United States
Department
of Agriculture

Animal and
Plant Health
Inspection
Service

**Veterinary
Services**

Part IV:
Reference of Health Management for Horses and Highlighted Diseases, 1998

National Animal Health Monitoring System **May 1999**

Acknowledgments

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

The Equine ‘98 Study was a cooperative effort between State and Federal agricultural statisticians, animal health officials, university researchers, extension personnel, and equine owners and operators. We want to thank the hundreds of industry members who helped determine the direction and objectives of this study by participating in focus groups and responding to interactive Internet and telephone surveys.

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

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

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Table of Contents

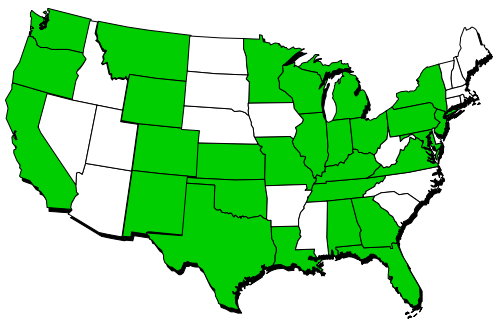
Part IV Regional Information

Introduction

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

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

Equine '98 Participating States



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

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

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

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

(Tables of contents for Parts I, II, and III and a list of Equine '98 outputs are included in the back pages of this report.) VMO's and AHT's also collected data for *Part IV: Reference of Health Management for Horses and Highlighted Diseases, 1998,* in the same 28 states. Data were collected on-farm from June 15 through September 11, 1998, from 1,136 participating operations with three or more horses present on January 1, 1998, except where noted. Some tables, noted within the text, are from additional data collected on-farm from November 2, 1998, through February 26, 1999, from 1,072 operations with three or more horses present on January 1, 1998.

Information in Part IV is ***operator reported*** and not assessments made by a VMO or other professional.

Results of the Equine '98 and other NAHMS studies are accessible on the World Wide Web at http://www.aphis.usda.gov/vs/ceah/cahm (menu choices: National Animal Health Monitoring System and Equine). For questions about this report or additional Equine '98 and NAHMS results, please contact:
Centers for Epidemiology and Animal Health; USDA:APHIS:VS, attn. NAHMS; 555 South Howes; Fort Collins, CO 80521; Telephone: (970) 490-8000; E-mail: NAHMSinfo@usda.gov;
World Wide Web: http://www.aphis.usda.gov/vs/ceah/cahm

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

Terms Used in This Report

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

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

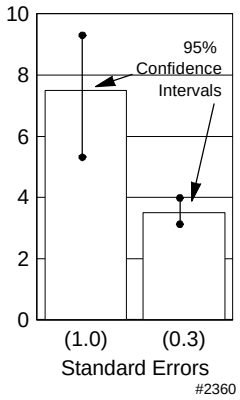
N/A: Not applicable.

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

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

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

Examples of a 95% Confidence Interval



Population estimates: Averages and proportions weighted to represent the population. For this report, the reference population was all operations with three or more horses present on January 1, 1998, in the 28 selected states, excluding race tracks. Most of the estimates in this report are provided with a measure of precision called the ***standard error***. If the only error is sampling error, chances are 95 out of 100 that the interval created by the estimate plus or minus two standard errors will contain the true population value. In the example illustrated above, an estimate of 7.5 with a standard error of 1.0 results in a range of 5.5 to 9.5 (two times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in a range of 2.8 to 4.0. Similarly, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of two. ***Where differences between groups are noted in this report, the 90 percent confidence intervals do not overlap.*** Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported. If there were no reports of the event, no standard error was reported.

Previous 12 months: The period of time 12 months prior to the Equine '98 interviews conducted from June 15 through September 11, 1998.

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

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

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

Size of operation: Size groupings based on number of resident horses at the ***time of the initial VMO intervie***w (April 20 - June 12, 1998). Size of operation was categorized as 1-5, 6-19, and 20 or more horses at the time of the interview. Although operations were required to have three or more horses or horse foals on January 1, 1998, to qualify for this (second) phase of the study, the horse population on the operation could have decreased to one horse or horse foal at the time of the interview.

Time of interview: The data collection window was June 15 through September 11, 1998, as the basis for analysis and results presented in this report, unless otherwise specified.

Section I: Population Estimates

A. General Management

1. Access to pasture

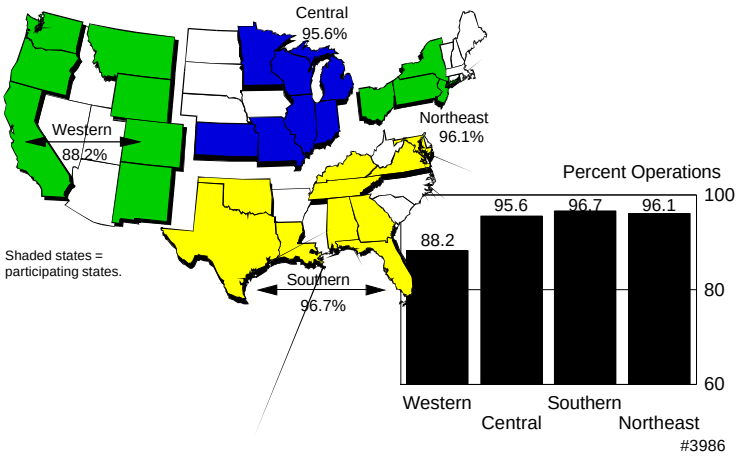
The majority of operations provided resident horses access to pasture in 1998. The percentages were similar across regions when standard errors were taken into consideration. Note that the Western region included arid states, such as New Mexico, and states with a high annual rainfall, such as Washington.

a. Percent of operations where resident horses had access to pasture during summer 1998 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
96.7	(1.7)	96.1	(2.8)	88.2	(3.7)	95.6	(1.7)	94.0	(1.3)

Percent of Operations Where Resident Horses Had Access to Pasture During Summer 1998 by Region



The percentages of operations providing access to pasture for resident horses were similar across types of operations. Primary functions in the Other category were diverse, including outfitters, carriage horse operations, and school horse operations.

b. Percent of operations where resident horses had access to pasture by primary function of operation:

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
91.8	(3.3)	99.1	(0.7)	94.5	(2.4)	93.3	(2.2)	89.7	(6.6)

Grass other than fescue was the most common type of pasture in regions other than the Northeast, where a mixture of legume and grasses was most common. Types of pasture in the Other category included wild oats, barley, weeds, and milo.

For operations with pasture, fescue grass, either alone or in combination with other grasses, was least frequently used in the Western and Northeast regions and most frequently reported to be the primary type of pasture in the Southern region. If fescue grass contains an endophyte called *Acromonium sp.*, which produces a toxin (ergovaline), it can pose a health risk to pregnant mares. NAHMS will present results of analyses of Equine '98 pasture samples for this fungus in a separate report.

c. For operations where any resident horses had access to pasture during the summer of 1998, percent of operations by primary type of pasture the resident horses had access to and by region:

	Percent Operations by Region									
	Southern		Northeast		Western		Central		All Operations	
Type	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Grass other than fescue, such as blue grass, timothy, bermuda, or native	50.8	(5.6)	39.9	(9.8)	55.8	(6.4)	46.2	(6.7)	49.6	(3.4)
Fescue only	2.2	(2.1)	2.4	(2.4)	0.0	(0.0)	1.3	(1.2)	1.4	(0.9)
Legume only such as alfalfa or clover	0.3	(0.3)	0.7	(0.7)	0.7	(0.7)	2.4	(2.3)	0.9	(0.5)
Mixture of fescue and other grasses	32.5	(4.8)	5.8	(3.5)	10.1	(3.5)	19.6	(5.2)	20.2	(2.5)
Mixture of legume and grasses (including fescue)	13.9	(3.4)	48.0	(9.5)	23.7	(5.0)	30.3	(7.1)	24.7	(2.8)
Other	0.2	(0.2)	0.0	(--)	6.3	(5.9)	0.1	(0.1)	1.8	(1.6)
Unknown	0.1	(0.0)	3.2	(3.1)	3.4	(2.4)	0.1	(0.1)	1.4	(0.8)
Total	100.0		100.0		100.0		100.0		100.0	

For operations with pasture, 22.3 percent of operations had less than half of the pasture covered with edible vegetation, as reported by owners/operators. Over 50 percent of the operations indicated that three-fourths or more of the pasture area had edible vegetation during the summer of 1998. Operations with less than 25 percent edible pasture ranged from 5.6 percent of operations in the Central region to 17.6 percent of operations in the Southern region. The amount of horses' diet that the pasture provided was not determined.

d. For operations where any resident horses had access to pasture during the summer of 1998, percent of operations by amount of area covered by edible vegetation during the driest part of summer in all pastures resident horses had access to (toxic or other harmful weeds were not included as edible vegetation) and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Percent of Area	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than 25%	17.6	(4.3)	8.8	(4.0)	7.2	(2.8)	5.6	(2.3)	11.2	(2.1)
25-49%	11.6	(3.2)	6.0	(3.3)	14.7	(4.2)	9.1	(3.4)	11.1	(1.9)
50-74%	26.0	(4.4)	38.9	(10.0)	23.4	(5.5)	23.4	(6.6)	26.7	(3.0)
75% or more	44.8	(5.3)	46.3	(9.6)	54.7	(6.5)	61.9	(6.9)	51.0	(3.4)
Total	100.0		100.0		100.0		100.0		100.0	

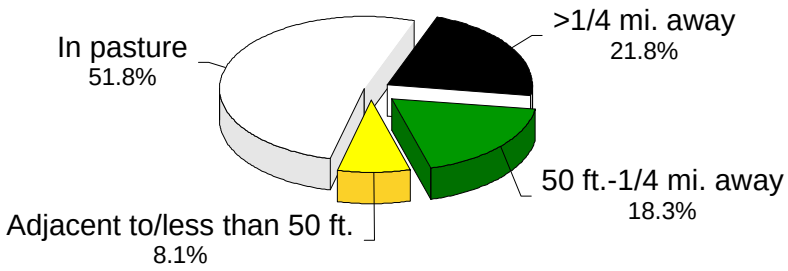
Overall, over 50 percent of operations with pasture access for horses had surface water, such as a stream, lake, pond, or irrigation ditch, in the pasture itself. Differences for surface water in pasture were not detected across regions when standard errors were taken into consideration. The nearest surface water was over one-quarter mile from the horse pasture on over one-third of operations in the Western region.

e. For operations where any resident horses had access to pasture during the summer of 1998, percent of operations by location of the nearest surface water, such as streams, lakes, ponds, and irrigation ditches, in relation to any pasture resident horses had access to in the summer of 1998 and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Location	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
In the pasture	52.3	(5.8)	35.9	(8.8)	55.0	(6.2)	57.5	(6.7)	51.8	(3.4)
Adjacent to or less than 50 feet from the pasture	6.7	(2.5)	17.6	(8.5)	4.9	(1.7)	8.2	(2.8)	8.1	(1.8)
50 feet to one-quarter mile from the pasture	21.3	(4.9)	37.8	(9.5)	6.1	(1.9)	15.0	(4.5)	18.3	(2.7)
More than one-quarter mile from the pasture	19.7	(5.0)	8.7	(3.6)	34.0	(7.0)	19.3	(4.9)	21.8	(3.1)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of Operations by Location of Nearest Surface Water in Relation to Any Pasture Resident Horses Had Access to in Summer 1998



Percent Operations

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2. Nearest surface water

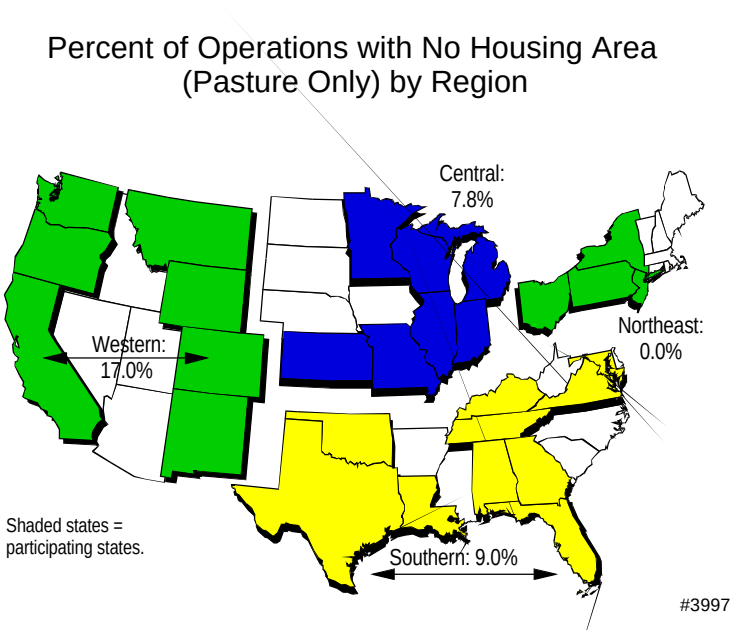
Seventeen percent of operations in the Western region had no housing for horses (pasture only), while all operations in the Northeast region reported they had some form of housing available for horses.

Percentages of operations with surface water adjacent to, or less than 50 feet from, the horse housing area ranged from 13.6 percent in the Southern region to 30.9 percent in the Northeast region.

a. Percent of operations by location of the nearest surface water, such as streams, lakes, ponds, and irrigation ditches, in relation to any horse housing area such as barn, stable, or paddock and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Location	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
No housing area (pasture only)	9.0	(2.6)	0.0	(--)	17.0	(5.2)	7.8	(3.5)	9.7	(1.9)
Adjacent to or less than 50 feet from the housing area	13.6	(3.0)	30.9	(8.9)	14.8	(3.6)	14.4	(4.7)	16.5	(2.2)
50 feet to one-quarter mile from the housing area	57.3	(5.0)	58.0	(9.1)	39.7	(5.7)	56.7	(6.2)	52.4	(3.1)
More than one-quarter mile from the housing area	20.1	(4.7)	11.1	(4.4)	28.5	(6.1)	21.1	(4.8)	21.4	(2.8)
Total	100.0		100.0		100.0		100.0		100.0	



3. Ground moisture level

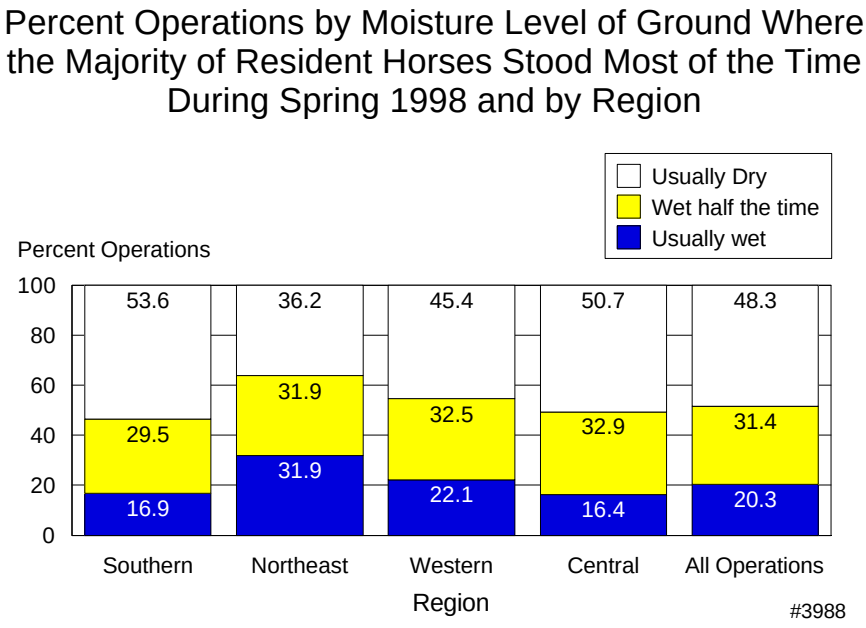
The ground where the majority of resident horses stood most of the time in 1998 was ***usually wet*** or ***wet about half the time*** for more than 50 percent of operations[1]. Note that the Western region included arid states, such as New Mexico, and states with a high annual rainfall, such as Washington.

Differences across regions were not detected when standard errors were taken into acount.

a. Percent of operations by moisture level[1] of the ground where the majority of resident horses stood most of the time during spring 1998 and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Level	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Usually wet	16.9	(3.8)	31.9	(8.8)	22.1	(4.6)	16.4	(4.3)	20.3	(2.5)
Wet about half the time	29.5	(4.5)	31.9	(8.1)	32.5	(6.2)	32.9	(6.7)	31.4	(3.0)
Usually dry	53.6	(5.4)	36.2	(9.3)	45.4	(7.1)	50.7	(6.9)	48.3	(3.4)
Total	100.0		100.0		100.0		100.0		100.0	



1 Wet ground = damp or muddy ground that doesn't necessarily have a lot of standing water puddles. Slurry can include urine and feces along with water in quantities enough to run downhill.

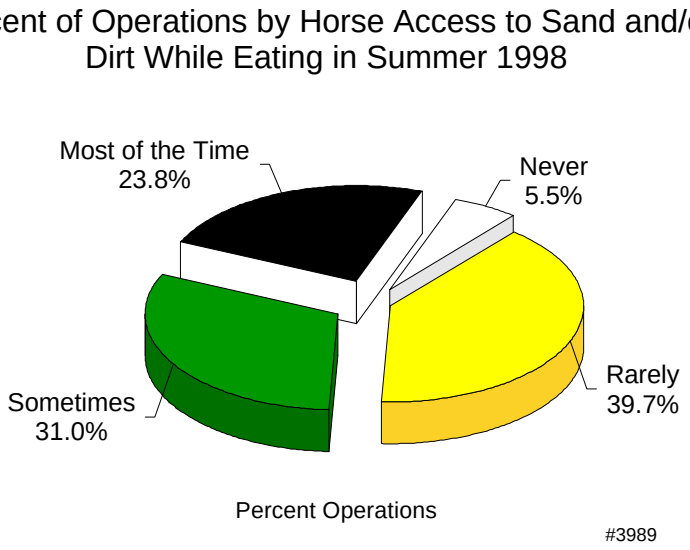
4. Access to sand and/or dirt

Over 50 percent of operations in the Northeast indicated horses *rarely* had access to sand or dirt while eating, while over 50 percent of operations in other regions indicated that horses *sometimes* or *most of the time* had access to dirt or sand while eating. Regional differences in where horses were fed (e.g., stalls vs. pasture) may account for this finding (see Part II: Baseline Reference of 1998 Equine Health and Management, page 95).

a. Percent of operations by how much time horses had access to sand and/or dirt while eating during the summer of 1998 and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Amount	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Most of the time	27.5	(4.5)	8.0	(4.5)	25.3	(5.1)	25.3	(5.8)	23.8	(2.6)
Sometimes	33.9	(4.1)	33.5	(8.6)	26.8	(4.5)	29.7	(6.0)	31.0	(2.7)
Rarely	33.9	(4.8)	54.6	(9.3)	41.4	(6.6)	38.2	(6.2)	39.7	(3.2)
Never	4.7	(1.9)	3.9	(2.8)	6.5	(2.8)	6.8	(3.1)	5.5	(1.3)
Total	100.0		100.0		100.0		100.0		100.0	



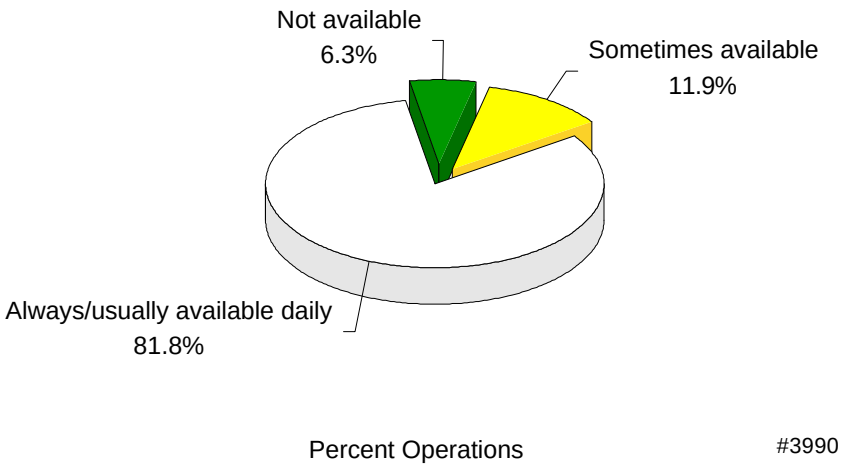
5. Access to salt

Salt, such as salt block or loose salt, was available for horses on the majority (93.7 percent) of operations, however 6.3 percent of operations overall indicated salt was not available to horses in the previous 12 months.

a. Percent of operations by access horses had to salt, such as block or loose salt, in the previous 12 months and by region:

Percent Operations by Region

	Southern		Northeast		Western		Central		All Operations	
Access	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Salt always available or usually available daily	85.9	(3.7)	87.2	(5.2)	78.0	(4.9)	75.8	(6.6)	81.8	(2.6)
Salt sometimes available	5.5	(1.7)	11.6	(5.1)	13.5	(3.9)	21.6	(6.6)	11.9	(2.1)
Salt not available	8.6	(3.4)	1.2	(1.1)	8.5	(4.4)	2.6	(1.5)	6.3	(1.8)
Total	100.0		100.0		100.0		100.0		100.0	



*Such as block or loose salt.

6. Grain/concentrate fed

Unpelleted sweet feed was the primary source of grain/concentrate for resident horses in summer on the largest percentage (33.2 percent) of operations, followed by grain mix with pellets (18.6 percent).

A larger percentage of operations fed grain/concentrate in winter (91.2 percent) compared to summer (76.1 percent), although proportionately, the percentages of operations feeding various types of concentrate were similar across seasons. Overall, 91.3 percent of operations fed grain/concentrate in either summer or winter (not shown in table).

a. Grain/concentrate fed by season

i. Percent of operations by ***primary*** grain/concentrate fed to the majority of resident horses by season:

Percent Operations by Season

Primary Grain/Concentrate Fed	Summer Percent	Summer Standard Error	Winter Percent	Winter Standard Error
Unpelleted sweet feed, such as grain mixed with molasses	33.2	(3.1)	41.4	(3.2)
Unpelleted grain, such as whole or rolled oats or corn	14.4	(2.2)	18.7	(2.4)
Geriatric feed	2.6	(1.1)	2.8	(1.1)
Complete feed pellets or cubes, such as a forage/grain mixture	7.0	(1.3)	8.2	(1.4)
Grain mix with pellets	18.6	(2.4)	19.7	(2.5)
Other	0.3	(0.2)	0.4	(0.2)
Any grain/concentrate	76.1	(2.6)	91.2	(1.6)

Approximately one-fourth of those operations that fed grain/concentrate to at least one horse fed 10 or more pounds of grain/concentrate per day in winter. A slightly smaller percentage of operations fed that much in summer.

ii. For operations that fed grain/concentrate during summer and winter, respectively, percent of operations that typically fed one or more horses 10 or more pounds of grain/concentrate per day by season:

Percent Operations by Season

Summer Percent	Summer Standard Error	Winter Percent	Winter Standard Error
19.7	(2.6)	25.3	(2.6)

For operations that fed grain/concentrate, rats or mice reportedly had access to grain/concentrate on 36.0 percent of operations, while birds had access on 20.6 percent of operations. Opossums had access to grain or concentrate on only 11.1 percent of operations.

Wild animals in the Other category included ferrel cats and dogs, coyotes, foxes, ground hogs, squirrels, raccoons, skunks, and woodchucks.

b. Wild animal access to feed and feeding area[1]

i. For operations that fed grain/concentrate during summer or winter, percent of operations by access of wild animals to the grain/concentrate:

Wild Animal	Percent Operations	Standard Error
Birds	20.6	(3.1)
Deer or elk	0.7	(2.5)
Opossums	11.1	(2.4)
Rats or mice	36.0	(3.4)
Other	5.5	(1.3)
Any wild animal	38.6	(3.4)

Birds and rats or mice each had access to horse feeding areas on over 70 percent of operations.
Deer or elk and opossums each reportedly had access to horse feeding areas on 30.0 percent or more of operations.

Wild animals in the Other category included coyote, feral cats and dogs, raccoons, skunks, squirrels, woodchucks, bears, chipmunks, gophers, foxes, bobcats, rabbits, and porcupines.

ii. Percent of operations where wild animals had access to any horse feeding area:

Wild Animal	Percent Operations	Standard Error
Birds	79.2	(3.0)
Deer or elk	30.0	(3.1)
Opossums	40.3	(3.2)
Rats or mice	74.3	(3.1)
Other	29.7	(2.9)
Any wild animal	86.1	(2.8)

1 Tables in A.6.b are from data collected on-farm from November 2, 1998, through February 26, 1999, from 1,072 operations with three or more horses present on January 1, 1998.

7. Insect control[1]

Horse flies and/or deer flies were seen around horses *sometimes* or *most of the time* on 91.1 percent of operations, while black flies were seen *sometimes* or *most of the time* on horses on 77.9 percent of operations.

a. Percent of operations by frequency of observing horse flies, deer flies, and black flies during the 1998 insect season:

	Percent Operations by Frequency						
	Never		Sometimes		Most of the Time		All Operations
Fly and Location	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
Horse flies and/or deer flies around horses	8.9	(1.7)	54.9	(3.2)	36.2	(3.2)	100.0
Black flies in the areas of the horses' ears, eyes, mouth, and underside	22.1	(3.1)	50.4	(3.4)	27.5	(2.8)	100.0

1 Tables in A.7 are from data collected on-farm from November 2, 1998, through February 26, 1999, from 1,072 operations with three or more horses present on January 1, 1998.

Overall, 89.1 percent of operations used some form of insect repellent method for horses. Multiple insect control methods were used. Nearly 83 percent of operations used repellents applied to horses. Over one-quarter of the operations used each of the following methods: face masks (35.5 percent), sticky tape (27.4 percent), and insecticide applied near horse housing (25.3 percent).

Methods of insect control in the Other category included baited traps, bug zappers, fly sheets on the horse, fly shampoo, fans, lime applied to stalls, frequent removal of manure, screens on barn windows/doors, and birds (ducks, swallows) to eat insects.

b. Percent of operations where the following insect repellent methods were used:

Insent Repellent Methods	Percent Operations	Standard Error
Repellents applied to horses	82.8	(2.7)
Insecticides applied to pasture areas	1.2	(0.5)
Insecticides applied in or near horse housing	25.3	(2.9)
Regional control program, such as aerial spraying	3.4	(1.5)
Sticky tape	27.4	(3.0)
Parasitic wasps specifically brought onto the operation	1.8	(0.7)
Face mask on horses	35.5	(3.1)
Fly tags attached to horse halters	4.1	(1.3)
In feed such as using Equitral®	1.9	(0.6)
Other method	10.1	(1.6)
Any method	89.1	(2.2)

For operations that applied insect repellents to horses, 37.8 percent of operations applied insect repellents 14 days or more per month.

c. For operations that applied insect repellents to horses, percent of operations by average number ***days per month*** the repellents were applied during the 1998 insect season:

Number Days per Month	Percent Operations	Standard Error
Less than 7	42.3	(3.3)
7 - 13	19.9	(2.5)
14 - 20	21.3	(3.0)
21 or more	16.5	(2.4)
Total	100.0	

B. Highlighted Diseases

1. Equine viral arteritis (EVA)

Overall, 59.4 percent of operations had never heard of equine viral arteritis (EVA), while 13.0 percent knew some basics or were knowledgeable of the disease. The Western region had the lowest percentage (4.9 percent) of operations that knew some basics or were knowledgeable of EVA.

a. Percent of operations by familiarity with the term equine viral arteritis (EVA) before the Equine '98 Study and by region:

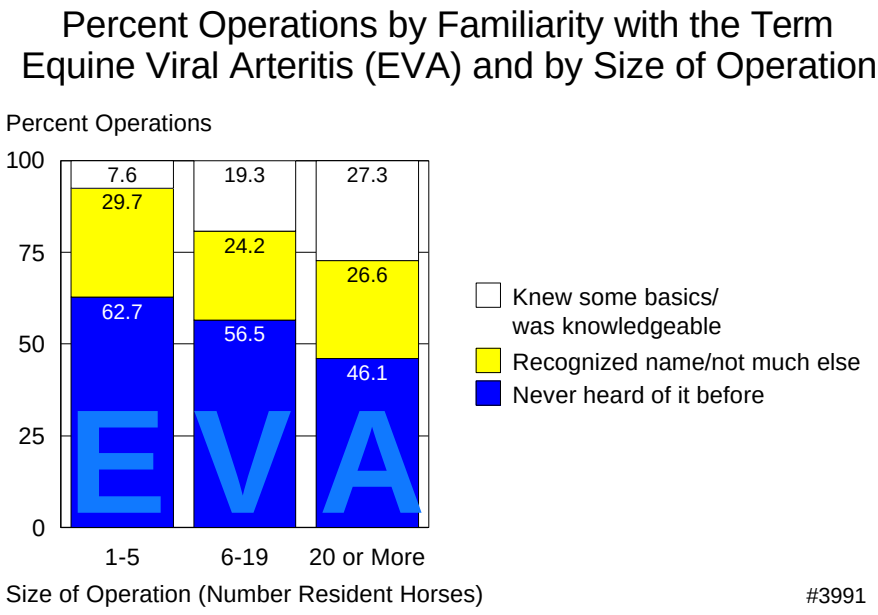
	Percent Operations by Region									
	Southern		Northeast		Western		Central		All Operations	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never heard of it before	53.5	(5.4)	34.1	(8.2)	75.6	(5.0)	65.4	(5.8)	59.4	(3.3)
Recognized name, not much else	29.0	(5.2)	50.9	(9.4)	19.5	(4.7)	20.3	(4.6)	27.6	(3.0)
Knew some basics or was knowledgeable	17.5	(3.8)	15.0	(6.3)	4.9	(1.7)	14.3	(3.8)	13.0	(2.0)
Total	100.0		100.0		100.0		100.0		100.0	

The percentage of operations that knew some basics or were knowledgeable regarding EVA increased with size of operation, from 7.6 percent of operations with one to five horses to 27.3 percent of operations with 20 or more horses.

i. Percent of operations by familiarity with the term equine viral arteritis (EVA) before the Equine '98 Study and by size of operation:

Percent Operations by Size of Operation
(Number Resident Horses)

	1-5		6-19		20 or More	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never heard of it before	62.7	(4.6)	56.5	(4.9)	46.1	(7.5)
Recognized name, not much else	29.7	(4.4)	24.2	(4.3)	26.6	(6.8)
Knew some basics or was knowledgeable	7.6	(2.4)	19.3	(3.8)	27.3	(6.8)
Total	100.0		100.0		100.0	

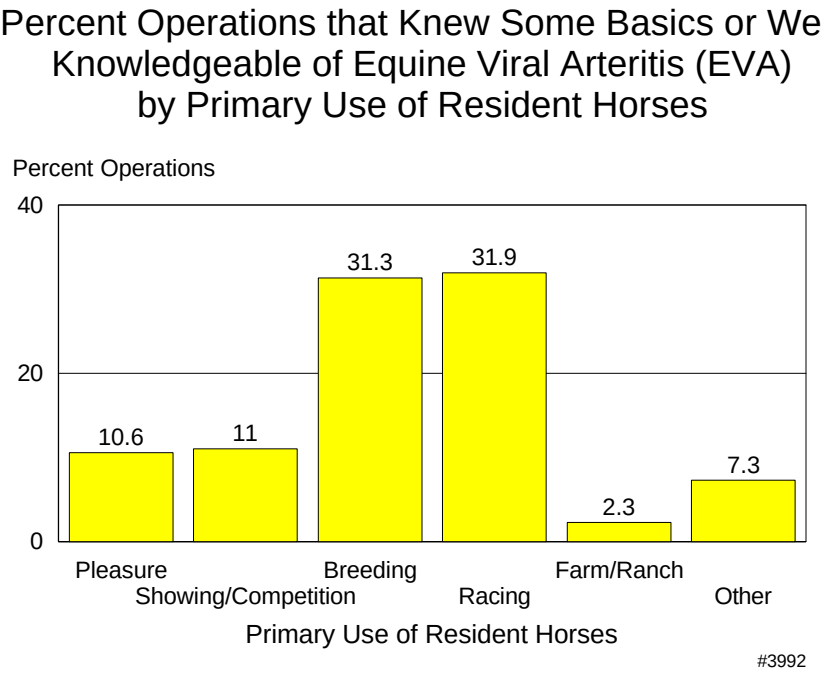


The percentages of operations that were familiar with EVA were highest in the racing (31.9 percent) and breeding (31.3 percent) categories of horse use and lowest in the farm/ranch category. Familiarity with diseases is often based on need to know, and to date, EVA has primarily impacted the breeding and racing industries due the potential for venereal transmission of EVA.

ii. Percent of operations by familiarity with the term equine viral arteritis (EVA) before the Equine '98 Study and by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

	Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never heard of it before	61.9	(4.9)	61.0	(8.3)	41.8	(7.2)	31.6	(15.0)	70.8	(6.6)	85.8	(8.0)
Recognized name, not much else	27.5	(4.7)	28.0	(6.2)	26.9	(7.3)	36.5	(17.3)	26.9	(6.5)	6.9	(4.4)
Knew some basics or was knowledgeable	10.6	(2.7)	11.0	(5.0)	31.3	(7.0)	31.9	(15.9)	2.3	(1.7)	7.3	(4.7)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

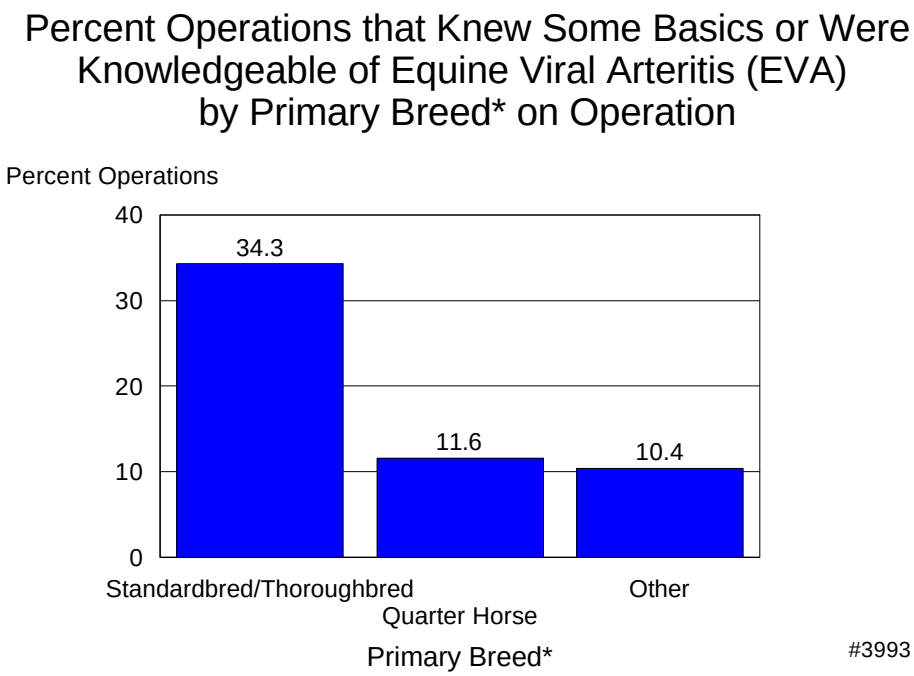


Familiarity with EVA was higher for operations with primarily[1] Thoroughbreds and/or Standardbreds compared to those with primarily Quarter Horses or other breeds. Sample size did not allow for reporting Standardbreds alone.

iii. For operations where resident horses of the following breeds made up at least 50 percent of the resident horse herd, percent of operations by familiarity with the term equine viral arteritis (EVA) before the Equine '98 Study and by breed:

Percent Operations by Breed

	Standardbred/ Thoroughbred		Quarter Horse		Other	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never heard of it before	30.4	(8.1)	68.3	(4.5)	56.9	(4.6)
Recognized name, not much else	35.3	(9.3)	20.1	(3.8)	32.7	(4.6)
Knew some basics or was knowledgeable	34.3	(9.4)	11.6	(3.2)	10.4	(2.5)
Total	100.0		100.0		100.0	



*For operations where resident horses of these breeds made up at least 50% of the resident horse herd.

1 At least 50 percent of the resident horse herd.

Overall, only 1.6 percent of operations vaccinated at least one resident horse against EVA. The lowest percentage (0.1 percent) was in the Western region. Vaccination practices were operator-reported and not verified by veterinary certificates or records.

b. Percent of operations that vaccinated at least one resident horse against equine viral arteritis (EVA) by region:

Percent Operations by Region

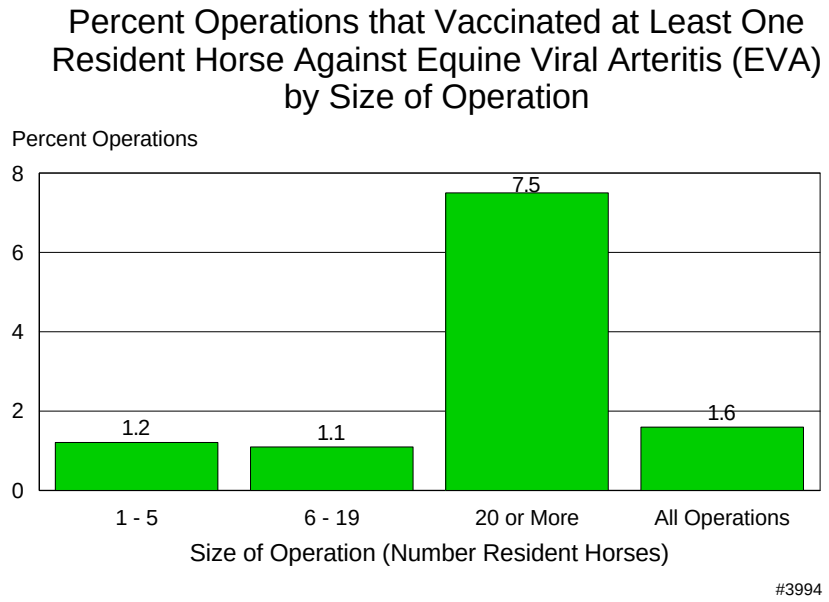
Southern		Northeast		Western		Central		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
1.1	(0.6)	2.7	(2.2)	0.1	(0.1)	3.5	(2.2)	1.6	(0.6)

Just over 1 percent of operations with fewer than 20 horses vaccinated at least one horse against EVA compared to 7.5 percent of operations with 20 or more horses.

i. Percent of operations that vaccinated at least one resident horse against equine viral arteritis (EVA) by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

1-5		6-19		20 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
1.2	(0.8)	1.1	(0.7)	7.5	(4.4)	1.6	(0.6)



The largest percentages of operations vaccinating against EVA were those where the primary use of horses was for breeding (7.0 percent) and racing (5.4 percent). Horses at race tracks were not included in this phase of the study. The lowest percentage (0.1 percent) was for those operations where the primary use of horses was farming or ranching.

ii. Percent of operations that vaccinated at least one resident horse against equine viral arteritis (EVA) by primary use of resident horses:

Percent Operations by Primary Use of Resident Horses

Pleasure		Showing/ Competition (Not Betting)		Breeding		Racing		Farm/Ranch		Other	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0.6	(0.5)	0.6	(0.3)	7.0	(3.6)	5.4	(4.8)	0.1	(0.1)	0.2	(0.2)

Overall, only 0.9 percent of operations indicated they had tested any horses for EVA in the previous 12 months. The highest percentage (1.9 percent) of operations that tested was in the Southern region. A smaller percentage of operations may have tested for EVA than the percentage that vaccinated as, once tested, horses may be vaccinated annually without further testing.

c. Percent of operations that reported testing any horses for equine viral arteritis (EVA) in the previous 12 months[1] 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
1.9	(1.7)	0.5	(0.4)	0.1	(0.1)	0.2	(0.1)	0.9	(0.6)

The percentage of operations that tested for EVA increased with size of operation.

i. Percent of operations that tested any horses for equine viral arteritis (EVA) in the previous 12 months[1] by size of operation:

Percent Operations by Size of Operation
(Number Resident Horses)

1-5		6-19		20 or More	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0.0	(0.0)	1.9	(1.8)	2.7	(0.9)

1 Last 12 months prior to the Equine '98 interview conducted between June 15, 1998, and September 11, 1998.

Approximately one-third of operations had resident stallions. Not all of these operations used stallions for breeding purposes.

d. Percent of operations that had resident stallions in the previous 12 months[1]:

Percent Operations	Standard Error
32.7	(3.0)

(See graphic on next page)

Of the operations with stallions, just under one-half (47.6 percent) used one or more of these stallions for breeding purposes in the previous 12 months. The number of mares bred per stallion was not determined.

i. For operations that had resident stallions in the previous 12 months[1], percent of operations that used any resident stallions for breeding:

Percent Operations	Standard Error
47.6	(5.1)

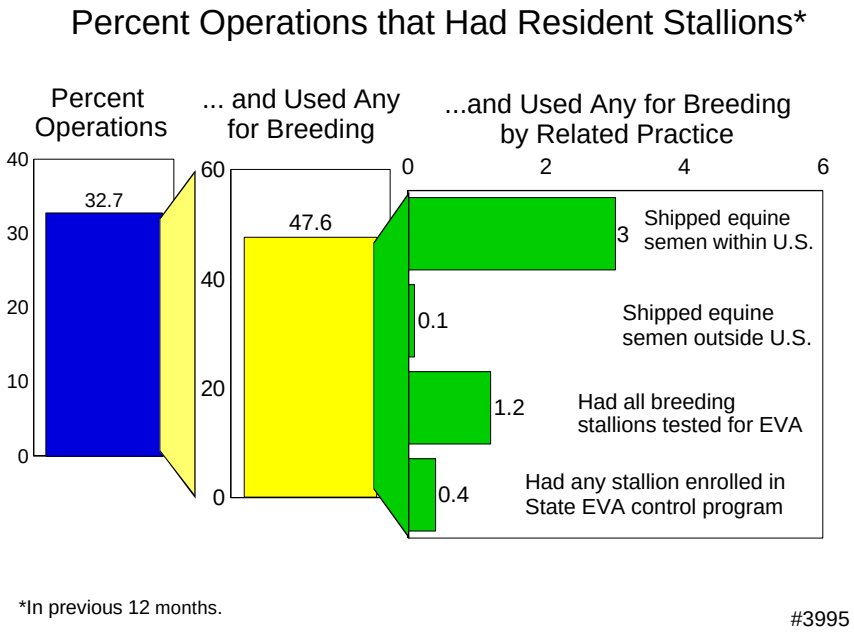
(See graphic on next page)

1 Last 12 months prior to the Equine '98 interview conducted between June 15, 1998, and September 11, 1998.

Of the operations that used stallions for breeding in the previous 12 months, only 3.0 percent shipped semen within the U.S. and 0.1 percent shipped semen internationally. Just over 1 percent of operations with breeding stallions indicated they tested all of these stallions for equine viral arteritis (EVA), and 0.4 percent of operations had stallions enrolled in a state EVA control program. Natural service is required of some breeds; however, Equine '98 data did not allow categorizing these results based on breeds of the stallions.

ii. For operations that used resident stallions for breeding in the previous 12 months[1], percent of operations that:

Practice	Percent Operations	Standard Error
Shipped equine semen within the U.S.	3.0	(1.4)
Shipped equine semen outside of the U.S.	0.1	(0.0)
Had all breeding stallions tested for EVA	1.2	(0.6)
Had any of these stallions enrolled in a State EVA control program	0.4	(0.4)



*In previous 12 months.

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1 Last 12 months prior to the Equine '98 interview conducted between June 15, 1998, and September 11, 1998.

Over 88 percent of operations had resident mares in the previous 12 months. Not all of these operations used these mares for breeding purposes.

e. Percent of operations that had resident mares in the previous 12 months[1]

Percent Operations	Standard Error
88.4	(2.0)

For operations with mares, 42.3 percent used one or more of these mares for breeding purposes in the previous 12 months.

i. For operations that had intact mares in the previous 12 months[1], percent of operations where any resident mares were bred whether or not they became pregnant:

Percent Operations	Standard Error
42.3	(3.3)

Only 5.5 percent of operations that bred one or more resident mares sometimes or always required the stallion to be tested or vaccinated for equine viral arteritis (EVA).

ii. For operations that bred any resident mares in the previous 12 months[1], percent of operations by equine viral arteritis (EVA) testing or vaccination requirements for stallions breeding these mares either by natural service or artificial insemination:

Practice	Percent Operations	Standard Error
Always test for EVA or always require stallions to be vaccinated for EVA	3.8	(1.9)
Sometimes test for EVA or sometimes require stallions to be vaccinated for EVA	1.7	(0.9)
Never test for EVA or never require stallions to be vaccinated for EVA	94.5	(2.1)
Total	100.0	

1 Last 12 months prior to the Equine '98 interview conducted between June 15, 1998, and September 11, 1998.

2. Vesicular stomatitis virus (VSV)

Overall, approximately two-thirds of operations had never heard of vesicular stomatitis virus (VSV). Recognition levels were similar across regions when standard errors are taken into account.

a. Percent of operations by familiarity with the term vesicular stomatitis virus (VSV) and by region:

Percent Operations by Region

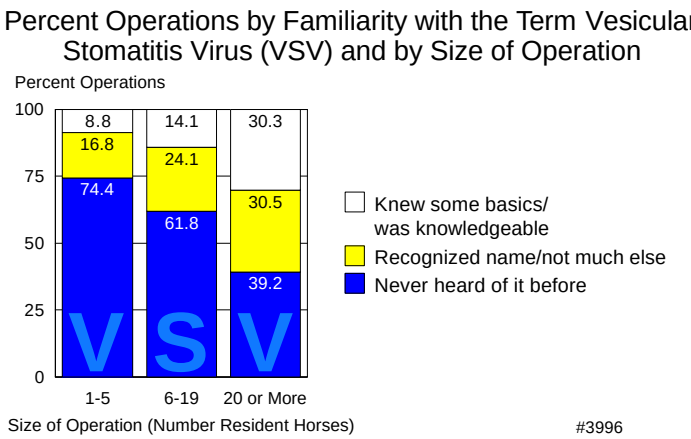
	Southern		Northeast		Western		Central		All Operations	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never heard of it before	60.3	(5.4)	67.3	(9.2)	71.1	(5.0)	76.8	(5.1)	67.7	(3.1)
Recognized name, not much else	24.4	(5.2)	21.9	(8.7)	19.1	(4.3)	12.9	(3.9)	20.2	(2.8)
Knew some basics or was knowledgeable	15.3	(3.4)	10.8	(6.1)	9.8	(2.3)	10.3	(3.7)	12.1	(1.8)
Total	100.0		100.0		100.0		100.0		100.0	

Familiarity with the term vesicular stomatitis virus (VSV) increased with increasing size of operation.

i. Percent of operations by familiarity with the term vesicular stomatitis virus (VSV) before the Equine '98 Study and by size of operation:

Percent Operations by Size of Operation (Number Resident Horses)

	1-5		6-19		20 or More	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Never heard of it before	74.4	(4.2)	61.8	(4.7)	39.2	(7.4)
Recognized name, not much else	16.8	(3.8)	24.1	(4.5)	30.5	(6.9)
Knew some basics or was knowledgeable	8.8	(2.4)	14.1	(3.1)	30.3	(7.0)
Total	100.0		100.0		100.0	



Section II: Methodology

A. Early Planning

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

B. Sampling and Estimation Details

1. NASS sampling frames - area frame

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

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

2. NASS sample frames - list frame

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

3. Multiple frame estimation

The Area Frame sample data and the List Frame sample data were then combined. The List Frame names were matched against the Area Frame names to assure accounting of all equids while avoiding duplication. Whenever a match occurred, the Area Frame data were not used, i.e., if an operation was on the list, it was represented by using the List Frame data. The multiple frame estimate was therefore comprised of an area estimate of the list incompleteness plus the list estimate. NASS considers 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, was published in March 1999 along with the January 1, 1999, inventory estimates. The reference population for equine inventory (NASS estimates) is 48 states, and the reference population for health statistics provided in Equine '98's Parts I and II is limited to 28 states. The reference population for subsequent health reports (Equine '98's Parts III and IV) is limited to operations with three or more horses present on January 1, 1998, in the 28 states.

C. Equine '98 Methods

1. Identifying industry informational needs

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

2. Materials development

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

3. Selection of states

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

$1,000 or more sales of agriculture products during the year or having at least five horses. Based on this definition, a large number of horses and operations with horses were not included in the Census of Agriculture data. These data were the best available for choosing states to be in the study.

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

4. Selection of the sample

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

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

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

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

5. Data collection

Approximately 200 NASS enumerators collected data for the Parts I and II baseline health descriptive reports via personal, on-site interviews from March 16, 1998, through April 10, 1998. Approximately 150 VMO's and AHT's collected data for subsequent Equine '98 health reports in the 28 states. The following table provides a summary of the data collection activities.

Data Collection	Data Collector	Questionnaire Name	Reference Report[1] & Date
March 16 - April 19, 1998	NASS Enumerator	Equine Management Report	Part I, released August 1998 & Part II, released September 1998
April 20 - June 12, 1998	Federal & State VMO's & AHT's	Initial Visit (horse management and health	Part III, released January 1999
June 15 - September 11, 1998	Federal & State VMO's & AHT's	Summer Visit (horse management and health)	Part IV, to be released April or May 1999
November 2, 1998 - February 26, 1999	Federal & State VMO's & AHT's	Winter Visit (horse health)	
March 1- 31, 1999	Federal & State VMO's & AHT's	Follow Up Phone Call (horse health)	

[1] See the inside back cover of this report for a list of additional Equine '98 Study products.

6. Editing and estimation

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

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

7. Response rates for Parts I & II reports

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

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

The numerator for the response rate calculation includes the 2,758 complete questionnaires, 199 responses with zero equine, and 13 responses with no resident equine for a total of 2,970 good responses. The denominator includes 2,970 good responses plus 787 refusals and 354 inaccessible for a total of 4,111. The response rate was therefore 72.2 percent. The two categories excluded from

the response rate calculation were 163 race tracks and 37 out of scope questionnaires such as prison farms and university farms. Race tracks were contacted for inventory data on the January Equine Survey and were not re-contacted.

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

8. Response rates for Part III and IV reports

The sample for this data collection was a subset of those participants from the first data collection. Respondents from the March 16 - April 10 data collection had to have three or more horses on hand January 1, 1998, to be eligible for the next phase of data collection. Out of the 2,758 complete responses in Phase 1, there were 2,238 (81.1 percent) operations eligible for participation in further components of the study. Of these operations, 1,576 (70.4 percent) elected to have their names turned over to APHIS for VMO contact about participating further in the study. Nearly three-fourths (74.7 percent of the operations contacted) of the sample turned over for VMO contact participated in the second phase of the study (Part III, data collected from April 10th through June 12th). Nearly all (96.4 percent) of the Part III participants remained in the study for the June 15 through September 11, 1998, visit (Part IV).

Complete responses from Phase I collection (March 16 - April 10, 1998; Part I & II reports)	2,758
Eligible for Phase 2 with three or more horses present January 1, 1998	2,238
Agreed to have their name turned over to APHIS for VMO contact (Phase 2 collection, Parts III and IV)	1,576
Complete responses for Part III (April 10 - June 12, 1998)	1,178
Complete responses for Part IV (June 15 - September 11, 1998)	1,136
Complete responses for Part IV (November 2, 1998 - February 26, 1999)	1,072

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

Appendix I: Sample Profile

A. Responding Operations (June 15 through September 11, 1998)

1. Type of operation

Primary Function of Operation	Part III: Number Responding Operations	Part IV: Number Responding Operations	Percent Operations Continuing
Boarding/Training facility	381	368	96.6
Breeding farm	199	194	97.5
Farm/Ranch	219	208	95.0
Residence with equids for personal use	228	217	95.2
Other	151	149	98.7
Total	1,178	1,136	96.4

2. Region

Region	Part III: Number Responding Operations	Part IV: Number Responding Operations	Percent Operations Continuing
Southern	435	418	96.1
Northeast	155	153	98.7
Western	323	307	95.0
Central	265	258	97.4
Total	1,178	1,136	96.4

3. Horses on hand January 1, 1998

Number	Part III: Number Responding Operations	Part IV: Number Responding Operations	Percent Operations Continuing
3 - 5*	273	264	96.7
6 - 19	449	433	96.4
20 or more	456	439	96.3
Total	1,178	1,136	96.4

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

4. Resident horses (whether or not present) at the time of interview (June 15-September 11, 1998)

Number	Part IV: Number Responding Operations
1 - 5	261
6 - 19	453
20 or more	422
Total	1,136

Appendix II: U.S. Equine Populations

Region	State	Census: Number **Horses and Ponies**[1] **on Farms** (Thousand Head) 1992	1997	Census: Number **Farms Reporting Horses and Ponies**[1] (Thousand Farms) 1992	1997	NASS: Number **Equine**[2] **- All Locations** (Thousand Head) January 1, 1998
Central	Illinois	46.1	51.7	7.3	7.6	99.0
	Indiana	48.1	58.6	8.4	9.2	140.0
	Kansas	42.9	52.8	9.7	10.6	104.0
	Michigan	54.0	66.2	7.8	9.1	130.0
	Minnesota	43.1	55.9	7.7	8.8	155.0
	Missouri	64.6	85.7	14.2	15.9	140.0
	Wisconsin	43.6	52.4	8.1	8.8	115.0
	Total	342.4	423.3	63.2	70.0	883.0
Northeast	New Jersey	23.9	22.6	2.5	2.3	45.0
	New York	43.3	47.8	6.4	6.5	157.0
	Ohio	72.0	76.2	10.9	11.7	155.0
	Pennsylvania	58.0	65.1	9.2	9.9	165.0
	Total	197.2	211.7	29.0	30.4	522.0
Southern	Alabama	29.7	42.5	5.7	7.4	130.0
	Florida	52.0	54.9	6.7	6.8	170.0
	Georgia	31.1	35.3	5.6	5.9	69.0
	Kentucky	78.1	95.9	12.4	13.4	150.0
	Louisiana	28.0	30.1	5.1	5.3	65.0
	Maryland	24.3	22.5	2.8	2.6	45.0
	Oklahoma	70.0	93.7	14.9	18.4	165.0
	Tennessee	61.1	89.0	12.4	15.3	185.0
	Texas	209.1	242.0	38.5	44.2	595.0
	Virginia	44.0	50.3	7.1	7.5	145.0
	Total	627.4	756.2	111.2	126.8	1,719.0
Western	California	124.9	113.1	15.0	13.0	235.0
	Colorado	69.4	81.7	9.9	11.2	140.0
	Montana	56.4	71.2	8.2	10.2	130.0
	New Mexico	41.4	38.8	5.7	5.9	64.0
	Oregon	51.9	68.3	9.2	10.7	120.0
	Washington	51.1	58.8	7.9	8.1	155.0
	Wyoming	40.7	50.6	4.5	5.3	61.0
	Total	435.8	482.5	60.4	64.4	905.0
Total (28 states)		1,602.8 (78.2% of US)	1,873.7 (77.2% of US)	263.8 (78.0% of US)	291.6 (77.7% of US)	4,029.0 (76.7% of US)
Total U.S. (50 states)		2,049.5	2,427.3	338.3	375.2	5,250.4

1 Horses and ponies and farms reporting horses and ponies. Source: Census of Agriculture 1992 and 1997.

2 Equine includes horses, ponies, mules, burros, and donkeys. Equine located on farms totaled 3.20 million head and 2.05 million head were located on non-farm places. Source: National Agricultural Statistics Service (NASS), March 2, 1999.

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

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

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

Part III: Management and Health of Horses, 1998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Completed and Expected Equine '98 Study
Outputs and Related Study Objectives

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

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

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

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

5. Gather data related to specific health problems.
   - Colic (info sheet), expected winter 1999.
   - Lameness (interpretive report), expected winter 2000.
   - Respiratory disease (info sheet), expected winter 2000.
   - Equine protozoal myeloencephalitis, EPM, including economics estimates, expected summer 1999.
   - Equine infectious anemia, EIA, including estimates of testing costs (info sheet), December 1998.

6. Feed problems.
   - Endophytes & fumonisins (info sheet), expected summer 1999.

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