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Service

**Veterinary
Services**

Part III:
Management and Health of Horses, 1998

National Animal Health Monitoring System **January 1999**

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), Veterinary Services (VS) during a nationwide study of management and animal health on equine operations.

The Equine '98 Study was a cooperative effort between State and Federal agricultural statisticians, animal health officials, university researchers, extension personnel, and equine 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 and responding to interactive Internet and telephone surveys.

Thanks to the National Agricultural Statistics Service (NASS) enumerators and State and Federal Veterinary Medical Officers (VMO's) and Animal Health Technician's (AHT's) who visited the operations and collected the data for their hard work and dedication to the National Animal Health Monitoring System (NAHMS). The roles of the producer, Area Veterinarian in Charge (AVIC), NAHMS Coordinator, VMO, AHT, and NASS enumerator were critical in providing quality data for Equine '98 reports. Special recognition goes to Dr. Josie Traub-Dargatz of Colorado State University, for her role as the equine specialist and industry liaison, and the College of Veterinary Medicine and Biomedical Sciences faculty and students who were heavily involved in the Equine '98 Study, for contributions which were invaluable in the design, implementation, and analysis phases of the study. Recognition also goes to Colorado State University's Department of Clinical Sciences staff who were actively involved in the Equine '98 Study, from the needs assessment phase through information dissemination. Thanks also to the Centers for Epidemiology and Animal Health (CEAH) for their efforts in generating and distributing timely reports from Equine '98 data.

All participants are to be commended for their efforts, particularly the producers whose voluntary efforts made the Equine '98 Study possible.

Dr. Nora Wineland, NAHMS Program Leader

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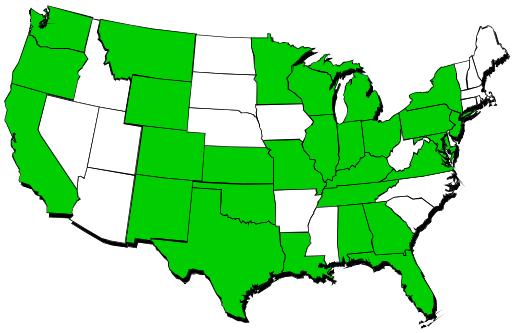
Part III Regional Information

Introduction

The National Animal Health Monitoring System's (NAHMS) Equine '98 Study was designed to provide both participants and those affiliated with the equine industry with information on the nation's equine population for education and research. NAHMS is sponsored by the USDA:APHIS:Veterinary Services (VS).

Equine '98 Participating States



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NAHMS developed study objectives by exploring existing literature and contacting industry members about their informational needs and priorities. The objectives are listed inside the back cover of this report.

The USDA's National Agricultural Statistics Service (NASS) collaborated with VS to select a statistically-valid sample such that inferences can be made to all places with equids (domestic horses, miniature horses, ponies, donkeys/burros, mules) and to all equids in the 28 states. The initial sample included 2,904 participating operations from 28 states for Equine '98 (see map at right). The 28-state target population represented 78.2 percent of U.S. horses and ponies and 78.0 percent of farms with horses and ponies (see Appendix II).

Parts I and *II: Baseline Reference of 1998 Equine Health and Management* were the first in a series of releases documenting Equine '98 Study results. NASS enumerators collected on-farm data from the 2,904 equine operations for these two initial reports via a questionnaire administered from March 16, 1998, through April 10, 1998. Inventory data from the 133 participating race tracks were only included in Part I, tables A.1.a through A.2.c. (Equine '98 outputs are listed on the back cover of this report.)

The second phase of data collection was done by Federal and state Veterinary Medical Officers (VMO's) and Animal Health Technicians (AHT's) in the 28 states. Data were collected on-farm for *Part III: Management and Health of Horses in the U.S., 1998*, from April 20 through June 12, 1998, from 1,178 participating operations that had three or more horses present on January 1, 1998. Race tracks were excluded from this phase of the study. This 28-state target population with three or more horses present on January 1, 1998, was estimated to represent**:

- 51.6 percent of operations with horses on January 1, 1998, in the 28 states.
- 83.9 percent of horses on January 1, 1998, in the 28 states.

Results of the Equine '98 and other NAHMS studies are accessible on the World Wide Web at http://www.aphis.usda.gov/vs/ceah/cahm (menu choices: National Animal Health Monitoring System and Equine).

For questions about this report or additional Equine '98 and NAHMS results, please contact:

Centers for Epidemiology and Animal Health; USDA:APHIS:VS, attn. NAHMS;
555 South Howes; Fort Collins, CO 80521; Telephone: (970) 490-8000;
Internet: NAHMSinfo@usda.gov; World Wide Web: http://www.aphis.usda.gov/vs/ceah/cahm

*Identification numbers are assigned to each graph in this report for public reference.
**Based on NAHMS projection.

Terms Used in This Report

Equid: Animal of the family *Equidae*. For this study, included only domestic horses, miniature horses, ponies, mules, and donkeys/burros.

Horse: For this study, a domestic horse that was at least 14 hands tall when full grown.

N/A: Not applicable.

Operation: An area of land managed as a unit by an individual, partnership, or hired manager.

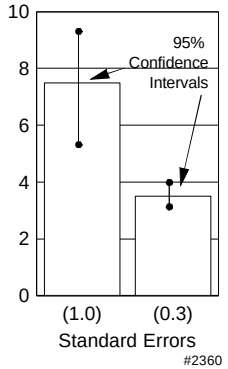
Operator: The person responsible for the day-to-day decisions on the operation.

Operation average: Calculated by summing single values for each operation divided by the total number of operations.

Perceived cause (of illness or death): Causes of illnesses or deaths were derived from observations of clinical signs reported by participating owners/operators and not necessarily substantiated by a veterinarian or laboratory.

Percent horses: The total number of ***horses*** with a certain attribute divided by the total number of horses on all operations (or all operations within a certain category such as size or region).

Examples of a 95% Confidence Interval



Percent horses on those operations: The total number of horses residing on those ***operations*** with a given attribute, divided by the total number of horses on all operations (or all operations within a certain category such as size or region).

Population estimates: Averages and proportions weighted to represent the population. For this report, the reference population was all operations with three or more horses present on January 1, 1998, in the 28 selected states, excluding race tracks. Most of the estimates in this report are provided with a measure of precision called the ***standard error***. If the only error is sampling error, chances are 95 out of 100 that the interval created by the estimate plus or minus two standard errors will contain the true population value. In the example illustrated above, an estimate of 7.5 with a standard error of 1.0 results in a range 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 a range of 2.8 and 4.0. Similarly, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of two. ***Where differences between groups are noted in this report, the 90 percent confidence intervals do not overlap.*** 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.

Previous 12 months: The period of time 12 months prior to the Equine '98 interviews conducted from April 20 through June 12, 1998.

Resident horse: A horse that spent or was expected to spend more time at the operation than at any other operation. The operation was its home base.

Regions for NAHMS Equine '98:
-**Western**: California, Colorado, Montana, New Mexico, Oregon, Washington, and Wyoming.
-**Northeast**: New Jersey, New York, Ohio, and Pennsylvania.
-**Southern**: Alabama, Florida, Georgia, Kentucky, Louisiana, Maryland, Oklahoma, Tennessee, Texas, and Virginia.
-**Central**: Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, and Wisconsin.

Sample profile: Information that describes characteristics of the operations from which Equine '98 data were collected.

Size of operation: Size groupings based on number of resident horses at the ***time of interview***. Size of operation was categorized as 1-5, 6-19, and 20 or more horses at the time of the interview. Although operations were required to have three or more horses or horse foals on January 1, 1998, to qualify for this (second) phase of the study, the horse population on the operation could have decreased to one horse or horse foal at the time of the interview.

Time of interview: The data collection window was April 20 through June 12, 1998, as the basis for analysis and results presented in this report.

Section I: Population Estimates

A. Facility Management

1. Water delivery systems

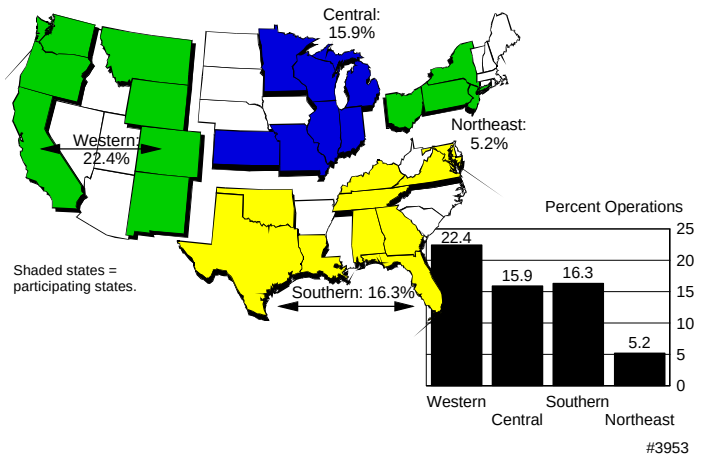
Methods of water delivery (distinct from ***source*** of water reported in *Part II: Reference of 1997 Beef Cow-Calf Health & Health Management Practices*, page 88) used for resident horses in the past 12 months were not mutually exclusive (operations could use more than one of the listed delivery systems). Overall, a water trough was used by the largest percentage of operations (80.8 percent) followed by buckets (47.6 percent). The least used source was automatic waterers. A lower percentage of operations in the Northeast region than other regions used automatic waterers (5.2 percent), and the largest percentage of operations using automatic waterers were in the Western region (22.4 percent).

a. Percent of operations that used the following water delivery systems for resident horses in the previous 12 months by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
System	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Running surface water, such as a creek, stream, spring, river, or irrigation ditch	29.9	(5.0)	34.4	(8.4)	43.5	(5.9)	32.3	(6.7)	34.7	(3.1)
Non-running surface water, such as a pond, lake, or reservoir	39.9	(5.4)	18.5	(6.8)	17.7	(4.0)	32.4	(5.7)	29.3	(2.8)
Buckets	50.6	(5.2)	67.2	(9.2)	31.8	(4.7)	49.9	(6.2)	47.6	(3.1)
Water trough (man-made container)	79.8	(3.8)	81.7	(7.0)	81.8	(4.0)	80.5	(4.5)	80.8	(2.3)
Automatic waterer	16.3	(3.2)	5.2	(2.5)	22.4	(4.2)	15.9	(3.9)	16.4	(1.9)
Other	0.0	--	0.0	--	0.0	--	0.0	--	0.0	--

Percent of Operations that Used Automatic Waterers for Resident Horses in the Previous 12 Months by Region



Note: the table below refers to the primary system used as a water delivery system. Regardless of season, the smallest percentage of operations used buckets only as the primary water delivery system, while the largest percentage used water troughs. The Other category included operations that used more than one system equally, such as a combination of troughs and automatic waterers.

b. Percent of operations by ***primary*** water delivery system used for most resident horses most of the time and by season:

	Percent Operations by Season			
Primary System	Summer 1997	Standard Error	Winter 1997-1998	Standard Error
Running surface water, such as a creek, stream, spring, river, or irrigation ditch	15.7	(2.3)	11.4	(1.9)
Non-running surface water, such as a pond, lake, or reservoir	12.2	(2.0)	10.1	(1.8)
Buckets and water trough equally	15.8	(2.3)	16.9	(2.4)
Buckets only	4.5	(1.2)	8.6	(1.8)
Water trough (man-made container) only	39.0	(3.1)	40.0	(3.1)
Automatic waterer	9.2	(1.5)	10.1	(1.5)
Other	3.6	(0.9)	2.9	(0.8)
Total	100.0		100.0	

Only a small percentage of operations (1.3 percent) used Oxion®, a bubbled, ionized oxygen in the drinking water of resident horses.

c. Percent of operations where bubbled ionized oxygen, such as Oxion®, was used in drinking water for resident horses:

Percent Operations	Standard Error
1.3	(0.9)

2. Hay or bedding storage

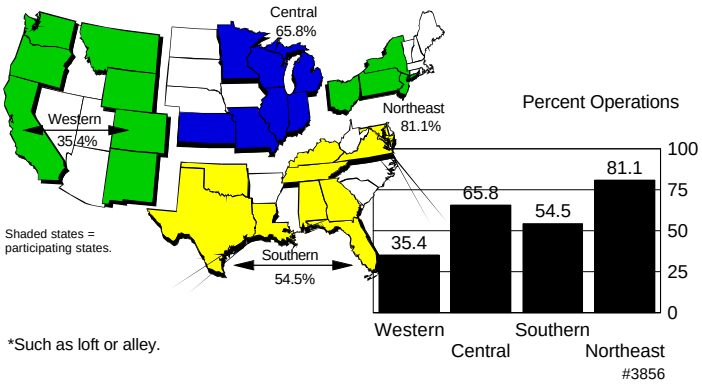
Overall, 55.3 percent of operations stored hay or bedding in the horses' housing area. The largest percentage of operations that stored hay or bedding in the horses' housing area was in the Northeast region (81.1 percent), and the smallest percentage (35.4 percent) was in the Western region.

a. Percent of operations where hay or bedding was stored in resident horse housing areas, such as in a loft or alley, by region:

Percent Operations by Region

Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
54.5	(4.8)	81.1	(7.1)	35.4	(5.8)	65.8	(6.0)	55.3	(3.2)

Percent of Operations Where Hay or Bedding Was Stored in Resident Horse Housing Areas* by Region



*Such as loft or alley.

3. Mouse and/or rat control

Over 94 percent of horse operations indicated they routinely used some form of rodent control. Cats were the most common means of rodent control (used on 77.4 percent of operations). Methods used by operations in the Other category included firearms, drowning, predators (snakes, raptors, ferrets), electrocution, traumatization with shovel/pitch fork.

a. Percent of operations where any of the following methods for mouse and/or rat control were routinely used:

Method	Percent Operations	Standard Error
Chemicals or bait	38.1	(3.0)
Traps or sticky tape	11.6	(1.8)
Cats	77.4	(2.7)
Dogs	30.2	(2.7)
Other	3.0	(0.9)
Any of the above	94.3	(1.8)

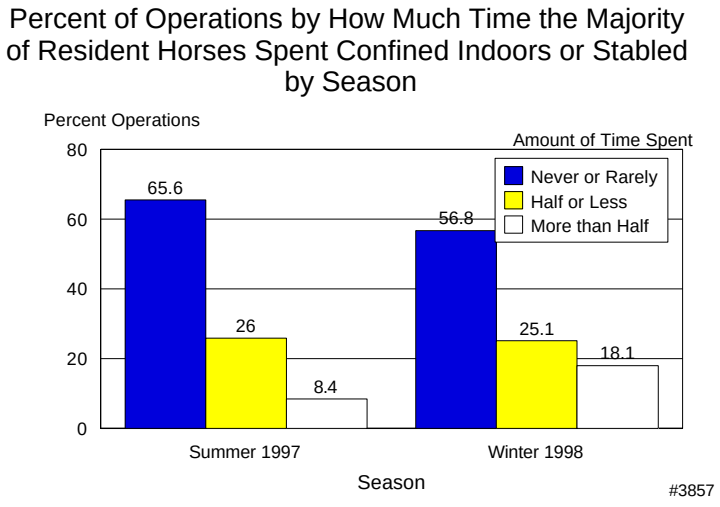
4. Confinement indoors

Confinment was defined as being restricted to the inside of a building, such as a barn, shed, or stable. Overall, 34.4 percent of operations confined horses indoors in summer, and 43.2 percent of operations did so in winter. Operations with a primary function of farm/ranch were less likely to confine horses indoors in either the summer or winter than operations with other primary functions.

Guest ranches, riding stables, outfitters, camps, and riding schools all fell into the Other category. The large standard errors for estimates in this diverse category should be considered when interpreting results.

a. Percent of operations by how much time the ***majority*** of resident horses spent confined indoors or stabled during summer 1997 and winter of 1998 and by primary function of the operation:

	Percent Operations by Time Spent Indoors						
	Never or Rarely		More than Rarely but Half the Time or Less		More than Half the Time		
Primary Function of Operation	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Total
Summer 1997							
Boarding/Training facility	30.9	(9.3)	52.8	(9.9)	16.3	(5.0)	100.0
Breeding farm	55.4	(8.4)	30.2	(7.1)	14.4	(6.9)	100.0
Farm/ranch	81.9	(3.9)	15.0	(3.7)	3.1	(1.4)	100.0
Residence (personal use)	67.0	(4.3)	26.3	(4.0)	6.7	(2.4)	100.0
Other	31.4	(10.6)	39.3	(12.9)	29.3	(10.5)	100.0
All operations	65.6	(2.9)	26.0	(2.6)	8.4	(1.9)	100.0
Winter 1998							
Boarding/Training facility	24.0	(8.8)	32.8	(8.1)	43.2	(9.9)	100.0
Breeding farm	47.0	(8.5)	36.6	(7.7)	16.4	(6.9)	100.0
Farm/ranch	75.5	(4.4)	16.9	(3.6)	7.6	(2.9)	100.0
Residence (personal use)	55.3	(4.6)	25.3	(4.2)	19.4	(3.9)	100.0
Other	31.3	(10.6)	35.1	(13.3)	33.6	(10.9)	100.0
All operations	56.8	(3.1)	25.1	(2.7)	18.1	(2.6)	100.0

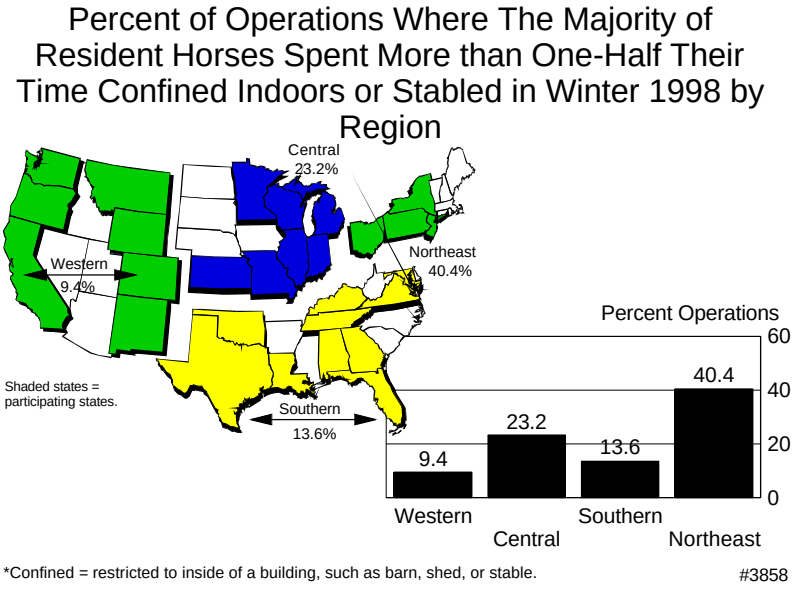


The amount of time horses spent confined indoors varied by geographic region. A larger percentage of operations in the Western region than in other regions rarely or never confined horses indoors (86.3 percent in the summer and 76.2 percent in the winter). The Northeast region had the largest percentage of operations that confined horses indoors, irrespective of season (60.9 percent in summer 1997 and 80.7 percent in winter 1998.)

b. Percent of operations by how much time the ***majority*** of resident horses spent confined indoors or stabled during summer 1997 and winter 1998 and by region:

Percent Operations by Time Spent Indoors

Region	Never or Rarely		More than Rarely But Half the Time or Less		More than Half the Time		
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Total
Summer 1997							
Southern	63.0	(4.7)	25.1	(4.0)	11.9	(4.4)	100.0
Northeast	39.1	(9.6)	50.2	(9.3)	10.7	(4.1)	100.0
Western	86.3	(3.6)	11.1	(3.4)	2.6	(1.0)	100.0
Central	60.9	(6.3)	31.2	(6.1)	7.9	(3.1)	100.0
Winter 1998							
Southern	57.8	(4.9)	28.6	(4.3)	13.6	(4.3)	100.0
Northeast	19.3	(7.3)	40.3	(9.3)	40.4	(8.8)	100.0
Western	76.2	(5.0)	14.4	(3.9)	9.4	(2.9)	100.0
Central	53.8	(6.5)	23.0	(5.4)	23.2	(6.6)	100.0



5. Consecutive years equids were kept on the operation

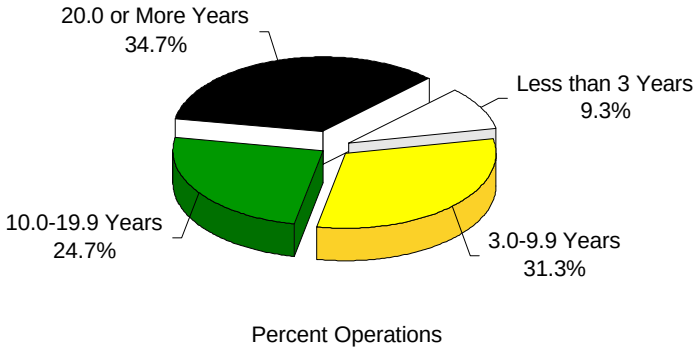
Overall, only 9.3 percent of operations had equids present on the operation for less than 3 years. Equids were on the operation for 20 or more consecutive years on 34.7 percent of operations. Regional differences were not observed when standard errors are taken into account.

a. Percent of operations by number of consecutive years equids had been on the operation and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Number Years	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 3.0	5.4	(2.3)	5.1	(3.6)	16.9	(6.3)	9.0	(3.6)	9.3	(2.2)
3.0 - 9.9	32.2	(5.2)	34.2	(8.7)	28.3	(5.0)	31.8	(5.6)	31.3	(2.9)
10.0 - 19.9	27.1	(4.3)	20.6	(6.8)	23.0	(4.5)	25.2	(5.7)	24.7	(2.6)
20.0 or more	35.3	(5.5)	40.1	(8.7)	31.8	(5.6)	34.0	(6.2)	34.7	(3.1)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of Operations by Number of Consecutive Years Equids Had Been on the Operation



B. Stall Management

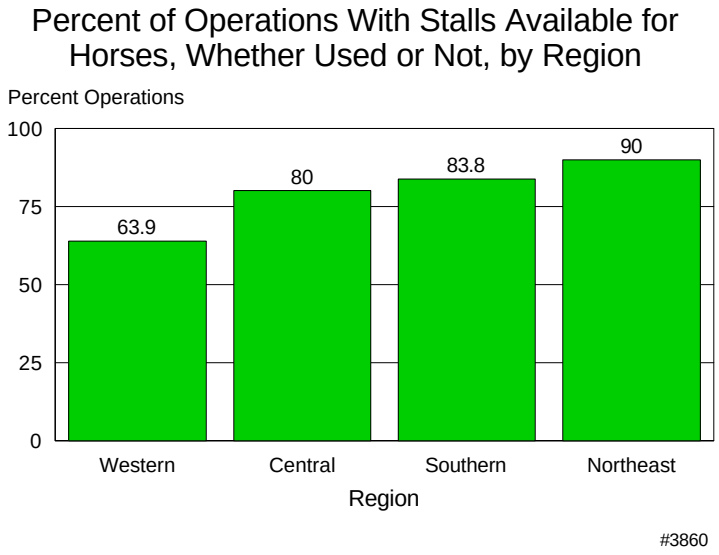
1. Stalls available

A stall was defined as: an enclosure typically for one horse; must be covered and able to confine the horse. There were regional differences regarding percentages of operations with stalls available for horses present on the operation. The smallest percentage of operations with stalls available for horses was in the Western region (63.9 percent), and the largest percentage was in the Northeast region (90.0 percent).

a. Percent of operations that had any stalls available for horses, whether used or not, by region:

Percent Operations by Region

Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
83.8	(3.4)	90.0	(5.0)	63.9	(6.1)	80.0	(5.0)	78.4	(2.7)



Stall availability increased with size of operation.

b. Percent of operations that had any stalls available for horses, whether used or not, by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
72.5	(4.1)	85.1	(3.1)	92.7	(4.3)	78.4	(2.7)

Fewer operations with horses used primarily for pleasure and farm or ranch work had stalls than did operations with horses for other use categories.

c. Percent of operations that had any stalls available for horses, whether used or not, by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

Pleasure		Showing/Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
73.7	(4.2)	97.5	(1.5)	92.9	(4.7)	99.8	(6.2)	59.0	(7.1)	94.2	(3.5)

2. Horses per stall

For operations with stalls, one-half (51.6 percent) of operations had at least one stall for every horse (one or fewer horses per stall).

a. For operations with stalls, percent of operations by number of resident horses per stall[1]:

Number Horses per Stall	Percent Operations	Standard Error
Less than 1.0	31.8	(3.2)
1.0	19.8	(2.8)
1.1 - 2.9	35.2	(3.3)
3.0 or more	13.2	(2.0)
Total	100.0	

1 Resident horse inventory on the day of the Equine '98 interview divided by the number of stalls available for horses.

3. Stall flooring

Note that the percentages of operations with stalls varied by region (Table B.1.a., page 9). Overall, the largest percentage (75.1 percent) of ***operations*** had stalls with dirt or clay flooring. Since any given operation could have had floors of various types, the number of stalls with each type of flooring was recorded. The largest percentage (69.6 percent) of ***stalls*** available for horses had dirt or clay floors. Rubber mats, concrete, or asphalt collectively accounted for flooring in 17.3 percent of the stalls.

A larger percentage of operations in the Northeast region (39.1 percent) used rubber mats as stall flooring compared to other regions. Concrete stall floors were used on the largest percentage of operations in the Northeast region (22.7 percent) and smallest percentage in the Southern region (2.0 percent). Wooden stall floors were used on the largest percentages of operations in the Northeast (13.6 percent) and Western (13.0 percent) regions.

a. For operations with stalls, percent of operations (and percent of stalls) by stall flooring type and by region:

Percent by Region

	Southern		Northeast		Western		Central		All Operations	
Flooring Type	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Operations										
Rubber mat	5.3	(2.7)	39.1	(9.4)	16.1	(3.7)	17.8	(5.1)	15.7	(2.3)
Dirt or clay	82.9	(3.9)	60.5	(9.6)	77.4	(4.2)	68.6	(6.6)	75.1	(2.8)
Gravel	0.7	(0.5)	5.0	(3.1)	2.6	(1.6)	8.9	(4.5)	3.6	(1.2)
Sand	9.0	(3.2)	4.4	(4.3)	4.9	(2.0)	4.0	(2.2)	6.3	(1.6)
Concrete	2.0	(0.8)	22.7	(8.8)	5.4	(2.0)	15.7	(5.0)	8.9	(1.9)
Asphalt or black top	1.2	(1.1)	4.6	(4.3)	0.0	(0.0)	0.1	(0.0)	1.2	(0.8)
Wooden floor (not wood chips)	0.3	(0.3)	13.6	(6.3)	13.0	(4.1)	2.8	(1.8)	5.8	(1.4)
Other	1.6	(1.1)	0.0	(0.0)	0.7	(0.7)	2.0	(1.7)	1.3	(0.6)
Stalls										
Rubber mat	4.2	(1.7)	14.9	(3.4)	19.2	(3.3)	12.4	(3.8)	11.0	(1.5)
Dirt or clay	83.3	(3.9)	55.2	(7.6)	59.4	(5.3)	69.0	(6.1)	69.6	(3.2)
Gravel	0.6	(0.3)	3.1	(1.6)	2.1	(0.9)	3.7	(1.8)	2.1	(0.6)
Sand	6.2	(2.2)	4.1	(4.0)	7.0	(2.9)	3.0	(1.7)	5.2	(1.4)
Concrete	3.5	(1.5)	9.9	(4.4)	1.4	(0.5)	8.6	(3.3)	5.6	(1.3)
Asphalt or black top	1.0	(0.6)	1.1	(0.8)	0.0	(0.0)	0.2	(0.2)	0.7	(0.3)
Wooden floor (not wood chips)	0.2	(0.2)	11.7	(5.2)	10.1	(4.1)	1.8	(1.1)	5.0	(1.5)
Other	1.0	(0.7)	0.0	(0.0)	0.8	(0.7)	1.3	(0.9)	0.8	(0.3)
Total	100.0		100.0		100.0		100.0		100.0	

4. Outdoor air access for stalls

Note that the percentages of operations with stalls varied by size of operation (Table B.1.b., page 10). Over three-fourths (78.2 percent) of operations that had stalls had an individual opening directly to outdoor air in the majority of stalls. For operations with stalls, a larger percentage of operations with one to five horses than operations with more horses had a majority of stalls with this type of air flow.

a. For operations with stalls, percent of operations where the majority of stalls had an individual opening, such as a door or window, directly to outdoor air by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
82.2	(3.4)	74.4	(4.0)	70.9	(6.6)	78.2	(2.4)

Note that the percentages of operations with stalls varied by resident horse use (Table B.1.c., page 10). Horses used for racing had the smallest percentage (58.5 percent) of operations with individual openings directly to outdoor air in the majority of stalls. Nevertheless, the small sample size with large standard error for this category makes a comparison difficult.

b. For operations with stalls, percent of operations where the majority of stalls had an individual opening, such as a door or window, directly to outdoor air by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

Pleasure		Showing/Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
81.1	(3.5)	79.3	(5.1)	76.9	(6.0)	58.5	(16.7)	71.2	(7.9)	76.7	(18.5)

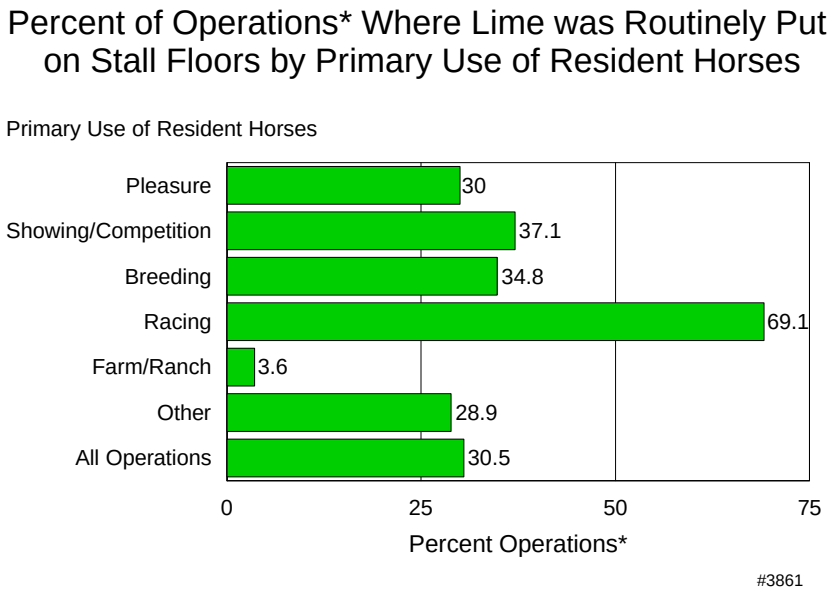
5. Use of lime

Note that the percentages of operations with stalls varied by use of resident horses (Table B.1.c., page 10.) For operations with stalls, operations that used horses primarily for racing were most likely, and operations where horses were used primarily for farm or ranch work were least likely, to use lime on stall floors.

a. For operations with stalls, percent of operations where lime was put on the stall floors on a routine basis by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other		All Operations	
Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
30.0	(4.6)	37.1	(7.3)	34.8	(6.9)	69.1	(15.8)	3.6	(1.8)	28.9	(21.7)	30.5	(3.1)



*For operations with stalls.

6. Use of sodium bisulfate

Overall, 2.3 percent of horse operations with stalls routinely used sodium bisulfate on stall floors. Sodium bisulfate is ***not*** lime and has been reported to reduce ammonia level and number of flies and decrease manure pH in equine stalls.

a. For operations with stalls, percent of operations where sodium bisulfate was put on the stall floors on a routine basis:

Percent Operations	Standard Error
2.3	(1.0)

7. Drain Location

Note that the percentages of operations with stalls varied by size of operation (Table B.1.b., page 10). Only 4.8 percent of horse operations had drains located in the majority of stalls (connected either to the sewer system or piped directly into the ground). Use of drains did not appear related to size of operation.

a. For operations with stalls, percent of operations where drains were located inside the majority of stalls by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
7.6	(2.9)	0.8	(0.4)	5.6	(4.0)	4.8	(1.6)

8. Cleaning after horse permanently removed from stall

Note that the percentages of operations with stalls varied by size of operation (Table B.1.b., page 10). Operations with fewer than 20 horses were more likely to have had only one horse use a stall or did not change horses that occupied the stall. Overall, only 6.1 percent of operations reported that they disinfected the stall between horses. The method of disinfection was not determined.

a. For operations with stalls, percent of operations using various stall cleaning/disinfection practices after a horse was permanently removed from its stall, e.g., prior to moving another horse into the stall, by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

	1-5		6-19		20 or More		All Operations	
Practice	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Remove all bedding and manure plus disinfect floor and/or walls	5.3	(1.7)	6.3	(2.5)	10.7	(4.4)	6.1	(1.4)
Remove all bedding and manure and add lime to floor	18.4	(4.3)	18.9	(4.1)	29.3	(6.4)	19.6	(2.8)
Remove all bedding and manure	27.7	(4.8)	23.0	(3.9)	20.7	(6.3)	25.3	(3.2)
Remove soiled bedding or manure only	11.6	(2.9)	13.9	(4.0)	30.2	(7.0)	14.1	(2.2)
Nothing is done to prepare the stall	11.3	(3.0)	15.1	(3.6)	5.5	(3.0)	12.3	(2.2)
Not applicable or only one horse uses a stall, no changes in long time	25.6	(4.1)	22.8	(4.8)	2.1	(0.8)	22.5	(2.8)
Other	0.1	(0.0)	0.0	(0.0)	1.5	(1.5)	0.1	(0.1)
Total	100.0		100.0		100.0		100.0	

Note that the percentages of operations with stalls varied across use categories (Table B.1.c., page 10). The following percentages are only applicable to operations with stalls for horses.

Operations with resident horses primarily used for breeding were more likely to disinfect the stall between horses than operations with resident horses for other specific uses. For farm/ranch operations with stalls (59.0 percent, Table B.1.c., page 10), 27.4 percent did nothing to prepare the stall for a new horse. This percentage represents a total of 16.2 percent of farm/ranch operations. Nearly one-half (44.4 percent) of operations with horses for racing that had stalls did not change horses' occupancy of the stalls.

Removal of soiled bedding and manure alone was rarely practiced on operations that had resident horses for uses in the Other category (0.5 percent).

b. For operations with stalls, percent of operations using various stall cleaning practices after a horse was permanently removed from its stall, e.g., prior to moving another horse into the stall, by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

	Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Practice	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Remove all bedding and manure plus disinfect floor and/or walls	5.9	(1.7)	3.5	(1.6)	14.6	(5.7)	1.8	(1.2)	0.1	(0.1)	1.8	(1.2)
Remove all bedding and manure and add lime to floor	23.7	(4.7)	17.4	(4.9)	17.1	(4.5)	30.4	(17.0)	3.0	(1.7)	26.2	(21.4)
Remove all bedding and manure	26.9	(4.9)	25.8	(7.4)	22.4	(5.3)	10.7	(7.6)	24.9	(8.8)	46.3	(27.7)
Remove soiled bedding or manure only	6.9	(2.2)	18.6	(5.9)	25.4	(7.2)	12.7	(9.0)	24.7	(8.1)	0.5	(0.4)
Nothing is done to prepare the stall	12.7	(3.1)	7.6	(3.3)	9.1	(3.9)	0.0	--	27.4	(9.4)	2.8	(2.3)
Not applicable or only one horse uses a stall, no changes in long time	23.9	(4.1)	27.1	(6.1)	10.6	(5.7)	44.4	(17.3)	19.7	(7.7)	22.4	(18.4)
Other	0.0	(0.0)	0.0	(0.0)	0.8	(0.8)	0.0	--	0.2	(0.2)	0.0	(0.0)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

C. Operation Surroundings

1. Distance to nearest operation with equids

The largest percentage of operations in each region indicated the nearest operation with equids was located 200 yards to 5 miles away. Over one-fourth of operations in the Western region (33.0 percent) and the Southern region (28.6 percent) had an operation with equids adjacent to their premises.

a. Percent of operations by distance from the operation to the nearest operation with any type of equid and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Distance	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Adjacent	28.6	(4.7)	17.3	(6.7)	33.0	(6.2)	15.2	(4.6)	25.4	(2.9)
Less than 200 yards	12.0	(2.9)	8.1	(3.6)	20.5	(5.1)	16.4	(4.3)	14.7	(2.1)
200 yards to 5 miles	52.9	(4.9)	68.6	(7.8)	44.2	(5.7)	67.7	(6.0)	55.8	(3.1)
More than 5 miles	2.9	(1.9)	6.0	(3.7)	2.0	(1.3)	0.7	(0.7)	2.6	(1.0)
Don't know	3.6	(2.5)	0.0	--	0.3	(0.2)	0.0	(0.0)	1.5	(1.0)
Total	100.0		100.0		100.0		100.0		100.0	

2. Specific land types within 5 miles

The Western region had a lower percentage of operations within 5 miles of a forest than other regions. The percentage of operations with a non-farmable marsh or swamp of one-fourth acre or more within 5 miles was similar across regions. The Western region had the largest percentage (30.5 percent) of operations that were not within 5 miles of a forest or marsh. The Western region included arid states, such as New Mexico, and states with a high annual rainfall, such as Washington.

a. Percent of operations with specified land types within 5 miles of the operation by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Land Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Non-farmable marsh or swamp one-quarter of an acre or more in size	56.9	(5.0)	59.1	(8.9)	50.7	(5.6)	66.2	(5.7)	57.4	(3.0)
Forest or woods five acres or more in size	85.7	(3.5)	96.6	(2.4)	60.8	(6.2)	86.2	(4.1)	80.5	(2.5)
Neither of the above	13.6	(3.4)	3.4	(2.4)	30.5	(6.1)	11.8	(3.8)	16.4	(2.4)

3. Frequency of wildlife

Wildlife are potential disease reservoirs for horses. Overall, mice/rats, racoons/skunks, coyotes/foxes, deer/elk, waterfowl, or evidence (tracks/scat/carcass/damage) of their presence were each seen on or in the vicinity of over 75 percent of operations. Vicinity was not specifically defined but was left to the operator's interpretation.

a. Percent of operations by frequency of seeing the following wildlife, or evidence of wildlife, on or in the immediate vicinity of the operation in the previous 12 months:

Percent Operations by Frequency

	Often		Sometimes		Never		Total
Wildlife	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
Mice or rats	30.6	(2.8)	61.3	(3.0)	8.1	(1.8)	100.0
Raccoons or skunks	21.3	(2.4)	55.1	(3.0)	23.6	(2.7)	100.0
Coyotes or foxes	25.6	(2.6)	55.0	(3.0)	19.4	(2.4)	100.0
Deer or elk	47.6	(3.2)	36.8	(3.0)	15.6	(2.6)	100.0
Water fowl such as geese or ducks	41.4	(3.1)	36.4	(3.0)	22.2	(2.7)	100.0
Bats	20.4	(2.5)	30.6	(2.9)	49.0	(3.1)	100.0
Opossums	17.0	(2.3)	40.8	(3.1)	42.2	(3.2)	100.0
			Often or Sometimes				
Any of the above			99.2	(0.6)	0.8	(0.6)	100.0

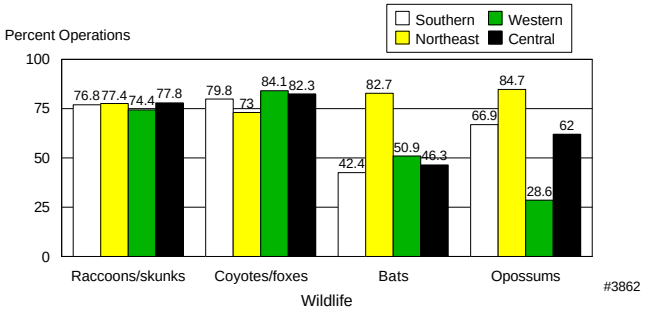
Observations of mice/rats, raccoons/skunks, and coyotes/foxes were similar across regions. A lower percentage of operations in the Western region (28.6 percent) than other regions reported sightings or evidence (tracks/scat/carcass/damage) of opossums on or near the operation in the previous year. Bats were observed on a larger percentage of operations in the Northeast region (82.7 percent) than in other regions.

b. Percent of operations where the following wildlife, or evidence of wildlife, were ***often or sometimes*** seen on or in the immediate vicinity of the operation in the previous 12 months by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Wildlife	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Mice or rats	95.8	(1.6)	88.7	(7.9)	90.8	(3.7)	88.4	(3.9)	91.9	(1.8)
Raccoons or skunks	76.8	(4.0)	77.4	(7.4)	74.4	(5.6)	77.8	(6.3)	76.4	(2.7)
Coyotes or foxes	79.8	(3.7)	73.0	(7.3)	84.1	(4.8)	82.3	(5.1)	80.6	(2.4)
Deer or elk	76.6	(5.4)	98.6	(1.2)	78.9	(4.8)	96.3	(2.1)	84.4	(2.6)
Water fowl such as geese or ducks	69.8	(5.1)	92.0	(5.6)	79.6	(5.6)	80.8	(4.6)	77.8	(2.7)
Bats	42.4	(5.3)	82.7	(5.8)	50.9	(5.4)	46.3	(6.3)	51.0	(3.1)
Opossums	66.9	(5.4)	84.7	(5.1)	28.6	(5.5)	62.0	(6.0)	57.8	(3.2)
Any of the above	99.3	(0.7)	100.0	--	98.0	(1.9)	100.0	--	99.2	(0.6)

Percent of Operations Where Evidence of the Following Wildlife Were Seen in the Operation Vicinity by Region*



*Wildlife or evidence of wildlife, were often or sometimes seen on or in the immediate vicinity of the operation in the previous 12 months.

Wild equids were sighted or other evidence of their presence was observed on or in the vicinity of less than 1 percent of operations.

c. Percent of operations by frequency of seeing wild horses and other wild equids on or in the immediate vicinity of the operation in the previous 12 months:

Percent Operations by Frequency

Often or Sometimes		Never		Total
Percent	Standard Error	Percent	Standard Error	Percent
0.9	(0.5)	99.1	(0.5)	100.0

D. General Resident Horse Management

1. Frequency of hoof trimming

Approximately one-half of operations (50.9 percent) trimmed horses hooves five or more times per year. Percentages for frequency of hoof trimming were similar across operation sizes when taking into account the standard errors.

a. Percent of operations by how often hooves were trimmed for the majority of resident horses in the previous 12 months and by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

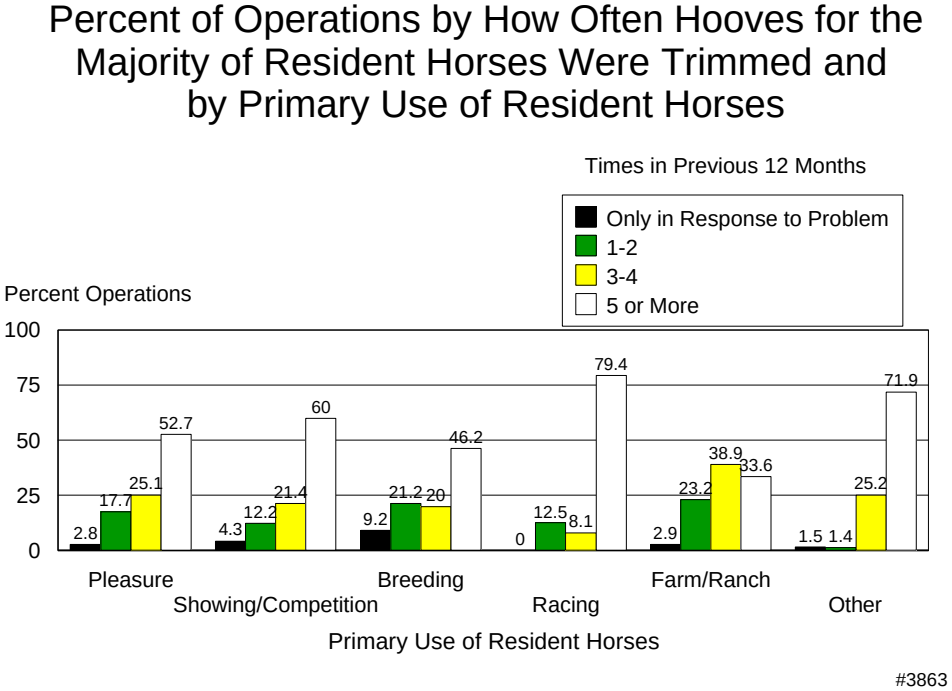
	1- 5		6-19		20 or More		All Operations	
Frequency	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Not trimmed in last 12 months	1.0	(0.6)	2.5	(1.2)	6.1	(4.3)	1.9	(0.6)
Only trimmed in response to a problem	3.5	(1.6)	4.7	(1.9)	2.2	(1.5)	3.8	(1.1)
1-2 times in the last 12 months	19.9	(3.6)	14.4	(3.5)	20.2	(6.8)	18.0	(2.5)
3-4 times in the last 12 months	25.7	(4.0)	25.9	(4.0)	20.4	(6.0)	25.4	(2.7)
5 or more times in the last 12 months	49.9	(4.4)	52.5	(4.7)	51.1	(7.2)	50.9	(3.0)
Total	100.0		100.0		100.0		100.0	

Larger percentages of operations with horses primarily used for racing (79.4 percent) and for miscellaneous uses in the Other category (71.9 percent) trimmed horses' hooves five or more times per year compared to operations with other primary uses of horses.

b. Percent of operations by how often hooves were trimmed for the majority of resident horses in the previous 12 months and by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

	Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Frequency	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Not trimmed in last 12 months	1.7	(0.9)	2.1	(2.1)	3.4	(1.6)	0.0	--	1.4	(1.0)	0.0	--
Only trimmed in response to a problem	2.8	(1.2)	4.3	(3.3)	9.2	(4.9)	0.0	(0.0)	2.9	(2.5)	1.5	(1.6)
1-2 times in the last 12 months	17.7	(3.6)	12.2	(5.6)	21.2	(6.2)	12.5	(8.9)	23.2	(6.2)	1.4	(1.4)
3-4 times in the last 12 months	25.1	(4.0)	21.4	(6.4)	20.0	(5.5)	8.1	(7.0)	38.9	(7.3)	25.2	(20.1)
5 or more times in the last 12 months	52.7	(4.4)	60.0	(7.1)	46.2	(7.4)	79.4	(11.2)	33.6	(6.6)	71.9	(20.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	



2. Frequency of shoeing

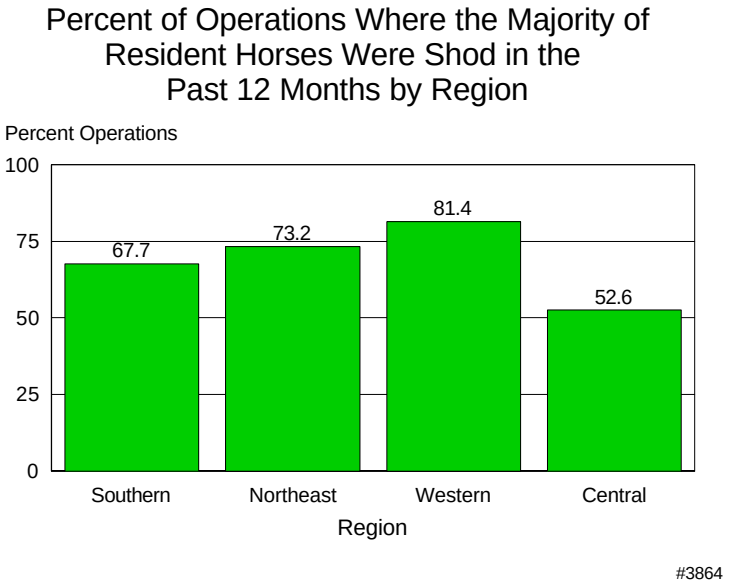
Overall, 31.0 percent of operations reported the majority of resident horses on the operation were not shod, while a similar percentage (30.3 percent) reported resident horses were shod five or more times in the previous 12 months.

The Central region had the largest percentage (47.4 percent) of operations where horses were not shod in the previous 12 months, while the Western region had the largest percentage (81.4 percent) of operations where horses were shod at least once in the previous 12 months. Climate, terrain (rocky, hard ground), and use can determine the need to shoe horses.

a. Percent of operations by how often the majority of resident horses were shod in the previous 12 months and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Frequency	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Not shod in last 12 months	32.3	(4.9)	26.8	(6.9)	18.6	(5.0)	47.4	(6.7)	31.0	(2.9)
Only shod in response to a problem	14.3	(4.6)	4.7	(3.4)	5.8	(3.8)	4.7	(2.6)	8.6	(2.2)
1-2 times in the last 12 months	12.1	(3.4)	2.3	(1.8)	21.4	(5.1)	8.5	(3.2)	12.6	(2.1)
3-4 times in the last 12 months	9.3	(2.7)	21.6	(9.5)	24.1	(4.2)	21.1	(4.8)	17.5	(2.3)
5 or more times in the last 12 months	32.0	(4.8)	44.6	(9.1)	30.1	(5.2)	18.3	(5.8)	30.3	(2.9)
Total	100.0		100.0		100.0		100.0		100.0	



Mid-size operations (those with six to 19 resident horses) were more likely than smaller operations (those with one to five resident horses) to shoe only in response to a problem. A larger percentage of operations with fewer than 20 resident horses shod horses one or two times per year compared to operations with 20 or more horses.

b. Percent of operations by how often the majority of resident horses were shod in the previous 12 months and by size operation:

Percent Operations by Size of Operations (Number Resident Horses)

	1-5		6-19		20 or More	
Frequency	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Not shod in last 12 months	30.2	(4.1)	31.1	(4.3)	36.9	(7.3)
Only shod in response to a problem	4.0	(2.1)	16.0	(4.9)	9.5	(3.7)
1-2 times in the last 12 months	15.1	(3.0)	10.3	(3.0)	3.1	(1.5)
3-4 times in the last 12 months	18.2	(3.3)	16.7	(3.5)	16.8	(6.3)
5 or more times in the last 12 months	32.5	(4.3)	25.9	(3.9)	33.7	(6.2)
Total	100.0		100.0		100.0	

Operations where the primary use of resident horses was breeding were the least likely to have shod horses during the previous 12 months, probably because this primary use did not center around riding.

c. Percent of operations by how often the majority of resident horses were shod in the previous 12 months and by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

	Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm or Ranch Work		Other	
Frequency	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Not shod in last 12 months	29.5	(4.1)	18.0	(6.0)	53.8	(7.4)	16.7	(9.7)	30.2	(6.6)	3.5	(2.6)
Only shod in response to a problem	9.7	(3.1)	2.3	(1.6)	14.2	(5.4)	25.0	(15.5)	1.5	(1.2)	21.8	(19.8)
1-2 times in the last 12 months	13.5	(3.1)	11.1	(5.5)	4.2	(1.8)	0.0	--	21.5	(7.0)	2.4	(1.9)
3-4 times in the last 12 months	18.9	(3.3)	16.1	(5.3)	14.2	(6.7)	0.1	(0.1)	20.9	(5.3)	5.5	(3.1)
5 or more times in the last 12 months	28.4	(4.3)	52.5	(6.9)	13.6	(3.8)	58.2	(16.6)	25.9	(6.3)	66.8	(21.2)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

3. Hospitalization

Overall, 11.6 percent of operations reported any resident horse was hospitalized and returned in the previous 12 months. The percentage of operations that had any resident horses hospitalized and returned to the operation increased with increasing number of resident horses on the operation.

a. Percent of operations where, in the previous 12 months, any resident horse was hospitalized and returned by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

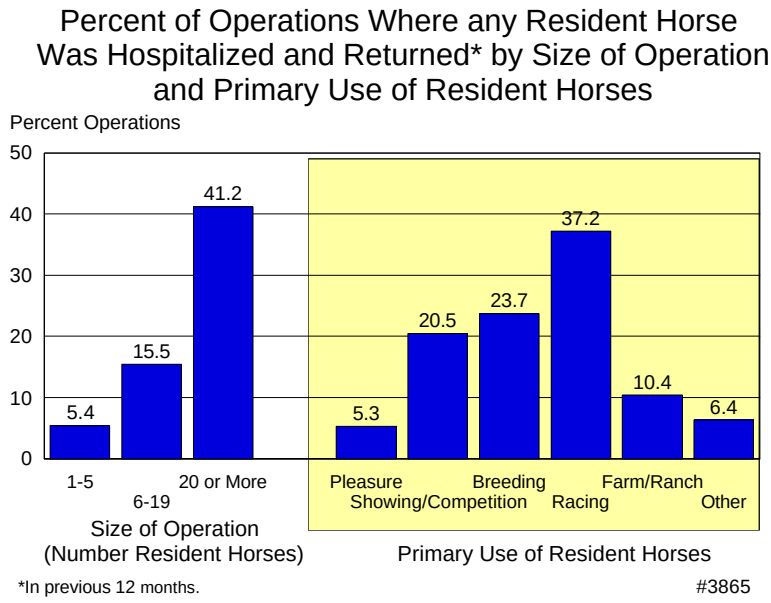
1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
5.4	(1.7)	15.5	(3.1)	41.2	(7.1)	11.6	(1.6)

The percentage of operations that had at least one resident horse go to a veterinary hospital and return in the previous 12 months ranged from 5.3 percent of operations with a primary use of pleasure to 37.2 percent of operations with a primary use of racing.

b. Percent of operations where any resident horses were hospitalized and returned in the previous 12 months by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
5.3	(1.4)	20.5	(5.7)	23.7	(6.5)	37.2	(17.2)	10.4	(3.3)	6.4	(4.0)



4. Isolation of horses returning to the operation

Over 13 percent of operations with 19 or fewer resident horses reported the horses never left the operation. Approximately two out of three operations with 19 or fewer resident horses never isolated horses that left the operation, had direct contact with outside horses, and returned. About one-half (52.0 percent) of operations with 20 or more horses never isolated returning horses, while 35.5 percent isolated returning horses for a cause such as evidence of, or exposure to, disease.

a. Percent of operations by what was done when resident horses left the operation, had direct contact with outside horses, and returned and by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

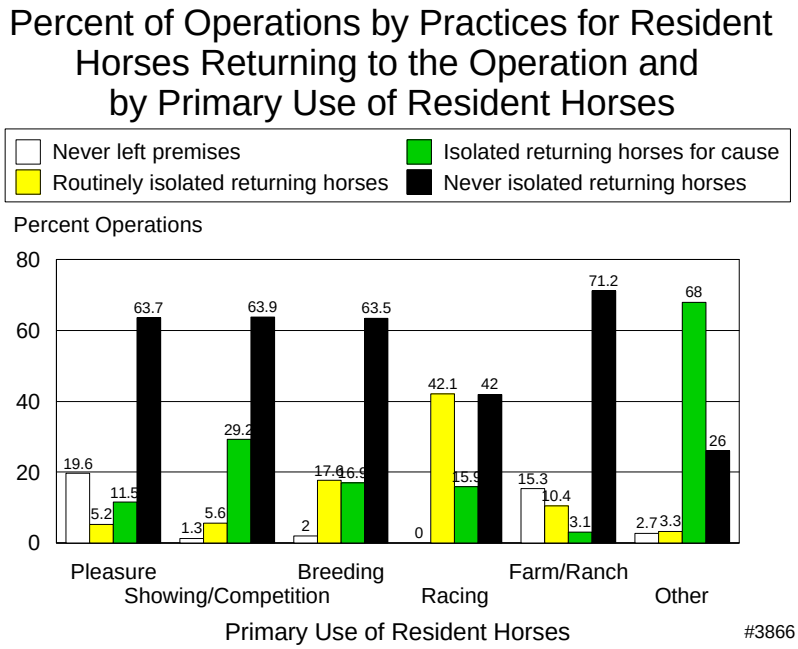
	1-5		6-19		20 or More		All Operations	
Practice	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Resident horses never left premises	15.1	(2.7)	13.3	(3.1)	1.0	(0.4)	13.4	(1.9)
Routinely isolated returning horses	7.1	(2.1)	10.8	(2.9)	11.5	(4.8)	8.7	(1.6)
Isolated returning horses for a cause such as evidence of or exposure to disease	12.9	(3.4)	10.9	(2.5)	35.5	(6.8)	13.9	(2.2)
Never isolated returning horses	64.9	(4.2)	65.0	(4.2)	52.0	(7.2)	64.0	(2.9)
Total	100.0		100.0		100.0		100.0	

Resident horses never left the operation on the largest percentage of operations where horses were kept for pleasure (19.6 percent) and farm/ranch use (15.3 percent) compared to operations with other primary uses of horses. Operations where the primary use of horses was racing showed the largest percentage of operations that routinely isolated returning horses (42.1 percent) followed by breeding (17.6 percent). The need to isolate resident horses that left the operation and had direct contact with outside horses, then returned is dependent on the individual situation, disease status of exposed horses, their immunity, amount of horse traffic on the operation, risk aversion of the operator, etc.

b. Percent of operations by what was done when resident horses left the operation, had direct contact with outside horses, and returned by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

	Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Practice	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Resident horses never left premises	19.6	(3.1)	1.3	(1.3)	2.0	(1.4)	0.0	--	15.3	(4.7)	2.7	(1.8)
Routinely isolated returning horses	5.2	(1.7)	5.6	(3.4)	17.6	(5.6)	42.1	(17.9)	10.4	(5.0)	3.3	(2.6)
Isolated returning horses for a cause such as evidence of or exposure to disease	11.5	(2.9)	29.2	(7.4)	16.9	(5.3)	15.9	(9.7)	3.1	(1.3)	68.0	(19.7)
Never isolated returning horses	63.7	(4.0)	63.9	(7.7)	63.5	(7.1)	42.0	(16.5)	71.2	(6.4)	26.0	(18.3)
Total	100.0		100.0		100.0		100.0		100.0		100.0	



E. Parasites and Deworming

1. Fecal testing policy for parasites

Levels of fecal testing were similar across regions when taking into account standard errors except that a larger percentage of operations in the Northeast region (41.8 percent) tested for parasites (either routinely or in response to a problem) than in the Central region (18.5 percent). In all regions, testing in response to a problem was the most common policy among operations that did fecal testing.

a. Percent of operations with various fecal testing ***policies*** for parasites in resident horses by region:

	Percent Operations by Region									
	Southern		Northeast		Western		Central		All Operations	
Policy	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never test for parasites	72.5	(4.6)	58.2	(8.9)	74.3	(4.3)	81.5	(4.3)	73.0	(2.6)
Routinely test most horses for parasites regardless of animal health status	6.9	(2.0)	2.2	(1.6)	2.4	(1.2)	4.1	(2.3)	4.4	(1.0)
Routinely test only foals for parasites	0.9	(0.9)	3.3	(3.3)	0.0	(0.0)	1.4	(1.4)	1.1	(0.6)
Test in response to a problem such as diarrhea, weight loss, or colic	19.7	(4.2)	36.3	(8.7)	23.3	(4.1)	13.0	(3.7)	21.5	(2.5)
Total	100.0		100.0		100.0		100.0		100.0	

Few operations with horses used primarily for farm/ranch use (6.3 percent) tested for parasites, while almost one-half (46.5 percent) of operations with horses primarily for racing tested for parasites.

b. Percent of operations with various fecal testing ***policies*** for parasites in resident horses by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

	Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Policy	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Never test for parasites	71.2	(3.8)	61.4	(8.0)	74.3	(6.0)	53.5	(17.1)	93.7	(2.8)	72.9	(20.3)
Routinely test most horses for parasites regardless of animal health status	5.5	(1.6)	1.1	(0.7)	5.7	(2.6)	12.5	(9.0)	0.9	(0.7)	1.6	(1.5)
Routinely test only foals for parasites	1.4	(1.0)	0.0	(0.0)	2.1	(2.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Test in response to a problem such as diarrhea, weight loss, or colic	21.9	(3.4)	37.5	(8.1)	17.9	(5.3)	34.0	(16.9)	5.4	(2.7)	25.5	(20.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

2. Operations deworming

Over 95 percent of operations, regardless of size, dewormed the majority of resident horses in the previous 12 months. These are higher percentages than those reported in Equine '98's *Part I: Baseline Reference of 1998 Equine Health and Management* (N280.898, August 1998). In Part I, it was reported that 86.7 percent of all operations dewormed at least once, and only 78.9 percent of operations with one to two equids dewormed in 1997 (page 32). Smaller operations (e.g., those with fewer than three horses) and operations with equids besides horses were included in the Part I data and may have influenced the differences noted between these reports.

a. Percent of operations where, in the previous 12 months, the ***majority*** of the resident horses were dewormed at least once by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
97.5	(1.2)	95.2	(2.2)	98.8	(0.6)	96.8	(1.0)

Regardless of region, over 96 percent of operations dewormed the majority of resident horses in the previous 12 months.

b. Percent of operations where, in the previous 12 months, the ***majority*** of the resident horses were dewormed at least once by region:

Percent Operations by Region

Southern		Northeast		Western		Central	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
96.1	(2.0)	100.0	--	96.1	(2.1)	96.8	(1.8)

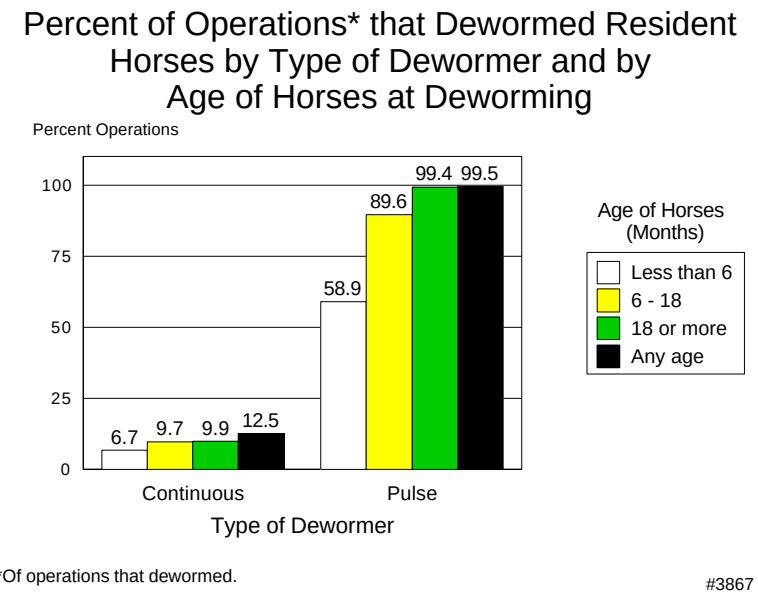
For operations that dewormed, almost all (99.5 percent) gave a pulse dewormer (dewormer given on a non-continuous basis) to at least one age group, while only 12.5 percent of operations gave continuous dewormers. These deworming methods were not mutually exclusive.

The percentage of operations that dewormed was less for foals (less than 6 months of age) than for other age categories, possibly because the operations had not dewormed foals less than 6 months of age in the previous 12 months, or it could be that the foals were considered too young to require a dewormer when the Equine '98 questionnaire was administered (Spring 1998) and the operations did not have foals the previous spring.

c. For operations that gave any dewormer to resident horses and had the following age classes of horses, percent of operations that dewormed each age group in the previous 12 months by pulse and continuous dewormer:

Percent Operations by Type of Dewormer Given

	Continuous		Pulse		Either Continuous or Pulse	
Age Class	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 6 months	6.7	(2.3)	58.9	(5.1)	62.7	(5.1)
6 - 18 months	9.7	(2.2)	89.6	(2.8)	92.8	(2.5)
18 months or older	9.9	(1.8)	99.4	(0.4)	99.9	(0.1)
Any age	12.5	(1.9)	99.5	(0.4)	100.0	--



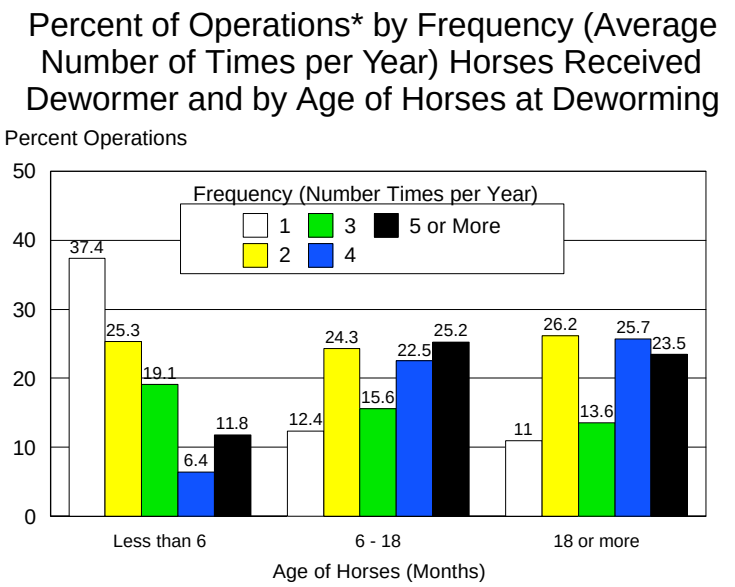
3. Use of dewormer other than continuous (pulse)

For horses 6 months or more of age, about one-half of operations gave a pulse dewormer four or more times per year. Most operations gave dewormer three or fewer times to foals less than 6 months of age. This lesser frequency could be because foals less than 6 months of age are often not dewormed for the first time until they are 2 or 3 months of age and because there is only a 6-month window of opportunity for deworming for this age group.

a. For operations that gave a ***pulse*** (***non-continuous***) dewormer to resident horses, percent of operations by frequency (average number of times) horses received dewormer in the previous 12 months and by age group:

Percent Operations by Age Group

Frequency (Number Times per Year)	Less than 6 Months		6 Months to Less than 18 Months		18 Months or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
1	37.4	(5.6)	12.4	(2.7)	11.0	(2.1)
2	25.3	(5.5)	24.3	(4.1)	26.2	(2.8)
3	19.1	(4.6)	15.6	(3.1)	13.6	(1.9)
4	6.4	(2.9)	22.5	(3.9)	25.7	(2.8)
5 or more	11.8	(3.6)	25.2	(4.0)	23.5	(2.6)
Total	100.0		100.0		100.0	



*Of operations that gave a pulse (non-continuous) dewormer to resident horses in the previous 12 months. #3868

Overall, two out of three operations (67.8 percent) that gave a pulse dewormer rotated class of dewormers in the previous 12 months. This percentage of operations was similar across operation size categories.

b. For operations that gave a ***pulse* (*non-continuous*)** dewormer, percent that rotated dewormers in the previous 12 months by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
67.6	(4.4)	68.4	(4.3)	67.0	(7.1)	67.8	(3.1)

Deworming methods were not mutually exclusive but had to have been used on the majority of resident horses to be reported. The most common method of administering pulse dewormer on operations that gave a pulse dewormer in the previous 12 months was a paste or liquid squirted into the horse's mouth. This finding was common to all sizes of operations. In general, a larger percentage of operations with 20 or more resident horses administered dewormer on feed or with deworming guns and/or stomach tubes than on smaller operations. Methods in the Other category included injectable ivermectin and a pour-on system.

c. For operations that gave a ***pulse* (*non-continuous*)** dewormer in the previous 12 months, percent that used any of the following deworming administration methods on the ***majority*** of the resident horses by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

	1-5		6-19		20 or More		All Operations	
Administration Method	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Paste or liquid squirted in mouth, such as with a syringe	98.1	(1.2)	98.6	(1.0)	98.2	(1.4)	98.3	(0.8)
Deworming gun	2.0	(1.2)	5.4	(2.6)	9.6	(3.4)	3.7	(1.2)
Stomach tube	6.2	(1.9)	7.1	(2.4)	9.0	(3.1)	6.7	(1.4)
Dewormer put on feed, but not as a continuous treatment	2.5	(1.2)	4.9	(1.9)	7.5	(3.0)	3.7	(1.0)
Other	0.9	(0.9)	0.1	(0.0)	1.9	(1.4)	0.7	(0.5)

The ***primary*** method of deworming horses on operations that gave a pulse dewormer in the previous 12 months was a paste or liquid squirted in the horse's mouth.

d. For operations that gave a ***pulse* (*non-continuous*)** dewormer in the previous 12 months, percent of operations by ***primary*** (based on frequency of use) deworming administration method used:

Primary Administration Method	Percent Operations	Standard Error
Paste or liquid squirted in mouth, such as with a syringe	96.3	(1.2)
Deworming gun	1.8	(1.0)
Stomach tube	1.2	(0.6)
Dewormer put on feed, but not as a continuous treatment	0.1	(0.1)
Other	0.6	(0.3)
Total	100.0	

Almost all operations (99.5 percent) that gave a pulse dewormer in the previous 12 months dewormed as a general preventive measure. This percentage was similar across operation size categories. Larger percentages of operations with 20 or more horses compared to smaller operations dewormed because they had horses that previously had colic, worms were seen, their horses were thin or doing poorly, or a fecal test indicated a need for deworming. Reasons for deworming were not mutually exclusive.

e. For operations that gave a ***pulse* (*non-continuous*)** dewormer in the previous 12 months, percent of operations where resident horses were dewormed for any of the following reasons by size of operation:

	Percent Operations by Size of Operation (Number Resident Horses)							
	1-5		6-19		20 or More		All Operations	
Reason for Deworming	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
General prevention measure	99.3	(0.7)	100.0	(0.0)	99.8	(0.2)	99.5	(0.4)
Horses had previous colic problem	4.3	(1.7)	1.9	(1.1)	14.6	(5.0)	4.3	(1.1)
Worms were seen	0.9	(0.6)	3.3	(1.4)	15.8	(5.3)	2.8	(0.7)
Horses were thin or doing poorly	8.0	(2.5)	21.9	(4.0)	43.4	(7.3)	15.5	(2.2)
Fecal test results indicated a need	1.1	(1.1)	2.9	(1.4)	7.5	(3.2)	2.2	(0.8)
Other	0.8	(0.5)	1.9	(1.1)	0.6	(0.3)	1.2	(0.5)

For 98.6 percent of operations, the ***primary*** reason for deworming was for general prevention.

f. For operations that gave a ***pulse (non-continuous)*** dewormer in the previous 12 months, percent of operations by ***primary*** reason for deworming resident horses:

Primary Reason	Percent Operations	Standard Error
General prevention measure	98.6	(0.7)
Horses had previous colic problem	0.0	--
Worms were seen	0.0	(0.0)
Horses were thin or doing poorly	1.4	(0.7)
Fecal test results indicated a need	0.0	(0.0)
Other	0.0	--
Total	100.0	

F. Injection Practices by Operation Personnel

1. Any personnel gave injections to a horse

Overall, personnel on 68.1 percent of operations had given injections to at least one horse on the operation in the previous 12 months. These personnel included the operator, a family member, or paid or unpaid labor who worked with horses on the operation but did not include a private veterinarian called to the operation.

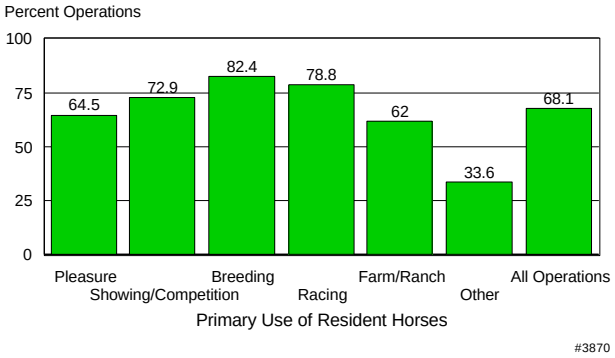
A larger percentage of operations where horses were used primarily for breeding (82.4 percent) gave injections to horses than on operations where horses were used for pleasure (64.5 percent), farm/ranch (62.0 percent), or operations in the Other category (33.6 percent). Differences among the remaining categories were not detected when standard errors were taken into account.

a. Percent of operations where any operation personnel gave injections to any horses on the operation in the previous 12 months by primary use of resident horses:

Percent of Operations by Primary Use of Resident Horses

Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other		All Operations	
Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
64.5	(4.1)	72.9	(6.9)	82.4	(6.0)	78.8	(17.0)	62.0	(7.5)	33.6	(19.7)	68.1	(2.9)

Percent of Operations Where Any Operation Personnel Gave Injections to Any Horses by Primary Use of Resident Horses



The percentages of operations where personnel gave injections in the previous 12 months increased with size of operation.

i. Percent of operations where any operation personnel gave injections to any horses on the operation in the previous 12 months by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
59.5	(4.1)	76.7	(4.2)	94.5	(4.1)	68.1	(2.9)

At least one of the operation personnel who gave injections was a veterinarian on 10.0 percent of operations that gave injections. This percentage includes operations where the horse owner was a veterinarian.

b. For operations where any operation personnel gave injections to any horses on the operation in the previous 12 months, percent of operations where any of those operation personnel were veterinarians:

Percent Operations	Standard Error
10.0	(2.9)

2. Methods used by operation personnel for injections in the muscle

Overall, a new or sterilized needle was used for each animal when giving intramuscular injections on 9 out of 10 operations (90.6 percent) where injections were given by operation personnel. This practice was similar across operation size categories as measured by number of resident horses. Intramuscular injections were not given on 0.5 percent of operations where injections were given. More operations reused needles between horses for IM injections than reused them for IV injections (see table F.3.a.).

a. For operations where any personnel gave injections, percent of operations using various methods for injections in the muscle (IM) by operation personnel in the previous 12 months by size of operation:

	Percent Operations by Size of Operation (Number Resident Horses)							
	1-5		6-19		20 or More		All Operations	
Injection Method	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
No IM injections	0.5	(0.5)	0.5	(0.5)	0.7	(0.7)	0.5	(0.3)
New or sterilized needle used for each animal	91.9	(3.3)	88.0	(3.9)	94.5	(2.4)	90.6	(2.4)
Disinfected needle between animals	7.4	(3.2)	6.9	(2.9)	4.1	(2.3)	6.9	(2.1)
Did not change or disinfect needles between animals	0.2	(0.2)	4.6	(2.9)	0.7	(0.5)	2.0	(1.1)
Total	100.0		100.0		100.0		100.0	

The majority of operations that gave IM injections used a needle only once (91.1 percent), while 8.8 percent reported injecting two to five horses intramuscularly with the same needle.

b. For operations where any personnel gave IM injections, percent of operations by average number of horses injected in the muscle with the same needle:

Number Horses Injected with Same Needle	Percent Operations	Standard Error
1	91.1	(2.4)
2 to 5	8.8	(2.4)
6 or more	0.1	(0.1)
Total	100.0	

3. Method used by operation personnel for intravenous injections

Overall, personnel on the majority of operations where injections were given ***did not*** give intravenous (IV) injections (79.8 percent of operations).

For those operations that gave IV injections, the majority of operations used a new or sterile needle. Table F.1.a.i. (page 35) shows that 94.5 percent of operations with 20 or more horses gave injections and 59.5 percent of operations with one to five horses gave injections. Therefore, a total of 51.0 percent of operations with 20 or more horses (54 percent of 94.5 percent) and a total of 8.0 percent of operations with one to five horses (13.4 percent of 59.5 percent) gave IV injections.

a. For operations where any personnel gave injections, percent of operations using various methods for intravenous (IV) injections by operation personnel in the previous 12 months by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

	1-5		6-19		20 or More		All Operations	
Injection Method	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
No IV injections	86.6	(3.6)	79.8	(4.1)	46.0	(7.3)	79.8	(2.6)
New or sterilized needle used for each animal	13.4	(3.6)	19.7	(4.1)	52.0	(7.2)	19.8	(2.6)
Disinfected needle between animals	0.0	(0.0)	0.5	(0.5)	2.0	(1.7)	0.4	(0.3)
Did not change or disinfect needles between animals	0.0	–	0.0	–	0.0	(0.0)	0.0	(0.0)
Total	100.0		100.0		100.0		100.0	

4. Information sources for giving injections

For operations that gave injections, four out of five operations (80.6 percent) got information on how to give them from a veterinarian. Thirty-two percent of operations got information from other horse owners, and 11.3 percent got information from books or magazines. These information sources were not mutually exclusive.

Operations with a primary function of farm/ranch had the largest percentage (6.2 percent) that used veterinary supply company personnel as a source of information on how to give injections. Percentages for those operations that learned to give injections from a book or magazine were higher for farm/ranch operations and residences with equids for personal use than for boarding/training facilities. Equine extension personnel were rarely used as sources for this information (1.1 percent of operations).

a. For operations where personnel gave injections to horses, percent of operations by source of information about how to give injections to horses and by primary function of operation:

Percent Operations by Primary Function of Operation

	Boarding/Training Facility		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other		All Operations	
Source	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
A veterinarian, either private practitioner or other licensed veterinarian	85.4	(6.5)	81.6	(6.7)	76.7	(4.8)	79.8	(4.8)	92.8	(5.6)	80.6	(2.7)
Veterinary technician	1.7	(0.6)	2.5	(1.4)	6.8	(3.5)	4.8	(2.5)	0.9	(0.4)	4.5	(1.5)
Equine extension personnel	0.1	(0.1)	0.1	(0.1)	2.1	(1.2)	1.3	(0.9)	0.1	(0.1)	1.1	(0.5)
Farrier	0.1	(0.0)	1.8	(1.7)	2.8	(1.5)	8.7	(2.9)	0.3	(0.2)	4.9	(1.4)
Vet supply company personnel	0.3	(0.2)	0.0	(0.0)	6.2	(2.9)	2.1	(1.1)	0.4	(0.2)	2.7	(0.9)
Book or magazine	3.1	(1.5)	6.1	(4.4)	13.5	(4.0)	14.4	(3.4)	3.9	(2.6)	11.3	(1.9)
Other horse owners	37.1	(11.0)	18.5	(6.1)	34.6	(6.3)	36.9	(5.5)	10.3	(5.2)	32.0	(3.4)
Other	3.2	(0.9)	14.0	(6.1)	12.0	(3.4)	7.4	(2.9)	8.9	(6.1)	9.2	(1.8)

G. Vaccination Practices

1. Vaccinations given to resident horses

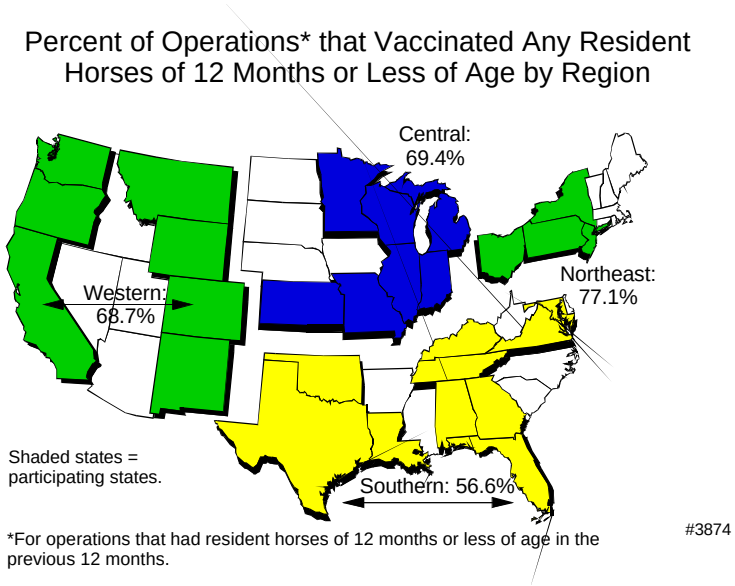
For operations with the specified age class or type of horse, 64.1 percent vaccinated horses less than 12 months of age, and approximately three-fourths each vaccinated broodmares and other horses over 12 months of age in the previous 12 months. There was a tendency for a lower percentage of operations in the Southern region to vaccinate horses than in other regions.

These percentages are higher than those reported in NAHMS Equine '98 *Part I: Baseline Reference of 1998 Equine Health and Management* (page 29). Data in Part III were generated from a subset of the operations (limited to operations with three or more horses) that contributed data for Part I. Part I showed a trend in increased percentages of operations vaccinating with increasing size of operations.

a. For operations that had resident horses of the following age class/type in the previous 12 months, percent of operations that vaccinated all or some horses by age class/type and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Age Class/Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
12 months or less	56.6	(7.1)	77.1	(12.8)	68.7	(8.5)	69.4	(8.6)	64.1	(4.6)
Broodmares	66.3	(6.5)	81.3	(10.4)	73.8	(11.9)	83.6	(6.6)	73.5	(4.4)
Other horses over 12 months	64.3	(5.4)	75.5	(7.2)	78.5	(6.5)	88.2	(3.8)	74.7	(3.0)



The table below presents the percentages of operations that vaccinated all or some horses in the specified age class/type category for several diseases. Generally, if a vaccine was used, it was given to all horses in an age or type category.

Two-thirds (63.0 percent) of operations with resident horses 12 months of age or less vaccinated these horses against tetanus. Just over 46 percent vaccinated young resident horses against encephalitis, and 46.5 percent vaccinated them against influenza. Only a small percentage of operations vaccinated any horses 12 months or less of age against *Clostridium perfringens* (C&D), equine viral arteritis (EVA), rotavirus, leptospirosis, or botulism.

The largest percentages of operations with broodmares vaccinated them against influenza (61.2 percent), tetanus (69.7 percent), encephalitis (57.2 percent), and herpesvirus (54.9 percent). Operations were more likely to vaccinate horses greater than 12 months of age than younger horses against herpesvirus.

The largest percentages of operations with other horses over 12 months of age vaccinated against tetanus (70.4 percent), encephalitis (63.2 percent), influenza (63.0 percent), and herpesvirus (42.8 percent). The four most common vaccinations given were the same across age categories. These were vaccinations against tetanus, influenza, encephalitis, and herpesvirus.

b. For operations that had resident horses in the specified age class/type category in the previous 12 months, percent of operations that vaccinated all or some horses against the following diseases by age class/type category:

Percent Operations Vaccinating All or Some Resident Horses by Age Class/Type Category

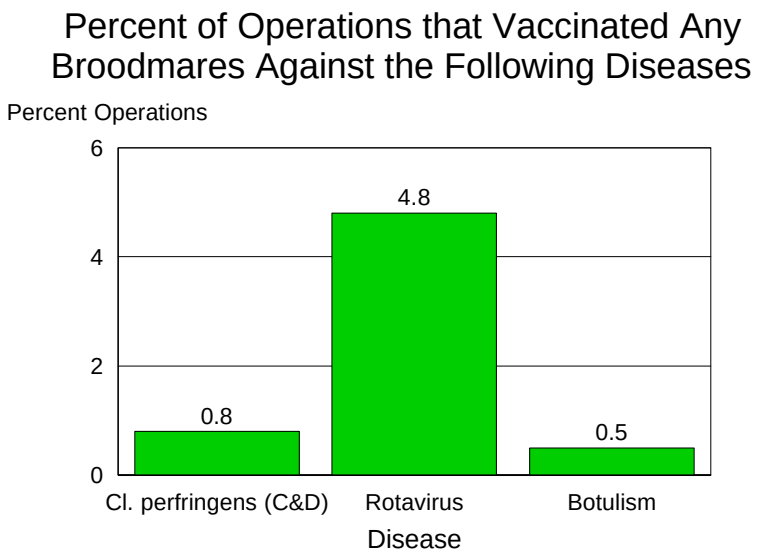
	12 Months or Less		Broodmares		Other Horses Over 12 Months	
Vaccination Against	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Influenza	46.5	(4.3)	61.2	(4.6)	63.0	(3.3)
Streptococcus equi (strangles)	13.0	(3.2)	14.0	(2.6)	13.3	(1.9)
Herpesvirus (rhino)	28.0	(3.9)	54.9	(4.6)	42.8	(3.4)
Potomac horse fever (PHF)	4.0	(1.3)	11.0	(2.6)	18.0	(2.7)
Rabies	10.3	(2.7)	20.3	(3.8)	24.5	(2.7)
Encephalitis	46.3	(4.3)	57.2	(4.6)	63.2	(3.2)
Tetanus	63.0	(4.6)	69.7	(4.7)	70.4	(3.2)
Clostridium perfringens (C&D)	0.1	(0.0)	0.8	(0.7)	1.0	(0.6)
Equine viral arteritis (EVA)	0.4	(0.3)	2.5	(1.1)	1.8	(0.6)
Rotavirus	0.1	(0.0)	4.8	(2.6)	2.3	(1.3)
Leptospirosis	0.9	(0.6)	2.8	(1.2)	2.5	(0.8)
Botulism	0.5	(0.3)	0.5	(0.2)	0.6	(0.3)
Other	0.0	(0.0)	0.0	(0.0)	0.3	(0.3)
Any	64.1	(4.6)	73.5	(4.4)	74.7	(3.0)

Less than 0.1 percent of operations in the Northeast and Central regions vaccinated broodmares against *Clostridium perfringens* (C&D). This vaccine is sometimes given to broodmares in late pregnancy to confer passive immunity in neonatal foals against the toxin produced by *Cl. perfringens* C&D. The Central region had the largest percentage of operations that vaccinated broodmares against rotavirus, however, taking the standard errors of the estimates into account, the percentage is not different across regions.

c. For operations that had ***resident broodmares*** in the previous 12 months, percent that vaccinated any broodmares against *Clostridium perfringens*, rotavirus, and botulism by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Vaccination Against	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Clostridium perfringens (C&D)	0.1	(0.1)	0.0	--	3.2	(2.9)	0.0	--	0.8	(0.7)
Rotavirus	2.5	(1.6)	1.1	(1.0)	4.9	(3.4)	11.8	(10.4)	4.8	(2.6)
Botulism	0.8	(0.5)	1.2	(1.0)	0.1	(0.1)	0.1	(0.1)	0.5	(0.2)



*Of operations that had any resident broodmares in the previous 12 months. #3871

Larger percentages of operations in the Northeast (35.4 percent) and Central (24.9 percent) regions than the other regions vaccinated resident horses (other than broodmares) greater than 12 months of age against Potomac Horse Fever. The smallest percentage of operations vaccinating against rabies was in the Western region (3.8 percent) with the largest percentage in the Northeast (55.6 percent of operations). Vaccination against a specific disease often parallels the real or perceived risk of the animal being exposed to or acquiring the disease.

d. For operations that had ***resident horses (other than broodmares)*** over 12 months of age in the previous 12 months, percent of operations that vaccinated some or all of these horses against specific diseases by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Vaccination Against	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Streptococcus equi	16.3	(3.6)	14.7	(5.0)	13.8	(3.4)	6.2	(2.6)	13.3	(1.9)
Herpesvirus	42.6	(6.1)	44.0	(9.4)	42.2	(6.2)	43.1	(6.7)	42.8	(3.4)
Potomac horse fever (PHF)	15.8	(5.0)	35.4	(9.0)	7.2	(2.0)	24.9	(5.5)	18.0	(2.7)
Rabies	23.4	(4.1)	55.6	(8.7)	3.8	(1.4)	33.5	(6.9)	24.5	(2.7)
Encephalitis	53.1	(5.1)	55.2	(9.5)	73.5	(6.5)	73.4	(6.2)	63.2	(3.2)
Tetanus	61.4	(5.3)	73.1	(7.3)	73.4	(7.0)	81.2	(5.5)	70.4	(3.2)

Percentage of ***resident horses*** on operations that vaccinated non-broodmares greater than 12 months of age paralleled percentage of ***operations*** vaccinating this age class/type (Table G.1.b.). Although all horses on the operation were not necessarily vaccinated, the majority of operations indicated that if they vaccinated against a specific disease, they vaccinated all horses.

e. Percent of ***resident horses*** on operations that vaccinated resident horses (other than broodmares) greater than 12 months of age against the following diseases:

Vaccination Against	Percent Resident Horses	Standard Error
Tetanus	75.4	(2.8)
Encephalitis	67.7	(3.0)
Influenza	67.5	(3.1)
Herpesvirus	46.6	(3.4)
Any vaccine	78.2	(2.7)

2. Influenza vaccination by age class/type category

A larger percentage of operations in the Central region (83.1 percent) than other regions vaccinated resident horses (other than broodmares) over 12 months of age against influenza. The lowest percentage of operations that vaccinated resident horses less than 12 months of age against influenza was in the Southern region (36.3 percent).

a. Percent of operations that vaccinated ***all or some resident horses*** against influenza in the previous 12 months by age class/type category and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Age Class/Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
12 months or less	36.3	(5.4)	56.0	(16.6)	54.8	(8.9)	55.9	(8.7)	46.5	(4.3)
Broodmares	54.0	(6.8)	56.1	(14.8)	61.4	(10.8)	78.7	(7.1)	61.2	(4.6)
Other horses over 12 months	54.8	(5.8)	52.6	(9.5)	63.7	(6.3)	83.1	(4.3)	63.0	(3.3)

3. Influenza vaccination for resident broodmares

Although 61.2 percent of operations with broodmares vaccinated them against influenza at some time (Table G.2.a), only 34.6 percent of operations with broodmares vaccinated them against influenza within 6 weeks prior to foaling. Vaccination of the mare prior to foaling may provide passive immunity to the foal.

a. For operations with ***resident broodmares*** in the previous 12 months, percent of operations that routinely vaccinated broodmares against influenza within 6 weeks prior to foaling by region:

Percent Operations by Region

Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
30.6	(6.6)	43.8	(15.3)	34.4	(9.3)	37.7	(8.5)	34.6	(4.4)

Percentages of operations vaccinating resident broodmares within 6 weeks prior to foaling increased with increasing size of operations.

b. For operations with ***resident broodmares*** in the previous 12 months, percent of operations that routinely vaccinated broodmares against influenza within 6 weeks prior to foaling by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
29.3	(7.2)	35.4	(5.5)	49.9	(7.9)	34.6	(4.4)

4. Number of times horses were vaccinated against influenza in the previous 12 months

The majority of operations that vaccinated resident horses against influenza vaccinated horses 12 months or less of age (48.3 percent) and horses over 12 months of age (75.6 percent) once annually. Although operations with horses 12 months of age or less were less likely to vaccinate these young horses against influenza compared to operations with older horses (Table G.2.a.), operations that did vaccinate horses 12 months of age or less vaccinated these young horses more frequently per year than operations that vaccinated older horses.

a. For operations that vaccinated ***resident horses*** against influenza, percent of operations by number of times the majority of resident horses were vaccinated against influenza in previous 12 months and by age category:

Percent Operations by Age of Horses

Number Times Vaccinated Against Influenza	12 Months or Less		Over 12 Months	
	Percent	Standard Error	Percent	Standard Error
1	48.3	(6.3)	75.6	(3.0)
2	39.2	(6.1)	18.1	(2.8)
3 or more	12.5	(4.9)	6.3	(1.6)
Total	100.0		100.0	

5. Age at first influenza vaccination

The majority of operations vaccinated resident foals against influenza at 2 months of age or older. Overall, 53.1 percent of operations vaccinated foals for the first time between 2 and 6 months of age, while 27.0 percent of operations vaccinated for the first time at 6 months of age or older.

a. For operations that vaccinated resident foals for influenza in the previous 12 months, percent of operations by the age (in months) that the majority of ***resident foals*** were first vaccinated against influenza in the first year of life:

Foal Age (Months)	Percent Operations	Standard Error
Less than 2	19.9	(4.8)
2 - less than 4	32.2	(5.5)
4 - less than 6	20.9	(5.3)
6 or more	27.0	(6.0)
Total	100.0	

Section II: Methodology

A. Early Planning

Early planning was the key to success in providing equine statistics. In 1996, two USDA Agencies, APHIS and NASS, committed to provide equine health statistics via the Equine '98 Study (first report disseminated in August 1998, to be followed by a number of reports through 1999) and demographic statistics (January 1, 1998, and January 1, 1999, equine inventories to be published in February 1999).

B. Sampling and Estimation Details

1. NASS sampling frames - area frame

The sampling phase for providing equine statistics began in early 1997. USDA/NASS livestock estimates were historically based on a multiple frame sampling technique which incorporates the benefits of sampling from both a list and area frame. The NASS area frame within each of the 48 continental states was based on a land use stratification such as intensively cultivated land, range land, urban land areas, and land in cities. The sampling units were actual land areas and were approximately the same size within each stratum. These sampling units are called segments which vary in size from stratum to stratum. For example, in the intensively cultivated or crop production stratum, the segment size was one square mile, whereas in the agricultural and mixed urban strata, the size could be as small as one-fourth square mile. Since equids are more often located in fringe areas around towns or cities such as found in the agriculture/urban strata compared to other livestock, additional segments from these strata were allocated to the sample.

Once a segment was selected, maps and/or photographs were prepared for a field interview. The entire land area of each segment was reviewed through site visits so that all land was associated with an operator (person responsible for the day-to-day decisions). Each segment was thus sub-divided into smaller land areas called tracts. The tract operator's name is very important in creating the multiple frame estimates to avoid duplication with the list. There were 7,122 segments selected in all 48 states. NASS collected data for the Fall Area Survey during December 1997. Respondents reported the number of equids expected to be on hand January 1,1998, on the total acres operated including acres operated outside the tract. The estimate for an Area Frame operation such as for total equids is then prorated back to the tract by the ratio of the operation's acres within the tract divided by the operation's total acres.

2. NASS sample frames - list frame

Since NASS did not previously have a list frame for equids, one had to be built. The goal was to compile names of operators/operations with large numbers of equids not normally considered to qualify as a farm (since farms would be estimated based on the area frame). A farm was defined as any place that produced and sold $1,000 or more in agricultural products. Therefore, list building concentrated on larger places with horses, such as service providers, that would generally not have other agriculture interests. Such operations included boarding stables, riding and training facilities breeding operations, and race tracks. These large, non-farm operations were rare and would not be accurately measured by the Area Frame. This list development occurred during the summer and fall of 1997. From January 1 through January 15, 1998, all list names in all 48 states were contacted by telephone or personal interview and asked for their equine inventory on January 1, 1998.

3. Multiple frame estimation

The Area Frame sample data and the List Frame sample data were then combined. The List Frame names were matched against the Area Frame names to assure accounting of all equids while avoiding duplication. Whenever a match occurred, the Area Frame data were not used, i.e., if an operation was on the list, it was represented by using the List Frame data. The multiple frame estimate was therefore comprised of an area estimate of the list incompleteness plus the list estimate. NASS has deemed multiple frame estimation to be most efficient for a given cost and to yield more precise estimates for livestock than other Area Frame estimators. This estimator was used in providing both the demographic and health statistics.

4. Population inferences

The inverse of the probability of selection was used as the initial weight and then adjusted for the various phases of selection and non-response. For both the demographic and the health statistics, the reference population was any place/operation with one or more equid on January 1,1998. The NASS estimates of equine inventory in the U.S. for January 1, 1998, will be published in February 1999 along with the January 1, 1999, inventory estimates. The reference population for equine inventory (NASS estimates) will be 48 states, and the reference population for health statistics provided in Parts I and II is limited to 28 states (Equine '98 Study.) The reference population for subsequent health reports is limited to operations with three or more horses present on January 1, 1998, in the 28 states.

C. Equine '98 Methods

1. Identifying industry informational needs

Preparation for Equine '98 began with a project to identify all of the existing sources of information for monitoring equine health. A *Catalog of Opportunities for Equine Health Monitoring* was compiled and distributed in June 1995. Second, a needs assessment was undertaken to identify industry informational needs. Next, objectives (shown on the inside back cover of this report) were developed for the Equine '98 Study from input via a number of focus groups. These focus groups included industry representatives, researchers, and State and Federal animal health officials. In addition, web site and 1-800 telephone call-in surveys were conducted from January 1 through March 15, 1997, to provide needs assessment input. This collective feedback formed the basis for the study objectives.

2. Materials development

Specific estimates for information needed to meet the objectives were identified via a mockup of the report without any data. Questionnaire design then began, followed by pre-testing in September and October 1997. The initial training school for NAHMS Coordinators (one from each of 28 participating states) took place in January 1998 in Fort Collins, Colorado. Subsequent training schools were held for NASS enumerators and APHIS VMO's (Veterinary Medical Officers) and AHT's (Animal Health Technicians) in each state.

3. Selection of states

A goal for all NAHMS national studies is to include states that account for at least 70 percent of the animal and producer/owner populations in the U.S. Budget constraints beyond this level of coverage were an important consideration. The most recent data available on which to base the selection of states to be included in Equine '98 Study was the 1992 Census of Agriculture data for horses and ponies (shown in Appendix II for states selected). Use of these data is limited in that it represented horses and ponies on farms only. A farm is defined as any place with $1,000 or more sales of agri-

culture products during the year or having at least five horses. Based on this definition, a large number of horses and operations with horses were not included in the Census of Agriculture data. These data were the best available at the time for choosing states to be in the study.

Each state's contribution to the U.S. total for number of horses and ponies and number of farms reporting horses or ponies was calculated. The animal contribution was given a weight of 0.6 and the number of farms a weight of 0.4. This weighted contribution (single number for percent of total) was a key determinant in selecting the states. Every state that accounted for 2 percent or more of the U.S. total horses and ponies was included in the study except for Iowa and Idaho which were excluded due to expected resource conflicts with a then proposed NAHMS cattle on feed study. Thus, 21 states were initially selected based on this criterion. In addition, seven states were included that individually contributed less than 2 percent. Georgia, Maryland and New Jersey were included due to a high level of state equine industry interest, and Alabama, Louisiana, New Mexico, and Wyoming were included to improve geographical representation. A total of 28 states were eventually included in the Equine '98 Study which accounted for 78.2 percent of the U.S. 1992 Census horses and ponies and 78.0 percent of the farms with horses and ponies.

4. Selection of the sample

The combined NASS Area and List data set (demographic sample) which provided estimates for the January 1, 1998, inventory for all states in the U.S. then became the basis for selecting the sample for the Equine '98 Study for the 28 target states. The Equine '98 sample selection is therefore a subsample of the NASS Fall 1997 Area Survey and January 1998 Equine Survey respondents that reported one or more equid on hand on January 1, 1998. The sub-sampling was done within size groups based on total number of equids for list and area separately. Distribution of the sample to individual states was based primarily on the U.S. 1992 Census size indicator (previously discussed).

The following table is provided to facilitate further understanding of the Equine '98 sampling process. NASS enumerators initially collected data from the sample (4,311) from March 16 through April 10, 1998. The sample for subsequent data collections was a subset of participants from the initial sample who had three or more horses present on January 1, 1998, and who wanted to participate in further phases of the study.

Equine '98 Sampling Process[1]

	NASS Collection	Equine '98 Sample
Area Sampling Frame:		
Number of segments selected for Fall survey	5,491	
Number of tracts reported	38,482	
Number of tracts reporting equine	6,125	
Number of tracts selected for Equine '98		2,244
List Sampling Frame:		
Number list records	14,856	
Number selected for January survey	14,856	
Number reporting equine in January survey	9,032	
Number selected for Equine '98 (excluding race tracks)		1,904
Number race tracks included in Equine '98 (office handling)		163
Total sample collected for Equine '98		4,311

[1] For the 28 states, a total of 2,244 samples were selected as a sub-sample of operators with one or more equid reported on the Fall Area Survey. Likewise, 1,904 list operators were selected as a sub-sample of operators with one or more equid reported on the January 1998 Equine Survey (list). Inventory data (only) from 163 race tracks were included as reported on the January 1998 Equine Survey.

5. Data collection

Approximately 200 NASS enumerators collected data for the Parts I and II baseline health descriptive reports via personal, on-site interviews from March 16, 1998, through April 10, 1998. Approximately 150 VMO's and AHT's collected data for initial visit on-site for Equine '98 health reports in the 28 states.

6. Editing and estimation

Initial data entry and editing for Equine '98 Parts I and II baseline reports were performed in each individual NASS state office. NAHMS personnel performed additional data edits on the entire data set after data from all states were combined. NAHMS personnel in Fort Collins Colorado entered, validated, and analyzed data for Part II.

Data entry and editing for subsequent reports was done by the NAHMS national staff in Fort Collins Colorado. The manual edit and follow-up with producers were done by VS field staff. The national staff did all summarization and estimation.

7. Response rates for Parts I & II reports

The response categories for Parts I and II are shown on page 49. These data were collected by NASS Enumerators from March 16 through April 10, 1998.

Category	Number	Percent
1 - race track office handling	163	3.8
2 - zero equids on hand Jan. 1, 1998	199	4.6
3 - no resident equids on Jan. 1, 1998	13	0.3
4 - refused	787	18.2
5 - 7 complete	2,758	64.0
8 - out of scope	37	0.9
9 - inaccessible	354	8.2
Total	4,311	100.0

The numerator for the response rate calculation includes the 2,758 complete questionnaires, 199 responses with zero equine, and 13 responses with no resident equine for a total of 2,970 good responses. The denominator includes 2,970 good responses plus 787 refusals and 354 inaccessible for a total of 4,111. The response rate was therefore 72.2 percent. The two categories excluded from the response rate calculation were 163 race tracks and 37 out of scope questionnaires such as prison farms and university farms. Race tracks were contacted for inventory data on the January Equine Survey and were not re-contacted.

Data for Parts I and II of the baseline health statistics were summarized from 2,904 good reports. These reports were 2,758 complete responses plus 133 race tracks which had some equine inventory on January 1, 1998, plus 13 reports with equine present but no ***resident*** equine on January 1, 1998. Non-response adjustments were made to the initial sampling weights to account for those operators not responding. This adjustment allowed inferences to be made to the target population of any place with one or more equids on January 1, 1998, in the 28 states.

8. Response rates for Part III report

The sample for this data collection was a subset of those participants from the first data collection. Respondents from the March 16 - April 10 data collection had to have three or more horses on hand January 1, 1998, to be eligible for the next phase of data collection. Out of the 2,758 complete responses in Phase 1, there were 2,238 (81.1 percent) operations eligible for participation in further components of the study. Of these operations, 1,576 (70.4 percent) elected to have their names turned over to APHIS for VMO contact about participating further in the study. Nearly three-fourths (74.7 percent of the operations contacted) of the sample turned over for VMO contact participated in the study.

Complete responses from Phase I collection (March 16 - April 10, 1998; Part I & II reports)	2,758
Eligible with three or more horses present January 1, 1998	2,238
Agreed to have their name turned over to APHIS for VMO contact (Phase II collection, April 10-June 12, 1998)	1,576
Complete responses for Part III report	1,178

See also Appendix I: Sample Profile for response rates by type of operation, region, and number of horses on hand January 1, 1998.

Appendix I: Sample Profile

A. Responding Operations (Operations with 3 or more horses present on January 1, 1998)

1. Type of operation

Primary Function of Operation	Sample	Number Responding Operations	Percent Operations Responding
Boarding/Training facility	502	381	75.9
Breeding farm	265	199	75.1
Farm/Ranch	301	219	72.8
Residence with equids for personal use	305	228	74.8
Other	203	151	74.4
Total	1,576	1,178	74.7

2. Region

Region	Sample	Number Responding Operations	Percent Operations Responding
Southern	596	435	73.0
Northeast	220	155	70.5
Western	399	323	81.0
Central	361	265	73.4
Total	1,576	1,178	74.7

3. Horses on hand January 1, 1998

Number	Sample	Number Responding Operations	Percent Operations Responding
3 - 5*	376	273	72.6
6 - 19	588	449	76.4
20 or more	612	456	74.5
Total	1,576	1,178	74.7

*Three premises with two horses on hand on January 1, 1998, completed this portion of the study.

4. Resident horses (whether or not present) at the time of interview (April 20 - June 12, 1998)

Number	Number Responding Operations
1 - 5	267
6 - 19	467
20 or more	444
Total	1,178

Appendix II: 1992 Census - Horses & Ponies on Farms[1]

U.S. Inventory of Horses & Ponies (on Farms) & Number of Farms Reporting Horses & Ponies

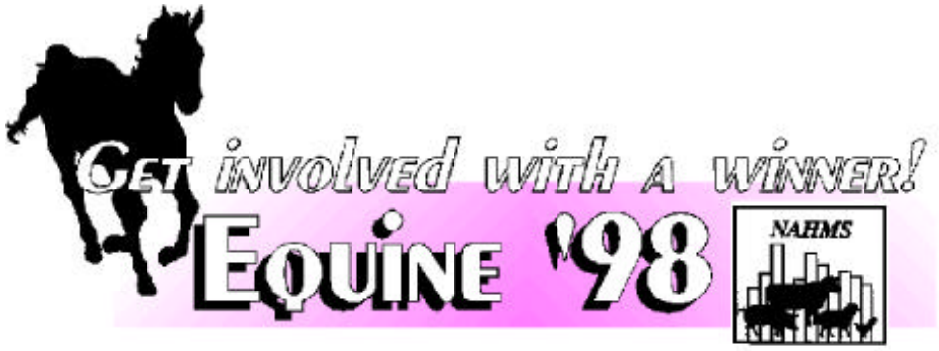
Region	State	Number Horses and Ponies[1] (Thousand Head)	Farms Reporting Horses and Ponies[1] (Thousand Farms)
Central	Illinois	46.1	7.3
	Indiana	48.1	8.4
	Kansas	42.9	9.7
	Michigan	54.0	7.8
	Minnesota	43.1	7.7
	Missouri	64.6	14.2
	Wisconsin	43.6	8.1
	Total	342.4	63.2
Northeast	New Jersey	23.9	2.5
	New York	43.3	6.4
	Ohio	72.0	10.9
	Pennsylvania	58.0	9.2
	Total	197.2	29.0
Southern	Alabama	29.7	5.7
	Florida	52.0	6.7
	Georgia	31.1	5.6
	Kentucky	78.1	12.4
	Louisiana	28.0	5.1
	Maryland	24.3	2.8
	Oklahoma	70.0	14.9
	Tennessee	61.1	12.4
	Texas	209.1	38.5
	Virginia	44.0	7.1
	Total	627.4	111.2
Western	California	124.9	15.0
	Colorado	69.4	9.9
	Montana	56.4	8.2
	New Mexico	41.4	5.7
	Oregon	51.9	9.2
	Washington	51.1	7.9
	Wyoming	40.7	4.5
	Total	435.8	60.4
Total (28 states)		1,602.8 (78.2% of U.S.)	263.8 (78.0% of U.S.)
Total U.S. (50 states)		2,049.5	338.3

1 Source: 1992 Census of Agriculture. By definition, this information includes horses and ponies on ***farms*** only. A farm is defined as any place that produced and sold $1,000 or more in agricultural products or had five or more horses. This definition may exclude over one-half the horse population in the U.S. National Agricultural Statistics Service (NASS), U.S.D.A., will publish official January 1, 1998, and January 1, 1999, inventory numbers in February 1999 which will be estimates for all equids on all places regardless of the farm definition.

Appendix III: Tables of Contents, Equine ‘98 Parts I & II

Part I: Baseline Reference of 1998 Equine Health and Management, August 1998

Part II: Baseline Reference of 1998 Equine Health and Management, September 1998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Equine '98
NAHMS

NAHMS Equine '98 Study: Completed and Expected Outputs and Related Study Objectives

1. Provide baseline information on equine health.
   - Part I: Baseline Reference of 1998 Equine Health and Management, August 1998.
   - Part II: Baseline Reference of 1998 Equine Health and Management, September 1998.
   - Morbidity/mortality (info sheet), expected fall 1998.

2. Estimate uses of equine health-related management practices.
   - Part II: Baseline Reference of 1998 Equine Health and Management, September 1998.
   - ***Part III: Management and Health of Horses in the U.S., 1998***, December 1998.
   - Part IV, spring 1999.
   - Sources of information/use of veterinarian (info sheet), August 1998.
   - Biosecurity (info sheet), August 1998.
   - Transportation of U.S. equids (info sheet), December 1998.
   - Unique identification methods for U.S. equids (info sheet), December 1998.
   - Vaccination practices (info sheet).

3. Determine type and use of animals in the U.S. equine population by type of operation.
   - Part I: Baseline Reference of 1998 Equine Health and Management, August 1998.
   - Composition of equine population (info sheet), August 1998.

4. Measure the prevalence of specific infectious agents or frequency of antibodies to specific infectious agents.
   - Flu (info sheet).
   - Equine viral arteritis, EVA (info sheet).
   - *Salmonella* (info sheet).
   - Parasites (info sheet).
   - *Streptococcus equi* (info sheet).
   - Equine protozoal myelitis, EPM (info sheet).

5. Gather data related to specific health problems.
   - Colic (info sheet), expected summer 1999.
   - Lameness (interpretive report), expected winter 2000.
   - Respiratory disease (info sheet), expected summer 1999.
   - Equine protozoal myeloencephalitis, EPM, including economics estimates, expected winter 1999.
   - Equine infectious anemia, EIA, including estimates of testing costs (info sheet), expected summer 1999.

6. Feed problems.
   - Endophytes & fumonisins (info sheet).

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