United States
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Agriculture

Animal and
Plant Health
Inspection
Service

**Veterinary
Services**

Dairy Heifer Morbidity, Mortality, and Health Management Focusing on Preweaned Heifers

April 1991 - July 1992

February 1994 **National Dairy Heifer Evaluation Project**

Acknowledgements

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The National Dairy Heifer Evaluation Project was a cooperative effort between State and Federal animal health officials, university researchers, and Cooperative Extension Service (CES) personnel. NAHMS wants to thank the State and Federal Veterinary Medical Officers (VMO's) who visited the farms and collected the data.

The roles of the producer, Area Veterinarian in Charge (AVIC), NAHMS Coordinator, Veterinary Medical Officer (VMO), Animal Health Technician (AHT), and NASS enumerator were critical in providing quality data for this report. All participants are to be commended for their efforts, particularly the producers whose voluntary efforts made the study possible.

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Introduction

This report is the second of a two-part series of statistical descriptive tables providing information on preweaning dairy heifer health and productivity. These reports are based on data collected as part of the National Animal Health Monitoring System (USDA:APHIS: Veterinary Services, NAHMS) National Dairy Heifer Evaluation Project (NDHEP). The NDHEP was conducted from April 1991 through July 1992.

The National Agricultural Statistics Service (NASS) collaborated with Veterinary Services to select a producer sample for the NDHEP that was statistically designed to provide inferences about the National dairy heifer population. NASS selected 3,346 operations in 28 preselected States (shown in illustration on page 4) to contact as a subsample of their January 1, 1991, cattle survey respondents. The 28 States represented 83 percent of U.S. milk cows; herds with 30 or more milk cows in the participating States represented 78 percent of milk cows in the U.S.

Part I, *Dairy Herd Management Practices Focusing on Preweaned Heifers* (released in July 1993), was based primarily on retrospective data collected via a questionnaire. A total of 1,811 producers had operations that qualified for the study and agreed to participate. Data were collected by enumerators from the National Association of State Departments of Agriculture (NASDA).

Part II, *Dairy Heifer Morbidity, Mortality, and Health Management Focusing on Preweaned Heifers*, is primarily based on prospective data recorded by producers on ‘calving logs’ and ‘diaries’ maintained on heifer calves born during a 3-month monitoring period.

A total of 921 producers monitored calves on a daily basis using diary cards. Producers were enrolled in the on-farm monitoring phase of the program on a staggered, monthly basis throughout the year by State and federal Veterinary Medical Officers (VMO’s). Data were collected via additional questionnaires and each producer maintained records and monitored health events of heifers born on the operation. Results were extrapolated to the U.S. dairy population. Some of the data items allow comparison of retrospective and prospective results (section B, pages 4-10, plus all items in sections C and D of this report, pages 11 through 22.) Estimates from these two methodologies may reflect differences due to such things as memory recall or producer bias.

Retrospective data: that collected by looking back on the past.

- Number of operations participating in the NDHEP, retrospective data collection: 1,811.

Prospective data: that collected as events occurred.

- Number of operations monitoring heifer calves daily using diary cards: 921
- Number of calves monitored: 17,011 head

Section A (Participant Profile) provides actual counts for the number of participating producers and the number of calves these producers monitored.

Sections B through D contain National population estimates based on data collected, such as averages and proportions which have been weighted to represent the National cow/calf population. The estimates are provided with a measure of variability called the standard error and denoted by (±). 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).

If you have questions about this report, contact

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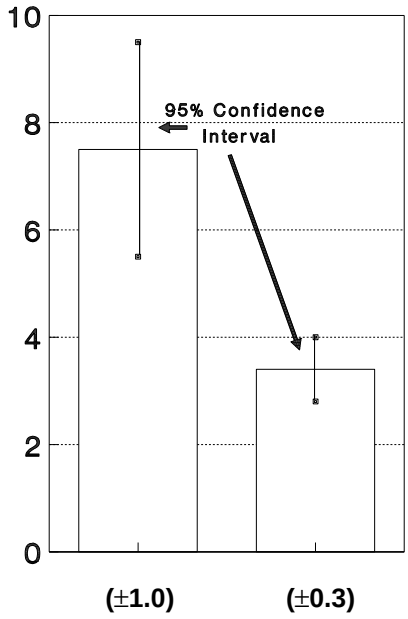
Examples of 95% Confidence Intervals



A. Participant Profile

(Sample operations from which data were extrapolated to represent the population.)

1. Number of farms providing data on retrospective and prospective death loss:

	Retrospective (Part B)	Prospective (Parts B, C, D, &E)
Number of operations	1,811	921

2. Descriptive statistics of responding operations

a. Milking and dry cow inventory: Number of Operations

Herd Size	Retrospective (Part B)	Percent	Prospective (Parts B, C, D, &E)	Percent
0-29	29	1.6	8	0.9
30-99	902	49.8	463	50.3
100-199	415	22.9	224	24.3
200+	465	25.7	226	24.5
Total	1,811	100.0	921	100.0

b. Type of operation:

Grade A	1,709	882
Grade B	87	37
Contract heifers	8	2
Other	2	0
Total	1,806	921

3. Calves monitored for prospective calving management (Part C): Number of Calves

20,615

4. Calves monitored for morbidity, mortality, and treatments (Part D)

a. Number of calves monitored: 17,011

b. Number of cohort calves monitored (born after the start date and were weaned or died during the 3-month monitoring period): 4,812

c. Number of weekly cohort calves monitored by week (present at beginning of the week and end of week or died during the week):

Week of Life	Number of Calves
1	11,674
2	10,794
3	9,933
4	9,074
5	8,044
6	6,861
7	6,047
8	4,299

d. Births and deaths

i. Number of calves born after start date: 12,406

ii. Number of calves that died: 780

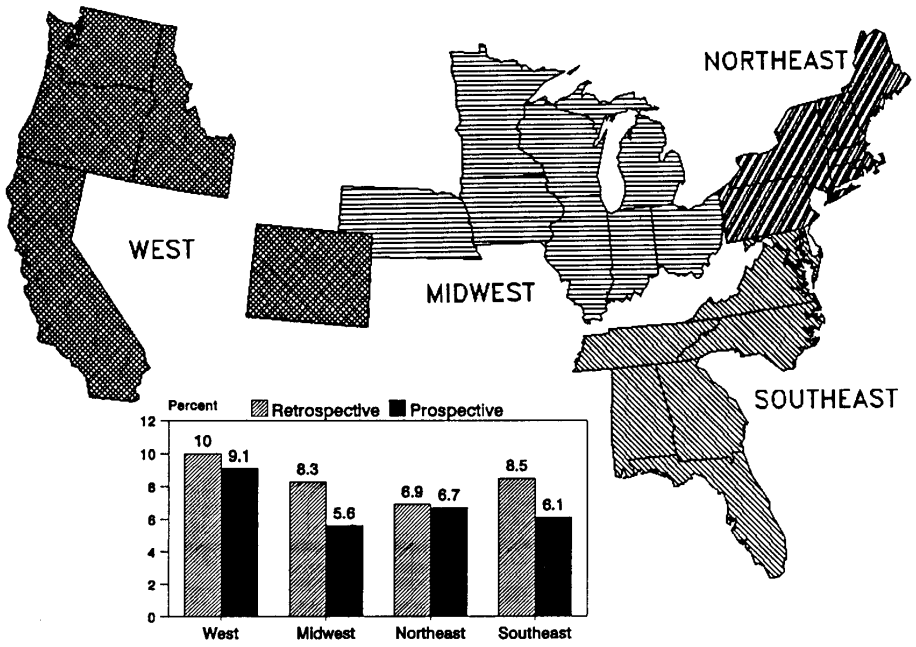
iii. Number of calves born after the start date that died: 648

B. Retrospective & Prospective Death Loss

1. Mortality by region, quarter, and calf herd size
   a. Heifer calf deaths as a percent of heifer calves (born alive or moved onto the operation) by region:

	Retrospective		Prospective	
	Percent	Standard Error	Percent	Standard Error
West	10.0	(±0.9)	9.1	(±0.9)
Midwest	8.3	(±0.7)	5.6	(±0.7)
Northeast	6.9	(±0.8)	6.7	(±1.4)
Southeast	8.5	(±0.6)	6.1	(±0.8)
Overall	8.4	(±0.4)	6.8	(±0.5)

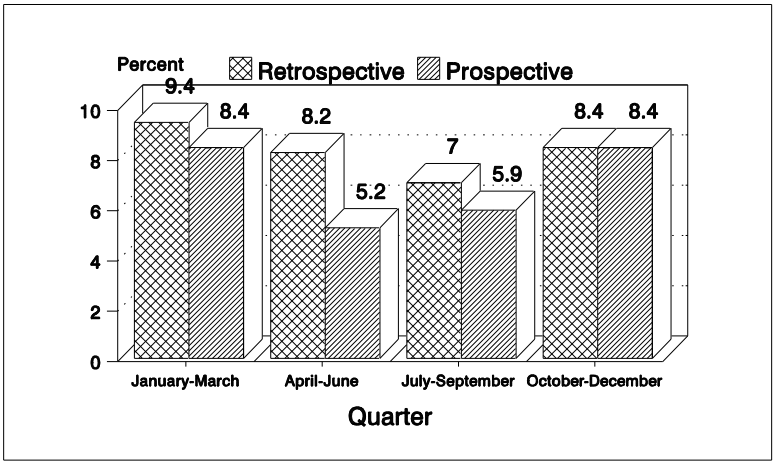
Heifer Calf Deaths as a
Percent of Heifer Calves Born Alive or Moved onto the Operation



1. Mortality by region, quarter, and calf herd size (continued)
   b. Heifer calf deaths as a percent of heifer calves (born alive or moved onto the operation) by quarter:

	Retrospective		Prospective	
	Percent	Standard Error	Percent	Standard Error
January-March	9.4	(±0.8)	8.4	(±0.9)
April-June	8.2	(±0.9)	5.2	(±0.9)
July-September	7.0	(±1.1)	5.9	(±1.0)
October-December	8.4	(±0.8)	8.4	(±1.1)
Overall	8.4	(±0.4)	6.8	(±0.5)

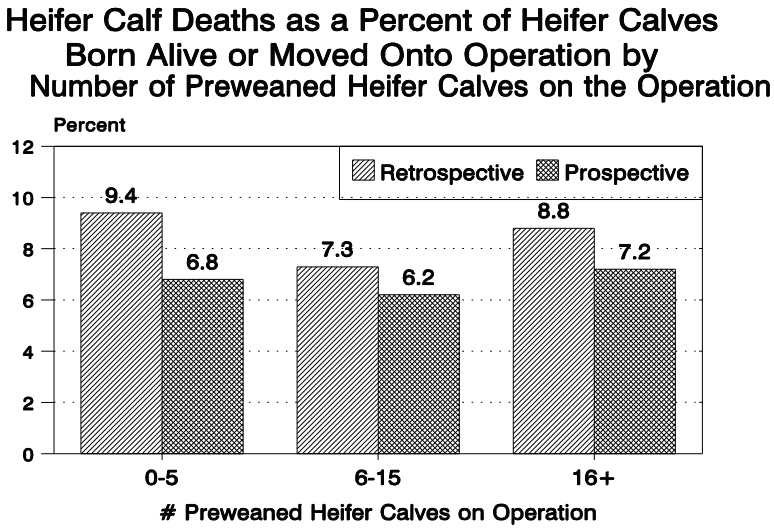
Heifer Calf Deaths as a Percent of Heifer Calves Born Alive or Moved Onto Operation by Quarter



1. Mortality by region, quarter, and calf herd size (continued)

c. Heifer calf deaths as a percent of heifer calves (born alive or moved onto the operation) by size group (number of preweaned heifer calves on the operation at the time of initial data collection):

	Retrospective		Prospective	
Number of Calves	Percent	Standard Error	Percent	Standard Error
0-5 preweaned calves	9.4	(±1.1)	6.8	(±1.0)
6-15 preweaned calves	7.3	(±0.6)	6.2	(±0.8)
16 + preweaned calves	8.8	(±0.7)	7.2	(±0.7)
Overall	8.4	(±0.4)	6.8	(±0.5)

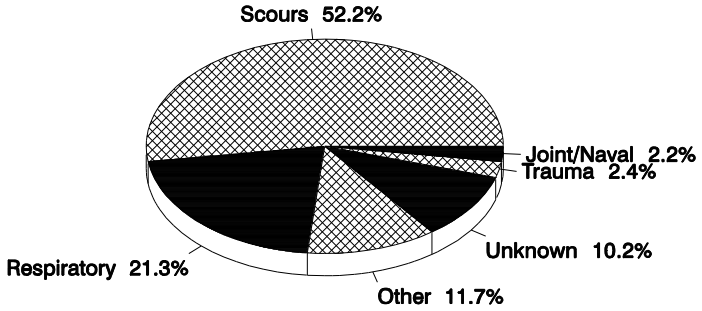


2. Percent of preweaned heifer calf deaths by perceived cause - retrospective

   a. Percent of total deaths and percent of calves born by perceived cause:

	Total Deaths		Calves Born	
	Percent	Standard Error	Percent	Standard Error
Scours/diarrhea	52.2	(±2.6)	4.4	(±0.4)
Respiratory problems	21.3	(±1.6)	1.8	(±0.1)
Trauma	2.4	(±0.8)	0.2	(±0.1)
Joint/naval problems	2.2	(±0.7)	0.2	(±0.1)
Other	11.7	(±1.8)	1.0	(±0.2)
Unknown	10.2	(±1.4)	0.8	(±0.1)
Total	100.0		8.4	(±0.4)

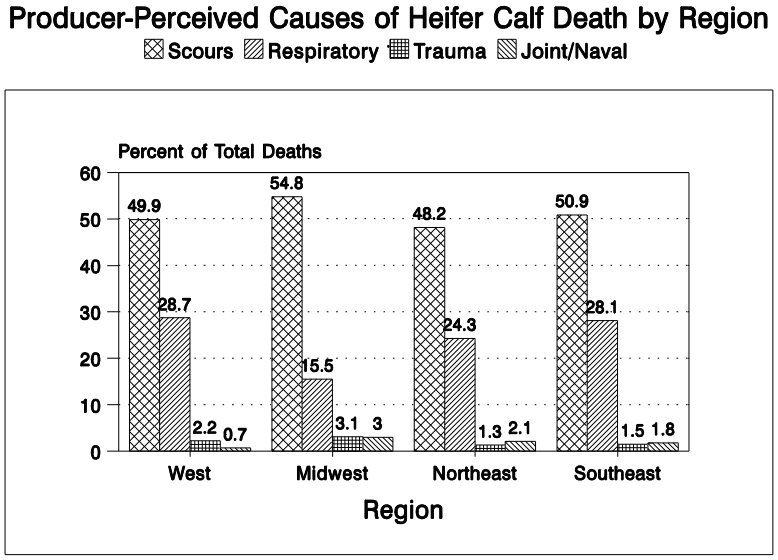
Percent of Total Preweaned Heifer Calf Deaths by Producer-Perceived Cause



Percent of Heifer Calf Deaths

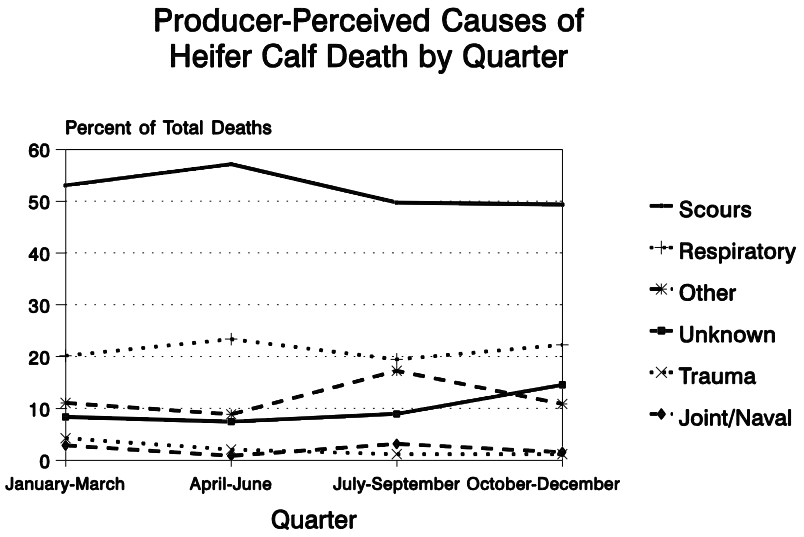
2. Percent of preweaned heifer calf deaths by perceived cause - retrospective (continued)
   b. Percent of total heifer calf deaths by perceived cause within regions:

	West		Midwest		Northeast		Southeast	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Scours/diarrhea	49.9	(±4.5)	54.8	(±4.0)	48.2	(±5.9)	50.9	(±4.7)
Respiratory problems	28.7	(±3.1)	15.5	(±2.3)	24.3	(±4.5)	28.1	(±3.8)
Trauma	2.2	(±1.0)	3.1	(±1.4)	1.3	(±0.8)	1.5	(±0.6)
Joint/naval problems	0.7	(±0.4)	3.0	(±1.4)	2.1	(±0.8)	1.8	(±0.8)
Other	14.5	(±5.4)	11.5	(±2.2)	10.3	(±3.7)	8.0	(±2.2)
Unknown	4.0	(±1.1)	12.1	(±2.4)	13.8	(±3.2)	9.7	(±2.7)
Total	100.0		100.0		100.0		100.0	



2. Percent of preweaned heifer calf deaths by perceived cause - retrospective (continued)
   c. Percent of total deaths by perceived cause within quarters:

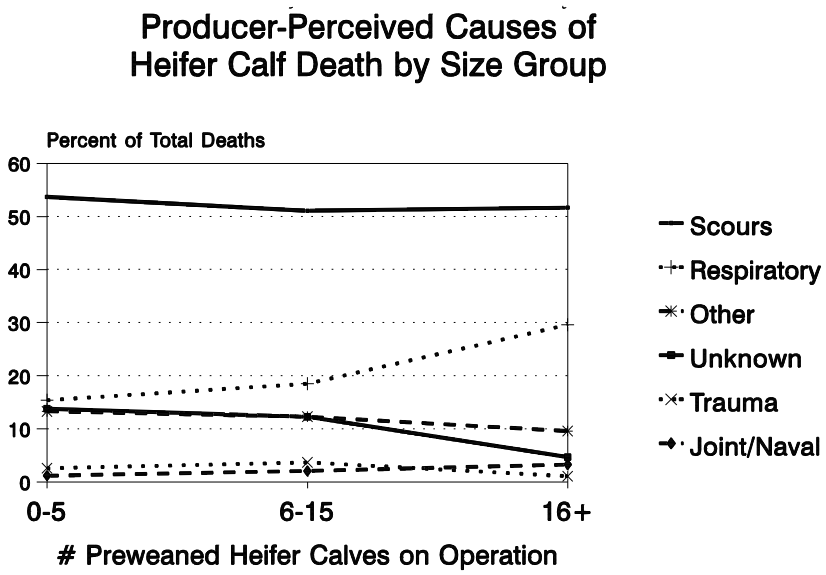
	January-March		April-June		July-September		October-December	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Scours/diarrhea	53.1	(±3.3)	57.2	(±5.8)	49.8	(±8.9)	49.4	(±4.5)
Respiratory problems	20.2	(±2.6)	23.4	(±4.3)	19.5	(±3.8)	22.3	(±3.0)
Trauma	4.3	(±2.0)	2.1	(±1.0)	1.2	(±1.1)	1.2	(±0.5)
Joint/naval problems	2.9	(±1.7)	0.9	(±0.4)	3.2	(±1.9)	1.6	(±0.6)
Other	11.1	(±2.6)	8.9	(±3.1)	17.3	(±7.1)	10.9	(±2.8)
Unknown	8.4	(±1.6)	7.5	(±2.6)	9.0	(±2.6)	14.6	(±3.3)
Total	100.0		100.0		100.0		100.0	



2. Percent of preweaned heifer calf deaths by perceived cause - retrospective (continued)

d. Percent of total deaths by perceived cause within size group (number of preweaned heifer calves on operation at the time of initial data collection):

	Number of Preweaned Heifer Calves					
	0-5		6-15		16+	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Scours/diarrhea	53.7	(±5.6)	51.1	(±3.8)	51.7	(±3.6)
Respiratory problems	15.4	(±2.9)	18.5	(±2.6)	29.6	(±2.8)
Trauma	2.6	(±1.3)	3.7	(±1.8)	1.1	(±0.4)
Joint/naval problems	1.2	(±0.6)	2.1	(±0.9)	3.3	(±1.8)
Other	13.3	(±3.0)	12.3	(±2.7)	9.6	(±3.9)
Unknown	13.8	(±3.4)	12.3	(±2.1)	4.7	(±0.9)
Total	100.0		100.0		100.0	



3. Calf crop:

	Percent	Standard Error
a. Calves born alive as a percent of cow and heifer (breeding age) inventory:	91.4	(±1.6)

C. Prospective Calving Management

1. Number of calves purchased or contract reared as a percent of all calves enrolled:

Percent	Standard Error
0.7	(±0.4)

2. Stillborns

   a. Number of heifer calves stillborn as a percent of those born during the calving period:

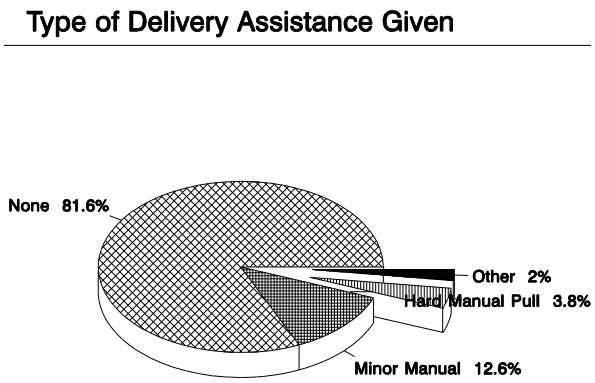
1.6	(±.02)

   b. Number of heifer calves stillborn as a percent of those born during the calving season by dam parity:

Dam Parity	Percent Stillborn	Standard Error
First	2.0	(±0.4)
Second	1.2	(±0.3)
Third	1.4	(±0.3)
Fourth	1.4	(±0.6)
Fifth	1.3	(±0.7)
Sixth	0.6	(±0.4)
Seventh	3.1	(±1.6)
Eighth +	1.7	(±1.3)
Unknown	2.4	(±1.1)

3. Calves born by parity
   a. Percent of heifers born by dam parity:

Dam Parity	Percent	Standard Error
First	27.6	(±0.8)
Second	23.5	(±0.7)
Third	17.8	(±0.5)
Fourth	11.3	(±0.4)
Fifth	7.1	(±0.4)
Sixth	3.2	(±0.3)
Seventh	1.1	(±0.1)
Eighth +	1.2	(±0.2)
Unknown	7.2	(±0.9)
Total	100.0	



4. Type of delivery
   a. Percent of heifer calves born by delivery type:

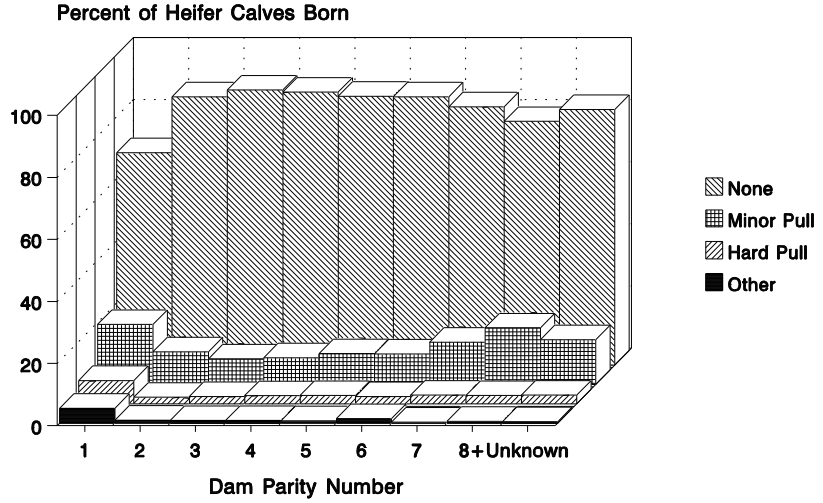
Delivery Type	Percent	Standard Error
Calved without assistance	81.6	(±0.9)
Minor manual assistance	12.6	(±0.7)
Hard manual pull	3.8	(±0.3)
Mechanical extraction	1.9	(±0.3)
Caesarian section	0.1	(±0.0)
Total	100.0	

4. Type of delivery (continued)

   b. Percent of heifer calves born by delivery type within dam parity:

	Dam Parity								
Delivery Type	1	2	3	4	5	6	7	8+	Unknown
Calved without assistance	68.4	86.4	88.6	87.9	86.6	86.4	83.2	78.5	82.3
Stand. Err.	(±1.6)	(±1.1)	(±1.3)	(±1.3)	(±2.1)	(±2.5)	(±3.5)	(±6.0)	(±4.8)
Minor manual assistance	19.3	10.5	8.2	8.6	9.9	9.8	13.6	18.2	14.4
Stand. Err.	(±1.4)	(±1.1)	(±1.0)	(±1.1)	(±1.9)	(±2.3)	(±3.3)	(±6.1)	(±4.4)
Hard manual pull	7.5	2.1	2.3	2.6	2.7	2.3	2.8	2.7	2.8
Stand. Err.	(±0.7)	(±0.3)	(±0.5)	(±0.6)	(±0.8)	(±0.8)	(±1.4)	(±1.3)	(±0.9)
Mechanical extraction	4.7	1.0	0.9	0.9	0.8	1.1	0.4	0.6	0.5
Stand. Err.	(±0.8)	(±0.2)	(±0.3)	(±0.3)	(±0.3)	(±0.7)	(±0.3)	(±0.5)	(±0.3)
Caesarian section	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Stand. Err.	(±0.6)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.3)	(±0.0)	(±0.0)	(±0.0)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Delivery Assistance Type by Dam Parity



5. Calving location
   a. Percent of heifer calves (born alive) by calving location:

Calving Location	Percent	Standard Error
Freestall in building	4.0	(±0.6)
Individual animal area in building	25.2	(±1.6)
Multiple animal area in building	17.3	(±1.3)
Tie stall/stanchion in building	14.1	(±1.1)
Drylot, individual animal, no building	1.9	(±0.4)
Drylot, multiple animal, no building	17.9	(±1.9)
Pasture, individual animal, no building	1.2	(±0.3)
Pasture, multiple animal, no building	18.4	(±1.2)
Total	100.0	

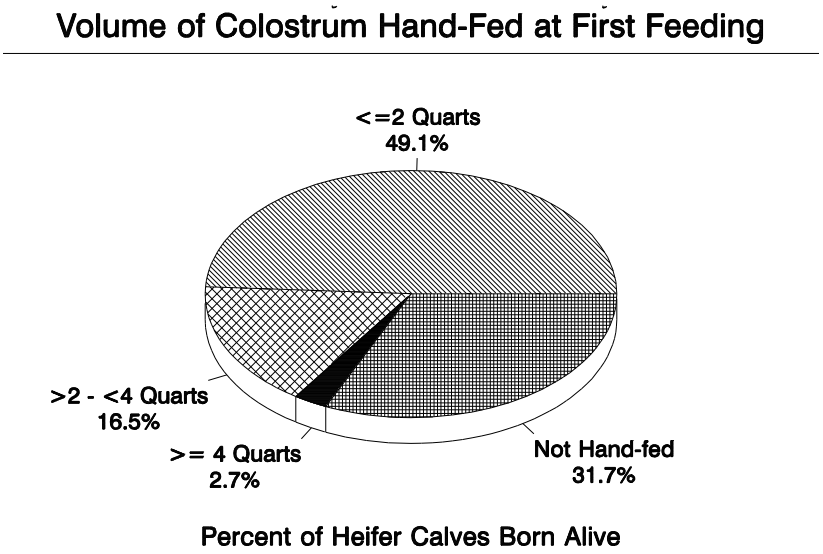
6. Colostrum feeding
   a. Percent of heifer calves (born alive) by delivery method for first feeding of colostrum:

Method of Delivery	Percent	Standard Error
During first nursing	31.6	(±1.5)
Hand fed from bucket or bottle	62.7	(±1.6)
Hand fed using esophageal feeder	5.4	(±0.9)
Did not get colostrum	0.3	(±0.1)
Total	100.0	

6. Colostrum feeding (continued)

b. Percent of heifer calves (born alive) by volume of colostrum hand-fed at first feeding:

Volume	Percent	Standard Error
2 quarts or less	49.1	(±1.8)
More than 2 but less than 4 quarts	16.5	(±1.3)
4 or more quarts	2.7	(±0.5)
Colostrum not hand-fed	31.7	(±1.5)
Total	100.0	



c. Percent of heifer calves (born alive) by time of first feeding of colostrum:

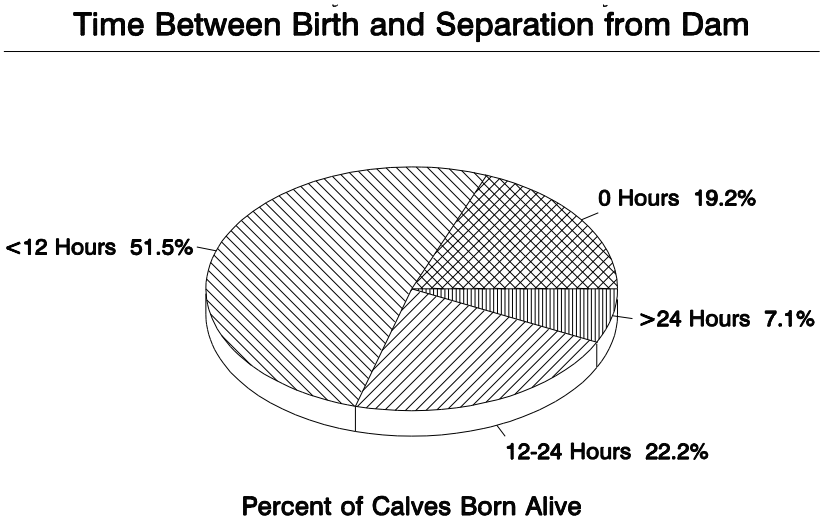
Time from Birth to First Colostrum	Percent	Standard Error
Less than 6 hours	68.6	(±1.8)
6 to 12 hours	28.0	(±1.5)
13 to 24 hours	2.8	(±1.3)
More than 24 hours	0.3	(±0.1)
Did not receive colostrum	0.3	(±0.1)
Total	100.0	

7. Naval dipping:
   a. Percent of heifer calves (born alive) by method of naval dipping:

Method	Percent	Standard Error
Iodine	45.1	(±2.0)
Not dipped	52.9	(±2.1)
Other	2.0	(±0.5)
Total	100.0	

8. Calves separated from dam:
   a. Percent of calves (born alive) by time of separation from dam:

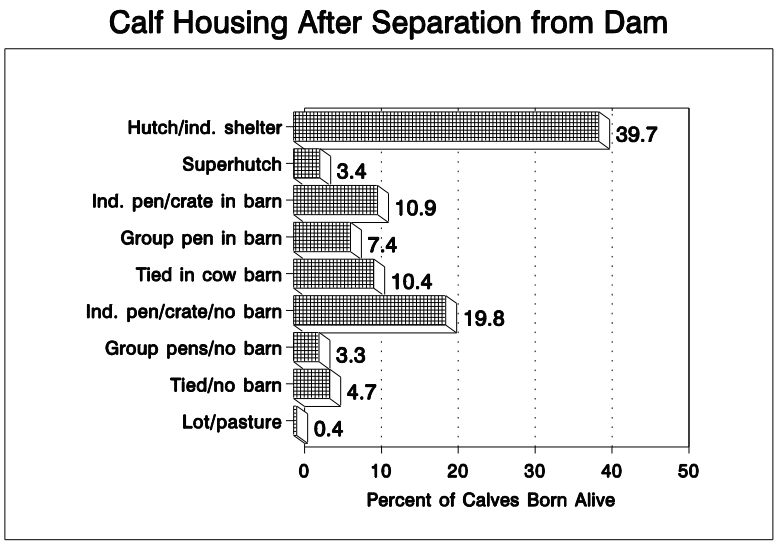
Length of Time	Percent	Standard Error
0 hours (before any nursing)	19.2	(±1.3)
Less than 12 hours	51.5	(±1.9)
12 to 24 hours	22.2	(±1.7)
More than 24 hours	7.1	(±0.7)
Total	100.0	



9. Calf housing after separation

a. Percent of calves (born alive) by type of housing after separation from dam:

Type of Housing	Percent	Standard Error
Hutch/individual shelter	39.7	(±2.0)
Superhutch	3.4	(±0.9)
Individual pen/crate in cow barn	10.9	(±1.1)
Group pens in cow barn	7.4	(±0.9)
Tied in cow barn	10.4	(±0.9)
Individual pen/crate not in cow barn	19.8	(±1.6)
Group pens not in cow barn	3.3	(±0.5)
Tied not in cow barn	4.7	(±0.7)
Lot/pasture, no building	0.4	(±0.2)
Total	100.0	

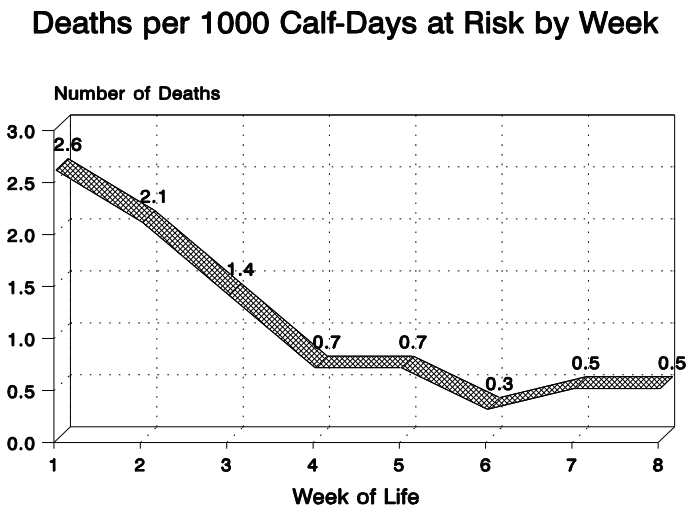


D. Prospective Morbidity & Mortality

1. Mortality

   a. Deaths per 1000 calf-days at risk:

Week of Life	Deaths per 1000 Calf Days at Risk	Standard Error
First	2.6	(±0.4)
Second	2.1	(±0.3)
Third	1.4	(±0.2)
Fourth	0.7	(±0.2)
Fifth	0.7	(±0.2)
Sixth	0.3	(±0.1)
Seventh	0.5	(±0.2)
Eighth	0.5	(±0.3)



   b. Percent mortality of weekly cohort[1] preweaned heifer calves by week of life:

Week of Life	Cumulative Percent	Percent	Standard Error
First	1.8	1.8	(±0.3)
Second	3.3	1.5	(±0.2)
Third	4.3	1.0	(±0.2)
Fourth	4.8	0.5	(±0.1)
Fifth	5.3	0.5	(±0.1)
Sixth	5.5	0.2	(±0.1)
Seventh	5.9	0.4	(±0.1)
Eighth	6.3	0.4	(±0.2)

1 Weekly cohort: calves present at the beginning of the week and end of week or died during the week

1. Mortality (continued)

   c. Percent of deaths by week of life:

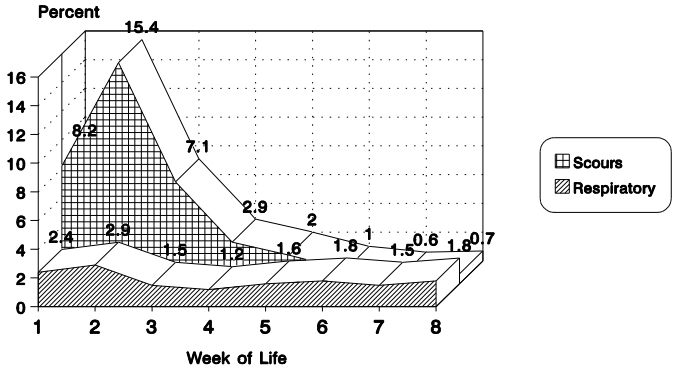
	All Calves Monitored		Calves Born After Start Date	
Week of Life	Percent	Standard Error	Percent	Standard Error
First	26.9	(±3.4)	32.7	(±3.9)
Second	21.3	(±2.6)	24.7	(±2.9)
Third	14.4	(±2.2)	15.0	(±2.5)
Fourth	6.8	(±1.9)	7.2	(±2.3)
Fifth	6.8	(±1.7)	5.4	(±1.8)
Sixth	3.0	(±0.8)	2.6	(±0.9)
Seventh	4.2	(±1.4)	2.9	(±1.0)
Eighth	3.7	(±2.0)	3.5	(±2.5)
Ninth +	12.9	(±2.6)	6.0	(±1.8)
Total	100.0		100.0	

2. Morbidity

   a. Percent of weekly cohort calves[1] with producer-identified signs of health problems by week of life:

	Scours		Respiratory	
i. Week of Life	Percent	Standard Error	Percent	Standard Error
First	8.2	(±0.6)	2.4	(±0.5)
Second	15.4	(±1.3)	2.9	(±0.5)
Third	7.1	(±0.7)	1.5	(±0.3)
Fourth	2.9	(±0.4)	1.2	(±0.2)
Fifth	2.0	(±0.3)	1.6	(±0.3)
Sixth	1.0	(±0.2)	1.8	(±0.4)
Seventh	0.6	(±0.1)	1.5	(±0.3)
Eighth	0.7	(±0.2)	1.8	(±0.4)

Percent of Heifer Calves* with Producer-Identified Signs of Scours & Respiratory Problems by Age



*Calves present at the beginning of the week and end of the week or died during the week.

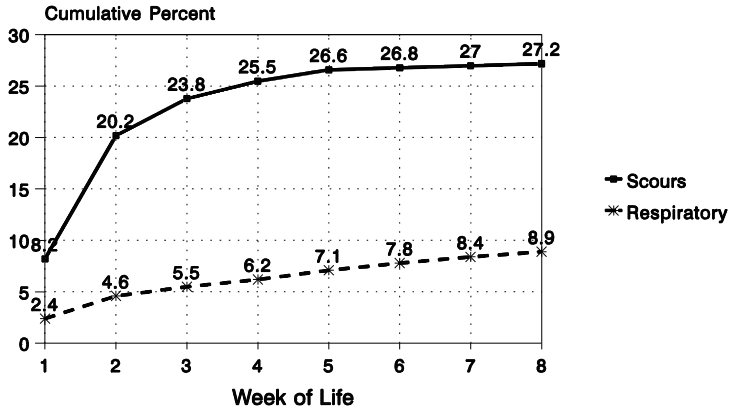
1 Weekly cohort: calves present at the beginning of the week and end of week or died during the week.

2. Morbidity (continued)

b. Cumulative percent of weekly cohort calves[1] born after the start date with first onset of producer-identified signs of scours and respiratory problems by week of life:

		Scours			Respiratory		
i.	Week of Life	Cumulative Percent	Percent 1st Onset	Standard Error	Cumulative Percent	Percent 1st Onset	Standard Error
	First	8.2	8.2	(± 0.6)	2.4	2.4	(±0.5)
	Second	20.2	12.0	(±1.1)	4.6	2.2	(±0.4)
	Third	23.8	3.6	(±0.5)	5.5	0.9	(±0.2)
	Fourth	25.5	1.7	(±0.3)	6.2	0.7	(±0.2)
	Fifth	26.6	1.1	(±0.3)	7.1	0.9	(±0.2)
	Sixth	26.8	0.2	(±0.1)	7.8	0.7	(±0.2)
	Seventh	27.0	0.2	(±0.1)	8.4	0.6	(±0.2)
	Eighth	27.2	0.2	(±0.1)	8.9	0.5	(±0.2)

Cumulative Percent of Heifer Calves* With Producer-Observed Signs of Scours & Respiratory Problems by Week of Life



*Weekly cohort calves: Present at beginning of week and end of week or died during the week.

1 Weekly cohort: calves present at the beginning of the week and end of week or died during the week.

3. Treatment

a. Of weekly cohort calves[1] born after the start date, cumulative percent that received first treatment by week of life:

Week of Life	Cumulative Percent	Percent 1st Treatment	Standard Error
First	16.8	16.8	(±1.2)
Second	29.6	12.8	(±1.1)
Third	33.7	4.1	(±0.5)
Fourth	36.3	2.6	(±0.4)
Fifth	37.9	1.6	(±0.3)

b. Percent of cohort calves by type of treatment administered[2,3]:

Treatments	Percent	Standard Error
Cut back or changed milk or replacer	15.9	(±4.6)
Oral electrolytes	20.9	(±6.5)
Fluids by injection	9.0	(±9.4)
Antibiotics by injection	24.5	(±7.1)
Fed antibiotics for illness	29.8	(±6.7)
Fed gut soothers (Pepto-Bismol®/Kaopectate®)	24.1	(±6.8)
Other	9.9	(±4.5)

1 Weekly cohort: calves present at the beginning of the week and end of week or died during the week.

2 Calves may have received more than one type of treatment.

3 Cohort calves: calves born after the start date and were weaned or died during the 3-month monitoring period.

4. Other management
   a. Percent of weekly cohort calves[1] that were dehorned by week of life:

Week of Life	Percent	Standard Error
1	2.1	(±0.5)
2	2.2	(±0.5)
3	1.2	(±0.2)
4	1.3	(±0.3)
5	1.0	(±0.2)
6	0.9	(±0.2)
7	1.3	(±0.3)
8	1.8	(±0.5)

   b. Percent of cohort calves[2] that were dehorned:

Percent	Standard Error
16.7	(±2.2)

   c. Percent of weekly cohort calves,[1] that were vaccinated by week of life:

Week of Life	Percent	Standard Error
1	6.0	(±1.0)
2	1.3	(±0.5)
3	1.2	(±0.4)
4	0.9	(±0.3)
5	0.9	(±0.2)
6	0.8	(±0.2)
7	0.8	(±0.3)
8	0.5	(±0.1)

   d. Percent of cohort calves[2] that were vaccinated:

Percent	Standard Error
15.1	(±6.3)

5. Exit reasons
   a. For all calves monitored, average age at time of exit by reason:

Reason	Average Age (Days)	Standard Error
Weaned	67.6	(±1.3)
Culled/sold	14.6	(±2.6)
Contract rearing	19.4	(±14.5)
Died	23.7	(±2.2)
End of study	49.3	(±1.4)
Lost identification	17.4	(±9.3)

1 Weekly cohort: calves present at the beginning of the week and end of week or died during the week.

2 Cohort calves: calves born after the start date and were weaned or died during the 3-month monitoring period.

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