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Poultry 2010

Reference of Health and Management Practices on Breeder Chicken Farms in the United States, 2010

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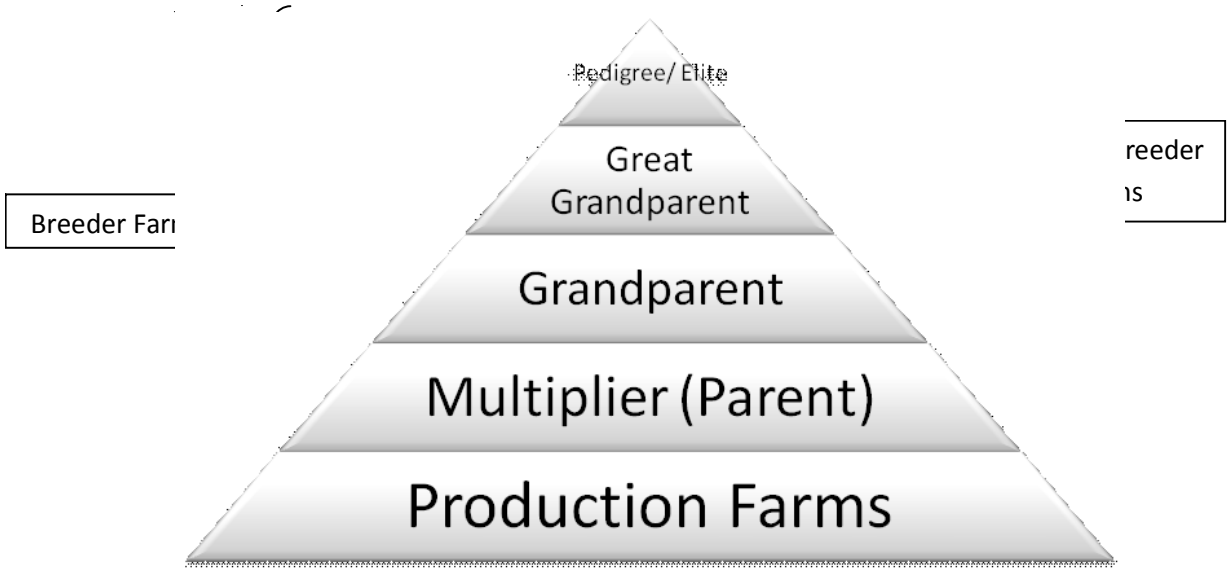
Items of Note

1. Background: poultry industry structure

Breeder farms are comprised of primary breeder farms and multiplier farms. The illustration below shows how chicken breeder farms in the United States are structured. Farms with pedigree/elite, great-grandparent, and/or grandparent birds are considered primary breeder farms, all of which produce eggs for hatching. The progeny of pedigree flocks form great-grandparent flocks, and the progeny of great-grandparent flocks form grandparent flocks, and so on. The progeny of multiplier (i.e., parent) flocks become production birds on broiler (meat production) or layer (table-egg production) farms.

Structure of breeder chicken farms in the United States



The poultry companies that participated in the NAHMS Poultry 2010 study accounted for 100.0 percent of primary breeder, 81.2 percent of broiler, 71.7 percent of table-egg layer, and 81.5 percent of turkey production in the United States. Companies that had chicken breeder farms (either company owned or contract) participated in the breeder-farm phase of the study.

Estimates for primary breeder farms (farms with pedigree, great-grandparent, and/or grandparent birds) and multiplier farms (farms with parent birds only) are separated in this report. Additional estimates are separated for broiler breeder farms (both primary breeder and multiplier farms for production of meat-type birds) and table-egg breeder farms (both primary breeder and multiplier farms for production of table-egg-type birds).

2. Breeder farm characteristics

- Birds on all primary breeder farms and birds on over 9 of 10 multiplier farms that produced table-egg layers were owned by breeder companies. Birds on nearly all multiplier farms that produced broilers were owned by broiler production companies.

- The majority of breeder farms raised pullets at a separate farm site belonging to the same company; 14.1 percent of primary breeder farms raised pullets on the breeder farm. No primary breeder farms or multiplier farms added birds to existing flocks when placing birds in laying houses.

- Primary breeder farms had an average of 14,246 laying hens, while multiplier farms had an average of 19,680 laying hens. Broiler breeder farms had an average of 19,084 laying hens compared with table-egg breeder farms which had an average of 23,021 laying hens.

- The average ratio of hens to roosters on breeder farms was about 11:1. Fertility in breeding flocks declines as the flock ages. Young males can be added to the breeder flock, which stimulates breeding activity through competition between new and established males. This practice is called spiking. Nearly all multiplier farms and 8 of 10 primary breeder farms had introduced spiking males to stimulate breeding activity during the previous 12 months. Nearly all broiler breeder farms but less than 3 percent of table-egg breeder farms introduced spiking males to stimulate breeding activity. About one-half of multiplier farms but less than 1 percent of primary breeder farms that introduced spiking males did so three or more times during the previous 12 months. The source of spiking males for nearly all farms was other farms from the same company. Nearly all breeder farms that received spiking males from other farms performed routine testing of the source farms for health status (e.g., *Mycoplasma* or other tests) and also tested males before placing them on the farm.

- Breeder farms were not in close proximity to other premises. The majority of breeder farms had no premises with backyard poultry, pigs, or commercial poultry that belonged to a different company within 1 mile of the farm, and about one-half of breeder farms had no commercial poultry that belonged to their company located within 1 mile of the farm. Additionally, breeder farms were, on average, over 2 miles away from a body of water where wild waterfowl congregated, 20 miles from a live-poultry market, and 25 miles from a processing or rendering facility.

- Controlling access to the farm can prevent introduction of disease via people and vehicles. Nearly all primary breeder farms had fencing surrounding the farm. Signs (e.g., no trespassing) were posted on nearly all multiplier farms. Additionally, the majority of poultry houses (over 75 percent) had locks on doors, warning signs at house doors, and an anteroom that personnel had to pass through that separated the outside area from the inside area. The majority of primary breeder farms had gravel or a hard surface immediately surrounding poultry houses, and the majority of multiplier farms had short grass surrounding the houses. No breeder farms had tall grass or brush immediately surrounding the houses.

- Employee management is important for the prevention of disease introduction and spread. Employees worked at another commercial poultry production or processing facility on less than 1 percent of multiplier farms and on none of the primary breeder farms. All primary breeder farms and nearly all multiplier farms had written biosecurity protocols. Additionally, over 9 of 10 primary breeder farms conducted formal biosecurity training for employees. No primary breeder farms allowed employees that entered poultry houses to own poultry or other birds, and nearly all required that the producer or employees shower before entering poultry houses. In addition, all primary breeder farms required that the producer and employees change clothing, change shoes or use shoe covers, and to not have been around poultry at least 24 hours before entering poultry houses. Over 8 of 10 multiplier farms required that the producer and employees use footwear protection, not be around other poultry, and not own poultry or birds. All primary breeder farms and over 90 percent of multiplier farms washed and disinfected feeders, flushed and disinfected water lines, washed and disinfected poultry houses, and cleaned the ventilation system after every flock.

- Business visitors that entered the poultry houses during the previous 12 months included company service personnel, catch crews, and private or company veterinarians. Only 0.6 percent of primary breeder farms and 16.6 percent of multiplier farms had any nonbusiness visitors (e.g., neighbors, friends, school field trips) enter the poultry houses during the previous 12 months.

- Over 9 of 10 primary breeder farms used vehicles dedicated to their company to transport shavings onto the farm, bring pullets onto the farm, and transport eggs to the hatchery.

- Only 4.4 percent of primary breeder farms used their hatcheries to hatch eggs for other companies, compared with 21.3 percent of multiplier farms. For over 9 of 10 breeder farms, reusable flats and racks for transporting eggs could be used by other farms within the same company but did not go to farms belonging to a different company. The majority of table-egg breeder farms used disposable flats.

- No breeder farms had pet birds on the farm. Over 8 of 10 breeder farms never saw wild birds, cats, dogs, and wild mammals in the poultry houses. Rodents were seen daily in the poultry houses on less than 5 percent of breeder farms.

- Very few disease problems were reported for breeder farms. The most common was *E. coli* peritonitis, with 22.7 percent of farms reporting at least a slight problem with *E. coli* peritonitis in the last completed flock. None of the breeder farms had any history of infectious coryza or avian influenza.

- All breeder farms participated in the National Poultry Improvement Plan (NPIP) avian influenza (AI) program. All primary breeder farms and more than 85 percent of multiplier farms participated in NPIP programs for pullorum, *Mycoplasma synoviae* (MS), and *Mycoplasma gallisepticum* (MG). Nearly all breeder farms tested their last completed flocks for MS, MG, and AI. All primary breeder farms and 4 of 10 multiplier farms tested their last completed flock for pullorum typhoid. (Note: Flocks may have been tested as pullets before coming onto the farm.) None of the farms that tested their last completed flocks for pullorum, MG, or AI had a positive test result, and less than 1 percent of farms had a positive test result for MS.

- Primary breeder farms did not vaccinate breeding hens while in lay. About one-third of multiplier farms vaccinated hens in lay against Newcastle disease and infectious bronchitis. Over 80 percent of primary breeder farms and multiplier farms vaccinated pullets against infectious laryngotracheitis, Newcastle disease, infectious bronchitis, *Salmonella*, infectious bursal disease, avian encephalomyelitis, chicken anemia virus, reovirus, fowl pox, and coccidiosis. All primary breeder farms vaccinated pullets for *E. coli,* and nearly all multiplier farms vaccinated pullets for cholera.

Acknowledgments

The Poultry 2010 study was a cooperative effort among animal health officials, university researchers, extension personnel, and poultry producers. We want to thank industry members who helped determine the direction and objectives of this study. Recognition also goes to the personnel at the Centers for Epidemiology and Animal Health for their efforts in generating reports from Poultry 2010 data and to our reviewers for providing valuable expertise and guidance through their comments.

All participants are to be commended, particularly the industry veterinarians whose voluntary efforts made this component of the Poultry 2010 study possible.

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Introduction

The National Animal Health Monitoring System (NAHMS) is a nonregulatory program of the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service. NAHMS is designed to help meet the Nation's animal-health information needs.

Layers '99 was NAHMS' first national study on poultry, and provided baseline health and management information for the table-egg industry. Layers '99 estimated the prevalence and associated risk factors of *Salmonella enterica* Enteritidis in U.S. layer flocks.

Poultry 2004 was NAHMS' second study of the U.S. poultry industry. Poultry 2004 provided information regarding bird health, bird movement, and biosecurity practices of backyard flocks, game fowl breeder flocks, and live poultry markets.

The Small Enterprise Chicken study was NAHMS' third study of the poultry industry, focusing on biosecurity and bird movement on operations with 1,000 to 19,999 chickens.

Poultry 2010 is NAHMS' fourth study of the U.S. poultry industry. For Poultry 2010, NAHMS conducted an extensive assessment to determine the information needs of the poultry industry, researchers, and Federal and State governments. This needs assessment resulted in three study objectives:

1. Describe the structure of commercial poultry industries, including interactions among poultry industry segments, movements, and biosecurity practices. Describe farm-level practices for chicken primary breeder and multiplier flocks. Identify critical factors for exclusion of disease (e.g., *Mycoplasma*).
2. Estimate the prevalence and investigate risk factors associated with clostridial dermatitis (cellulitis/gangrenous dermatitis) on turkey-grower farms.
3. Describe bird health, movement, and biosecurity practices of urban chicken flocks in four U.S. cities—Miami, Denver, Los Angeles, and New York City.

"Reference of Health and Management Practices on Breeder Chicken Farms in the United States, 2010," is the fourth in a series of reports containing information from the Poultry 2010 study. For this report, a questionnaire was administered to broiler (meat type) and layer (egg type) chicken breeder farms located in the Central and East regions of the United States (see map, p 4). These regions accounted for 98 percent of egg-type breeder flocks, 97 percent of egg-type breeder birds, and over 99 percent of meat-type breeder flocks and birds (see Appendix II, p 134). This report contains information provided from May 27 through October 16, 2010, by poultry company veterinarians or representatives from 482 chicken breeder farms.

The methods used and the number of respondents in the study can be found at the end of this report.

Further information on NAHMS studies and reports is available online at:
http://www.aphis.usda.gov/nahms

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Terms Used in This Report

Anteroom: A room that separates the outside environment from the area where poultry are housed. The anteroom is usually inside the outer poultry house door and before the door that leads into the animal area. Farm personnel use the anteroom to change clothes and disinfect footwear and hands.

Company type:

- **Breeder company:** A company that owns only breeder flocks.
- **Production company:** A company that produces broilers, turkeys, or table eggs for human consumption. Production companies may or may not also have multiplier/parent flocks.

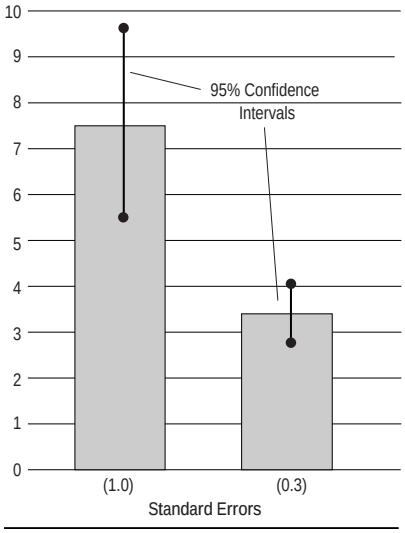
Contract farm: A cooperation between a farmer and a poultry company to produce birds; the farmer provides housing and daily care for the birds, and the poultry company owns the birds and provides feed and veterinary care.

Farm type:

- **Breeder farm:** Produces eggs for hatching. Includes primary breeder farms for meat-type (broiler) chickens, primary breeder farms for table-egg-type chickens, multiplier farms for meat-type (broiler) chickens, and multiplier farms for table-egg-type chickens.
  - **Primary breeder:** Breeding birds whose offspring are used as breeding birds. These include pedigree (elite/foundation), great-grandparent, and grandparent flocks. Includes broiler primary breeder farms and table-egg primary breeder farms.
  - **Multiplier (parent):** Breeding birds whose offspring are used as production birds (broilers, market turkeys, table egg layers). Includes broiler multiplier farms and table-egg multiplier farms.
  - **Broiler breeder:** Includes primary breeder farms and multiplier farms for meat-type (broiler) chickens.
  - **Table-egg breeder:** Includes primary breeder farms and multiplier farms for table-egg-type chickens.
- **Production farm:** Produces final product for human consumption.
  - **Broiler farm:** Produces chickens for meat.
  - **Table-egg farm:** Produces eggs for human consumption.
  - **Turkey farm:** Produces turkeys for meat.
- **Pullet farm:** Raises young female birds that will be placed on laying farms, etc. (either breeder farms or table-egg farms). A pullet farm does not have adult breeding hens.

Operation average: The average value for all operations. A single value for each operation is summed over all operations reporting divided by the number of operations reporting. For example, operation average of characteristics of last completed flock (see table a., p 74) is calculated by summing reported average characteristics over all operations divided by the number of operations.

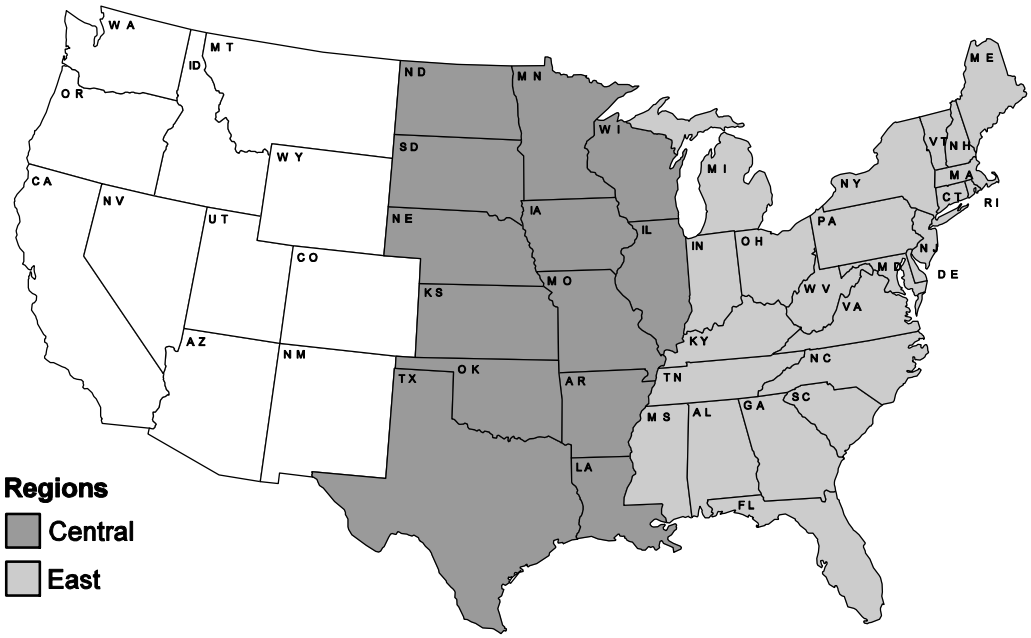
Examples of a 95% Confidence Interval



Population estimates: Population estimates in this report are provided with a measure of precision called the standard error. A 95-percent confidence interval can be created with bounds equal to the estimate plus or minus two standard errors. If the only error is sampling error, the confidence intervals created in this manner will contain the true population mean 95 out of 100 times. In the example to the left, an estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in limits of 2.8 and 4.0. Alternatively, the 90-percent confidence interval would be created by multiplying the standard error by 1.65 instead of 2. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported (0.0). If there were no reports of the event, no standard error was reported (—). References to estimates being higher or lower than other estimates are based on the 95-percent confidence intervals not overlapping.

Shavings: The bedding on the floor of the poultry houses. Common bedding materials include wood shavings and rice hulls.

Poultry 2010 Regions



Section I: Population Estimates

A. Area Surrounding Farm

1. Region

Primary breeder and multiplier farms that produced broilers were concentrated in the East region. More than 8 of 10 primary breeder farms that produced table-egg-type chickens (84.5 percent) were located in the Central region.

Percentage of farms by region and by farm type:

	Percent Farms									
	Farm Type									
	Primary breeder—broiler		Primary breeder—table egg		Multiplier—broiler		Multiplier—table egg		All breeder farms	
Region	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Central	29.6	(5.6)	84.5	(13.2)	21.9	(1.7)	41.6	(6.6)	23.5	(1.6)
East	70.4	(5.6)	15.5	(13.2)	78.1	(1.7)	58.4	(6.6)	76.5	(1.6)
Total	100.0		100.0		100.0		100.0		100.0	

2. Number of birds (poultry) per square mile

About 3 of 4 breeder farms (76.7 percent) were located in counties with 2,000 or more birds per square mile.

a. Percentage of breeder farms by number of birds (poultry) per square mile in farm's county, and by region:

	Percent Breeder Farms					
	Region					
	Central		East		All farms	
Number of birds	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Less than 100	9.4	(4.4)	8.7	(2.0)	8.8	(1.8)
100 to less than 2,000	24.0	(3.3)	11.6	(2.3)	14.5	(2.0)
2,000 or more	66.6	(5.0)	79.7	(2.7)	76.7	(2.4)
Total	100.0		100.0		100.0	

Six of 10 primary breeder farms (59.0 percent) and 8 of 10 multiplier farms (78.9 percent) were located in counties with 2,000 or more birds per square mile.

b. Percentage of farms by number of birds (poultry) per square mile in farm's county, and by farm type:

	Percent Farms			
	Farm Type			
	Primary breeder		Multiplier	
Number of birds	Percent	Std. error	Percent	Std. error
Less than 100	9.1	(2.5)	8.8	(2.1)
100 to less than 2,000	31.9	(2.1)	12.3	(2.2)
2,000 or more	59.0	(2.4)	78.9	(2.7)
Total	100.0		100.0	

The majority of broiler breeder farms (77.9 percent) were located in counties with 2,000 or more birds per square mile. The majority of table-egg breeder farms (54.1 percent) were located in counties with 100 to fewer than 2,000 birds per square mile.

c. Percentage of farms by number of birds (poultry) per square mile in farm's county, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number of birds	Percent	Std. error	Percent	Std. error
Less than 100	8.9	(1.9)	6.6	(1.8)
100 to less than 2,000	13.2	(2.0)	54.1	(5.1)
2,000 or more	77.9	(2.5)	39.3	(5.0)
Total	100.0		100.0	

3. Number of poultry farms per square mile

About one-half the breeder farms in the East region (50.9 percent) were located in counties with 0.25 poultry farms or more per square mile. In the Central region, the majority of breeder farms (60.0 percent) were located in counties with 0.125 to fewer than 0.25 poultry farms per square mile.

a. Percentage of breeder farms by number of poultry farms per square mile in farm's county, and by region:

	Percent Breeder Farms					
	Region					
	Central		East		All farms	
Number of poultry farms	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Less than 0.05	2.5	(0.6)	14.0	(2.7)	11.3	(2.0)
0.05 to less than 0.125	32.2	(5.0)	20.1	(2.8)	22.9	(2.4)
0.125 to less than 0.25	60.0	(5.0)	15.0	(2.1)	25.5	(1.9)
0.25 or more	5.3	(1.9)	50.9	(2.5)	40.3	(2.0)
Total	100.0		100.0		100.0	

About 4 of 10 primary breeder and multiplier farms (38.7 and 40.5 percent, respectively) were located in counties with 0.25 poultry farms or more per square mile.

b. Percentage of farms by number of poultry farms per square mile in farm's county, and by farm type:

	Percent Farms			
	Farm Type			
	Primary breeder		Multiplier	
Number of poultry farms	Percent	Std. error	Percent	Std. error
Less than 0.05	0.0	(—)	12.8	(2.3)
0.05 to less than 0.125	25.2	(4.1)	22.6	(2.7)
0.125 to less than 0.25	36.1	(5.4)	24.1	(2.1)
0.25 or more	38.7	(5.5)	40.5	(2.1)
Total	100.0		100.0	

Photograph courtesy of Frank T. Jones

About 4 of 10 table-egg breeder farms (43.8 percent) were located in counties with 0.05 to less than 0.125 poultry farms per square mile.

c. Percentage of farms by number of poultry farms per square mile in farm's county, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number of poultry farms	**Percent**	**Std. error**	**Percent**	**Std. error**
Less than 0.05	10.8	(2.1)	29.0	(4.8)
0.05 to less than 0.125	22.2	(2.5)	43.8	(5.1)
0.125 to less than 0.25	26.2	(2.0)	2.9	(2.9)
0.25 or more	40.8	(2.0)	24.3	(5.4)
Total	100.0		100.0	

4. Neighboring premises

On average, both primary breeder farms and multiplier farms were more than 2 miles away from a water body where wild water fowl congregate. About one-half of respondents did not know the distance to the nearest premises with backyard poultry or to a live-poultry market. For those who did know, the average distance to the nearest premises with backyard poultry was 2.5 miles, and the average distance to the nearest live-poultry market was more than 20 miles. Processing or rendering facilities were 25.5 miles away, on average.

a. Average distance (in miles) from farm to nearest neighboring premises, by farm type:

Average Distance (miles)

	Farm Type							
	Primary breeder		Multiplier		All farms		Did not know	
Premises	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Pct.**	**Std. error**
Water body where wild water fowl congregate	2.4	(0.4)	3.2	(0.4)	3.1	(0.4)	20.2	(2.6)
Premises with commercial poultry that contracts with this company	2.0	(0.2)	3.0	(0.3)	2.9	(0.3)	6.0	(1.5)
Premises with commercial poultry, different company	4.3	(1.5)	6.5	(0.8)	6.3	(0.7)	22.8	(2.1)
Premises with backyard, hobby, or fighting poultry	1.3	(0.1)	2.7	(0.3)	2.5	(0.2)	50.1	(3.0)
Live poultry market or poultry flea market	20.8	(1.8)	21.2	(1.5)	21.1	(1.4)	58.1	(2.6)
Processing or rendering facility	19.7	(2.4)	26.1	(1.3)	25.5	(1.2)	36.5	(2.4)

Table-egg breeder farms were farther away from other commercial poultry premises (either same company or different company) on average than broiler breeder farms. Conversely, broiler breeder farms were farther away from a water body where wild water fowl congregated on average than layer breeder farms, although table-egg breeders were still an average of 1.1 miles away from a water body.

b. Average distance (in miles) from farm to nearest neighboring premises, by farm type:

	Average Distance (miles)			
	Farm Type			
	Broiler breeder		**Table-egg breeder**	
Premises	**Average**	**Std. error**	**Average**	**Std. error**
Water body where wild water fowl congregate	3.1	(0.4)	1.1	(0.2)
Premises with commercial poultry that contracts with this company	2.8	(0.3)	9.1	(0.7)
Premises with commercial poultry, different company	5.9	(0.7)	17.7	(1.1)
Premises with backyard, hobby, or fighting poultry	2.5	(0.2)	4.5	(2.4)
Live poultry market or poultry flea market	21.1	(1.4)	*	
Processing or rendering facility	25.5	(1.2)	18.3	(3.1)

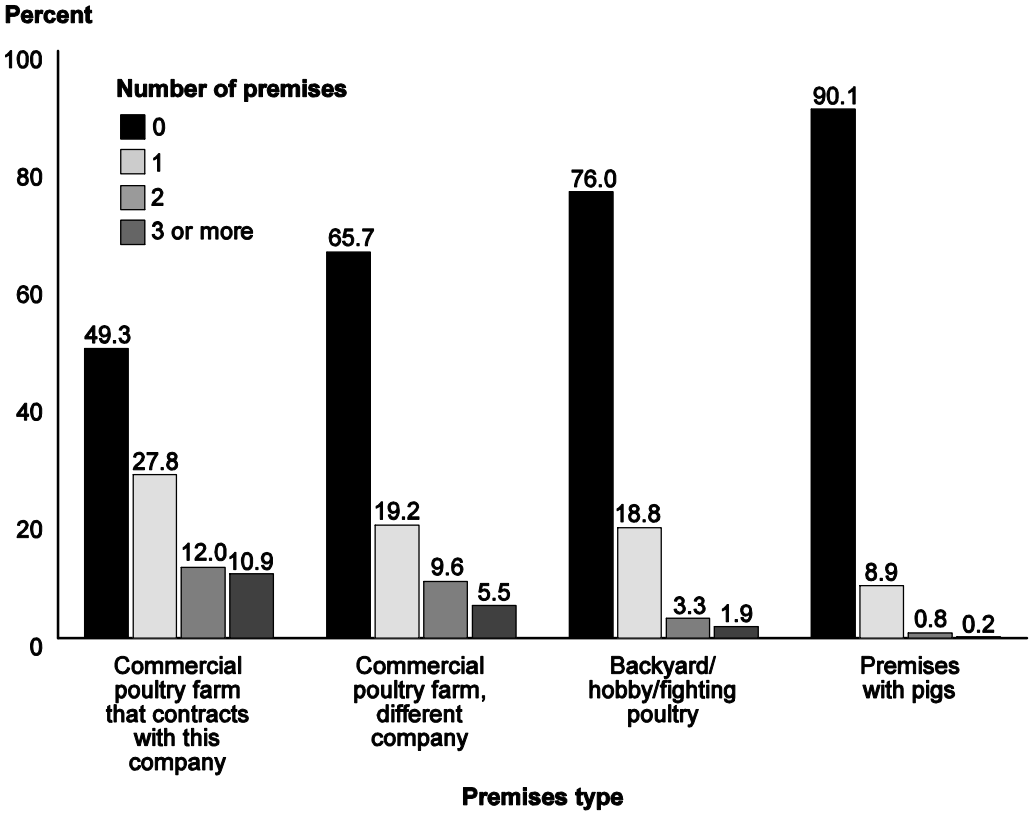
*Too few responses to estimate.

The majority of breeder farms were located more than 1 mile from a commercial poultry farm belonging to a different company, backyard poultry, or premises with pigs. About one-half of breeder farms (49.3 percent) had no commercial poultry farms that contracted with their company located within a 1-mile radius of the farm.

c. Percentage of breeder farms by type and number of premises within a 1-mile radius:

	Percent Breeder Farms								
	Number of Premises								
	0		1		2		3 or more		
Premises type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Commercial poultry farm that contracts with this company	49.3	(3.2)	27.8	(3.0)	12.0	(2.4)	10.9	(1.8)	100.0
Commercial poultry farm, different company	65.7	(3.0)	19.2	(2.7)	9.6	(2.0)	5.5	(1.4)	100.0
Backyard/hobby/ fighting poultry	76.0	(2.9)	18.8	(2.8)	3.3	(1.3)	1.9	(1.2)	100.0
Premises with pigs	90.1	(2.2)	8.9	(2.2)	0.8	(0.8)	0.2	(0.2)	100.0

Percentage of breeder farms by type and number of premises within a 1-mile radius



About 4 of 10 primary breeder farms (39.9 percent) and 2 of 10 multiplier farms (21.9 percent) were located within a 1-mile radius of a backyard poultry flock.

d. Percentage of farms by type of premises within a 1-mile radius and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Premises type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Commercial poultry farm that contracts with this company	49.1	(5.5)	50.9	(3.5)	50.7	(3.2)
Commercial poultry farm, different company	38.1	(4.8)	33.9	(3.3)	34.3	(3.0)
Backyard/hobby/ fighting poultry	39.9	(5.6)	21.9	(3.2)	24.0	(2.9)
Premises with pigs	9.8	(3.6)	9.9	(2.5)	9.9	(2.2)

A small percentage of farms (1.4 percent) had free-ranging backyard poultry within 100 feet of the farm perimeter during the previous 12 months.

e. Percentage of farms that had seen free-ranging backyard poultry within 100 feet of the farm during the previous 12 months, by region:

Percent Farms					
Region					
Central		East		All farms	
Percent	**Std. error**	**Percent**	**Std. error**	**Percent**	**Std. error**
4.2	(3.5)	0.5	(0.3)	1.4	(0.9)

f. Percentage of primary breeder and multiplier farms that had seen free-ranging backyard poultry within 100 feet of the farm during the previous 12 months:

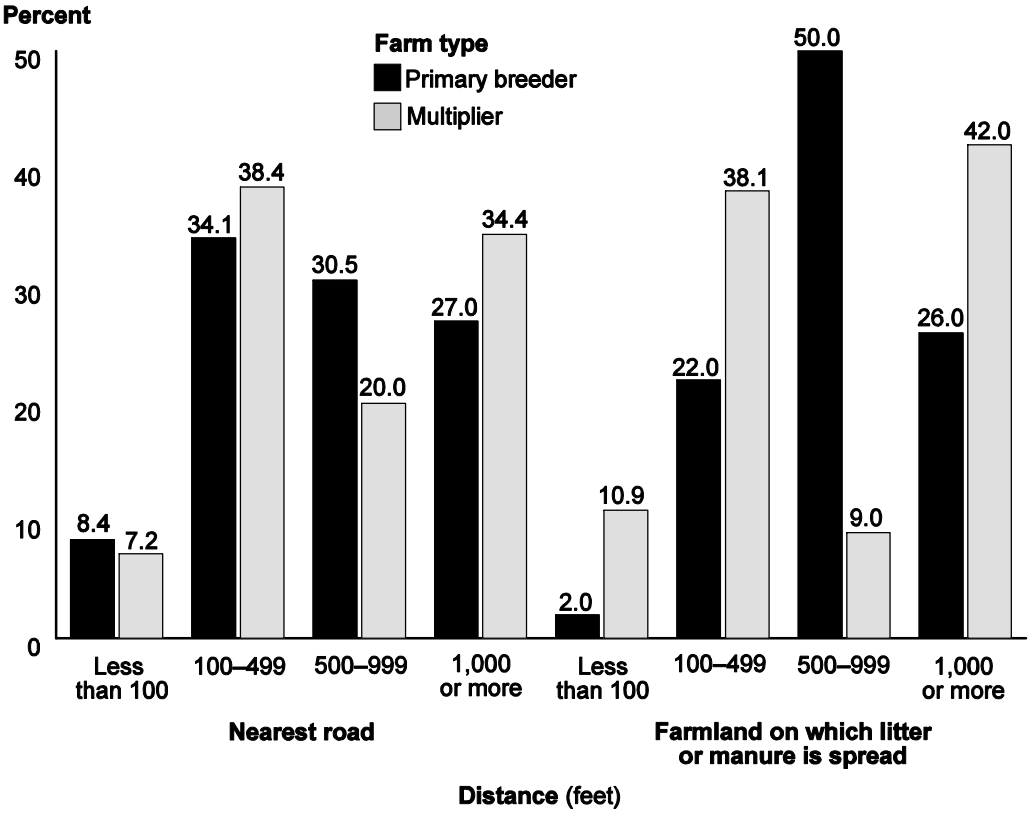
Percent Farms			
Farm Type			
Primary breeder		Multiplier	
Percent	Std. error	Percent	Std. error
3.8	(2.7)	1.1	(0.9)

On over one-half of primary breeder and multiplier farms (57.5 and 54.4 percent, respectively), the nearest road was 500 or more feet from any of the farms' poultry houses. On less than 10 percent of primary breeder and multiplier farms (8.4 and 7.2 percent, respectively), the nearest road was less than 100 feet from any of the farms' poultry houses. On over three-fourths of primary breeder farms (76.0 percent) and over one-half of multiplier farms (51.0 percent), the nearest farmland on which litter or manure was spread was 500 or more feet away from any of the farms' poultry houses. (See Section B.4 on p 27 for more information about litter application to land.)

g. Percentage of primary breeder and multiplier farms by shortest distance (in feet) from any poultry house to a road or to farmland on which litter or manure is spread:

Percent Farms									
Distance (feet)									
	Less than 100		100–499		500–999		1,000 or more		
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Nearest road									
Primary breeder	8.4	(1.6)	34.1	(5.4)	30.5	(5.5)	27.0	(5.2)	100.0
Multiplier	7.2	(2.1)	38.4	(3.5)	20.0	(2.7)	34.4	(3.2)	100.0
Nearest farmland on which litter or manure is spread									
Primary breeder	2.0	(2.0)	22.0	(5.0)	50.0	(3.8)	26.0	(5.3)	100.0
Multiplier	10.9	(2.3)	38.1	(3.6)	9.0	(2.0)	42.0	(3.5)	100.0

Percentage of primary breeder and multiplier farms by shortest distance (in feet) from any poultry house to a road or to farmland on which litter or manure is spread



B. Breeder Farm Characteristics

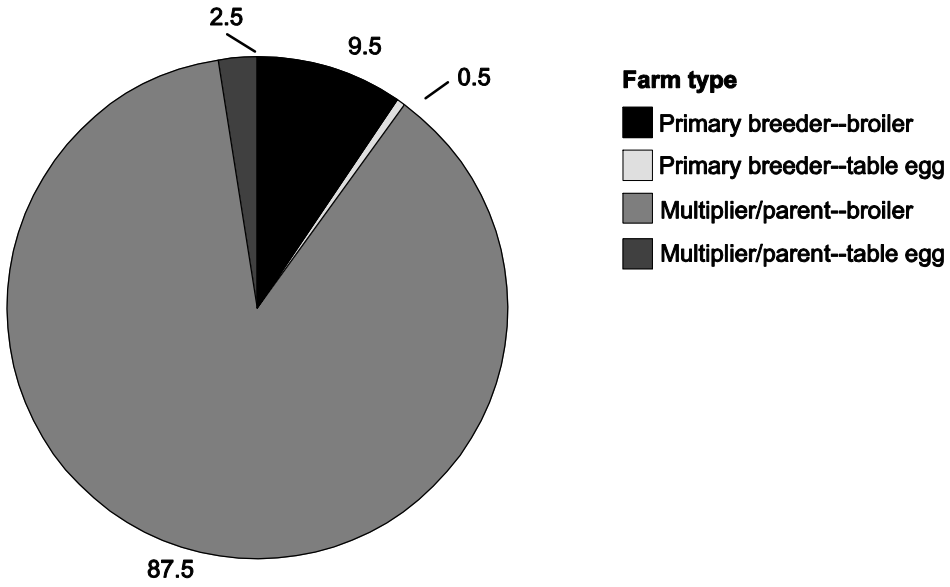
1. Farm description

The Poultry 2010 breeder farm study included broiler and table-egg breeder farms belonging to breeder companies and production companies. Overall, 10.0 percent of broiler and table-egg breeder farms were primary breeder farms. The majority of breeder farms (87.5 percent) were broiler multiplier farms.

a. Percentage of breeder farms by farm type:

Farm type	Percent farms	Std. error
Primary breeder—broiler	9.5	(0.0)
Primary breeder—table egg	0.5	(0.1)
Multiplier/parent—broiler	87.5	(0.0)
Multiplier/parent—table egg	2.5	(0.1)
Total	100.0	

Percentage of breeder farms by farm type



Birds on all primary breeder farms (100.0 percent) and birds on about 9 of 10 table-egg multiplier farms (90.9 percent) were owned by breeder companies. Birds on nearly all broiler multiplier farms (98.7 percent) were owned by production companies.

b. Percentage of farms by bird ownership and by farm type:

	Percent Farms									
	Farm Type									
	Primary breeder—broiler		Primary breeder—table egg		Multiplier—broiler		Multiplier—table egg		All breeder farms	
Bird ownership	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Breeder company	100.0	(—)	100.0	(—)	1.3	(0.5)	90.9	(0.4)	13.5	(0.4)
Production company	0.0	(—)	0.0	(—)	98.7	(0.5)	9.1	(0.4)	86.5	(0.4)
Total	100.0		100.0		100.0		100.0		100.0	

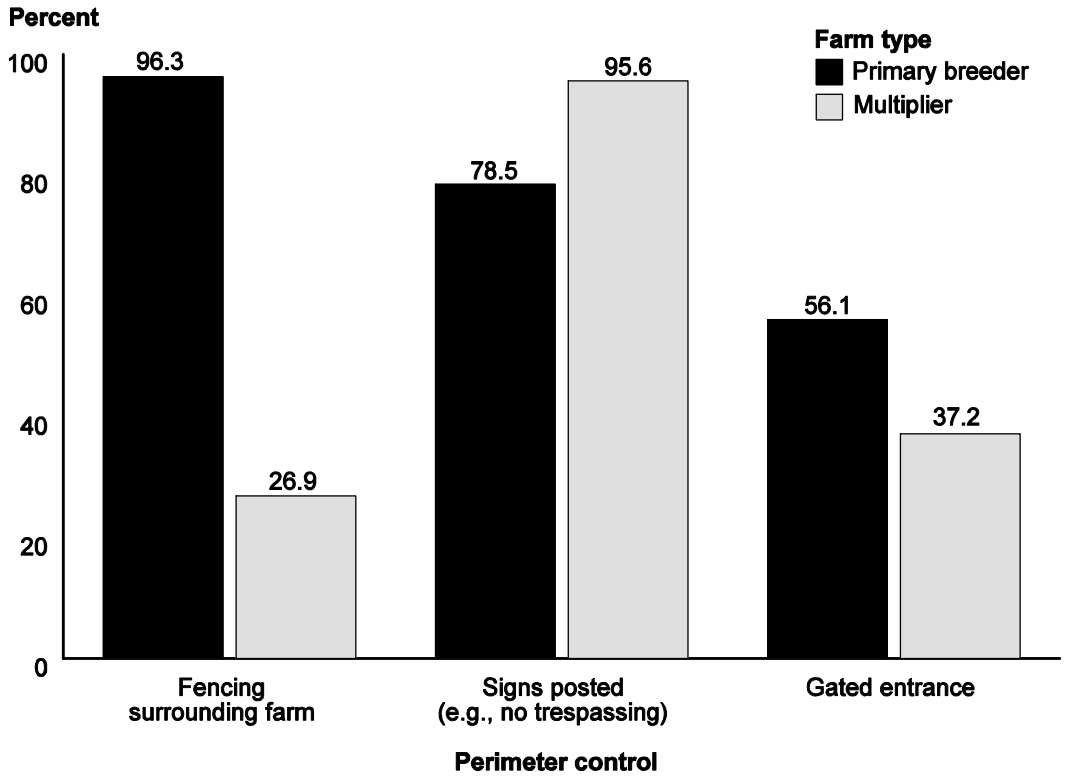
2. Farm access

Nearly all primary breeder farms (96.3 percent) had fencing surrounding the farm. Signs were posted on nearly all multiplier farms (95.6 percent).

a. Percentage of farms by perimeter control and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Perimeter control	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Fencing surrounding farm	96.3	(0.6)	26.9	(3.0)	34.1	(2.7)
Signs posted (e.g., no trespassing)	78.5	(2.2)	95.6	(1.5)	93.8	(1.3)
Gated entrance	56.1	(0.6)	37.2	(2.6)	39.1	(2.3)

Percentage of farms by perimeter control and by farm type



Signs were posted on over 9 of 10 broiler breeder farms (93.7 percent) and all table-egg breeder farms (100.0 percent). Fencing and gated entrances were more commonly found on broiler breeder farms.

b. Percentage of farms by perimeter control and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Perimeter control	**Percent**	**Std. error**	**Percent**	**Std. error**
Fencing surrounding farm	34.6	(2.8)	17.3	(3.2)
Signs posted (e.g., no trespassing)	93.7	(1.4)	100.0	(—)
Gated entrance	39.8	(2.4)	17.3	(3.2)

On 81.2 percent of farms, vehicles came onto the farm via gravel road.

c. Percentage of farms by road surface used by vehicles coming onto the farm and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Road surface	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Hardtop/asphalt	2.2	(1.0)	2.8	(0.7)	2.7	(0.7)
Gravel	88.6	(3.1)	80.4	(2.9)	81.2	(2.6)
Dirt	9.2	(3.0)	16.8	(2.8)	16.1	(2.5)
Total	100.0		100.0		100.0	

d. Percentage of farms by road surface used by vehicles coming onto the farm and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Road surface	Percent	Std. error	Percent	Std. error
Hardtop/asphalt	2.8	(0.7)	1.3	(1.3)
Gravel	80.8	(2.7)	94.7	(3.3)
Dirt	16.4	(2.6)	4.0	(3.0)
Total	100.0		100.0	

3. Farm vehicles

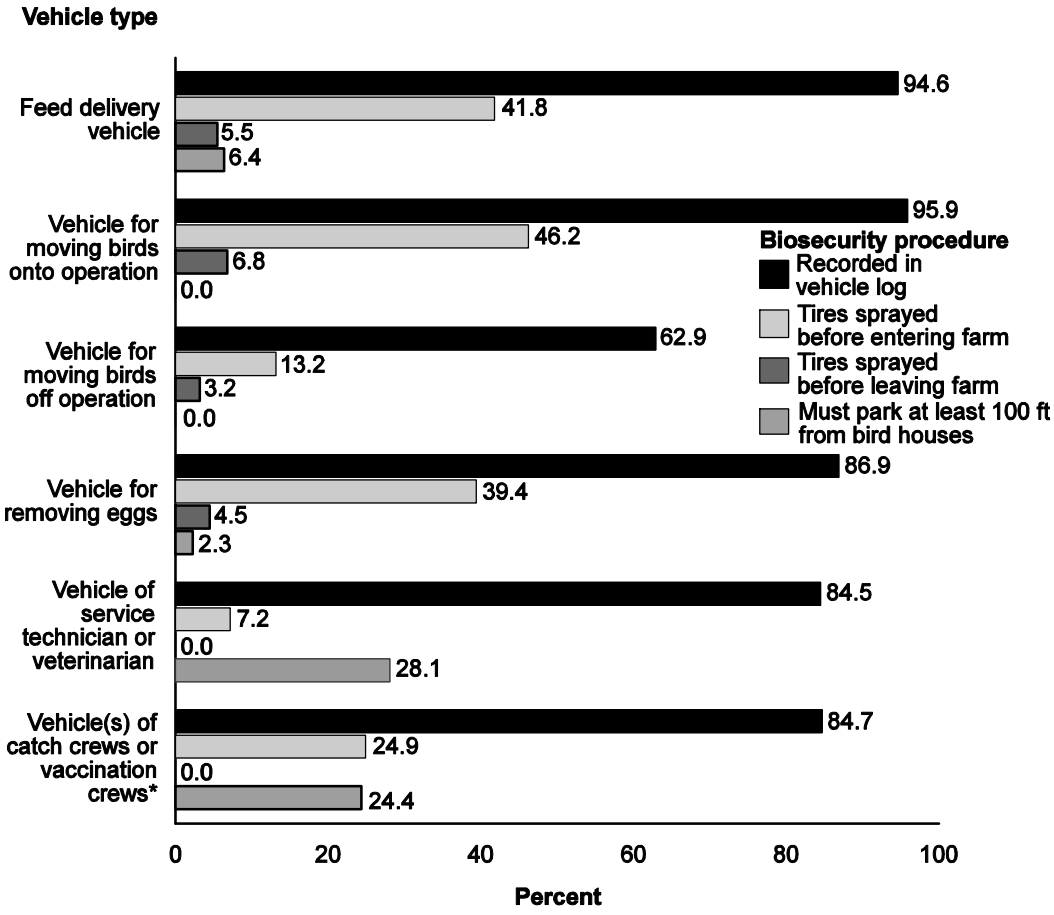
The majority of primary breeder farms required that visits by the specified vehicle types be recorded in a vehicle log. About 4 of 10 primary breeder farms required that the tires on feed trucks, vehicles moving birds onto the operation, and vehicles removing eggs be sprayed before entering the farm. Vehicle tires are often sprayed with a disinfectant to prevent introduction of disease.

a. Percentage of **primary breeder** farms by biosecurity procedures required for the following vehicle types visiting the farm:

	Percent Primary Breeder Farms							
	Biosecurity Procedure							
	Recorded in vehicle log		Tires sprayed before entering farm		Tires sprayed before leaving farm		Must park at least 100 ft from bird houses	
Vehicle type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Feed delivery vehicle	94.6	(3.2)	41.8	(4.2)	5.5	(3.2)	6.4	(3.3)
Vehicle for moving birds onto operation	95.9	(2.5)	46.2	(3.2)	6.8	(3.7)	0.0	(—)
Vehicle for moving birds off operation	62.9	(4.9)	13.2	(4.6)	3.2	(2.4)	0.0	(—)
Vehicle for removing eggs	86.9	(3.8)	39.4	(4.6)	4.5	(3.1)	2.3	(2.3)
Vehicle of service technician or veterinarian	84.5	(4.9)	7.2	(3.7)	0.0	(—)	28.1	(5.4)
Vehicle(s) of catch crews or vaccination crews*	84.7	(5.1)	24.9	(5.5)	0.0	(—)	24.4	(5.5)

*For farms that have catch or vaccination crews.

Percentage of primary breeder farms by biosecurity procedures required for the following vehicle types visiting the farm



*For farms that have catch or vaccination crews.

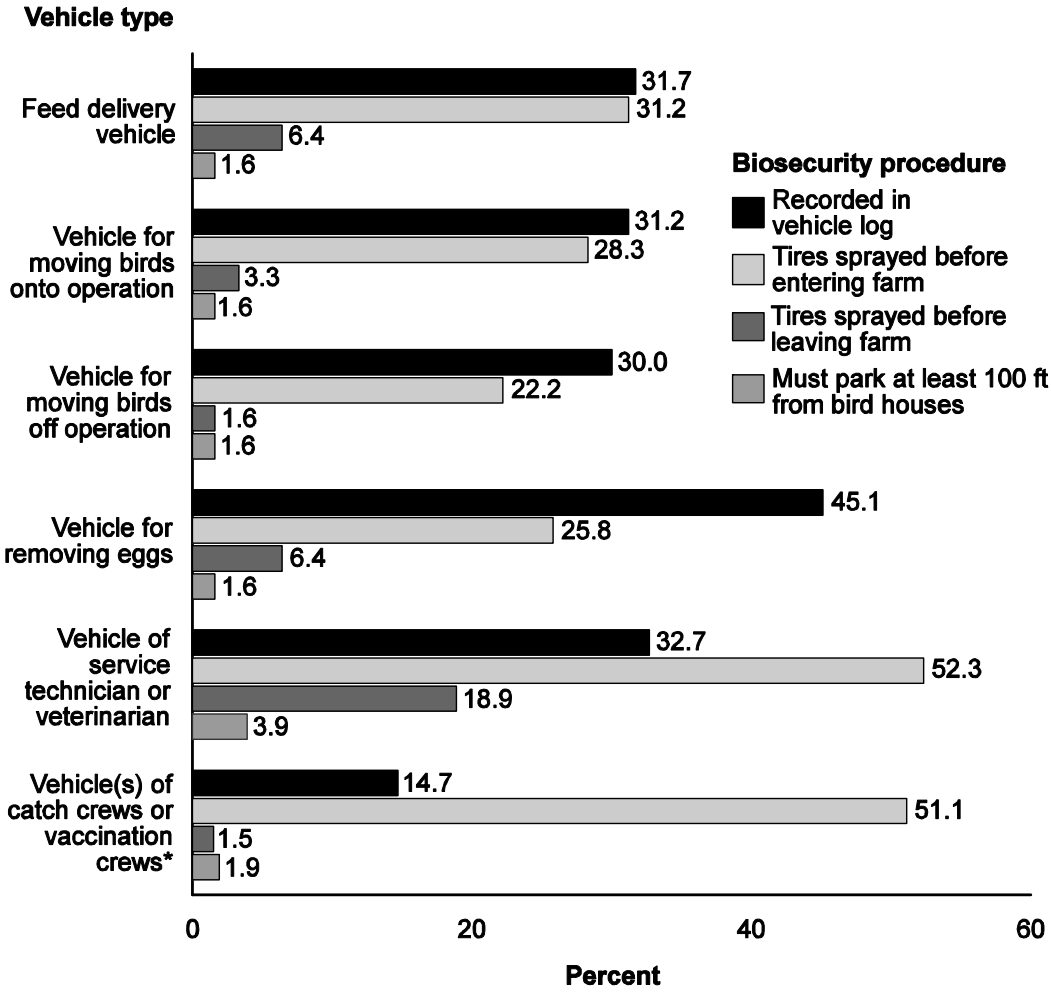
At least 3 of 10 multiplier farms kept a vehicle log to record visits by feed trucks, vehicles moving birds onto and off the operation, vehicles removing eggs, and vehicles of a service technician or veterinarian. Over one-half of multiplier farms sprayed the tires of service technician/veterinarian and catch/vaccination crew vehicles before allowing the vehicles entrance to the farm.

b. Percentage of **multiplier** farms by biosecurity procedures required for the following vehicle types visiting the farm:

	Percent Multiplier Farms							
	Biosecurity Procedure							
	Recorded in vehicle log		Tires sprayed before entering farm		Tires sprayed before leaving farm		Must park at least 100 ft from bird houses	
Vehicle type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Feed delivery vehicle	31.7	(2.3)	31.2	(2.2)	6.4	(2.0)	1.6	(0.5)
Vehicle for moving birds onto operation	31.2	(2.2)	28.3	(2.2)	3.3	(1.5)	1.6	(0.5)
Vehicle for moving birds off operation	30.0	(2.2)	22.2	(1.9)	1.6	(1.0)	1.6	(0.5)
Vehicle for removing eggs	45.1	(2.2)	25.8	(2.0)	6.4	(2.0)	1.6	(0.5)
Vehicle of service technician or veterinarian	32.7	(2.4)	52.3	(2.0)	18.9	(1.8)	3.9	(1.3)
Vehicle(s) of catch crews or vaccination crews*	14.7	(2.4)	51.1	(2.4)	1.5	(1.0)	1.9	(0.6)

*For farms that have catch or vaccination crews.

Percentage of multiplier farms by biosecurity procedures required for the following vehicle types visiting the farm



*For farms that have catch or vaccination crews.

Overall, 99.4 percent of breeder farms used shavings as bedding in poultry houses.

c. Percentage of farms that used shavings, by farm type:

Percent Farms					
Farm Type					
Primary breeder		Multiplier		All farms	
Percent	Std. error	Percent	Std. error	Percent	Std. error
95.1	(0.7)	99.8	(0.1)	99.4	(0.0)

All broiler breeder farms and 80.0 percent of table-egg breeder farms used shavings.

d. Percentage of farms that used shavings, by farm type:

Percent Farms			
Farm Type			
Broiler breeder		Table-egg breeder	
Percent	Std. error	Percent	Std. error
100.0	(—)	80.0	(1.3)

On nearly all primary breeder farms that used shavings (94.8 percent), the vehicle used to transport shavings onto the farm was used exclusively on the company's farms, while on 9 of 10 multiplier farms (90.8 percent), the vehicle used to transport shavings was also used for other companies' farms.

e. For farms that used shavings, percentage of farms by best description of vehicle used most often to transport shavings onto the farm during the previous 12 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Vehicle description	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Vehicle dedicated to this farm only	0.5	(0.5)	0.0	(—)	0.0	(0.0)
Vehicle dedicated to this company only	94.8	(3.3)	9.2	(1.5)	16.4	(1.5)
Vehicle also used on other companies' or independent farms	4.7	(3.3)	90.8	(1.5)	83.6	(1.5)
Total	100.0		100.0		100.0	

For table-egg breeder farms that used shavings, about one-third (34.3 percent) restricted the use of the vehicle used to transport shavings to the company's farms.

f. For farms that used shavings, percentage of farms by best description of vehicle used most often to transport shavings onto the farm during the previous 12 months, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Vehicle description	**Percent**	**Std. error**	**Percent**	**Std. error**
Vehicle dedicated to this farm only	0.0	(—)	1.8	(1.8)
Vehicle dedicated to this company only	16.0	(1.5)	34.3	(5.3)
Vehicle also used on other companies' or independent farms	84.0	(1.5)	63.9	(5.3)
Total	100.0		100.0	

4. Litter

For breeder farms that used shavings, about 9 of 10 farms (88.2 percent) moved used litter off the farm. Litter was not reused for a second flock on any breeder farms. Producers may use more than one litter disposal practice.

a. For farms that used shavings, percentage of farms by disposition of used litter after the completion of a flock's laying cycle, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Litter disposition	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Stored on farm	2.4	(2.4)	17.5	(2.8)	16.3	(2.6)
Applied to land on this farm	43.9	(5.9)	61.4	(3.1)	59.9	(2.9)
Moved off the farm	85.2	(2.9)	88.5	(2.2)	88.2	(2.0)
Reused for another flock	0.0	(—)	0.0	(—)	0.0	(—)

No table-egg breeder farms stored used litter on the farm, while 16.7 percent of broiler breeder farms did.

b. For farms that used shavings, percentage of farms by disposition of used litter after the completion of a flock's laying cycle, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Litter disposition	Percent	Std. error	Percent	Std. error
Stored on farm	16.7	(2.7)	0.0	(—)
Applied to land on this farm	59.2	(3.0)	89.6	(3.8)
Moved off the farm	88.1	(2.1)	92.6	(4.3)
Reused for another flock	0.0	(—)	0.0	(—)

The majority of breeder farms that stored used litter (80.7 percent) stored the litter 100 to 499 feet from the nearest poultry house.

c. For breeder farms that stored used litter on the farm, percentage of farms by distance (in feet) from litter storage to nearest poultry house:

Distance (feet)	**Percent breeder farms**	**Std. error**
Less than 100	15.0	(7.5)
100–499	80.7	(7.7)
500 or more	4.3	(2.5)
Total	100.0	

A very small percentage of primary breeder and multiplier farms applied litter and/or manure from another farm to their land. Typically, when litter from another farm was applied it was from the same company.

d. Percentage of farms that applied litter and/or manure from another farm to their land, by litter/manure source and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		**Multiplier**		**All farms**	
Litter/manure source	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Same company	2.3	(2.3)	2.0	(0.9)	2.1	(0.8)
Different company	0.0	(—)	0.2	(0.2)	0.2	(0.2)
Either	2.3	(2.3)	2.0	(0.9)	2.1	(0.8)

A very small percentage of broiler breeder farms and no layer breeder farms applied litter and/or manure from another farm to their land.

e. Percentage of farms that applied litter and/or manure from another farm to their land, by litter/manure source and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Litter/manure source	**Percent**	**Std. error**	**Percent**	**Std. error**
Same company	2.1	(0.9)	0.0	(—)
Different company	0.2	(0.2)	0.0	(—)
Either	2.1	(0.9)	0.0	(—)

5. Source of drinking water

About 8 of 10 multiplier farms (82.6 percent) used well water for their birds' drinking water, and nearly one-half of primary breeder farms (45.1 percent) used municipal water.

a. Percentage of farms by source of birds' drinking water and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Source of drinking water	**Pct.**	**Std. error**	**Pct.**	**Std. Error**	**Pct.**	**Std. error**
Surface water	0.0	(—)	0.7	(0.7)	0.7	(0.7)
Well water	54.9	(5.0)	82.6	(2.8)	79.8	(2.6)
Municipal water system	45.1	(5.0)	16.4	(2.8)	19.2	(2.6)
Other water system	0.0	(—)	0.3	(0.2)	0.3	(0.2)
Total	100.0		100.0		100.0	

For primary breeder farms that did not use municipal water for their birds' drinking water, about two-thirds (68.7 percent) sanitized the water. Some farms may monitor water for bacteria and sanitize the water only when necessary.

b. For farms that did not use municipal water for birds' drinking water, percentage of farms that sanitized the water (e.g., chlorination, peroxide, etc.), by farm type:

Percent Farms					
Farm Type					
Primary breeder		Multiplier		All farms	
Percent	Std. error	Percent	Std. error	Percent	Std. error
68.7	(8.2)	27.7	(2.6)	30.7	(2.5)

A higher percentage of table-egg breeder farms than broiler breeder farms used municipal water for their birds' drinking water (40.0 and 18.6 percent, respectively).

c. Percentage of farms by source of birds' drinking water and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Source of drinking water	Percent	Std. error	Percent	Std. error
Surface water	0.7	(0.7)	0.0	(—)
Well water	80.4	(2.7)	60.0	(4.2)
Municipal water system	18.6	(2.7)	40.0	(4.2)
Other water system	0.3	(0.2)	0.0	(—)
Total	100.0		100.0	

Photograph courtesy of Frank T. Jones

Nearly all table-egg breeder farms that did not use municipal water for their birds' drinking water sanitized the water (95.8 percent).

d. For farms that did not use municipal water for birds' drinking water, percentage of farms that sanitized the water (e.g., chlorination, peroxide, etc.), by farm type:

Percent Farms			
Farm Type			
Broiler breeder		Table-egg breeder	
Percent	Std. error	Percent	Std. error
29.1	(2.5)	95.8	(2.0)

The percentages of farms by sources of birds' drinking water were similar by region.

e. Percentage of farms by source of birds' drinking water and by region:

	Percent Farms			
	Region			
	Central		East	
Source of drinking water	**Percent**	**Std. error**	**Percent**	**Std. error**
Surface water	0.0	(—)	0.8	(0.9)
Well water	72.8	(6.7)	82.0	(2.7)
Municipal water system	27.2	(6.7)	16.8	(2.7)
Other water system	0.0	(—)	0.4	(0.3)
Total	100.0		100.0	

C. House Characteristics

1. Number of poultry houses

A total of 5.3 percent of primary breeder farms and 26.9 percent of multiplier farms had three or more poultry houses on the farm.

a. Percentage of farms by number of poultry houses on the farm, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Number of houses	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1	23.2	(3.4)	19.1	(2.5)	19.5	(2.3)
2	71.5	(4.2)	54.0	(3.5)	55.8	(3.2)
3–4	4.6	(2.7)	26.6	(3.0)	24.4	(2.7)
5 or more	0.7	(0.5)	0.3	(0.2)	0.3	(0.2)
Total	100.0		100.0		100.0	

Broiler breeder farms tended to have more poultry houses on the farm than table-egg breeder farms.

b. Percentage of farms by number of poultry houses on the farm, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number of houses	Percent	Std. error	Percent	Std. error
1	17.9	(2.4)	71.7	(5.0)
2	57.2	(3.3)	7.7	(3.5)
3–4	24.7	(2.8)	14.3	(4.7)
5 or more	0.2	(0.2)	6.3	(2.5)
Total	100.0		100.0	

The percentages of farms by number of poultry houses were similar across regions.

c. Percentage of breeder farms by number of poultry houses on the farm, and by region:

	Percent Breeder Farms			
	Region			
	Central		East	
Number of houses	**Percent**	**Std. error**	**Percent**	**Std. error**
1	16.3	(5.6)	20.5	(2.5)
2	50.8	(7.6)	57.3	(3.5)
3–4	32.6	(7.0)	21.9	(2.8)
5 or more	0.3	(0.2)	0.3	(0.2)
Total	100.0		100.0	

2. Age of poultry houses

The majority of poultry houses on primary breeder and multiplier farms were 10 to 19 years old. The percentages of houses across age categories were similar on primary breeder and multiplier farms.

a. Percentage of poultry houses on the farm, by age of house and by farm type:

	Percent Houses					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Age of house (years)	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. Error**
Less than 5	14.7	(4.5)	13.7	(2.1)	13.8	(1.9)
5–9	19.9	(4.2)	21.9	(2.7)	21.7	(2.5)
10–19	58.3	(5.9)	55.7	(3.2)	55.9	(3.0)
20 or more	7.1	(3.0)	8.7	(1.2)	8.6	(1.2)
Total	100.0		100.0		100.0	

The percentages of poultry houses by age category did not differ substantially for broiler breeder and table-egg breeder farms.

b. Percentage of poultry houses on the farm, by age of house and by farm type:

	Percent Houses			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Age of house (years)	**Percent**	**Std. error**	**Percent**	**Std. error**
Less than 5	13.8	(2.0)	16.6	(6.7)
5–9	21.8	(2.6)	18.0	(5.6)
10–19	56.1	(3.1)	47.4	(7.2)
20 or more	8.3	(1.2)	18.0	(5.9)
Total	100.0		100.0	

The percentage of poultry houses by age category did not differ substantially by region.

c. Percentage of poultry houses on the farm, by age of house and by region:

	Percent Houses			
	Region			
	Central		East	
Age of house (years)	**Percent**	**Std. error**	**Percent**	**Std. error**
Less than 5	21.0	(4.2)	11.5	(2.1)
5–9	13.4	(4.8)	24.4	(2.9)
10–19	62.2	(6.4)	53.8	(3.3)
20 or more	3.4	(1.1)	10.3	(1.5)
Total	100.0		100.0	

3. Housing security

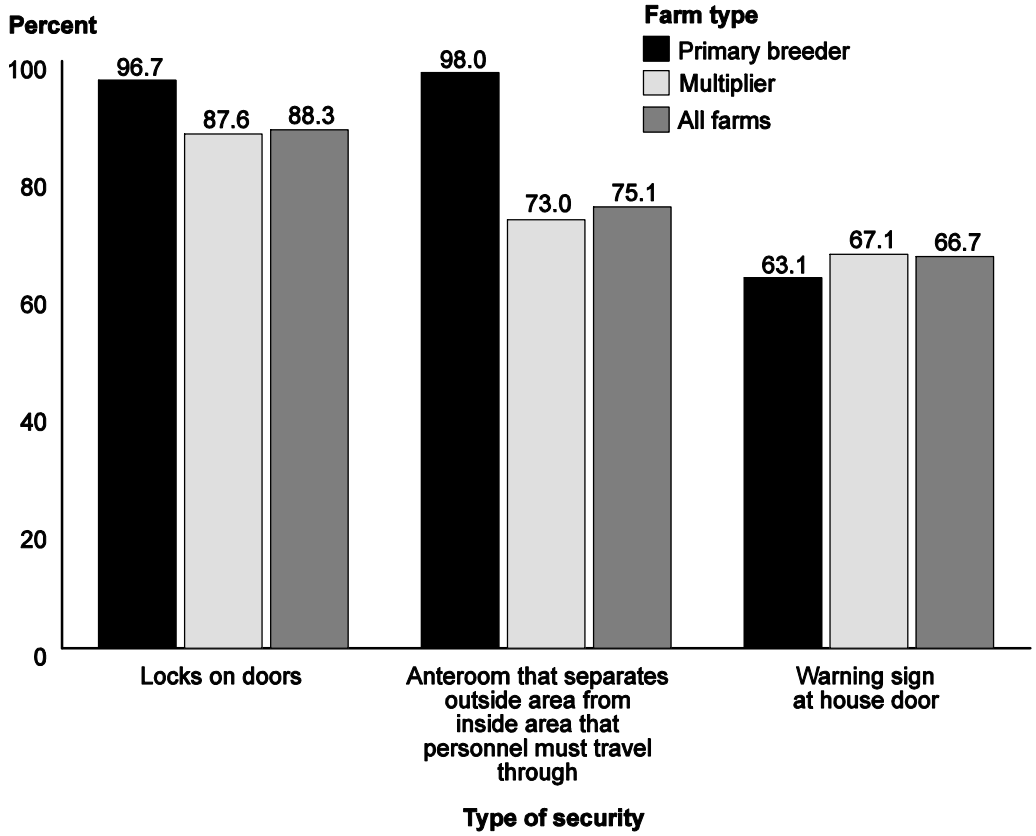
The majority of poultry houses had locks on the doors, anterooms that personnel traveled through, and warning signs at the house door.

a. Percentage of poultry houses on the farm, by type of house security and by farm type:

	Percent Houses					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Type of security	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Locks on doors	96.7	(3.2)	87.6	(1.8)	88.3	(1.7)
Anteroom that separates outside area from inside area that personnel must travel through	98.0	(2.0)	73.0	(2.7)	75.1	(2.5)
Warning sign at house door	63.1	(5.9)	67.1	(2.6)	66.7	(2.4)

Photo courtesy Judy Rodriguez

Percentage of poultry houses on the farm, by type of house security and by farm type



A higher percentage of houses on table-egg breeder farms had anterooms and warning signs at the house door compared with houses on broiler breeder farms.

b. Percentage of poultry houses on the farm, by type of house security and by farm type:

	Percent Houses			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Type of security	**Percent**	**Std. error**	**Percent**	**Std. error**
Locks on doors	88.5	(1.7)	82.2	(10.0)
Anteroom that separates outside area from inside area that personnel must travel through	74.7	(2.6)	93.3	(3.4)
Warning sign at house door	66.1	(2.5)	91.8	(3.9)

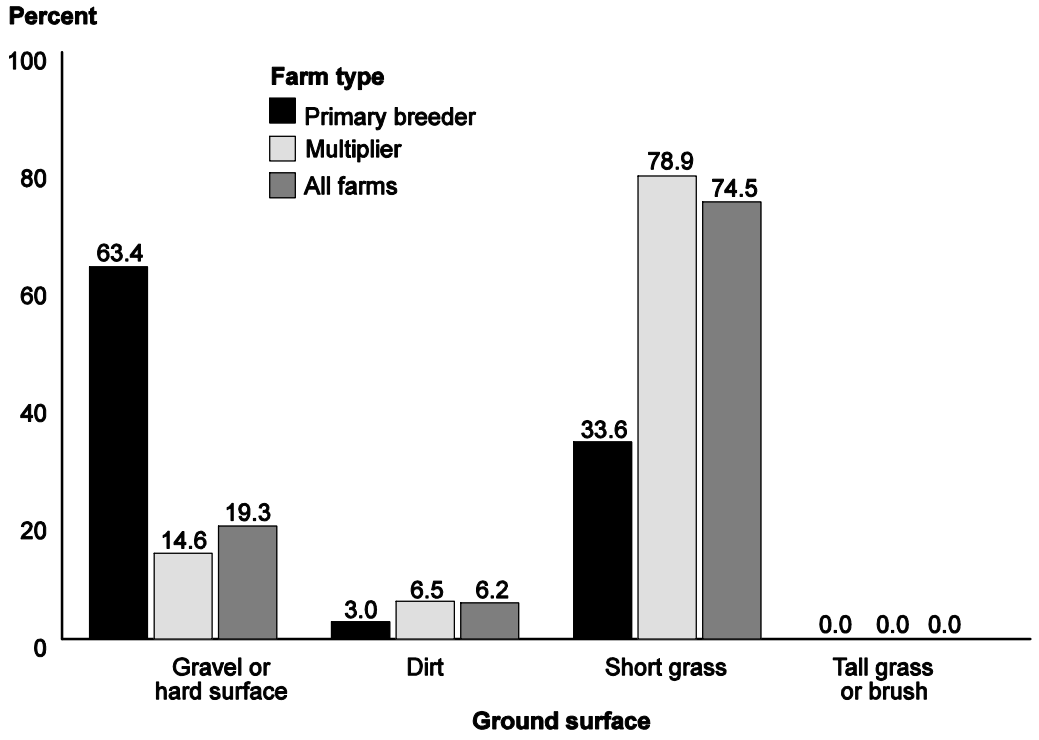
4. Ground surface surrounding poultry houses

The majority of primary breeder farms (63.4 percent) had gravel or a hard surface surrounding their poultry houses, and the majority of multiplier farms (78.9 percent) had short grass immediately surrounding their houses. No breeder farms had tall grass or brush immediately surrounding their houses.

a. Percentage of farms by ground surface immediately surrounding the poultry houses, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Ground surface	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Gravel or hard surface	63.4	(5.6)	14.6	(1.9)	19.3	(1.8)
Dirt	3.0	(2.1)	6.5	(1.7)	6.2	(1.5)
Short grass	33.6	(5.5)	78.9	(2.3)	74.5	(2.2)
Tall grass or brush	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0	

Percentage of farms by ground surface immediately surrounding the poultry houses, and by farm type

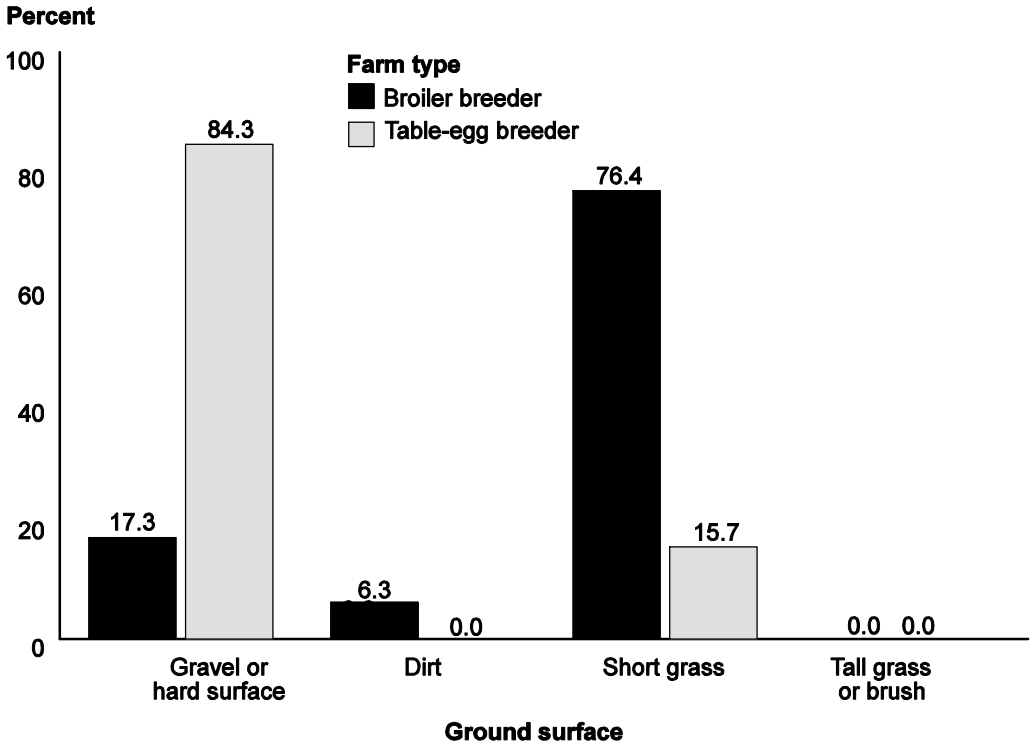


The majority of table-egg breeder farms (84.3 percent) had gravel or a hard surface surrounding their poultry houses, and the majority of broiler breeder farms (76.4 percent) had short grass immediately surrounding their houses.

b. Percentage of farms by ground surface immediately surrounding the poultry houses, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Ground surface	**Percent**	**Std. error**	**Percent**	**Std. error**
Gravel or hard surface	17.3	(1.9)	84.3	(3.4)
Dirt	6.3	(1.6)	0.0	(—)
Short grass	76.4	(2.2)	15.7	(3.4)
Tall grass or brush	0.0	(—)	0.0	(—)
Total	100.0		100.0	

Percentage of farms by ground surface immediately surrounding the poultry houses, and by farm type



A higher percentage of farms had short grass immediately surrounding their poultry houses in the Central region than in the East region (86.1 and 71.0 percent, respectively).

c. Percentage of farms by ground surface immediately surrounding the poultry houses, and by region:

	Percent Farms			
	Region			
	Central		East	
Ground surface	**Percent**	**Std. error**	**Percent**	**Std. error**
Gravel or hard surface	13.1	(2.1)	21.2	(2.4)
Dirt	0.8	(0.8)	7.8	(2.0)
Short grass	86.1	(2.1)	71.0	(2.8)
Tall grass or brush	0.0	(—)	0.0	(—)
Total	100.0		100.0	

5. Cleaning procedures for poultry houses

All primary breeder farms and nearly all multiplier farms washed and disinfected feeders; flushed and disinfected water lines; washed down and disinfected houses; and cleaned fans, ventilation systems, and cool cells between every flock. All primary breeder farms and about one-half of multiplier farms (46.0 percent) also dry cleaned walls/ceilings between every flock. About 8 of 10 primary breeder farms and about 4 of 10 multiplier farms washed and disinfected water tanks after every flock. Some farms, particularly farms using municipal water, may not have water tanks.

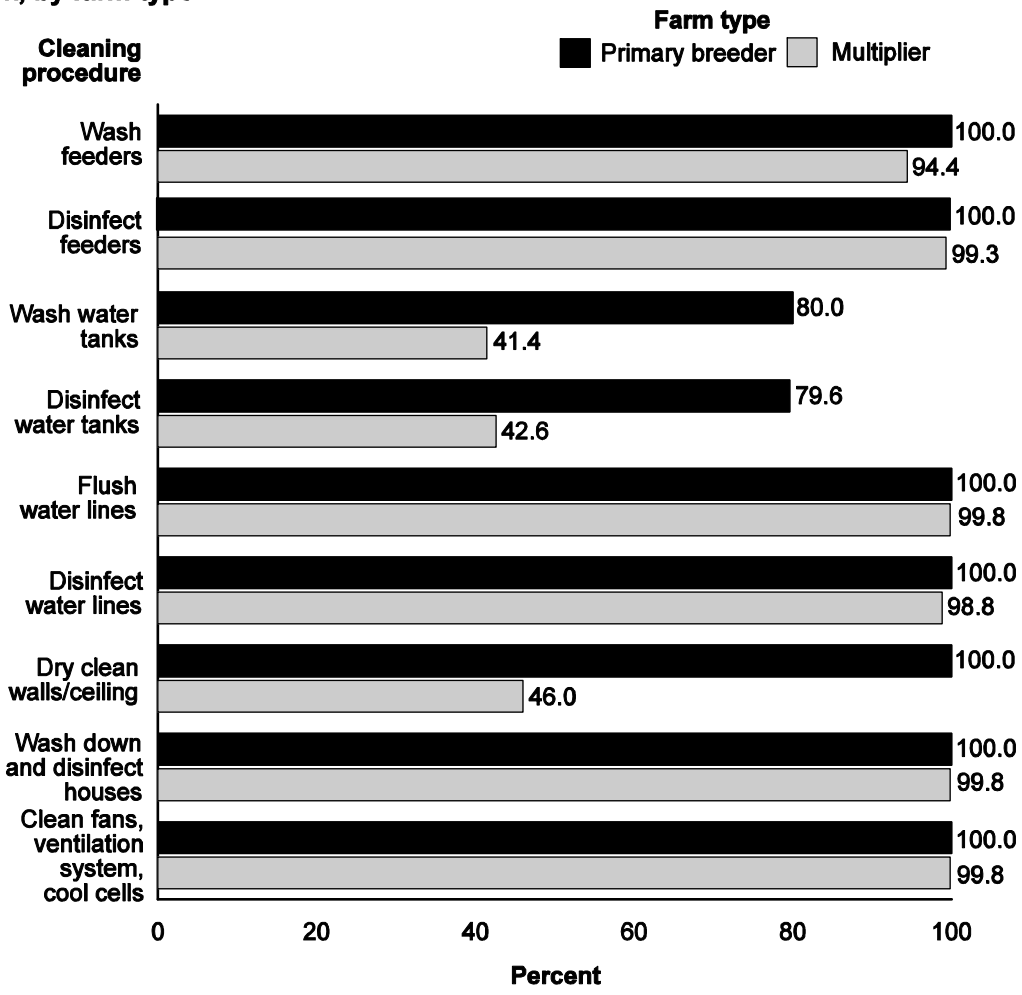
a. Percentage of **primary breeder** farms by cleaning procedures used for poultry houses, and by frequency procedures were used:

	Percent Primary Breeder Farms								
	Frequency								
	After every flock		After two flocks		After three or more flocks		Never		
Cleaning procedure	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Wash feeders	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0
Disinfect feeders	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0
Wash water tanks	80.0	(4.9)	0.0	(—)	0.0	(—)	20.0	(4.9)	100.0
Disinfect water tanks	79.6	(4.9)	0.0	(—)	0.0	(—)	20.4	(4.9)	100.0
Flush water lines	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0
Disinfect water lines	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0
Dry clean walls/ceiling	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0
Wash down and disinfect houses	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0
Clean fans, ventilation system, cool cells	100.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	100.0

b. Percentage of **multiplier** farms by cleaning procedures used for poultry houses, and by frequency procedures were used:

	Percent Multiplier Farms								
	Frequency								
	After every flock		After two flocks		After three or more flocks		Never		
Cleaning procedure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Wash feeders	94.4	(1.7)	0.2	(0.1)	0.0	(—)	5.4	(1.7)	100.0
Disinfect feeders	99.3	(0.3)	0.2	(0.1)	0.0	(—)	0.5	(0.3)	100.0
Wash water tanks	41.4	(3.5)	0.3	(0.1)	0.0	(—)	58.3	(3.5)	100.0
Disinfect water tanks	42.6	(3.5)	0.3	(0.1)	0.0	(—)	57.1	(3.5)	100.0
Flush water lines	99.8	(0.1)	0.2	(0.1)	0.0	(—)	0.0	(—)	100.0
Disinfect water lines	98.8	(0.4)	0.2	(0.1)	0.0	(—)	1.0	(0.4)	100.0
Dry clean walls/ceiling	46.0	(3.4)	0.2	(0.1)	0.0	(—)	53.8	(3.4)	100.0
Wash down and disinfect houses	99.8	(0.1)	0.2	(0.1)	0.0	(—)	0.0	(—)	100.0
Clean fans, ventilation system, cool cells	99.8	(0.1)	0.2	(0.1)	0.0	(—)	0.0	(—)	100.0

Percentage of farms that used the following cleaning procedures after every flock, by farm type



6. Down time between flocks

Usual down time for houses between flocks was at least 28 days for nearly all primary breeder and multiplier farms (99.6 and 91.0 percent, respectively).

a. Percentage of farms by usual number of days houses were down between flocks, and by farm type:

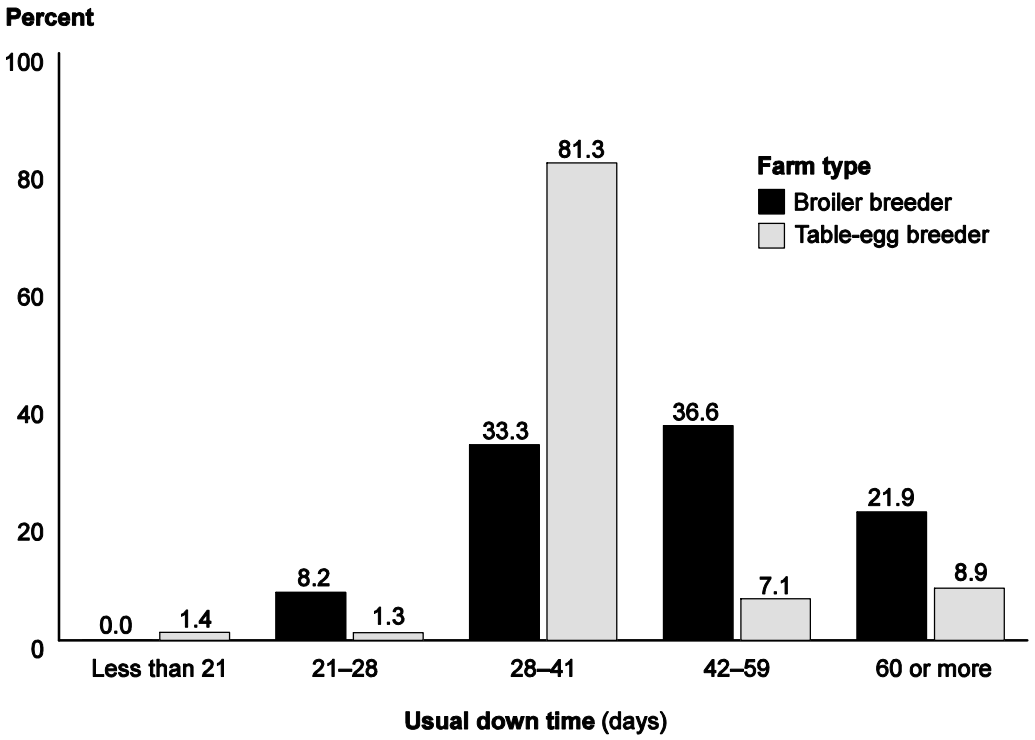
	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Usual down time (days)	**Pct.**	**Std. Error**	**Pct.**	**Std. error**	**Pct.**	**Std. Error**
Less than 21	0.4	(0.4)	0.0	(—)	0.1	(0.0)
21–28	0.0	(—)	9.0	(1.8)	8.0	(1.6)
28–41	31.0	(2.1)	35.2	(3.4)	34.7	(3.1)
42–59	62.2	(3.8)	32.5	(3.0)	35.7	(2.7)
60 or more	6.4	(3.2)	23.3	(1.0)	21.5	(1.0)
Total	100.0		100.0		100.0	

About 8 of 10 table-egg breeder farms (81.3 percent) had a usual down time of 28 to 41 days for houses between flocks. Over one-half of broiler breeder farms (58.5 percent) had a usual down time of 42 days or longer.

b. Percentage of farms by usual number of days houses were down between flocks, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Usual down time (days)	**Percent**	**Std. error**	**Percent**	**Std. error**
Less than 21	0.0	(—)	1.4	(1.4)
21–28	8.2	(1.7)	1.3	(1.3)
28–41	33.3	(3.2)	81.3	(3.0)
42–59	36.6	(2.8)	7.1	(2.9)
60 or more	21.9	(1.0)	8.9	(3.5)
Total	100.0		100.0	

Percentage of farms by usual number of days houses were down between flocks, and by farm type



The average down time for houses between flocks was 42 days.

c. Average number of days houses were usually down between flocks, by farm type:

Average Number Days					
Farm Type					
Primary breeder		Multiplier		All farms	
Average	Std. error	Average	Std. error	Average	Std. error
43.3	(0.9)	41.8	(0.5)	42.0	(0.5)

Broiler breeder farms had a higher average down time for houses between flocks than table-egg breeder farms (42.3 and 32.5 days, respectively).

d. Average number of days houses were usually down between flocks, by farm type:

Average Number Days			
Farm Type			
Broiler breeder		Table-egg breeder	
Average	Std. error	Average	Std. error
42.3	(0.5)	32.5	(1.0)

Photograph courtesy of Frank T. Jones

D. People

1. Personnel

On about 8 of 10 farms (82.3 percent) the producer or other employees lived on-site. The producer or other employees worked at another commercial poultry facility on no primary breeder farms and on less than 1 percent of multiplier farms.

a. Percentage of farms on which the producer/employees lived on-site or worked at another commercial poultry facility, by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
	Pct.	Std. Error	Pct.	Std. error	Pct.	Std. error
Producer or other employee lives on-site	73.7	(4.2)	83.2	(2.5)	82.3	(2.3)
Producer or other employee works at another commercial poultry production or processing facility	0.0	(—)	0.6	(0.3)	0.5	(0.3)

The percentage of farms in which the producer or other employees lived on-site or worked at another commercial poultry facility was similar for broiler breeder and table-egg breeder farms.

b. Percentage of farms on which the producer/employees lived on-site or worked at another commercial poultry facility, by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
	Percent	Std. error	Percent	Std. error
Producer or other employee lives on-site	82.1	(2.4)	87.9	(3.9)
Producer or other employee works at another commercial poultry production or processing facility	0.5	(0.3)	0.0	(—)

English was the primary language spoken by the producer for nearly all farms (96.1 percent). Spanish was the primary language for employees on 17.9 percent of farms. “Other” languages were mainly Asian.

c. Percentage of farms by primary language spoken by the producer and employees, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Language	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Producer						
English	93.8	(2.8)	96.4	(1.2)	96.1	(1.1)
Spanish	0.0	(—)	0.7	(0.7)	0.7	(0.7)
Other	6.2	(2.8)	2.9	(1.0)	3.2	(0.9)
Total	100.0		100.0		100.0	
Employees						
English	79.9	(4.9)	79.6	(2.6)	79.7	(2.4)
Spanish	13.2	(4.4)	18.6	(2.5)	17.9	(2.2)
Other	6.9	(2.9)	1.8	(1.0)	2.4	(0.9)
Total	100.0		100.0		100.0	

A higher percentage of table-egg breeder farms had Spanish-speaking employees compared with broiler breeder farms (59.7 and 16.6 percent of farms, respectively).

d. Percentage of farms by primary language spoken by the producer and employees, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Language	**Percent**	**Std. error**	**Percent**	**Std. error**
Producer				
English	96.0	(1.2)	100.0	(—)
Spanish	0.7	(0.7)	0.0	(—)
Other	3.3	(1.0)	0.0	(—)
Total	100.0		100.0	
Employees				
English	80.9	(2.5)	40.3	(1.5)
Spanish	16.6	(2.3)	59.7	(1.5)
Other	2.5	(1.0)	0.0	(—)
Total	100.0		100.0	

"Other" languages (mainly Asian) were more commonly spoken by producers and employees on farms in the Central region than in the East region.

e. Percentage of breeder farms by primary language spoken by the producer and employees, and by region:

	Percent Breeder Farms			
	Region			
	Central		East	
Language	**Percent**	**Std. error**	**Percent**	**Std. error**
Producer				
English	89.1	(3.5)	98.3	(1.0)
Spanish	0.0	(—)	0.9	(0.9)
Other	10.9	(3.5)	0.8	(0.4)
Total	100.0		100.0	
Employees				
English	77.4	(4.8)	80.3	(2.7)
Spanish	13.7	(3.4)	19.1	(2.7)
Other	8.9	(3.9)	0.6	(0.3)
Total	100.0		100.0	

All primary breeder farms (100 percent) had written biosecurity protocols, and over 9 of 10 primary breeder farms (90.8 percent) conducted formal biosecurity training for employees.

f. Percentage of farms by type of biosecurity training used and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Type of training	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Written biosecurity protocols	100.0	(—)	93.0	(1.9)	93.7	(1.7)
Formal employee biosecurity training	90.8	(1.6)	39.8	(2.6)	45.0	(2.4)

A higher percentage of table-egg breeder farms than broiler breeder farms conducted formal biosecurity training for employees (84.6 and 43.8 percent, respectively).

g. Percentage farms by type of biosecurity training used and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Type of training	**Percent**	**Std. error**	**Percent**	**Std. error**
Written biosecurity protocols	93.5	(1.8)	100.0	(—)
Formal employee biosecurity training	43.8	(2.4)	84.6	(1.8)

2. Visitors

Visitors who entered the poultry houses during the previous 12 months included company service person (99.4 percent of farms), catch crew (91.1 percent), private or company veterinarian (63.7 percent), and other business visitors (62.9 percent). No primary breeder farms had extension agents, wholesaler/buyer/dealers, or renderers enter the poultry houses, and less than 1 percent of primary breeder farms had a nutritionist, customers, or nonbusiness visitors enter the poultry houses.

a. Percentage of farms by type of visitors that entered the poultry houses during the previous 12 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Type of visitor	Pct.	Std. error	Pct.	Std. Error	Pct.	Std. error
Federal/State veterinarian or animal health worker	1.4	(1.1)	12.1	(2.1)	11.2	(1.9)
Extension agent or university veterinarian	0.0	(—)	9.0	(1.8)	8.2	(1.6)
Private or company veterinarian	92.3	(3.2)	61.1	(3.4)	63.7	(3.1)
Company service person	100.0	(—)	99.4	(0.4)	99.4	(0.3)
Nutritionist or feed company consultant	0.9	(0.6)	19.4	(2.6)	17.9	(2.4)
Catch crew	99.0	(1.0)	90.4	(1.9)	91.1	(1.7)
Vaccination crew	23.5	(3.5)	9.2	(1.8)	10.4	(1.7)
Customer (private individual)	0.4	(0.4)	6.6	(1.8)	6.1	(1.7)
Wholesaler, buyer, or dealer	0.0	(—)	0.0	(—)	0.0	(—)
Renderer	0.0	(—)	2.8	(1.2)	2.6	(1.1)
Feed delivery personnel	1.4	(1.1)	19.8	(2.8)	18.3	(2.5)
Other business visitors including other producers and service personnel	71.2	(3.8)	62.1	(3.1)	62.9	(2.8)
Other nonbusiness visitors including neighbors, friends, and school field trips	0.6	(0.6)	16.6	(2.2)	15.2	(2.0)

A higher percentage of table-egg breeder farms than broiler breeder farms had a nutritionist or feed consultant enter the poultry houses during the previous 12 months (65.8 and 16.4 percent, respectively). A higher percentage of broiler breeder farms than table-egg breeder farms had other business visitors enter the poultry houses (64.6 and 8.7 percent, respectively).

b. Percentage of farms by type of visitors that entered the poultry houses during the previous 12 months, and by farm type:

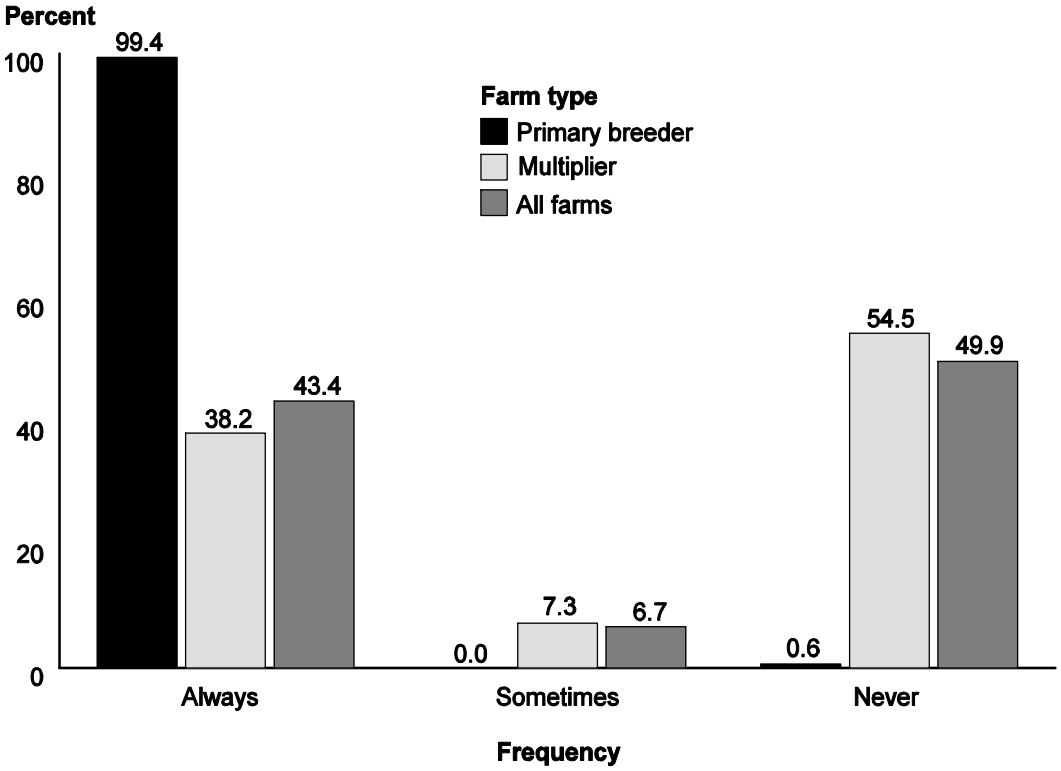
	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Type of visitor	**Percent**	**Std. error**	**Percent**	**Std. error**
Federal/State veterinarian or animal health worker	11.0	(2.0)	16.2	(3.1)
Extension agent or university veterinarian	8.2	(1.7)	7.6	(0.1)
Private or company veterinarian	63.0	(3.2)	86.1	(2.4)
Company service person	99.4	(0.3)	100.0	(—)
Nutritionist or feed company consultant	16.4	(2.5)	65.8	(2.2)
Catch crew	91.3	(1.8)	86.3	(0.0)
Vaccination crew	10.0	(1.7)	22.5	(1.3)
Customer (private individual)	6.1	(1.7)	3.7	(1.8)
Wholesaler, buyer, or dealer	0.0	(—)	0.0	(—)
Renderer	2.7	(1.2)	0.0	(—)
Feed delivery personnel	18.4	(2.6)	14.5	(4.1)
Other business visitors including other producers and service personnel	64.6	(2.9)	8.7	(2.2)
Other nonbusiness visitors including neighbors, friends, and school field trips	15.6	(2.0)	0.0	(—)

Nearly all primary breeder farms (99.4 percent) and about 4 of 10 multiplier farms (38.2 percent) always recorded visits to the poultry houses in a visitor log.

c. Percentage of farms by frequency that visits to the poultry houses were recorded in a visitor log, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Frequency	Pct.	Std. Error	Pct.	Std. error	Pct.	Std. Error
Always	99.4	(0.6)	38.2	(2.3)	43.4	(2.1)
Sometimes	0.0	(—)	7.3	(1.6)	6.7	(1.5)
Never	0.6	(0.6)	54.5	(2.3)	49.9	(2.1)
Total	100.0		100.0		100.0	

Percentage of farms by frequency that visits to the poultry houses were recorded in a visitor log, and by farm type

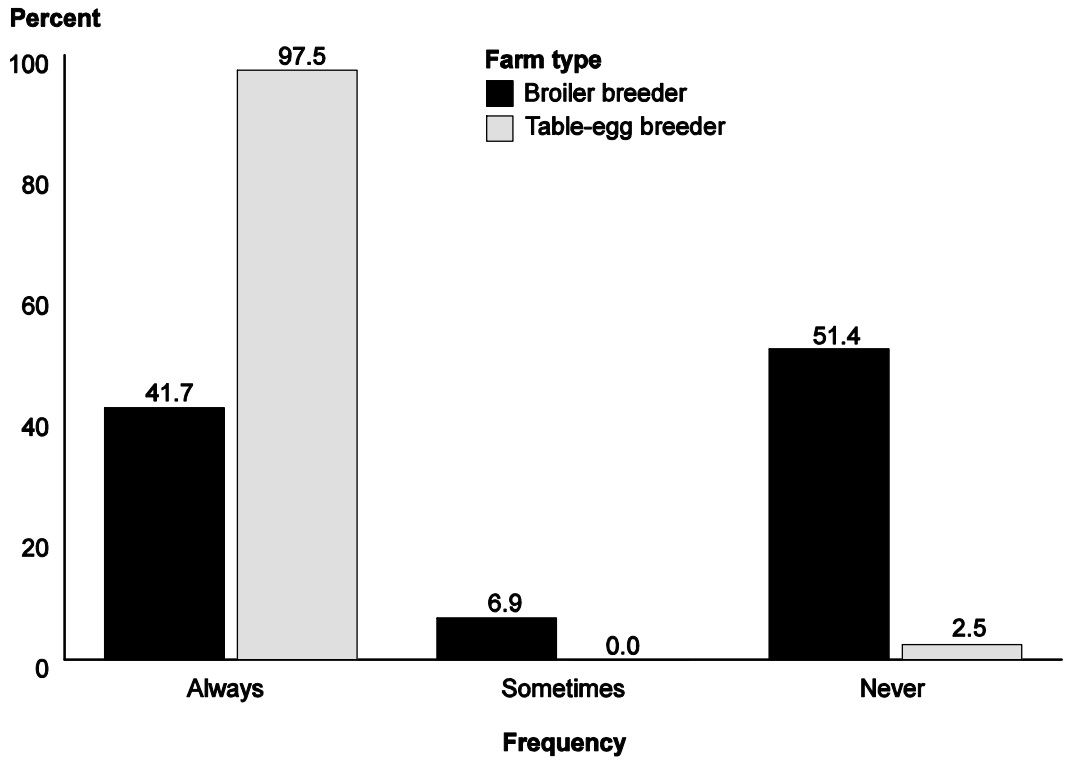


Nearly all table-egg breeder farms (97.5 percent) and about 4 of 10 broiler breeder farms (41.7 percent) always recorded visits to the poultry houses in a visitor log.

d. Percentage of farms by frequency that visits to the poultry houses were recorded in a visitor log, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Frequency	**Percent**	**Std. error**	**Percent**	**Std. error**
Always	41.7	(2.1)	97.5	(1.3)
Sometimes	6.9	(1.5)	0.0	(—)
Never	51.4	(2.2)	2.5	(1.3)
Total	100.0		100.0	

Percentage of farms by frequency that visits to the poultry houses were recorded in a visitor log, and by farm type



3. Biosecurity measures

Over 6 of 10 breeder farms always required that the producer and employees use footwear protection before entering poultry houses, not be around other poultry for at least 24 hours, and not own poultry or birds (66.5, 60.5, and 95.0 percent of farms, respectively).

a. Percentage of breeder farms by biosecurity measures required for the **producer and employees** who entered the poultry houses, and by frequency measures were used:

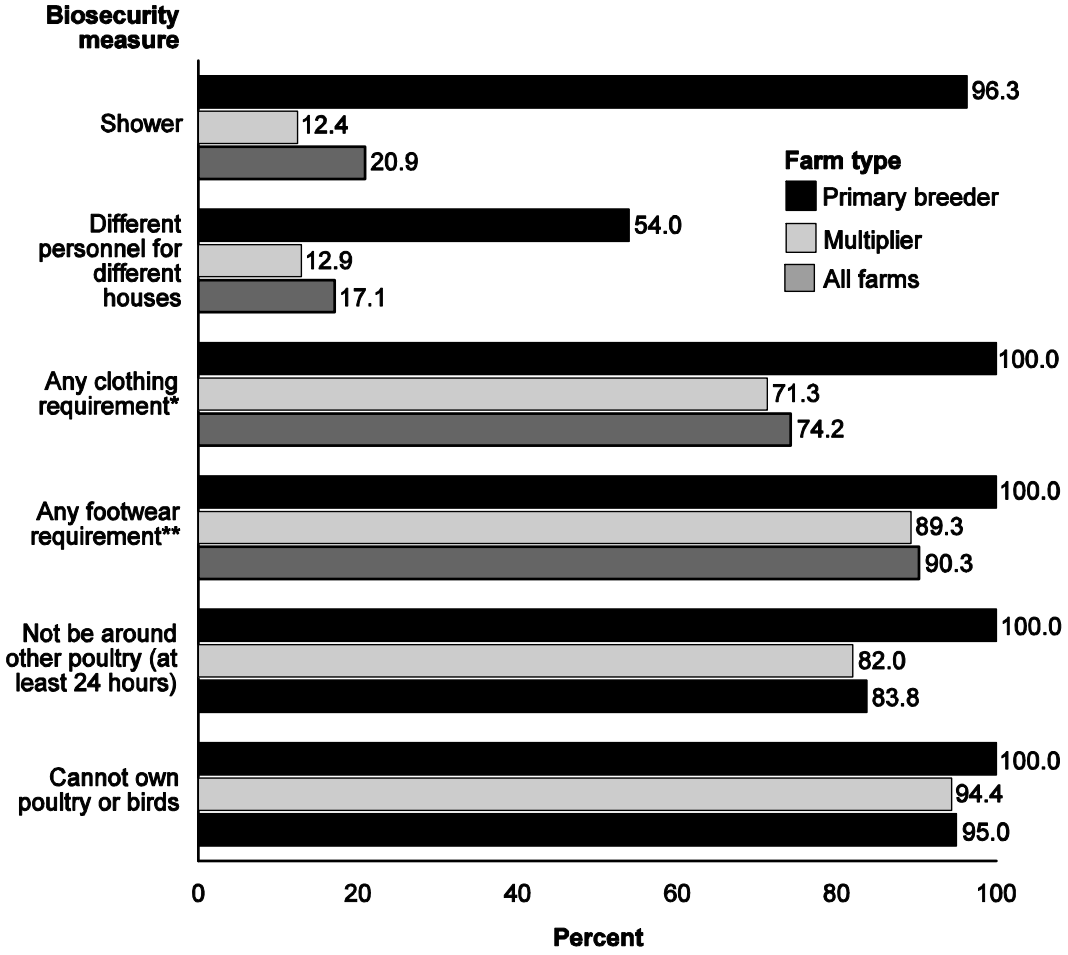
	Percent Breeder Farms						
	Frequency						
	Always		Sometimes		Never		
Biosecurity measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Shower	10.9	(0.7)	10.0	(1.8)	79.1	(1.8)	100.0
Different personnel for different houses	4.2	(1.2)	12.9	(2.0)	82.9	(2.2)	100.0
Wear disposable coveralls	19.9	(1.6)	9.3	(1.6)	70.8	(2.2)	100.0
Change of clothing (washable)	29.7	(1.8)	38.6	(2.5)	31.7	(2.7)	100.0
Any clothing requirement	44.6	(2.0)	29.6	(2.1)	25.8	(2.4)	100.0
Change shoes or use shoe covers	48.2	(2.1)	29.1	(1.9)	22.7	(2.1)	100.0
Foot bath (liquid)	40.7	(1.9)	11.7	(1.9)	47.6	(2.2)	100.0
Foot bath (dry)	21.1	(1.3)	20.7	(1.0)	58.2	(1.0)	100.0
Scrub footwear (bucket and brush)	19.6	(0.5)	5.1	(1.4)	75.3	(1.4)	100.0
Any footwear requirement	66.5	(2.3)	23.8	(1.8)	9.7	(1.8)	100.0
Not be around other poultry (at least 24 hours)	60.5	(2.9)	23.3	(2.7)	16.2	(2.3)	100.0
Cannot own poultry or birds	95.0	(1.4)	0.0	(—)	5.0	(1.4)	100.0

All primary breeder farms required that the producer and employees change clothing, change shoes or use shoe covers before entering poultry houses, not be around poultry for at least 24 hours, and not own poultry or birds. Over 8 of 10 multiplier farms required that the producer and employees use footwear protection, not be around other poultry, and not own poultry or birds.

b. Percentage of farms by biosecurity measures always or sometimes required for the **producer and employees** who entered the poultry houses, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Biosecurity measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Shower	96.3	(0.6)	12.4	(2.0)	20.9	(1.8)
Different personnel for different houses	54.0	(2.7)	12.9	(2.4)	17.1	(2.2)
Wear disposable coveralls	36.8	(5.0)	28.4	(2.4)	29.2	(2.2)
Change of clothing (washable)	100.0	(—)	64.7	(3.0)	68.3	(2.9)
Any clothing requirement	100.0	(—)	71.3	(2.6)	74.2	(2.4)
Change shoes or use shoe covers	100.0	(—)	74.8	(2.4)	77.3	(2.1)
Foot bath (liquid)	95.6	(0.5)	47.6	(2.4)	52.4	(2.2)
Foot bath (dry)	46.8	(1.3)	41.3	(1.1)	41.8	(1.0)
Scrub footwear (bucket and brush)	49.1	(3.4)	22.1	(1.5)	24.7	(1.4)
Any footwear requirement	100.0	(—)	89.3	(2.0)	90.3	(1.8)
Not be around other poultry (at least 24 hours)	100.0	(—)	82.0	(2.5)	83.8	(2.3)
Cannot own poultry or birds	100.0	(—)	94.4	(1.5)	95.0	(1.4)

Percentage of farms by biosecurity measures always or sometimes required for the producer and employees who entered the poultry houses, and by farm type



*Wear disposable coveralls or change clothing.
**Change shoes, use shoe covers, use foot bath, or scrub footwear.

Nearly all farms (93.3 percent) prohibited catch and vaccination crews from owning poultry or birds. Biosecurity practices may differ for catch crews and vaccination crews since catch crews visit at the end of the life of the flock and vaccination crews visit during the flock production period. If practices differed, they would fall in the sometimes category.

c. Percentage of breeder farms by biosecurity measures required for **catch and vaccination crews*** that entered the poultry houses, and by frequency measures were used:

	Percent Breeder Farms						
	Frequency						
	Always		Sometimes		Never		
Biosecurity measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Shower	8.4	(1.3)	1.9	(0.5)	89.7	(1.3)	100.0
Different personnel for different houses	0.6	(0.4)	4.7	(1.2)	94.7	(1.3)	100.0
Wear disposable coveralls	32.8	(3.2)	18.5	(1.8)	48.7	(3.1)	100.0
Change of clothing (washable)	59.4	(2.8)	13.0	(2.4)	27.6	(3.2)	100.0
Any clothing requirement	80.1	(3.1)	3.3	(1.4)	16.6	(3.0)	100.0
Change shoes or use shoe covers	58.3	(2.9)	4.6	(1.6)	37.1	(2.8)	100.0
Foot bath (liquid)	35.5	(3.3)	7.3	(2.0)	57.2	(3.0)	100.0
Foot bath (dry)	15.9	(1.2)	1.3	(0.5)	82.8	(1.2)	100.0
Scrub footwear (bucket and brush)	17.0	(2.2)	4.8	(1.4)	78.2	(2.2)	100.0
Any footwear requirement	66.1	(2.6)	3.0	(1.6)	30.9	(2.3)	100.0
Not be around other poultry (at least 24 hours)	29.4	(3.2)	57.3	(3.1)	13.3	(2.6)	100.0
Cannot own poultry or birds	93.3	(1.6)	2.4	(0.9)	4.3	(1.3)	100.0

*For those operations that had catch or vaccination crews.

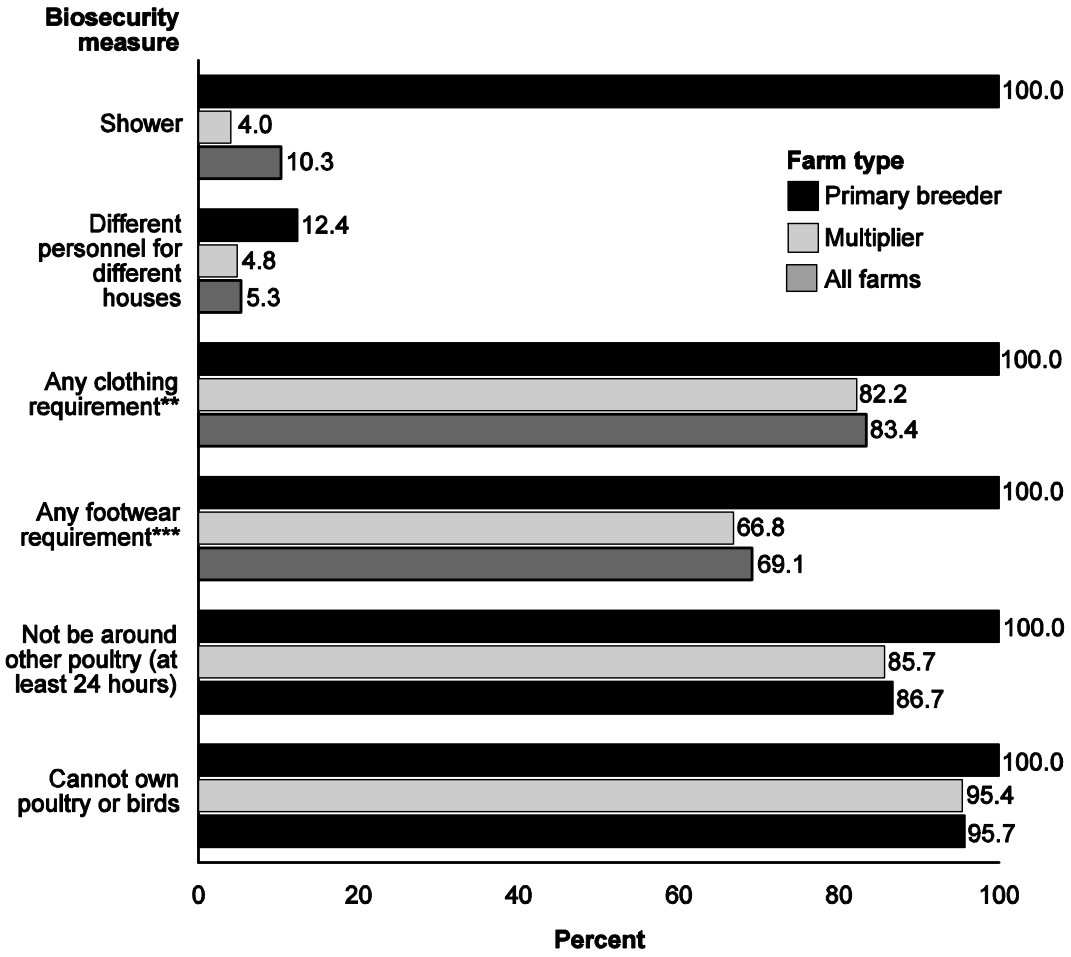
All primary breeder farms required that catch and vaccination crews that were to enter poultry houses must shower, change clothing, change shoes or use shoe covers, not be around poultry for at least 24 hours, and not own poultry or birds. Over 8 of 10 multiplier farms had clothing requirements for catch and vaccination crews and prohibited crews from owning poultry or birds.

d. Percentage of farms by biosecurity measures always or sometimes required for **catch and vaccination crews*** that entered the poultry houses, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Biosecurity measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Shower	100.0	(—)	4.0	(1.3)	10.3	(1.3)
Different personnel for different houses	12.4	(6.0)	4.8	(1.3)	5.3	(1.3)
Wear disposable coveralls	48.8	(7.9)	51.4	(3.3)	51.3	(3.1)
Change of clothing (washable)	100.0	(—)	70.4	(3.4)	72.4	(3.1)
Any clothing requirement	100.0	(—)	82.2	(3.2)	83.4	(3.0)
Change shoes or use shoe covers	100.0	(—)	60.3	(3.0)	62.9	(2.8)
Foot bath (liquid)	92.0	(1.1)	39.2	(3.2)	42.8	(3.0)
Foot bath (dry)	33.1	(4.0)	16.0	(1.3)	17.2	(1.2)
Scrub footwear (bucket and brush)	66.0	(4.9)	18.6	(2.3)	21.8	(2.2)
Any footwear requirement	100.0	(—)	66.8	(2.5)	69.1	(2.3)
Not be around other poultry (at least 24 hours)	100.0	(—)	85.7	(2.8)	86.7	(2.6)
Cannot own poultry or birds	100.0	(—)	95.4	(1.4)	95.7	(1.3)

*For those operations that had catch or vaccination crews.

Percentage of farms by biosecurity measures always or sometimes required for catch and vaccination crews* that entered the poultry houses, and by farm type



*For those operations that had catch or vaccination crews.
**Wear disposable coveralls or change clothing.
***Change shoes, use shoe covers, use foot bath, or scrub footwear.

Nearly all breeder farms required clothing and footwear protection for visitors entering poultry houses (95.7 and 99.6 percent of farms, respectively).

e. Percentage of breeder farms by biosecurity measures required for **visitors** who entered the poultry houses, and by frequency measures were used:

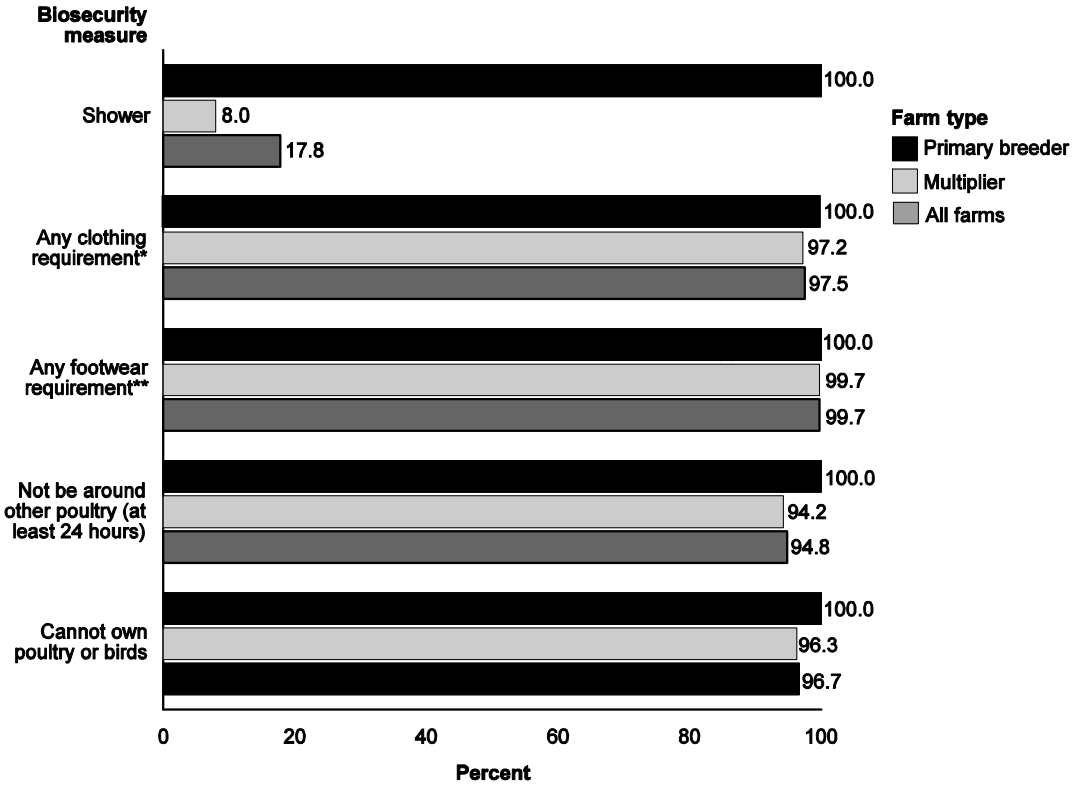
	Percent Breeder Farms						
	Frequency						
	Always		Sometimes		Never		
Biosecurity measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Shower	12.4	(0.8)	5.4	(1.6)	82.2	(1.8)	100.0
Wear disposable coveralls	83.0	(1.6)	7.4	(1.4)	9.6	(1.0)	100.0
Change of clothing (washable)	32.7	(2.6)	37.0	(2.6)	30.3	(2.6)	100.0
Any clothing requirement	95.7	(1.1)	1.8	(1.0)	2.5	(0.6)	100.0
Change shoes or use shoe covers	96.1	(1.0)	1.3	(0.9)	2.6	(0.6)	100.0
Foot bath (liquid)	42.6	(2.5)	13.0	(2.1)	44.4	(2.2)	100.0
Foot bath (dry)	39.9	(1.2)	1.1	(0.4)	59.0	(1.2)	100.0
Scrub footwear (bucket and brush)	17.9	(1.4)	3.8	(1.2)	78.3	(1.7)	100.0
Any footwear requirement	99.6	(0.3)	0.1	(0.1)	0.3	(0.2)	100.0
Not be around other poultry (at least 24 hours)	51.6	(2.5)	43.2	(2.4)	5.2	(1.3)	100.0
Cannot own poultry or birds	88.9	(1.5)	7.8	(1.0)	3.3	(1.1)	100.0

All primary breeder farms and nearly all multiplier farms always or sometimes required visitors entering poultry houses to use a clothing precaution, change shoes or use shoe covers, not be around poultry for at least 24 hours, and not own poultry or birds. All primary breeder farms always or sometimes required visitors to shower before entering poultry houses.

f. Percentage of farms by biosecurity measures always or sometimes required for **visitors** who entered the poultry houses, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Biosecurity measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Shower	100.0	(—)	8.0	(2.0)	17.8	(1.8)
Wear disposable coveralls	40.3	(5.0)	96.3	(1.0)	90.4	(1.0)
Change of clothing (washable)	100.0	(—)	66.0	(2.9)	69.7	(2.6)
Any clothing requirement	100.0	(—)	97.2	(0.6)	97.5	(0.6)
Change shoes or use shoe covers	100.0	(—)	97.1	(0.7)	97.4	(0.6)
Foot bath (liquid)	95.6	(0.5)	50.9	(2.5)	55.6	(2.2)
Foot bath (dry)	45.0	(0.3)	40.5	(1.3)	41.0	(1.2)
Scrub footwear (bucket and brush)	50.1	(3.2)	18.3	(1.9)	21.7	(1.7)
Any footwear requirement	100.0	(—)	99.7	(0.2)	99.7	(0.2)
Not be around other poultry (at least 24 hours)	100.0	(—)	94.2	(1.5)	94.8	(1.3)
Cannot own poultry or birds	100.0	(—)	96.3	(1.2)	96.7	(1.1)

Percentage of farms by biosecurity measures always or sometimes required for visitors who entered the poultry houses, and by farm type



*Wear disposable coveralls or change clothing.
**Change shoes, use shoe covers, use foot bath, or scrub footwear.

About 4 of 10 primary breeder farms (38.3 percent) and 9 of 10 multiplier farms (94.4 percent) used catch crews that also caught birds for other companies. None of the primary breeder farms used vaccination crews that also caught birds for other companies.

g. Percentage of farms that used catch crews or vaccination crews that also caught birds for other companies, by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Crew type	Pct.	Std. Error	Pct.	Std. error	Pct.	Std. Error
Catch	38.3	(4.8)	94.4	(1.8)	89.1	(1.7)
Vaccination	0.0	(—)	8.7	(2.0)	7.8	(1.8)

About 9 of 10 broiler breeder farms (89.9 percent) and 6 of 10 table-egg breeder farms (61.3 percent) used catch crews that also caught birds for other companies.

h. Percentage of farms that used catch crews or vaccination crews that also caught birds for other companies, by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Crew type	Percent	Std. error	Percent	Std. error
Catch	89.9	(1.7)	61.3	(0.0)
Vaccination	8.1	(1.8)	0.0	(—)

E. Animals

1. Inventory and age grouping

About 25 percent of primary breeder farms and 6 percent of multiplier farms had no laying hens on the day the study questionnaire was completed; however, these farms were probably between flocks (in down time). Pullets and young roosters were rarely kept on the breeding farms.

a. Percentage of farms by type of birds present* and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Type of bird	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Pullets	4.7	(1.4)	0.0	(—)	0.5	(0.1)
Laying hens	76.7	(4.5)	94.2	(1.6)	92.3	(1.5)
Young roosters	4.7	(1.4)	1.7	(0.6)	2.0	(0.6)
Breeding roosters	76.7	(4.5)	94.1	(1.7)	92.3	(1.6)

*Birds present on the day the questionnaire was completed.

The percentage of farms with no laying hens on the day the questionnaire was completed was similar for broiler breeder farms and table-egg breeder farms.

b. Percentage of farms by type of birds present* and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Type of bird	**Percent**	**Std. error**	**Percent**	**Std. error**
Pullets	0.5	().1)	0.0	(—)
Laying hens	92.2	(1.6)	97.4	(1.8)
Young roosters	2.1	(0.6)	0.0	(—)
Breeding roosters	92.1	(1.6)	97.4	(1.8)

*Birds present on the day the questionnaire was completed.

Multiplier farms tended to be larger than primary breeder farms; 36.9 percent of multiplier farms had 20,000 or more laying hens compared with 5.5 percent of primary breeder farms.

c. For farms with laying hens present,* percentage of farms by number of laying hens and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Number laying hens	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1–9,999	27.6	(5.5)	14.6	(2.5)	15.7	(2.3)
10,000–19,999	66.9	(6.1)	48.5	(3.6)	50.1	(3.3)
20,000–29,999	3.0	(2.5)	18.8	(2.9)	17.4	(2.6)
30,000 or more	2.5	(2.5)	18.1	(2.6)	16.8	(2.4)
Total	100.0		100.0		100.0	

*Birds present on the day the questionnaire was completed.

Table-egg breeder farms tended to be larger than broiler breeder farms. The majority of table-egg breeder farms had 20,000 to 29,999 laying hens, whereas the majority of broiler breeder farms had 10,000 to 19,999 laying hens.

d. For farms with laying hens present,* percentage of farms by number of laying hens and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number laying hens	Percent	Std. error	Percent	Std. error
1–9,999	15.7	(2.4)	14.7	(2.0)
10,000–19,999	51.5	(3.4)	7.2	(3.8)
20,000–29,999	15.8	(2.7)	69.5	(3.1)
30,000 or more	17.0	(2.5)	8.6	(3.7)
Total	100.0		100.0	

*Birds present on the day the questionnaire was completed.

Primary breeder farms had an average of 14,246 laying hens while multiplier farms had an average of 19,680 laying hens.

e. For farms with laying hens present*, average number of laying hens per farm, by farm type:

Average Number Laying Hens					
Farm Type					
Primary breeder		Multiplier		All farms	
Average	Std. error	Average	Std. error	Average	Std. error
14,246	(948)	19,680	(620)	19,208	(573)

*Birds present on the day the questionnaire was completed.

Broiler breeder farms had an average of 19,084 laying hens while table-egg breeder farms had an average of 23,021 laying hens.

f. For farms with laying hens present,* average number of laying hens per farm, by farm type:

Average Number Laying Hens			
Farm Type			
Broiler breeder		Table-egg breeder	
Average	Std. error	Average	Std. error
19,084	(591)	23,021	(865)

*Birds present on the day the questionnaire was completed.

Breeder farms had an average of 10.8 laying hens per breeding rooster. The number of laying hens per breeding rooster was similar for primary breeder and multiplier farms.

g. For farms with laying hens present,* average number of laying hens per breeding rooster, by farm type:

Average Number Laying Hens					
Farm Type					
Primary breeder		Multiplier		All farms	
Average	Std. error	Average	Std. error	Average	Std. error
11.0	(0.4)	10.7	(0.1)	10.8	(0.1)

*Birds present on the day the questionnaire was completed.

Broiler breeder farms had a higher average number of laying hens per breeding rooster compared with table-egg breeder farms (10.8 and 9.7 hens per rooster, respectively).

h. For farms with laying hens present,* average number of laying hens per breeding rooster, by farm type:

Average Number Laying Hens			
Farm Type			
Broiler breeder		Table-egg breeder	
Average	Std. error	Average	Std. error
10.8	(0.1)	9.7	(0.1)

*Birds present on the day the questionnaire was completed.

The whole farm had just one age of birds on almost all breeder farms (95.0 percent). When different ages were present it tended to be in different houses.

i. Percentage of farms by best description of bird age grouping on the farm, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Age grouping	**Pct.**	**Std. error**	**Pct.**	**Std. Error**	**Pct.**	**Std. error**
Multi-age, same house	1.6	(0.7)	0.7	(0.7)	0.8	(0.6)
Different ages, different houses	10.0	(3.8)	3.6	(1.4)	4.2	(1.3)
Whole farm one age	88.4	(3.8)	95.7	(1.6)	95.0	(1.5)
Total	100.0		100.0		100.0	

For nearly all broiler breeder farms (95.5 percent) and three-fourths of table-egg breeder farms (76.9 percent), the whole farm had one age of birds.

j. Percentage of farms by best description of bird age grouping on the farm, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Age grouping	**Percent**	**Std. error**	**Percent**	**Std. error**
Multi-age, same house	0.6	(0.6)	6.0	(2.6)
Different ages, different houses	3.9	(1.3)	17.1	(5.1)
Whole farm one age	95.5	(1.5)	76.9	(5.0)
Total	100.0		100.0	

Over one-half of table-egg primary breeder farms (53.8 percent) contained a combination of great-grandparent and grandparent stock, compared with only 3.1 percent of broiler primary breeder farms.

k. Percentage of **primary breeder** farms, by type of bird and by farm type*:

	Percent Primary Breeder Farms					
	Farm Type					
	Broiler primary breeder		Table-egg primary breeder		All primary breeder farms	
Type of bird	**Pct.**	**Std. error**	**Pct.**	**Std. Error**	**Pct.**	**Std. error**
Pedigree (Elite/ Foundation) only	5.4	(1.4)	0.0	(—)	5.2	(1.3)
Elite and other breeders	0.0	(—)	7.7	(7.7)	0.4	(0.4)
Great-grandparent only	14.4	(2.1)	0.0	(—)	13.6	(2.0)
Great-grandparent and grandparent	3.1	(1.1)	53.8	(14.3)	5.5	(1.3)
Grandparent only	77.1	(2.5)	38.5	(14.0)	75.3	(2.5)
Other	0.0	(—)	0.0		0.0	(—)
Total	100.0		100.0		100.0	

*Results in this table are from Phase I (see Section II: Methodology, p 130).

2. Last completed laying flock

Hens were placed and removed at a younger age on primary breeder farms than on multiplier farms. Primary breeder farms experienced a higher mortality than multiplier farms. Note: Although culls were not specifically addressed in the study questionnaire, farms may have included culls in the mortality estimates.

a. Operation average characteristics of last completed laying flock, by farm type:

	Operation Average					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Characteristics of last completed flock	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**
Age of hens when placed (weeks)	18.4	(0.4)	21.2	(0.0)	20.9	(0.1)
Percent hens that died	15.4	(0.7)	11.8	(0.6)	12.2	(0.5)
Percent hens that died at or before 60 weeks of age	15.1	(0.6)	10.3	(0.5)	10.8	(0.5)
Age hens removed (weeks)	59.8	(0.2)	64.6	(0.1)	64.1	(0.1)

Hens were placed at a younger age and removed at an older age on table-egg breeder farms than on broiler breeder farms. Broiler breeder farms experienced a higher mortality than table-egg breeder farms.

b. Operation average characteristics of last completed laying flock, by farm type:

	Operation Average			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Characteristics of last completed flock	**Average**	**Std. error**	**Average**	**Std. error**
Age of hens when placed (weeks)	21.0	(0.1)	16.8	(0.0)
Percent hens that died	12.4	(0.5)	7.3	(0.2)
Percent hens that died at or before 60 weeks of age	11.0	(0.5)	6.3	(0.2)
Age hens removed (weeks)	64.0	(0.1)	66.5	(0.6)

Molting of hens was rarely done on either primary breeder or multiplier farms.

c. Percentage of farms that molted the last completed laying flock, by farm type:

Percent Farms					
Farm Type					
Primary breeder		Multiplier		All farms	
Percent	Std. error	Percent	Std. error	Percent	Std. error
0.5	(0.5)	0.2	(0.1)	0.2	(0.1)

d. Percentage of farms that molted the last completed laying flock, by farm type:

Percent Farms			
Farm Type			
Broiler breeder		Table-egg breeder	
Percent	Std. error	Percent	Std. error
0.1	(0.1)	5.3	(3.0)

3. Spent- and dead-hen disposal

Over 9 of 10 breeder farms (95.4 percent) disposed of spent hens via processing.

a. Percentage of farms by usual disposal method of spent hens and by farm type:

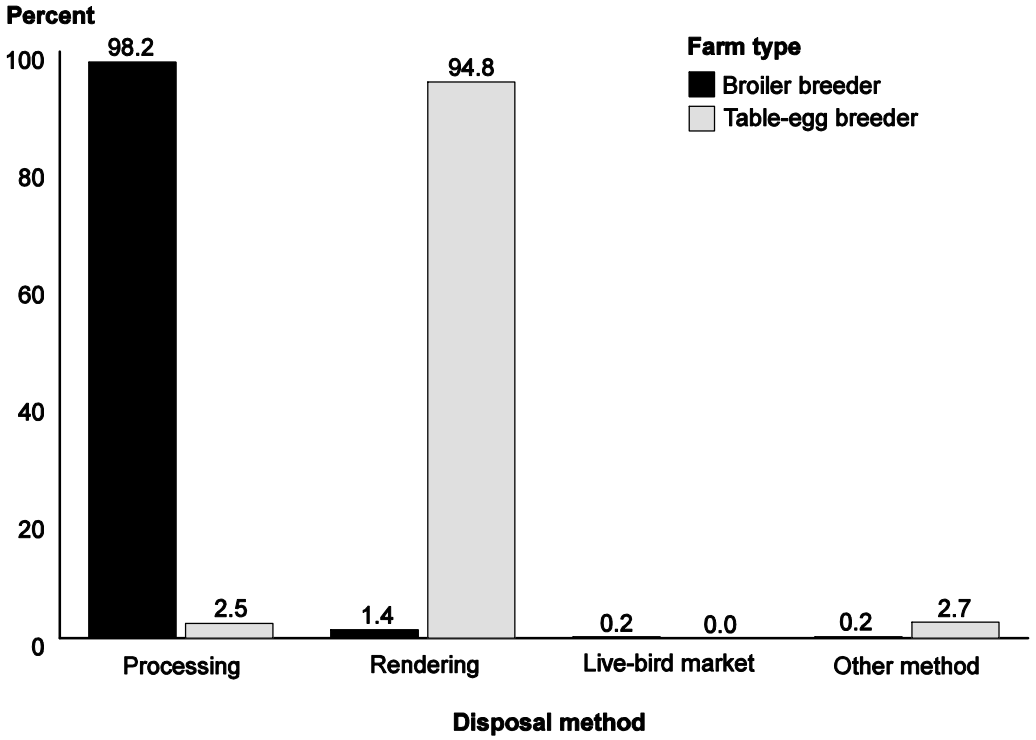
	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Disposal method	Pct.	Std. error	Pct.	Std. Error	Pct.	Std. error
Processing	94.6	(0.9)	95.5	(0.6)	95.4	(0.5)
Rendering	4.6	(0.5)	4.1	(0.5)	4.2	(0.4)
Live-bird market	0.0	(—)	0.2	(0.2)	0.2	(0.2)
Other method	0.8	(0.8)	0.2	(0.2)	0.2	(0.2)
Total	100.0		100.0		100.0	

Nearly all broiler breeder farms (98.2 percent) disposed of spent hens via processing, whereas rendering was the method of spent-hen disposal used for the highest percentage of table-egg breeder farms (94.8 percent).

b. Percentage of farms by usual disposal method of spent hens, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Disposal method	**Percent**	**Std. error**	**Percent**	**Std. error**
Processing	98.2	(0.5)	2.5	(1.3)
Rendering	1.4	(0.4)	94.8	(3.0)
Live-bird market	0.2	(0.2)	0.0	(—)
Other method	0.2	(0.2)	2.7	(2.8)
Total	100.0		100.0	

Percentage of farms by usual disposal method of spent hens, and by farm type



Over 9 of 10 farms in the Central and East regions disposed of spent hens via processing.

c. Percentage of breeder farms by usual disposal method of spent hens, and by region:

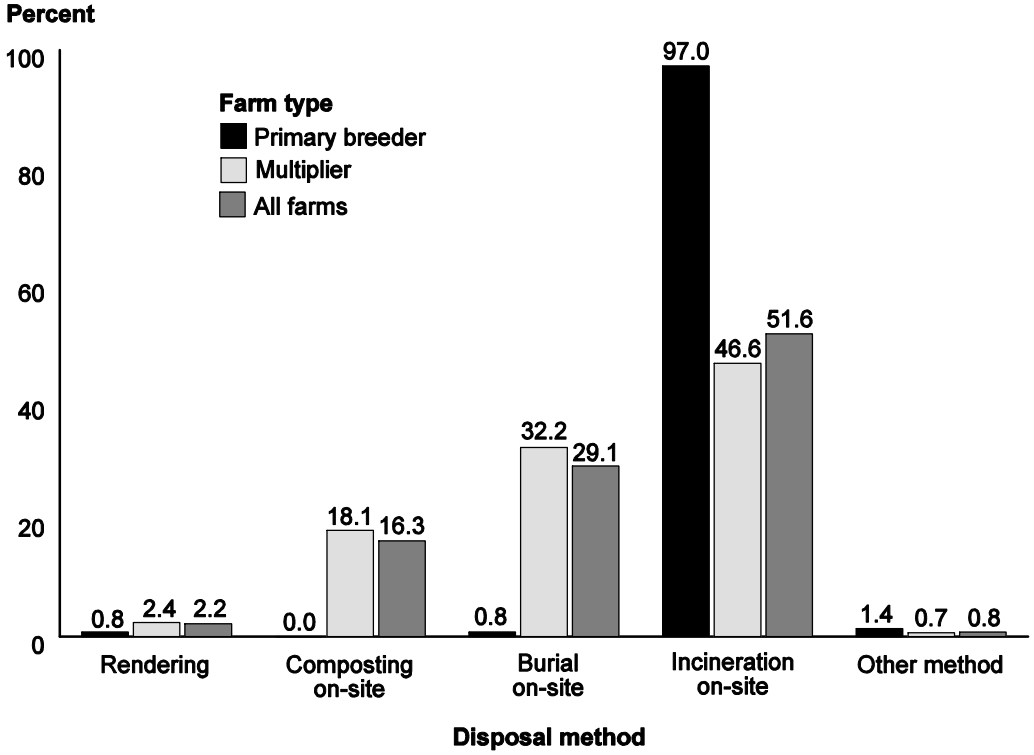
	Percent Breeder Farms			
	Region			
	Central		East	
Disposal method	**Percent**	**Std. error**	**Percent**	**Std. error**
Processing	93.7	(0.8)	95.9	(0.7)
Rendering	6.3	(0.8)	3.5	(0.6)
Live-bird market	0.0	(—)	0.3	(0.3)
Other method	0.0	(—)	0.3	(0.2)
Total	100.0		100.0	

Nearly all primary breeder farms (97.0 percent) and about one-half of multiplier farms (46.6 percent) disposed of their daily mortality via on-site incineration. About one-third of multiplier farms (32.2 percent) disposed of their daily mortality by burial on-site.

d. Percentage of farms by usual carcass (daily mortality) disposal method, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Disposal method	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Rendering	0.8	(0.5)	2.4	(1.2)	2.2	(1.1)
Composting on-site	0.0	(—)	18.1	(2.7)	16.3	(2.4)
Burial on-site	0.8	(0.8)	32.2	(1.7)	29.1	(1.6)
Incineration on-site	97.0	(1.3)	46.6	(3.1)	51.6	(2.8)
Other method	1.4	(0.8)	0.7	(0.3)	0.8	(0.2)
Total	100.0		100.0		100.0	

Percentage of farms by usual carcass (daily mortality) disposal method, and by farm type



A higher percentage of broiler breeder farms than table-egg breeder farms buried carcasses on-site (29.7 and 8.3 percent of farms, respectively).

e. Percentage of farms by usual carcass (daily mortality) disposal method, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Disposal method	**Percent**	**Std. error**	**Percent**	**Std. error**
Rendering	2.1	(1.1)	8.0	(3.8)
Composting on-site	16.2	(2.5)	20.0	(4.4)
Burial on-site	29.7	(1.6)	8.3	(3.4)
Incineration on-site	51.5	(2.9)	52.5	(4.9)
Other method	0.5	(0.2)	11.2	(3.3)
Total	100.0		100.0	

Carcass disposal methods did not differ substantially by region. Note the large standard errors in the Central region.

f. Percentage of breeder farms by usual carcass (daily mortality) disposal method, and by region:

	Percent Breeder Farms			
	Region			
	Central		East	
Disposal method	**Percent**	**Std. error**	**Percent**	**Std. error**
Rendering	0.7	(0.4)	2.7	(1.4)
Composting on-site	30.8	(7.5)	12.2	(2.2)
Burial on-site	0.4	(0.4)	37.3	(2.1)
Incineration on-site	66.9	(7.5)	47.2	(3.0)
Other method	1.2	(0.4)	0.6	(0.3)
Total	100.0		100.0	

4. Other animals on farm

Cattle were present on about 45.4 percent of breeder farms. No breeder farms had pet birds.

a. Percentage of farms by type of animals on the farm and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Type of Animal	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Cattle	40.7	(5.6)	45.9	(3.3)	45.4	(3.0)
Pigs	12.0	(4.2)	2.1	(0.6)	3.1	(0.7)
Other livestock	16.7	(4.0)	23.9	(3.1)	23.2	(2.8)
Pet birds	0.0	(—)	0.0	(—)	0.0	(—)
Other pets (dogs, cats, etc.)	39.6	(5.0)	70.0	(2.9)	66.9	(2.7)

A higher percentage of broiler breeder farms than table-egg breeder farms had cattle and other livestock, whereas a higher percentage of table-egg breeder farms had pigs.

b. Percentage of farms by type of animals on the farm and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Type of Animal	**Percent**	**Std. error**	**Percent**	**Std. error**
Cattle	46.3	(3.1)	15.0	(4.0)
Pigs	2.8	(0.7)	13.7	(3.8)
Other livestock	23.8	(2.9)	1.3	(1.3)
Pet birds	0.0	(—)	0.0	(—)
Other pets (dogs, cats, etc.)	67.2	(2.7)	59.7	(5.3)

Cattle were found on a higher percentage of breeder farms in the Central region than in the East region.

c. Percentage of breeder farms by type of animals on the farm and by region:

	Percent Breeder Farms			
	Region			
	Central		East	
Type of Animal	**Percent**	**Std. error**	**Percent**	**Std. error**
Cattle	63.3	(6.4)	39.9	(3.4)
Pigs	6.8	(2.1)	2.0	(0.7)
Other livestock	26.0	(6.7)	22.3	(3.0)
Pet birds	0.0	(—)	0.0	(—)
Other pets (dogs, cats, etc.)	77.5	(4.6)	63.7	(3.2)

Over 8 of 10 breeder farms never saw wild birds, cats, dogs, or wild mammals in the poultry houses. All animal types listed were seen daily in the houses on less than 5 percent of breeder farms (4.6 percent).

d. Percentage of breeder farms by type of animals seen in the poultry houses during the previous 3 months, and by frequency of sightings:

	Percent Breeder Farms										
	Frequency										
	1 Never		2		3 Weekly		4		5 Daily		
Type of Animal	Pct.	Std. Error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. Error	Pct.	Std. Error	Total
Rodents	32.0	(2.1)	28.7	(3.0)	30.1	(3.0)	4.6	(1.6)	4.6	(1.7)	100.0
Wild birds	86.7	(2.4)	7.3	(1.8)	2.3	(1.1)	2.1	(1.1)	1.6	(0.9)	100.0
Cats	86.2	(1.0)	3.3	(1.3)	6.0	(1.6)	1.4	(1.0)	3.1	(1.4)	100.0
Dogs	86.6	(2.4)	4.7	(1.5)	4.2	(1.2)	0.2	(0.2)	4.3	(1.7)	100.0
Wild mammals (raccoon, opossum, etc.)	93.6	(1.6)	5.1	(1.4)	0.9	(0.7)	0.0	(—)	0.4	(0.3)	100.0

Wild birds, cats, dogs, and wild mammals were seen at least weekly on less than 1 percent of primary breeder farms, and rodents were seen at least weekly on only 6.2 percent of primary breeder farms.

e. Percentage of farms by type of animals seen in the poultry houses at least weekly (score 3, 4, or 5, see table previous page) during the previous 3 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Type of Animal	**Pct.**	**Std. Error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Rodents	6.2	(2.3)	43.0	(3.4)	39.3	(3.0)
Wild birds	0.7	(0.5)	6.6	(2.0)	6.0	(1.8)
Cats	0.4	(0.4)	11.6	(1.7)	10.5	(1.6)
Dogs	0.4	(0.4)	9.7	(2.2)	8.7	(2.0)
Wild mammals (raccoons, opossum, etc.)	0.0	(—)	1.4	(0.8)	1.3	(0.7)

Rodents were seen at least weekly on 7 of 10 table-egg breeder farms (69.6 percent) and 4 of 10 broiler breeder farms (38.4 percent).

f. Percentage of farms by type of animals seen in the poultry houses at least at least weekly (score 3, 4, or 5, see table previous page) during the previous 3 months, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Type of Animal	**Percent**	**Std. Error**	**Percent**	**Std. Error**
Rodents	38.4	(3.1)	69.6	(2.1)
Wild birds	6.1	(1.8)	3.7	(2.1)
Cats	10.8	(1.6)	1.3	(1.2)
Dogs	9.0	(2.1)	1.3	(1.2)
Wild mammals (raccoons, opossum, etc.)	1.3	(0.8)	1.3	(1.3)

5. Rodent and insect control

Nearly all breeder farms (99.2 percent) used chemical or bait rodent control. Traps or sticky tape were used on about one-third of breeder farms (36.1 percent).

a. Percentage of farms by method of rodent control used during the previous 12 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Rodent control	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Chemicals or bait	100.0	(—)	99.1	(0.9)	99.2	(0.8)
Traps or sticky tape	45.4	(0.5)	35.1	(2.5)	36.1	(2.2)
Cats or dogs	0.0	(—)	14.7	(1.2)	13.2	(1.1)
Exterminator	0.0	(—)	0.6	(0.3)	0.6	(0.2)

About one of three broiler breeder farms (34.2 percent) and all table-egg breeder farms used traps or sticky tape for rodent control.

b. Percentage of farms by method of rodent control used during the previous 12 months, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Rodent control	Percent	Std. error	Percent	Std. error
Chemicals or bait	99.2	(0.8)	100.0	(—)
Traps or sticky tape	34.2	(2.3)	100.0	(—)
Cats or dogs	13.6	(1.1)	0.0	(—)
Exterminator	0.3	(0.2)	9.0	(3.2)

Insecticide sprays were used by 9 of 10 breeder farms (90.5 percent).

c. Percentage of farms by method of insect control used during the previous 12 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Insect control	**Pct.**	**Std. error**	**Pct.**	**Std. Error**	**Pct.**	**Std. error**
Insecticide sprays	95.4	(1.4)	89.9	(2.3)	90.5	(2.1)
Sticky tape	12.9	(2.1)	14.2	(2.4)	14.1	(2.1)
Parasites (e.g., insect parasitic nematodes)	0.7	(0.5)	17.0	(1.1)	15.3	(1.0)
Fly baits	90.6	(3.4)	75.3	(2.8)	76.8	(2.5)
Other control method	1.2	(0.7)	4.9	(1.7)	4.5	(1.5)

Sticky tape was used for insect control on 9 of 10 table-egg breeder farms (89.7 percent) but was used infrequently on broiler breeder farms (11.8 percent).

d. Percentage of farms by method of insect control used during the previous 12 months, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Insect control	**Percent**	**Std. error**	**Percent**	**Std. error**
Insecticide sprays	90.2	(2.1)	98.7	(1.3)
Sticky tape	11.8	(2.2)	89.7	(3.0)
Parasites (e.g., insect parasitic nematodes)	15.6	(1.0)	6.8	(3.5)
Fly baits	76.2	(2.6)	97.2	(2.8)
Other control method	4.6	(1.5)	2.6	(1.7)

F. Bird Health and Vaccination

1. Disease problems

Breeder farms reported very few disease problems for the last completed flock. The most common disease problem on breeder farms was *E. coli* peritonitis; 22.7 percent of farms reported at least a slight problem with *E. coli* peritonitis in the last completed flock. “Other” problems were mostly mites and *Staphylococcus* infection.

a. Percentage of breeder farms by severity of disease problems in the last completed flock:

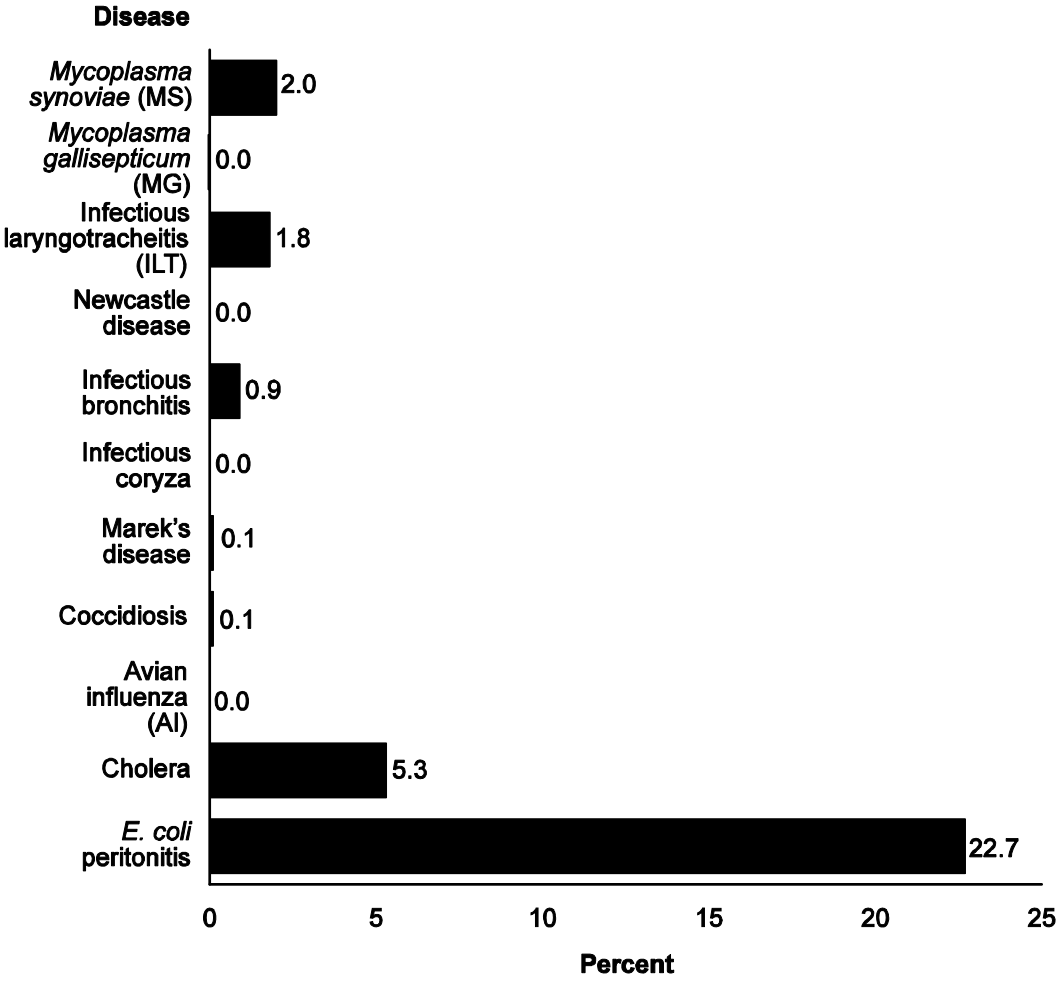
	Percent Breeder Farms								
	Severity								
	Severe		Moderate		Slight		None		
Disease	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Mycoplasma synoviae (MS)	0.7	(0.6)	0.5	(0.3)	0.8	(0.4)	98.0	(0.8)	100.0
Mycoplasma gallisepticum (MG)	0.0	(—)	0.0	(—)	0.0	(—)	100.0	(—)	100.0
Infectious laryngotracheitis (ILT)	0.0	(—)	0.0	(—)	1.8	(1.0)	98.2	(1.0)	100.0
Newcastle disease	0.0	(—)	0.0	(—)	0.0	(—)	100.0	(—)	100.0
Infectious bronchitis	0.0	(—)	0.0	(—)	0.9	(0.7)	99.1	(0.7)	100.0
Infectious coryza	0.0	(—)	0.0	(—)	0.0	(—)	100.0	(—)	100.0
Marek’s disease	0.0	(—)	0.0	(—)	0.1	(0.1)	99.9	(0.1)	100.0
Coccidiosis	0.0	(—)	0.0	(—)	0.1	(0.1)	99.9	(0.1)	100.0
Avian influenza (AI)	0.0	(—)	0.0	(—)	0.0	(—)	100.0	(—)	100.0
Cholera	0.6	(0.6)	1.8	(0.8)	2.9	(1.2)	94.7	(1.5)	100.0
E. coli peritonitis	0.7	(0.6)	8.3	(1.6)	13.7	(2.1)	77.3	(2.4)	100.0
Other disease problem	0.5	(0.3)	4.9	(0.8)	11.2	(1.2)	83.4	(1.2)	100.0

About two-thirds of primary breeder farms (67.7 percent) had at least a slight problem with *E. coli* peritonitis in their last completed flock.

b. Percentage of farms that had slight, moderate, or severe problems with the following diseases in the last completed flock, by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Disease	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Mycoplasma synoviae (MS)	3.8	(2.6)	1.8	(0.8)	2.0	(0.8)
Mycoplasma gallisepticum (MG)	0.0	(—)	0.0	(—)	0.0	(—)
Infectious laryngotracheitis (ILT)	0.0	(—)	2.1	(1.1)	1.8	(1.0)
Newcastle disease	0.0	(—)	0.0	(—)	0.0	(—)
Infectious bronchitis	2.6	(1.9)	0.7	(0.7)	0.9	(0.7)
Infectious coryza	0.0	(—)	0.0	(—)	0.0	(—)
Marek’s disease	0.0	(—)	0.1	(0.1)	0.1	(0.1)
Coccidiosis	0.0	(—)	0.1	(0.1)	0.1	(0.1)
Avian influenza (AI)	0.0	(—)	0.0	(—)	0.0	(—)
Cholera	0.0	(—)	5.8	(1.7)	5.3	(1.5)
E. coli peritonitis	67.7	(4.5)	17.6	(2.6)	22.7	(2.4)
Other disease problem	0.5	(0.5)	18.4	(1.3)	16.6	(1.2)

Percentage of farms that had slight, moderate, or severe problems with the following diseases in the last completed flock



Except for “other” disease problems, broiler breeder and table-egg breeder farms experienced similar levels of disease problems in their last completed flocks.

c. Percentage of farms that had slight, moderate, or severe problems with the following diseases in the last completed flock, by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Disease	**Percent**	**Std. error**	**Percent**	**Std. error**
Mycoplasma synoviae (MS)	2.0	(0.8)	0.0	(—)
Mycoplasma gallisepticum (MG)	0.0	(—)	0.0	(—)
Infectious laryngotracheitis (ILT)	1.9	(1.0)	0.0	(—)
Newcastle disease	0.0	(—)	0.0	(—)
Infectious bronchitis	0.9	(0.7)	2.5	(1.7)
Infectious coryza	0.0	(—)	0.0	(—)
Marek’s disease	0.0	(—)	2.8	(2.8)
Coccidiosis	0.0	(—)	2.8	(2.8)
Avian influenza (AI)	0.0	(—)	0.0	(—)
Cholera	5.4	(1.6)	1.3	(1.3)
E. coli peritonitis	22.5	(2.5)	26.8	(3.4)
Other disease problem	17.1	(1.2)	0.0	(—)

Except for “other” disease problems, disease problems did not differ substantially by region.

d. Percentage of breeder farms that had slight, moderate, or severe problems with the following diseases in the last completed flock, by region:

	Percent Breeder Farms			
	Region			
	Central		East	
Disease	**Percent**	**Std. error**	**Percent**	**Std. error**
Mycoplasma synoviae (MS)	1.6	(1.1)	2.1	(1.0)
Mycoplasma gallisepticum (MG)	0.0	(—)	0.0	(—)
Infectious laryngotracheitis (ILT)	0.0	(—)	2.4	(1.3)
Newcastle disease	0.0	(—)	0.0	(—)
Infectious bronchitis	1.1	(0.8)	0.8	(0.8)
Infectious coryza	0.0	(—)	0.0	(—)
Marek’s disease	0.3	(0.3)	0.0	(—)
Coccidiosis	0.3	(0.3)	0.0	(—)
Avian influenza (AI)	0.0	(—)	0.0	(—)
Cholera	2.8	(2.7)	6.0	(1.8)
E. coli peritonitis	14.1	(3.2)	25.3	(3.0)
Other disease problem	0.2	(0.2)	21.6	(1.5)

No breeder farms had any history of infectious coryza or avian influenza. A higher percentage of farms (22.7 percent) reported a problem with *E. coli* perotinitis in the last completed flock (see table b., p 87) than reported a problem in the last year (13.2 percent) [table below]. The problem in the last completed flock may have happened more than 1 year ago.

e. Percentage of breeder farms by time elapsed since most recent case of the following diseases:

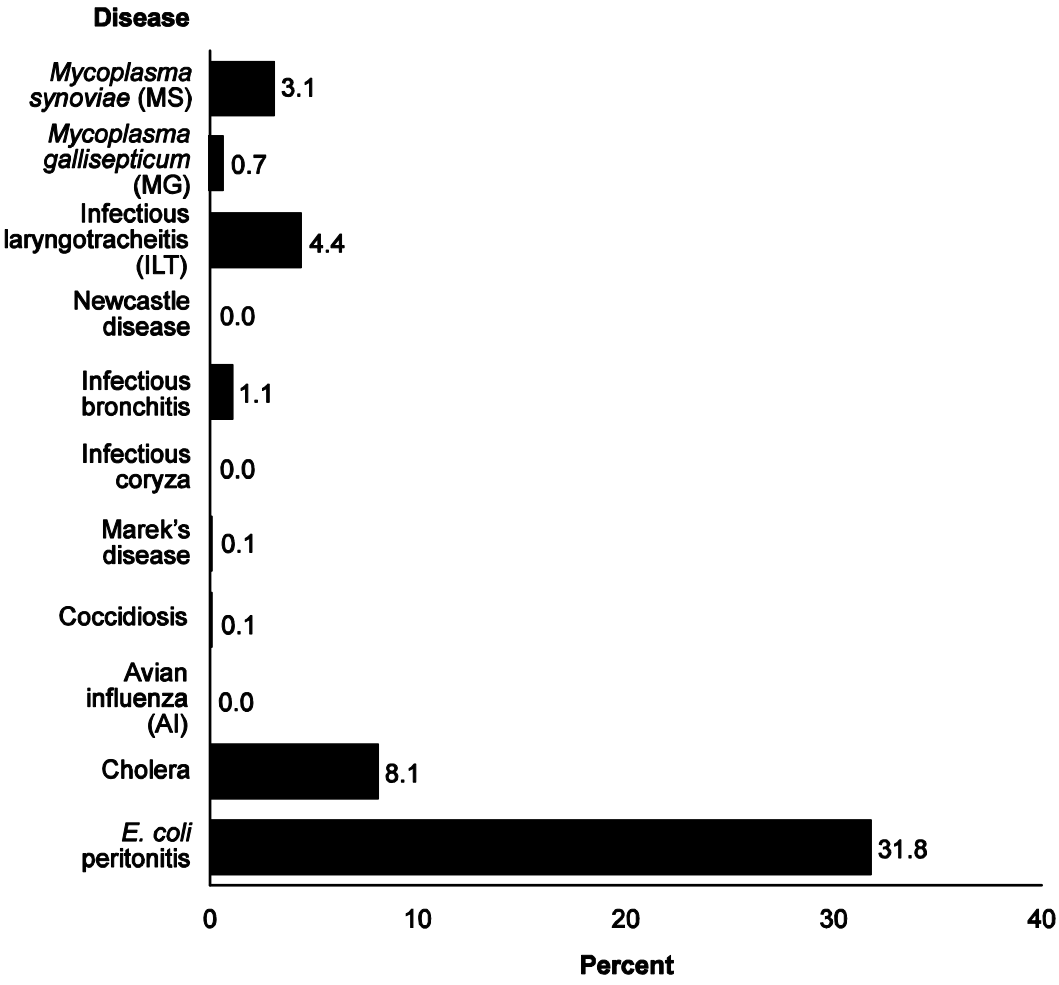
	Percent Breeder Farms								
	Time (years)								
	Less than 1		**1 to 3**		**More than 3**		**Never**		
Disease	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Mycoplasma synoviae (MS)	0.6	(0.6)	2.5	(0.6)	5.8	(1.3)	91.1	(1.5)	100.0
Mycoplasma gallisepticum (MG)	0.0	(—)	0.7	(0.6)	0.8	(0.7)	98.5	(0.9)	100.0
Infectious laryngotracheitis (ILT)	2.5	(1.2)	1.9	(1.0)	0.7	(0.6)	94.9	(1.4)	100.0
Newcastle disease	0.0	(—)	0.0	(—)	0.7	(0.7)	99.3	(0.7)	100.0
Infectious bronchitis	0.4	(0.3)	0.7	(0.7)	0.8	(0.7)	98.1	(1.0)	100.0
Infectious coryza	0.0	(—)	0.0	(—)	0.0	(—)	100.0	(—)	100.0
Marek's disease	0.1	(0.1)	0.0	(—)	0.1	(0.1)	99.8	(0.2)	100.0
Coccidiosis	0.0	(—)	0.1	(0.1)	2.8	(0.2)	97.1	(0.2)	100.0
Avian influenza (AI)	0.0	(—)	0.0	(—)	0.0	(—)	100.0	(—)	100.0
Cholera	5.1	(1.7)	3.0	(1.1)	3.4	(1.4)	88.5	(2.2)	100.0
E. coli peritonitis	13.2	(2.1)	18.6	(2.5)	3.3	(1.1)	64.9	(2.9)	100.0
Other disease problem	13.0	(1.1)	5.8	(1.0)	0.2	(0.2)	81.0	(1.2)	100.0

Overall, 31.8 percent of breeder farms had at least one case of *E. coli* peritonitis during the previous 3 years, with 86.6 percent of primary breeder farms affected. A total of 8.1 percent of farms experienced cholera during the previous 3 years.

f. Percentage of farms that experienced any cases of the following diseases during the previous 3 years, by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Disease	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Mycoplasma synoviae (MS)	6.1	(3.4)	2.8	(0.9)	3.1	(0.9)
Mycoplasma gallisepticum (MG)	0.0	(—)	0.7	(0.7)	0.7	(0.6)
Infectious laryngotracheitis (ILT)	0.0	(—)	4.9	(1.5)	4.4	(1.4)
Newcastle disease	0.0	(—)	0.0	(—)	0.0	(—)
Infectious bronchitis	2.6	(2.0)	1.0	(0.8)	1.1	(0.7)
Infectious coryza	0.0	(—)	0.0	(—)	0.0	(—)
Marek's disease	0.0	(—)	0.1	(0.1)	0.1	(0.1)
Coccidiosis	0.0	(—)	0.1	(0.1)	0.1	(0.1)
Avian influenza (AI)	0.0	(—)	0.0	(—)	0.0	(—)
Cholera	0.5	(0.5)	9.0	(2.2)	8.1	(1.9)
E. coli peritonitis	86.6	(3.6)	25.5	(3.1)	31.8	(2.8)
Other disease problem	0.5	(0.5)	20.8	(1.4)	18.8	(1.2)

Percentage of farms that experienced any cases of the following diseases during the previous 3 years



In general, the percentage of farms with any cases of the listed diseases during the previous 3 years was similar for broiler breeder and table-egg breeder farms.

g. Percentage of farms that experienced any cases of the following diseases during the previous 3 years, by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Disease	**Percent**	**Std. error**	**Percent**	**Std. error**
Mycoplasma synoviae (MS)	3.1	(0.9)	2.5	(1.8)
Mycoplasma gallisepticum (MG)	0.6	(0.6)	1.3	(1.3)
Infectious laryngotracheitis (ILT)	4.5	(1.4)	0.0	(—)
Newcastle disease	0.0	(—)	0.0	(—)
Infectious bronchitis	1.1	(0.7)	2.5	(1.7)
Infectious coryza	0.0	(—)	0.0	(—)
Marek’s disease	0.0	(—)	2.8	(2.8)
Coccidiosis	0.0	(—)	4.1	(3.1)
Avian influenza (AI)	0.0	(—)	0.0	(—)
Cholera	8.3	(2.0)	1.3	(1.3)
E. coli peritonitis	31.7	(2.9)	32.0	(3.6)
Other disease problem	19.3	(1.3)	1.3	(1.3)

Presence of disease during the previous 3 years was generally similar for breeder farms in the Central and East regions.

h. Percentage of breeder farms that experienced any cases of the following diseases during the previous 3 years, by region:

	Percent Breeder Farms			
	Region			
	Central		East	
Disease	**Percent**	**Std. error**	**Percent**	**Std. error**
Mycoplasma synoviae (MS)	2.7	(1.4)	3.2	(1.0)
Mycoplasma gallisepticum (MG)	0.0	(—)	0.9	(0.8)
Infectious laryngotracheitis (ILT)	0.0	(—)	5.7	(1.8)
Newcastle disease	0.0	(—)	0.0	(—)
Infectious bronchitis	2.1	(1.3)	0.9	(0.9)
Infectious coryza	0.0	(—)	0.0	(—)
Marek’s disease	0.4	(0.4)	0.0	(—)
Coccidiosis	0.4	(0.4)	0.0	(0.0)
Avian influenza (AI)	0.0	(—)	0.0	(—)
Cholera	12.7	(5.6)	6.7	(1.8)
E. coli peritonitis	27.9	(6.1)	32.9	(3.3)
Other disease problem	1.1	(0.9)	24.0	(1.6)

2. Flock testing

Nearly all primary breeder farms (94.4 percent) tested their last completed flock 11 or more times for MS, MG, and AI. The majority of multiplier farms tested one to five times for these diseases (59.3, 59.3, and 70.1 percent, respectively). Tests for pullorum were performed less frequently. It is important to note that some respondents may have included testing of pullets in the total number of tests, and others may have only counted testing of laying hens. (See Appendix I, p 133, for NPIP testing requirements.)

a. Percentage of farms that tested the last completed flock for the following diseases, by number of times flock was tested (number of testing occasions) and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Number testing occasions	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Pullorum-typhoid						
0	0.0	(—)	59.9	(2.0)	53.9	(1.8)
1 to 5	45.4	(0.5)	39.8	(2.0)	40.3	(1.8)
6 to 10	5.7	(3.1)	0.3	(0.2)	0.9	(0.4)
11 or more	48.9	(3.2)	0.0	(—)	4.9	(0.3)
Mycoplasma synoviae (MS)						
0	0.0	(—)	0.3	(0.2)	0.3	(0.2)
1 to 5	0.0	(—)	59.3	(1.8)	53.4	(1.7)
6 to 10	5.6	(3.1)	37.8	(1.8)	34.5	(1.7)
11 or more	94.4	(3.1)	2.6	(0.1)	11.8	(0.3)
Mycoplasma gallisepticum (MG)						
0	0.0	(—)	0.3	(0.2)	0.3	(0.2)
1 to 5	0.0	(—)	59.3	(1.8)	53.4	(1.7)
6 to 10	5.6	(3.1)	37.8	(1.8)	34.5	(1.7)
11 or more	94.4	(3.1)	2.6	(0.1)	11.8	(0.3)
Avian influenza (AI)						
0	0.0	(—)	0.2	(0.2)	0.2	(0.2)
1 to 5	0.0	(—)	70.1	(2.2)	63.0	(2.0)
6 to 10	5.6	(3.1)	27.1	(2.2)	25.0	(2.0)
11 or more	94.4	(3.1)	2.6	(0.1)	11.8	(0.3)

Nearly all table-egg breeder farms tested for MS, MG, and AI 11 or more times, while the majority of broiler breeder farms tested for these diseases 1 to 5 times. Nearly all table-egg breeder farms tested for pullorum 1 to 5 times. Broiler multipliers do not routinely test for pullorum and rely on the broiler primary breeders to supply pullorum-free chicks. All primary breeder farms test for pullorum (see previous table).

b. Percentage of farms that tested the last completed flock for the following diseases, by number of times flock was tested (number of testing occasions) and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number testing occasions	**Percent**	**Std. error**	**Percent**	**Std. error**
Pullorum-typhoid				
0	55.4	(1.9)	2.5	(1.3)
1 to 5	38.6	(1.9)	97.5	(1.3)
6 to 10	0.9	(0.4)	0.0	(—)
11 or more	5.1	(0.3)	0.0	(—)
Total	100.0		100.0	
Mycoplasma synoviae (MS)				
0	0.2	(0.2)	2.5	(1.3)
1 to 5	55.0	(1.7)	1.2	(1.2)
6 to 10	35.6	(1.7)	0.0	(—)
11 or more	9.2	(0.3)	96.3	(0.0)
Total	100.0		100.0	
Mycoplasma gallisepticum (MG)				
0	0.2	(0.2)	2.5	(1.3)
1 to 5	55.0	(1.7)	1.2	(1.2)
6 to 10	35.6	(1.7)	0.0	(—)
11 or more	9.2	(0.3)	96.3	(0.0)
Total	100.0		100.0	
Avian influenza (AI)				
0	0.2	(0.2)	0.0	(—)
1 to 5	64.9	(2.0)	2.5	(1.3)
6 to 10	25.7	(2.0)	1.2	(1.2)
11 or more	9.2	(0.3)	96.3	(0.0)
Total	100.0		100.0	

None of the farms that tested their last completed flocks for pullorum or AI had a positive test result, and less than 1 percent of farms had a positive test result for MS or MG.

c. For farms that tested the last completed flock for disease, percentage of farms that had at least one positive test for the following diseases:

Disease	Percent Farms	Std. error
Pullorum-typhoid	0.0	(—)
Mycoplasma synoviae (MS)	0.9	(0.7)
Mycoplasma gallisepticum (MG)	0.0*	(0.0)
Avian influenza (AI)	0.0	(—)

*Rounds to 0.0 (<0.1).

Of all MS testing occasions that occurred on breeder farms, only 0.1 percent revealed at least one bird positive for MS.

d. Percentage of testing occasions in which at least one bird tested positive, by disease tested for:

Disease	Percent testing occasions	Std. error
Pullorum-typhoid	0.0	(—)
Mycoplasma synoviae (MS)	0.1	(0.1)
Mycoplasma gallisepticum (MG)	0.0*	(0.0)
Avian influenza (AI)	0.0	(—)

*Rounds to 0.0 (<0.1).

All breeder farms participated in the NPIP AI program. All primary breeder farms and more than 85 percent of multiplier farms participated in the NPIP programs for pullorum, MS, and MG.

e. Percentage of farms that participated in an NPIP program for the following diseases, by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Disease	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Pullorum-typhoid	100.0	(—)	95.6	(1.6)	96.1	(1.4)
Mycoplasma synoviae (MS)	100.0	(—)	85.7	(0.0)	87.1	(0.0)
Mycoplasma gallisepticum (MG)	100.0	(—)	85.6	(0.0)	87.1	(0.0)
Avian influenza (AI)	100.0	(—)	100.0	(—)	100.0	(—)

All table-egg breeder farms participated in the NPIP programs for pullorum, MS, and AI, and 97.5 percent participated in the NPIP-MG program.

f. Percentage of farms that participated in an NPIP program for the following diseases, by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Disease	**Percent**	**Std. error**	**Percent**	**Std. error**
Pullorum-typhoid	95.9	(1.4)	100.0	(—)
Mycoplasma synoviae (MS)	86.7	(0.0)	100.0	(—)
Mycoplasma gallisepticum (MG)	86.7	(0.0)	97.5	(1.3)
Avian influenza (AI)	100.0	(—)	100.0	(—)

3. Vaccines given before and while laying

Primary breeder farms did not vaccinate breeding hens in lay. About one-third of multiplier farms vaccinated hens against Newcastle disease or infectious bronchitis while in lay. Over 80 percent of primary breeder farms and multiplier farms vaccinated pullets against ILT, Newcastle disease, infectious bronchitis, *Salmonella*, IBD, avian encephalomyelitis, chicken anemia virus, reovirus, fowl pox, and coccidiosis. All primary breeder farms vaccinated pullets for *E. coli,* and nearly all multiplier farms (98.0 percent) vaccinated pullets for cholera.

a. Percentage of farms that vaccinated breeding hens before they entered the laying house (as pullets) and while in lay, by disease vaccinated for and by farm type:

	Percent Farms							
	Pullets				Hens In lay			
	Farm type				Farm type			
	Primary breeder		Multiplier		Primary breeder		Multiplier	
Disease	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Infectious laryngotracheitis (ILT)	95.6	(0.5)	99.5	(0.3)	0.0	(—)	0.0	(—)
Mycoplasma synoviae (MS)	0.0	(—)	1.8	(0.5)	0.0	(—)	0.0	(—)
Mycoplasma gallisepticum (MG)	0.0	(—)	1.8	(0.5)	0.0	(—)	0.0	(—)
Cholera	40.2	(0.4)	98.0	(0.2)	0.0	(—)	0.0	(—)
Newcastle disease	100.0	(—)	95.5	(1.3)	0.0	(—)	31.5	(2.2)
Infectious bronchitis	100.0	(—)	96.3	(1.2)	0.0	(—)	31.5	(2.2)
Salmonella	86.7	(2.0)	85.1	(0.6)	0.0	(—)	0.0	(—)
Infectious bursal disease (IBD)	100.0	(—)	97.7	(0.6)	0.0	(—)	0.0	(—)
Avian encephalomyelitis	94.4	(3.1)	97.5	(0.6)	0.0	(—)	0.0	(—)
E. coli	100.0	(—)	15.5	(0.6)	0.0	(—)	0.0*	(0.0)
Chicken anemia virus	100.0	(—)	95.4	(0.6)	0.0	(—)	0.0	(—)
Reovirus	99.2	(0.8)	95.1	(0.6)	0.0	(—)	0.0	(—)
Fowl pox	100.0	(—)	97.7	(0.6)	0.0	(—)	0.0	(—)
Coccidiosis	94.8	(0.9)	92.9	(1.5)	0.0	(—)	0.0	(—)
Other vaccines	40.2	(0.4)	39.1	(1.7)	0.0	(—)	0.0	(—)

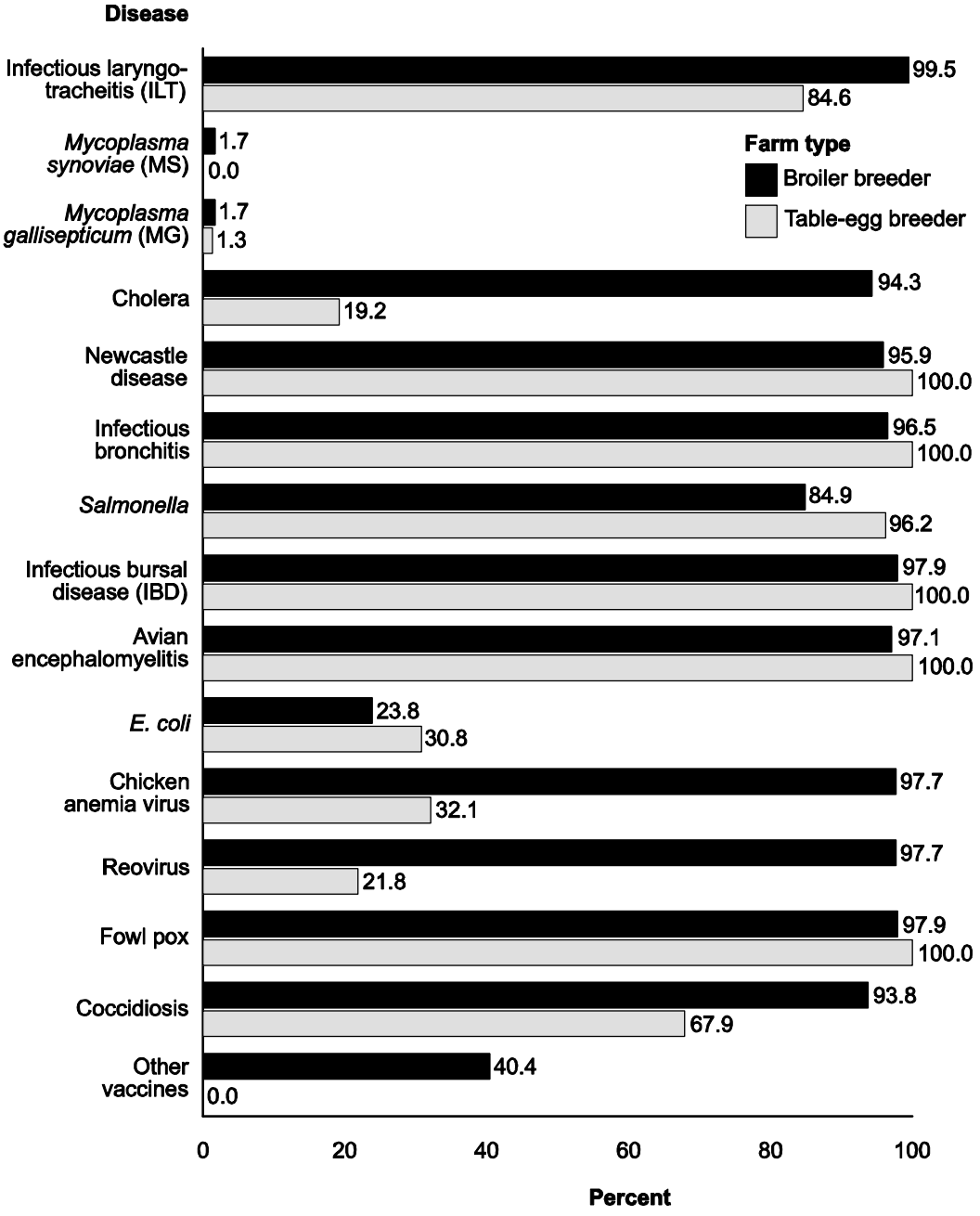
*Rounds to 0.0 (<0.1).

Table-egg breeder farms did not vaccinate birds in lay, except for 1.3 percent of farms that vaccinated for *E. coli*. About 3 of 10 broiler breeder farms vaccinated birds in lay against Newcastle disease or infectious bronchitis. More than 9 of 10 broiler breeder farms vaccinated pullets for cholera, chicken anemia virus, and reovirus compared with less than one-third of table-egg breeder farms.

b. Percentage of farms that vaccinated breeding hens before they entered the laying house (as pullets) and while in lay, by disease vaccinated for and by farm type:

	Percent Farms							
	Pullets				Hens in lay			
	Farm type				Farm type			
	Broiler breeder		Table-egg breeder		Broiler breeder		Table-egg breeder	
Disease	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Infectious laryngotracheitis (ILT)	99.5	(0.3)	84.6	(1.8)	0.0	(—)	0.0	(—)
Mycoplasma synoviae (MS)	1.7	(0.5)	0.0	(—)	0.0	(—)	0.0	(—)
Mycoplasma gallisepticum (MG)	1.7	(0.5)	1.3	(1.3)	0.0	(—)	0.0	(—)
Cholera	94.3	(0.0)	19.2	(4.2)	0.0	(—)	0.0	(—)
Newcastle disease	95.9	(1.2)	100.0	(—)	29.5	(2.1)	0.0	(—)
Infectious bronchitis	96.5	(1.1)	100.0	(—)	29.5	(2.1)	0.0	(—)
Salmonella	84.9	(0.6)	96.2	(0.0)	0.0	(—)	0.0	(—)
Infectious bursal disease (IBD)	97.9	(0.5)	100.0	(—)	0.0	(—)	0.0	(—)
Avian encephalomyelitis	97.1	(0.6)	100.0	(—)	0.0	(—)	0.0	(—)
E. coli	23.8	(0.6)	30.8	(2.0)	0.0	(—)	1.3	(1.3)
Chicken anemia virus	97.7	(0.5)	32.1	(0.4)	0.0	(—)	0.0	(—)
Reovirus	97.7	(0.5)	21.8	(0.3)	0.0	(—)	0.0	(—)
Fowl pox	97.9	(0.5)	100.0	(—)	0.0	(—)	0.0	(—)
Coccidiosis	93.8	(1.4)	67.9	(0.4)	0.0	(—)	0.0	(—)
Other vaccines	40.4	(1.5)	0.0	(—)	0.0	(—)	0.0	(—)

Percentage of farms that vaccinated breeding hens before they entered the laying house (as pullets), by disease vaccinated for and by farm type



The most common type of vaccine used for infectious laryngotracheitis was tissue culture (90.4 percent of farms).

c. For farms that vaccinated pullets for infectious laryngotracheitis (ILT), percentage of farms by type of ILT vaccination:

Vaccination type	Percent farms	Std. error
Chick embryo	8.4	(2.5)
Tissue culture	90.4	(2.6)
Vector	16.4	(1.6)

Killed and live infectious bursal disease vaccines were used more commonly than recombinant vaccines. The most common delivery system was individual injection (98.5 percent of farms) followed by water (85.0 percent of farms).

d. For farms that vaccinated pullets for infectious bursal disease (IBD), percentage of farms by IBD vaccine type and by delivery system:

	Percent farms	Std. error
Vaccine type		
Killed (inactivated)	94.5	(1.3)
Live/modified live	94.5	(1.2)
Recombinant	9.9	(1.8)
Delivery system		
Spray	52.0	(1.7)
Water	85.0	(1.5)
Individual injection	98.5	(0.5)
In ovo	25.2	(2.1)
Other delivery system	1.4	(0.9)

Nearly all breeder farms kept daily records for mortality, feed consumption, and egg production (99.9, 98.5, and 99.9 percent of farms, respectively). Over 9 of 10 primary breeder farms (94.1 percent) kept morbidity records.

a. Percentage of farms by records kept and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Records kept	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Morbidity (illness)						
Yes	94.1	(2.1)	28.6	(3.2)	35.4	(2.9)
No	5.9	(2.1)	71.4	(3.2)	64.6	(2.9)
Total	100.0		100.0		100.0	
Mortality						
Yes, daily	100.0	(—)	99.9	(0.1)	99.9	(0.1)
Yes, not daily	0.0	(—)	0.1	(0.1)	0.1	(0.1)
No	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0	
Feed consumption						
Yes, daily	95.0	(2.8)	98.8	(0.9)	98.5	(0.8)
Yes, not daily	5.0	(2.8)	1.1	(0.9)	1.4	(0.8)
No	0.0	(—)	0.1	(0.1)	0.1	(0.1)
Total	100.0		100.0		100.0	
Egg production						
Yes, daily	100.0	(—)	99.9	(0.1)	99.9	(0.1)
Yes, not daily	0.0	(—)	0.1	(0.1)	0.1	(0.1)
No	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0	

Morbidity records were kept by about one-third of broiler breeder farms (35.8 percent) and one-fourth of table-egg breeder farms (23.1 percent).

b. Percentage of farms by records kept and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Records kept	**Percent**	**Std. error**	**Percent**	**Std. error**
Morbidity (illness)				
Yes	35.8	(3.0)	23.1	(2.0)
No	64.2	(3.0)	76.9	(2.0)
Total	100.0		100.0	
Mortality				
Yes, daily	100.0	(—)	97.2	(2.8)
Yes, not daily	0.0	(—)	2.8	(2.8)
No	0.0	(—)	0.0	(—)
Total	100.0		100.0	
Feed consumption				
Yes, daily	98.8	(0.9)	87.6	(3.1)
Yes, not daily	1.2	(0.9)	9.6	(3.6)
No	0.0	(—)	2.8	(2.8)
Total	100.0		100.0	
Egg production				
Yes, daily	100.0	(—)	97.2	(2.8)
Yes, not daily	0.0	(—)	2.8	(2.8)
No	0.0	(—)	0.0	(—)
Total	100.0		100.0	

G. Bird Movement/ Transport

1. Replacement pullets

The majority of breeder farms raised replacement pullets at a different farm site belonging to the same company; 14.1 percent of primary breeder farms raised replacement pullets on the same farm.

a. Percentage of farms by location that replacement pullets were raised for the farm, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Location raised	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
On this farm	14.1	(2.1)	1.1	(0.9)	2.4	(0.9)
On a different farm site, same company (including contract)	86.7	(2.0)	99.8	(0.2)	98.5	(0.3)
On a farm from another company	0.0	(—)	0.2	(0.2)	0.2	(0.2)

The majority of broiler breeder and table-egg breeder farms raised replacement pullets on a different farm site, same company (98.5 and 100.0 percent of farms, respectively).

b. Percentage of farms by location that replacement pullets were raised for the farm, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Location raised	Percent	Std. error	Percent	Std. error
On this farm	2.4	(0.9)	2.8	(2.8)
On a different farm site, same company (including contract)	98.5	(0.3)	100.0	(—)
On a farm from another company	0.2	(0.2)	0.0	(—)

2. Farms that supplied pullets

The majority of breeder farms (85.9 percent) had one source farm that supplied pullets or chicks to the farm. Primary breeder farms tended to have more source farms than multiplier farms.

a. Percentage of farms by number of different farms that supplied pullets or chicks to the farm, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Number of farms	Pct.	Std. Error	Pct.	Std. error	Pct.	Std. Error
1	65.4	(5.2)	88.3	(2.0)	85.9	(1.8)
2 to 9	17.7	(4.5)	11.5	(2.0)	12.2	(1.8)
10 or more	16.9	(4.8)	0.2	(0.2)	1.9	(0.5)
Total	100.0		100.0		100.0	

The majority of broiler breeder farms and table-egg breeder farms received their pullets or chicks from one source farm (86.1 and 79.2 percent of farms, respectively).

b. Percentage of farms by number of different farms that supplied pullets or chicks to the farm, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number of farms	Percent	Std. error	Percent	Std. error
1	86.1	(1.9)	79.2	(3.8)
2 to 9	11.9	(1.9)	20.8	(3.8)
10 or more	2.0	(0.5)	0.0	(—)
Total	100.0		100.0	

All primary breeder farms were within an average of 99 miles or less from source farms that supplied pullets or chicks to the farm: 44.6 percent were less than 20 miles and 55.4 percent were 20 to 99 miles from source farms. Multiplier farms tended to be farther from their source farms.

c. Percentage of farms by average distance (in miles) pullets (or chicks if pullets are raised on farm) were transported to the farm, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Average distance (miles)	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Less than 20	44.6	(5.2)	18.5	(2.3)	21.3	(2.1)
20 to 99	55.4	(5.2)	79.1	(2.3)	76.6	(2.1)
100 or more	0.0	(—)	2.4	(0.5)	2.1	(0.5)
Total	100.0		100.0		100.0	

Over 4 of 10 layer breeder farms (41.5 percent) were located an average of 100 miles or more from their pullet source farms, whereas less than 1 percent of broiler breeder farms (0.9 percent) were 100 miles or more from their pullet source farms.

Note: Since table-egg breeder farms account for only 3 percent of all breeder farms (see table a., p 17), they do not contribute greatly to the “all farms” estimate in the previous table.

d. Percentage of farms by average distance (in miles) pullets (or chicks if pullets are raised on farm) were transported to the farm, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Average distance (miles)	**Percent**	**Std. error**	**Percent**	**Std. error**
Less than 20	21.2	(2.2)	23.6	(3.5)
20 to 99	77.9	(2.2)	34.9	(5.3)
100 or more	0.9	(0.5)	41.5	(5.6)
Total	100.0		100.0	

All primary breeder farms and 8 of 10 multiplier farms used vehicles dedicated to their company only to bring pullets/chicks onto the farm.

e. Percentage of farms by best description of vehicle used most often to bring pullets/chicks onto the farm during the previous 12 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Vehicle description	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Vehicle dedicated to this farm only	0.0	(—)	0.7	(0.4)	0.6	(0.4)
Vehicle dedicated to this company only	100.0	(—)	79.5	(1.3)	81.6	(1.1)
Vehicle also used on other companies' farms or independent farms	0.0	(—)	19.8	(1.2)	17.8	(1.1)
Total	100.0		100.0		100.0	

Nearly all table-egg breeder farms (97.2 percent) and 8 of 10 broiler breeder farms (81.1 percent) used vehicles dedicated to their company only to bring pullets/chicks onto the farm.

f. Percentage of farms by best description of vehicle used most often to bring pullets/chicks onto the farm during the previous 12 months, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Vehicle description	**Percent**	**Std. error**	**Percent**	**Std. error**
Vehicle dedicated to this farm only	0.7	(0.4)	0.0	(—)
Vehicle dedicated to this company only	81.1	(1.2)	97.2	(2.8)
Vehicle also used on other companies' farms or independent farms	18.2	(1.1)	2.8	(2.8)
Total	100.0		100.0	

No primary breeder farms or multiplier farms added pullets to existing flocks when placing pullets in the laying houses.

g. Percentage of farms by procedures for placing pullets in laying houses, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Procedure for placing pullets	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Whole farm all-in/all-out*	54.7	(4.9)	96.8	(1.4)	92.5	(1.4)
All-in/all-out by house*	45.3	(4.9)	3.2	(1.4)	7.5	(1.4)
Pullets added to existing flocks	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0	

*May take a couple of weeks to complete additions, but birds not added to existing flocks.

About 9 of 10 broiler breeder farms (93.2 percent) and 7 of 10 table-egg breeder farms (68.9 percent) placed pullets all-in/all-out for the whole farm.

h. Percentage of farms by procedures for placing pullets in laying houses, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Procedure for placing pullets	**Percent**	**Std. error**	**Percent**	**Std. error**
Whole farm all-in/all-out*	93.2	(1.4)	68.9	(3.7)
All-in/all-out by house*	6.8	(1.4)	31.1	(3.7)
Pullets added to existing flocks	0.0	(—)	0.0	(—)
Total	100.0		100.0	

*May take a couple of weeks to complete additions, but birds not added to existing flocks.

3. Breeding

On over 9 of 10 breeder farms (93.7 percent), breeding males were always raised on the same farm as pullets.

a. Percentage of farms by location that breeding males were raised, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Location raised	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Males always raised on same farm as pullets	96.3	(0.6)	93.4	(1.9)	93.7	(1.7)
Males always raised on different farm from pullets	0.0	(—)	0.9	(0.4)	0.8	(0.4)
Males sometimes raised on same farm as pullets and sometimes on different farm from pullets	3.7	(0.6)	5.7	(1.9)	5.5	(1.7)
Total	100.0		100.0		100.0	

A higher percentage of table-egg breeder farms than broiler breeder farms sometimes raised males on a different farm from pullets (13.9 and 5.3 percent of farms, respectively).

b. Percentage of farms by location that breeding males were raised, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Location raised	**Percent**	**Std. error**	**Percent**	**Std. error**
Males always raised on same farm as pullets	93.9	(1.8)	86.1	(1.9)
Males always raised on different farm from pullets	0.8	(0.4)	0.0	(—)
Males sometimes raised on same farm as pullets and sometimes on different farm from pullets	5.3	(1.7)	13.9	(1.9)
Total	100.0		100.0	

Nearly all multiplier farms (96.7 percent) and 8 of 10 primary breeder farms (80.2 percent) introduced spiking males during the previous 12 months to stimulate breeding activity.

c. Percentage of farms that introduced spiking males during the previous 12 months to stimulate breeding activity, by farm type:

Percent Farms					
Farm Type					
Primary breeder		Multiplier		All farms	
Percent	Std. error	Percent	Std. error	Percent	Std. error
80.2	(2.2)	96.7	(0.4)	95.0	(0.4)

Nearly all broiler breeder farms (99.8 percent) but less than 3 percent of table-egg breeder farms (2.6 percent) introduced spiking males during the previous 12 months to stimulate breeding activity.

d. Percentage of farms that introduced spiking males during the previous 12 months to stimulate breeding activity, by farm type:

Percent Farms			
Farm Type			
Broiler breeder		Table-egg breeder	
Percent	Std. error	Percent	Std. error
99.8	(0.4)	2.6	(1.8)

About one-half of multiplier farms (49.5 percent) but less than 1 percent of primary breeder farms (0.6 percent) that introduced spiking males during the previous 12 months, introduced the males three or more times.

e. For farms that introduced spiking males to stimulate breeding activity during the previous 12 months, percentage of farms by number of times males were introduced, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Number times	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1	54.2	(6.3)	14.0	(2.2)	17.6	(2.1)
2	45.2	(6.2)	36.5	(3.5)	37.3	(3.2)
3 times or more	0.6	(0.6)	49.5	(3.1)	45.1	(2.8)
Total	100.0		100.0		100.0	

The source of spiking males for nearly all farms was other farms from the same company. No farms used spiking males from a different company.

f. For farms that introduced spiking males to stimulate breeding activity during the previous 12 months, percentage of farms by source of spiking males:

Source of spiking males	Percent farms	Std. error
Excess males from young flocks on same farm	2.9	(1.1)
Other farms, same company	99.9	(0.1)
Other farms, different company	0.0	(—)

Nearly all breeder farms that received spiking males from other farms performed routine testing of the source farms for health status (e.g., *Mycoplasma* or other tests) and also tested males before placing them on the farm.

g. For farms that introduced spiking males that came from other farms, percentage of farms by health practices performed on source farm and males:

Health practice	**Percent farms**	**Std. error**
Routine testing of source farm for health status (e.g., *Mycoplasma* or other tests)	99.8	(0.2)
Testing of males before placing on farm (e.g., *Mycoplasma* or other tests)	99.4	(0.3)
Quarantine of males before introducing to laying flock	7.1	(1.7)

Spiking males were transported an average of 20 to 49 miles for about one-half of receiving farms.

h. For farms that introduced spiking males that came from other farms, percentage of farms by average number of miles spiking males were transported to the farm:

Average distance traveled (miles)	**Percent farms**	**Std. error**
Less than 20	24.5	(2.7)
20 to 49	50.1	(3.5)
50 to 99	25.4	(3.0)
100 or more	0.0	(—)
Total	100.0	

4. Vehicles used to remove birds

The majority of primary breeder farms (59.7 percent) used vehicles dedicated to their company only to remove birds from the farm, whereas the majority of multiplier farms (78.8 percent) used vehicles that were also used for other companies' farms.

a. Percentage of farms by best description of vehicle used most often to remove birds from the farm during the previous 12 months (e.g., transport birds to slaughter or market), and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Vehicle description	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Vehicle dedicated to this farm only	0.0	(—)	0.2	(0.2)	0.2	(0.2)
Vehicle dedicated to this company only	59.7	(4.6)	21.0	(2.3)	24.9	(2.1)
Vehicle also used on other companies' farms or independent farms	39.5	(4.6)	78.8	(2.3)	74.8	(2.1)
Other vehicles used	0.8	(0.8)	0.0	(—)	0.1	(0.1)
Total	100.0		100.0		100.0	

Table-egg breeder farms most commonly used vehicles dedicated to their company to remove birds, and broiler breeder farms most commonly used vehicles that were also used for other companies.

b. Percentage of farms by best description of vehicle used most often to remove birds from the farm during the previous 12 months (e.g., transport birds to slaughter or market), and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Vehicle description	**Percent**	**Std. error**	**Percent**	**Std. error**
Vehicle dedicated to this farm only	0.2	(0.2)	0.0	(—)
Vehicle dedicated to this company only	23.1	(2.2)	82.5	(0.0)
Vehicle also used on other companies' farms or independent farms	76.7	(2.2)	14.8	(2.8)
Other vehicles used	0.0	(—)	2.7	(2.7)
Total	100.0		100.0	

Photograph courtesy of Frank T. Jones

H. Egg Movement and Transport

1. Egg handling

Nearly all breeder farms gathered eggs by belt only or by both hand and belt. Only 1.6 percent of farms used hand gathering only.

a. Percentage of farms by egg-gathering method and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Egg-gathering method	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Hand only	0.7	(0.5)	1.7	(1.0)	1.6	(0.9)
Belt only	30.9	(5.2)	56.5	(2.7)	54.0	(2.5)
Both hand and belt	68.4	(5.2)	41.8	(2.5)	44.4	(2.3)
Total	100.0		100.0		100.0	

About three-fourths of table-egg breeder farms (78.4 percent) used belt only to gather eggs.

b. Percentage of farms by egg-gathering method and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Egg-gathering method	Percent	Std. error	Percent	Std. error
Hand only	1.6	(0.9)	2.6	(1.7)
Belt only	53.2	(2.5)	78.4	(3.8)
Both hand and belt	45.2	(2.4)	19.0	(3.8)
Total	100.0		100.0	

The majority of primary breeder and multiplier farms sent clean floor eggs to the hatchery and discarded broken floor eggs.

c. Percentage of **primary breeder** farms by handling procedures for the following egg types:

	Percent Primary Breeder Farms						
	Handling Procedure						
	Sent to hatchery		Sent to breaker		Discarded		
Egg type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Clean floor eggs	92.8	(2.1)	5.3	(0.9)	1.9	(1.9)	100.0
Dirty floor eggs	30.1	(5.1)	47.7	(3.6)	22.2	(4.8)	100.0
Broken eggs	0.0	(—)	15.1	(4.6)	84.9	(4.6)	100.0

d. Percentage of **multiplier** farms by handling procedures for the following egg types:

	Percent Multiplier Farms						
	Handling Procedure						
	Sent to hatchery		Sent to breaker		Discarded		
Egg type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Clean floor eggs	97.8	(0.1)	2.1	(0.1)	0.1	(0.1)	100.0
Dirty floor eggs	2.4	(1.2)	65.8	(0.7)	31.8	(1.4)	100.0
Broken eggs	0.0	(—)	24.2	(0.8)	75.8	(0.8)	100.0

2. Eggs transported to the hatchery

Breeder farms most commonly transported eggs to the hatchery two times per week (95.2 percent of farms).

a. Percentage of farms by number of times per week eggs were transported to the hatchery, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Number of times per week	Pct.	Std. Error	Pct.	Std. error	Pct.	Std. error
1	0.8	(0.8)	0.0	(—)	0.1	(0.1)
2	99.2	(0.8)	94.7	(1.4)	95.2	(1.3)
3 or more	0.0	(—)	5.3	(1.4)	4.7	(1.3)
Total	100.0		100.0		100.0	

Four of 10 table-egg breeder farms (40.3 percent) transported eggs to the hatchery 3 or more times per week.

b. Percentage of farms by number of times per week eggs were transported to the hatchery, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Number of times per week	Percent	Std. error	Percent	Std. error
1	0.0	(—)	2.7	(2.7)
2	96.3	(1.3)	57.0	(5.6)
3 or more	3.7	(1.3)	40.3	(5.2)
Total	100.0		100.0	

Multiplier farms transported eggs a longer distance to the hatchery than primary breeder farms; 33.0 percent of multiplier farms, but only 8.2 percent of primary breeder farms, transported eggs 50 miles or more to the hatchery.

c. Percentage of farms by distance (in miles) eggs were transported to the hatchery, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Distance (miles)	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Less than 20	44.0	(5.5)	20.0	(3.1)	22.6	(2.8)
20–49	47.8	(5.6)	47.0	(3.6)	47.1	(3.2)
50–99	7.4	(1.7)	20.9	(3.0)	19.4	(2.7)
100 or more	0.8	(0.8)	12.1	(0.8)	10.9	(0.7)
Total	100.0		100.0		100.0	

Broiler breeder farms transported eggs a longer distance to the hatchery than table-egg breeder farms; 79.2 percent of broiler breeder farms, but only 22.3 percent of table-egg breeder farms; transported eggs 20 miles or more to the hatchery.

d. Percentage of farms by distance (in miles) eggs were transported to the hatchery, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Distance (miles)	**Percent**	**Std. error**	**Percent**	**Std. error**
Less than 20	20.8	(2.9)	77.7	(3.4)
20–49	48.2	(3.3)	11.5	(3.6)
50–99	20.0	(2.8)	2.5	(1.3)
100 or more	11.0	(0.8)	8.3	(3.4)
Total	100.0		100.0	

Nearly all breeder farms (95.4 percent) used a vehicle dedicated to their company only to transport eggs to the hatchery.

e. Percentage of farms by best description of vehicle used most often to transport eggs from the farm to the hatchery during the previous 12 months, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Vehicle description	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Vehicle dedicated to this farm only	0.0	(—)	0.2	(0.2)	0.2	(0.2)
Vehicle dedicated to this company only	100.0	(—)	94.9	(1.7)	95.4	(1.5)
Vehicle also used on other companies' farms or independent farms	0.0	(—)	4.9	(1.7)	4.4	(1.5)
Total	100.0		100.0		100.0	

A small percentage of broiler breeder farms (4.5 percent) used vehicles that were also used on other companies' farms to transport eggs to the hatchery.

f. Percentage of farms by best description of vehicle used most often to transport eggs from the farm to the hatchery during the previous 12 months, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Vehicle description	**Percent**	**Std. error**	**Percent**	**Std. error**
Vehicle dedicated to this farm only	0.2	(0.2)	1.3	(1.3)
Vehicle dedicated to this company only	95.3	(1.5)	98.7	(1.3)
Vehicle also used on other companies' farms or independent farms	4.5	(1.5)	0.0	(—)
Total	100.0		100.0	

3. Hatcheries that hatch eggs from other farms

Primary breeder farms rarely used hatcheries that also hatched eggs for other companies (4.4 percent of farms). The hatchery on 21.3 percent of multiplier farms also hatched eggs for other farms from different companies.

a. Percentage of farms in which the hatchery that hatched eggs from this farm also hatched eggs from other farms, by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Hatchery hatched eggs from…	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Other farms within the same company	99.2	(0.8)	100.0	(0.0)	99.9	(0.1)
Other farms from different companies	4.4	(0.5)	21.3	(2.0)	19.6	(1.8)

The percentage of farms in which the hatchery hatched eggs for other companies was similar for broiler breeder and table-egg breeder farms.

b. Percentage of farms in which the hatchery that hatched eggs from this farm also hatched eggs from other farms, by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Hatchery hatched eggs from…	Percent	Std. error	Percent	Std. error
Other farms within the same company	100.0	(—)	96.0	(3.0)
Other farms from different companies	19.6	(1.9)	20.0	(1.3)

4. Egg flats

Nearly all primary breeder and multiplier farms used flats that may go to other farms within the same company only; none used flats that went to farms belonging to different companies.

a. Percentage of farms by best description of how flats were usually handled, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Handling description	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Disposable	4.4	(0.5)	2.1	(0.1)	2.3	(0.0)
Returned to same farm	0.8	(0.8)	1.5	(0.8)	1.5	(0.7)
May go to other farms, same company only	94.8	(0.9)	96.4	(0.8)	96.2	(0.7)
May go to other farms, other companies	0.0	(—)	0.0	(—)	0.0	(—)
No flats used	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0	

The majority of table-egg breeder farms (78.7 percent) used disposable flats.

b. Percentage of farms by best description of how flats were usually handled, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Handling description	**Percent**	**Std. error**	**Percent**	**Std. error**
Disposable	0.0	(—)	78.7	(0.0)
Returned to same farm	1.0	(0.7)	15.0	(1.3)
May go to other farms, same company only	99.0	(0.7)	6.3	(1.3)
May go to other farms, other companies	0.0	(—)	0.0	(—)
No flats used	0.0	(—)	0.0	(—)
Total	100.0		100.0	

All farms that used nondisposable flats cleaned and disinfected the flats before returning them to a farm.

c. For farms that used nondisposable flats, percentage of farms in which the flats were usually cleaned and disinfected before leaving the hatchery and returning to a farm:

Percent farms	Std. error
100.0	(—)

d. Percentage of farms in which buggies to roll flats onto trucks were used at different premises, by farm type

Percent Farms					
Farm Type					
Primary breeder		Multiplier		All farms	
Percent	Std. error	Percent	Std. error	Percent	Std. error
54.5	(2.7)	85.5	(0.8)	82.4	(0.8)

Buggies used to roll flats onto the trucks were used at different premises for a higher percentage of broiler breeder farms (84.1 percent) than table-egg breeder farms (26.7 percent).

e. Percentage of farms in which buggies to roll flats onto trucks were used at different premises, by farm type:

Percent Farms			
Farm Type			
Broiler breeder		Table-egg breeder	
Percent	Std. error	Percent	Std. error
84.1	(0.8)	26.7	(4.0)

Nearly all farms that used buggies for different premises cleaned and disinfected the buggies between farms.

f. For farms in which buggies were used at different premises, percentage of farms that cleaned and disinfected buggies between farms:

Percent farms	Std. error
97.6	(1.3)

5. Egg racks

Nearly all multiplier farms (97.0 percent) and 6 of 10 primary breeder farms (58.2 percent) used racks that may go to other farms within the same company only; 4 of 10 primary breeder farms (40.6 percent) did not use racks.

a. Percentage of farms by best description of how racks were usually handled, and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Handling description	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Returned to same farm	1.2	(0.9)	0.5	(0.2)	0.6	(0.2)
May go to other farms, same company only	58.2	(0.7)	97.0	(1.2)	93.1	(1.1)
May go to other farms, other companies	0.0	(—)	0.3	(0.2)	0.3	(0.2)
No racks used	40.6	(0.5)	2.2	(1.2)	6.0	(1.1)
Total	100.0		100.0		100.0	

Photograph courtesy of Frank T. Jones

A total of 14.0 percent of table-egg breeder farms returned racks to the same farm.

b. Percentage of farms by best description of how racks were usually handled, and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Handling description	**Percent**	**Std. error**	**Percent**	**Std. error**
Returned to same farm	0.1	(0.1)	14.0	(3.3)
May go to other farms, same company only	93.4	(1.1)	84.7	(3.5)
May go to other farms, other companies	0.3	(0.2)	0.0	(—)
No racks used	6.2	(1.1)	1.3	(1.3)
Total	100.0		100.0	

All farms that used racks cleaned and disinfected the racks before they left the hatchery and returned to a farm.

c. For farms that used racks, percentage of farms in which the racks were usually cleaned and disinfected before leaving the hatchery and returning to a farm:

Percent farms	Std. error
100.0	(—)

6. Equipment sharing

About three-fourths of primary breeder farms (78.5 percent) and one-half of multiplier farms (52.2 percent) never shared outside tools, equipment, or machinery—other than racks or flats—with another farm within the same company, and all primary breeder farms (100.0 percent) and 7 of 10 multiplier farms (70.5 percent) never shared these items with farms from a different company.

a. Percentage of farms that shared any outside tools, equipment, or machinery—other than racks and flats—(e.g., tractors, feeding equipment, litter spreaders, trailers) with other farms during the previous 12 months, by frequency shared and by farm type:

	Percent Farms					
	Farm Type					
	Primary breeder		Multiplier		All farms	
Frequency shared	Pct.	Std. error	Pct.	Std. Error	Pct.	Std. error
Another farm, same company						
At least monthly	0.4	(0.4)	3.6	(1.4)	3.2	(1.3)
Less than monthly	21.1	(5.0)	44.2	(3.1)	41.9	(2.8)
Never	78.5	(5.0)	52.2	(3.2)	54.9	(2.9)
Total	100.0		100.0		100.0	
Another farm, different company						
At least monthly	0.0	(—)	0.3	(0.2)	0.3	(0.2)
Less than monthly	0.0	(—)	29.2	(2.2)	26.2	(2.0)
Never	100.0	(—)	70.5	(2.2)	73.5	(2.0)
Total	100.0		100.0		100.0	

About 9 of 10 table-egg breeder farms (89.2 percent) and one-half of broiler breeder farms (53.9 percent) never shared outside tools, equipment, or machinery—other than racks or flats—with another farm within the same company, and all table-egg breeder farms (100.0 percent) and 7 of 10 broiler breeder farms (72.8 percent) never shared these items with farms from a different company.

b. Percentage of farms that shared any outside tools, equipment, or machinery—other than racks and flats—(e.g., tractors, feeding equipment, litter spreaders, trailers) with other farms during the previous 12 months, by frequency shared and by farm type:

	Percent Farms			
	Farm Type			
	Broiler breeder		Table-egg breeder	
Frequency shared	**Percent**	**Std. error**	**Percent**	**Std. error**
Another farm, same company				
At least monthly	3.2	(1.3)	2.6	(1.8)
Less than monthly	42.9	(2.9)	8.2	(3.2)
Never	53.9	(3.0)	89.2	(3.6)
Total	100.0		100.0	
Another farm, different company				
At least monthly	0.3	(0.2)	0.0	(—)
Less than monthly	26.9	(2.0)	0.0	(—)
Never	72.8	(2.0)	100.0	(—)
Total	100.0		100.0	

Nearly all farms that shared equipment washed and disinfected the equipment before bringing it onto the farm.

c. For farms that shared tools, equipment, and/or machinery—other than racks or flats—percentage of farms that washed and disinfected equipment/machinery before bringing it onto the farm:

Percent farms	Std. error
94.6	(2.4)

Section II: Methodology

A. Needs Assessment

NAHMS develops study objectives by exploring existing literature and contacting industry members and other stakeholders about their informational needs and priorities during a needs assessment phase. For Poultry 2010, the following activities were conducted:

- A focus group consisting of industry, State, Federal, and university representatives met at the World Poultry Exposition in Atlanta, GA, in January 2008.

- A needs assessment questionnaire was distributed to poultry veterinarians via the presidents of the egg layer, broiler, turkey, and primary breeder veterinary groups. This questionnaire was also distributed to State and Federal veterinarians, and laboratory and research personnel.

- Discussions were held with each of the poultry veterinary groups at the American Association of Avian Pathologists meeting in New Orleans, LA, in July 2008, and in Seattle, WA, in July 2009.

- Additional discussions occurred at the United States Animal Health Association Transmissible Diseases of Poultry Committee.

B. Sampling and Estimation

1. Phase I: Company survey

Phase I of the Poultry 2010 study focused on the industry structure and company practices. The selection unit for Phase I was the poultry company. A total of 6 breeder companies, 14 broiler companies, 23 table egg layer companies, and 15 turkey companies were selected to participate in Phase I of the Poultry 2010 study. Turkey breeder companies were not included. Companies that had broilers and turkeys were considered to be two separate companies for the purposes of this study. Additionally, subparts of some large turkey companies were considered to be separate companies. Large turkey co-ops were considered to be companies. The selected companies represent all primary breeders, 81.2 percent of broilers produced during 2009[1], 71.7 percent of table egg layers in production on December 31, 2009[1], and 76.8 percent of turkeys slaughtered in 2009[2] in the United States.

2. Phase II: Breeder Farm study

Companies that participated in Phase I and that had any layer (egg type) or broiler (meat type) breeder farms were eligible to participate in Phase II (Breeder Farm study). Turkey breeder farms were not included in Phase II. The Poultry 2010 Breeder Farm study included farms located in the Central and East regions of the United States (see map, p 4). States in these regions accounted for 98 percent of egg-type breeder flocks, 97 percent of egg-type breeder birds, and over 99 percent of meat-type breeder flocks and birds in flocks participating in the National Poultry Improvement Plan (see Appendix II).

3. Data collection

Data collection was conducted from May 27 through October 16, 2010. Company veterinarians or representatives completed one company questionnaire per company. Companies that had breeder farms selected a sample of farms for Phase II (Breeder Farm study), and completed one questionnaire per farm. Some veterinarians elected to complete farm-level questionnaires for all of their breeder farms, while others selected a sample of farms. Breeder companies, broiler companies, and table-egg companies had a choice of completing the company and farm-level questionnaires either online or by hard copy. Turkey company questionnaires were only available via hard copy. The online data collection Web site was developed and managed by a private Web site development company. Hard-copy questionnaires were mailed to the NAHMS office and entered into a SAS data file.

4. Data analysis

Online data (both company and farm level) were forwarded to NAHMS as comma-delimited files. These files were converted to SAS data sets and merged with the SAS data sets that had been entered by NAHMS staff, resulting in one company-level SAS data set and one farm-level SAS data set. Validation checks were performed on these data sets after they were combined. Point estimates were generated using SUDAAN software, which accounts for complex study design.

5. Population inferences

a. Phase I: Company survey

Inferences cover the population of the selected poultry companies. The selected companies represent all primary breeders, 81.2 percent of broilers produced during 2009,[1] 71.7 percent of table egg layers in production on December 31, 2009,[1] and 76.8 percent of turkeys slaughtered in 2009[2] in the United States. All respondent data were statistically weighted to reflect the population from which they were selected. Because companies were selected with certainty, the initial selection weight was equal to one for all selected companies. This selection weight was adjusted for nonresponse within industry segment and size strata.

b. Phase II: Breeder farm study

Companies with any broiler or table-egg breeder farms were eligible to continue on to Phase II. The company weight was adjusted for nonresponse within industry segment. This weight was then adjusted by an expansion factor equal to the number of breeder farms that the company had divided by the number of farms that completed the questionnaire. The reporting unit for Phase II was the individual farm.

C. Response Rate

Overall, 72 percent of selected companies participated in Phase I (company survey). Of those companies eligible to continue to Phase II (Breeder Farm study), 81 percent participated.

Companies	Breeder companies	Broiler companies	Table-egg companies	Turkey companies	Total
Selected for Phase I (company-level survey)	6	14	23	15*	58
Participated in Phase I	6 (100%)	8 (57%)	16 (70%)	12 (80%)	42 (72%)
Eligible for Phase II (Breeder Farm study)	6	8	2**	0	16
Participated in Phase II	5 (83%)	6 (75%)	2 (100%)	0	13 (81%)

*For the purpose of this study, subparts of some large turkey companies were considered to be separate (unique) companies. Also, large turkey co-ops were considered to be companies.

**Most table-egg companies receive birds from a breeder company and do not have their own breeder farms.

[1] www.WattAgNet.com, February 2010. WATT PoultryUSA survey.

[2] WATT PoultryUSA Turkey Profiles, February 2010.

Appendix I: National Poultry Improvement Plan Testing Requirements

NPIP testing requirements for egg- and meat-type breeder chicken flocks, by disease

Disease	Primary breeder flocks	Multiplier flocks
Pullorum	Test at 4 months of age	No NPIP requirements
Mycoplasma gallisepticum (MG)	Test at 4 months of age and every 90 days	Test at 4 months of age and every 90 days
Mycoplasma synoviae (MS)	Test at 4 months of age and every 90 days	Test at 4 months of age and every 90 days
Avian influenza (AI)	Test at greater than 4 months of age and every 90 days	Test at greater than 4 months of age and every 90 days

Source: NPIP Web site.

Appendix II: NPIP Flocks and Birds

Number of Layer (Egg-type) and Broiler (Meat-type) Chicken Breeder Flocks and Number of Birds in National Poultry Improvement Plan, by Region

Region	Layer breeder flocks	Layer breeder birds	Broiler breeder flocks	Broiler breeder birds
West	4 (2.0%)	111,130 (3.1%)	9 (0.2%)	582,105 (0.7%)
Central	115 (56.6%)	1,584,868 (44.5%)	1,408 (25.2%)	24,117,882 (29.0%)
East	84 (41.4%)	1,866,750 (52.4%)	4,158 (74.6%)	58,578,821 (70.3%)
Total	203 (100.0%)	3,562,748 (100.0%)	5,575 (100.0%)	83,278,808 (100.0%)

Source: Dr. Steve Roney, NPIP.

Appendix III: Sample Profile

1. Number of participating farms by type

Type	Number of farms
Primary breeder—broiler (meat-type)	117
Primary breeder—layer (egg-type)	13
Multiplier/parent—broiler (meat-type)	291
Multiplier/parent—layer (egg-type)	61
Total	482

2. Number of participating farms by region

Region	Number of farms
Central	107
East	375
Total	482

Appendix IV: Study Objectives and Related Outputs

1. Describe the structure of commercial poultry industries, including interactions among poultry industry segments, movements, and biosecurity practices. Describe farm-level practices for chicken primary breeder and multiplier flocks. Identify critical factors for exclusion of disease (such as *Mycoplasma*).

• Poultry 2010: Structure of the U.S. Commercial Poultry Industry, expected fall 2011
• Poultry 2010: Reference of Health and Management Practices on Breeder Chicken Farms in the United States, 2010, expected fall 2011
• Info sheets, expected fall 2011

2. Estimate the prevalence and investigate risk factors associated with clostridial dermatitis (cellulitis/gangrenous dermatitis) on turkey grower farms.

• Poultry 2010: Clostridial dermatitis on United States Turkey Farms, Interpretive Report, expected spring 2012
• Info sheets, expected spring 2012

3. Estimate the size of the urban chicken ownership population in Los Angeles. Describe bird health, movement, and biosecurity practices of urban chicken flocks in four U.S. cities: Miami, Denver, Los Angeles and New York City.

• Poultry 2010: Reference of the Health and Management of Chicken Flocks in Urban Settings in Four U.S. Cities, April 2011
• Characteristics of Urban Chicken Flocks in Four U.S. Cities: the Human/Chicken Interface, info sheet, April 2011
• Biosecurity of Urban Chicken Flocks in Four U.S. Cities, info sheet, April 2011
• Poultry 2010: Urban-chicken Ownership in Los Angeles County, California, 2010, descriptive report, July 2011
• Urban Chicken Flocks in Los Angeles County, California, 2010