



United States  
Department  
of Agriculture

Animal and  
Plant Health  
Inspection  
Service

Veterinary  
Services

# ***Part I:*** **Baseline Reference of 1998 Equine Health and Management**



## **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 also 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. Thanks also to the staff at the Centers for Epidemiology and Animal Health (CEAH) for their efforts in generating 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.

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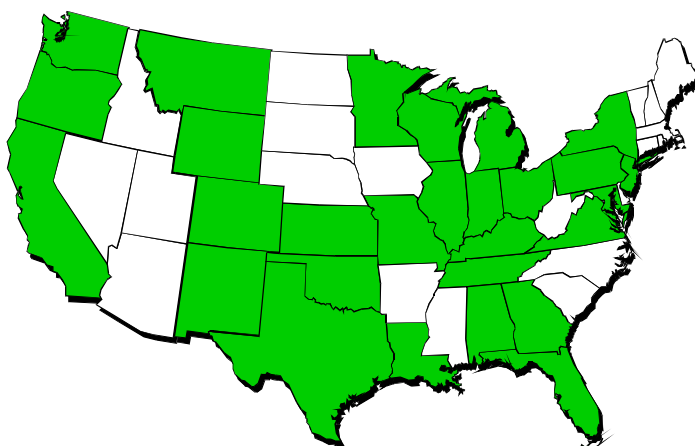
## Introduction

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

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 for all places with equids and for all equids in the 28 states. The sample provided 2,904 participating operations from 28 states for Equine '98 (see map at right and Section II for further details). 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).

Equine '98 Participating States



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*Parts I and II: Baseline Reference of 1998 Equine Health and Management* are the first in a series of releases documenting Equine '98 Study results.

NASS enumerators collected data for these reports via a questionnaire administered on-site from March 16, 1998, through April 10, 1998. Inventory data from the 133 participating race tracks were included in this report, tables A.1.a. through A.2.c., but not in other Equine '98 estimates.

Results of the Equine '98, NAHMS' first equine study 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:

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World Wide Web: <http://www.aphis.usda.gov/vs/ceah/cahm>

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

## 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 equid 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:** A single value for each operation is summed over all operations reporting divided by the number of operations reporting.

**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 equids:** The total number of *equids* with a certain attribute divided by the total number of equids.

**Percent equids on those operations:** The total number of equids residing on an *operation* with a given attribute, divided by the total number of equids on all operations.

**Population estimates:** Averages and proportions weighted to represent the population. For this report, the reference population was all equine operations in the 28 selected States. Most of the estimates in this report are provided with a measure of variability called the *standard 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 at right, 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 to 4.0. Similarly, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of two. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was then reported. If there were no reports of the event, no standard error was reported.

**Ratio:** The sum of one variable across all operations divided by the sum of another variable across all operations. For example, on page 13, the sum of equids on August 1, 1997, is divided by the sum of equids on January 1, 1998. The nearer to one, the more the two variables are similar.

**Resident equid:** An equid 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.

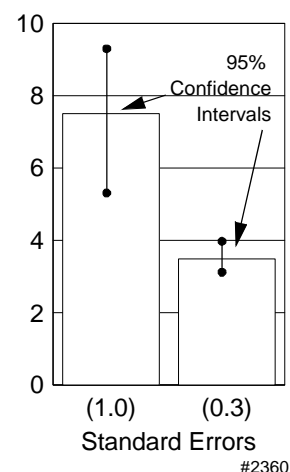
-**Southern:** Alabama, Florida, Georgia, Kentucky, Louisiana, Maryland, Oklahoma, Tennessee, Texas, and Virginia.

-**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 equids present on January 1, 1998. Size of operation was categorized as 1-2, 3-5, 6-19, and 20 or more equids present on January 1, 1998.

**Examples of a 95% Confidence Interval**





## Section I: Population Estimates

### A. Equine Demographics

#### 1. All equids

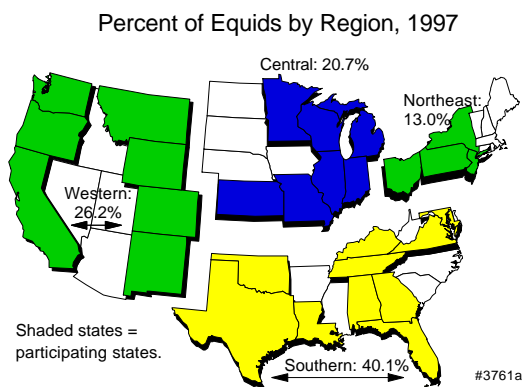
Equine '98 estimates represent the 28 study states only. The National Agricultural Statistics Service (NASS) will publish equine inventory estimates for the U.S. in February 1999.

For the 28 states in the Equine '98 Study, the largest percentages of operations (41.5 percent) and equids (40.1 percent) were in the Southern region. The smallest percentages were in the Northeast region (12.9 percent of operations and 13.0 percent of equids).

The percentage of operations paralleled the percentage of equids in each region, i.e., 12.9 percent of the operations and 13.0 percent of the equids were in the Northeast region. These percentages reflect only those states included in the Equine '98 Study and regions as defined for reporting.

##### a. Percent of operations and equids by region:

Measure	Percent by Region							
	Southern		Northeast		Western		Central	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Operations	41.5	(2.2)	12.9	(1.2)	23.5	(2.0)	22.1	(1.6)
Equids	40.1	(1.8)	13.0	(1.1)	26.2	(1.6)	20.7	(1.6)
	All Operations							
	Percent							
	100.0							



Although the Southern region had the largest percentage of equids (see Table A.1.a. above), the Northeast had the greatest equine density (3.1 equids per square mile).

##### i. Number of equids per square mile by region:

Number Equids by Region									
Southern		Northeast		Western		Central		All Operations	
Number	Standard Error	Number	Standard Error	Number	Standard Error	Number	Standard Error	Number	Standard Error
2.0	(0.1)	3.1	(0.3)	1.1	(0.1)	1.6	(0.1)	1.6	(0.1)

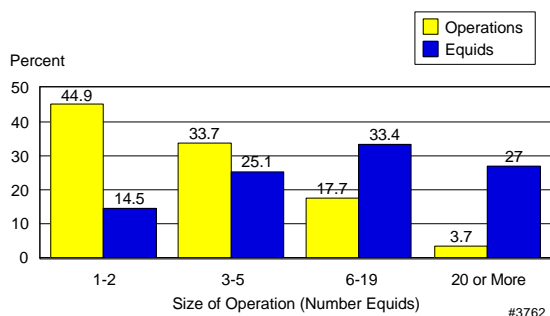
Smaller operations (five or fewer equids) accounted for 78.6 percent of all operations and only 39.6 percent of the equid population. Large operations (20 or more equids) accounted for few (3.7 percent) operations but 27.0 percent of equids.

b. Percent of operations and equids by size of operation:

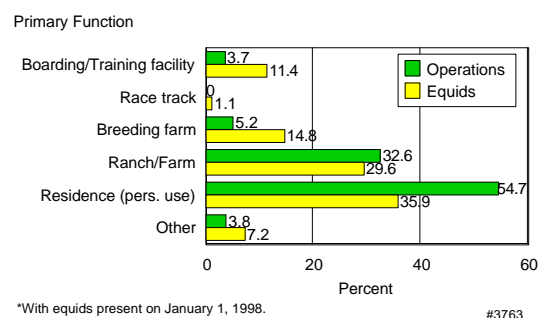
Percent by Size of Operation (Number Equids)

Measure	1-2		3-5		6-19		20 or More		All Operations
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
Operations	44.9	(2.2)	33.7	(1.7)	17.7	(1.2)	3.7	(0.4)	100.0
Equids	14.5	(1.1)	25.1	(1.4)	33.4	(1.8)	27.0	(1.9)	100.0

Percent of Operations and Equids by Size of Operation, 1997



Percent of Operations\* (and Percent of All Equids on those Operations) by Primary Function of the Operation, 1997



\*With equids present on January 1, 1998.

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Operations with primary functions of boarding and/or training and breeding accounted for 3.7 and 5.2 percent of all equine operations, respectively, yet each accounted for over 10 percent of all equids, indicating they were generally larger operations. Operations that were residences with personal use of equids accounted for 54.7 percent of operations and 35.9 percent of equids.

Race tracks accounted for less than 0.1 percent of operations (rounded to 0.0 in the table below) and 1.1 percent of equids. Race tracks were included in estimates of the population inventory, but were not included in health events and management estimates.

c. Percent of operations (and percent of all equids on those operations) with equids present on January 1, 1998, by primary function of the operation:

Percent by Primary Function of Operation

Measure	Boarding/Training Facility		Race Track		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other	
	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Operations	3.7	(0.6)	0.0	(0.0)	5.2	(0.6)	32.6	(2.0)	54.7	(2.2)	3.8	(0.8)
Equids	11.4	(1.4)	1.1	(0.2)	14.8	(1.5)	29.6	(1.8)	35.9	(1.9)	7.2	(1.1)

Farm or ranch use of equids represented 15.2 percent of all operations. Breeding as a primary use of equids represented 6.0 percent of operations. The categories of racing and showing/competition represented a total of 8.4 percent of operations.

Pleasure was the **primary** use of equids on the largest percentage of operations regardless of region (66.8 percent). Larger percentages of operations in the Western and Southern regions used equids primarily for farm/ranch work (20.6 and 18.4 percent, respectively) than in the Central (8.9 percent) and Northeast (5.7 percent) regions. Outfitting, carriage horses, and teaching horses are examples of uses included in the other category.

d. Percent of operations by **primary** use of equids present on January 1, 1998, and region:

Primary Use of Equids	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
Pleasure	63.2	(3.1)	66.9	(5.3)	65.5	(4.1)	74.7	(3.5)	66.8	(1.9)
Showing/competition (not betting)	6.8	(1.2)	9.0	(3.3)	5.2	(1.4)	6.0	(1.5)	6.5	(0.8)
Breeding	6.3	(1.2)	6.3	(1.9)	3.5	(0.9)	7.9	(2.0)	6.0	(0.7)
Racing	2.7	(0.8)	2.9	(1.5)	1.0	(0.4)	0.9	(0.6)	1.9	(0.4)
Farm/ranch	18.4	(2.5)	5.7	(2.2)	20.6	(2.9)	8.9	(1.9)	15.2	(1.3)
Other	<u>2.6</u>	(0.9)	<u>9.2</u>	(3.9)	<u>4.2</u>	(1.4)	<u>1.6</u>	(0.8)	<u>3.6</u>	(0.7)
Total	100.0		100.0		100.0		100.0		100.0	

As the size of operation (number equids) increased, percentages of operations where pleasure was the primary use of equids decreased. Percentages for operations where equids were primarily for showing/competition, racing, or breeding increased along with size of operation.

e. Percent of operations by primary use of equids present on January 1, 1998, and size of operation:

Primary Use of Equids	Percent Operations by Size of Operation (Number Equids)							
	1-2		3-5		6-19		20 or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Pleasure	80.0	(2.9)	66.3	(2.7)	43.9	(3.0)	20.5	(4.1)
Showing/competition (not betting)	2.3	(1.0)	9.0	(1.6)	10.0	(1.8)	18.8	(4.3)
Breeding	1.3	(0.8)	3.8	(1.1)	16.7	(2.3)	31.3	(5.5)
Racing	0.3	(0.3)	2.4	(0.8)	4.0	(1.1)	7.8	(4.1)
Farm/ranch	12.1	(2.2)	16.2	(1.9)	22.0	(2.5)	11.1	(2.4)
Other	<u>4.0</u>	(1.5)	<u>2.3</u>	(0.7)	<u>3.4</u>	(0.9)	<u>10.5</u>	(3.2)
Total	100.0		100.0		100.0		100.0	

About one-third of operations in each region had a primary function of farm or ranch except for the Northeast (21.6 percent). Race tracks accounted for less than 0.1 percent of operations in each region (rounded to 0.0 in the table below).

f. Percent of operations with equids present on January 1, 1998, by primary function of the operation and region:

Primary Function of Operation	<u>Percent Operations by Region</u>							
	Southern		Northeast		Western		Central	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Boarding/training	3.5	(0.9)	5.4	(1.6)	3.7	(1.0)	2.9	(1.2)
Race track	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Breeding farm	5.9	(1.1)	6.1	(2.0)	3.8	(0.9)	4.9	(1.3)
Farm/ranch	34.5	(3.3)	21.6	(4.6)	34.9	(4.3)	33.3	(4.1)
Residence with equids for personal use	52.2	(3.7)	63.3	(5.0)	54.3	(4.9)	54.7	(4.4)
Other	3.9	(1.6)	3.6	(1.3)	3.3	(1.3)	4.2	(1.7)
Total	100.0		100.0		100.0		100.0	

Roughly one-half of the boarding/training and breeding operations were in the 6 to 19 equid operation size range. Nearly one-half of race tracks had less than 20 equids present, which may have been due to a lack of races or meets occurring at the time of reporting (January 1, 1998). About one-half of the farms/ranches and residences with equids for personal use had one or two equids present.

g. Percent of operations with equids present on January 1, 1998, by primary function of the operation and size of operation:

Primary Function of Operation	<u>Percent Operations by Size of Operation (Number Equids)</u>							
	1-2		3-5		6-19		20 or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Boarding/training facility	12.0	(7.5)	17.3	(5.3)	44.0	(7.1)	26.7	(5.5)
Race track	4.9	(2.0)	7.6	(2.2)	34.1	(3.8)	53.4	(4.0)
Breeding farm	1.1	(1.1)	24.0	(6.0)	52.2	(6.0)	22.7	(4.6)
Farm/ranch	50.3	(3.2)	27.9	(2.5)	19.7	(1.9)	2.1	(0.4)
Residence with equids for personal use	48.2	(3.2)	40.1	(2.8)	11.1	(1.3)	0.6	(0.3)
Other	40.8	(12.5)	19.7	(6.6)	24.4	(7.4)	15.1	(4.8)

## 2. Type of equids

The percentage of operations across regions with various categories of equids present was relatively consistent, taking into account the standard error of these estimates. Operations with horses were the largest percentage in each region.

The Southern region had a lower percentage of operations with ponies than other regions.

a. Percent of *operations* with equids present on January 1, 1998, by type of equid and region:

Type	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
Horses	92.7	(1.6)	90.9	(4.8)	96.5	(1.7)	93.2	(3.2)	93.5	(1.2)
Miniature horses	4.1	(1.5)	1.9	(0.8)	2.5	(1.4)	2.6	(0.9)	3.1	(0.7)
Ponies	8.9	(1.5)	20.3	(5.0)	13.7	(2.3)	19.0	(3.7)	13.7	(1.4)
Mules	4.5	(0.9)	2.5	(1.1)	6.0	(1.4)	2.7	(0.9)	4.2	(0.6)
Donkeys or burros	7.3	(1.4)	4.8	(2.5)	5.8	(1.7)	5.8	(3.0)	6.3	(1.0)

The number of horses as a percent of total equids was similar across regions. The Southern region had the lowest percentage (3.8 percent) of ponies (as a percent of total equids within the region) and the highest percentage (4.0 percent) of donkeys or burros.

b. Percent of *equids* on operations with equids present on January 1, 1998, by type of equid and region:

Type	Percent Equids by Region									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Horses	88.1	(1.3)	88.4	(2.2)	88.8	(1.4)	87.8	(1.8)	88.3	(0.8)
Miniature horses	2.2	(0.5)	1.3	(0.5)	1.1	(0.4)	1.4	(0.6)	1.6	(0.3)
Ponies	3.8	(0.8)	7.6	(2.0)	5.2	(1.1)	7.2	(1.2)	5.4	(0.6)
Mules	1.9	(0.4)	1.0	(0.6)	3.5	(0.9)	1.2	(0.4)	2.0	(0.3)
Donkeys or burros	4.0	(0.8)	1.7	(1.0)	1.4	(0.4)	2.4	(1.3)	2.7	(0.4)
Total	100.0		100.0		100.0		100.0		100.0	

More than 85 percent of each type of equid were 18 months or older. Fewer mules than other types of equids, i.e., horses, ponies, and donkeys/burros, were less than 18 months of age.

c. Percent of equids present on January 1, 1998, by age and type:

Type	Percent Equids by Age				
	Less than 18 Months		18 Months or Older		Total
	Percent	Standard Error	Percent	Standard Error	
Horses	10.3	(0.6)	89.7	(0.6)	100.0
Miniature horses	11.9	(3.3)	88.1	(3.3)	100.0
Ponies	7.9	(1.8)	92.1	(1.8)	100.0
Mules	2.5	(1.0)	97.5	(1.0)	100.0
Donkeys or burros	14.7	(4.4)	85.3	(4.4)	100.0

**NOTE:** Race tracks were not included beyond this point.

For equids 18 months of age and older, miniature horses had the highest percentage of intact males, indicating castration was not as common a practice for male miniature horses as it was for other types of equids. Percentages of miniature horses (7.4 percent) and mules (6.8 percent) of unknown gender status were larger than percentages for unknowns of other equid types.

d. Percent of equids 18 months of age or older on January 1, 1998, by gender and type:

Type	Percent Equids by Gender									
	Intact Males		Castrated Males		Females (Not Pregnant)		Pregnant Females		Unknown	
	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Horses	7.4	(0.5)	40.4	(1.1)	39.7	(1.0)	10.6	(0.7)	1.9	(0.6)
Miniature horses	27.0	(5.5)	26.8	(6.7)	24.7	(3.8)	14.1	(3.1)	7.4	(5.3)
Ponies	7.1	(2.0)	30.4	(4.1)	48.7	(4.5)	12.5	(3.8)	1.3	(0.8)
Mules	8.1	(2.8)	43.8	(4.9)	41.3	(4.6)	--	--	6.8	(5.8)
Donkeys or burros	17.8	(3.7)	28.0	(6.6)	44.6	(7.8)	8.5	(3.1)	1.1	(0.7)

### 3. Horse breeds

Appaloosa, Arabian, Paint, Standardbred, Tennessee Walker, Thoroughbred, and Quarter Horse each represented at least 3 percent of U.S. horses and foals (excluding miniature horses). Other breeds were lumped into an "Other (registered)" category, such as but not limited to, Morgans, Saddlebreds, Trakehner, Oldenburg, Holsteiner, Freisian, Andalusian, Hanovarian, Lippizaner, Haflinger, Swedish Warmblood, Paso Fino, and Peruvian Paso. The "Other, not registered" category was made up of horses that were not registered and did not fit into one of the designated breed categories.

Draft breed horses and/or foals (including but not limited to Belgian, Shire, Clydesdale, Suffolk, and Percheron) accounted for larger percentages of horses and foals in the Central (12.0 percent) and Northeast (10.6 percent) regions than in the Southern (1.1 percent) and Western (2.0 percent) regions. Standardbreds accounted for the largest percentage of horses and foals in the Northeast region (9.9 percent) and lowest in the Western (0.9 percent) region. Thoroughbreds accounted for a larger percentage of the horses and/or foals in the Southern (14.2 percent) region than in the Central (4.3 percent) region. Quarter Horses accounted for nearly 40 percent of all horses in all regions except the Northeast (24.4 percent). Small numbers of equids in some breeds within regions caused some regional estimates to be imprecise (large standard errors).

- a. For operations that had horses (other than miniature horses) present on January 1, 1998, percent of all horses (including horse foals) by breed and region:

Breed	Percent Horses by Region									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Appaloosa	5.3	(1.3)	4.9	(1.0)	6.4	(1.2)	7.0	(1.5)	5.9	(0.7)
Arabian	4.5	(0.9)	9.6	(2.9)	10.1	(1.4)	10.0	(1.6)	7.8	(0.7)
Draft breed	1.1	(0.5)	10.6	(2.9)	2.0	(0.6)	12.0	(3.5)	4.8	(0.9)
Paint	4.7	(0.7)	8.8	(3.1)	5.1	(0.7)	5.0	(1.1)	5.4	(0.6)
Standardbred	2.1	(0.7)	9.9	(2.1)	0.9	(0.5)	5.6	(1.5)	3.5	(0.5)
Tennessee Walker	8.2	(1.8)	4.3	(1.4)	1.5	(0.5)	2.9	(1.1)	4.8	(0.8)
Thoroughbred	14.2	(2.9)	7.4	(1.9)	10.1	(2.3)	4.3	(1.1)	10.2	(1.4)
Quarter Horse	42.1	(2.7)	24.4	(3.1)	45.0	(3.0)	36.7	(3.5)	39.5	(1.6)
Other (registered)	9.2	(2.3)	8.0	(1.5)	7.1	(1.1)	12.2	(3.0)	9.1	(1.2)
Other (not registered)	8.6	(1.3)	12.1	(2.5)	11.8	(2.1)	4.3	(0.9)	9.0	(0.9)
Total	100.0		100.0		100.0		100.0		100.0	

#### 4. Resident equids

In each region, the majority of equids were considered residents of an operation. The definition for resident for the Equine '98 Study was an equid that spent or was expected to spend more time at that operation than at any other operation. The operation was considered the animal's home base. Approximately 2.5 percent of equids were considered as not having a resident "home base". Equids on race tracks were not included in this estimate.

- a. Number of equids considered residents of the operation (whether or not present on the operation) as of January 1, 1998, as a percent of residents and non-resident equids present on January 1, 1998, by region and type:

Type	<u>Percent Equids by Region</u>									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Horses	98.2	(0.5)	95.8	(1.7)	97.4	(0.6)	97.5	(1.5)	97.6	(0.5)
Miniature horses	99.7	(0.2)	100.0	(0.0)	100.0	--	99.9	(0.0)	99.8	(0.1)
Ponies	96.4	(2.5)	99.7	(0.2)	100.0	(0.0)	95.1	(3.0)	97.6	(1.1)
Mules	95.5	(4.0)	100.0	--	85.7	(12.1)	100.0	--	91.9	(5.8)
Donkeys or burros	98.4	(1.5)	100.0	--	98.8	(1.2)	100.0	(0.0)	98.9	(0.9)
All equids	98.1	(0.5)	96.3	(1.5)	97.2	(0.8)	97.5	(1.3)	97.5	(0.4)

Overall, the majority (87.8 percent) of resident equids were owned by the operation. Operations in the Southern region owned a larger percentage (91.5 percent) of resident equids than those in the Northeast (82.8 percent) and Western (84.3 percent) regions.

- b. Percent of resident equids as of January 1, 1998, that were owned by the operation (including owned by family members) by region:

<u>Percent Resident Equids by Region</u>									
Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
91.5	(1.3)	82.8	(3.2)	84.3	(1.8)	88.0	(2.0)	87.8	(0.9)



Boarding/training facilities owned less than one-half (42.6 percent) of their resident equids:

- i. Percent of resident equids as of January 1, 1998, that were owned by the operation (including owned by family members) by primary function of operation:

<u>Percent Resident Equids by Primary Function of Operation</u>									
Boarding/Training Facilities		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
42.6	(4.9)	91.6	(1.6)	94.8	(0.9)	94.5	(0.9)	83.5	(3.9)

The majority of resident equids were present on their resident operations on January 1, 1998. Only 1.8 percent of resident equids were away from the operation.

- c. Percent of resident equids as of January 1, 1998, that were present on the operation January 1, 1998:

Percent Resident Equids	Standard Error
98.2	(0.4)

A majority of operations (96.7 percent) had the same number of total equids present on January 1, 1998, as the reported number of resident equids. Only 0.2 percent of operations had a larger number of resident equids than the total equids present on January 1, indicating the number of resident equids traveling or stabled elsewhere outnumbered equids visiting that operation (if any). Approximately 3 percent of operations had more equids present on January 1, 1998, than resident equids.

- d. Percent of operations by number of all equids present on January 1, 1998, compared to the number of resident equids (whether or not present):

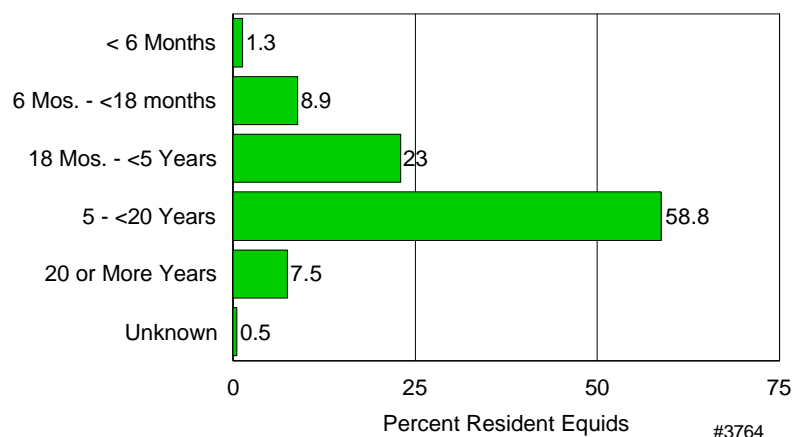
Level	Percent Operations	Standard Error
More resident than present	0.2	(0.1)
More present than resident	3.1	(0.6)
Resident and present the same	96.7	(0.6)

The majority (58.8 percent) of equids were in the 5 to 20 years age group. A larger percentage of ponies than other types of equids were 20 or more years of age. About one-half of the miniature horses (49.7 percent) and donkeys or burros (47.3 percent) were in the 18 months to less than 5 years of age category.

e. Percent of resident equids (whether or not present on the operation) on January 1, 1998, by type and age:

Percent Resident Equids by Age													
	Less than 6 Months		6 Months -Less than 18 Months		18 Months - Less than 5 Years		5-less than 20 Years		20 or More Years		Unknown		
Type	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Total
Horses	1.3	(0.2)	9.0	(0.5)	22.1	(0.8)	59.8	(1.0)	7.4	(0.5)	0.4	(0.2)	100.0
Miniature horses	3.0	(1.2)	9.7	(2.6)	49.7	(6.9)	29.5	(5.6)	2.7	(1.9)	5.4	(5.2)	100.0
Ponies	0.6	(0.5)	7.3	(1.8)	20.6	(3.2)	55.6	(4.1)	15.2	(3.4)	0.7	(0.4)	100.0
Mules	0.7	(0.5)	2.0	(0.9)	11.1	(3.1)	81.7	(3.8)	4.3	(1.9)	0.2	(0.1)	100.0
Donkeys or burros	2.1	(0.9)	12.0	(4.2)	47.3	(6.7)	36.0	(6.7)	0.9	(0.4)	1.7	(1.5)	100.0
All equids	1.3	(0.2)	8.9	(0.5)	23.0	(0.8)	58.8	(1.0)	7.5	(0.5)	0.5	(0.2)	100.0

Percent of Resident Equids by Age, 1997



A larger percentage of resident equids were less than 6 months of age on August 1, 1997 (summer inventory), than on January 1, 1998 (winter inventory), which was appropriate as most mares are bred to have foals in the early spring.

In January, 10.2 percent of resident equids were less than 18 months of age, while 7.5 percent were 20 or more years of age. Ages of 0.5 percent of resident equids were unknown.

f. Percent of resident equids by age and date:

Age	Percent Resident Equids			
	August 1, 1997		January 1, 1998	
	Percent	Standard Error	Percent	Standard Error
Less than 6 months	5.2	(0.4)	1.3	(0.2)
6 months-less than 18 months	7.5	(0.5)	8.9	(0.5)
18 months-less than 5 years	21.9	(0.8)	23.0	(0.8)
5 years-less than 20 years	56.8	(1.0)	58.8	(1.0)
20 or more years	7.6	(0.6)	7.5	(0.5)
Unknown	<u>1.0</u>	(0.4)	<u>0.5</u>	(0.2)
Total	100.0		100.0	

While the total number of equids stayed essentially the same, there were four times as many foals present in August 1997 as in January 1998. Two times the number of unknown indicates a somewhat larger recall problem for August 1997 compared to January 1998.

g. Ratio of the number of equids considered residents (whether or not present) on **August 1, 1997**, to the number of residents on **January 1, 1998**, (whether or not present) by age:

Age	Ratio Resident Equids	Standard Error
Less than 6 months	4.03	(0.57)
6 months-less than 18 months	0.85	(0.05)
18 months-less than 5 years	0.97	(0.03)
5 years-less than 20 years	0.98	(0.01)
20 or more years	1.03	(0.03)
Unknown	2.08	(0.65)
All ages	1.02	(0.01)

The majority of operations (60.6 percent) had similar minimum and maximum numbers of resident equids in 1997, i.e., a consistent inventory. One-third of operations (33.9 percent) had a maximum of 1.1 to 2.5 times as many resident equids (present at one time) as their lowest number of resident equids. Only 1.6 percent of operations had no resident equids present at some time during 1997. The minimum number of equids was within 10 percent of the maximum number of equids on over three-fourths (76.0 percent) of small operations and only one-fourth (25.1 percent) of large operations.

h. Percent of operations by ratio of minimum/maximum number of resident equids present at any one time during 1997 and size of operation:

Ratio (Minimum/Maximum)	Percent Operations by Size of Operation (Number Equids)									
	1-2		3-5		6-19		20 or More		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0	1.9	(0.7)	1.8	(0.8)	0.5	(0.3)	1.8	(1.7)	1.6	(0.5)
0.1 - 0.39	2.5	(1.0)	5.8	(1.6)	3.9	(1.1)	4.7	(1.7)	3.9	(0.7)
0.4 - 0.89	19.6	(3.0)	35.8	(2.5)	59.0	(3.0)	68.4	(4.9)	33.9	(1.9)
0.90 - 1.00	<u>76.0</u>	(3.1)	<u>56.6</u>	(2.8)	<u>36.6</u>	(3.0)	<u>25.1</u>	(4.6)	<u>60.6</u>	(2.0)
Total	100.0		100.0		100.0		100.0		100.0	

## B. Health and Health Management

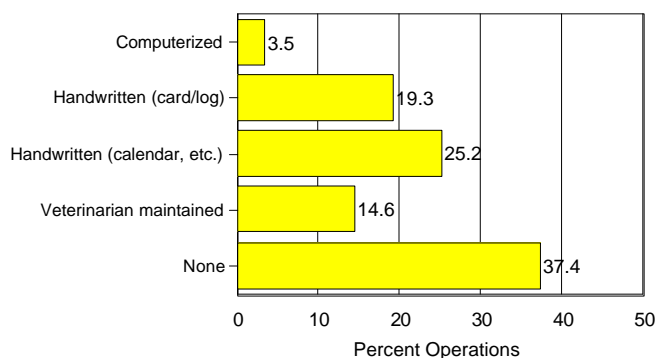
### 1. Record keeping

Over 62 percent of operations maintained health records. Operations with 20 or more equids were more likely to maintain some type of health record than smaller operations. Records were mainly in a handwritten form (44.5 percent of operations), either through notes or a designated health log, such as health card and log book. Computerized health records were used on a larger proportion of operations with six or more equids than operations with fewer animals.

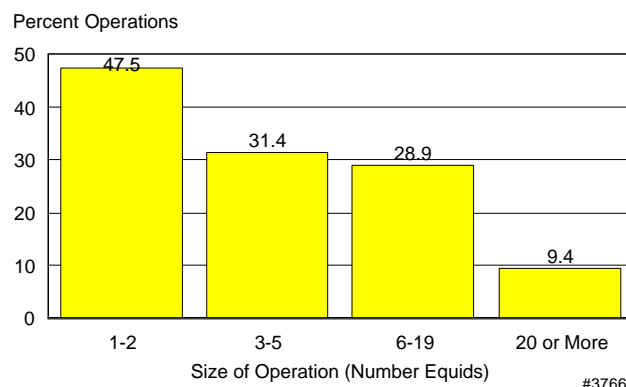
a. Percent of operations by primary method of equine health records relied on by the operator by size of operation:

Primary Method	Percent Operations by Size of Operation (Number Equids)									
	1-2		3-5		6-19		20 or More		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Computerized health records	3.1	(1.4)	2.8	(0.8)	5.2	(1.3)	7.0	(1.7)	3.5	(0.7)
Hand written in designated log (e.g., health card, log book)	15.4	(2.9)	17.4	(2.4)	28.3	(2.7)	41.4	(5.6)	19.3	(1.7)
Hand written notes (calendar, checkbook)	19.4	(2.8)	30.2	(2.5)	28.9	(2.9)	32.7	(5.7)	25.2	(1.6)
Operation records maintained by veterinarian	14.6	(3.1)	18.2	(2.3)	8.7	(1.6)	9.5	(2.6)	14.6	(1.7)
No written or computerized records	47.5	(3.8)	31.4	(2.7)	28.9	(2.9)	9.4	(2.6)	37.4	(2.1)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of Operations by Primary Method of Maintaining Equine Health Records, 1997



Percent of Operations that Kept No Equine Health Records by Size of Operation, 1997



## 2. Health care responsibility

The operator had the primary responsibility for making and implementing health care decisions for resident equids on nearly three out of four operations. The operator's spouse was the primary person responsible for health care decisions and implementation on about 17 percent of operations. Someone other than the operator or spouse held these responsibilities on about 10 percent of all operations.

a. Percent of *operations* by person(s) who had the primary responsibility for health care decisions and implementation:

Percent Operations by Person(s) Primarily Responsible

Person	Health Care Decisions		Health Care Implementation	
	Percent	Standard Error	Percent	Standard Error
Operator	73.1	(2.0)	71.4	(2.0)
Spouse	17.0	(1.8)	17.2	(1.8)
Relative less than 18 years old	1.5	(0.6)	1.7	(0.6)
Relative 18 years old or older	4.5	(0.8)	4.6	(0.8)
Employee	0.5	(0.1)	0.6	(0.2)
Equid owner (not operator) or their designated agent	2.9	(0.5)	3.0	(0.5)
Other	0.5	(0.3)	1.5	(0.5)
Total	100.0		100.0	

Employees were more likely to be responsible for health care decisions and implementation on operations with 20 or more equids compared to smaller operations, although small numbers of operations in the largest size category caused these estimates to be less precise (large standard errors).

b. Percent of operations where employees had the primary responsibility for health care decisions and health care implementation by size of operation:

Percent Operations by Size of Operation (Number Equids)

Responsibility	1-2		3-5		6-19		20 or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Health care decisions	0.1	(0.1)	0.5	(0.1)	0.7	(0.3)	4.2	(2.4)
Health care implementation	0.1	(0.1)	0.5	(0.3)	1.1	(0.4)	6.6	(2.6)

Owners (other than the operator) were responsible for health care decisions and implementation on larger percentages of boarding/training operations than on operations of other primary functions.

- c. Percent of operations where equid owners (other than the operator of the facility) had the primary responsibility for health care decisions and health care implementation by primary function of operation:

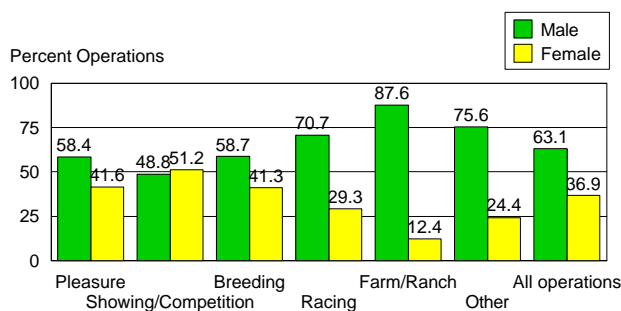
Equid Owner Responsibility	Percent Operations by Primary Function of Operation									
	Boarding/Training Facility		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other	
	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Health care decisions	16.1	(4.1)	1.5	(1.0)	2.8	(1.0)	2.3	(0.7)	1.3	(0.8)
Health care implementation	16.0	(4.1)	3.1	(2.0)	3.1	(1.0)	2.1	(0.7)	1.2	(0.8)

Men were more likely to be the health care decision maker and to implement health care on operations where the primary use of equids was racing, farming/ranching, or other. The gender distribution was closer to 50:50 on operations where the primary use of equids was for pleasure, showing/competition, and breeding.

- d. Percent of operations by gender of person(s) who had the primary responsibility for health care decisions and implementation and primary use of equids:

Primary Use of Equids	Percent Operations by Gender					
	Health Care Decisions			Health Care Implementation		
	Male	Female	Standard Error	Male	Female	Standard Error
	Percent	Percent		Percent	Percent	
Pleasure	57.9	42.1	(2.7)	58.4	41.6	(2.8)
Showing/Competition	47.2	52.8	(6.5)	48.8	51.2	(6.5)
Breeding	56.1	43.9	(5.8)	58.7	41.3	(5.7)
Racing	85.0	15.0	(7.3)	70.7	29.3	(9.6)
Farm/Ranch	87.5	12.5	(3.5)	87.6	12.4	(3.5)
Other	74.1	25.9	(9.0)	75.6	24.4	(9.0)
All operations	62.7	37.3	(2.1)	63.1	36.9	(2.1)

Percent of Operations by Gender of Person(s) Who Had Primary Responsibility for Health Care Implementation and Primary Use of Equids, 1997



### 3. Health care information sources

The following were considered either **very** important or **somewhat** important sources of equine health care information for over 50 percent of all operations: veterinarians, farriers, other horse owners, feed and veterinary supply store personnel, and magazines and books. The World Wide Web/internet was a **very or somewhat** important source of equine health information for 11.0 percent of operations, while this source was either not applicable or not available to 61.9 percent of the operations.

Veterinarians, in particular, were considered a **very** important source of information for equine health care decisions on 84.1 percent of the operations, by far the highest percentage for any information source listed below.

#### a. Percent of operations by level of importance as information sources for equine health care decisions:

Source	Percent Operations by Level of Importance								Total
	Very Important		Somewhat Important		Not Important		Not Applicable		
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
Veterinarian	84.1	(1.6)	12.6	(1.4)	2.9	(0.9)	0.4	(0.3)	100.0
Equine nutritionist	12.2	(1.3)	17.6	(1.5)	35.5	(1.9)	34.7	(2.0)	100.0
Acupuncturist/ Chiropractor	4.0	(0.8)	10.0	(1.3)	41.3	(2.0)	44.7	(2.1)	100.0
Equine dentist (other than veterinarian)	9.4	(1.1)	14.0	(1.4)	37.1	(2.0)	39.5	(2.1)	100.0
Farrier	49.2	(2.2)	28.2	(1.9)	15.4	(1.5)	7.2	(1.0)	100.0
Extension agents/ university or vocational-agriculture personnel/4-H instructor	7.9	(1.1)	26.5	(1.8)	41.7	(2.0)	23.9	(1.8)	100.0
Riding instructors/ horse trainers	10.6	(1.3)	19.3	(1.6)	38.9	(1.9)	31.2	(2.0)	100.0
Other horse owners	18.1	(1.7)	43.4	(2.1)	27.3	(1.8)	11.2	(1.5)	100.0
Horse association meetings/newsletters	11.1	(1.3)	28.6	(1.8)	40.7	(2.0)	19.6	(1.8)	100.0
Feed store or veterinary supply store personnel	23.2	(1.7)	40.9	(2.0)	26.9	(1.8)	9.0	(1.4)	100.0
Radio/television/ newspaper	2.2	(0.5)	17.3	(1.7)	52.7	(2.0)	27.8	(2.0)	100.0
Horse magazines/ reference books	18.6	(1.7)	36.6	(1.9)	31.6	(1.8)	13.2	(1.6)	100.0
Web/internet	2.8	(0.7)	8.2	(1.2)	27.1	(1.8)	61.9	(2.0)	100.0



#### 4. Use of a veterinarian

Approximately three-fourths (73.8 percent) of operations used the services of a veterinarian at least once for resident equids in 1997. Percentages of operations using a veterinarian at least once in 1997 for any equine service increased from 60.8 percent of operations with one to two equids to 94.8 percent for those operations with 20 or more equids. This increase seems reasonable since larger operations have greater numbers of equids at risk for needing veterinary care. Percentages of operations using a veterinarian at least once for each of the services specified below increased with increasing size of operation. The exception was for those services combined in the other category.

Over 40 percent of operations overall used a veterinarian at least once for individual animal diagnosis or treatment, vaccination consultation or service, to provide drugs or vaccines, and diagnostic services such as a Coggins test.

These estimates do not reflect the number of *times* a veterinarian's services were used per year, only if they were used at least once in 1997 by the type of service.

a. Percent of operations that used a veterinarian at least once for resident equids for the following services in 1997 by size of operation:

Service	Percent Operations by Size of Operation (Number Equids)									
	1-2		3-5		6-19		20 or More		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Individual animal diagnosis or treatment	36.1	(3.7)	54.2	(2.8)	69.2	(2.7)	85.9	(3.7)	49.9	(2.0)
Reproductive evaluation (e.g., palpation)	5.3	(1.7)	17.2	(2.3)	34.8	(2.9)	61.1	(5.3)	16.6	(1.4)
Vaccination consultation or service	34.2	(3.9)	49.9	(2.9)	51.8	(3.2)	63.0	(5.7)	43.7	(2.3)
Provide drugs or vaccines	29.3	(3.6)	47.4	(2.7)	63.9	(2.9)	83.9	(3.6)	43.6	(2.0)
Deworming consultation or service	29.4	(3.6)	35.2	(2.7)	44.3	(3.2)	48.2	(5.6)	34.7	(2.0)
Dentistry	13.7	(2.9)	28.9	(2.6)	36.1	(3.1)	68.6	(5.3)	24.8	(1.8)
Nutritional consultation	11.9	(2.8)	17.1	(2.2)	22.0	(2.5)	41.8	(5.5)	16.5	(1.6)
Diagnostic services (individual or herd test, e.g., Coggins)	24.8	(3.5)	46.8	(3.0)	58.9	(3.2)	80.8	(4.1)	40.3	(2.2)
Health certificate	15.1	(2.7)	30.8	(2.7)	39.5	(2.9)	68.6	(5.6)	26.7	(1.7)
Purchase or insurance examination	6.4	(2.3)	7.0	(1.4)	14.5	(2.0)	48.4	(5.6)	9.6	(1.2)
Other	0.9	(0.6)	1.4	(0.7)	4.2	(1.4)	1.8	(0.6)	1.7	(0.4)
Any of the above	60.8	(3.7)	80.8	(2.1)	89.0	(1.8)	94.8	(2.5)	73.8	(2.0)

## 5. Hoof care

Regardless of the size of operation, a hired professional farrier usually trimmed hooves and performed routine and corrective shoeing on a larger percentage of operations than did operation personnel, a veterinarian, or other outside person. Operation personnel trimmed hooves on more operations than they shod hooves regardless of the size of operation.

The percentages of operations that provided shoeing (both routine and corrective) for equids increased with increasing size of operation. A hired professional farrier predominantly performed corrective shoeing.

a. Percent of operations by the person who usually provided the following hoof care services for resident equids and size of operation:

Provider	Percent Operations by Size of Operation (Number Equids)									
	1-2		3-5		6-19		20 or More		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
<b>Hoof trimming:</b>										
Operation personnel (including operator)	18.0	(2.8)	21.3	(2.3)	30.6	(3.0)	24.2	(4.4)	21.6	(1.6)
Hired professional farrier	69.4	(3.5)	70.5	(2.5)	66.0	(3.2)	73.0	(4.6)	69.3	(1.9)
Veterinarian	1.3	(0.9)	0.5	(0.4)	0.0	(0.0)	0.0	--	0.8	(0.4)
Other outside person	3.6	(1.2)	2.8	(0.8)	1.2	(0.7)	0.7	(0.5)	2.8	(0.6)
Not done	<u>7.7</u>	(1.9)	<u>4.9</u>	(1.2)	<u>2.2</u>	(0.7)	<u>2.1</u>	(1.7)	<u>5.5</u>	(1.0)
Total	100.0		100.0		100.0		100.0		100.0	
<b>Routine shoeing:</b>										
Operation personnel (including operator)	5.9	(1.4)	10.0	(1.6)	17.9	(2.4)	18.8	(4.1)	9.9	(1.0)
Hired professional farrier	52.0	(3.8)	67.6	(2.6)	68.2	(3.0)	76.4	(4.5)	61.1	(2.0)
Veterinarian	0.3	(0.2)	0.5	(0.4)	0.0	(0.0)	0.0	--	0.3	(0.2)
Other outside person	3.3	(1.2)	2.0	(0.7)	1.5	(0.8)	0.3	(0.3)	2.4	(0.6)
Not done	<u>38.5</u>	(3.5)	<u>19.9</u>	(2.2)	<u>12.4</u>	(1.9)	<u>4.5</u>	(2.1)	<u>26.3</u>	(1.9)
Total	100.0		100.0		100.0		100.0		100.0	
<b>Corrective shoeing:</b>										
Operation personnel (including operator)	3.9	(1.0)	7.0	(1.2)	14.5	(2.3)	14.1	(3.5)	7.2	(0.8)
Hired professional farrier	39.2	(3.9)	54.1	(2.9)	60.6	(3.3)	72.2	(4.7)	49.2	(2.3)
Veterinarian	0.1	(0.1)	0.3	(0.2)	0.2	(0.2)	0.0	(0.0)	0.2	(0.1)
Other outside person	2.2	(1.1)	2.1	(0.9)	1.5	(0.8)	0.0	(0.0)	2.0	(0.6)
Not done	<u>54.6</u>	(3.9)	<u>36.5</u>	(2.8)	<u>23.2</u>	(2.6)	<u>13.7</u>	(3.7)	<u>41.4</u>	(2.3)
Total	100.0		100.0		100.0		100.0		100.0	

## 6. Dental care

Overall in 1997, more than one-third of operations (36.8 percent) identified a veterinarian as the primary dental care provider. Over one-half (55.6 percent) did not provide dental care to equids. The specific types of dental services provided were not determined.

### a. Percent of operations by primary provider of equine dental care (for resident equids) in 1997:

Provider	Percent Operations	Standard Error
Veterinarian	36.8	(2.0)
Equine dentist (nonveterinarian)	4.8	(0.6)
Other	2.8	(0.5)
Not done	<u>55.6</u>	(2.0)
Total	100.0	

In 1997, larger operations were more likely to provide dental care for resident equids; 86.3 percent of operations with 20 or more equids compared to 29.3 percent of operations with one or two equids provided dental care in 1997. As the size of operation increased, the percentage of operations where an equine dentist (nonveterinarian) provided primary dental care increased.

### b. Percent of operations by primary equine dental care provider for resident equids in 1997 and size of operation:

Provider	<u>Percent Operations by Size of Operation (Number Equids)</u>							
	1-2		3-5		6-19		20 or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Veterinarian	27.5	(3.6)	43.7	(2.9)	42.6	(3.1)	59.5	(5.6)
Equine dentist (nonveterinarian)	1.3	(0.6)	5.3	(1.2)	9.4	(1.5)	20.6	(4.8)
Other	0.5	(0.4)	3.9	(0.9)	5.8	(1.3)	6.2	(2.7)
Not done	<u>70.7</u>	(3.6)	<u>47.1</u>	(2.9)	<u>42.2</u>	(3.2)	<u>13.7</u>	(3.2)
Total	100.0		100.0		100.0		100.0	

In 1997, operations where the primary use of equids was for racing were most likely to provide dental care (81.6 percent). A nonveterinarian equine dentist was most likely to be the primary provider of equine dentistry on operations where the primary use of equids was racing and least likely on operations that used equids primarily for pleasure and farm/ranch work.

c. Percent of operations by primary equine dental care provider for resident equids in 1997 by primary use of equids:

Percent Operations by Primary Use of Equids

Provider	Pleasure		Showing/ Competition		Breeding		Racing		Farm/Ranch		Other	
	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Veterinarian	37.0	(2.7)	53.4	(6.5)	57.4	(5.8)	31.6	(9.2)	26.1	(3.4)	17.8	(5.1)
Equine dentist (non- veterinarian)	2.7	(0.6)	18.3	(4.5)	10.5	(2.9)	37.3	(10.6)	1.6	(0.8)	6.8	(3.9)
Other	1.4	(0.4)	1.2	(1.0)	7.3	(2.4)	12.7	(6.9)	6.4	(2.0)	2.6	(1.7)
Not done	<u>58.9</u>	(2.7)	<u>27.1</u>	(6.5)	<u>24.8</u>	(5.5)	<u>18.4</u>	(8.5)	<u>65.9</u>	(3.8)	<u>72.8</u>	(6.9)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

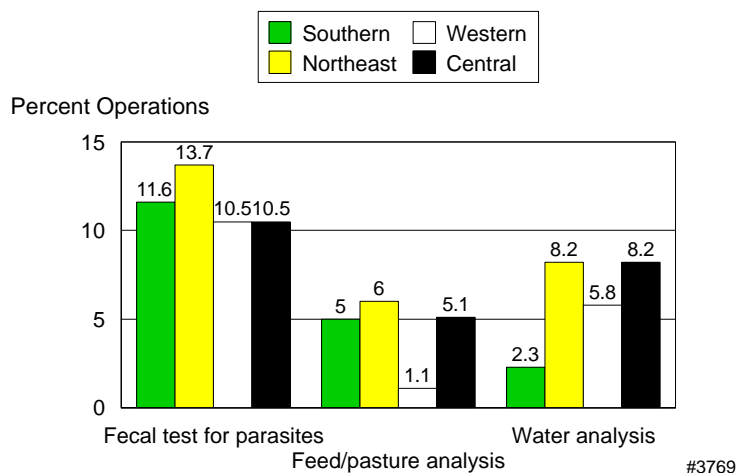
## 7. Fecal, feed, and water tests performed

Regardless of geographic region, just over 10 percent of operations tested equine feces for parasites in 1997. Feed or pasture were analyzed by fewer operations in the Western region (1.1 percent) than the other three regions. Fewer operations in the Southern region (2.3 percent) than the other regions had water analyzed.

a. Percent of operations that had the following tests performed for resident equids in 1997 by region:

Test	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
Fecal test for parasites	11.6	(1.6)	13.7	(3.2)	10.5	(2.6)	10.5	(2.2)	11.4	(1.1)
Feed or pasture analysis	5.0	(1.0)	6.0	(2.3)	1.1	(0.4)	5.1	(1.3)	4.2	(0.6)
Water analysis	2.3	(0.6)	8.2	(2.6)	5.8	(1.7)	8.2	(2.2)	5.2	(0.8)

Percent of Operations that Had the Following Tests Performed for Resident Equids by Region, 1997



Generally, the percentages of operations that had equine feces tested for parasites, tested feed or pasture, or analyzed water in 1997 increased with increasing size of operation.

b. Percent of operations that had the following tests performed for resident equids in 1997 by size of operation:

Test	Percent Operations by Size of Operation (Number Equids)							
	1-2		3-5		6-19		20 or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Fecal test for parasites	5.9	(1.7)	12.3	(1.7)	20.1	(2.4)	27.2	(4.0)
Feed or pasture analysis	1.1	(0.6)	5.9	(1.3)	6.7	(1.4)	15.3	(3.3)
Water analysis	3.1	(1.1)	6.7	(1.5)	5.9	(1.6)	12.7	(3.4)

In 1997, larger percentages of boarding/training and breeding operations did fecal testing for parasites on resident equids and feed or pasture analyses than operations of other primary functions. The farm/ranch function had the smallest percentage (2.5 percent) of operations that performed water analyses.

c. Percent of operations that had the following tests performed for resident equids in 1997 by primary function of operation:

Percent Operations by Primary Function of Operation										
Test	Boarding/Training Facility		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Fecal test for parasites	24.9	(5.0)	26.0	(5.1)	6.6	(1.4)	11.8	(1.7)	13.6	(4.7)
Feed or pasture analysis	13.7	(4.2)	9.7	(2.7)	2.9	(0.7)	3.8	(0.9)	5.3	(2.7)
Water analysis	12.3	(3.7)	7.7	(4.0)	2.5	(0.8)	6.1	(1.2)	4.3	(2.4)

## 8. Equine infectious anemia (EIA)

Over one-half (58.9 percent) of operations in the Central region had not heard of EIA.

a. Percent of operations by familiarity with EIA before the Equine '98 interview and region:

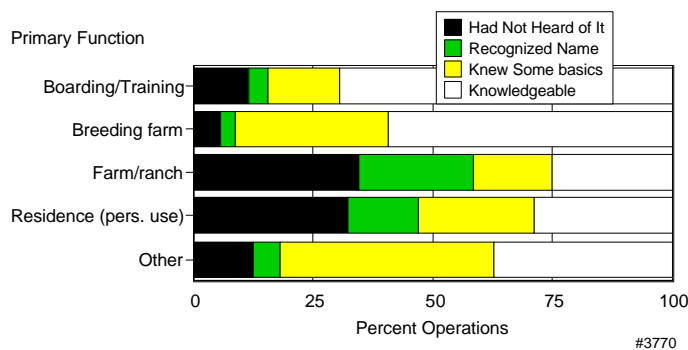
Level of Familiarity	Percent Operations by Region									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Had not heard of it before	25.9	(3.5)	31.9	(4.5)	45.6	(4.1)	58.9	(3.8)	30.3	(2.0)
Recognized name, not much else	14.1	(2.7)	13.0	(3.3)	13.6	(3.1)	11.1	(1.9)	16.3	(1.5)
Knew some basics	34.2	(3.9)	33.5	(4.2)	15.4	(2.5)	13.8	(3.4)	22.5	(1.6)
Knowledgeable	<u>25.8</u>	(4.0)	<u>21.6</u>	(3.7)	<u>25.4</u>	(3.4)	<u>16.2</u>	(2.4)	<u>30.9</u>	(1.9)
Total	100.0		100.0		100.0		100.0		100.0	

About one-third of farm/ranch operations and residences with equids for personal use had not heard of EIA, while over one-half of the boarding/training and breeding facilities considered themselves knowledgeable about the disease.

i. Percent of operations by familiarity with EIA before the Equine '98 interview and primary function of operation:

Level of Familiarity	Percent Operations by Primary Function of Operation									
	Boarding/Training Facility		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Had not heard of it before	11.5	(5.2)	5.7	(2.0)	34.6	(3.3)	32.5	(3.0)	12.6	(7.3)
Recognized name, not much else	4.1	(1.8)	3.3	(1.4)	23.9	(2.8)	14.6	(1.9)	5.7	(3.0)
Knew some basics	15.0	(5.1)	31.8	(5.7)	16.5	(2.1)	24.2	(2.5)	44.6	(11.3)
Knowledgeable	<u>69.4</u>	(6.9)	<u>59.2</u>	(5.9)	<u>25.0</u>	(2.7)	<u>28.7</u>	(2.8)	<u>37.1</u>	(11.3)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of Operations by Reported Familiarity with EIA and Primary Function of Operation



The Southern region had the largest percentage (55.2 percent) of operations that tested resident equids for EIA in 1997, while the Western region had the smallest percentage (18.9 percent) of operations that tested resident equids for EIA.

b. Percent of operations that had at least one Coggins or other test performed for equine infectious anemia (EIA) for resident equids in 1997 by region:

<u>Percent Operations by Region</u>									
Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
55.2	(3.4)	36.2	(5.3)	18.9	(3.4)	40.3	(4.4)	40.9	(2.2)

As the size of operation increased, so did the percentage of operations that tested at least one resident equid for EIA in 1997.

c. Percent of operations that had a Coggins or other test performed for equine infectious anemia (EIA) for resident equids in 1997 by size of operation:

<u>Percent Operations by Size of Operation (Number Equids)</u>									
1-2		3-5		6-19		20 or More			
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error		
27.0	(3.6)	45.1	(3.0)	60.7	(3.2)	76.4	(4.8)		

Over two-thirds of operations that were primarily boarding/training facilities, breeding farms, and other function tested resident equids for EIA in 1997. Approximately one-third of operations had equids tested for EIA in the farm/ranch and residence with equids for personal use categories.

d. Percent of operations that had a Coggins or other test performed for equine infectious anemia (EIA) for resident equids in 1997 by primary function of operation:

<u>Percent Operations by Primary Function of Operation</u>									
Boarding/Training Facilities		Breeding Farm		Farm/Ranch		Residence (Personal Use)		Other	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
79.1	(5.8)	78.7	(5.3)	30.5	(2.9)	39.1	(3.2)	67.9	(9.9)



Over 60 percent of resident equids were tested for EIA on operations that did EIA testing. Overall, 35.6 percent of resident equids on all operations were tested for EIA in 1997.

The percentage of resident equids tested for EIA was lower in the Western region (12.1 percent) compared to other regions.

e. Percent of resident equids tested for EIA in 1997 by region:

<u>Percent Resident Equids by Region</u>										
	Southern		Northeast		Western		Central		All Operations	
Percent Resident Equids Tested on:	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Operations that tested for EIA	69.5	(2.9)	61.3	(5.5)	38.8	(4.3)	66.5	(6.5)	63.4	(2.3)
All operations	49.7	(2.6)	32.8	(4.3)	12.1	(1.8)	38.9	(4.4)	35.6	(1.7)

For resident equids that were tested for EIA, each was tested slightly more than one time on average during 1997.

f. For operations that tested for EIA during 1997, average number of tests per equid tested:

Average Number Tests per Equid	Standard Error
1.1	(0.0)

The cost of testing was the owner/operators' estimates of total cost, including veterinarian fees, costs of transporting equids, and testing costs. For operations that tested for EIA in 1997, the average cost per test was slightly less than the operation average. These results indicate that the cost per test was similar across operations regardless of operation size or weight given to their response.

There were 1.37 million official EIA tests performed in fiscal year 1997, per USDA:APHIS:Veterinary Services. Multiplying the average cost per test of \$24.65 times 1.37 million tests results in an estimated \$34 million spent by the equine industry on EIA testing in 1997.

g. For operations that tested for EIA during 1997, average and operation average cost per test (including call fee and cost of transportation):

Cost per Test (Dollars)			
Average	Standard Error	Operation Average	Standard Error
\$24.65	(\$0.74)	\$26.57	(\$0.85)

Overall, the primary reasons operations tested for EIA were for show requirements within the state (41.4 percent of operations) followed by for interstate movement (19.2 percent of operations). International movement of equids and equine illness consistent with EIA were infrequent *primary* reasons for EIA testing, most likely because these events occur infrequently.

A larger percentage of operations tested equids for EIA for interstate movement in the Western region (39.1 percent) than in other regions in 1997. A larger percentage of operations in the Southern region (21.4 percent) tested equids for EIA for personal knowledge than in other areas.

h. For operations that tested for EIA during 1997, percent of operations by primary reason for testing and region:

Primary Reason	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
Change of ownership (within state)	9.8	(2.0)	12.8	(4.3)	5.5	(2.5)	13.6	(3.6)	10.5	(1.5)
Show requirement (within state)	37.6	(3.4)	46.5	(8.3)	36.3	(11.7)	50.9	(5.6)	41.4	(2.8)
Interstate movement	16.7	(3.1)	18.3	(6.0)	39.1	(9.2)	16.0	(4.2)	19.2	(2.2)
International movement	0.7	(0.5)	1.4	(1.4)	1.4	(1.2)	0.9	(0.6)	0.9	(0.4)
For personal knowledge	21.4	(3.3)	9.5	(3.4)	11.3	(6.2)	8.9	(3.3)	16.2	(2.2)
Veterinary recommendation due to equine illness	4.4	(2.3)	2.9	(2.7)	1.9	(1.4)	1.1	(0.8)	3.2	(1.3)
Other	9.4	(2.7)	8.6	(7.0)	4.5	(2.0)	8.6	(3.4)	8.6	(1.9)
Total	100.0		100.0		100.0		100.0		100.0	

## 9. Vaccinations

Overall, at least one resident equid on 60.5 percent of operations received some kind of vaccine in 1997, an indication that resident equids were *not* vaccinated on nearly 40 percent of operations. Nearly three-fourths of operations in the Western region (73.9 percent) vaccinated compared to one-half of operations in the Southern and Central regions.

a. Percent of operations where any vaccines were administered to resident equids during 1997 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
54.2	(3.4)	62.3	(6.2)	73.9	(3.7)	56.8	(4.8)	60.5	(2.2)

The percentage of operations that administered some kind of vaccine to at least one resident equid in 1997 increased with increasing size of operation. Estimates in the table below do not reflect the number of equids vaccinated or number of vaccines given per equid but indicate that less than one-half (44.9 percent) of operations with one to two equids and 89.8 percent of operations with 20 or more resident equids vaccinated at least one resident equid.

b. Percent of operations where any vaccines were administered to resident equids during 1997 by size of operation:

Percent Operations by Size of Operation (Number Equids)							
1-2		3-5		6-19		20 or More	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
44.9	(3.8)	70.5	(2.5)	74.4	(3.0)	89.8	(2.6)

On operations where any vaccines were administered to resident equids in 1997, the veterinarian was the primary source of vaccine for the largest percentage of operations (67.7 percent) followed by feed or veterinary supply stores (22.4 percent) and catalogs (8.8 percent).

c. For operations where any vaccines were administered to resident equids during 1997, percent of operations where vaccines given were obtained from the following sources (and primary source):

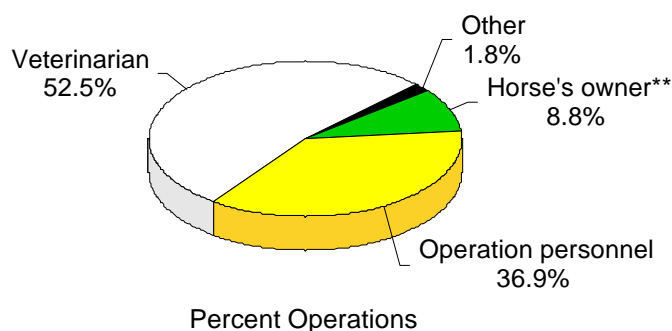
Source	Percent Operations			
	All Sources	Standard Error	Primary Source	Standard Error
Veterinarian	75.0	(2.1)	67.7	(2.3)
Feed or veterinary supply store	30.8	(2.1)	22.4	(1.9)
Catalog	13.4	(1.5)	8.8	(1.3)
Other	1.5	(0.6)	1.1	(0.5)
Total			100.0	

Veterinarians, operation personnel, and horse owners may have given vaccines on any one operation, although veterinarians administered the **majority** of vaccines on just over one-half (52.5 percent) of the operations where at least some resident equids were vaccinated in 1997. Operation personnel gave the **majority** of vaccines on over one-third (36.9 percent) of the operations.

d. For operations where any vaccines were administered to resident equids during 1997, percent of operations by person(s) giving the vaccines and who administered the majority of vaccinations:

Person Vaccinating	Percent Operations			
	Given By	Standard Error	Majority Given	Standard Error
Veterinarian	65.7	(2.4)	52.5	(2.6)
Operation personnel (including operator)	49.3	(2.5)	36.9	(2.4)
Horse's owner (other than operator)	14.8	(1.7)	8.8	(1.5)
Other	2.6	(0.8)	<u>1.8</u>	(0.7)
Total			100.0	

Percent of Operations\* by Person(s) Who Administered the Majority of Vaccinations , 1997



\*For operations where any vaccines were administered to resident equids.  
 \*\* Other than the operator.

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On operations where vaccinations were given to equids, operation personnel administered the majority of vaccinations on larger percentages of breeding operations (51.4 percent) than on boarding/training operations (24.2 percent) and residences with personal use of equids (32.6 percent). For operations that vaccinated, a veterinarian administered the majority of vaccinations on over one-half of residences with personal use of equids (58.2 percent) and boarding/training facilities (57.5 percent)

e. For operations where vaccines were administered to resident equids during 1997, percent of operations by person giving the majority of vaccinations and primary function of operation:

Percent Operations by Person Vaccinating

Primary Function of Operation	Veterinarian		Operation Personnel (Including Operator)		Horse's Owner (Not Operator)		Other		Total
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
Boarding/training facility	57.5	(7.7)	24.2	(5.7)	18.2	(6.0)	0.1	(0.1)	100.0
Breeding farm	37.5	(6.2)	51.4	(6.3)	9.3	(4.1)	1.8	(1.4)	100.0
Farm/ranch	47.5	(4.6)	39.2	(4.1)	12.3	(3.1)	1.0	(0.8)	100.0
Residence with equids for personal use	58.2	(3.6)	32.6	(3.3)	6.7	(1.9)	2.5	(1.2)	100.0
Other	30.2	(12.7)	68.0	(12.6)	1.6	(1.0)	0.2	(0.2)	100.0

## 10. Deworming

Overall, a dewormer was given to at least one resident equid on 86.7 percent of operations in 1997. This percentage was similar across regions of the country.

a. Percent of operations where dewormers were given to at least one resident equid during 1997 by region:

<u>Percent Operations by Region</u>									
Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
85.7	(2.4)	89.7	(3.9)	89.9	(2.2)	83.4	(4.1)	86.7	(1.5)

Over 90 percent of operations with three or more equids gave dewormers to resident equids in 1997. A lower percentage (78.9 percent) of operations with one to two equids gave dewormers. It appears that more operations, regardless of size of operation, gave dewormers to equids than vaccinated at least one equid in 1997. (See B.9.b.)

b. Percent of operations where any dewormers were given to resident equids during 1997 by size of operation:

<u>Percent Operations by Number Equids</u>							
1-2		3-5		6-19		20 or More	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
78.9	(3.0)	90.8	(1.6)	95.9	(1.3)	99.4	(0.4)

For operations that dewormed at least one equid, the largest percentage (62.5 percent) of operations **primarily** obtained dewormers for equids from feed or veterinary supply stores in 1997. Only about one-fourth (27.0 percent) primarily obtained dewormers from a veterinarian.

c. For operations where any dewormers were given to resident equids during 1997, percent of operations where dewormers were obtained from the following sources (and primary source):

Source	Percent Operations			
	All Sources	Standard Error	Primary Source	Standard Error
Veterinarian	33.3	(2.0)	27.0	(2.0)
Feed or veterinary supply store	72.9	(1.9)	62.5	(2.1)
Catalog	12.7	(1.4)	8.5	(1.1)
Other	2.5	(0.6)	<u>2.0</u>	(0.5)
Total			100.0	

Operation personnel administered the **majority** of dewormers to resident equids on 70.3 percent of operations that dewormed in 1997. Veterinarians administered the **majority** of dewormers on only 13.0 percent of operations.

d. For operations where any dewormers were given to resident equids during 1997, percent of operations by person(s) giving the dewormers and who gave the **majority** of dewormers:

Person Deworming	Percent Operations			
	Given By	Standard Error	Majority Given By	Standard Error
Veterinarian	23.2	(1.9)	13.0	(1.5)
Operation personnel (including operator)	75.2	(2.2)	70.3	(2.2)
Horse's owner (not operator)	19.9	(2.0)	15.4	(1.8)
Other	1.7	(0.5)	<u>1.3</u>	(0.5)
Total			100.0	

## C. Births, Illnesses, and Deaths<sup>1</sup>

### 1. Born alive or born dead

#### a. Operations with births

Overall, 16.9 percent of operations had at least one equine birth in 1997. The percentage of operations that had equine births increased with increasing size of operations.

#### i. Percent of operations that had any equine births during 1997 by size of operation:

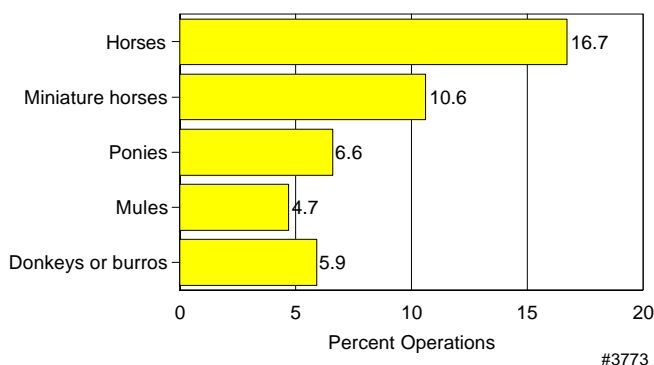
Percent Operations by Size of Operation (Number Equids)									
1-2		3-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
3.8	(1.5)	13.0	(1.7)	45.6	(3.2)	73.7	(4.6)	16.9	(1.2)

At least one horse foal was born on 16.7 percent of those operations that had horses in 1997.

#### ii. For operations that had the following types of equids<sup>2</sup>, percent of operations that had births of each equid type during 1997:

Type	Percent Operations with Equid Type	Standard Error
Horses	16.7	(1.2)
Miniature horses	10.6	(4.2)
Ponies	6.6	(2.2)
Mules	4.7	(1.9)
Donkeys or burros	5.9	(2.3)

Percent of Operations\* that Had Births by Equid Type, 1997



\*For operations that had these types of equids.

1 Morbidity and mortality events were infrequent and therefore, estimates by use of equid or other categories could not be made with much confidence.

2 Based on January 1, 1998, inventory.

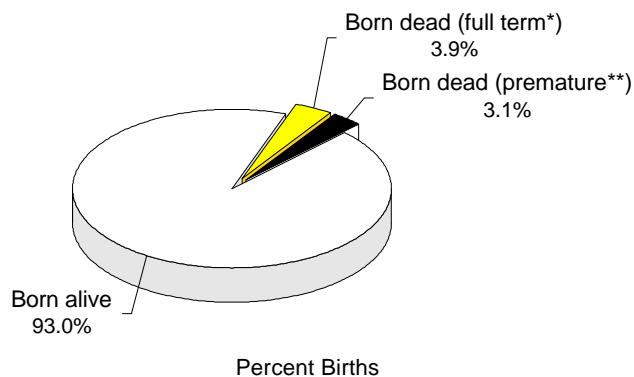


Overall, 93 percent of births were live births. Approximately equal percentages of equids born dead were full term and premature.

b. Percent of equids born alive, born dead (320 days or more gestation), or born dead (less than 320 days gestation) during 1997:

Percent Births						
Born Alive		Born Dead Full Term		Born Dead Premature		Total
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
93.0	(1.0)	3.9	(0.8)	3.1	(0.6)	100.0

Percent of Equids Born Alive, Born Dead (Full Term\*), and Born Dead (Premature\*\*), 1997



\* 320 days or more gestation.

\*\* Less than 320 days gestation.

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At least 90 percent of births in each equid category were live births. Although no mules were reported born dead, the number of operations with mule births in the Equine '98 Study was very low.

i. Percent of equids born alive by type of equid:

Type	Percent Equids	Standard Error
Horses	93.0	(1.1)
Miniature horses	90.5	(2.7)
Ponies	93.8	(3.9)
Mules	100.0	--
Donkeys or burros	90.7	(1.0)

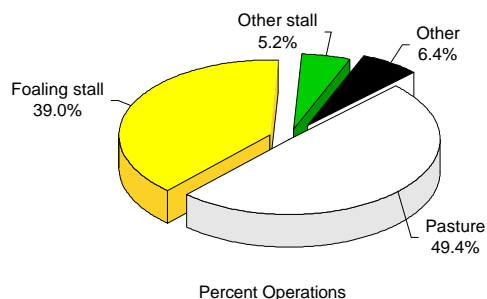
## 2. Foaling location

Overall, nearly 50 percent of operations that had one or more foals born alive in 1997 routinely had foals born on pasture, and 44.2 percent routinely had foals born in a stall (whether designated as a foaling stall or a stall used for another purpose).

a. For operations where foals were born alive in 1997, percent of operations by location best describing where foals were routinely born and region:

Foaling Location	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
Pasture	52.5	(5.2)	34.0	(8.8)	55.8	(9.6)	42.4	(7.8)	49.4	(3.8)
Designated foaling stall	33.5	(4.8)	60.8	(9.3)	30.0	(6.7)	51.2	(7.5)	39.0	(3.4)
Other stall	6.7	(2.8)	5.0	(3.0)	3.1	(1.5)	4.6	(2.9)	5.2	(1.5)
Other	<u>7.3</u>	(3.2)	<u>0.2</u>	(0.1)	<u>11.1</u>	(4.9)	<u>1.8</u>	(1.1)	<u>6.4</u>	(1.9)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of Operations\* by Location Foals Were Routinely Born, 1997



\* For operations where foals were born alive in 1997.

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As operation size increased, the percentage of operations routinely foaling on pasture declined and the percentage of operations using designated foaling stalls increased.

b. For operations where foals were born alive in 1997, percent of operations by location best describing where foals were routinely born and size of operation:

Foaling Location	Percent Operations by Size of Operation (Number Equids)					
	1-5		6-19		20 or More	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Pasture	62.5	(7.0)	44.4	(4.4)	35.0	(5.8)
Designated foaling stall	22.1	(5.4)	44.9	(4.7)	59.0	(6.2)
Other stall	8.0	(3.6)	3.6	(1.2)	4.2	(3.0)
Other	<u>7.4</u>	(3.8)	<u>7.1</u>	(2.8)	<u>1.8</u>	(0.9)
Total	100.0		100.0		100.0	

### 3. Neonatal practices

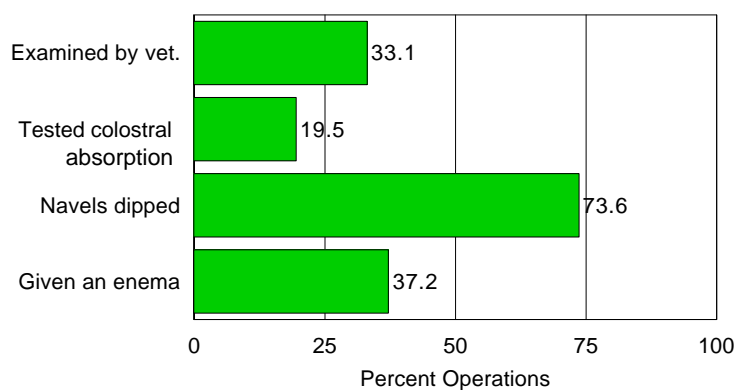
Overall, fewer than 20 percent of operations with live births routinely tested foals for adequate absorption of immunoglobulins. A larger percentage (34.2 percent) of operations with 20 or more equids routinely performed this test.

Approximately one-third of these operations had a veterinarian examine newborn foals in the first 48 hours of life. Overall, 73.6 percent of operations treated foals' navels, and 37.2 percent routinely gave the foal an enema in the first 48 hours of its life.

- a. For operations where foals were born alive, percent of operations routinely performing the following practices on neonatal foals during the first 2 days (48 hours) of life by size of operation:

Practice	Percent Operations by Size of Operation (Number Equids)							
	1-5		6-19		20 or More		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Examined by a veterinarian	36.2	(8.5)	28.6	(3.9)	39.8	(7.0)	33.1	(3.9)
Tested for adequate colostral absorption of immunoglobulins	15.5	(4.9)	17.7	(3.6)	34.2	(6.9)	19.5	(3.0)
Navels dipped	73.6	(3.0)	71.8	(3.7)	83.0	(4.3)	73.6	(3.0)
Given an enema	37.2	(3.7)	35.5	(4.1)	58.4	(6.4)	37.2	(3.7)

Percent of Operations Routinely Performing the Following Practices on Neonatal Foals During the First 2 Days of Life, 1997



\* For operations where foals were born alive.

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#### 4. Morbidity

For operations with foals during 1997, the largest percentages of operations had one or more foals with digestive problems other than colic (e.g., diarrhea, 13.4 percent) and injury/wounds/trauma (12.7 percent) within the first 6 months of life. Digestive problems affected over 20 percent of foals within their first 6 months of life, and injury/wounds/trauma affected 13.4 percent of foals. At least some operations had one or more foals with each of the problems listed. These estimates do not include equids on race tracks. Morbidity may be different for that population of equids.

See graph on page 39.

a. For operations with foals, percent of operations (and percent of foals) where resident foals *less than 6 months old* were affected with the following conditions during 1997:

Cause	Percent			
	Operations	Standard Error	Foal Inventory <sup>1</sup>	Standard Error
Colic	2.7	(1.0)	2.4	(0.8)
Other digestive problems (e.g., diarrhea)	13.4	(3.3)	21.9	(4.8)
Respiratory problems	3.6	(1.3)	8.2	(3.9)
Eye problems	1.3	(0.5)	1.2	(0.4)
Skin problems	1.5	(1.1)	1.4	(0.8)
Reproductive problems (e.g., hermaphrodite, inguinal hernia)	1.8	(1.0)	1.4	(0.7)
Behavioral problems (e.g., unusual, affected use or safety)	0.1	(0.0)	0.0	(0.0)
Injury/wounds/trauma	12.7	(2.3)	13.4	(2.5)
Leg/hoof problems (could not be used for intended use without treatment)	2.8	(0.8)	2.4	(0.6)
Neurologic problems (e.g., spinal problem, wobblers, seizure, EPM)	0.3	(0.1)	0.4	(0.2)
Infectious disease unrelated to specific body system	0.6	(0.3)	0.7	(0.4)
Chronic weight loss	0.7	(0.3)	0.6	(0.3)
Overweight/obese	1.2	(1.0)	1.1	(0.8)

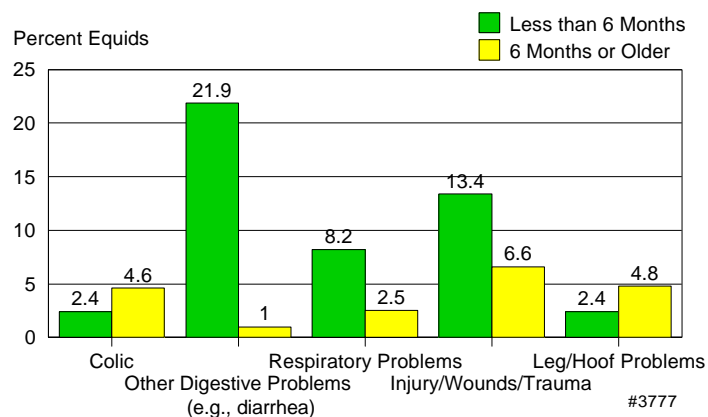
<sup>1</sup> Number of resident foals affected as a percent of August 1, 1997, resident foal inventory.

Percentages of equids affected with the various conditions were fairly similar across regions.

b. Percent of resident equids **6 months of age or older** that were affected with the following conditions during 1997 by region:

Cause	Percent Equids <sup>1</sup> by Region									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Colic	4.7	(0.8)	5.1	(1.4)	4.4	(0.9)	4.2	(1.0)	4.6	(0.5)
Other digestive problems (e.g., diarrhea)	0.8	(0.3)	2.2	(1.0)	1.1	(0.4)	0.3	(0.2)	1.0	(0.2)
Respiratory problems	2.2	(0.6)	2.0	(0.8)	2.6	(0.8)	3.1	(0.9)	2.5	(0.4)
Eye problems	2.0	(0.4)	0.8	(0.2)	1.9	(0.5)	1.7	(0.5)	1.7	(0.2)
Skin problems	2.9	(0.7)	1.2	(0.4)	2.4	(0.5)	1.3	(0.4)	2.2	(0.3)
Reproductive problems (e.g., infertility, dystocia)	0.8	(0.2)	1.0	(0.4)	1.1	(0.3)	1.0	(0.2)	0.9	(0.1)
Behavioral problems (e.g., unusual, affected use or safety)	0.4	(0.2)	0.4	(0.2)	0.7	(0.3)	0.9	(0.5)	0.6	(0.1)
Injury/wounds/trauma	5.9	(0.7)	7.1	(1.4)	7.1	(0.8)	7.0	(1.2)	6.6	(0.5)
Leg/hoof problems (could not be used for intended use without treatment)	4.4	(0.6)	5.3	(1.3)	5.6	(0.7)	4.4	(1.0)	4.8	(0.4)
Neurologic problems (e.g., spinal problem, wobblers, seizure, EPM)	0.4	(0.2)	0.2	(0.1)	0.7	(0.2)	0.3	(0.2)	0.4	(0.1)
Infectious disease unrelated to specific body system	0.1	(0.1)	1.3	(0.7)	1.1	(0.4)	0.5	(0.2)	0.6	(0.2)
Chronic weight loss	0.5	(0.3)	0.8	(0.4)	0.7	(0.2)	0.9	(0.3)	0.7	(0.1)
Overweight/obese	0.6	(0.3)	0.8	(0.4)	2.3	(0.8)	2.0	(0.7)	1.4	(0.3)

Percent of Foals/Equids Affected with Selected Conditions by Age, 1997



1. Number of resident equids 6 months of age or older affected as a percent of January 1, 1998, resident equine inventory 6 months of age or older.

Health event categories were kept as basic as possible to minimize misclassification since events were owner/operator reported. The equid did not have to be examined by a veterinarian for the owner/operator to report the problem, so misdiagnosis by the owner/operator was possible. Recall bias (e.g., asking the owner/operator to remember number of animals with various medical problems for an entire year) may have occurred. Recent events and those with more costly consequences would more likely be reported.

The largest percentage of operations (see Table C.4.c.) and percentage of equids (see Table C.4.b.) experienced colic, leg/hof problems, and injury/wounds/trauma. A higher percentage of operations (and equids) were affected by equine obesity versus had problems with chronic weight loss.

c. Percent of *operations* where resident equids *6 months of age or older* were affected with the following conditions during 1997 by region:

Cause	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
Colic	13.1	(1.8)	16.1	(4.4)	14.0	(3.1)	12.7	(3.3)	13.6	(1.4)
Other digestive problems (e.g., diarrhea)	2.5	(0.9)	3.9	(1.4)	4.2	(1.3)	1.1	(0.6)	2.8	(0.5)
Respiratory problems	4.9	(1.1)	5.4	(2.2)	7.6	(3.1)	8.1	(2.2)	6.3	(1.0)
Eye problems	7.9	(1.6)	3.5	(1.1)	8.8	(2.6)	7.3	(2.2)	7.4	(1.0)
Skin problems	7.0	(1.5)	3.4	(1.1)	7.5	(1.9)	4.0	(1.2)	6.0	(0.8)
Reproductive problems (e.g., infertility, dystocia)	2.7	(0.8)	3.4	(1.5)	4.0	(1.0)	3.3	(0.8)	3.2	(0.5)
Behavioral problems (e.g., unusual, affected use or safety)	1.3	(0.7)	1.8	(0.9)	2.4	(1.3)	1.8	(0.8)	1.7	(0.5)
Injury/wounds/trauma	16.2	(2.0)	16.7	(3.4)	21.7	(2.6)	17.8	(2.9)	17.9	(1.3)
Leg/hof problems (could not be used for intended use without treatment)	15.3	(2.2)	14.5	(3.7)	22.0	(3.0)	11.5	(2.5)	16.0	(1.4)
Neurologic problems (e.g., spinal problem, wobblers, seizure, EPM)	1.5	(0.7)	0.7	(0.3)	3.2	(1.1)	0.9	(0.5)	1.6	(0.4)
Infectious disease unrelated to specific body system	0.5	(0.3)	2.0	(1.0)	1.4	(0.5)	1.3	(0.7)	1.1	(0.3)
Chronic weight loss	2.1	(1.1)	3.8	(1.8)	2.8	(1.0)	3.2	(1.0)	2.7	(0.6)
Overweight/obese	2.5	(1.1)	3.4	(1.8)	6.9	(2.5)	6.3	(2.1)	4.5	(0.9)

Injury/wounds/trauma and/or leg/hof problems, followed by colic and respiratory problems, accounted for the greatest number of days of lost use and greatest costs for more operations in 1997 than any other health conditions. Injury/wound/trauma and leg/hof problems were combined as many operations had difficulty choosing between these categories (e.g., traumatic cause of a fracture). Obesity rarely caused the greatest number of days of lost use or greatest cost on operations.

d. Percent of operations by condition with the greatest number of days of lost use and greatest cost (including cost of lost use) during 1997:

Cause	Percent Operations			
	Greatest Number Days Lost	Standard Error	Greatest Cost	Standard Error
Colic	16.6	(2.7)	16.7	(2.4)
Other digestive problems	2.4	(0.7)	2.3	(0.7)
Respiratory problems	7.9	(2.1)	8.9	(2.3)
Eye problems	4.0	(1.2)	4.2	(1.2)
Skin problems	2.1	(0.8)	2.5	(0.9)
Reproductive problems	2.9	(0.7)	3.9	(0.8)
Behavioral problems	3.2	(1.3)	1.5	(0.8)
Injury/wounds/trauma <i>OR</i> Leg or hoof problems	53.4	(3.4)	52.6	(3.2)
Neurologic problems	2.3	(0.9)	2.2	(0.9)
Infectious disease unrelated to specific body system	2.3	(0.9)	2.4	(0.9)
Chronic weight loss	2.5	(1.2)	2.4	(1.2)
Overweight/obese	<u>0.4</u>	(0.3)	<u>0.4</u>	(0.2)
Total	100.0		100.0	

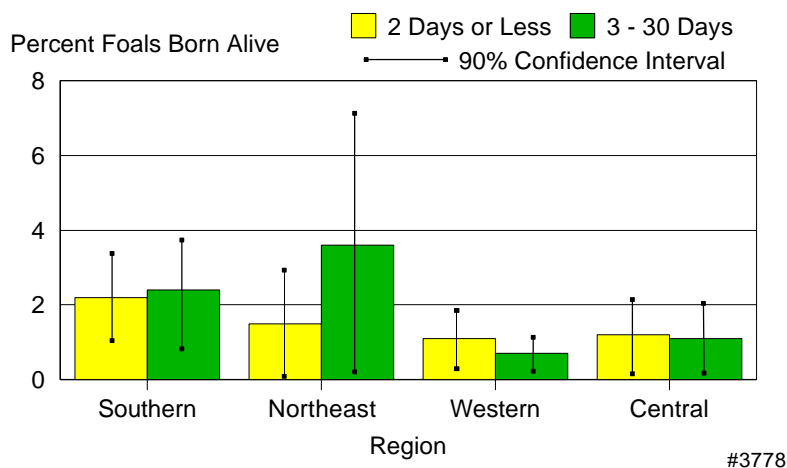
## 5. Mortality

Overall, the mortality rate for foals in the first 30 days of life was 3.6 percent with almost one-half of deaths occurring at 2 days or less of age. Small numbers of foals and foal deaths within regions caused some regional estimates to be somewhat imprecise (large standard errors).

- a. Foals that died in the first 30 days of life (including born on or moved onto the operation) as a percent of foals born alive in 1997 by age (in days) and region:

Age (Days)	Percent Foals by Region									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
2 or less	2.2	(0.7)	1.5	(0.9)	1.1	(0.5)	1.2	(0.6)	1.7	(0.4)
3-30	2.4	(0.9)	3.6	(2.1)	0.7	(0.3)	1.1	(0.6)	1.9	(0.5)
Total	4.6	(1.1)	5.1	(2.2)	1.8	(0.6)	2.3	(0.8)	3.6	(0.7)

### Foals that Died in the First 30 Days of Life as a Percent of Foals Born Alive by Age and Region, 1997





Health event categories were kept as basic as possible to minimize misclassification since events were owner/operator reported. The equid did not have to be examined by a veterinarian for the owner/operator to report the problem, so misdiagnosis by the owner/operator was possible. Recall bias (e.g., asking the owner/operator to remember number of animals with various medical problems for an entire year) may have occurred. Recent events and those with more costly consequences would more likely be reported.

The small number of operations with foals and foal deaths caused some estimates to be somewhat imprecise (large standard errors). For example, for birth defects in 2-day-old or younger age range, the 90 percent confidence interval is 1.2 to 31.8 percent. Thus, differences between cause of death estimates (colic, other digestive, etc.) within the two age groups are difficult to detect.

Frequently listed conditions in the Other Known causes of foal death at 30 days of age or younger included prematurity, lack of milk or colostrum production by the mare, exposure/drowned, and infection. Overall, causes for one-third of foal deaths at 30 or fewer days of age were unknown. A larger percentage of foal deaths were attributed to birth defects than were attributed to other diseases and conditions.

b. Percent of foal deaths (30 days of age or younger) by age and cause of death:

Cause	<u>Percent Foal Deaths by Age (Days)</u>					
	2 or Less		3-30		0-30	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Colic	0.0	(0.0)	0.3	(0.2)	0.2	(0.1)
Other digestive disease (e.g., diarrhea)	0.7	(0.5)	0.6	(0.4)	0.6	(0.3)
Respiratory disease	2.0	(1.4)	1.1	(0.4)	1.5	(0.7)
Neurologic disease (e.g., seizures, wobblers, spinal problems)	4.4	(3.6)	1.8	(1.4)	3.1	(1.9)
Dystocia or birthing complications	9.2	(6.9)	1.3	(0.9)	5.1	(3.4)
Birth defects	16.5	(9.3)	18.7	(9.0)	17.6	(6.5)
Injury/wounds/trauma	8.9	(8.0)	9.9	(7.7)	9.4	(7.6)
Other known	32.2	(12.2)	26.6	(7.6)	29.3	(7.5)
Unknown	<u>26.1</u>	(8.6)	<u>39.7</u>	(11.6)	<u>33.2</u>	(7.3)
Total	100.0		100.0		100.0	

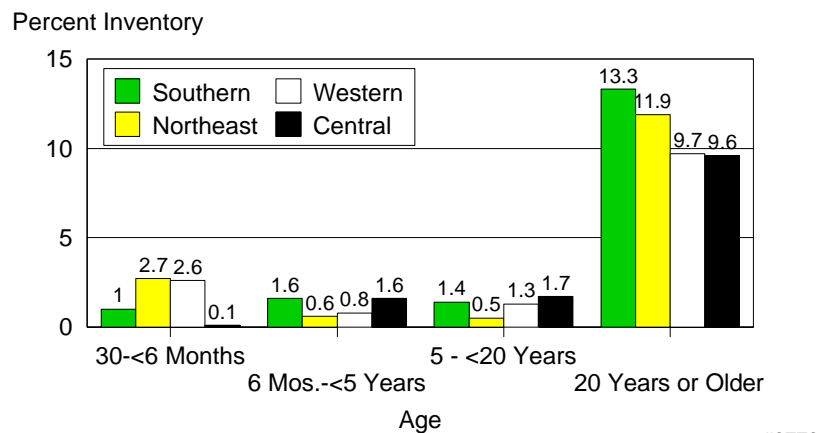
Overall, mortality rates in equine age groups from 30 days to 6 months, 6 months to 5 years, and 5 to 20 years were similar at 1.3 to 1.4 percent of resident equids based on August 1, 1997, inventory. The highest percentage mortality was in the 20 years or older age group (11.1 percent of equids). High standard errors in this category within each region were due to low numbers of operations and deaths within regions.

Although recall bias was a concern for deaths, owners/operators were more likely to remember the numbers of animals that died and the causes of those deaths than the numbers of illnesses from which animals recovered.

c. Number of resident equids more than 30 days of age that died or were euthanized during 1997 as a percent of August 1, 1997, age class resident inventory by region:

Age (Days)	Percent Equids by Region									
	Southern		Northeast		Western		Central		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Greater than 30 days, but less than 6 months	1.0	(0.5)	2.7	(1.9)	2.6	(1.4)	0.1	(0.1)	1.4	(0.4)
From 6 months up to 5 years	1.6	(0.6)	0.6	(0.5)	0.8	(0.4)	1.6	(0.8)	1.3	(0.3)
From 5 years to 20 years	1.4	(0.3)	0.5	(0.2)	1.3	(0.3)	1.7	(0.7)	1.3	(0.2)
20 years or older	13.3	(4.2)	11.9	(3.9)	9.7	(3.3)	9.6	(3.6)	11.1	(1.9)

### Number Resident Equids Older than 30 Days that Died or Were Euthanized as a Percent of August 1, 1997, Age Class Inventory by Region, 1997



Overall, the largest percentages of deaths for equine more than 30 days of age were attributed to old age (29.5 percent) followed by colic (17.5 percent) and injury/wounds/trauma (10.5 percent).

Injury/wounds/trauma may have involved leg or hoof problems indicating a potential overlap between these two categories. Combined injury/wounds/trauma and leg or hoof problems accounted for 17.6 percent of deaths in equids more than 30 days of age.

Respiratory problems, injury/wounds/trauma, and leg/hof problems accounted for 49.1 percent of the deaths in the youngest age category (more than 30 days, but less than 6 months.) Colic and injury/wounds/trauma combined with leg/hof problems accounted for over 50 percent of the deaths in the 6 months to 5 years and 5 to 20 years age categories.

Nearly one-fourth of the deaths in the two age groups from 6 months to 5 years and 5 to 20 years were attributed to "other known" causes. Some of the more frequent causes in the other category included cancer, cardiovascular disease (heart attack, aneurysm), poisoning, lightning strike, liver disease, and birth defects.

d. Percent of equine deaths (more than 30 days of age), including euthanasia, by cause and age:

Cause	Percent Equine Deaths by Age									
	Greater than 30 Days, But Less than 6 Months		From 6 Months - 5 Years		From 5 Years -20 Years		20 Years or Older		All Ages	
	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
Colic	6.6	(4.6)	33.4	(13.1)	23.1	(6.1)	6.3	(2.6)	17.5	(4.1)
Other digestive problems (e.g., diarrhea)	8.2	(5.0)	0.2	(0.1)	1.2	(0.6)	0.9	(0.7)	1.1	(0.5)
Respiratory problems	14.1	(12.0)	0.2	(0.1)	3.2	(2.6)	4.0	(2.1)	3.4	(1.5)
Neurologic problems (e.g., spinal problem, wobblers, seizure, EPM)	5.8	(4.3)	5.3	(5.5)	0.7	(0.4)	5.7	(4.3)	3.8	(2.4)
Dystocia	0.1	(0.1)	0.0	(0.0)	2.0	(0.9)	0.1	(0.0)	0.8	(0.3)
Reproductive problems (e.g., infertility, dystocia)	0.0	--	0.0	--	0.8	(0.6)	1.9	(1.5)	1.1	(0.8)
Injury/wounds/trauma	28.1	(14.2)	16.7	(10.8)	16.3	(5.1)	0.9	(0.6)	10.5	(3.8)
Leg or hoof problems	6.9	(6.9)	0.1	(0.1)	18.4	(8.0)	0.4	(0.1)	7.1	(2.7)
Old age	--	--	--	--	5.7	(2.8)	66.6	(9.5)	29.5	(5.5)
Other known	5.2	(4.6)	23.6	(8.2)	22.1	(6.0)	9.5	(3.9)	16.6	(3.1)
Unknown	<u>25.0</u>	(16.9)	<u>20.5</u>	(9.1)	<u>6.5</u>	(3.2)	<u>3.7</u>	(2.1)	<u>8.6</u>	(2.5)
Total	100.0		100.0		100.0		100.0		100.0	

The percentage of deaths due to colic was less in the Northeast (5.4 percent) and Central (7.5 percent) regions compared to the Southern (23.9 percent) and Western (22.0 percent) regions. The Central region had the lowest percentage of deaths attributed to old age (16.5 percent), while the Northeast had the highest percentage (53.2 percent) of deaths attributed to old age. Small numbers of deaths attributed to certain causes within each region caused some estimates to be imprecise (large standard errors.)

e. Percent of resident equine deaths (more than 30 days of age), including euthanasia, by cause and region:

Cause	<u>Percent Equine Deaths by Region</u>							
	Southern		Northeast		Western		Central	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Colic	23.9	(7.9)	5.4	(3.5)	22.0	(6.2)	7.5	(5.6)
Other digestive problems (e.g., diarrhea)	1.7	(0.8)	0.1	(0.1)	1.4	(1.3)	0.2	(0.1)
Respiratory problems	0.6	(0.4)	8.2	(5.7)	0.2	(0.2)	9.5	(5.7)
Neurologic problems (e.g., spinal problem, seizure, wobblers )	6.2	(5.8)	1.4	(1.2)	0.9	(0.6)	4.6	(3.8)
Dystocia or birthing complications	1.2	(0.8)	1.2	(1.0)	0.4	(0.4)	0.1	(0.1)
Reproductive problems (e.g., infertility, dystocia)	0.7	(0.5)	0.1	(0.0)	0.0	(0.0)	3.8	(3.8)
Injury/wounds/trauma	6.2	(2.3)	11.5	(6.7)	7.4	(2.7)	21.6	(14.2)
Leg or hoof problems (could not be used for intended use without treatment)	7.4	(4.1)	2.1	(1.5)	7.4	(4.9)	9.4	(7.6)
Old age	23.1	(8.3)	53.2	(12.1)	37.9	(10.3)	16.5	(7.7)
Other known	19.9	(5.8)	0.5	(0.3)	14.5	(6.3)	22.6	(5.0)
Unknown	<u>9.1</u>	(4.3)	<u>16.3</u>	(8.7)	<u>7.9</u>	(3.9)	<u>4.2</u>	(4.1)
Total	100.0		100.0		100.0		100.0	

## Section II: Methodology

### A. Early Planning

#### 1. APHIS and NASS commitment

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 to be disseminated in August 1998, 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. Equine '98 Methods

#### 1. Identifying industry informational needs

First, 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. The sample

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 was 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 agriculture products during the year or had 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 number of horses and ponies and number of farms reporting horses or ponies were calculated for number of animals. 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. Data Collection

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

#### 5. 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. The response and non-response categories for the entire data set are shown below.

Category	Number	Percent
1 - race track office handling	163	3.8
2 - zero equine on hand Jan. 1, 1998	199	4.6
3 - no resident equine on Jan. 1, 1998	13	0.3
4 - refused	787	18.3
5 - 7 complete	2,758	64.0
8 - out of scope	37	0.9
9 - inaccessible	<u>354</u>	<u>8.2</u>
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 Part 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 equid on January 1, 1998, in the 28 states.

### C. Sampling and Estimation Details for Demographics and Health Statistics

#### 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 equine 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 the segment is accounted for and associated with an operator (person responsible for the day-to-day decisions). Each segment is 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 equine 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 equine 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 equine, 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). 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, and race tracks. These 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. However, to avoid any possible duplication, the List Frame names were matched against the Area Frame names. 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 in the Equine '98 Study is limited to 28 states.

## D. Equine '98 Sample Selection

### 1. Sub-sample of January 1, 1998, demographics sample

The combined NASS Area and List data set 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 sub-sample 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 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.

Equine '98 Sampling Process<sup>1</sup>

	NASS Collection	Equine '98 Sample
<u>Area Sampling Frame:</u>		
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
<u>List Sampling Frame:</u>		
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)		<u>163</u>
Total sample for Equine '98		4,311

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



## Appendix I: Sample Profile

### A. Responding Operations (operations with equids present on January 1, 1998)

#### 1. Type of operation

Primary Function of Operation	Number Responding Operations
Boarding/Training facility	678
Race track	133
Breeding farm	389
Farm/Ranch	714
Residence with equids for personal use	695
Other	<u>295</u>
Total	2,904

#### 2. Region

Region	Number Responding Operations
Southern	1,141
Northeast	418
Western	715
Central	<u>630</u>
Total	2,904

#### 3. Total equids on hand January 1, 1998

Number	Number Responding Operations
Less than 3	364
3 - 5	616
6 - 19	915
20 or more	<u>1,009</u>
Total	2,904

#### 4. Total resident equids (whether or not present) January 1, 1998 (does not include race tracks)

Number	Number Responding Operations
Less than 3	617
3 - 5	376
6 - 19	875
20 or more	<u>903</u>
Total	2,771

## Appendix II: 1992 Census - Horses & Ponies

### U.S. Inventory of Horses & Ponies on Farms & Number of Farms Reporting Horses & Ponies<sup>1</sup>

Region	State	Number Horses and Ponies <sup>1</sup> (Thousand Head)	Farms Reporting Horses and Ponies <sup>1</sup> (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	<u>43.6</u>	<u>8.1</u>
	Total	342.4	63.2
Northeast	New Jersey	23.9	2.5
	New York	43.3	6.4
	Ohio	72.0	10.9
	Pennsylvania	<u>58.0</u>	<u>9.2</u>
	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	<u>44.0</u>	<u>7.1</u>
	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	<u>40.7</u>	<u>4.5</u>
	Total	<u>435.8</u>	<u>60.4</u>
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

<sup>1</sup> 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 at least five 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.



## Expected Products and Related Study Objectives

### 1. Provide baseline information on equine health.

- *Part I: Baseline Reference of 1998 Equine Health and Management.*
- Part II: Baseline Reference of 1998 Equine Health and Management, expected fall 1998.
- Morbidity/mortality (info sheet).

### 2. Estimate uses of equine health-related management practices.

- Part II: Baseline Reference of 1998 Equine Health and Management, expected fall 1998.
- Part III, expected winter 1998.
- Sources of information/use of veterinarian (info sheet).
- Biosecurity (info sheet).
- Animal movement (info sheet), expected fall 1998.

### 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.*
- Composition of equine population (info sheet).

### 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).

### 5. Gather data related to specific health problems.

- Colic (info sheet), expected winter 2000.
- Lameness (interpretive report), expected winter 2000.
- Respiratory disease (info sheet), expected winter 2000.
- Equine protozoal myeloencephalitis, EPM, including economics estimates, (interpretive summary) expected spring 1999.
- Equine infectious anemia, EIA, including estimates of testing costs (info sheet), expected summer 1999.

### 6. Feed problems.

- Endophytes (info sheet).
- Fumonisin (info sheet).

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