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United States
Department
of Agriculture

Animal and
Plant Health
Inspection
Service

Veterinary
Services

Part II: Reference of Swine Health & Health Management in the United States, 2000

National Animal Health Monitoring System

March, 2002

Acknowledgments

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

The Swine 2000 study was a cooperative effort between state and federal agricultural statisticians, animal health officials, university researchers, extension personnel, and pork producers, owners, and operators. We want to thank the hundreds of industry members who helped determine the direction and objectives of this study by participating in focus groups.

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Thomas E. Walton,
Director
Centers for Epidemiology and Animal Health

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Contacts for further information:
Questions or comments on Swine 2000 study methodology or requests for additional data analysis:
Dr. Eric Bush: (970) 490-8000 **[After May 20, 2002, (970)-494-7400]**
Information on reprints or other NAHMS reports: Mr. Brad Doty
Telephone: (970) 490-8000 **[After May 20, 2002, (970) 494-7400]** E-mail: NAHMSweb@aphis.usda.gov

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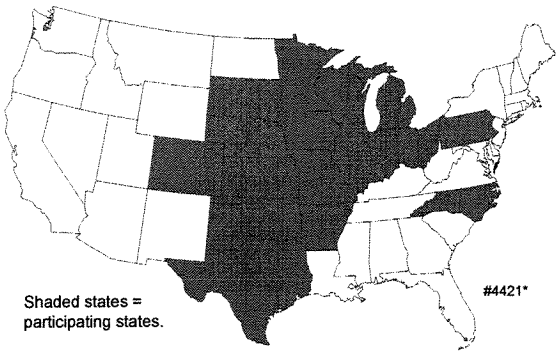
Introduction

As part of the National Animal Health Monitoring System (NAHMS), the USDA:APHIS:Veterinary Services (VS) conducted its first national study of the swine industry with the 1990 National Swine Survey. Study results provided an overview of swine health, productivity, and management for 95 percent of the U.S. swine herd, the population represented by the 1,661 participating producers. The National Swine Survey focused on farrowing sows and preweaning piglets.

NAHMS' second national swine study, Swine '95, was designed to provide both participants and the industry with information on over 90 percent of the U.S. swine herd.

Part I: Reference of Swine Health and Management in the United States, 2000 is the first of a series of reports containing national information resulting from NAHMS' third national swine project, the Swine 2000 study. Swine 2000 was designed to provide both participants and the industry with information on nearly 94 percent of the U.S. swine herd on operations with 100 or more pigs. Data for Part I were collected from 2,499 swine production sites from 2,328 operations. The USDA's National Agricultural Statistics Service (NASS) collaborated with VS to select a producer sample statistically designed to provide inferences to the nation's swine population of operations with 100 or more pigs. Included in the study were 17 of the major pork-producing states (see map) that accounted for 94 percent of the U.S. pig inventory and 92 percent of U.S. pork producers with 100 or more pigs. NASS interviewers contacted producers from June 1 through July 14, 2000.

States Participating in the Swine 2000 Study



Part II: Reference of Swine Health & Health Management in the United States, 2000 is the second of a series of reports from NAHMS' Swine 2000 study. Data were collected from 895 swine production sites by Federal and State Veterinary Medical Officers (VMOs) and Animal Health Technicians (AHTs) from August 21, 2000, through November 3, 2000. (Data for the upcoming Part III were collected from December 1, 2000, through February 28, 2001). This second phase of data collection included those sites that responded to NASS enumerators in phase one and agreed to continue participating.

Methodology and number of respondents can be found at the end of this report. Further information on NAHMS studies and reports is available online at: www.aphis.usda.gov/vs/ceah/cahm

For questions about either report or additional copies, please contact one of the addresses shown below.

Before May 20, 2002

Centers for Epidemiology and Animal Health
USDA:APHIS:VS, Attn. NAHMS
555 South Howes
Fort Collins, Colorado 80521
(970) 490-8000
NAHMSweb@aphis.usda.gov

After May 20, 2002

Centers for Epidimiology and Animal Health
USDA:APHIS:VS, Attn. NAHMS
2150 Centre Avenue, Building B
Fort Collins, CO 80526
(970) 494-7400
NAHMSweb@aphis.usda.gov

* Identification numbers are assigned to each graph in this report, for public reference.

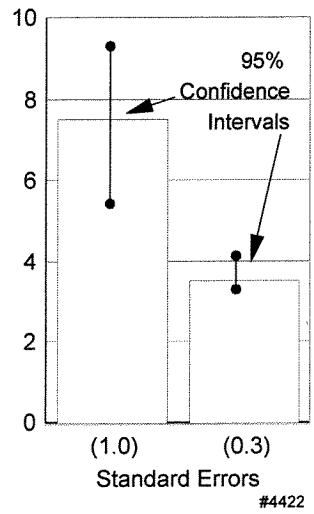
Terms Used in This Report

N/A: Not applicable.

Percent animals: The number of animals on sites with a certain attribute divided by the total number of animals on all sites. In some cases, it is assumed the attribute applies to all animals on the site. The animal type is defined in each table and may include total inventory, sow inventory, number of pigs that entered the nursery, or other specific pig groups. The "percent animals" estimates reflect the larger sites which have the majority of pigs.

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 reflect the smaller producers, since they make up the majority of operations.

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, then confidence intervals created in this manner will contain the true population mean 95 out of 100 times. In the example at right, 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 two. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported. If there were no reports of the event, no standard error was reported. See the table below for an example:

Estimate	Stand. Error	Interpretation
0.0	(--)	All respondents answered "no" to question
0.0	(0.0)	<0.1 percent answered "yes" to question
NA	(--)	No respondents answered question
*	(--)	Too few respondents to report estimate

Sample profile: Information that describes characteristics of the sites from which Swine 2000 data were collected.
Site: Distinct geographic locations or premises designated as a production site for commercial swine. Multiple premises were considered to be one site if a single farm manager was involved in the day-to-day activities at all locations. (See operation selection in methodology section for details on site selection within operations.)
Total inventory: All swine present on the site on June 1, 2000.
Too few respondents to report estimate: If the denominator was less than 20, estimates were not reported, except where noted.

Section I: Population Estimates

A. Inventory

1. Types of animals

a. Percent of sites with the following types of animals[1], by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Type of Animal	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Breeding females	59.9	(3.9)	43.2	(3.4)	49.4	(8.1)	56.9	(3.2)
Weaned market pigs	89.7	(3.0)	95.8	(1.3)	92.8	(5.1)	90.8	(2.5)

[1] Animals on the site in the 12 months prior to the interview.

B. Breeding Females - Health and Management

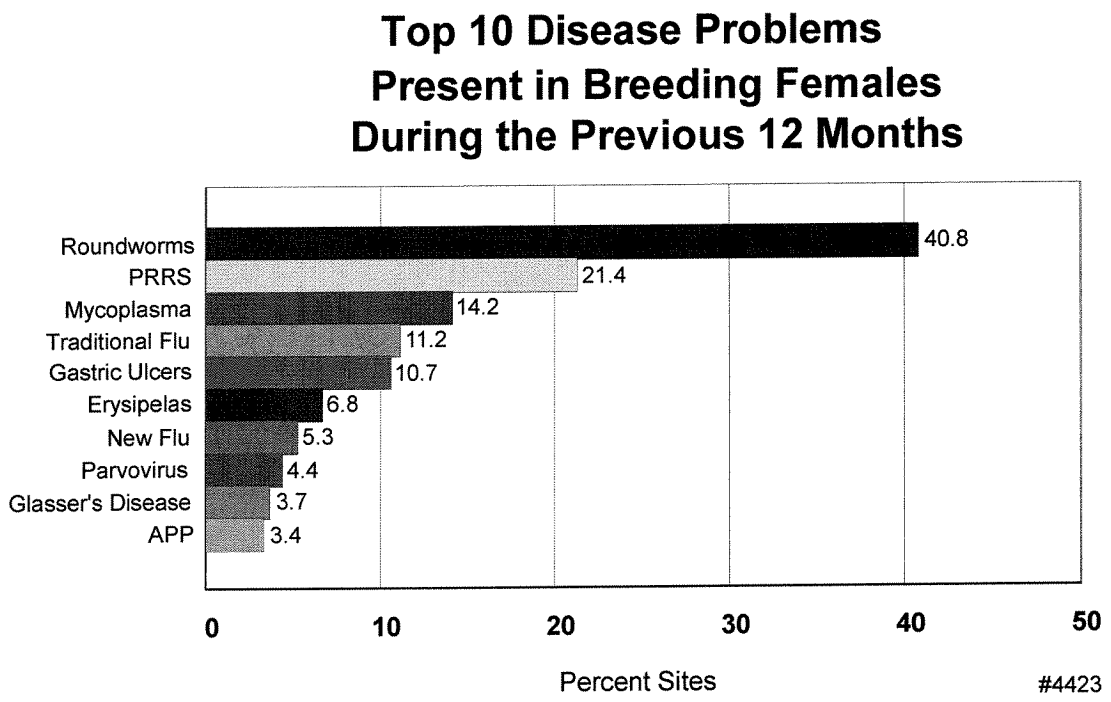
(All tables in section "B" are for sites that had breeding females during the 12 months prior to the interview.)

1. Disease problems present in breeding females during the previous 12 months

Regardless of herd size, the two health problems reported most often in breeding herds were roundworms and PRRS. However, PRRS was reported much less frequently in small herds (15.1 percent) than large herds (58.3 percent). Either mycoplasma or new swine flu (H3N2) were the next most prevalent problems. Swine dysentery was the only disease reported more commonly on small sites than on other sites. Other reported disease problems were ileitis, streptococcus, and mange/lice.

a. Percent of sites where the following disease problems were present in breeding females during the previous 12 months:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Disease Problem	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
APP (*Actinobacillus pleuropneumoniae, Haemophilus*)	2.0	(0.8)	9.1	(2.4)	9.2	(2.7)	3.4	(0.8)
PRRS (porcine reproductive and respiratory syndrome)	15.1	(3.4)	39.8	(7.0)	58.3	(5.5)	21.4	(3.1)
Mycoplasma pneumonia	11.0	(2.5)	22.5	(5.0)	33.9	(5.7)	14.2	(2.2)
New swine flu (swine influenza virus H3N2)	1.3	(0.6)	24.2	(7.0)	20.4	(4.2)	5.3	(1.1)
Traditional swine flu (swine influenza virus H1N1)	6.1	(1.7)	38.2	(7.4)	27.2	(4.7)	11.2	(1.9)
Salmonella	1.4	(0.7)	3.7	(1.5)	8.8	(5.0)	2.3	(0.7)
Swine dysentery	1.3	(0.6)	1.1	(0.7)	0.7	(0.7)	1.3	(0.5)
TGE (transmissible gastroenteritis)	2.0	(0.8)	3.8	(1.5)	4.7	(1.9)	2.4	(0.7)
Gastric ulcers	8.6	(2.3)	21.3	(6.0)	17.4	(3.3)	10.7	(2.1)
Pseudorabies	0.0	(--)	3.2	(3.1)	4.7	(2.3)	0.7	(0.4)
Leptospirosis	2.8	(0.9)	5.5	(1.8)	4.1	(1.5)	3.2	(0.8)
Parvovirus	2.5	(0.8)	9.3	(3.5)	15.9	(4.4)	4.4	(0.9)
Erysipelas	5.7	(1.7)	9.1	(2.8)	14.2	(4.2)	6.8	(1.5)
Glasser's disease *(Haemophilus parasuis)*	1.7	(0.8)	12.1	(6.3)	12.4	(3.4)	3.7	(1.0)
Roundworms	39.3	(5.6)	54.7	(6.7)	38.2	(5.7)	40.8	(4.7)
Other disease problems in breeding females	7.2	(2.5)	20.2	(7.2)	13.7	(3.4)	9.1	(2.2)


Top 10 Disease Problems
Present in Breeding Females
During the Previous 12 Months
Roundworms
PRRS
Mycoplasma
Traditional Flu
Gastric Ulcers
Erysipelas
New Flu
Parvovirus
Glasser's Disease
APP
40.8
21.4
14.2
11.2
10.7
6.8
5.3
4.4
3.7
3.4
0
10
20
30
40
50
Percent Sites
#4423

The disease conditions diagnosed most commonly by a veterinarian or laboratory were swine influenza, Glasser's disease, and PRRS. Roundworms and erysipelas were least likely to be diagnosed by a veterinarian or laboratory.

b. For sites where the following disease problems were present in breeding females during the previous 12 months, percent of sites where the disease was diagnosed by a veterinarian or laboratory:

Disease Problem	Percent Sites	Standard Error
APP (*Actinobacillus pleuropneumoniae*, *Haemophilus*)	43.3	(10.1)
PRRS (Porcine reproductive and respiratory syndrome)	76.7	(6.8)
Mycoplasma pneumonia	52.3	(7.5)
New swine flu (swine influenza virus H3N2)	88.0	(5.7)
Traditional swine flu (swine influenza virus H1N1)	61.4	(8.4)
Salmonella	2.3	(0.7)
Swine dysentery	6.2	(6.0)
TGE (transmissible gastroenteritis)	75.2	(12.2)
Gastric ulcers	44.1	(9.6)
Pseudorabies	81.5	16.7)
Leptospirosis	40.5	(11.7)
Parvo virus	52.0	(9.5)
Erysipelas	27.5	(8.5)
Glasser's disease *(Haemophilus parasuis)*	83.0	(9.0)
Roundworms	17.3	(6.7)
Other disease problems in breeding females	37.5	(10.7)

2. Disease problems present in suckling pigs during the previous 12 months

The top three diseases in suckling piglets were colibacillosis, meningitis, and greasy pig disease, which were present on at least half the sites with a breeding inventory of 250 or more. Porcine reproductive and respiratory syndrome (PRRS) was found in preweaned pigs on 10.7 percent of sites.

a. Percent of sites where the following disease problems were present in preweaned (suckling) pigs during the previous 12 months, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Disease Problem	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
PRRS (porcine reproductive and respiratory syndrome)	8.2	(2.6)	20.3	(5.5)	22.2	(4.1)	10.7	(2.3)
TGE (transmissible gastroenteritis)	2.8	(1.0)	6.2	(3.0)	4.2	(1.9)	3.2	(0.9)
Rotavirus	3.8	(1.5)	8.8	(2.5)	19.0	(4.1)	5.7	(1.3)
Escherichia coli (colibacillosis)	42.4	(5.9)	49.5	(6.9)	65.8	(5.1)	45.2	(4.8)
Coccidiosis	6.0	(1.8)	15.2	(4.5)	25.2	(5.8)	8.6	(1.7)
Clostridium	6.1	(1.7)	16.2	(4.9)	27.0	(5.8)	9.0	(1.7)
Streptococcus suis (meningitis, polyserositis, arthritis)	24.1	(5.2)	50.7	(6.9)	57.6	(5.7)	29.8	(4.3)
Greasy pig disease (*Staphylococcus hyicus*)	19.6	(3.7)	52.7	(6.8)	52.4	(5.6)	25.9	(3.4)
Other disease problems in preweaned pigs	6.3	(2.5)	1.3	(0.8)	4.8	(1.8)	5.7	(2.0)

The three diseases reported most commonly in preweaned suckling pigs (colibacillosis, meningitis, and greasy pig disease) were the least likely to be diagnosed by a veterinarian or laboratory.

b. For sites where the following disease problems were present in preweaned (suckling) pigs during the previous 12 months, percent of sites where the disease was diagnosed by a veterinarian or a laboratory:

Disease	Percent Sites	Standard Error
PRRS (Porcine reproductive and respiratory syndrome)	58.5	(11.0)
TGE (transmissible gastroenteritis)	40.3	(12.2)
Rotavirus	64.6	(9.6)
Escherichia coli (colibacillosis)	23.1	(4.4)
Coccidiosis	58.8	(9.8)
Clostridium	60.7	(8.9)
Streptococcus suis (meningitis, polyserositis, arthritis)	38.3	(7.3)
Greasy pig disease (*Staphylococcus hyicus*)	32.2	(5.8)
Other disease problems in preweaned pigs	38.6	(15.3)

3. Mycoplasma vaccination

A mycoplasma vaccine was used in breeding females on 20.9 percent of sites. Large sites (46.2 percent) were more likely to use a mycoplasma vaccine than small sites (15.3 percent). Nearly 40 percent of all breeding females were on sites that administered mycoplasma vaccine. **Note:** Estimates for "individual vaccine type" do not add up to estimates for "any vaccine use" because some respondents did not know the specific type of mycoplasma vaccine being used.

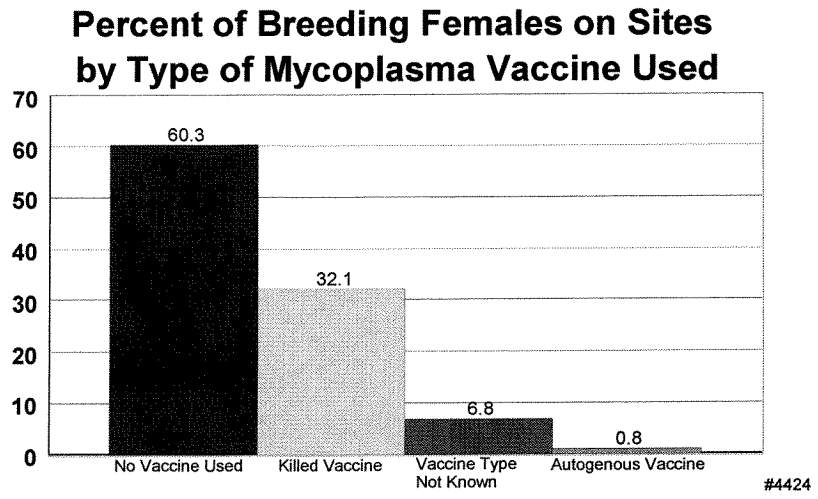
a. Vaccine type

i. Percent of breeding females on sites that used the following types of mycoplasma vaccine during the previous ***6 months***:

Vaccine Type	Percent Breeding Females	Standard Error
Killed vaccine	32.1	(4.5)
Autogenous mycoplasma vaccine	0.8	(0.3)
Any type of mycoplasma vaccine	39.7	(4.5)

ii. Percent of sites that used the following types of mycoplasma vaccine in breeding females during the previous ***6 months***, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Vaccine Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Killed vaccine	11.1	(2.8)	36.5	(7.1)	37.4	(5.3)	15.9	(2.6)
Autogenous Mycoplasma vaccine	0.4	(0.3)	2.2	(1.3)	0.6	(0.3)	0.6	(0.3)
Any type of mycoplasma vaccine	15.3	(3.1)	43.6	(7.0)	46.2	(5.5)	20.9	(2.9)



The vast majority of sites that vaccinated breeding females for mycoplasma vaccinated young gilts prior to entering the breeding herd (15.6 of 20.9 = 74.6 percent).

b. Vaccine timing

i. Percent of sites that vaccinated breeding females against mycoplasma pneumonia during the following reproductive time periods, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Time Period	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Prior to entering the breeding herd, i.e., as young pigs	12.2	(2.9)	25.5	(5.9)	36.3	(5.3)	15.6	(2.6)
As gilts at time of entering the breeding herd	6.1	(1.8)	20.6	(5.3)	24.7	(4.7)	9.2	(1.7)
During gestation up to 4 weeks ***before*** farrowing	3.7	(1.4)	12.0	(5.8)	9.0	(2.5)	5.0	(1.3)
During the ***last*** 4 weeks of gestation	3.8	(1.3)	9.2	(3.7)	7.8	(2.1)	4.7	(1.2)
Between farrowing through weaning	0.9	(0.6)	1.1	(0.8)	2.1	(1.1)	1.0	(0.5)
After weaning through the breeding period	0.3	(0.1)	8.0	(3.9)	1.8	(1.4)	1.2	(0.4)
Once or twice a year, regardless of reproductive stage	1.3	(0.9)	2.5	(1.4)	3.0	(1.8)	1.6	(0.7)
Vaccinate during at least one of the above time periods	15.3	(3.1)	43.6	(7.0)	46.2	(5.5)	20.9	(2.9)

Breeding females received only one mycoplasma vaccination on over half the breeding herds that were vaccinated for mycoplasma. This one-time vaccination occurred prior to entry into the breeding herd on the majority of sites (41.3 percent), but also occurred at time of entry (7.4 percent of sites) or after entry (8.9 percent of sites). One-fifth of sites that vaccinated breeding herds for mycoplasma vaccinated all three times: prior to entry, at time of entry, and after entry.

ii. For sites that vaccinated breeding females, percent of sites by combinations of vaccine timing (prior to entry, at entry, in the breeding herd):

Vaccination Timing				
Prior to Entry	At Entry	In the Breeding Herd	Percent Sites	Standard Error
Yes	Yes	Yes	20.2	(5.3)
Yes	Yes	No	8.0	(2.7)
Yes	No	Yes	5.5	(2.0)
No	Yes	Yes	8.7	(2.3)
Yes	No	No	41.3	(6.8)
No	Yes	No	7.4	(3.6)
No	No	Yes	8.9	(3.2)
	Total		100.0	

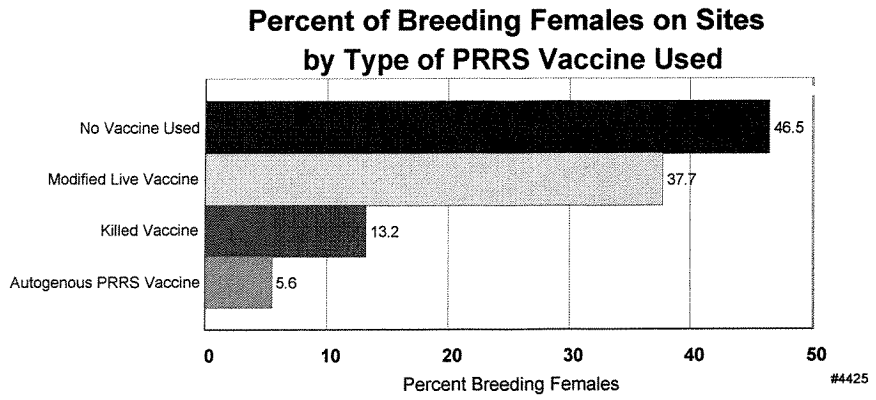
4. Porcine reproductive and respiratory syndrome (PRRS) vaccination and control

Overall, more than half (53.5 percent) of breeding females were on sites that vaccinated against PRRS. Only 37.1 percent of all sites vaccinated breeding females against PRRS, although nearly 70 percent of large sites did so (table 4a.ii). Modified live vaccines were the predominant type of vaccine and were used on about 30 percent of all sites. **Note:** Estimates for "individual vaccine type" do not add up to estimates for "any vaccine use" because some sites used multiple vaccine types or did not know the specific type of PRRS vaccine being used.

a. Vaccine type

i. Percent of breeding females on sites that used the following types of PRRS vaccine during the previous ***6 months***:

Vaccine Type	Percent Breeding Females	Standard Error
Modified live vaccine	37.7	(4.4)
Killed vaccine	13.2	(2.2)
Autogenous PRRS vaccine	5.6	(2.1)
Any type of PRRS vaccine	53.5	(4.7)



ii. Percent of sites that used the following types of PRRS vaccines in breeding females during the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Vaccine Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Modified live vaccine	26.0	(5.8)	50.3	(7.1)	44.2	(5.5)	29.9	(4.8)
Killed vaccine	4.3	(1.5)	18.1	(4.8)	21.4	(4.5)	7.1	(1.4)
Autogenous PRRS vaccine	0.1	(0.1)	2.6	(1.3)	7.4	(5.2)	1.0	(0.5)
Any type of PRRS vaccine	30.6	(5.8)	60.8	(6.8)	69.4	(5.1)	37.1	(4.7)

b. Vaccine timing

Nineteen percent of sites that vaccinated breeding females against PRRS used more than one brand or type of PRRS vaccine during the previous 6 months.

i. For sites that vaccinated breeding females against PRRS, percent of sites that used more than one brand or type of PRRS vaccine in breeding females during the previous ***6 months,*** by size of site:

Percent Sites								
Size of Site (Sow and Gilt Inventory)								
Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
14.3	(5.1)	38.2	(8.7)	20.1	(5.1)	19.0	(4.2)

The majority of breeding females that received PRRS vaccine were vaccinated at the time of entry into the breeding herd (29.9 of 37.1 = 80.6 percent).

ii. Percent of sites that usually vaccinated breeding females against PRRS during the following time periods, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Time Period	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Prior to entering the breeding herd, i.e., as young pigs	6.2	(1.9)	21.0	(6.5)	32.8	(5.7)	10.0	(1.9)
As gilts at time of entering the breeding herd	24.1	(5.7)	51.1	(6.9)	59.3	(5.3)	29.9	(4.6)
During gestation up to 4 weeks ***before*** farrowing	1.9	(0.8)	15.9	(6.5)	20.3	(5.3)	4.9	(1.2)
During the ***last*** 4 weeks of gestation	5.7	(2.4)	8.3	(3.1)	11.5	(4.9)	6.5	(2.0)
Between farrowing through weaning	14.5	(5.5)	23.7	(6.4)	20.7	(3.8)	15.9	(4.5)
After weaning through the breeding period	8.1	(2.7)	10.3	(4.3)	12.3	(5.5)	8.7	(2.3)
At regular intervals, regardless of reproductive stage	2.4	(1.2)	7.8	(4.0)	7.3	(2.9)	3.4	(1.1)
Vaccinate during at least one of the above time periods	30.6	(5.8)	60.8	(6.8)	69.4	(5.1)	37.1	(4.7)

For one-fifth of PRRS-vaccinated breeding herds, breeding females received one vaccination. Over half the sites vaccinating females for PRRS did so at entry to and while in the breeding herd.

iii. For sites that vaccinated breeding females against PRRS, percent of sites by combinations of vaccine timing (prior to entry, at entry, in the breeding herd), by size of site:

Vaccination Timing				
Prior to Entry	At Entry	In the Breeding Herd	Percent Sites	Standard Error
Yes	Yes	Yes	14.7	(4.0)
Yes	Yes	No	5.0	(2.1)
Yes	No	No	2.7	(1.0)
Yes	No	Yes	4.6	(2.2)
No	Yes	Yes	55.5	(7.7)
No	Yes	No	5.6	(1.6)
No	No	Yes	11.9	(4.7)
	Total		100.0	

PRRS is difficult to control. Various methods were employed by producers. The most common strategy was to receive only PRRS-negative semen or boars. Large and medium sites acclimatized gilts more commonly than small sites to control PRRS.

c. Control of PRRS

i. Percent of sites where the following measures were used ***specifically*** to control or prevent PRRS in breeding females, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Control Measure	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Obtain replacement gilts from PRRS- negative source	18.4	(4.1)	48.2	(6.9)	46.7	(5.7)	23.9	(3.6)
Test replacement gilts for PRRS	4.5	(1.5)	24.6	(5.7)	32.2	(4.9)	9.0	(1.6)
Acclimate incoming gilts to PRRS	8.8	(2.0)	45.6	(7.0)	57.1	(5.4)	16.7	(2.3)
Herd closed to new gilt introduction (no purchased gilts)	26.2	(5.2)	16.6	(4.3)	28.1	(5.3)	25.4	(4.3)
Receive only PRRS-negative semen or boars	28.2	(4.6)	53.2	(6..9)	56.9	(5.7)	33.3	(4.0)
Other measures, excluding vaccination	0.8	(0.5)	1.0	(0.6)	5.1	(2.6)	1.2	(0.5)
Any of the above	50.4	(5.9)	86.2	(3.4)	89.9	(2.6)	57.4	(5.0)

5. Swine influenza virus (SIV) vaccination

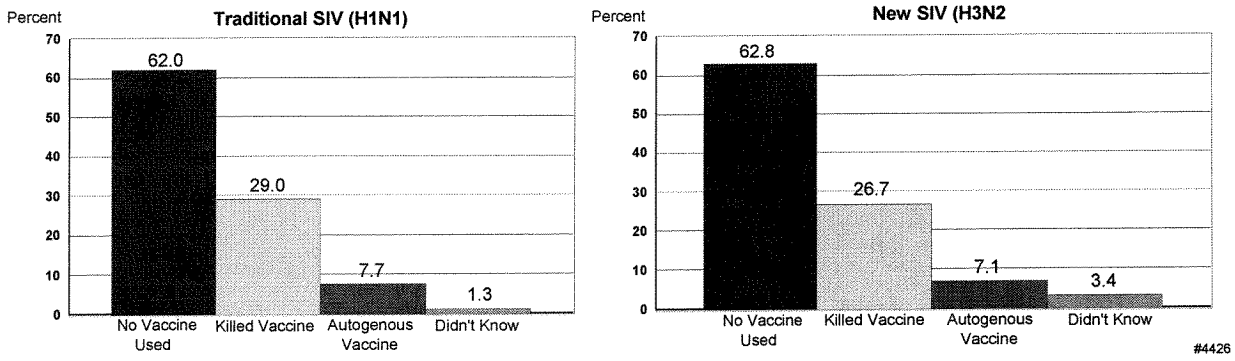
a. Vaccine type

In the six months prior to the administration of the study questionnaire, 31.0 percent of breeding females resided on sites that used both types of influenza vaccines (H1N1 and H3N2).

i. Percent of breeding females on sites that used the following types of swine influenza virus vaccine during the previous ***6 months:***

Vaccine Type	Percent Breeding Females	Standard Error
Killed SIV H1N1 vaccine	29.0	(4.9)
Autogenous SIV H1N1 vaccine	7.7	(2.6)
Any SIV H1N1 vaccine	38.0	(4.7)
Killed SIV H3N2 vaccine	26.7	(4.9)
Autogenous SIV H3N2 vaccine	7.1	(2.7)
Any SIV H3N2 vaccine	37.2	(4.7)
Both SIV H1N1 and H3N2 vaccines	31.0	(4.8)
Any SIV vaccine	44.1	(4.5)

Percent of Breeding Females on Sites by Type of SIV Vaccine Used



Breeding females were vaccinated against traditional Swine Influenza Virus (SIV H1N1) on 11.2 percent of sites. The newer SIV H3N2 influenza vaccine was used on 10.6 percent of sites, while both vaccines were used on 7.6 percent of sites. Very few small sites used "any SIV vaccine." Estimates for any vaccine use do not total, since some respondents did not know the specific vaccine type used.

ii. Percent of sites that used the following types of swine influenza virus vaccine in breeding females during the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Vaccine Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Killed SIV H1N1 vaccine	3.0	(1.3)	33.8	(7.5)	32.2	(5.1)	8.7	(1.6)
Autogenous SIV H1N1 vaccine	0.2	(0.2)	6.3	(2.4)	7.9	(3.2)	1.5	(0.4)
Any SIV H1N1 vaccine	4.4	(1.4)	39.4	(7.3)	42.4	(5.5)	11.2	(1.8)
Killed SIV H3N2 vaccine	3.9	(1.7)	21.9	(7.9)	27.4	(4.8)	7.7	(1.8)
Autogenous SIV H3N2 vaccine	0.4	(0.4)	5.3	(2.2)	9.9	(5.0)	1.7	(0.6)
Any SIV H3N2 vaccine	5.0	(1.8)	29.4	(7.6)	41.5	(5.7)	10.6	(1.9)
Both SIV H1N1 and H3N2 vaccines	2.9	(1.2)	28.5	(7.7)	28.1	(4.8)	7.6	(1.6)
Any SIV vaccine	6.5	(1.9)	40.2	(7.2)	55.8	(5.5)	14.2	(2.2)

Of sites that vaccinated breeding females for swine influenza virus H1N1 (11.2 percent), over 70 percent (8.0 of 11.2 = 71.4 percent) vaccinated gilts at time of entry into the breeding herd.

b. Vaccine timing

i. Percent of sites that vaccinated breeding females against swine influenza virus H1N1(traditional swine flu) during the following time periods, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Time Period	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Prior to entering the breeding herd, i.e., as young pigs	2.1	(0.9)	10.2	(3.4)	23.3	(5.0)	4.8	(1.0)
As gilts at time of entering the breeding herd	2.7	(1.2)	27.0	(6.8)	35.4	(5.4)	8.0	(1.5)
During gestation up to 4 weeks ***before*** farrowing	0.6	(0.3)	7.6	(2.1)	13.2	(3.4)	2.4	(0.5)
During the ***last*** 4 weeks of gestation	1.8	(1.0)	14.9	(6.2)	11.9	(2.8)	4.0	(1.1)
Between farrowing through weaning	0.2	(0.2)	11.1	(6.4)	4.2	(2.6)	1.7	(0.8)
After weaning through the breeding period	1.0	(0.7)	2.6	(1.4)	3.1	(2.6)	1.3	(0.6)
Once or twice a year, regardless of reproductive stage	0.5	(0.5)	6.0	(2.6)	5.9	(2.8)	1.5	(0.5)
Vaccinate during at least one of the above time periods	4.4	(1.4)	39.4	(7.3)	42.4	(5.5)	11.2	(1.8)

ii. Percent of sites that vaccinated breeding females against swine influenza virus H3N2 (new swine flu) during the following time periods, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Time Period	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Prior to entering the breeding herd, i.e., as young pigs	1.4	(0.8)	6.0	(2.5)	19.9	(5.5)	3.5	(0.9)
As gilts at time of entering the breeding herd	4.0	(1.7)	17.9	(6.7)	33.1	(5.8)	8.0	(1.7)
During gestation up to 4 weeks ***before*** farrowing	0.2	(0.2)	9.1	(6.2)	17.1	(5.3)	2.6	(0.9)
During the ***last*** 4 weeks of gestation	1.6	(1.0)	13.9	(6.6)	14.4	(5.1)	3.9	(1.2)
Between farrowing through weaning	2.0	(1.1)	7.0	(5.5)	1.5	(0.7)	2.4	(1.1)
After weaning through the breeding period	0.0	(--)	0.8	(0.8)	1.3	(0.6)	0.2	(0.1)
Once or twice a year, regardless of reproductive stage	0.0	(0.0)	5.5	(2.6)	7.1	(2.9)	1.2	(0.4)
Vaccinate during at least one of the above time periods	5.0	(1.8)	29.4	(7.6)	41.5	(5.7)	10.6	(1.9)

6. Use of antibiotics to treat sows

Antibiotics are frequently administered to sows for various disease conditions. Over 60 percent of sites gave antibiotics to treat disease conditions in breeding sows. Sites with 250 or more sows and gilts were more likely than sites with fewer sows and gilts to have given antibiotics to treat disease.

a. Sows treated with antibiotics

i. Percent of sites that gave antibiotics to ***treat*** disease conditions in breeding females during the previous ***12 months,*** by size of site:

Percent Sites								
Size of Site (Sow and Gilt Inventory)								
Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
56.1	(5.8)	84.2	(3.4)	82.3	(3.9)	61.3	(4.9)

b. Treatment records

Records on the administration of any antibiotics should be maintained. For sites that gave antibiotics to sows, 58.7 percent kept some type of record. Large and medium sites were more likely than small sites to keep records of these treatments. The most common records kept were drug used, date, and animal identification.

i. For sites that gave antibiotics to treat disease conditions in breeding females, percent of sites that recorded the following types of information, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Type of Information Recorded	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Animal ID	27.4	(5.4)	73.2	(6.3)	72.4	(6.5)	39.0	(5.0)
Pen ID	17.8	(4.3)	31.3	(7.0)	38.2	(5.8)	22.0	(3.6)
Facility or house ID	10.3	(2.6)	29.7	(7.6)	33.3	(5.4)	15.7	(2.6)
Site ID	7.6	(2.1)	13.6	(4.5)	27.9	(5.0)	10.8	(1.9)
Date of treatment	30.4	(5.7)	76.6	(5.6)	76.6	(6.5)	42.2	(5.2)
Name of drug	30.2	(5.8)	78.5	(5.3)	78.0	(6.4)	42.5	(5.2)
Dose	21.9	(5.1)	51.7	(8.0)	52.6	(6.5)	29.6	(4.4)
Route used	15.8	(4.8)	17.2	(7.6)	27.2	(4.7)	17.3	(3.8)
Who administered the drug	13.8	(4.4)	30.7	(7.6)	34.4	(5.8)	18.5	(3.7)
Withdrawal time or date withdrawal period is completed	28.3	(6.3)	25.2	(7.5)	28.5	(4.7)	27.9	(4.9)
Outcome of treatment	5.3	(1.9)	5.2	(3.3)	9.2	(2.6)	5.7	(1.5)
Other data recorded	2.6	(1.2)	6.8	(3.0)	4.9	(2.1)	3.4	(1.0)
Any data recorded	49.7	(7.5)	86.5	(4.5)	83.3	(6.4)	58.7	(6.1)

c. Selection of antibiotics

The owner was the primary decision-maker concerning which antibiotics were used to treat sick breeding females on 45.9 percent of sites.

i. Percent of sites that identified the following person as the primary decision maker for deciding which antibiotics to use for the ***treatment of sick breeding females*** on site, by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Primary Decision Maker	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Owner of the operation	46.2	(5.8)	58.9	(6.4)	28.5	(4.6)	45.9	(4.8)
Farm manager on site, but not the owner	3.2	(1.4)	11.1	(3.9)	22.9	(4.5)	5.7	(1.3)
Local veterinary practitioner	6.3	(2.7)	9.9	(4.0)	11.5	(5.1)	7.2	(2.3)
Consulting or second opinion veterinarian	0.3	(0.2)	1.2	(0.9)	3.7	(1.6)	0.7	(0.3)
Company veterinarian or company nutritionist	0.1	(0.1)	2.4	(1.1)	7.8	(2.5)	1.0	(0.3)
Service manager who oversees more than one operation	0.0	(--)	0.7	(0.5)	3.8	(1.9)	0.4	(0.2)
Other person	0.0	(--)	0.0	(--)	4.1	(3.7)	0.4	(0.3)
Operation did not use antibiotics on sick breeding females	43.9	(5.8)	15.8	(3.4)	17.7	(3.9)	38.7	(4.9)
Total	100.0		100.0		100.0		100.0	

7. Introduction of gilts

Almost 70 percent of sites introduced at least one group of gilts into the breeding herd during the previous six months. For sites with at least 250 sows/gilts, less than 2.0 percent did not introduce any breeding females. Three or more groups were introduced on 31.9 percent of sites.

a. Percent of sites that introduced the following number of ***groups*** of gilts into the sow herd as breeding animals during the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Number of Groups of Gilts	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0	38.1	(5.9)	1.9	(1.1)	1.6	(0.6)	31.2	(4.8)
1	25.1	(5.0)	3.4	(1.4)	3.1	(2.3)	21.0	(4.0)
2	16.1	(4.3)	15.3	(4.9)	15.2	(4.5)	15.9	(3.6)
3	11.5	(5.0)	34.0	(7.6)	9.1	(2.2)	13.6	(4.1)
4	2.0	(0.8)	7.1	(2.8)	6.7	(2.9)	2.9	(0.8)
5	2.4	(0.9)	3.4	(1.7)	3.4	(1.1)	2.6	(0.7)
6 or more	4.8	(1.4)	34.9	(6.0)	60.9	(5.5)	12.8	(1.8)
Total	100.0		100.0		100.0		100.0	

b. Percent of sites by the average number of gilts per group introduced into the breeding herd during the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Average Number of Gilts per Group	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0	38.1	(5.9)	1.9	(1.1)	1.6	(0.6)	31.2	(4.8)
1-9	17.2	(4.9)	9.9	(2.6)	1.9	(0.8)	15.1	(4.0)
10 -19	26.0	(5.3)	23.8	(5.3)	9.1	(2.4)	24.3	(4.3)
20-49	14.8	(3.6)	45.4	(6.9)	50.0	(5.7)	21.0	(3.2)
50 or more	3.9	(2.3)	19.0	(6.9)	37.4	(5.3)	8.4	(2.1)
Total	100.0		100.0		100.0		100.0	

One-fifth of sites introduced 50 percent or more of their total breeding female inventory within the previous 6 months.

c. Percent of sites by percent of breeding-female inventory introduced within the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Percent of Breeding Female Inventory Introduced in Previous 6 Months	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0.0	38.1	(5.9)	1.9	(1.1)	1.6	(0.6)	31.2	(4.8)
0.1 - 24.9	19.2	(4.5)	42.1	(6.6)	62.3	(5.2)	25.3	(3.8)
25.0 - 49.9	19.6	(4.0)	48.1	(7.1)	28.3	(4.5)	23.3	(3.5)
50 or more	23.1	(5.7)	7.9	(3.4)	7.8	(2.9)	20.2	(4.7)
Total	100.0		100.0		100.0		100.0	

Replacement gilts may be designated as such long before they enter the breeding herd or closer to the time they are needed. Although replacement gilts may be designated before the finishing stage (less than 16 weeks), during the finishing stage, or after the finishing stage (26 weeks or more), there may be a delay in when they are actually commingled with sows in the breeding herd. Over half (53.1 percent) of sites selected gilts during the finisher stage. Over 40 percent of sites waited until gilts were 26 weeks or older (on average) before being designated as part of the breeding herd.

d. For sites that introduced gilts into the sow herd in the previous ***6 months***, percent of sites by site average age (in weeks) of gilts when designated as part of the breeding herd and by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Age When Designated as Part of the Breeding Herd	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 16 weeks	2.3	(1.0)	13.7	(7.0)	14.5	(4.7)	5.5	(1.5)
16 through 25 weeks	52.7	(7.5)	58.0	(7.2)	49.6	(5.8)	53.1	(5.6)
26 weeks or more	45.0	(7.5)	28.3	(5.6)	35.9	(5.7)	41.4	(5.6)
Total	100.0		100.0		100.0		100.0	

On over 60 percent of sites, gilts were not placed with sows until they were 30 weeks of age or more.

e. For sites that introduced gilts into the sow herd in the previous ***6 months***, percent of sites by site average age (in weeks) of gilts when commingled with sows in the breeding herd and by size of site:

	Percent Sites							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Age When Commingled with Sows in the Breeding Herd	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 26 weeks	20.1	(4.9)	22.7	(7.1)	19.2	(3.9)	20.3	(3.8)
26 through 29 weeks	14.0	(3.6)	30.8	(6.8)	35.2	(6.0)	19.1	(3.2)
30 weeks or more	65.9	(6.2)	46.5	(7.2)	45.6	(5.7)	60.6	(5.0)
Total	100.0		100.0		100.0		100.0	

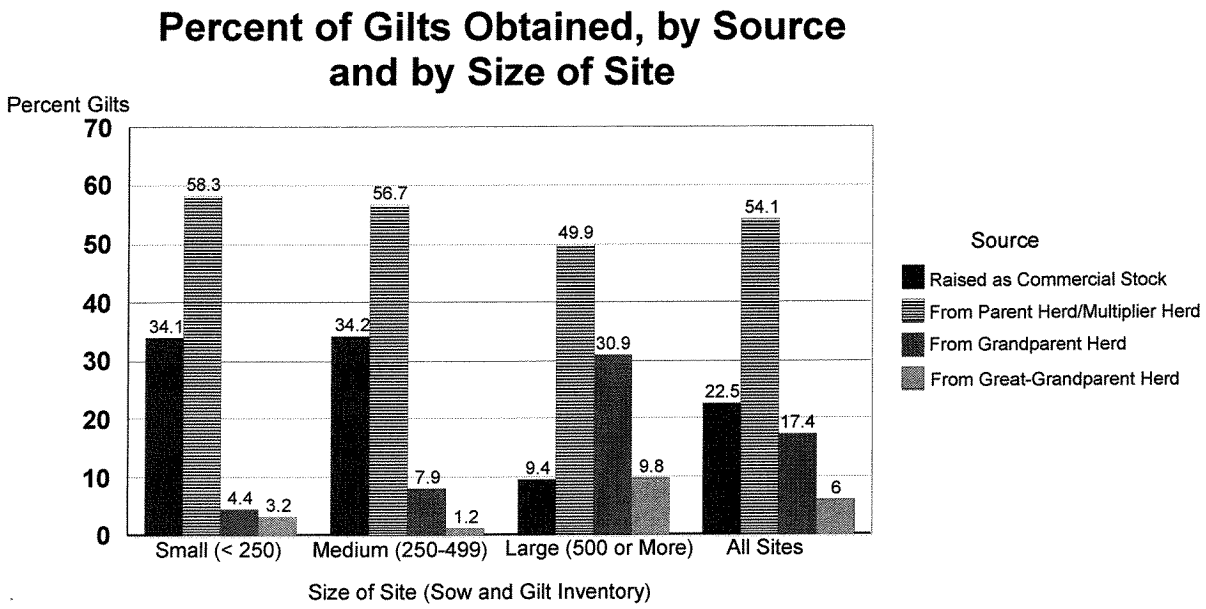
Over half (54.1 percent) the gilts introduced in the previous 6 months were from a parent herd/multiplier herd, and 22.5 percent of introduced gilts were raised as commercial stock (i.e., terminal cross females), although this was more common on small and medium sites.

f. Gilt Sources

i. For sites that introduced gilts into the sow herd in the previous ***6 months***, percent of gilts obtained from the following sources, by size of site:

	Percent Gilts							
	Size of Site (Sow and Gilt Inventory)							
	Small (Less than 250)		Medium (250-499)		Large (500 or More)		All Sites	
Source	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Raised as commercial stock[1] (terminal cross females)	34.1	(9.1)	34.2	(10.1)	9.4	(2.5)	22.5	(3.7)
From a parent herd/multiplier herd (crossing farm)	58.3	(10.2)	56.7	(9.0)	49.9	(7.2)	54.1	(5.4)
From a grandparent herd	4.4	(2.0)	7.9	(3.6)	30.9	(6.8)	17.4	(3.9)
From a great-grandparent herd	3.2	(1.8)	1.2	(0.9)	9.8	(3.9)	6.0	(2.0)
Total	100.0		100.0		100.0		100.0	

[1]Internal replacements included in this category.


Percent of Gilts Obtained, by Source and by Size of Site
Percent Gilts
70
60
50
40
30
20
10
0
34.1
58.3
4.4
3.2
34.2
56.7
7.9
1.2
9.4
49.9
30.9
9.8
22.5
54.1
17.4
6
Small (< 250)
Medium (250-499)
Large (500 or More)
All Sites
Size of Site (Sow and Gilt Inventory)
Source
Raised as Commercial Stock
From Parent Herd/Multiplier Herd
From Grandparent Herd
From Great-Grandparent Herd

C. Weaned Pigs - Health and Management

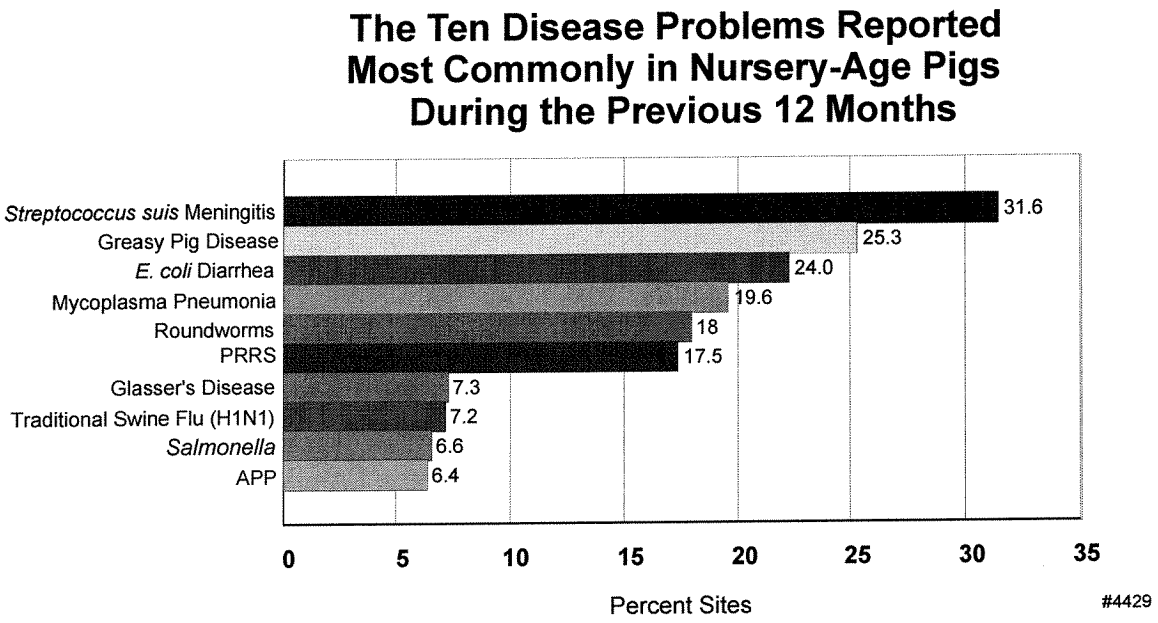
(All tables in Section "C" are for those sites with nursery-age pigs and/or grower/finisher pigs during the 12 months prior to the interview).

Regardless of herd size, the most prevalent disease problem in nursery-age pigs was *Streptococcus suis* (meningitis). Other more prevalent diseases depended on herd size. For example, greasy pig was the second or third most common disease reported on sites with less than 10,000 total inventory, and PRRS was the second most common disease reported on sites with 10,000 or more total inventory.

1. Disease problems present in nursery-age pigs during the previous 12 months

a. For sites with nursery-age pigs, percent of sites where the following disease problems were present in nursery-age pigs during the previous 12 months, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Disease Problem	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
APP (*Actinobacillus pleuropneumoniae*, *Haemophilus*)	5.2	(1.3)	11.6	(2.4)	13.4	(6.5)	6.4	(1.2)
Glasser's disease *(Haemophilus parasuis)*	3.7	(1.0)	22.5	(3.8)	38.4	(10.3)	7.3	(1.2)
Mycoplasma pneumonia	14.6	(2.5)	41.5	(3.9)	52.7	(9.7)	19.6	(2.4)
New swine flu (swine influenza virus H3N2)	0.5	(0.3)	6.9	(2.1)	13.4	(6.8)	1.8	(0.5)
Traditional swine flu (swine influenza virus H1N1)	4.9	(1.6)	15.9	(2.6)	36.9	(8.8)	7.2	(1.4)
PRRS (porcine reproductive and respiratory syndrome)	13.4	(4.1)	33.8	(3.9)	58.0	(8.7)	17.5	(3.4)
Salmonella	5.5	(1.4)	12.2	(2.2)	8.4	(3.4)	6.6	(1.2)
Swine dysentery	2.8	(1.1)	5.3	(1.9)	1.9	(1.5)	3.2	(1.0)
TGE (transmissible gastroenteritis)	0.8	(0.4)	2.0	(0.9)	4.5	(2.2)	1.0	(0.4)
E. coli diarrhea	22.1	(5.4)	32.1	(3.9)	40.7	(11.5)	24.0	(4.4)
Edema disease	5.1	(2.0)	11.5	(2.5)	3.3	(2.1)	6.1	(1.7)
Post-weaning multi-systemic wasting syndrome (PMWS) or Circovirus	4.4	(1.5)	10.4	(2.0)	20.9	(7.4)	5.7	(1.3)
Greasy pig disease (*Staphylococcus hyicus*)	21.3	(3.6)	43.9	(4.0)	34.2	(8.1)	25.3	(3.2)
Streptococcus suis (meningitis)	24.0	(3.8)	64.9	(3.7)	76.7	(7.2)	31.6	(3.5)
Roundworms	20.9	(3.9)	4.5	(1.7)	6.9	(4.6)	18.0	(3.2)
Other disease problems in nursery-age pigs	3.1	(0.9)	7.2	(2.0)	8.3	(5.6)	3.9	(0.9)


The Ten Disease Problems Reported Most Commonly in Nursery-Age Pigs During the Previous 12 Months
Streptococcus suis Meningitis
Greasy Pig Disease
E. coli Diarrhea
Mycoplasma Pneumonia
Roundworms
PRRS
Glasser's Disease
Traditional Swine Flu (H1N1)
Salmonella
APP
31.6
25.3
24.0
19.6
18
17.5
7.3
7.2
6.6
6.4
0
5
10
15
20
25
30
35
Percent Sites
#4429

The disease problems diagnosed most commonly by a veterinarian or laboratory were Glasser's disease, *Salmonella*, and PRRS. Roundworms, PMWS, and Greasy pig disease were least likely to be diagnosed by a veterinarian or laboratory.

b. For sites where the following diseases were present in nursery-age pigs during the previous 12 months, percent of sites where the disease was diagnosed by a veterinarian or laboratory:

Disease Problem	Percent Sites	Standard Error
APP (*Actinobacillus pleuropneumoniae*, *Haemophilus*)	59.1	(9.0)
Glasser's disease *(Haemophilus parasuis)*	81.6	(5.8)
Mycoplasma pneumonia	53.0	(5.3)
New swine flu (swine influenza virus H3N2)	*	(--)
Traditional swine flu (swine influenza virus H1N1)	46.5	(9.4)
PRRS (porcine reproductive and respiratory syndrome)	67.8	(8.8)
Salmonella	68.0	(8.1)
Swine dysentery	*	(--)
TGE (transmissible gastroenteritis)	*	(--)
E. coli diarrhea	32.7	(7.5)
Edema disease	33.9	(10.4)
Post-weaning multi-systemic wasting syndrome (PMWS) or Circovirus	29.6	(7.9)
Greasy pig disease (*Staphylococcus hyicus*)	28.2	(5.2)
Streptococcus suis (meningitis)	53.8	(5.5)
Roundworms	2.9	(1.7)
Other disease problems in nursery-age pigs	57.1	(12.5)

*Too few respondents to report estimate.

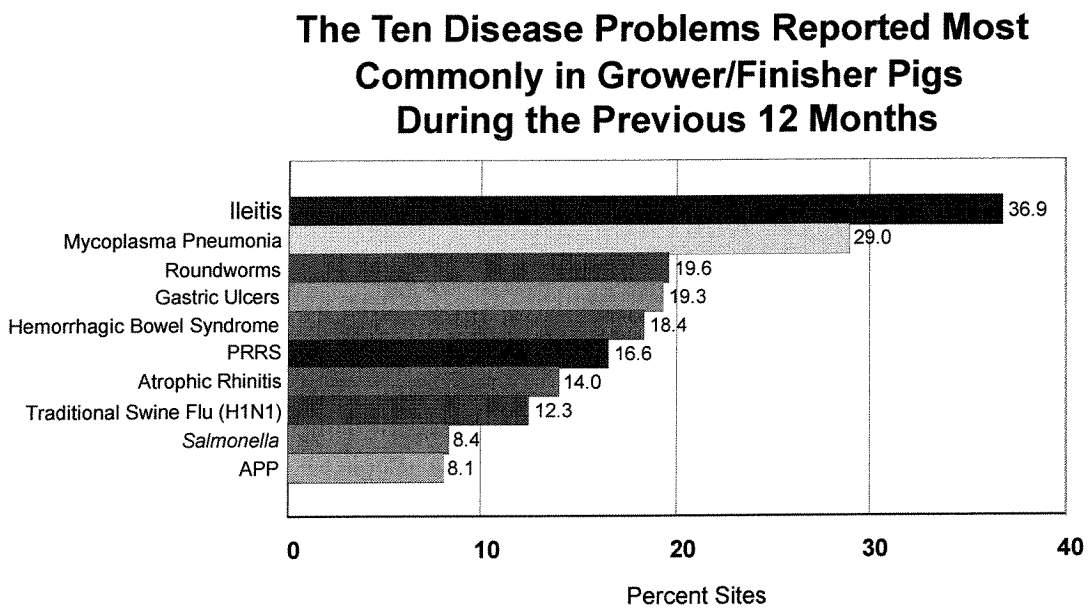
2. Disease problems present in grower/finisher pigs

a. Diseases present during the previous 12 months

Disease problems were reported frequently in grower/finisher pigs. The enteric problem of ileitis (*Lawsonia intracellularis*) was the most common disease present in grower/finisher pigs, occurring on more than one-third of sites. Respiratory diseases were reported frequently (mycoplasma pneumonia on 29.0 percent of sites, and PRRS on 16.6 percent). Over two-thirds of large sites reported that mycoplasma pneumonia was present in grower/finisher pigs.

i. For sites with grower/finisher pigs, percent of sites where the following disease problems were present in grower/finisher pigs during the previous 12 months, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Disease Problem	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
APP (*Actinobacillus pleuropneumoniae*, *Haemophilus*)	6.5	(1.4)	14.9	(2.6)	21.0	(7.1)	8.1	(1.3)
Glasser's disease (*Haemophilus parasuis*)	4.3	(1.6)	8.8	(1.8)	34.0	(9.6)	5.4	(1.4)
Mycoplasma pneumonia	22.8	(3.5)	55.7	(3.8)	68.0	(8.7)	29.0	(3.1)
New swine flu (swine influenza virus H3N2)	1.3	(0.7)	15.6	(2.8)	37.6	(9.4)	4.2	(0.8)
Traditional swine flu (swine influenza virus H1N1)	8.9	(1.8)	25.5	(3.2)	51.5	(8.8)	12.3	(1.7)
Porcine reproductive and respiratory syndrome (PRRS)	12.7	(3.6)	32.4	(3.7)	50.7	(8.9)	16.6	(3.0)
Salmonella	6.6	(1.5)	16.8	(2.8)	8.6	(3.0)	8.4	(1.4)
Pseudorabies	0.8	(0.5)	2.7	(1.4)	2.5	(2.2)	1.1	(0.5)
Atrophic rhinitis	13.5	(2.5)	16.3	(2.7)	13.3	(6.6)	14.0	(2.1)
Hemorrhagic bowel syndrome	15.6	(3.2)	30.1	(3.5)	36.7	(9.3)	18.4	(2.7)
Ileitis (*Lawsonia intracellularis*)	32.7	(4.5)	53.7	(3.7)	75.0	(7.4)	36.9	(3.8)
Swine dysentery	1.5	(0.6)	3.0	(1.5)	0.0	(--)	1.7	(0.5)
Gastric ulcers	13.9	(2.8)	43.7	(3.7)	38.9	(8.7)	19.3	(2.5)
Erysipelas	3.9	(1.6)	5.3	(1.2)	2.3	(1.4)	4.1	(1.3)
Post-weaning multi-systemic wasting syndrome (PMWS) or Circovirus	2.3	(0.7)	8.8	(2.1)	12.4	(6.5)	3.6	(0.7)
Roundworms	21.7	(3.6)	10.4	(2.6)	8.2	(3.5)	19.6	(2.9)
Other disease problems in grower/finisher pigs	7.9	(2.4)	6.1	(1.5)	2.3	(2.2)	7.5	(2.0)


The Ten Disease Problems Reported Most Commonly in Grower/Finisher Pigs During the Previous 12 Months
Ileitis
Mycoplasma Pneumonia
Roundworms
Gastric Ulcers
Hemorrhagic Bowel Syndrome
PRRS
Atrophic Rhinitis
Traditional Swine Flu (H1N1)
Salmonella
APP
36.9
29.0
19.6
19.3
18.4
16.6
14.0
12.3
8.4
8.1
0
10
20
30
40
Percent Sites

ii. For sites where the following disease problems were present in grower/finisher pigs during the previous 12 months, percent of sites where the disease was diagnosed by a veterinarian or laboratory, by size of site:

Disease Problem	Percent Sites	Standard Error
APP (*Actinobacillus pleuropneumoniae, Haemophilus*)	59.1	(7.1)
Glasser's disease *(Haemophilus parasuis)*	62.7	(13.8)
Mycoplasma pneumonia	55.3	(5.5)
New swine flu (swine influenza virus H3N2)	75.0	(8.1)
Traditional swine flu (swine influenza virus H1N1)	47.5	(6.3)
Porcine reproductive and respiratory syndrome (PRRS)	75.2	(5.0)
Salmonella	60.5	(7.6)
Pseudorabies	*	(--)
Atrophic rhinitis	24.7	(5.7)
Hemorrhagic bowel syndrome	61.7	(8.3)
Ileitis (*Lawsonia intracellularis*)	55.0	(5.3)
Swine dysentery	*	(--)
Gastric ulcers	62.7	(5.6)
Erysipelas	*	(--)
Post-weaning multi-systemic wasting disease (PMWS) or Circovirus	53.9	(9.4)
Roundworms	3.1	(1.5)
Other disease problems in nursery-age pigs	39.1	(12.4)

*Too few respondents to report estimate.

b. Age of onset for respiratory disease

The percent of sites with no outbreak of respiratory disease ranged from 7.2 for large sites to 29.3 for small sites. Onset of clinical respiratory disease signs on one-third of sites was 16 weeks or older. For almost one-fourth of small sites the average age of onset was 12 to 13 weeks. The average age for onset of clinical signs of respiratory disease on all sites was 14.8 weeks.

i. Percent of sites by site average age (in weeks) of onset of respiratory signs, such as cough (i.e., "the wall") in grower/finisher pigs, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Age(in Weeks)	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 12 weeks	6.5	(1.9)	10.1	(2.3)	2.8	(2.2)	7.1	(1.6)
12-13 weeks	23.9	(6.1)	15.6	(2.7)	3.4	(2.9)	22.0	(4.9)
14-15 weeks	11.7	(3.2)	13.5	(2.8)	13.0	(6.7)	12.1	(2.6)
16-17 weeks	17.8	(4.8)	19.6	(3.6)	13.9	(5.2)	18.1	(3.8)
18 or more weeks	10.8	(2.6)	27.7	(3.4)	59.7	(9.7)	14.9	(2.3)
No clinical respiratory disease in grower/finisher pigs in the previous 2 years	29.3	(5.1)	13.5	(2.7)	7.2	(3.5)	25.8	(4.0)
Total	100.0		100.0		100.0		100.0	

ii. For sites that had any clinical signs of respiratory disease in grower/finisher pigs during the previous 2 years, site average age (in weeks) of onset of respiratory signs, such as cough (i.e., "the wall") in grower/finisher pigs, by size of site:

Average Age (in Weeks)							
Size of Site (Total Inventory)							
Small Less than 2,000		Medium 2,000-9,999		Large 10,000 or More		All Sites	
Age (In Weeks)	Standard Error	Age (In Weeks)	Standard Error	Age (In Weeks)	Standard Error	Age (In Weeks)	Standard Error
14.5	(0.4)	15.5	(0.3)	17.2	(0.4)	14.8	(0.3)

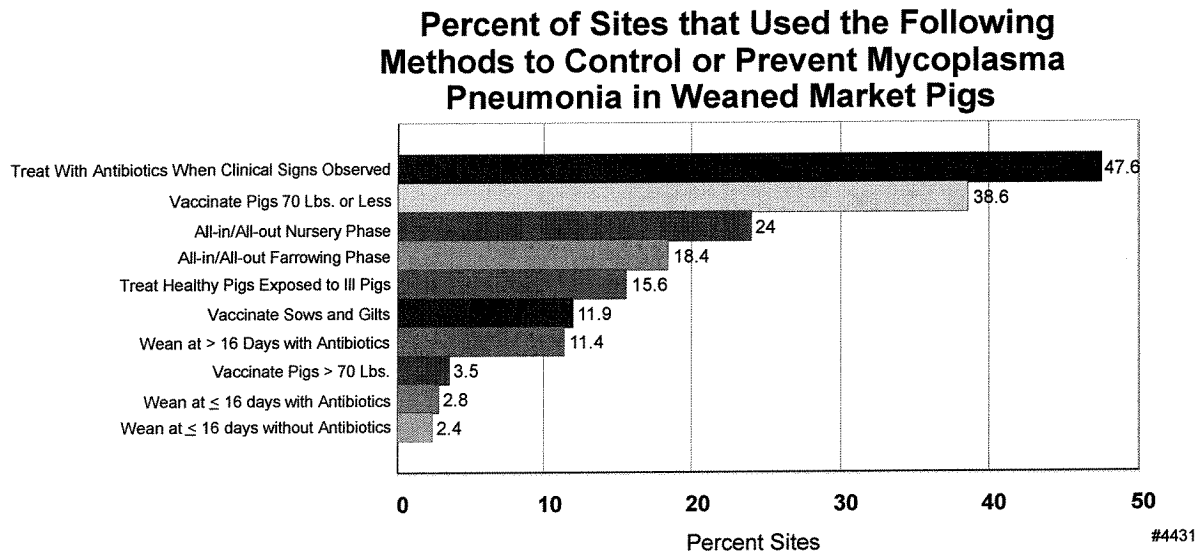
3. Mycoplasma vaccination and control

About two-thirds of sites followed some measure to either control or prevent mycoplasma in weaned market pigs. Nearly 40 percent of sites vaccinated pigs 70 pounds or less. Pigs displaying clinical signs of pneumonia were treated with antibiotics on 47.6 percent of sites. All-in, all-out nursery was among the more common strategies employed to control mycoplasma, especially on large sites.

a. Control of mycoplasma

i. For sites with weaned market pigs, percent of sites where the following measures were used ***specifically*** to control or prevent mycoplasma pneumonia in weaned market pigs (either by this operation or the operation where the pigs originated or were going to), by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Measure	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Early weaning at 16 days or less with no antibiotics	1.5	(0.5)	6.1	(1.4)	2.8	(2.1)	2.4	(0.5)
Early weaning at 16 days or less with antibiotics in feed or water or by injection	1.8	(0.5)	6.4	(1.5)	14.5	(6.1)	2.8	(0.5)
Weaning at greater than 16 days with antibiotics in feed or water or by injection	10.1	(2.4)	17.2	(2.6)	11.4	(4.4)	11.4	(2.0)
All-in, all-out in farrowing phase	13.8	(2.2)	36.2	(3.3)	60.5	(8.2)	18.4	(2.0)
All-in, all-out in nursery phase	18.5	(2.7)	45.3	(3.4)	65.9	(7.6)	24.0	(2.4)
Vaccinate sows and gilts with mycoplasma vaccine	9.1	(2.0)	22.5	(2.7)	42.2	(9.1)	11.9	(1.8)
Vaccinate pigs 70 pounds or less with mycoplasma vaccine	33.3	(4.3)	60.8	(3.4)	55.3	(8.5)	38.6	(3.6)
Vaccinate pigs greater than 70 pounds with mycoplasma vaccine	2.0	(0.8)	10.6	(1.8)	0.6	(0.5)	3.5	(0.8)
Treat pigs showing clinical signs of pneumonia with antibiotics	42.6	(4.5)	68.0	(3.4)	73.2	(6.6)	47.6	(3.8)
Treat healthy pigs that share pen or air space with ill pigs as preventive measure	12.0	(2.2)	30.3	(3.2)	34.9	(9.0)	15.6	(2.0)
Other measures taken	1.1	(0.4)	3.9	(1.1)	5.6	(2.8)	1.7	(0.4)
Any of the above control measures	61.8	(4.9)	86.7	(2.9)	87.1	(4.8)	66.6	(4.1)



b. Vaccination against mycoplasma

About two-thirds of small sites did not vaccinate weaned pigs for mycoplasma, while the majority of sites with 2,000 or more pigs did. A slight majority of sites that did vaccinate used only one dose.

i. For sites with weaned market pigs, percent of sites by number of times weaned market pigs were vaccinated against mycoplasma pneumonia, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Number Times Vaccinated	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0 times	66.1	(4.3)	34.5	(3.5)	44.8	(8.5)	60.0	(3.6)
1 time only	17.2	(2.8)	44.1	(3.4)	31.2	(7.2)	22.3	(2.5)
2 times	16.7	(3.8)	20.7	(2.8)	24.0	(8.8)	17.6	(3.1)
3 or more times	0.0	(--)	0.7	(0.3)	0.0	(--)	0.1	(0.1)
Total	100.0		100.0		100.0		100.0	

The average age at which the first mycoplasma vaccine was given depended on whether it was to be the only dose (7.5 weeks) or the first of two doses (3.4 weeks).

ii. For sites that vaccinated weaned market pigs against mycoplasma pneumonia, average age (in weeks) that weaned market pigs received the following doses of mycoplasma vaccine:

Dose	Age (In Weeks)	Standard Error
1st and only dose	7.5	(0.3)
1st of two doses	3.4	(0.2)
2nd dose	6.5	(0.3)
3rd dose	*	(--)

*Too few respondents to report estimates.

4. Porcine reproductive and respiratory syndrome (PRRS) vaccination and control

PRRS vaccine was used in weaned market pigs on only 5.2 percent of sites that had weaned market pigs (table 4a. ii). No large sites (10,000 or more inventory) used PRRS vaccine in weaned pigs. A modified live vaccine was the most common type of PRRS vaccine used.

a. Vaccine type

i. Percent of weaned market pigs that were on sites that used the following types of PRRS vaccines in weaned market pigs during the previous ***6 months:***

Vaccine Type	Percent Weaned Market Pigs	Standard Error
Modified live vaccine	4.3	(1.1)
Killed vaccine	0.5	(0.3)
Autogenous PRRS vaccine	0.1	(0.0)
Type unknown	1.6	(0.6)
Any type of PRRS vaccine	6.4	(1.3)

ii. For sites with weaned market pigs, percent of sites that used the following types of PRRS vaccine in weaned market pigs in the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Vaccine Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Modified live vaccine	3.0	(1.0)	5.3	(1.6)	0.0	(--)	3.4	(0.9)
Killed vaccine	0.9	(0.6)	0.5	(0.4)	0.0	(--)	0.8	(0.5)
Autogenous PRRS vaccine	0.0	(--)	0.2	(0.1)	0.0	(--)	0.0	(0.0)
Type unknown	1.1	(0.7)	2.2	(0.8)	0.0	(--)	1.2	(0.6)
Any type of PRRS vaccine	4.6	(1.3)	8.2	(1.8)	0.0	(--)	5.2	(1.1)

iii. For sites that vaccinated weaned market pigs against PRRS, percent of sites that used more than one brand or type of PRRS vaccine in weaned market pigs in the previous ***6 months,*** by size of site:

Percent Sites								
Size of Site (Total Inventory)								
Less than 2,000		2,000-9,999		10,000 or More		All Sites	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
30.6	(15.6)	5.1	(3.2)	NA	(--)	22.6	(11.4)

b. Vaccine timing

The average age for vaccinating weaned pigs for PRRS varied widely among sites.

i. For sites that vaccinated weaned market pigs for PRRS, percent of sites by site average age (in weeks) that weaned market pigs were vaccinated against PRRS, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Average Age (in Weeks)	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
1 - 3 weeks	25.7	(13.7)	27.8	(9.3)	NA	(--)	26.3	(10.1)
4 - 6 weeks	24.1	(11.8)	33.2	(9.8)	NA	(--)	26.8	(8.9)
7 - 9 weeks	21.9	(12.1)	34.8	(12.8)	NA	(--)	25.7	(9.6)
10 or more weeks	28.3	(14.4)	4.2	(2.9)	NA	(--)	21.2	(10.5)
Total	100.0		100.0		NA		100.0	

c. Control of PRRS

About twice as many medium sized sites (60.5 percent) or large sites (78.6 percent) followed some kind of measure to control or prevent PRRS, compared to small sites (31.1 percent). The most common method reported, regardless of site size, was obtaining weaned pigs from a single source.

i. For sites with weaned market pigs, percent of sites where the following measures were used ***specifically*** to control or prevent PRRS in weaned market pigs, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Control Measure	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Obtain weaned pigs from PRRS negative sow herd	9.5	(3.4)	12.5	(2.3)	3.0	(1.3)	10.0	(2.8)
Obtain early weaned pigs from stable PRRS positive sow herd	8.4	(1.9)	23.0	(2.7)	33.0	(8.2)	11.4	(1.7)
Single (or limited) source of weaned pigs	21.8	(3.9)	39.4	(3.3)	57.4	(8.2)	25.5	(3.2)
Matched source of weaned pigs for PRRS status	2.9	(0.7)	14.0	(2.3)	43.1	(9.0)	5.5	(0.8)
Nursery depopulation	14.2	(3.6)	21.9	(3.2)	4.1	(2.1)	15.5	(2.9)
Obtain weaned pigs from farrowing rooms that limited cross-fostering	8.0	(3.4)	20.4	(2.6)	50.4	(8.7)	10.9	(2.8)
Other measures (excluding vaccinations)	2.5	(0.9)	3.1	(1.1)	6.3	(2.9)	2.7	(0.8)
Any of the above	31.1	(4.1)	60.5	(3.3)	78.6	(6.2)	37.2	(3.5)

5. Swine influenza virus (SIV) vaccination

Weaned market pigs were vaccinated against swine influenza on about 5 percent of sites for each vaccine (traditional and new). Both vaccines were used on 3.7 percent of sites. Large sites were more likely to vaccinate for either type of SIV. Estimates for "any vaccine" do not total, since some respondents did not know the specific vaccine type used.

a. Vaccine type

i. For sites with weaned market pigs, percent of sites that used the following types of swine influenza virus vaccines in weaned market pigs in the previous ***6 months,*** by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Vaccine Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Killed SIV H1N1 vaccine	2.0	(0.8)	8.4	(1.8)	21.4	(7.1)	3.4	(0.8)
Autogenous SIV H1N1 vaccine	0.6	(0.4)	1.7	(0.7)	1.1	(1.0)	0.8	(0.3)
Any SIV H1N1 vaccine	2.7	(0.9)	12.8	(2.1)	22.5	(7.1)	4.8	(0.9)
Killed SIV H3N2 vaccine	2.5	(1.1)	6.8	(1.4)	15.9	(6.7)	3.5	(0.9)
Autogenous SIV H3N2 vaccine	0.3	(0.1)	3.3	(1.1)	1.1	(1.0)	0.8	(0.2)
Any SIV H3N2 vaccine	3.1	(1.1)	12.7	(2.0)	17.1	(6.8)	5.0	(1.0)
Both SIV H1N1 and H3N2 vaccines	2.1	(0.9)	9.7	(1.7)	17.1	(6.8)	3.7	(0.8)
Any SIV vaccine	3.7	(1.2)	15.9	(2.4)	22.5	(7.1)	6.2	(1.1)

During the 6 months prior to the administration of the study questionnaire, 10.5 percent of weaned market pigs resided on sites that used both types of SIV vaccine (H1N1 and H3N2).

ii. For sites with weaned market pigs, percent of weaned market pigs on sites that used the following types of swine influenza virus vaccines in weaned market pigs in the previous ***6 months:***

Vaccine Type	Percent Weaned Market Pigs	Standard Error
Killed SIV H1N1 vaccine	7.7	(1.4)
Autogenous SIV H1N1 vaccine	3.5	(2.2)
Any SIV H1N1 vaccine	12.5	(2.5)
Killed SIV H3N2 vaccine	6.9	(1.4)
Autogenous SIV H3N2 vaccine	4.9	(2.3)
Any SIV H3N2 vaccine	13.3	(2.5)
Both SIV H1N1 and H3N2 vaccines	10.5	(2.4)
Any SIV vaccine	15.3	(2.6)

b. Vaccine timing

The majority of sites that vaccinated weaned market pigs against swine influenza vaccinated pigs between 7 and 10 weeks of age.

i. For sites that usually vaccinated weaned market pigs against traditional SIV (H1N1), percent of sites that vaccinated at the following ages (in weeks):

Age (in Weeks)	Percent Sites	Standard Error
Less than 7 weeks	32.6	(9.0)
7 - 10 weeks	52.0	(8.9)
11 or more weeks	15.4	(6.4)
Total	100.0	

ii. For sites that usually vaccinated weaned market pigs against new SIV (H3N2), percent of sites that vaccinated at the following ages (in weeks):

Age (In Weeks)	Percent Sites	Standard Error
Less than 7 weeks	24.5	(8.9)
7 - 10 weeks	62.7	(9.6)
11 or more weeks	12.8	(6.1)
Total	100.0	

6. Use of antimicrobials in nursery-age pigs

Nursery-age pigs that showed signs of respiratory disease were frequently treated with antimicrobials. More small sites reported no clinical respiratory disease (31.0 percent) than large sites (12.8 percent). The most frequent approach was to treat all pigs that shared air space with ill pigs. Fewer sites opted to treat only clinically ill pigs, the second most frequent approach.

a. Treatment of respiratory disease

i. For sites with nursery-age pigs, percent of sites that used the following courses of action[1] for the most recent occurrence of respiratory disease outbreak in nursery-age pigs in the previous 2 years, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Action	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Did not treat any pigs with antibiotics	13.9	(5.6)	2.3	(1.5)	0.0	(--)	11.7	(4.6)
Treated only clinically ill pigs with antibiotics	14.3	(2.9)	24.1	(3.9)	13.6	(5.5)	16.0	(2.5)
Treated all pigs in same pen with clinically ill pigs with antibiotics	6.7	(2.6)	2.8	(1.1)	3.9	(2.1)	6.0	(2.2)
Treated all pigs in the same pen and pens adjacent to clinically ill pigs with antibiotics	7.3	(4.0)	1.4	(0.8)	0.0	(--)	6.2	(3.3)
Treated all pigs in entire room with clinically ill pigs with antibiotics (all pigs with shared air space)	26.8	(4.0)	49.6	(4.0)	69.7	(7.4)	31.3	(3.5)
No clinical respiratory disease in nursery-age pigs in the previous 2 years	31.0	(4.5)	19.8	(3.0)	12.8	(4.4)	28.8	(3.7)
Total	100.0		100.0		100.0		100.0	

[1]Only one course of action could be selected.

b. Selection of antibiotics

On small and medium-sized sites, the owner of the site was the primary decision-maker concerning which antibiotics were used to treat sick nursery-age pigs. On large sites, a company veterinarian or nutritionist was the primary decision-maker.

i. For sites with nursery-age pigs, percent of sites that used the following primary decision-maker for deciding which antibiotics were used to ***treat sick nursery-age pigs*** on site, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Primary Decision-Maker	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Owner of the site	81.3	(3.7)	51.2	(4.0)	11.8	(5.1)	75.3	(3.2)
Farm manager on site, but not the owner	1.6	(0.5)	10.4	(2.1)	13.3	(4.0)	3.2	(0.6)
Local veterinary practitioner	13.8	(3.5)	15.5	(3.0)	16.2	(7.1)	14.2	(2.9)
Consulting or second opinion veterinarian	0.7	(0.3)	2.1	(0.6)	12.2	(5.2)	1.1	(0.3)
Company veterinarian or company nutritionist	0.4	(0.2)	9.8	(2.1)	41.8	(9.9)	2.5	(0.5)
Service manager who oversees more than one site	1.5	(0.9)	11.0	(2.3)	4.7	(3.3)	3.2	(0.9)
Other primary decision-maker	0.2	(0.2)	0.0	(--)	0.0	(--)	0.1	(0.1)
Site did not use antibiotics on sick nursery-age pigs	0.5	(0.4)	0.0	(--)	0.0	(--)	0.4	(0.4)
Total	100.0		100.0		100.0		100.0	

c. Antimicrobials in feed

Antimicrobials were placed in the feed of nursery-age pigs for growth promotion on 82.7 percent of sites. Chlortetracycline (30.1 percent), Tylosin (23.2 percent), and Carbadox (22.8 percent) were the most common antimicrobials fed to nursery-age pigs for growth promotion.

i. For sites with nursery-age pigs, percent of sites that used the following antimicrobials or feed additives in the feed of nursery-age pigs for growth promotion in the previous ***6 months*** and the site average number of days the antimicrobial was used:

Product Given	Percent Sites	Standard Error	Average Number Days	Standard Error
Apramycin	8.6	(3.9)	28.2	(5.9)
Arsanilic acid	1.4	(0.5)	*	(--)
Bacitracin	9.1	(2.4)	38.8	(4.6)
Bacitracin zinc	0.5	(0.3)	*	(--)
Bambermycins	0.2	(0.1)	*	(--)
Carbadox	22.8	(2.8)	23.5	(1.3)
Chlortetracycline	30.1	(4.5)	24.5	(2.8)
Chlortetracycline/Sulfathiazole/ Penicillin	11.5	(2.3)	23.0	(2.0)
Chlortetracycline/Sulfamethazine/ Penicillin	4.3	(1.1)	27.0	(2.9)
Lincomycin	6.3	(1.2)	21.5	(1.3)
Neomycin & Terramycin	6.0	(1.7)	29.2	(4.7)
Oxytetracycline	2.4	(0.9)	*	(--)
Ractopamine	0.0	(--)	NA	(--)
Roxarsone	0.7	(0.3)	*	(--)
Tiamulin	14.6	(2.6)	16.9	(1.8)
Tilmicosin	3.6	(1.5)	28.5	(4.7)
Tylosin	23.2	(3.9)	26.7	(2.1)
Tylosin & Sulfamethazine	6.6	(1.6)	23.7	(4.2)
Virginiamycin	0.1	(0.1)	*	(--)
Other antimicrobial	2.2	(0.7)	*	(--)
Any of the above used	82.7	(3.0)		

*Too few producers use this antimicrobial to report estimate.

7. Use of antimicrobials in grower/finisher pigs

When some grower/finisher pigs became ill with respiratory disease, all pigs sharing the same air space were treated with antibiotics on 39.5 percent of sites. The second strategy most often implemented was to treat only clinically ill pigs. No respiratory disease was reported in grower/finisher pigs in the previous 2 years on 16.4 percent of sites.

a. Treatment of respiratory disease

i. For sites with grower/finisher pigs, percent of sites that used the following courses of action[1] for their most recent occurrence of respiratory disease outbreak in grower/finisher pigs in the previous 2 years, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Action	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Did not treat any pigs with antibiotics	7.8	(3.3)	0.8	(0.4)	0.0	(-)	6.5	(2.7)
Treated only clinically ill pigs with antibiotics	29.0	(5.3)	18.8	(2.6)	15.6	(5.6)	27.1	(4.4)
Treated all pigs in same pen with clinically ill pigs with antibiotics	6.7	(2.0)	9.4	(3.0)	0.0	(-)	7.1	(1.7)
Treated all pigs in the same pen and pens adjacent to clinically ill pigs with antibiotics	3.4	(1.2)	4.1	(1.9)	0.5	(0.4)	3.4	(1.0)
Treated all pigs in entire room with clinically ill pigs with antibiotics (all pigs with shared air space)	35.2	(4.2)	57.2	(3.8)	78.2	(6.4)	39.5	(3.6)
No clinical respiratory disease in grower/finisher pigs in the previous 2 years	17.9	(3.3)	9.7	(2.0)	5.7	(2.8)	16.4	(2.7)
Total	100.0		100.0		100.0		100.0	

[1]Only one course of action could be selected.

b. Grower/finisher pigs treated

Over 90 percent of sites with 2,000 or more pigs used antibiotics to treat disease conditions in grower/finisher pigs. Antibiotics were used to treat disease conditions on 70.4 percent of sites with grower/finisher pigs during the 12 months prior to administration of the questionnaire.

i. For sites with grower/finisher pigs, percent of sites that gave antibiotics to ***treat*** disease conditions in grower/finisher pigs in the previous ***12 months,*** by size of site:

Percent Sites								
Size of Site (Total Inventory)								
Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
65.4	(5.0)	92.0	(2.1)	93.7	(3.6)	70.4	(4.2)

c. Treatment records

Antibiotic name and date of treatment were the most common items recorded on sites using antibiotics to treat disease conditions in grower/finisher pigs. The majority of large sites also recorded pen ID, facility ID, site ID, dose, route administered, and who administered the drug.

i. For sites that gave antibiotics to treat disease conditions in grower/finisher pigs, percent of sites that typically recorded the following types of information, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Type of Information Typically Recorded	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Animal ID	13.0	(2.9)	18.9	(3.2)	6.1	(3.5)	14.2	(2.4)
Pen ID	28.0	(4.1)	43.0	(3.9)	59.5	(8.8)	31.9	(3.4)
Facility or house ID	23.3	(3.5)	61.3	(3.9)	74.8	(7.1)	32.8	(3.3)
Site ID	17.0	(3.1)	40.4	(3.8)	64.4	(8.5)	23.1	(2.7)
Date of treatment	40.2	(5.0)	67.7	(3.8)	77.9	(6.7)	47.0	(4.2)
Name of drug	41.7	(5.1)	66.0	(3.9)	77.9	(6.7)	47.8	(4.2)
Dose	25.4	(4.1)	50.7	(3.9)	73.7	(7.2)	32.0	(3.4)
Route used	20.3	(3.8)	38.9	(3.7)	61.9	(8.5)	25.2	(3.1)
Who administered the drug	13.3	(2.5)	39.4	(3.7)	52.3	(9.5)	19.8	(2.4)
Withdrawal time or date withdrawal period is completed	21.9	(3.8)	39.2	(3.8)	49.8	(9.6)	26.3	(3.1)
Outcome of treatment	8.1	(1.9)	19.5	(3.0)	13.7	(5.4)	10.8	(1.7)
Other data recorded	8.3	(2.3)	6.3	(2.1)	2.9	(1.7)	7.8	(1.8)
Any data recorded	57.5	(5.9)	82.7	(3.4)	82.5	(6.4)	63.6	(4.8)

d. Selection of antibiotics

On small and medium sites, the owner of the site was the primary decision-maker concerning which antibiotics were used to treat sick grower/finisher pigs and/or the antibiotics used for growth promotion.

i. For sites with grower/finisher pigs, percent of sites that used the following primary decision-maker for deciding which antibiotics were used to ***treat sick grower/finisher pigs*** on the operation by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Primary Decision Maker	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Owner of the operation	79.3	(3.5)	50.9	(3.7)	10.8	(4.4)	73.6	(3.1)
Farm manager on site, but not the owner	1.4	(0.5)	10.6	(2.3)	6.7	(2.8)	3.0	(0.6)
Local veterinary practitioner	11.1	(2.9)	10.3	(2.2)	13.8	(6.3)	11.0	(2.4)
Consulting or second opinion veterinarian	0.7	(0.3)	2.8	(1.1)	9.1	(4.4)	1.2	(0.3)
Company veterinarian or company nutritionist	1.5	(0.9)	6.3	(1.4)	45.8	(9.0)	2.9	(0.8)
Service manager who oversees more than one operation	4.1	(1.4)	18.9	(2.7)	13.8	(5.7)	6.8	(1.3)
Other primary decision-maker	0.2	(0.1)	0.0	(--)	0.0	(--)	0.1	(0.1)
Operation did not use antibiotics on sick grower/finisher pigs	1.7	(1.3)	0.2	(0.2)	0.0	(--)	1.4	(1.1)
Total	100.0		100.0		100.0		100.0	

ii. For sites with ***weaned market pigs***, percent of sites that used the following primary decision-maker for deciding which antibiotics were used for ***growth promotion*** by size of site:

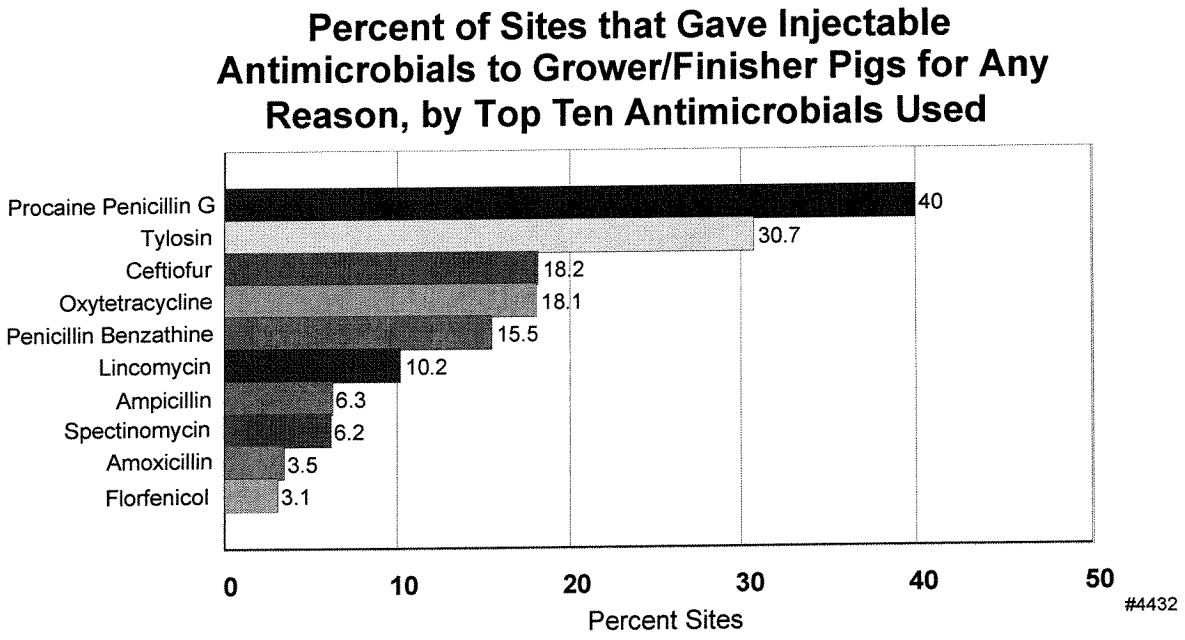
	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Primary Decision Maker	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Owner of the operation	81.0	(3.1)	51.2	(3.4)	10.3	(4.2)	74.6	(2.7)
Farm manager on site, but not the owner	1.1	(0.5)	5.7	(1.3)	12.0	(5.1)	2.1	(0.5)
Local veterinary practitioner	4.3	(1.5)	5.5	(1.5)	4.6	(2.5)	4.5	(1.3)
Consulting or second opinion veterinarian	0.5	(0.2)	3.3	(1.1)	9.7	(4.3)	1.1	(0.3)
Company veterinarian or company nutritionist	4.1	(1.4)	25.0	(2.6)	51.9	(8.5)	8.6	(1.3)
Service manager who oversees more than one operation	3.9	(1.5)	8.7	(2.0)	2.9	(2.7)	4.8	(1.3)
Other primary decision-maker	0.7	(0.6)	0.0	(0.0)	4.2	(3.7)	0.6	(0.4)
Operation did not use antibiotics for growth promotion	4.4	(1.7)	0.6	(0.3)	4.4	(2.9)	3.7	(1.4)
Total	100.0		100.0		100.0		100.0	

e. Injectable medications

Approximately two-thirds of sites injected grower/finisher pigs with antimicrobials during the six months prior to administering the questionnaire. The most common reason was to treat respiratory disease. The two most common antimicrobials given by injection were Procaine Penicillin G and Tylosin. Tylosin was the most common injectable antimicrobials for treating enteric diseases.

i. For sites with grower/finisher pigs, percent of sites that gave the following antimicrobials by ***injection*** to grower/finisher pigs in the previous ***6 months,*** by the primary reason for giving them:

	Percent Sites											
	Primary Reason Given											
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Other Treatments		Any Reason	
Product Given	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Ampicillin	0.0	(--)	0.1	(0.1)	4.4	(0.8)	0.5	(0.2)	1.3	(0.4)	6.3	(1.0)
Amoxicillin	0.0	(--)	0.3	(0.1)	1.6	(0.5)	0.1	(0.1)	1.5	(1.3)	3.5	(1.4)
Ceftiofur	0.0	(--)	0.8	(0.6)	14.6	(1.9)	1.8	(0.7)	1.0	(0.5)	18.2	(2.2)
Erythromycin	0.0	(--)	0.0	(--)	1.7	(1.3)	0.2	(0.2)	0.1	(0.1)	2.0	(1.4)
Florfenicol	0.0	(--)	0.0	(--)	2.2	(0.8)	0.7	(0.6)	0.2	(0.1)	3.1	(1.0)
Gentamicin	0.0	(--)	0.1	(0.1)	0.2	(0.1)	1.5	(0.5)	0.0	(0.0)	1.8	(0.5)
Lincomycin	0.0	(--)	1.7	(1.1)	5.0	(1.0)	1.1	(0.4)	2.4	(0.9)	10.2	(1.8)
Oxytetracycline	0.0	(--)	1.1	(0.3)	16.1	(2.3)	0.6	(0.3)	0.3	(0.2)	18.1	(2.4)
Procaine Penicillin G	0.0	(--)	1.8	(0.5)	30.2	(3.4)	0.5	(0.2)	7.5	(1.5)	40.0	(3.7)
Penicillin Benzathine	0.0	(--)	0.9	(0.3)	12.8	(2.1)	0.6	(0.3)	1.2	(0.4)	15.5	(2.2)
Spectinomycin	0.0	(--)	0.2	(0.1)	4.4	(1.9)	1.6	(0.5)	0.0	(0.0)	6.2	(2.0)
Tylosin	0.0	(--)	3.5	(1.3)	13.8	(2.1)	11.1	(2.1)	2.3	(0.9)	30.7	(3.2)
Other antimicrobials	0.0	(--)	0.0	(--)	1.2	(1.0)	0.2	(0.2)	0.3	(0.2)	1.7	(1.1)
Any antimicrobial	0.0	(--)	6.4	(1.5)	57.2	(4.2)	15.4	(2.3)	14.1	(2.2)	64.5	(4.5)


Percent of Sites that Gave Injectable Antimicrobials to Grower/Finisher Pigs for Any Reason, by Top Ten Antimicrobials Used
Procaine Penicillin G
Tylosin
Ceftiofur
Oxytetracycline
Penicillin Benzathine
Lincomycin
Ampicillin
Spectinomycin
Amoxicillin
Florfenicol
40
30.7
18.2
18.1
15.5
10.2
6.3
6.2
3.5
3.1
0
10
20
30
40
50
Percent Sites
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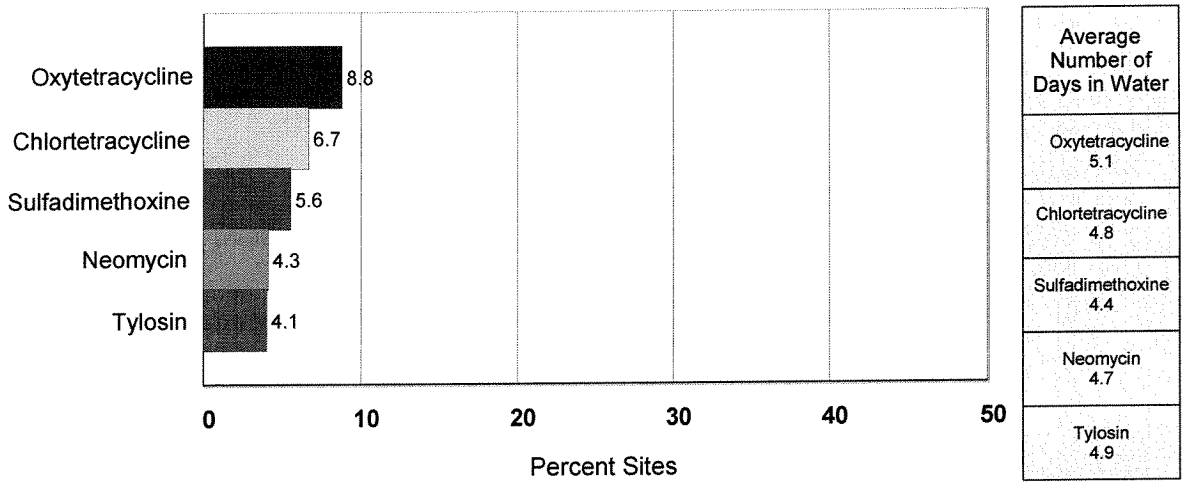
f. Water medications

Approximately one-third of sites provided antimicrobials in water to grower/finisher pigs. The most common reason was to treat respiratory disease. The two most common antimicrobials given in water were Oxytetracycline and Chlortetracycline. The primary water-delivered antimicrobials used to treat enteric disease were Neomycin and Tylosin.

i. For sites that had any grower/finisher pigs, percent of sites that gave the following antimicrobials in ***water*** to grower/finisher pigs in the previous ***6 months*** by the primary reason for giving them:

	Percent Sites											
	Primary Reason Given											
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Other Treatments		Any Reason	
Product Given	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Apramycin	0.0	(--)	0.0	(--)	0.1	(0.1)	0.0	(--)	0.0	(--)	0.1	(0.1)
Bacitracin	0.0	(--)	0.0	(--)	0.1	(0.1)	1.1	(0.6)	0.0	(--)	1.2	(0.6)
Chlortetracycline	0.0	(--)	0.2	(0.1)	6.2	(1.0)	0.2	(0.1)	0.1	(0.1)	6.7	(1.1)
Lincomycin and Spectinomycin	0.0	(--)	0.1	(0.1)	1.3	(0.3)	1.0	(0.4)	0.0	(--)	2.4	(0.5)
Neomycin	0.0	(--)	0.8	(0.3)	0.5	(0.3)	3.0	(0.7)	0.0	(--)	4.3	(0.8)
Oxytetracycline	0.0	(--)	0.4	(0.2)	8.3	(1.4)	0.0	(--)	0.1	(0.1)	8.8	(1.4)
Penicillin G potassium	0.0	(--)	0.1	(0.1)	1.5	(0.9)	0.0	(--)	0.1	(0.1)	1.7	(0.9)
Spectinomycin	0.0	(--)	0.0	(--)	1.1	(0.7)	0.5	(0.5)	0.0	(--)	1.6	(0.9)
Sulfachlorpyridazine	0.0	(--)	1.1	(1.1)	0.0	(--)	0.0	(--)	0.0	(--)	1.1	(1.1)
Sulfadimethoxine	0.0	(--)	0.5	(0.4)	5.1	(1.4)	0.0	(0.0)	0.0	(--)	5.6	(1.5)
Sulfamethazine	0.0	(--)	0.3	(0.2)	2.8	(0.6)	0.0	(0.0)	0.0	(--)	3.1	(0.7)
Tetracycline	0.0	(--)	0.0	(0.0)	2.8	(0.8)	0.4	(0.3)	0.0	(--)	3.2	(0.9)
Tiamulin	0.0	(--)	0.1	(0.0)	1.5	(0.4)	1.2	(0.6)	0.0	(0.0)	2.8	(0.8)
Tylosin	0.0	(0.0)	0.2	(0.1)	1.2	(0.5)	2.7	(0.7)	0.0	(--)	4.1	(0.9)
Other antimicrobials	0.0	(--)	0.5	(0.3)	2.5	(0.6)	0.9	(0.6)	0.7	(0.3)	4.6	(1.0)
Any antimicrobial	0.0	(0.0)	4.0	(1.3)	25.2	(2.7)	7.5	(1.3)	1.0	(0.3)	31.2	(3.1)

Percent of Sites that Gave the Following Antimicrobials in Water to Grower/Finisher Pigs for Any Reason, and Average Number of Days Antimicrobials Were in Water



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ii. For sites that gave the following antimicrobials in ***water*** to grower/finisher pigs in the previous ***6 months***, the site average number of days the antimicrobial was given, by the primary reason for giving them:

	Site Average Number Days											
	Primary Reason Given											
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Other Treatments		Any Reason	
Product Given	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error
Apramycin	NA	(--)	NA	(--)	*	(--)	NA	(--)	NA	(--)	*	(--)
Bacitracin	NA	(--)	NA	(--)	*	--)	*	(--)	NA	(--)	*	(--)
Chlortetracycline	NA	(--)	3.9	(0.4)	4.9	(0.2)	*	(--)	*	(--)	4.8	(0.2)
Lincomycin & Spectinomycin	NA	(--)	*	(--)	5.2	(0.4)	2.6	(0.5)	NA	(--)	4.0	(0.5)
Neomycin	NA	(--)	4.8	(0.4)	4.1	(0.3)	4.8	(0.2)	NA	(--)	4.7	(0.1)
Oxytetracycline	NA	(--)	5.1	(0.5)	5.1	(0.2)	NA	(--)	*	(--)	5.1	(0.2)
Penicillin G potassium	NA	(--)	*	(--)	*	(--)	NA	(--)	*	(--)	*	(--)
Spectinomycin	NA	(--)	NA	(--)	*	(--)	*	(--)	NA	(--)	*	(--)
Sulfa-chlorpyridazine	NA	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Sulfadimethoxine	NA	(--)	3.7	(0.7)	4.5	0.2)	NA	(--)	NA	(--)	4.4	0.2)
Sulfamethazine	NA	(--)	7.5	(4.1)	5.2	(0.3)	NA	(--)	NA	(--)	5.5	(0.4)
Tetracycline	NA	(--)	NA	(--)	4.6	(0.2)	*	(--)	NA	(--)	4.8	(0.2)
Tiamulin	NA	(--)	*	(--)	8.2	(2.9)	4.5	(0.6)	NA	(--)	6.4	(1.6)
Tylosin	NA	(--)	*	(--)	4.2	(0.3)	4.3	(0.2)	NA	(--)	4.9	(0.6)
Other antimicrobial	NA	(--)	2.9	(0.7)	4.6	(0.4)	5.1	(0.2)	5.2	(0.9)	4.5	(0.3)

*Too few respondents to report estimates. Estimates for "days in water by reason" are provided as long as at least 20 respondents used that antimicrobial for any reason, and if at least 4 respondents used the antimicrobial for primary reason.

g. Feed antimicrobials

Over 88 percent of sites gave antimicrobials in feed to grower/finisher pigs. The most common reason was for growth promotion. Tylosin, Chlortetracycline, and Bacitracin were the most common feed-additive antimicrobials used. Chlortetracycline was the top choice for treating respiratory disease. Tylosin was the number one choice for treating enteric disease.

i. For sites with grower/finisher pigs, percent of sites that gave the following antimicrobials in ***feed*** to grower/finisher pigs in the previous ***6 months*** by the primary reason for giving them:

	Percent Sites											
	Primary Reason Given											
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Other Treatments		Any Reason	
Product Given	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Apramycin	0.3	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.3	(0.2)
Arsanilic acid	0.2	(0.1)	0.9	(0.3)	0.0	(--)	0.0	(--)	0.0	(--)	1.1	(0.3)
Bacitracin	29.9	(3.3)	3.2	(1.1)	0.5	(0.3)	1.4	(0.4)	0.0	(--)	35.0	(3.5)
Bacitracin zinc	0.1	(0.1)	0.3	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	0.4	(0.2)
Bambermycins	0.6	(0.2)	0.5	(0.2)	0.0	(--)	0.0	(--)	0.0	(--)	1.1	(0.3)
Carbadox	1.4	(0.4)	3.7	(0.9)	0.0	(0.0)	1.2	(0.5)	0.0	(--)	6.3	(1.1)
Chlortetracycline	7.9	(1.6)	17.6	(3.8)	21.6	(3.0)	0.9	(0.6)	0.0	(--)	48.0	(4.1)
Chlortetracycline/ Sulfathiazole/ Penicillin	0.2	(0.1)	3.0	(1.3)	0.5	(0.2)	0.0	(--)	0.0	(--)	3.7	(1.3)
Chlortetracycline/ Sulfamethazine/ Penicillin	0.0	(--)	1.6	(0.6)	0.2	(0.1)	0.0	(--)	0.0	(0.0)	1.8	(0.6)
Lincomycin	2.0	(1.0)	1.8	(0.6)	4.0	(1.1)	0.8	(0.6)	0.0	(--)	8.6	(1.7)
Neomycin & Terramycin	0.7	(0.3)	0.7	(0.3)	0.2	(0.1)	0.7	(0.4)	0.0	(--)	2.3	(0.6)
Oxytetracycline	0.9	(0.6)	1.0	(0.3)	1.7	(0.7)	0.0	(0.0)	0.0	(--)	3.6	(1.0)
Ractopamine	2.0	(0.7)	0.0	(--)	0.0	(0.0)	0.0	(--)	0.1	(0.1)	2.1	(0.7)
Roxarsone	0.7	(0.5)	0.9	(0.6)	0.0	(0.0)	0.3	(0.2)	0.0	(--)	1.9	(0.8)
Tiamulin	0.2	(0.2)	2.4	(0.8)	1.0	(0.5)	2.1	(1.0)	0.0	(--)	5.7	(1.4)
Tilmicosin	0.0	(0.0)	0.3	(0.1)	0.6	(0.2)	0.1	(0.0)	0.0	(--)	1.0	(0.3)
Tylosin	31.3	(4.5)	13.2	(1.9)	1.4	(0.4)	10.3	(2.0)	0.1	(0.1)	56.3	(4.0)
Tylosin & Sulfamethazine	0.1	(0.1)	2.1	(1.1)	0.8	(0.5)	0.1	(0.1)	0.0	(--)	3.1	(1.2)
Virginiamycin	2.6	(1.1)	0.1	(0.1)	0.0	(--)	0.4	(0.3)	0.0	(--)	3.1	(1.1)
Other antimicrobials	0.6	(0.4)	0.4	(0.3)	0.8	(0.7)	0.0	(--)	0.0	(--)	1.8	(0.8)
Any antimicrobials	63.7	(3.8)	37.9	(4.0)	27.4	(3.2)	15.2	(2.3)	0.2	(0.1)	88.5	(2.3)

"Number of days" indicates the total number of days that antimicrobials were included in feed during the grower/finisher phase. It does not necessarily represent consecutive days.

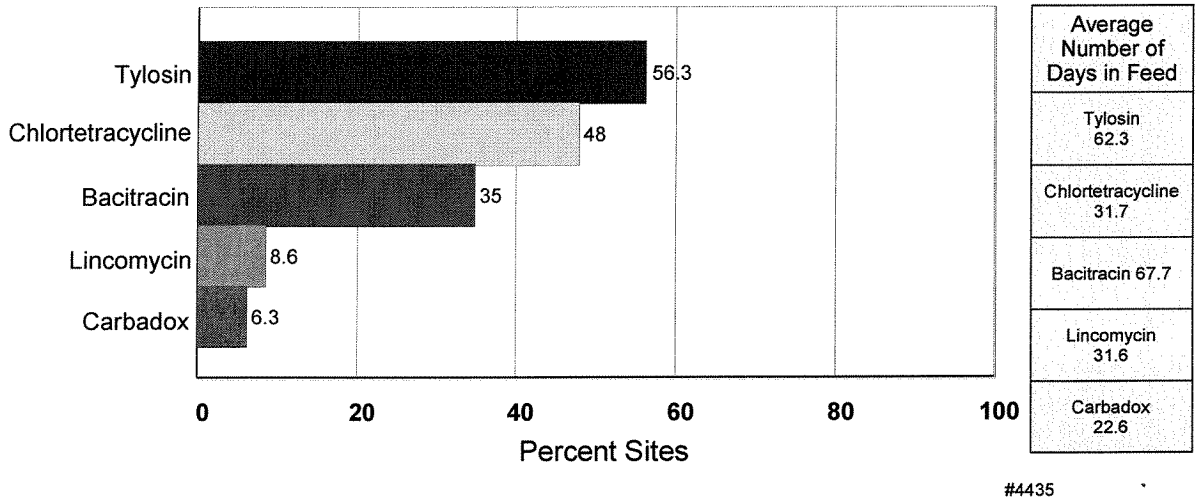
ii. For sites that gave the following antimicrobials in feed to grower/finisher pigs in the previous ***6 months***, site average number of days the antimicrobials was given in ***feed,*** by the primary reason for giving them:

	Site Average Number Days Given											
	Primary Reason Given											
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Other Treatments		Any Reason	
Product Given	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error	Number Days	Stand. Error
Apramycin	*	(--)	NA	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Arsanilic acid	*	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Bacitracin	71.0	(3.7)	55.6	(23.3)	27.2	(3.3)	31.9	(3.6)	NA	(--)	67.7	(3.7)
Bacitracin zinc	*	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Bambermycins	*	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Carbadox	25.7	(3.2)	19.5	(1.8)	NA	(--)	27.0	(5.5)	NA	(--)	22.6	(1.7)
Chlortetracycline	52.1	(5.4)	42.9	(13.1)	17.0	(4.1)	8.0	(2.4)	NA	(--)	31.7	(6.0)
Chlortetracycline/ Sulfathiazole/ Penicillin	*	(--)	19.6	(5.1)	19.6	(7.1)	NA	(--)	NA	(--)	19.9	(4.4)
Chlortetracycline/ Sulfamethazine/ Penicillin	NA	(--)	*	(--)	*	(--)	NA	(--)	NA	(--)	*	(--)
Lincomycin	84.5	(9.1)	17.9	(3.3)	14.7	(2.5)	9.1	(3.9)	NA	(--)	31.6	(8.4)
Neomycin & Terramycin	*	(--)	*	(--)	*	(--)	*	(--)	NA	(--)	*	(--)
Oxytetracycline	*	(--)	25.3	(7.2)	19.1	(5.5)	NA	(--)	NA	(--)	37.8	(12.8)
Ractopamine	27.6	(2.0)	NA	(--)	NA	(--)	NA	(--)	*	(--)	27.6	(1.9)
Roxarsone	*	(--)	*	(--)	NA	(--)	*	(--)	NA	(--)	*	(--)
Tiamulin	*	(--)	18.1	(3.0)	23.4	(6.0)	8.2	(0.8)	NA	(--)	16.9	(2.5)
Tilmicosin	*	(--)	*	(--)	*	(--)	*	(--)	NA	(--)	*	(--)
Tylosin	72.5	(7.6)	58.4	(6.8)	39.1	(17.5)	36.0	(4.9)	*	(--)	62.3	(5.2)
Tylosin & Sulfamethazine	46.5	(15.5)	16.7	(3.4)	23.5	(5.7)	*	(--)	NA	(--)	19.6	(3.4)
Virginiamycin	*	(--)	*	(--)	NA	(--)	*	(--)	NA	(--)	*	(--)
Other antimicrobials	*	(--)	*	(--)	*	(--)	NA	(--)	NA	(--)	*	(--)

*Too few respondents to report estimates.

Estimates for "days in feed by reason" are provided as long as at least 20 respondents used that antimicrobial for any reason, and if at least 4 respondents used the antimicrobial for primary reason.

Percent of Sites that Gave Antimicrobials in Feed to Grower/Finisher Pigs for Any Reason by Top Five Antimicrobials Used, and Number of Days Antimicrobials Were in Feed



Dose indicates the average dose for the total number of days the antimicrobial was included in feed. The actual dose fed might have varied if, for example, antimicrobials were fed two weeks at one level and then two weeks at another level.

iii. For sites that gave the following antimicrobials in ***feed*** to grower/finisher pigs in the previous ***6 months***, the average dose (in grams per ton) of the antimicrobials used, by the primary reason for giving them:

	Average Dose											
	Primary Reason Given											
	Growth Promotion		Disease Prevention		Respiratory Disease Treatment		Enteric Disease Treatment		Other Treatments		Any Reason	
Product Given	Grams per Ton	Stand. Error	Grams per Ton	Stand. Error	Grams per Ton	Stand. Error	Grams per Ton	Stand. Error	Grams per Ton	Stand. Error	Grams per Ton	Stand. Error
Apramycin	*	(--)	NA	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Arsanilic acid	*	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Bacitracin	37.2	(3.9)	70.3	(21.1)	80.6	(13.9)	107.5	(28.0)	NA	(--)	42.6	(3.9)
Bacitracin zinc	*	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Bambermycins	*	(--)	*	(--)	NA	(--)	NA	(--)	NA	(--)	*	(--)
Carbadox	30.0	(3.4)	47.1	(1.8)	NA	(--)	50.0	(0.0)	NA	(--)	44.1	(1.7)
Chlortetracycline	97.9	(14.1)	263.5	(19.1)	326.6	(17.3)	271.8	(81.7)	NA	(--)	262.9	(13.3)
Chlortetracycline/ Sulfathiazole/ Penicillin	*	(--)	250.3	(7.1)	212.0	(25.2)	NA	(--)	NA	(--)	244.3	(6.9)
Chlortetracycline/ Sulfamethazine/ Penicillin	NA	(--)	*	(--)	*	(--)	NA	(--)	NA	(--)	*	(--)
Lincomycin	31.0	(11.9)	108.7	(24.7)	122.9	(16.8)	55.0	(22.4)	NA	(--)	98.4	(17.3)
Neomycin & Terramycin	*	(--)	*	(--)	*	(--)	*	(--)	NA	(--)	*	(--)
Oxytetracycline	*	(--)	272.5	(39.1)	337.9	(52.9)	NA	(0.0)	NA	(--)	252.8	(50.3)
Ractopamine	8.9	(0.5)	NA	(--)	NA	(--)	NA	(--)	*	(--)	8.9	(0.5)
Roxarsone	*	(--)	*	(--)	NA	(--)	*	(--)	NA	(--)	*	(--)
Tiamulin	*	(--)	25.9	(4.6)	34.6	(2.3)	34.0	(1.1)	NA	(--)	31.3	(2.2)
Tilmicosin	NA	(--)	*	(--)	*	(--)	*	(--)	NA	(--)	*	(--)
Tylosin	38.8	(3.3)	53.5	(4.2)	74.4	(8.3)	71.4	(8.6)	*	(--)	48.8	(2.9)
Tylosin & Sulfamethazine	*	(--)	171.2	(18.9)	176.0	(18.3)	*	(--)	NA	(--)	174.9	(12.3)
Virginiamycin	*	(--)	*	(--)	NA	(--)	*	(--)	NA	(--)	*	(--)
Other antimicrobials	*	(--)	*	(--)	*	(--)	NA	(--)	NA	(--)	*	(--)

*Too few respondents to report estimates.

Estimates for "dose in feed by reason" are provided as long as at least 20 respondents used that antimicrobial for any reason, and if at least 4 respondents used the antimicrobial for primary reason.

8. Use of dewormers in grower/finisher pigs

Dewormers were given by injection on 15.6 percent of sites with grower/finisher pigs. Dewormers were added to feed on 39.7 percent of sites (table 8c).

a. For sites with grower/finisher pigs, percent of sites that gave the following parasite treatments by ***injection*** to grower/finisher pigs in the previous ***6 months:***

Product Given	Percent Sites	Standard Error
Doramectin	2.5	(1.2)
Ivermectin	12.0	(3.1)
Levamisole	1.2	(1.1)
Other dewormer	0.2	(0.2)
Any dewormer	15.6	(3.4)

b. For sites with grower/finisher pigs, percent of sites that gave the following parasite treatments in ***water*** to grower/finisher pigs in the previous ***6 months*** and the average number of days given:

Product Given	Percent Sites	Standard Error	Number Days	Standard Error
Levamisole	5.1	(1.5)	1.7	(0.2)
Piperazine	1.1	(0.4)	*	(--)
Any dewormer	6.2	(1.6)		

*Too few respondents to report estimate.

c. For sites with grower/finisher pigs, percent of sites that gave the following parasite treatments in ***feed*** to grower/finisher pigs in the previous ***6 months*** and the average number of days given:

Product Given	Percent Sites	Standard Error	Number Days	Standard Error
Dichlorvos	2.6	(1.0)	2.3	(0.5)
Fendbendazole	27.8	(3.9)	7.0	(0.7)
Hygromycin B	0.4	(0.4)	*	(--)
Ivermectin	8.8	(3.6)	6.8	(0.3)
Levamisole	0.7	(0.5)	*	(--)
Pyrantel tartrate	1.3	(0.4)	*	(--)
Other dewormer	0.2	(0.2)	*	(--)
Any dewormer	39.7	(4.3)		

*Too few respondents to report estimates.

9. Other grower/finisher management practices

a. Split sex feeding

i. For sites with weaned market pigs, percent of sites that fed weaned market males and females different rations (split sex feeding), by size of site:

Percent Sites							
Size of Site (Total Inventory)							
Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
15.2	(2.3)	56.0	(3.5)	45.6	(8.4)	22.9	(2.2)

ii. For sites that practiced split-sex feeding, percent of sites by age (in weeks) when split-sex feeding was started, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Age (weeks)	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 8 weeks	24.6	(6.3)	22.4	(3.6)	26.2	(8.5)	23.6	(3.7)
8 - 12 weeks	64.8	(6.8)	67.4	(4.1)	48.9	(10.6)	65.6	(4.0)
13 or more weeks	10.6	(3.6)	10.2	(2.8)	24.9	(11.3)	10.8	(2.3)
Total	100.0		100.0		100.0		100.0	

b. Wean-to-finish facilities

Use of wean-to-finish facilities to grow weaned pigs to market did not vary by herd size. Although a majority of these sites did not double stock[1], about one-fourth of sites indicated they sometimes double stock. About half the sites had facilities built specifically for wean-to-finish. And about half the sites had converted some traditional buildings for wean-to-finish (more common among small sites).

i. For sites with weaned market pigs, percent of sites where none, some or all weaned market pigs were housed in wean-to-finish buildings, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Proportion of Weaned Market Pigs Housed in Wean-to-Finish Buildings	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
None	83.4	(2.9)	83.6	(2.3)	81.9	(6.5)	83.4	(2.4)
Some	2.1	(0.7)	4.5	(1.2)	4.8	(4.5)	2.6	(0.6)
All	14.5	(2.8)	11.9	(2.1)	13.3	(5.1)	14.0	(2.3)
Total	100.0		100.0		100.0		100.0	

ii. For sites with weaned market pigs in wean-to-finish buildings, percent of sites by frequency of double-stocking[1] one of these buildings, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Frequency of Double-Stocking Wean-to-Finish Buildings	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Always	16.2	(7.1)	12.9	(5.1)	9.0	(5.1)	15.5	(5.8)
Sometimes	23.4	(8.0)	23.6	(6.4)	26.4	(20.2)	23.5	(6.6)
Never	60.4	(9.1)	63.5	(7.3)	64.6	(19.5)	61.0	(7.5)
Total	100.0		100.0		100.0		100.0	

[1]Double stocking is filling a pen with twice as many weaned pigs as normal. When the pigs reach a certain size or age, some of them must be moved to another pen to provide more space.

iii. For sites that had wean-to-finish buildings, percent that had any buildings built specifically for wean-to-finish, and percent that had buildings originally built for other purposes but then converted them to wean-to-finish buildings:

Type of Wean-to-Finish Buildings	All Sites Percent	All Sites Standard Error
Built specifically for the purpose	54.8	(7.6)
Built for other purpose and converted	56.0	(6.9)

Pigs were re-sorted at least once from 40 pounds to market weight on the majority of sites. However, 39.8 percent of sites never resorted pigs from 40 pounds to market. The amount of re-sorting did not vary notably by herd size.

c. Pen re-sortment

i. For sites with grower/finisher pigs, percent of sites by the number of times pigs from 40 pounds to market weight were usually re-sorted[1], by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Number of Times Pigs Were Usually Re-sorted	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0	41.6	(5.0)	30.7	(3.4)	44.9	(9.5)	39.8	(4.2)
1	42.6	(4.8)	50.6	(3.8)	43.2	(8.9)	43.9	(4.0)
2	12.1	(2.3)	14.9	(2.5)	11.9	(4.7)	12.6	(2.0)
3 or more	3.7	(1.2)	3.8	(1.0)	0.0	(--)	3.7	(1.2)
Total	100.0		100.0		100.0		100.0	

[1]Re-sorting is shuffling pigs between pens, i.e. sorting by size. This includes moving pigs from the nursery to finisher pens. However, keeping a group of pigs together and moving them from one pen to another is not considered re-sorting.

d. Supplements in diet

Soybean meal or other vegetable protein was part of the grower/finisher diet on nearly all sites. Meat or bone meal was included in the diet on one-fifth of sites. Fat was added to the diet on over one-third of sites.

i. For sites with grower/finisher pigs, percent of sites that included the following supplements (including pre-mix) in any of the grower/finisher diets, by size of site:

	Percent Sites							
	Size of Site (Total Inventory)							
	Small (Less than 2,000)		Medium (2,000-9,999)		Large (10,000 or More)		All Sites	
Supplement	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Fish meal	7.1	(1.6)	16.6	(2.5)	15.6	(5.6)	8.8	(1.4)
Meat or bone meal	19.4	(3.8)	25.6	(2.8)	22.7	(7.2)	20.5	(3.1)
Soybean meal or other vegetable protein source	98.1	(0.7)	95.2	(1.1)	95.6	(2.4)	97.6	(0.6)
Other protein sources	22.8	(4.3)	11.4	(2.1)	5.4	(2.3)	20.6	(3.6)
Bakery/food manufacture byproducts (not table waste)	4.2	(1.1)	18.9	(2.7)	33.4	(8.4)	7.1	(1.1)
Animal and/or vegetable fat	30.0	(4.3)	59.6	(3.8)	71.1	(9.3)	35.6	(3.7)

e. *Salmonella* control

The two most common *Salmonella*-reducing strategies were vaccination and withdrawal of feed before shipping to slaughter.

i. For sites with grower/finisher pigs, percent of sites that used the following intervention strategies for grower/finisher pigs specifically to reduce shedding of *Salmonella*:

Intervention Strategy	Percent Sites	Standard Error
Withdraw feed before shipping to slaughter	3.2	(0.5)
Feed competitive exclusion product	0.5	(0.3)
Feed probiotics	1.0	(0.4)
Test feed for *Salmonella*	1.7	(0.4)
Vaccinate against *Salmonella*	4.7	(1.3)
Other strategy	0.5	(0.2)
Any intervention strategies	9.3	(1.5)

Section II: Methodology

A. Needs Assessment

Objectives were developed for the Swine 2000 study from input obtained over a period of several months, via a number of focus groups and individual contacts. Participants included representatives of producer and veterinary organizations, academia, state and federal government and private business. Topics identified for the Swine 2000 study were:

1) Research respiratory diseases such as porcine reproduction and respiratory syndrome (PRRS), mycoplasma, and swine influenza virus (SIV).

2) Add to a national swine serum bank established through NAHMS' 1990 National Swine Survey and Swine '95 study to ensure this resource is available for future research on domestic swine diseases and emerging pathogens.

3) Collect on-farm information about food-borne pathogens, such as Salmonella, Toxoplasma, and Yersinia.

4) Describe the adoption level of good production practices and provide information on the decision-making process related to antibiotics.

5) Assess industry progress on environmental practices and target future efforts for developing guidelines and educational programs for producers.

B. Sampling and Estimation

1. State selection

Initial selection of states to be included in the study was done in February 1999, using the National Agricultural Statistics Service (NASS) December 1, 1998, Hog and Pig Report. A goal for NAHMS' national studies is to include states that account for at least 70 percent of the animal and producer population in the U.S. The NASS hog and pig estimation program collects data quarterly from producers in 17 states and annually in all states. The 17 states accounted for 92.6 percent of the December 1, 1998, swine inventory in the U.S. and 73.7 percent of operations with swine in the U.S. A workload memo identifying the 17 states in relation to all states in terms of size (inventory and operations) was provided to the USDA:APHIS:VS Regional Directors. Each Regional Director sought input from their respective states about being included or excluded from the study. By midyear 1999, 17 states were chosen: Arkansas, Colorado, Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, and Wisconsin. These states coincided with the states in the NASS quarterly reporting program, which now included the western states of Colorado, Oklahoma, and Texas, and excluded the southeastern states of Georgia, Tennessee, and Kentucky. The western states were undergoing rapid growth, whereas in many of the southeastern states populations of pigs and producers were declining. As of December 1, 2000, the 17 states accounted for 93.6 percent (56,035,000 head) of pigs in the U.S. and 76.4 percent (65,500) of the operations in the U.S. (See Appendix II for respective data on individual states.)

2. Operation Selection

An evaluation of the total inventory and number of operations showed that the 1-99 size group (in 15 of the 17 states where estimates were available) contained 41.0 percent of the operations but only 1.5 percent of the inventory. Therefore, operations with fewer than 100 pigs were declared ineligible for the study so that the number of participants could be concentrated in the larger size groups.

Due to the rapid decline in number of producers in the U.S., and therefore the likelihood that many randomly selected producers would be out of the swine business, a large screening sample was selected. NASS chose a stratified random sample, with stratification based on state and herd size, of 13,000 operations from a list of individual and corporate producers as well as contractors. Contractor-only arrangements (contractors who did not own any pigs) were not eligible for selection. Operations identified via the screening process that had 100 or more pigs were eligible to be contacted for an on-site interview. A randomly selected sample of these eligible operations was chosen for participation in the 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 (1 with breeding animals and 2 with weaned pigs).

3. Population Inferences

Inferences cover the population of swine operations with 100 or more total pigs in the 17 states, since these operations were the only ones eligible for sample selection. These states accounted for 92.3 percent of operations with 100 or more pigs in the U.S. and 93.6 percent of the U.S. pig inventory as of December 1, 2000. *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 non-response within each state and size group to allow for inferences back to the original population from which the sample was selected.

C. Data Collection

1. General Swine Farm Report - Screening, April - May 2000

NASS' telephone interviewers administered the screening questions, which took approximately 10 minutes. Participation in this interview is summarized in Table 2a in the Response Rate section.

2. General Swine Farm Report, June 1 - July 14, 2000

NASS' enumerators administered the General Swine Farm Report in person to each selected producer. The interview took approximately 1 hour. NASS' enumerators asked producers for permission for Veterinary Medical Officers (VMOs) to contact the producers and discuss additional phases of data collection (results to be reported in subsequent reports).

3. Initial VS Visit, August 21 - October 31, 2000

State and Federal VMOs contacted producers to solicit participation in the next phase of the NAHMS Swine 2000 study. A producer agreement that promises data confidentiality and indicates producer intentions for biological sampling was signed with respondents. A face-to-face interview was conducted to complete the Initial VS Visit questionnaire, which took 50 minutes on average.

D. Data Analysis

1. Validation and estimation

a. General Swine Farm report

Initial data entry and validation for both the General Swine Farm Report screening form and General Swine Farm Report (results reported in Swine 2000 Part I) were performed in individual NASS state offices. Data were entered into a SAS data set. NAHMS national staff performed additional data validation on the entire data set after data from all states were combined.

b. Initial VS Visit

Completed Initial VS Visit questionnaires were sent first to State NAHMS coordinators, where they were manually reviewed for errors and accuracy, then forwarded to CEAH. Data entry and validation for the Initial VS Visit were completed at CEAH directly into SAS. Data validation programs were run on data after being entered. NAHMS' national staff performed additional data checks on the entire dataset.

2. Response rates

a. General Swine Farm Report - Screening questionnaire

A total of 11,138 operations (85.8 percent) completed the screening survey. Of these, 7,156 operations had 100 or more total pigs and, thus, were eligible for the next phase of data collection. The next survey, the General Swine Farm Report (GSFR) was completed approximately 2 months later via personal interview.

Response Category	Number Operations	Percent Operations
Eligible	7,156	55.1
Not eligible	3,189	24.6
Out of business	537	4.1
Out of scope (prison farms, research farms, etc.)	256	2.0
Refusal	1,040	8.0
Inaccessible	810	6.2
Total	12,988	100.0

Given an expected response rate of 60 percent, the 7,156 eligible operations would result in more than the 2,500 planned respondents. Therefore, 2,407 names were dropped (via random selection) from the respondent list. The final number of operations eligible for the GSFR was 4,749.

Most operations were independent, single-site enterprises, or contract nursery or finisher sites. For larger operations with multiple production sites, up to three production sites were randomly selected to complete the GSFR (one site with sows and two without sows).

b. General Swine Farm Report

Response Category	Number Operations	Percent Operations	Number Sites	Percent Sites
Survey complete and VMO consent	1,208	25.4	1,316	26.7
Survey complete, refused VMO consent	1,120	23.6	1,183	24.0
No pigs on June 1, 2000	181	3.8	181	3.7
Out of business	67	1.4	67	1.4
Out of scope (prison and research farms, etc.)	29	0.6	29	0.6
Refusal	1,736	36.6	1,736	35.3
Inaccessible	408	8.6	408	8.3
Total	4,749	100.0	4,920	100.0

c. Initial Visit

Response Category	Number Sites	Percent Sites
Survey complete	895	68.0
Refusal	292	22.2
Ineligible	25	1.9
Inaccessible	104	7.9
Total	1,316	100.0

Appendix I: Sample Profile

A. Responding Sites

1a. Total inventory

Size of Site (Total Inventory)	Number Responding Sites
Less than 2,000	490
2,000 - 9,999	361
10,000 or more	44
Total	895

1b. Sow inventory

Size of Site (Total Sows and Gilts on Operation)	Number Responding Sites
0	405
1-249	232
250-499	112
500 or more	146
Total	895

2. Type of site

Type of Site	Number Responding Sites
Contract producer	283
Independent-market own pigs	556
Independent - market through cooperative	40
Other	16
Total	895

3. Number of responding sites by region:

Number Hogs and Pigs Sold	Number Responding Sites
Northern	186
West Central	240
East Central	291
Southern	178
Total	895

4. Number of responding sites with the following production phases:

Production Phase	Number Responding Sites
Farrow to finish	321
Feeder pig producer	48
Weaned pig producer	83
Nursery site	57
Finisher site	269
Nursery and finisher site	80
Other phase	37
Total	895

Appendix II: U.S. Populations & Operations

Number of Hogs and Pigs on December 1, 2000, and Number of Operations in 1999[1]

Region	State	Number Hogs and Pigs (Thousand Head)		Number Operations in 1999	
		All Operations	Operations with 100 or More Head	All Operations	Operations with 100 or More Head
East Central	Illinois	4,200	4,158	5,100	3,300
	Indiana	3,400	3,366	4,400	2,700
	Iowa	15,400	15,369	12,300	10,400
	Ohio	1,510	1,435	5,200	2,200
	Total	24,510	24,328	27,000	18,600
Northern	Michigan	950	936	2,200	800
	Minnesota	5,800	5,742	7,300	5,300
	Pennsylvania	1,040	1,009	3,000	900
	Wisconsin	620	577	2,700	800
	Total	8,410	8,264	15,200	7,800
West Central	Colorado	840	836	500	90
	Kansas	1,570	1,554	1,600	720
	Nebraska	3,100	3,053	4,000	2,600
	Missouri	2,900	2,871	3,600	1,800
	South Dakota	1,360	1,333	1,900	1,100
	Total	9,770	9,647	11,600	6,310
Southern	Arkansas	685	671	1,100	440
	North Carolina	9,400	9,372	3,600	1,700
	Oklahoma	2,340	2,305	2,700	300
	Texas	920	874	4,300	110
	Total	13,345	13,222	11,700	2,550
Total (17 states)		56,035 (93.6% of US)	55,461 (93.6% of US)	65,500 (76.4% of US)	35,260 (92.3% of US)
Total U.S. (50 states)		59,848	59,250	85,760	38,200

1 Source: NASS Hogs and Pigs, December 28, 2000. An operation was any place having one or more head of hogs and pigs on hand at any time during the year.

Swine 2000 Study Objectives and Related Outputs

1) Research respiratory diseases such as porcine reproduction and respiratory syndrome (PRRS), Mycoplasma, and swine influenza virus (SIV).

- Info sheets and interpretive reports, expected Summer 2002

2) Add to a swine serum bank established through NAHMS 1990 National Swine Survey and Swine '95 study to ensure this resource is available for future national research on domestic swine diseases and emerging pathogens.

- Collected sera banked July, 2001

3) Collect on-farm information about food-borne pathogens, such as Salmonella, Toxoplasma, and Yersinia.

- Part I: Reference of Swine Health and Management in the United States, 2000, August 2001
- **Part II: Reference of Swine Health and Health Management in the United States, 2000, March 2002**
- Info sheets and interpretive reports, expected Fall 2002

4) Describe the adoption level of good production practices and provide information on the decision-making process related to antibiotics.

- **Part II: Reference of Swine Health and Health Management in the United States, 2000, March 2002**
- Changes in the U.S. Pork Industry, 1990-2000, expected Fall 2002
- Info sheets, expected March 2002

5) Assess industry progress on environmental issues and target future efforts for developing guidelines and educational programs for producers.

- Part I: Reference of Swine Health and Management in the United States, 2000, August 2001
- **Part II: Reference of Swine Health and Health Management in the United States, 2000, March 2002**
- Part III expected Summer 2002
- Changes in the U.S. Pork Industry, 1990-2000, expected Fall 2002
- Info sheets, expected Winter 2002

Before May 20, 2002

Centers for Epidemiology and Animal Health
USDA:APHIS:VS, attn. NAHMS
555 South Howes
Fort Collins, CO 80521
(970) 490-8000
NAHMSweb@aphis.usda.gov
www.aphis.usda.gov.ceah/cahm

After May 20, 2002

Centers for Epidemiology and Animal Health
USDA:APHIS:VS, attn. NAHMS
2150 Centre Avenue, Building B
Fort Collins, CO 80526
(970) 494-7400
NAHMSweb@aphis.usda.gov
www.aphis.usda.gov.ceah/cahm

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