	
Dogs									
	None	20.3	(4.2)	2.0	(1.4)	0.0	(--)	14.0	(2.9)
	Some	23.1	(4.0)	5.9	(2.2)	4.9	(2.7)	17.2	(2.7)
	All	56.6	(5.1)	92.1	(2.6)	95.1	(2.7)	68.8	(3.6)
	Total	100.0		100.0		100.0		100.0	

Nearly half of buildings (47.7 percent) had rodent bait stations inside the building.

c. For sites with at least one building used to house swine, percentage of ***buildings*** that had rodent bait stations in the following areas, by size of site:

Percent Buildings

Size of Site (Total Inventory)

Bait Station Placement	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
Inside building	38.6	(4.3)	59.5	(5.7)	61.9	(13.1)	47.7	(4.1)
Outside building perimeter 50 ft apart or less	16.6	(3.3)	35.9	(6.2)	66.5	(9.0)	32.0	(4.7)
Outside building perimeter more than 50 ft apart	8.6	(2.1)	43.8	(6.2)	22.4	(6.6)	17.6	(2.4)

Nearly all sites (97.6 percent) use a closed structure to store feed. In addition, 21.6 percent of small sites used an open structure for feed storage.

d. Percentage of sites with the following types of feed storage, by size of site:

Percent Sites

Size of Site (Total Inventory)

Feed Storage Type	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
Open structure	21.6	(4.6)	9.1	(4.9)	3.4	(2.8)	16.7	(3.7)
Closed structure	97.1	(1.8)	98.9	(0.5)	98.2	(0.8)	97.6	(1.2)
Bags	48.7	(5.3)	39.7	(5.7)	39.8	(6.3)	45.8	(3.9)
Piles	3.8	(1.5)	0.0	(--)	0.0	(--)	2.5	(1.0)

For sites that use a closed structure to store feed, 21.0 percent reported that rats and mice could still access the feed.

e. For sites with the following feed storage types, percentage of sites where the following types of animals could access feed:

	Percent Sites							
	Storage Type							
	Open Structure		Closed Structure		Bags		Piles*	
Animal Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Birds	73.5	(13.5)	14.0	(2.5)	24.0	(4.3)	NA	(--)
Cats	60.0	(11.8)	13.3	(2.5)	32.9	(4.9)	NA	(--)
Rats and mice	100.0	(--)	21.0	(3.1)	71.1	(4.6)	NA	(--)
Dogs	37.4	(9.5)	11.5	(2.2)	24.0	(4.2)	NA	(--)

*Estimate not reported due to small sample size.

For sites where feed was stored in an open or closed structure, about half of sites (50.9 percent) placed rodent bait stations at any location, and 29.4 percent placed them (50 or fewer feet apart) outside the structure where feed was kept.

f. For sites that stored feed in open or closed structures, percentage of sites that placed rodent bait stations in the following areas relative to the feed storage buildings or units, 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**	
Bait Station Placement	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Inside structure	16.2	(3.0)	17.4	(4.1)	22.6	(5.5)	17.3	(2.4)
Outside structure perimeter 50 ft apart or less	24.1	(4.8)	30.0	(5.3)	55.4	(7.5)	29.4	(3.7)
Outside structure perimeter more than 50 ft apart	7.5	(2.1)	35.8	(5.5)	33.2	(7.1)	16.1	(2.2)
Any rodent bait stations placed	39.3	(5.2)	69.4	(5.8)	84.6	(5.5)	50.9	(3.9)

2. Employee policy

About two of three sites (68.0 percent) had a policy in place that prohibits employees from coming into contact with off-site swine.

Percentage of sites that had a policy prohibiting employees from coming into contact with swine not on-site (e.g., pigs on a neighbor's farm or on employee's own farm), 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**
62.7	(4.9)	78.7	(5.0)	79.9	(6.2)	68.0	(3.6)

3. Carcass disposal

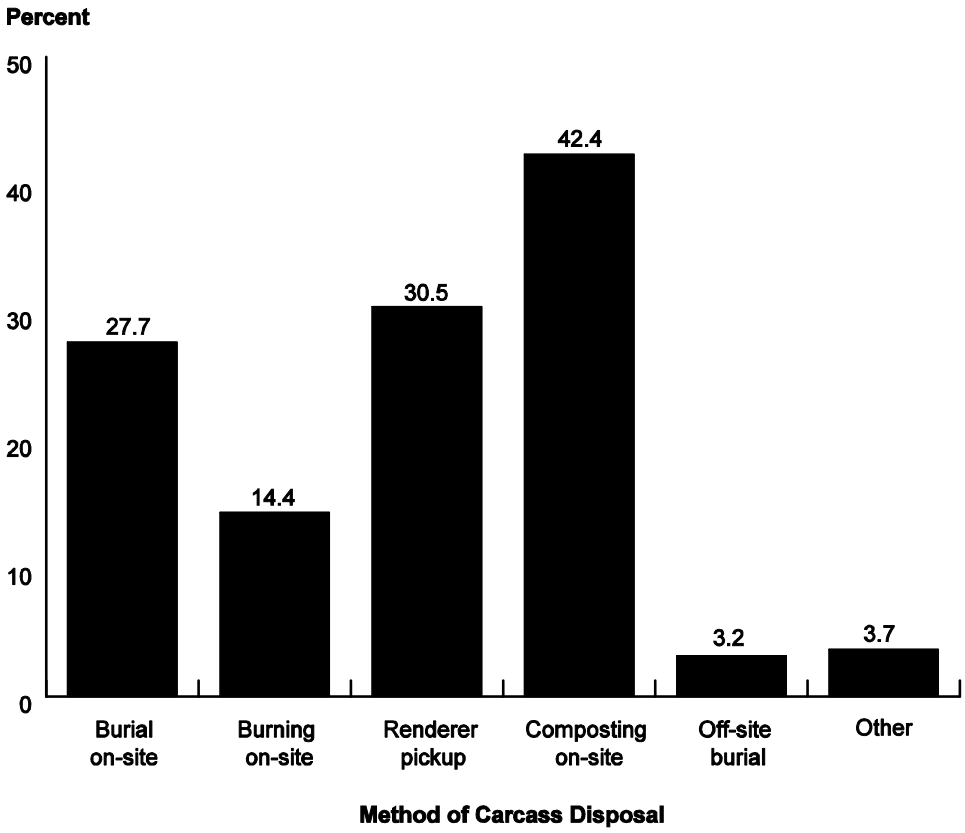
From June through November 2006, 42.4 percent of sites with at least one death used on-site composting as a method of carcass disposal.

a. For sites with at least one preweaned piglet or weaned pig death from June through November 2006, percentage of sites by method of carcass disposal:

	Percent Sites					
	Sites with at Least One Preweaned* Death		Sites with at Least One Weaned** Death		Sites with Any Deaths	
Method of Carcass Disposal	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Burial on-site	33.6	(5.2)	25.5	(3.5)	27.7	(3.5)
Burning on-site	15.2	(3.8)	13.9	(3.4)	14.4	(3.3)
Renderer pickup	9.9	(3.2)	31.3	(3.3)	30.5	(3.2)
Composting on-site	40.5	(5.4)	41.4	(4.1)	42.4	(3.9)
Off-site burial	2.0	(1.4)	2.7	(1.3)	3.2	(1.3)
Other	10.4	(3.9)	0.9	(0.8)	3.7	(1.5)

*Pigs not yet weaned.
**Weaned pigs and older pigs.

For Sites with at Least One Preweaned Piglet or Weaned Pig Death from June Through November 2006, Percentage of Sites by Method of Carcass Disposal



Over half of carcasses (59.5 percent) were picked up by a renderer. About one-quarter of carcasses (24.1 percent) were disposed of by composting on-site.

b. For sites with at least one preweaned piglet or weaned pig death from June through November 2006, percentage of pig deaths by method of carcass disposal:

	Percent Pig Deaths					
	Preweaned* Deaths		Weaned** Deaths		All Deaths	
Method of Carcass Disposal	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Burial on-site	3.0	(1.7)	5.6	(1.6)	4.0	(1.7)
Burning on-site	8.8	(5.3)	15.2	(7.7)	11.3	(5.4)
Renderer pickup	60.2	(19.5)	58.4	(9.3)	59.5	(14.9)
Composting on-site	26.5	(13.6)	20.3	(4.8)	24.1	(9.2)
Off-site burial	0.2	(0.2)	0.5	(0.3)	0.3	(0.2)
Other	1.3	(1.2)	0.0	(0.0)	0.8	(0.7)
Total	100.0		100.0		100.0	

*Pigs not yet weaned.
**Weaned pigs and older pigs.

4. Records

About one-third of sites with sows (33.8 percent) used commercial software to keep track of individual sow production.

a. For sites with the specified pig types, percentage of sites that used commercial software for the following types of records:

Pig/Record Type	Percent Sites	Standard Error
Individual sow production records	33.8	(4.5)
Group sow production records	28.6	(4.3)
Group growing pig (nursery, grower/ finisher, wean/finish) production records	27.1	(3.4)

Over half of sites that used antibiotics to treat disease conditions in grower/finisher pigs recorded the name of the antibiotic and the date of treatment.

b. For sites that used antibiotics, percentage of sites by pig type and by type of information recorded when treating disease conditions with antibiotics:

	Percent Sites					
	Pig Type					
	Breeding		Nursery-age		Grower/ Finisher	
Information Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Animal ID	53.4	(5.6)	13.5	(3.5)	10.1	(2.4)
Pen/crate ID	44.4	(5.4)	28.0	(4.1)	29.6	(3.7)
Facility or house ID	36.4	(5.2)	35.8	(4.4)	35.8	(3.6)
Site ID	29.3	(4.9)	28.4	(3.8)	31.4	(3.4)
Date of treatment	62.3	(5.6)	44.9	(4.7)	50.2	(4.1)
Name of drug	63.5	(5.5)	48.7	(4.8)	50.5	(4.1)
Dose	50.7	(5.6)	38.3	(4.8)	36.5	(3.9)
Route used	35.2	(5.3)	32.1	(4.7)	31.2	(3.7)
Who administered drug	36.3	(5.4)	31.0	(4.8)	30.4	(3.8)
Withdrawal time or date withdrawal period completed	41.2	(5.4)	32.9	(4.8)	35.5	(3.9)
Outcome of treatment	19.4	(4.8)	16.6	(3.5)	15.9	(3.1)
Other	3.4	(1.8)	2.2	(1.2)	1.8	(0.7)

Photo courtesy of National Pork Board

5. Feed ingredients

Nearly one-third of sites (30.6 percent) used vegetable fat made from soybeans in some rations fed to hogs.

Percentage of sites that used the following ingredients in any feed rations fed to hogs:

Ingredient	Percent Sites	Standard Error
Tallow (animal fat from cattle or sheep)	27.5	(3.1)
Lard (pork fat)	26.6	(3.4)
Other animal fat	11.2	(1.7)
Vegetable fat made from soybeans	30.6	(3.2)
Other vegetable fat	12.2	(1.9)
Molasses	4.5	(1.3)
Spray-dried plasma	24.1	(2.8)
Blood meal, serum albumin, or other blood products	20.6	(2.7)
Meat and bone meal (tankage)	17.6	(2.8)

H. Movement of Swine

1. Swine shipments

Nearly all sites (98.3 percent) sold or shipped at least one pig off-site from June through November 2006.

Percentage of sites that sold or shipped at least one pig off-site from June through November 2006:

Percent Sites	Standard Error
98.3	(0.9)

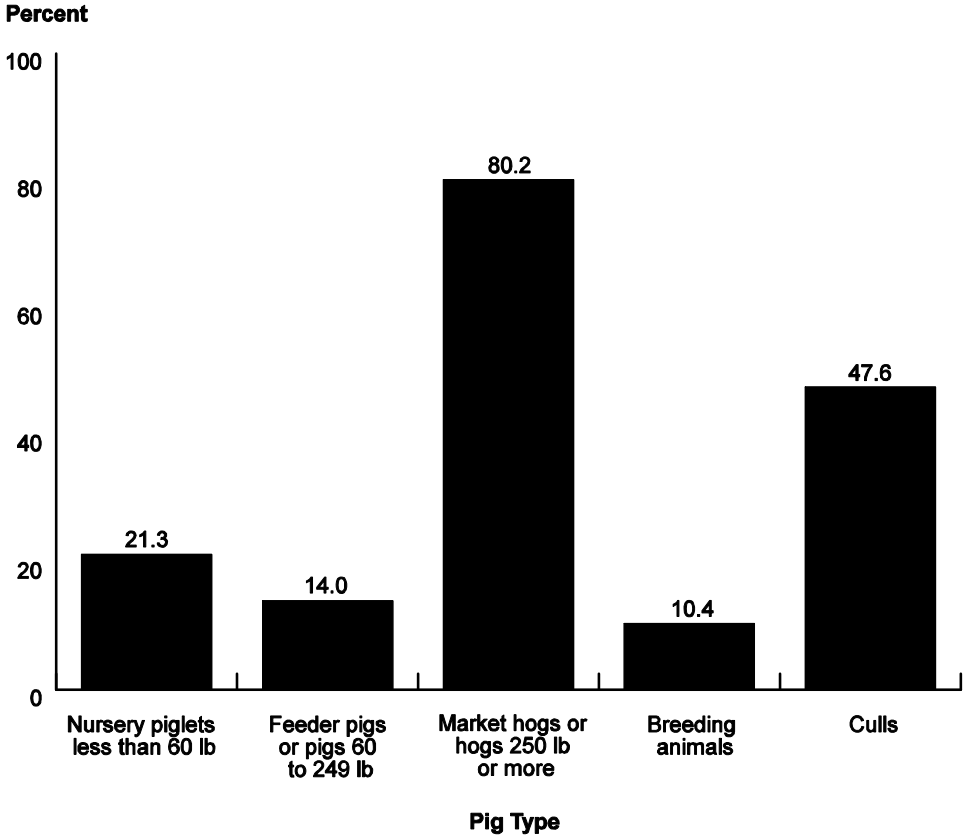
2. Pig type

Market hogs were sold or shipped by 80.2 percent of sites, which comprised over half of off-site shipments (56.8 percent).

For sites that sold or shipped at least one pig off-site from June through November 2006, percentage of sites and percentage of shipments by type of pig sold or shipped:

Pig Type	Percent Sites	Standard Error	Percent Shipments	Standard Error
Nursery piglets less than 60 lb	21.3	(2.4)	19.4	(3.1)
Feeder pigs or pigs 60 to 249 lb	14.0	(2.6)	7.6	(1.6)
Market hogs or hogs 250 lb or more	80.2	(2.5)	56.8	(4.0)
Breeding animals	10.4	(2.4)	4.8	(1.2)
Culls	47.6	(3.6)	11.4	(0.9)
Total			100.0	

For Sites that Sold or Shipped at Least One Pig Off-Site from June Through November 2006, Percentage of Sites by Type of Pig Sold or Shipped



3. Destination

Nearly half of all pig shipments (49.8 percent) went directly to slaughter.

For sites that sold or shipped at least one pig off-site from June through November 2006, percentage of shipments by destination:

Destination	Percent Shipments	Standard Error
Directly to slaughter	49.8	(3.6)
Sale/auction/buying station	19.5	(2.7)
Dealer	1.4	(0.6)
Show/fair	2.6	(0.9)
Feedlot/feed yard	0.6	(0.3)
Another operation	13.6	(1.9)
Another site belonging to same operation (e.g., nursery, grower)	12.5	(3.3)
Total	100.0	

4. Distance

Only 5.3 percent of shipments traveled 300 miles or more.

For sites that sold or shipped at least one pig off-site, percentage of shipments by distance traveled one way:

Distance (Miles)	Percent Shipments	Standard Error
Less than 10	20.9	(4.7)
10 to 29	15.3	(2.2)
30 to 99	32.1	(3.9)
100 to 299	26.4	(3.1)
300 or more	5.3	(1.3)
Total	100.0	

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 (available on request) 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 study 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, from November 1 to 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 needs assessment respondents, by respondent type

Nearly half of 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 respective animal and producer populations 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.

3. Second VS Visit, December 4, 2006 – March 15, 2007

State and Federal VMOs completed the VS phase of the NAHMS Swine 2006 study by making a second visit to participating producers. A face-to-face interview was conducted to complete the Second VS Visit questionnaire, which took 54 minutes on average.

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 and Second VS Visit Questionnaire

After completing the Initial VS Visit Questionnaires, 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.

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.

a. Operation level response

			Evaluation Parameters	
Response Category	**Number Operations**	**Percent Operations**	**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.

b. Site level response

Response Category	**Number Sites1/**	**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

1/ 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	Phase II: Second VS Visit
Size of Site (Total Inventory)	**Number Responding Sites**	**Number Responding Sites**	**Number Responding Sites**
Fewer than 2,000	1,157	260	213
2,000 to 4,999	724	176	152
5,000 or more	349	78	70
Total	2,230	514	435

1b. Sow inventory

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit	Phase II: Second VS Visit
Size of Site (Total Sows and Gilts)	**Number Responding Sites**	**Number Responding Sites**	**Number Responding Sites**
No sows and gilts	1,353	278	244
Fewer than 250	468	100	83
250 to 499	102	37	26
500 or more	307	99	82
Total	2,230	514	435

2. Type of site

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit	Phase II: Second VS Visit
Type of Site	**Number Responding Sites**	**Number Responding Sites**	**Number Responding Sites**
Contract producer	1,027	237	206
Independent: market own pigs	1,086	246	205
Independent: market through cooperative	105	30	24
Other	12	1	0
Total	2,230	514	435

3. Regions

	Phase I: General Swine Farm Report	Phase II: Initial VS Visit	Phase II: Second VS Visit
Region	**Number Responding Sites**	**Number Responding Sites**	**Number Responding Sites**
North	499	96	86
West Central	456	135	122
East Central	888	156	120
South	387	127	107
Total	2,230	514	435

4. Production phase

Production Phase Combination	Phase I: General Swine Farm Report Number Responding Sites	Phase II: Initial VS Visit Number Responding Sites	Phase II: Second VS Visit Number Responding Sites
All four phases	502	120	98
Gestation, farrowing, and nursery	81	14	10
Nursery and grower/finisher	357	74	67
Gestation and farrowing	226	83	66
Nursery only	217	44	39
Grower/finisher only	809	170	147
Other combination	38	9	8
Total	2,230	514	435

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[1]**	**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

[1]Derived from NASS publication Farm, Land in Farms, and Livestock Operations, February 2007.

Appendix III: Swine 2006 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 Practices in the United States, 2006, December 2007
- **Part III: Reference of Swine Health, Productivity, and General Management, 2006, March 2008**
- Info sheets, expected spring 2008

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 Practices in the United States, 2006, December 2007
- **Part III: Reference of Swine Health, Productivity, and General Management, 2006, March 2008**
- Info sheets, expected spring 2008

3. Examine vaccination and antimicrobial use practices.

- Part II: Reference of Swine Health and Health Management Practices 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