USDA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Veterinary Services

National Animal Health Monitoring System

November 2014

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Layers 2013

Part IV: Reference of Organic Egg Production in the United States, 2013

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Items of Note

Organic farming, which includes organic egg production, is a growing trend in U.S. agriculture. The requirements for certified organic egg production include feeding only certified organic feed, no antibiotic use, cage-free housing, and outside access for birds. Overall, 27.6 percent of layer farms were certified as organic operations. By region, the percentage of farms certified as organic operations ranged from 20.1 percent in the Southeast region to 37.0 percent in the Central region. The percentage of farms certified as organic operations decreased as farm size increased; 61.0 percent of small farms (fewer than 30,000 birds) were certified as organic operations compared with less than 2 percent of large farms (100,000 birds or more). Likewise, the majority of organic farms (85.4 percent) were small; only 2.7 percent had a maximum capacity of 100,000 or more birds. It is important to note that this study included only farms with 3,000 or more birds. The number of organic farms with fewer than 3,000 birds and their management practices were not included in this study.

Nearly all certified organic farms had an uncovered outdoor area for birds. Outside areas on about half of certified organic farms provided 2.0 to 4.9 square feet of space per bird, when houses were at maximum capacity. On 38.0 percent of farms, the outside area provided less than 2 square feet of space per bird, while 12.6 percent of farms provided 5 or more square feet of space per bird. Although less than 1 percent of certified organic farms observed wild waterfowl in the layers' outdoor area, nearly two-thirds of farms (64.6 percent) observed other wild birds in the outside area.

A total of 0.2 percent of layers was lost due to predators in the last completed flock. The most common predator control methods used on certified organic farms included electric fencing (20.4 percent), traps (19.4 percent), and shooting (15.7 percent).

The primary manure-handling method used by the highest percentage of certified organic farms (72.8 percent) was raised slats over floor. About half of farms stored manure on-farm, most commonly outside. About three-fourths of farms that stored manure on-farm (73.9 percent) stored it in a location attached to the layer house or within 100 feet of the house.

Only 3.6 percent of certified organic farms molted their flocks.

About half of certified organic farms had a problem with *E. coli* peritonitis in their last completed flock, although it was generally a minor problem. Measures were taken to prevent *E. coli* peritonitis on about two-thirds of farms (67.0 percent). The preventive measures used by the highest percentages of farms were chlorine in the water and probiotics (33.3 and 32.3 percent, respectively). The most severe problem reported was cannibalism; 12.6 percent of farms reported a moderate or severe problem with

cannibalism. About 5 percent of hens in the last completed flock died by 60 weeks of age, and about 7 percent died in total.

Producers were asked to report all possible responses for how they would treat a hypothetical disease situation. About half of certified organic farms would likely not treat birds for respiratory problems; however, if respiratory problems were severe enough, 20.8 percent of farms would consider depopulating and 15.0 percent would remove sick birds from the organic market and then treat them. For parasite problems, diatomaceous earth was the treatment preferred by the highest percentage of farms (48.8 percent).

Less than 1 percent of certified organic farms gave an antibiotic at any time to the last completed flock. These birds and their eggs must be removed from the organic market and marketed through other channels.

About one of five certified organic farms (21.8 percent) gathered eggs by hand, accounting for 4.7 percent of eggs produced in May 2013. Nearly all farms processed eggs off-farm. For farms that processed eggs off-farm, about 3 of 10 transported eggs 100 or more miles. Nearly all farms (99.6 percent) used reusable plastic flats that were cleaned and disinfected before reuse. The majority of farms (70.2 percent) cleaned and disinfected racks and pallets before reusing them.

Almost four-fifths of certified organic farms (79.2 percent) required employees to use footbaths before entering bird areas. The majority of farms (59.1 percent) required employees to not be around other poultry at least 24 hours before coming on-farm, and 80.7 percent of farms did not allow employees to own other poultry or birds.

Broilers, other poultry, and other domestic birds were rarely found on certified organic farms. Nearly half of farms had cattle. Dogs were present on over half of farms.

Mice caused the greatest ongoing rodent problem on certified organic farms, both inside the layer house (60.3 percent of farms) and in the layers' outdoor area (50.5 percent of farms). Farms with rodent problems usually ranked the problems as low (minor impact on building or feed efficiency). About 9 of 10 farms monitored rodent index as part of their rodent control program inside the layer house, and 1 of 3 did so in the layers' outdoor area. Nearly all farms had a typical rodent index of 0 to 10 (low) during the previous 12 months. No farms reported a typical rodent index of 26 or more (high). The majority of farms used traps or sticky tape/glue traps during the previous 12 months to control rodents; 10 percent used cats.

Over half of certified organic farms (55.5 percent) had a down time of 18 days or longer; none had a down time of less than 4 days. More than 80 percent of farms emptied feeders and feed hoppers; flushed and disinfected water lines; dry cleaned walls and ceilings; and cleaned fans, ventilation systems, or cool cells after every flock.

All certified organic farms obtained pullets from National Poultry Improvement *Salmonella* Enteritidis clean flocks. About one-third of farms had been inspected by the Food and Drug Administration.

Layers on 98.9 percent of certified organic farms were vaccinated against *Salmonella* as pullets, and an additional 0.5 percent of farms vaccinated birds both as pullets and as layers. Less than 1 percent of farms did not vaccinate either pullets or layers against *Salmonella.* Nearly all farms (95.6 percent) tested for *Salmonella* Enteritidis in the layer flock environment at some time from June 2012 to May 2013. No tests were positive for *Salmonella* Enteritidis.

Certified organic farms were smaller than nonorganic farms and were more likely to gather eggs by hand and process eggs off-farm. Only 3.6 percent of organic farms routinely molted their flocks compared with 50.0 percent of nonorganic farms. Organic and nonorganic farms reported similar levels of rodent problems inside the layer houses. Compared with nonorganic farms, a higher percentage of organic farms used traps or sticky tape/glue traps, and a lower percentage used chemicals or baits to control rodents. Compared with nonorganic farms, a higher percentage of organic farms reported problems with cannibalism, respiratory disease, *E. coli* peritonitis, and parasites; however, disease problems were generally reported to be minor. Mortality was similar for organic and nonorganic farms.

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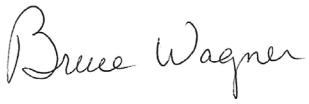
Acknowledgments

The Layers 2013 study was a cooperative effort among animal- and human-health officials, university researchers, and poultry industry leaders and producers. We would like to thank our reviewers for providing valuable expertise and guidance through their comments. All participants are to be commended, particularly poultry producers whose voluntary efforts made the Layers 2013 study possible.



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Suggested bibliographic citation for this report:
USDA 2014. Layers 2013 “Part IV: Reference of Organic Egg Production in the United States, 2013”
USDA–APHIS–VS, CEAH. Fort Collins, CO
#686.1114

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Feedback
Feedback, comments, and suggestions regarding Layers 2013 study reports are welcomed. You may submit feedback via online survey at: http://www.aphis.usda.gov/nahms (Click on “FEEDBACK on NAHMS reports.”)

Introduction

The National Animal Health Monitoring System (NAHMS) is a nonregulatory program of the U.S. 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 of the U.S. poultry industry and provided baseline health and management information for the table-egg industry. Layers '99 estimated the prevalence and associated risk factors of *Salmonella* 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, gamefowl breeder flocks, and live-poultry markets.

The Small Enterprise Chicken study in 2007 was NAHMS' third study of the poultry industry and focused on biosecurity and bird movement on operations with 1,000 to 19,999 chickens.

Poultry 2010 was NAHMS' fourth study of the U.S. poultry industry, addressing four topics: 1) the structure of commercial poultry industries, 2) farm-level practices for chicken primary breeder and multiplier flocks, 3) prevalence of and risk factors associated with clostridial dermatitis on turkey grower farms, and 4) management of urban chicken flocks in four U.S. cities—Miami, Denver, Los Angeles, and New York City.

Layers 2013 is NAHMS' fifth study of the U.S. poultry industry, updating baseline health and management information for the table-egg industry. Layers 2013 estimated the prevalence of *Salmonella* Enteritidis in U.S. layer flocks and described management practices relevant to *Salmonella* Enteritidis .

Layers 2013 "Part IV: Reference of Organic Egg Production in the United States, 2013" is the fourth in a series of reports containing information from Layers 2013, focusing on health and management practices. This report contains information provided by poultry producers from 85 organic table-egg layer farms in 19 States.[1] It is important to note that this study included only farms with 3,000 or more birds. Certified organic farms with fewer than 3,000 birds were not included in this study.

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

[1] Arkansas, Alabama, California, Florida, Georgia, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, New England States (CT, MA, ME, NH, VT) considered one State for this study, North Carolina, Ohio, Pennsylvania, Texas, Washington, Wisconsin.

Terms Used in This Report

Certified organic operation: An operation certified by an accredited certifying agent as utilizing a system of organic production in compliance with the USDA National Organic Program. On organic egg operations, laying hens must have access to the outdoors, be raised cage free, be fed certified organic feed, and must not be given antibiotics.

Crew: Workers not employed by a single farm but who work temporarily at one or more farms, e.g., vaccination crews and catching crews.

Eggs:

Eggs for breaking: Eggs sent to a breaking plant where they are separated from the shell to become liquid whole eggs or liquid yolks, and liquid egg whites. Liquid egg products are ultimately submitted to a heat treatment such as pasteurization.

Shell eggs: Raw whole eggs contained in the shell.

Farm size: Size groupings based on number of layers 20 weeks of age or older on the farm at maximum capacity. For this report, farm sizes were categorized as small (fewer than 30,000 birds); medium (30,000 to 99,999 birds); and large (100,000 or more birds).

Flock: A group of birds of similar age (may vary several weeks from the median age of the flock) considered as a production unit. A flock usually fills only one layer house, but it may take up more or less than one house.

Last completed flock: The most recent flock that completed its production cycle and was then removed from the farm.

Layer: A female chicken that produces eggs.

Molt: The period when birds are taken out of production (usually around 65 weeks of age) until they return approximately to their 18-week of age weight. After a rest period, they are returned to production for another laying cycle.

Operation average: The average value for all operations; a single value for each operation is summed over all operations reporting and divided by the number of operations reporting. For example, operation average percentage of last completed flock lost to predators (table C.7) was calculated by summing the percentage of predator loss reported by each operation and dividing by the number of operations.

Population estimates: Data from the operations responding to the survey are weighted to reflect their probability of selection during sampling and to account for survey nonresponse. 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. An estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5

(1.96 times the standard error above and below the estimate). An estimate of 3.4 gives 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 (—).

Porch system: Outdoor area with flooring, screens, and cover.

Prebiotic: Nondigestible feed ingredients that can increase the health-promoting attributes of bacteria already in the colon.

Probiotic: Product that contains live microbes intended to confer a health benefit on the host.

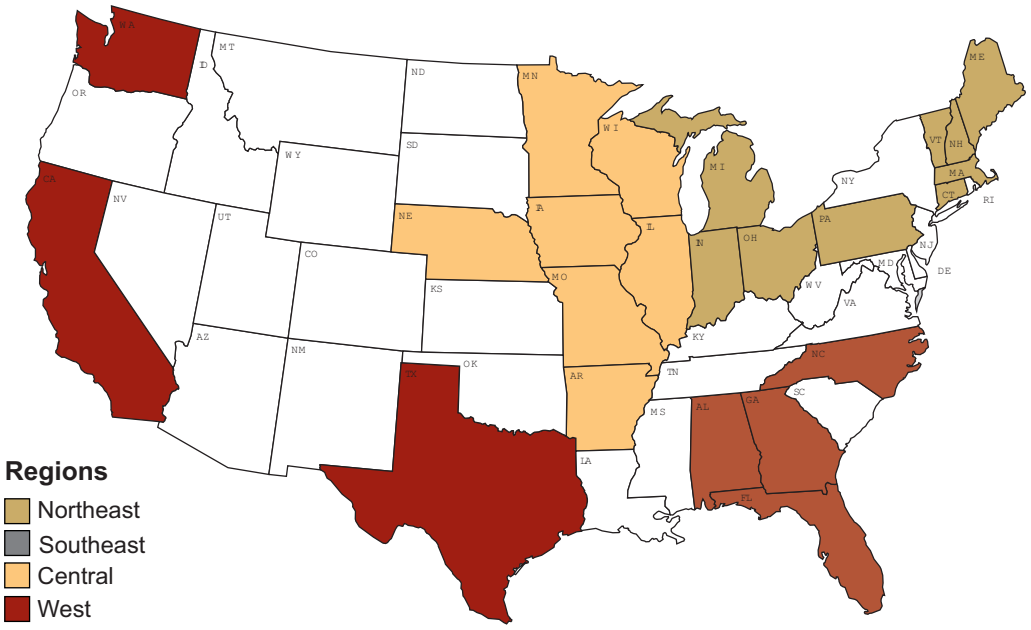
Pullet: A female chicken less than 20 weeks of age that has not yet laid eggs. A pullet placed in the laying house is called a layer.

Regions:

Northeast: Indiana, Michigan, Ohio, Pennsylvania, New England States (Connecticut, Massachusetts, Maine, New Hampshire, Vermont)
Southeast: Alabama, Florida, Georgia, North Carolina
Central: Arkansas, Illinois, Iowa, Minnesota, Missouri, Nebraska, Wisconsin
West: California, Texas, Washington

Rodent index: Equivalent of number of mice caught per 12 rodent traps per 7 days.

Layers 2013 study States*



*New England States (CT, MA, ME, NH, VT) were considered one State for study analyses.

Section I: Population Estimates

Note: Where appropriate, column totals are shown as 100.0 to aid in interpretation; however, estimates may not sum to 100.0 due to rounding.

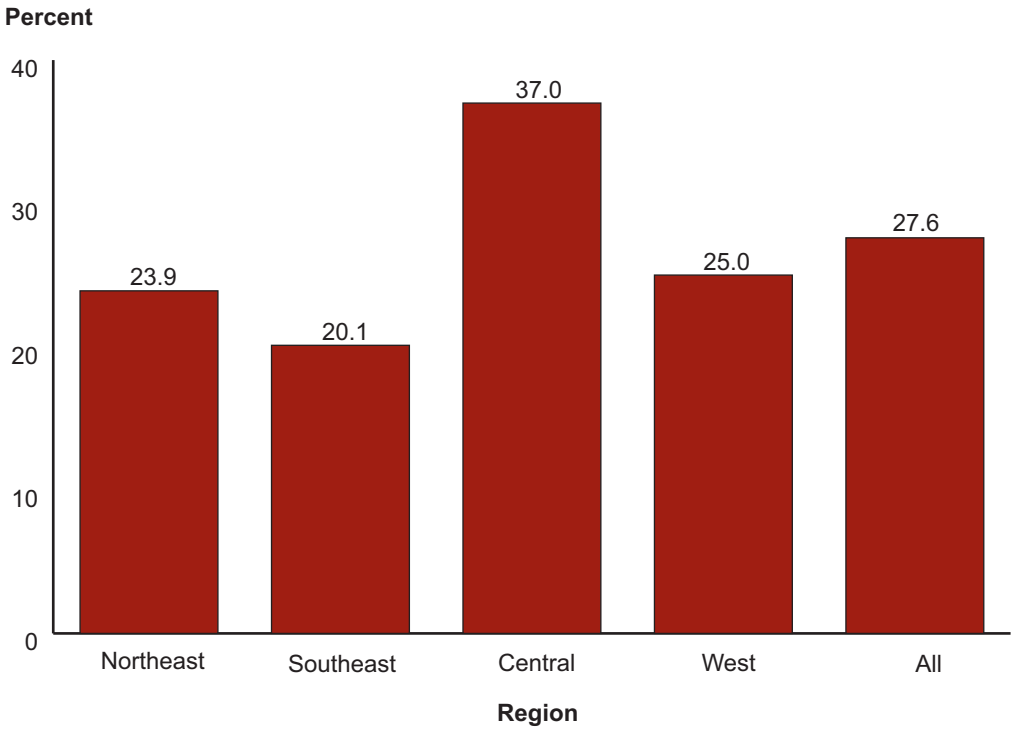
A. General Layer Farm Management

Overall, 27.6 percent of layer farms were certified as organic operations. By region, the percentage of layer farms certified as organic operations ranged from 20.1 percent in the Southeast region to 37.0 percent in the Central region.

A.1. Percentage of layer farms certified as organic operations, by region:

Percent Farms									
Region									
Northeast		Southeast		Central		West		All	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
23.9	(3.9)	20.1	(2.8)	37.0	(1.9)	25.0	(4.6)	27.6	(2.1)

Percentage of layer farms certified as organic, by region

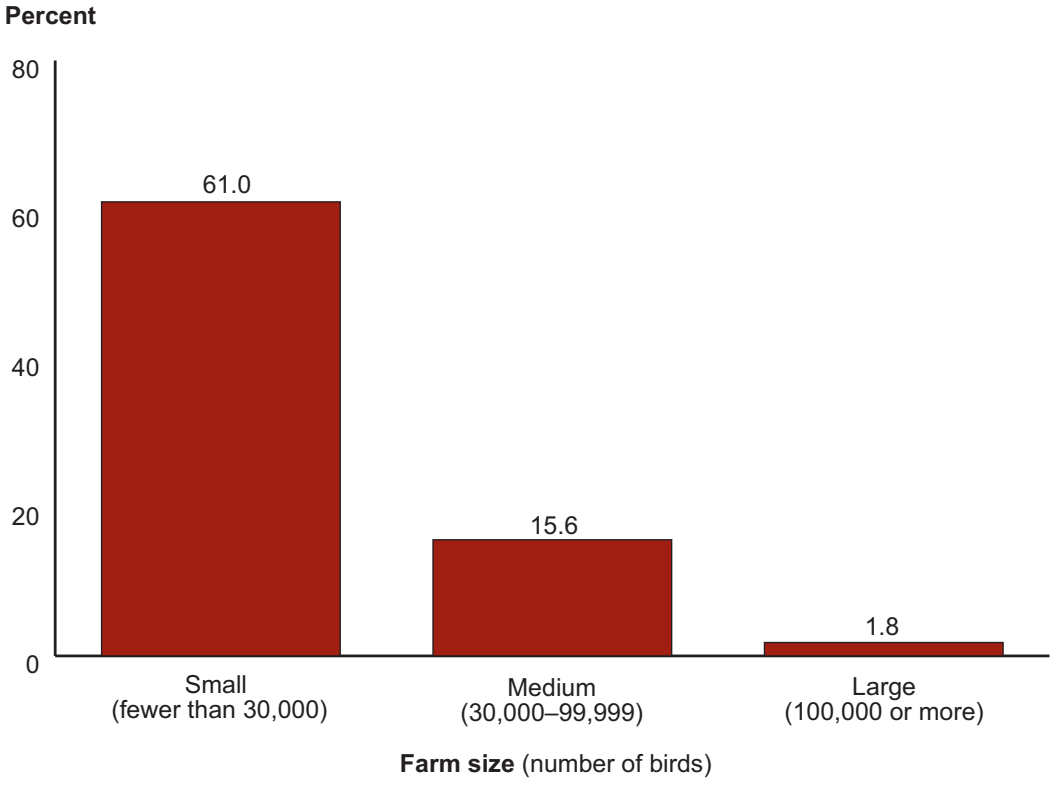


The percentage of layer farms certified as organic operations decreased as farm size increased; 61.0 percent of small farms were certified as organic operations compared with less than 2 percent of large farms.

A.2. Percentage of layer farms certified as organic operations, by farm size:

Percent Farms					
Farm Size (number birds)					
Small (fewer than 30,000)		**Medium** (30,000–99,999)		**Large** (100,000 or more)	
Percent	**Std. error**	**Percent**	**Std. error**	**Percent**	**Std. error**
61.0	(5.1)	15.6	(3.2)	1.8	(0.5)

Percentage of layer farms certified as organic, by farm size



Overall, 29.1 percent of layer farms had outdoor access for birds, and nearly all of these farms (94.9 percent) were certified organic farms.

A.3. Percentage of layer farms with outdoor access for birds:

Percent farms	Std. error
29.1	(2.1)

A.4. For layer farms with outdoor access for birds, percentage of farms certified as organic operations:

Percent farms	Std. error
94.9	(1.6)

Three-fourths of certified organic farms (75.2 percent) were contract farms.

A.5. Percentage of certified organic farms by production and marketing arrangement:

Arrangement	Percent farms	Std. error
Company-owned farm	6.7	(1.3)
Contract farm—company owns birds and markets eggs	52.4	(4.0)
Contract farm—producer owns birds; company markets eggs	22.8	(4.2)
Independent producer—producer owns birds and markets eggs	7.3	(3.5)
Farmer-owned cooperative	10.9	(2.7)
Total	100.0	

Small farms accounted for the majority of farms certified as organic operations (85.4 percent). Only 2.7 percent of certified organic farms had a maximum capacity of 100,000 or more birds. It is important to note that this study included only certified organic farms with 3,000 or more birds. Certified organic farms with fewer than 3,000 birds were not included in this study.

A.6. Percentage of certified organic farms by farm size (maximum capacity):

Maximum capacity (number birds)	**Percent farms**	**Std. error**
Small (fewer than 30,000)	85.4	(2.4)
Medium (30,000 to 99,999)	11.9	(2.3)
Large (100,000 or more)	2.7	(0.7)
Total	100.0	

B. Poultry Houses

Most certified organic farms had only one layer house on-site.

B.1. Percentage of organic farms by number of layer houses on-site:

Number of houses	Percent farms	Std. error
1	76.1	(2.9)
2	11.6	(1.9)
3–5	6.3	(1.8)
6 or more	5.9	(1.2)
Total	100.0	

For nearly all certified organic farms, all layer houses on-site were certified as organic. Less than 3 percent of certified organic farms had any layer houses that were not certified as organic.

B.2. Percentage of certified organic farms in which all layer houses on-site were certified as organic:

Percent farms	Std. error
97.3	(0.7)

About 9 of 10 layer houses on certified organic farms (92.9 percent) held fewer than 30,000 birds.

B.3. Percentage of layer houses on certified organic farms by maximum capacity of houses:

Maximum capacity (number birds)	Percent houses*	Std. error
Fewer than 1,000	3.4	(2.1)
1,000–29,999	89.5	(2.3)
30,000–99,999	7.2	(2.1)
100,000–199,999	0.0	(—)
200,000 or more	0.0	(—)
Total	100.0	

*All of the houses are not necessarily organic.

Over one-third of layer houses on certified organic farms were 20 years old or older, while 28 percent of houses were less than 5 years old.

B.4. Percentage of layer houses on certified organic farms, by age of house:

Age of house (yr)	**Percent layer houses***	**Std. error**
Less than 5	28.0	(4.3)
5–9	13.7	(2.7)
10–19	22.3	(4.1)
20 or more	36.1	(5.8)
Total	100.0	

*All houses were not necessarily certified organic.

About half of certified organic farms (53.2 percent) locked the door on all layer houses most of the time.

B.5. Percentage of certified organic farms in which all, some, or none of the layer houses* had doors that were locked most of the time:

Percent Farms						
Doors Locked Most of the Time						
All doors		**Some doors**		**None**		
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
53.2	(5.8)	0.6	(0.3)	46.2	(5.8)	100.0

*All houses were not necessarily certified organic.

C. Outdoor Access

Nearly all certified organic farms (95.2 percent) had an uncovered outdoor area for birds. In keeping with regulations for certified organic egg production, all farms provided outdoor access.

C.1. Percentage of certified organic farms by type of outdoor access provided:

Type of outdoor access	Percent farms	Std. error
Porch system	2.2	(0.5)
Other covered outdoor area	3.2	(0.7)
Uncovered outdoor area	95.2	(0.7)
Rotating pasture system (e.g., mobile poultry house)	1.3	(0.4)
Other	0.0	(—)

Outside areas on about half of certified organic farms provided 2.0 to 4.9 square feet of space per bird, when houses were at maximum capacity. On 38.0 percent of farms, the outside area provided less than 2 square feet of space per bird, while 12.6 percent of farms provided 5 or more square feet of space per bird.

C.2. Percentage of certified organic farms by square feet per bird provided in the outdoor area, when houses are at maximum capacity:

Square feet per bird	Percent farms	Std. error
Less than 2	38.0	(5.4)
2.0–2.9	24.4	(5.4)
3.0–4.9	24.9	(4.7)
5.0 or more	12.6	(3.2)
Total	100.0	

The percentage of certified organic farms by the typical number of doors birds used for outdoor access in each layer house was similar, when considering the standard errors.

C.3. Percentage of certified organic farms by typical number of doors birds used for outdoor access in each layer house:

Percent Farms								
Number of Doors for Outside Access								
1		2–5		6–9		10 or more		
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
16.9	(5.5)	28.1	(6.9)	25.1	(5.7)	29.8	(5.4)	100.0

Doors for outdoor access on certified organic farms were typically 24 inches or more in height and 24 inches or more in width on 48.1 and 74.4 percent of farms, respectively.

C.4. Percentage of certified organic farms by typical height and width of doors used to provide outdoor access to birds:

	Percent Farms			
	Door Dimensions			
	Height		Width	
Measure (in)	Percent	Std. error	Percent	Std. error
Less than 18.0	34.2	(5.4)	11.6	(4.5)
18.0–23.9	17.7	(5.6)	14.0	(5.4)
24.0–39.9	25.8	(5.6)	39.8	(7.1)
40.0 or more	22.3	(4.5)	34.6	(5.6)
Total	100.0		100.0	

A small percentage of certified organic farms fed or watered birds in the outdoor area.

C.5. Percentage of certified organic farms that fed or watered birds in the outdoor area:

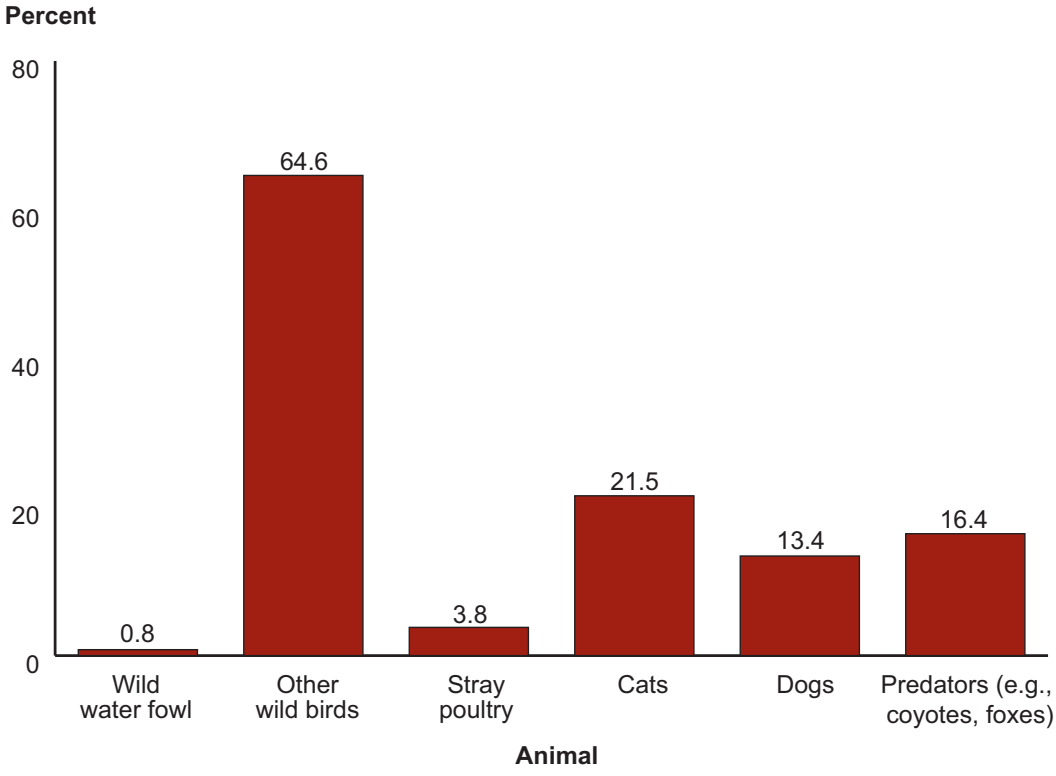
	Percent farms	Std. error
Provided drinking water	11.7	(2.4)
Fed birds	0.9	(0.4)

Although less than 1 percent of certified organic farms had seen wild waterfowl in the layers' outdoor area, nearly two-thirds of farms (64.6 percent) had seen other wild birds in the outdoor area.

C.6. Percentage of certified organic farms in which the following animals were seen in the layers' outdoor area during the previous 12 months:

Animal	Percent farms	Std. error
Wild waterfowl	0.8	(0.5)
Other wild birds	64.6	(5.4)
Stray poultry	3.8	(1.8)
Cats	21.5	(3.4)
Dogs	13.4	(2.3)
Predators (e.g., coyotes, foxes)	16.4	(4.2)

Percentage of certified organic farms in which the following animals were seen in the layers' outdoor area during the previous 12 months



On average, only 0.2 percent of the last completed flock was lost to predators.

C.7. Operation average percentage of last completed flock lost to predators:

Operation average percent of last completed flock	Std. error
0.2	(0.0)

About 60 percent of certified organic farms used at least one method of predator control. The highest percentages of farms used electric fencing, traps, and shooting to control predators (20.4, 19.4, and 15.7 percent, respectively). Perimeter fencing (not electric) accounted for the highest percentage of responses in the “Other” category.

C.8. Percentage of certified organic farms by method of predator control used during the previous 12 months:

Method of predator control	Percent farms	Std. error
Dogs	5.8	(1.2)
Llamas	0.0	(—)
Shooting	15.7	(3.0)
Electric fencing	20.4	(5.6)
Traps	19.4	(3.9)
Air cannons	0.0	(—)
Other	21.0	(4.2)
Any	59.3	(6.0)

D. Pullets

The majority of certified organic farms received pullets from a single source.

D.1. Percentage of certified organic farms by number of different source-farms (including the layer site) used to populate the most recently placed layer flock:

Number sites	Percent farms	Std. error
1	94.1	(2.1)
2	5.9	(2.1)
3 or more	0.0	(—)
Total	100.0	

About two-thirds of certified organic farms (68.8 percent) acquired pullets from a different farm site belonging to the same company; 5.9 percent of farms raised pullets on-farm.

D.2. Percentage of certified organic farms by source of pullets making up the most recently placed layer flock:

Source	Percent farms	Std. error
A different company	25.6	(5.6)
A different farm site, same company	68.8	(5.8)
Raised on this farm	5.9	(2.2)

On about two-thirds of certified organic farms (69.7 percent), pullets making up the most recently placed layer flock received a prebiotic or probiotic product; 10.8 percent farms did not know if the pullets received a prebiotic or probiotic.

D.3. Percentage of certified organic farms by whether pullets making up the most recently placed layer flock were given a prebiotic or probiotic product:

Product was given	Percent farms	Std. error
Yes	69.7	(5.2)
No	19.5	(4.5)
Don’t know	10.8	(2.4)
Total	100.0	

E. Layer Management

Over 9 of 10 certified organic farms (92.5 percent) used well water as the primary source of drinking water for layers.

E.1. Percentage of certified organic farms by primary source of drinking water for layers:

Water source	Percent farms	Std. error
Municipal	6.3	(2.2)
Well	92.5	(2.3)
Surface (e.g., pond)	1.2	(0.7)
Total	100.0	

For certified organic farms that used a nonmunicipal source of drinking water for layers, about one-third (35.4 percent) chlorinated the water. Peroxide as a water treatment accounted for the highest percentage of responses in the “Other” category.

E.2. Percentage of certified organic farms by water treatment performed on-farm, and by primary source of drinking water for layers:

	Percent Farms					
	Water Source					
	Municipal		Nonmunicipal		All	
Treatment	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Chlorination	0.0	(—)	35.4	(5.5)	33.2	(5.3)
Acidifiers	0.0	(—)	32.4	(6.3)	30.4	(6.1)
Iodine	0.0	(—)	6.2	(3.2)	5.8	(3.0)
Filters	88.7	(5.9)	75.4	(5.1)	76.3	(4.8)
Other	0.0	(—)	22.6	(5.5)	21.2	(5.1)

The majority of certified organic farms used nipple drinkers for layers.

E.3. Percentage of certified organic farms by type of water delivery system used in layer houses:

Delivery system	Percent farms	Std. error
Nipple drinker	94.9	(1.8)
Cup drinker	0.8	(0.6)
Bell drinker	5.1	(1.7)
Troughs	1.6	(1.4)
Other	0.4	(0.0)

On 11.6 percent of certified organic farms, the feed mill that provided feed for the layers was located on-farm.

E.4. Percentage of certified organic farms that had an on-farm feed mill to provide feed for layers:

Percent farms	Std. error
11.6	(4.3)

Almost 9 of 10 certified organic farms used feed trucks that delivered feed to other farms.

E.5. Percentage of certified organic farms in which the truck that delivered feed to the farm also delivered feed to other farms:

Percent farms	Std. error
88.7	(4.2)

The primary manure-handling method used by the highest percentage of certified organic farms (72.8 percent) was raised slats over floor.

E.6. Percentage of certified organic farms by primary manure-handling method:

Manure-handling method	Percent farms	Std. error
High rise	0.0	(—)
Deep pit (below ground)	0.7	(0.3)
Shallow pit (ground level)	16.8	(3.0)
Raised slats over floor (no manure belt)	72.8	(4.7)
Flush system to a lagoon	0.0	(—)
Manure belt	0.9	(0.4)
Scraper system (not flush or pit)	8.7	(4.0)
Total	100.0	

About half of certified organic farms stored any manure on-farm, the majority of which stored the manure outside.

E.7. Percentage of certified organic farms by on-farm manure-storage method:

Manure storage method	Percent farms	Std. error
In a building	13.8	(4.1)
In an open structure (e.g., lean-to)	2.4	(0.3)
Outside	31.0	(6.0)
Any	46.2	(6.5)

About three-fourths of certified organic farms that stored manure on-farm (73.9 percent) stored it in a location attached to the layer house or within 100 feet of the house .

E.8. For the 46.2 percent of organic farms that stored manure on-farm (table E.7), percentage of farms by minimum distance from the manure storage/disposal area to the nearest layer house:

Maximum distance to layer house (ft)	**Percent farms**	**Std. error**
Attached to layer house	21.1	(8.0)
Less than 100	52.8	(9.0)
100–199	5.5	(2.0)
200 or more	20.7	(7.8)
Total	100.0	

Only a small percentage of certified organic farms (3.6 percent) molted their flocks.

E.9. Percentage of certified organic farms by routine molting method used:

Molting method	**Percent farms**	**Std. error**
Do not usually molt	96.4	(1.0)
Withhold or restrict feed	1.5	(0.5)
Feed alternative diet	2.1	(0.8)
Total	100.0	

More than half of certified organic farms (56.3 percent) used composting as the primary method for disposing of dead birds. Only 1 percent of farms used a renderer.

E.10. Percentage of certified organic farms by primary method of dead-bird (daily mortality) disposal:

Disposal method	Percent farms	Std. error
Composting	56.3	(6.5)
Incineration	9.5	(3.8)
Burial/covered deep pit	18.7	(6.0)
Rendering	1.0	(0.4)
Landfill	9.8	(3.2)
Other	4.8	(2.1)
Total	100.0	

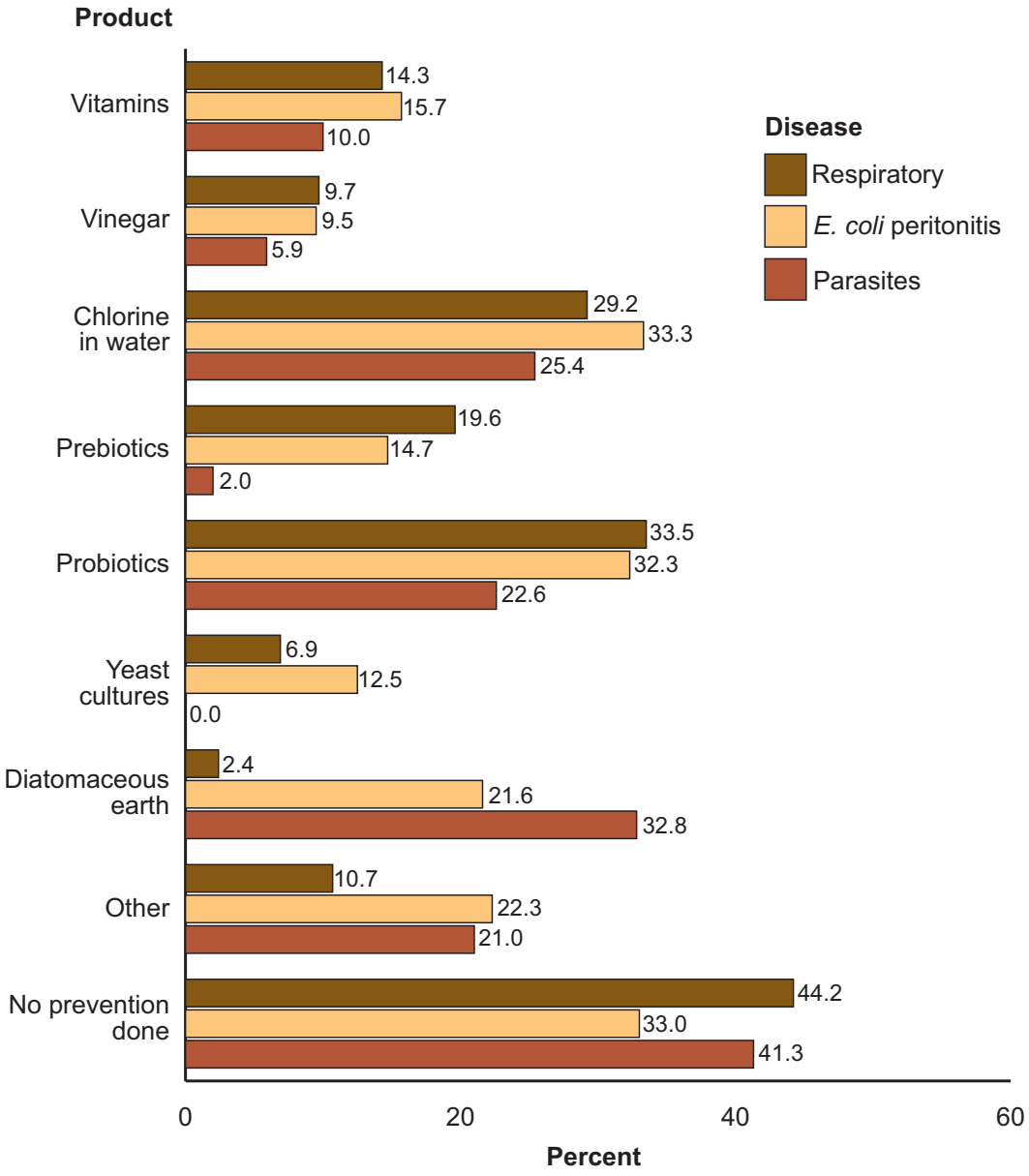
F. Layer Health Management

About two-thirds of certified organic farms (67.0 percent) took measures to prevent *E. coli* peritonitis in their flock. More than half of farms (55.8 percent) took measures to prevent respiratory disease; 33.5 percent of farms used probiotics to prevent respiratory disease.

F.1. Percentage of certified organic farms by products used in the previous 12 months to **prevent** the following diseases:

	Percent Farms							
	Disease							
	Respiratory		*E. coli* peritonitis		Parasites		Other gastro-intestinal disease	
Product	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Vitamins	14.3	(4.8)	15.7	(4.9)	10.0	(3.2)	16.4	(4.9)
Vinegar	9.7	(4.6)	9.5	(4.6)	5.9	(3.1)	12.1	(4.6)
Chlorine in water	29.2	(6.3)	33.3	(6.1)	25.4	(5.5)	9.6	(4.6)
Prebiotics	19.6	(4.5)	14.7	(4.1)	2.0	(0.8)	14.1	(4.1)
Probiotics	33.5	(6.1)	32.3	(6.1)	22.6	(5.3)	17.9	(5.4)
Yeast cultures	6.9	(3.8)	12.5	(4.1)	0.0	(—)	9.4	(3.8)
Diatomaceous earth	2.4	(0.9)	21.6	(5.1)	32.8	(5.0)	3.9	(1.0)
Other	10.7	(3.6)	22.3	(5.5)	21.0	(5.4)	7.6	(3.5)
No prevention done	44.2	(6.2)	33.0	(4.9)	41.3	(6.3)	54.6	(5.7)

Percentage of certified organic farms by products used in the previous 12 months to prevent the following diseases



Producers were asked to report all possible responses for how they would respond to a hypothetical disease situation. About half of certified organic farms (42.3 percent) would likely not treat respiratory problems; however, if the problems were severe enough, 20.8 percent of farms would consider depopulating and 15.0 percent would remove sick birds from the organic market and treat. For treating parasites, the highest percentage of farms (48.8 percent) would use diatomaceous earth. In the "Other" category, disease treatments included oregano and garlic for all diseases.

F.2. Percentage of certified organic farms by products that would be used to **treat** layers if they became ill with the following diseases:

	Percent Farms							
	Disease							
	Respiratory		*E. coli* peritonitis		Parasites		Other gastrointestinal disease	
Product	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Vitamins	26.8	(6.3)	25.1	(6.3)	15.1	(4.6)	21.4	(6.3)
Vinegar	11.6	(4.8)	18.3	(5.3)	7.8	(3.3)	20.0	(5.5)
Chlorine in water	11.4	(4.8)	12.3	(4.8)	7.6	(3.2)	11.9	(5.0)
Prebiotics	17.4	(4.5)	16.8	(4.5)	2.9	(0.9)	15.5	(4.4)
Probiotics	10.6	(5.0)	14.3	(5.4)	5.7	(3.3)	22.3	(5.9)
Yeast cultures	8.0	(4.0)	8.7	(4.2)	0.9	(0.7)	6.7	(4.2)
Diatomaceous earth	3.3	(1.2)	5.0	(1.9)	48.8	(5.9)	5.6	(1.5)
No treatment; allow to resolve	42.3	(5.7)	24.6	(3.6)	24.2	(5.0)	50.2	(6.0)
Remove from organic market and treat	15.0	(3.4)	2.8	(1.6)	0.6	(0.3)	6.9	(3.3)
Depopulate	20.8	(4.6)	12.9	(4.1)	9.0	(3.6)	9.7	(3.7)
Other	47.5	(5.9)	48.5	(6.6)	29.1	(5.8)	14.6	(4.4)

Less than 1 percent of certified organic farms gave an antibiotic at any time to the last completed flock. Birds treated with antibiotics (and their eggs) must be removed from the organic market and marketed through other channels.

F.3. Percentage of certified organic farms in which the last completed flock was given any antibiotic at any time during the laying cycle:

Percent farms	Std. error
0.6	(0.3)

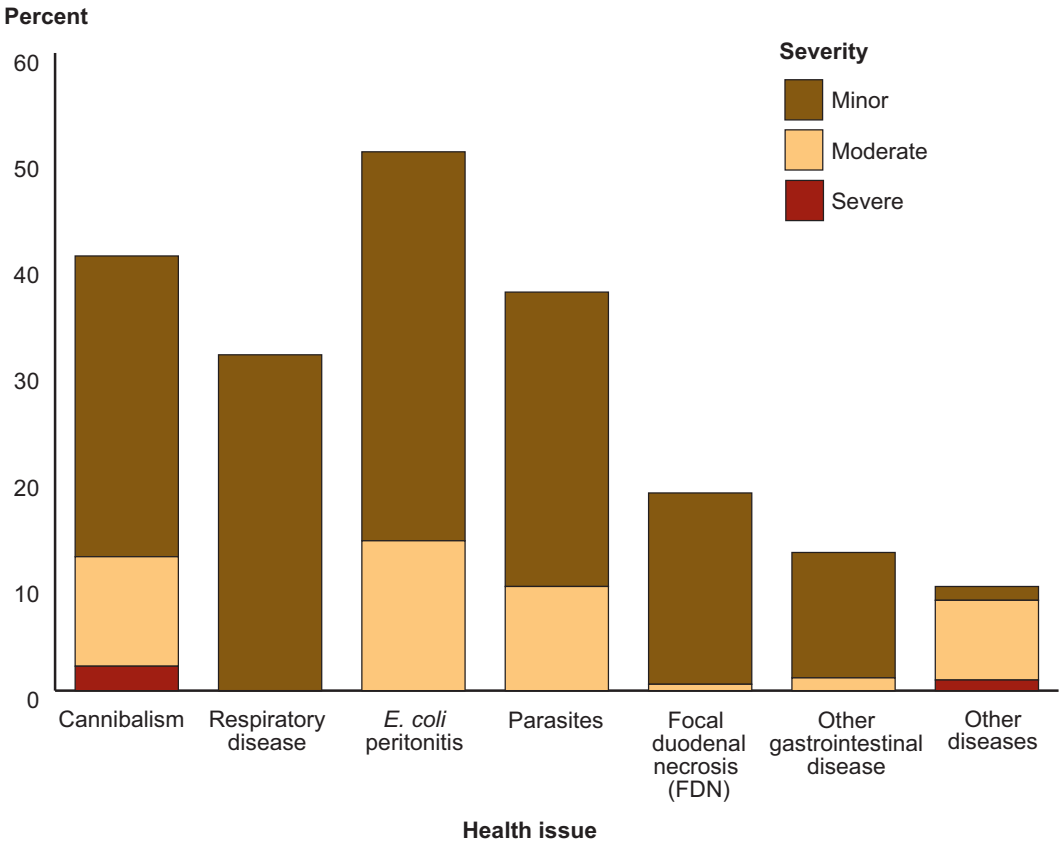
G. Morbidity and Mortality

About half of certified organic farms had problems with *E. coli* peritonitis in their last completed flock, although problems were generally minor. The most severe problem was cannibalism; 12.6 percent of farms reported a moderate or severe problem with cannibalism. More than two-thirds of farms reported no problem with respiratory disease, and when respiratory problems were reported, they were minor (31.6 percent of farms). Heat stress was the most frequently reported health issue in the "Other" category.

G.1. Percentage of certified organic farms by severity of the following health issues in the last completed flock:

	Percent Farms								
	Severity								
	Severe		Moderate		Minor		No problem		
Health issue	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Cannibalism	2.3	(1.5)	10.3	(4.1)	28.3	(6.1)	59.1	(6.5)	100.0
Respiratory disease	0.0	(—)	0.0	(—)	31.6	(7.2)	68.4	(7.2)	100.0
E. coli peritonitis	0.0	(—)	14.1	(4.5)	36.6	(6.2)	49.3	(6.9)	100.0
Parasites	0.0	(—)	9.8	(4.3)	27.7	(5.2)	62.5	(6.4)	100.0
Focal duodenal necrosis (FDN)	0.0	(—)	0.6	(0.4)	18.0	(5.9)	81.5	(5.9)	100.0
Other gastrointestinal disease	0.0	(—)	1.2	(0.5)	11.8	(4.0)	87.0	(4.0)	100.0
Other diseases	1.0	(0.7)	7.5	(4.2)	1.3	(0.8)	90.2	(4.3)	100.0

Percentage of certified organic farms by severity of the following health issues in the last completed flock



About 5 percent of hens in the last completed flock died by 60 weeks of age, and about 7 percent died in total.

G.2. Percentage of hens in the last completed flock that died by 60 weeks of age, and percentage that died in total:

Percent Hens			
60 weeks		Total	
Percent	**Std. error**	**Percent**	**Std. error**
4.9	(0.5)	6.8	(0.5)

About half of certified organic farms (51.9 percent) had a 60-week mortality of less than 4 percent, and about one-fifth of farms (18.9 percent) had a 60-week mortality of 7 percent or higher.

G.3. Percentage of certified organic farms by 60-week mortality for the last completed flock:

Mortality (percent died)	**Percent farms**	**Std. error**
Less than 4.0	51.9	(5.6)
4.0–6.9	29.2	(6.2)
7.0–9.9	7.9	(4.4)
10.0 or more	11.0	(4.8)
Total	100.0	

H. Egg Handling

Four of 10 certified organic farms produced 90 or more eggs per 100 hens per day during May 2013.

H.1. Percentage or certified organic farms by egg production per 100 hens* per day during May 2013:

Number eggs/100 hens/day	Percent farms	Std. error
Fewer than 80.0	17.4	(3.8)
80.0–89.9	42.1	(4.7)
90.0 or more	40.5	(5.4)
Total	100.0	

*June 1, 2013, inventory of hens 20 weeks or older.

Almost all eggs produced on certified organic farms (98.6 percent) were shell eggs.

H.2. Percentage of certified organic farms and percentage of eggs, by type of egg production during May 2013:

Production type	Percent farms	Std. error	Percent eggs	Std. error
Shell egg only	83.7	(4.0)	98.6	(0.4)
Eggs for breaking only	1.0	(0.3)	1.4	(0.4)
Both	15.3	(4.0)	NA	
Total	100.0		100.0	

About one of five certified organic farms (21.8 percent)—accounting for 4.7 percent of eggs produced in May 2013—gathered eggs by hand. Almost half of farms (49.9 percent)—accounting for 54.5 percent of eggs—used a belt with automated packing. Some farms used more than one method for gathering eggs.

H.3. Percentage of certified organic farms and percentage of eggs, by method of gathering eggs during May 2013:

Method	Percent farms	Std. error	Percent eggs	Std. error
Hand	21.8	(4.8)	4.7	(1.7)
Belt with packing by hand	39.1	(6.1)	40.7	(6.8)
Belt with automated packing	49.9	(6.4)	54.5	(6.7)
Total			100.0	

Note: The remainder of tables in section H refer to farms that produced shell eggs.

Nearly all certified organic farms processed eggs off-farm.

H.4. Percentage of certified organic farms by primary location for shell-egg processing (washing, grading, and packing into cartons):

Location	Percent farms	Std. error
On-farm	2.3	(0.5)
Off-farm	97.7	(0.5)
Total	100.0	

For certified organic farms that processed eggs off-farm, 67.9 percent had egg pickups every 6 to 9 days, and about 3 in 10 farms transported eggs 100 or more miles. Three-fourths of farms (78.1 percent) did not know the usual percent humidity for stored eggs.

H.5. For the 97.7 percent of certified organic farms that processed eggs off-farm (table H.4), percentage of farms by on-farm egg management characteristic:

Management characteristic	Percent farms	Std. error
Average number of days between egg pickups		
0–2	11.7	(2.7)
3–5	20.4	(4.9)
6–9	67.9	(5.4)
10 or more	0.0	(—)
Total	100.0	
Usual temperature for egg storage on-farm (°F)		
Less than 50	97.6	(1.5)
50–59	0.0	(—)
60 or more	0.7	(0.4)
Did not know	1.7	(1.5)
Total	100.0	
Usual percent humidity for egg storage on-farm		
Less than 50	0.0	(—)
50–74	12.6	(3.2)
75 or higher	9.4	(4.8)
Did not know	78.1	(5.7)
Total	100.0	
Distance (mi) to processing plant where the majority of eggs were processed		
Less than 5	6.0	(3.6)
5–9	14.5	(4.8)
10–99	46.2	(5.5)
100 or more	29.1	(6.6)
Did not know	4.3	(3.5)
Total	100.0	

About one of three certified organic farms washed eggs on-farm before sending them to the processor.

H.6. For the 97.7 percent of certified organic farms that processed eggs off-farm (table H.4), percentage of farms that washed any eggs on-farm before sending them to the processor:

Percent farms	Std. error
32.4	(7.1)

The majority of organic farms that washed eggs on-farm before sending them to the processor washed the eggs at a temperature less than 80°F. Eggs should be washed at a temperature at least 20°F warmer than the egg. Note: Estimates in the following table are imprecise (large standard error) due to the small sample size.

H.7. For certified organic farms that washed eggs before sending them to the processor, percentage of farms by temperature that eggs were washed:

Temperature (°F)	Percent farms	Std. error
Less than 80	63.3	(15.8)
80–99	16.2	(11.1)
100 or higher	20.6	(12.5)
Total	100.0	

Nearly all certified organic farms that processed eggs off-site used reusable plastic flats that were cleaned and disinfected before being reused. The majority of farms cleaned and disinfected racks and pallets before reusing them.

H.8. For the 97.7 percent of certified organic farms that processed eggs off-farm (table H.4), percentage of farms by management of egg flats, rack, and pallets:

Management practice	Percent farms	Std. error
Type of flats primarily used for storage and transport of shell eggs processed off-farm		
Disposable fiber	0.0	(—)
Reusable plastic, cleaned and disinfected	99.6	(0.0)
Reusable plastic, not cleaned and disinfected	0.4	(0.0)
Total	100.0	
Egg racks or pallets usually returned to the same farm		
Yes	15.8	(5.0)
No	84.2	(5.0)
Total	100.0	
Before being reused at the farm, racks or pallets were usually. . .		
Cleaned only	10.3	(2.2)
Disinfected only	0.0	(—)
Cleaned and disinfected	70.2	(5.6)
Neither cleaned nor disinfected	19.5	(5.2)
Total	100.0	

I. Employee and Visitor Biosecurity

Over three-fourths of certified organic farms required employees and crews to use footbaths (79.2 and 82.4 percent, respectively) before entering bird areas. A change of clothing was required on a higher percentage of farms for crews (70.7 percent) than for employees (29.9 percent). The majority of farms did not allow employees to own poultry or birds and required that employees to not be around other poultry for at least 24 hours.

I.1. Percentage of certified organic farms in which the following precautions were required for employees and company or contract crews who worked in the layer houses:

	Percent Farms			
	Employees		Crews[1]	
Precaution	**Percent**	**Std. error**	**Percent**	**Std. error**
Different personnel for different houses[2]	22.0	(4.3)	6.0	(2.9)
Shower	0.6	(0.4)	0.0	(—)
Hand sanitizer	65.7	(5.7)	62.7	(5.9)
Footbaths	79.2	(4.8)	82.4	(4.9)
Change boots or use shoe covers	56.4	(6.0)	77.3	(5.9)
Change clothes/ coveralls	29.9	(5.6)	70.7	(6.4)
Not be around other poultry for at least 24 hr (e.g., other farms, markets, slaughter plants) before coming on this farm	59.1	(6.3)	48.4	(7.1)
Cannot own their own poultry or birds	80.7	(5.1)	49.4[3]	(6.4)

[1]For farms that had crews (e.g., catching crews, vaccination crews).
[2]For farms with more than one house.
[3]38.5 percent did not know.

For certified organic farms that used footbaths, approximately one-third used liquid and two-thirds used dry powder.

I.2. For certified organic farms that used footbaths, percentage of farms by type of footbath used:

Footbath type	Percent farms	Std. error
Liquid	34.6	(5.2)
Dry powder	65.4	(5.2)
Total	100.0	

Two-thirds of certified organic farms that used liquid footbaths (66.2 percent) changed the disinfectant daily, while nearly all farms that used dry powder changed the disinfectant every 10 days or more.

I.3. For certified organic farms that used footbaths, percentage of farms by length of time footbath disinfectant was typically used before being changed, and by footbath type:

	Percent Farms			
	Footbath Type			
	Liquid		Dry powder	
Time (days)	**Percent**	**Std. error**	**Percent**	**Std. error**
1 or less	66.2	(8.9)	0.0	(—)
2–9	33.8	(8.9)	1.1	(0.7)
10 or more	0.0	(—)	98.9	(0.7)
Total	100.0		100.0	

Nearly all certified organic farms posted signs (e.g., no trespassing) to restrict visitor or vehicle access to the farm.

I.4. Percentage of certified organic farms by barriers used to restrict or limit visitor or vehicle access to the farm:

Barrier	Percent farms	Std. error
Locked gated entrance	10.7	(3.8)
Unlocked gated entrance	6.4	(2.1)
Fencing that limits vehicle access	20.2	(3.7)
Signs posted (e.g., no trespassing)	97.5	(1.5)
Other	0.4	(0.0)

About half of certified organic farms required business visitors and nonbusiness visitors to park their vehicles in a restricted area away from layer housing.

I.5. Percentage of certified organic farms by vehicle biosecurity requirements for business and nonbusiness visitors to the farm:

Requirement	Percent farms	Std. error
Business visitors (e.g., consultants, repairman)		
Have vehicle tires cleaned or disinfected upon entering	7.7	(1.9)
Park in a restricted area away from layer housing	49.0	(4.4)
Use a vehicle that has not been on another poultry farm that day	21.2	(4.4)
Do other vehicle biosecurity measures	0.4	(0.0)
Nonbusiness visitors (e.g., neighbors, school field trips)		
Vehicle tires cleaned or disinfected upon entering	5.6	(2.0)
Park in a restricted area away from layer housing	40.3	(5.2)
Use a vehicle that has not been on another poultry farm that day	23.4	(5.3)
Do other vehicle biosecurity measures	6.2	(3.2)

Over half of certified organic farms (57.5 percent) did not allow nonbusiness visitors inside layer houses. The majority of farms (91.8 percent) did allow business visitors in layer houses, but required them to sign in.

I.6. Percentage of certified organic farms by biosecurity policy for business and nonbusiness visitors who enter layer houses:

Policy	Percent farms	Std. error
Business visitors (e.g., consultants, repairman)		
Visitors NOT allowed inside the layer houses	3.8	(1.1)
Visitors allowed in layer houses but required to sign in	91.8	(3.3)
Visitors allowed in layer houses and NOT required to sign in	4.4	(3.1)
Total	100.0	
Nonbusiness visitors (e.g., neighbors, school field trips)		
Visitors NOT allowed inside the layer houses	57.5	(5.4)
Visitors allowed in layer houses but required to sign in	31.3	(3.4)
Visitors allowed in layer houses and NOT required to sign in	11.2	(4.3)
Total	100.0	

Certified organic farms that allowed business and nonbusiness visitors to enter layer houses may have the visitors follow biosecurity procedures. Showers were rarely required for visitors. Over 80 percent of organic farms required business visitors to use footbaths, change boots or use shoe covers, and change clothes (83.4, 92.2, and 83.5 percent, respectively).

I.7. For certified organic farms in which business or nonbusiness visitors were allowed to enter the layer houses, percentage of farms by biosecurity requirements for visitors:

Requirement	Percent farms	Std. error
Business visitors (e.g., consultants, repairman)		
Shower	2.5	(1.0)
Hand sanitizer	61.7	(6.4)
Footbaths	83.4	(4.5)
Change boots or use shoe covers	92.2	(4.2)
Change clothes/coveralls	83.5	(4.5)
Not be around other poultry at least 24 hr (e.g., other farms, markets, slaughter plants) before coming on this farm	43.9	(6.6)
Cannot own their own poultry or birds	41.5*	(5.6)
Nonbusiness visitors (e.g., neighbors, school field trips)		
Shower	0.0	(—)
Hand sanitizer	42.5	(9.0)
Footbaths	65.9	(9.3)
Change boots or use shoe covers	63.6	(9.3)
Change clothes/coveralls	49.8	(9.5)
Not be around other poultry at least 24 hr (e.g., other farms, markets, slaughter plants) before coming on this farm	45.1	(4.5)
Cannot own their own poultry or birds	32.5	(3.3)

*26.3 percent did not know.

J. Animals

About 7 of 10 certified organic farms (69.3 percent) were located within 1 mile of another premises with poultry.

J.1. Percentage of organic farms by distance to the nearest premises with poultry*:

Distance (mi)	**Percent farms**	**Std. error**
Less than 1	69.3	(5.0)
1–2	20.4	(4.6)
More than 2	10.3	(2.1)
Total	100.0	

*Includes backyard flocks, chickens, ducks, geese, turkeys, etc.

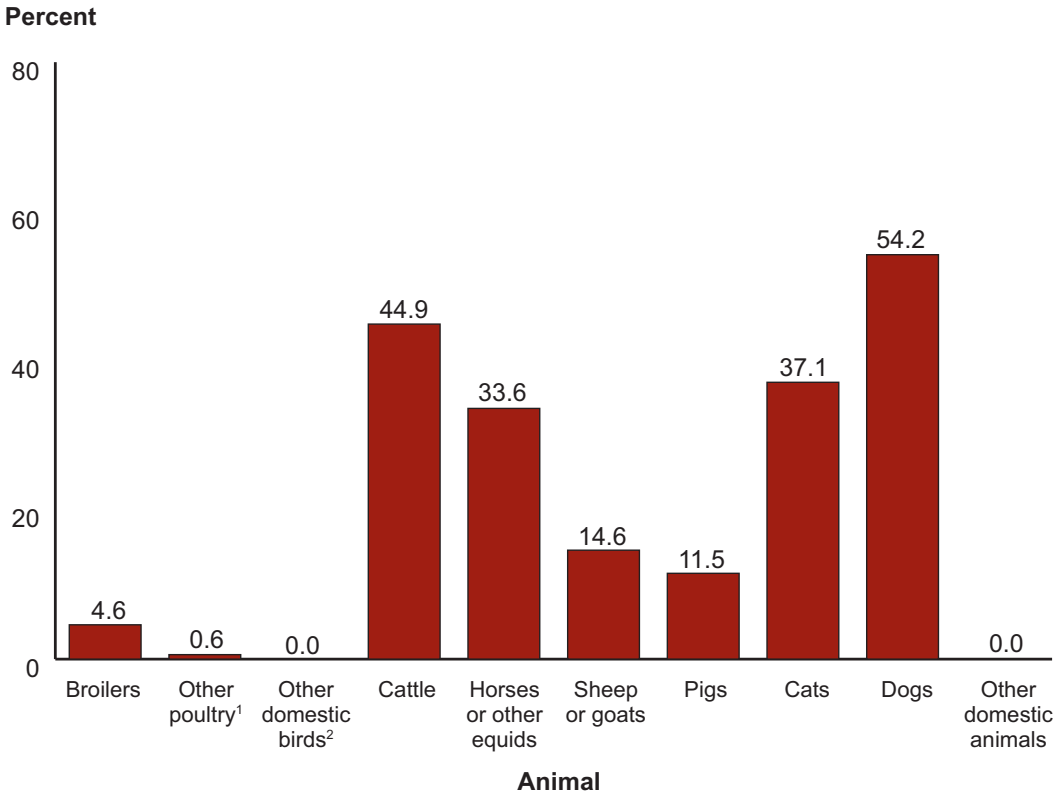
Broilers, other poultry, and other domestic birds were present on less than 5 percent of certified organic farms. Nearly half of farms (44.9 percent) had cattle, and over half of farms (54.2 percent) had dogs.

J.2. Percentage of certified organic farms in which the following domestic animals were present on the farm:

Animal	**Percent farms**	**Std. error**
Broilers	4.6	(2.0)
Other poultry[1]	0.6	(0.3)
Other domestic birds[2]	0.0	(—)
Cattle	44.9	(7.0)
Horses or other equids	33.6	(4.9)
Sheep or goats	14.6	(5.4)
Pigs	11.5	(4.1)
Cats	37.1	(6.1)
Dogs	54.2	(4.7)
Other domestic animals	0.0	(—)

[1]Including pet and exhibition poultry.
[2]E.g., ratites, peacocks.

Percentage of certified organic farms in which the following domestic animals were present on the farm



[1] Includes pet and exhibition poultry.
[2] E.g., ratites, peacocks.

On certified organic farms, no wild birds, cats, or dogs had access to feed before it was fed to layers; however, flies had access to feed on 27.8 percent of certified organic farms.

J.3. Percentage of certified organic farms in which the following animals had access to feed before it was fed to layers (e.g., feed in tanks, bins, feed lines):

Animal	Percent farms	Std. error
Rodents	20.6	(5.1)
Wild birds	0.0	(—)
Flies	27.8	(5.7)
Darkling beetles	20.6	(5.1)
Cats	0.0	(—)
Dogs	0.0	(—)

K. Rodent and Fly Control

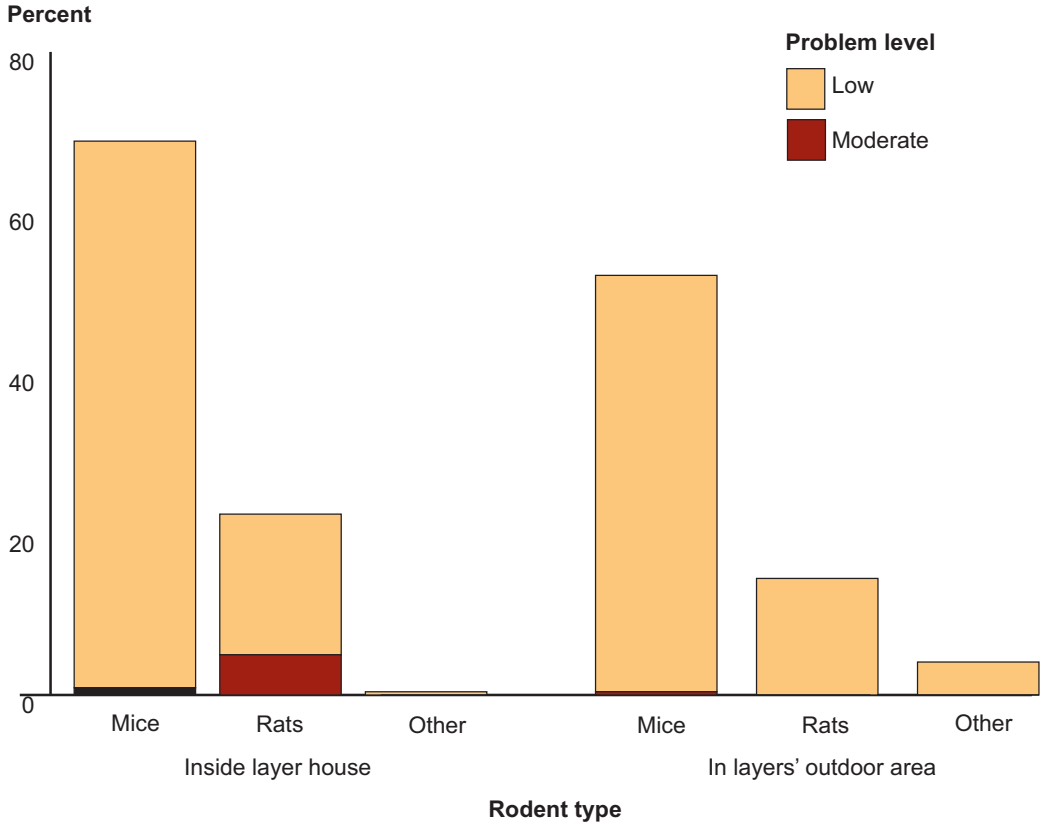
About two-thirds of certified organic farms (68.9 percent) reported any problems with mice inside the layer house, and about one-fourth (22.5 percent) reported any problems with rats. When farms did have rodent problems, the level of the problem was described by the majority of farms as low (minor impact on building or feed efficiency). Similar percentages of farms had problems with mice or rats in the layers' outdoor area. No farms reported a high-level problem with rodents inside the layer house or in the layers' outdoor area.

K.1. Percentage of certified organic farms by level of ongoing problems caused by mice, rats, and other rodents inside layer house(s) and in the layers' outdoor area during the previous 12 months:

	Percent Farms								
	Level of problem*								
	High		Moderate		Low		No problem		
Rodent type	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Inside layer house									
Mice	0.0	(—)	0.9	(0.4)	68.0	(5.8)	31.1	(5.8)	100.0
Rats	0.0	(—)	5.0	(3.6)	17.5	(2.9)	77.5	(4.3)	100.0
Other rodents	0.0	(—)	0.0	(—)	0.4	(0.0)	99.6	(0.0)	100.0
In layers' outdoor area									
Mice	0.0	(—)	0.4	(0.3)	51.8	(6.1)	47.8	(6.1)	100.0
Rats	0.0	(—)	0.0	(—)	14.5	(2.6)	85.5	(2.6)	100.0
Other rodents	0.0	(—)	0.0	(—)	4.1	(3.5)	95.9	(3.5)	100.0

*High (e.g., significant damage to building, significant impact on layer health or feed efficiency); moderate (e.g., moderate damage to building, moderate impact on layer health or feed efficiency); Low (e.g., minor impact on building or feed efficiency).

Percentage of certified organic farms by level of ongoing problems caused by mice, rats, and other rodents inside the layer house(s) and in the layers' outdoor area during the previous 12 months



The highest percentage of certified organic farms reported that mice caused the greatest ongoing problem inside the layer house and in the layers' outdoor area (60.3 and 50.5 percent, respectively).

K.2. Percentage of certified organic farms by rodent that caused the greatest ongoing problem inside the layer house and in the layers' outdoor area during the previous 12 months:

	Percent Farms			
	Inside layer house		In layers' outdoor area	
Rodent	**Percent**	**Std. error**	**Percent**	**Std. error**
Mice	60.3	(6.2)	50.5	(6.1)
Rats	10.0	(3.8)	5.7	(1.6)
Other rodents	0.0	(—)	4.1	(3.5)
No problem with rodents	29.7	(5.8)	39.8	(6.1)
Total	100.0		100.0	

The majority of certified organic farms monitored rodents inside the layer houses via visual signs and mechanical traps. For the "Other" category, bait consumption was the method used for the highest percentage of farms.

K.3. Percentage of certified organic farms by method used to monitor rodents inside the layer house and in the layers' outdoor area:

	Percent Farms			
	Inside layer house		In layers' outdoor area	
Method	**Percent**	**Std. error**	**Percent**	**Std. error**
Visual signs	80.0	(4.1)	77.3	(4.6)
Mechanical traps	93.4	(3.7)	35.0	(6.1)
Other	10.4	(3.3)	10.9	(3.4)

About 9 of 10 organic farms monitored rodent index as part of their rodent control program inside the layer house, and 1 of 3 did so in the layers' outdoor area.

K.4. Percentage of certified organic farms that monitored rodent index as part of their rodent control program inside the layer house and in the layers' outdoor area:

Percent Farms			
Inside layer house		In layers' outdoor area	
Percent	Std. error	Percent	Std. error
89.5	(4.0)	33.3	(5.2)

For certified organic farms that monitored rodent index, almost all had a typical rodent index of 0 to 10 (low) during the previous 12 months. No farms reported a typical high rodent index (26 or more).

K.5. For certified organic farms that monitored rodent index, percentage of farms by typical rodent index in the layer house and in the layers' outdoor area during the previous 12 months:

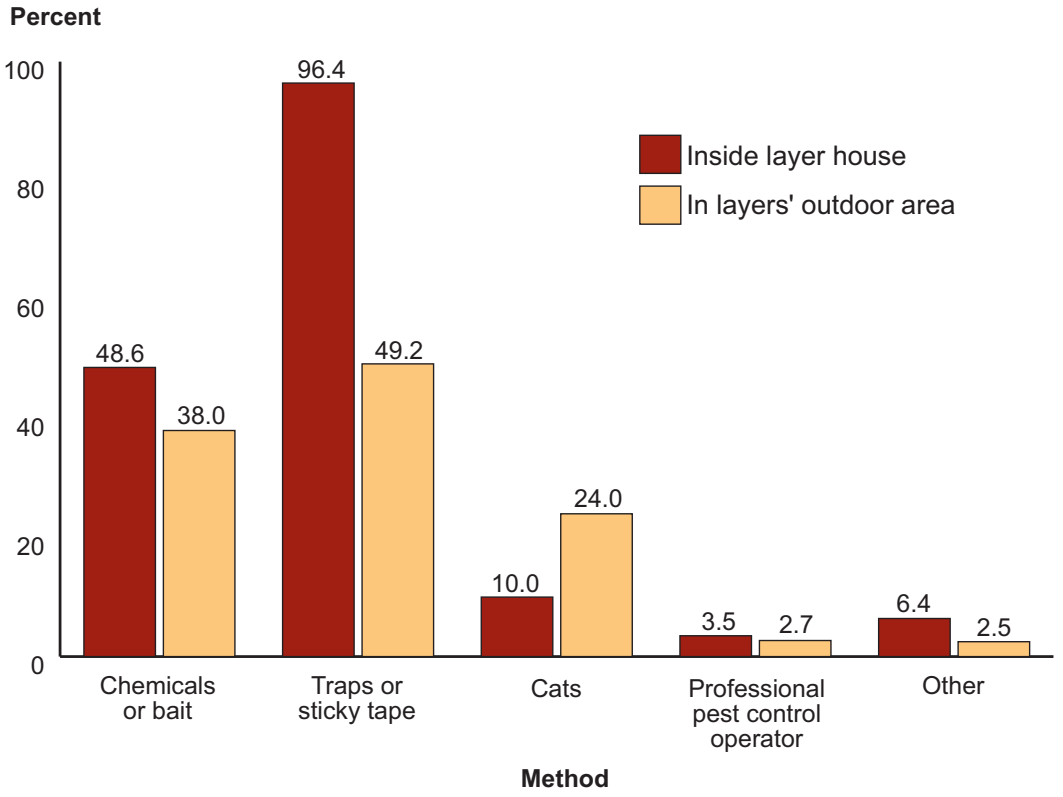
	Percent Farms			
	Inside layer house		In layers' outdoor area	
Rodent index (number mice caught per 12 rodent traps per 7 days)	Percent	Std. error	Percent	Std. error
0–10 (low)	97.2	(1.1)	100.0	(—)
11–25 (moderate)	2.8	(1.1)	0.0	(—)
26 or more (high)	0.0	(—)	0.0	(—)
Total	100.0		100.0	

Almost all organic farms had used traps or sticky tape/glue traps to control rodents inside the layer house during the previous 12 months; 10 percent used cats. To control rodents in the layers' outdoor area, about half of farms (49.2 percent) used traps or sticky tape/glue traps. Almost one-fourth of farms (24.0 percent) used cats to control rodents in the layers' outdoor area.

K.6. Percentage of certified organic farms by rodent control method used during the previous 12 months inside the layer house and in the layers' outdoor area:

	Percent Farms			
	Inside layer house		In layers' outdoor area	
Method	**Percent**	**Std. error**	**Percent**	**Std. error**
Chemicals or bait	48.6	(4.6)	38.0	(5.6)
Traps or sticky tape/glue traps	96.4	(1.3)	49.2	(6.4)
Cats	10.0	(4.3)	24.0	(6.2)
Professional pest control operator	3.5	(1.1)	2.7	(0.9)
Other	6.4	(3.6)	2.5	(0.8)

Percentage of certified organic farms by rodent control method used during the previous 12 months inside the layer house and in the layers' outdoor area



The highest percentage of certified organic farms (54.5 percent) used baits/traps as a fly control method inside the layer house. More than one-fourth of farms (28.4 percent) used biological predators, such as parasitic wasps to control flies inside the layer house. For the layers' outdoor area, a very small percentage of farms used any fly control methods.

K.7. Percentage of certified organic farms by fly control method used during the previous 12 months (other than manure removal) inside the layer house and in the layers' outdoor area:

	Percent Farms			
	Inside layer house		In layers' outdoor area	
Method	**Percent**	**Std. error**	**Percent**	**Std. error**
Residual spray (long acting)	0.4	(0.0)	0.7	(0.1)
Space spray/fogger	6.7	(3.0)	1.3	(0.3)
Baits/traps	54.5	(5.4)	16.7	(4.3)
Larvicide (spot treatment)	1.3	(0.3)	0.0	(—)
Larvicide in feed	6.5	(3.0)	0.0	(—)
Biological predators	28.4	(4.9)	0.6	(0.3)
Other	5.6	(1.8)	1.7	(0.7)

L. Down Time Procedures

Over half of certified organic farms (55.5 percent) had a down time of 18 days or longer; none had a down time of less than 4 days.

L.1. Percentage of certified organic farms by number of days layer houses were usually empty between flocks:

Number days	Percent farms	Std. error
Less than 4	0.0	(—)
4–10	11.3	(3.1)
11–17	33.2	(4.7)
18 or more	55.5	(4.9)
Total	100.0	

More than 80 percent of certified organic farms emptied feeders and feed hoppers; flushed water lines; disinfected water lines; dry cleaned walls and ceilings; and cleaned fans, ventilation systems, or cool cells after every flock.

L.2. Percentage of certified organic farms by frequency that the following procedures were performed during down time:

	Percent Farms						
	Frequency						
	After each flock		After two or more flocks		Never		
Procedure*	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Empty feeders	100.0	(—)	0.0	(—)	0.0	(—)	100.0
Wash feeders	65.8	(4.8)	7.8	(2.3)	26.4	(4.6)	100.0
Disinfect feeders	67.0	(4.8)	5.3	(2.1)	27.7	(4.8)	100.0
Empty feed hoppers	99.0	(0.3)	0.0	(—)	1.0	(0.3)	100.0
Wash feed hoppers	63.6	(5.0)	5.8	(2.2)	30.6	(4.9)	100.0
Disinfect feed hoppers	64.6	(5.0)	3.9	(1.9)	31.6	(5.0)	100.0
Empty water tanks	47.7	(9.0)	0.0	(—)	52.3	(9.0)	100.0
Wash water tanks	47.7	(9.0)	0.0	(—)	52.3	(9.0)	100.0
Disinfect water tanks	42.6	(8.2)	0.0	(—)	57.4	(8.2)	100.0
Flush water lines	98.0	(1.3)	0.6	(0.3)	1.4	(1.2)	100.0
Disinfect water lines	84.5	(4.6)	3.2	(1.9)	12.4	(4.3)	100.0
Bacterial culture water source	54.8	(6.3)	18.0	(4.0)	27.3	(5.1)	100.0
Wash egg belts	70.6	(6.2)	6.1	(2.2)	23.3	(6.0)	100.0
Disinfect egg belts	68.2	(5.1)	6.8	(3.8)	25.0	(5.9)	100.0
Dry clean (blow down) walls or ceilings	84.5	(4.3)	1.6	(1.4)	13.9	(4.2)	100.0
Wash walls or ceilings	74.6	(4.6)	4.6	(2.0)	20.8	(4.5)	100.0
Disinfect walls or ceilings	73.8	(4.7)	3.7	(1.9)	22.5	(4.6)	100.0
Fumigate walls or ceilings	45.7	(5.8)	5.1	(2.1)	49.2	(5.9)	100.0
Clean fans, ventilation system, or cool cells	83.8	(5.3)	3.3	(3.1)	12.9	(4.2)	100.0

*For farms with the specified equipment.

M. *Salmonella*

All certified organic farms obtained pullets from breeding flocks considered *Salmonella* Enteritidis clean by the National Poultry Improvement Plan.

M.1. Percentage of certified organic farms in which pullets making up the most recently placed layer flock originated from a breeding flock monitored for *Salmonella* Enteritidis by the National Poultry Improvement Plan:

Percent farms	Std. error
100.0	(—)

To monitor *Salmonella* Enteritidis in pullets, almost three-fourths of certified organic farms (74.1 percent) cultured samples from the farm's environment or manure. About 1 of 10 farms did not know if the other pullet-monitoring methods were used at the pullet farm.

M.2. Percentage of certified organic farms by method used to monitor *Salmonella* Enteritidis in pullets making up the most recently placed layer flock:

Method	Percent farms	Std. error	Percent farms that didn't know	Std. error
Test "dead-on-arrival" chicks or chick-box paper	36.7	(5.5)	11.4	(2.4)
Culture of environment or manure	74.1	(4.7)	2.3	(0.6)
PCR (Taqman, BAX) or other rapid test (SDIX, Neogen) of environment/manure	39.0	(5.6)	9.4	(2.4)
Test live birds	5.4	(3.7)	12.8	(4.4)

About 9 of 10 certified organic farms that tested dead-on-arrival chicks or chick-box paper indicated that they would most likely destroy the flock if *Salmonella* Enteritidis was found. No farms would treat birds with antibiotics.

M.3. For certified organic farms that tested "dead-on-arrival" chicks or chick-box paper, percentage of farms by what was usually done or what would be done if *Salmonella* Enteritidis was found:

	Percent farms	Std. error
Treat birds with antibiotics	0.0	(—)
Destroy flock	90.1	(2.8)
Increase monitoring during growing period	9.9	(2.8)
No changes in production practices	0.0	(—)
Total	100.0	

About one-third of certified organic farms had been inspected by the Food and Drug Administration (FDA).

M.4. Percentage of certified organic farms that had been inspected by the FDA:

Percent farms	Std. error
31.3	(5.3)

On 98.9 percent of certified organic farms, birds had been vaccinated against *Salmonella* as pullets only, and on 0.5 percent of farms, birds had been vaccinated as pullets and layers.

M.5. Percentage of certified organic farms in which birds were vaccinated against *Salmonella* as pullets[1] and/or layers:[2]

	Percent farms	Std. error
Pullets only	98.9	(0.5)
Layers only	0.0	(—)
Both	0.5	(0.4)
Neither	0.6	(0.4)
Total	100.0	

[1]Pullets making up the most recently placed layer flock.
[2]Layers making up the last completed layer flock.

Overall, 90.6 percent of certified organic farms participated in at least one type of *Salmonella* Enteritidis quality assurance program; 79.0 percent participated in a company-sponsored program; and 39.7 percent participated in a State quality assurance program.

M.6. Percentage of certified organic farms that participated in the following *Salmonella* Enteritidis quality assurance programs:

Program	Percent farms	Std. error
State	39.7	(4.6)
Company sponsored	79.0	(4.3)
Commodity group (e.g., United Egg Producers)	24.5	(3.7)
Other (excluding FDA)	5.7	(1.8)
Any	90.6	(3.5)

Nearly all certified organic farms (95.6 percent) tested the layer flock environment for *Salmonella* Enteritidis at some time from June 2012 through May 2013. None of these tests was positive for *Salmonella* Enteritidis.

M.7. Percentage of certified organic farms that tested the layer flock environmental for *Salmonella* Enteritidis, by time period of testing and, for farms that tested, percentage with at least one positive test:

	Percent Farms			
	Testing		Positive test	
Time period	**Percent**	**Std. error**	**Percent**	**Std. error**
June–August 2012	28.7	(6.1)	0.0	(—)
September–November 2012	38.3	(5.4)	0.0	(—)
December 2012–February 2013	53.6	(7.1)	0.0	(—)
March–May 2013	56.5	(7.0)	0.0	(—)
Total (June 2012–May 2013)	95.6	(2.0)	0.0	(—)

N. Comparison of Organic and Nonorganic Farms

Compared with nonorganic farms, a higher percentage of certified organic farms had fewer than 30,000 birds, gathered eggs by hand, and processed eggs off-farm. A higher percentage of certified organic farms than nonorganic farms composted dead birds, and a lower percentage disposed of dead birds by rendering. Only 3.6 percent of certified organic farms routinely molted their flocks compared with 50.0 percent of nonorganic farms.

N.1. Percentage of certified organic farms and percentage of nonorganic farms, by farm characteristics:

Characteristic	Percent organic farms	Std. error	Percent nonorganic farms	Std. error
Farm size (number birds)				
Fewer than 30,000	85.4	(2.4)	20.8	(2.4)
30,000–99,999	11.9	(2.3)	24.4	(3.1)
100,000 or more	2.7	(0.7)	54.8	(3.4)
Manure-handling method				
High rise	0.0	(—)	59.9	(2.7)
Deep pit (below ground)	0.7	(0.3)	1.3	(0.6)
Shallow pit (ground level)	16.8	(3.0)	5.1	(1.5)
Raised slats over floor (no manure belt)	72.8	(4.7)	12.5	(1.7)
Flush system to a lagoon	0.0	(—)	4.3	(0.8)
Manure belt	0.9	(0.4)	13.6	(2.1)
Scraper system (not flush or pit)	8.7	(4.0)	3.3	(0.8)
Molting				
Routinely molt	3.6	(1.0)	50.0	(3.7)
Dead bird disposal method				
Composting	56.3	(6.5)	38.1	(3.8)
Incineration	9.5	(3.8)	11.9	(1.6)
Burial/covered deep pit	18.7	(6.0)	7.0	(1.3)
Rendering	1.0	(0.4)	23.0	(1.7)
Landfill	9.8	(3.2)	16.7	(3.4)
Other	4.8	(2.1)	3.3	(2.7)
Egg handling				
Any eggs hand gathered	21.8	(4.8)	6.6	(1.7)
Eggs primarily processed on-farm	2.3	(0.5)	34.4	(2.3)

A lower percentage of certified organic farms than nonorganic farms required that employees not be around other poultry for at least 24 hours (59.1 and 83.5 percent, respectively). The percentages of farms that required other employee biosecurity measures were similar for organic and nonorganic farms.

N.2. Percentage of certified organic farms and percentage of nonorganic farms by employee biosecurity requirements:

Employee biosecurity requirements	Percent organic farms	Std. error	Percent nonorganic farms	Std. error
Different personnel for different houses*	22.0	(4.3)	24.4	(2.8)
Shower	0.6	(0.4)	7.5	(2.8)
Hand sanitizer	65.7	(5.7)	51.0	(3.8)
Footbaths	79.2	(4.8)	77.3	(4.2)
Change boots or use shoe covers	56.4	(6.0)	37.2	(3.8)
Change clothes/coveralls	29.9	(5.6)	34.9	(3.7)
Not be around other poultry for at least 24 hr (e.g., other farms, markets, slaughter plants) before coming on this farm	59.1	(6.3)	83.5	(4.1)
Cannot own their own poultry or birds	80.7	(5.1)	89.8	(3.6)

*For farms with more than one layer house.

The percentages of certified organic and nonorganic farms by level of rodent problems inside the layer houses were similar. Compared with nonorganic farms, a higher percentage of certified organic farms used traps or sticky tape/glue traps to control rodents and a lower percentage used chemicals or baits.

N.3. Percentage of certified organic farms and percentage of nonorganic farms by severity of rodent problem inside the layer house, and by rodent control methods used:

	Percent organic farms	Std. error	Percent nonorganic farms	Std. error
Severity of problem (mice)				
High	0.0	(—)	0.5	(0.5)
Moderate	0.9	(0.4)	11.6	(3.8)
Low	68.0	(5.8)	53.8	(3.4)
No problem	31.1	(5.8)	34.0	(3.9)
Severity of problem (rats)				
High	0.0	(—)	0.0	(—)
Moderate	5.0	(3.6)	1.0	(0.4)
Low	17.5	(2.9)	24.8	(4.0)
No problem	77.5	(4.3)	74.2	(4.0)
Rodent control method				
Chemicals or bait	48.6	(4.6)	93.5	(1.6)
Traps or sticky tape/glue traps	96.4	(1.3)	87.0	(2.2)
Cats	10.0	(4.3)	11.2	(3.8)
Professional pest control operator	3.5	(1.1)	24.3	(2.7)
Other	6.4	(3.6)	1.8	(1.4)

Compared with nonorganic farms, a higher percentage of certified organic farms had problems with cannibalism, *E. coli* peritonitis, and parasites; however, these disease problems were generally reported to be minor on certified organic farms (table G.1). The percentage of farms by mortality was similar for certified organic and nonorganic farms.

N.4. Percentage of certified organic farms and percentage of nonorganic farms, by morbidity and mortality:

	Percent organic farms	Std. error	Percent nonorganic farms	Std. error
Morbidity (minor, moderate, or severe problem in the last completed flock)				
Cannibalism	40.9	(6.5)	21.8	(2.4)
Respiratory disease	31.6	(7.2)	20.1	(2.4)
E. coli peritonitis	50.7	(6.9)	22.6	(2.1)
Parasites	37.5	(6.4)	11.3	(1.5)
Focal duodenal necrosis (FDN)	18.5	(5.9)	10.8	(2.7)
Other gastrointestinal disease	13.0	(4.0)	10.8	(2.0)
Other diseases	9.8	(4.3)	10.4	(1.9)
Mortality (percentage died at or before 60 weeks of age)				
Less than 4.0	51.9	(5.6)	47.9	(4.1)
4.0–6.9	29.2	(6.2)	37.0	(4.0)
7.0 or more	18.9	(5.2)	15.1	(2.3)

Section II: Methodology

A. Needs Assessment

A *Salmonella* Enteritidis working group was formed to identify areas in which APHIS–VS should have a role in the prevention and control of *Salmonella* Enteritidis on table-egg farms. This working group identified a need to update the information from the NAHMS Layers '99 study as well as a need for a current estimate of the prevalence of *Salmonella* Enteritidis on table-egg farms.

B. Sampling and Estimation

1. State selection

The goal for NAHMS national studies is to include States that account for at least 70 percent of the targeted animal and farm population in the United States. A total of 19 States were selected for inclusion in the study based upon each State's contribution to the U.S. total number of table-egg operations and the number of laying hens. For the purpose of sampling, New England (Connecticut, Maine, Massachusetts, New Hampshire, Vermont) was considered as one State. These 19 States accounted for 76.4 percent of table-egg farms with 3,200 or more layers,[2] 87.1 percent of hens on farms with 30,000 or more hens,[3] and 77.8 percent of table eggs produced.[3]

2. Farm selection

The Food and Drug Administration (FDA) maintains a list of egg-laying operations with 3,000 or more laying hens that produce eggs for human consumption. A random sample of farms was selected from this list within four size strata (3,000 to 29,999, 30,000 to 49,999, 50,000 to 99,999, 100,000 or more laying hens) in each of the 19 selected States. All organic farms on the list were selected.

3. Population Inferences

Estimates for the Layers 2013 study inferred to the population of farms with 3,000 or more table-egg layers that were registered with the FDA in 19 States. Estimates for this report infer to the subset of farms on the FDA list that were certified organic. Data were weighted to reflect the population from which they were selected. The inverse of the probability of selection for each farm was the initial selection weight. This weight was adjusted for nonresponse within State and size stratum.

[2] 2007 Census of Agriculture (includes table eggs and eggs for hatching).
[3] NASS Chickens and Eggs Report, January 2009.

C. Data Collection

Veterinary medical officers (VMOs) from USDA–VS contacted producers from June 1 to September 30, 2013. Questionnaires were completed via in-person interviews. Questions regarding pullet rearing, *Salmonella* Enteritidis testing, and vaccinating were primarily answered by a company representative, while questions relating to day-to-day layer management were primarily answered by farm personnel.

D. Data Analysis

1. Editing and estimation

Data were entered into a SAS data set. Validation checks were performed to identify improperly entered data and relational checks. Summarization and estimation were performed using SUDAAN software.

2. Response rates

Of the 804 farms selected 112 (13.9 percent) were ineligible (breeder farms, pullet farms, duplicate farms, etc.). Of the 692 eligible farms, 317 refused participation and 47 were unable to be contacted. Of the 645 farms that were contacted, 328 participated (50.9 percent). A total of 85 organic farms participated in the study.

Response category	Number operations
Selected	804
Eligible	692
Not contacted	47
Refused	317
Participant (total)	328
Participant (organic)	85

Appendix I: Sample Profile

A. Size

	Responding Farms	
Number of layers	**Layers 2013**	**Organic farms**
Fewer than 30,000	114	63
30,000–99,999	62	17
100,000 or more	152	5
Total	328	85

B. Region

	Responding Farms	
Region	**Layers 2013**	**Organic farms**
Northeast	129	31
Southeast	50	10
Central	98	30
West	51	14
Total	328	85

Appendix II: Number of Farms and Number of Layers

State	No. farms[1,2]	No. table egg layers on hand (x1,000)[3,4]
Arkansas	542	3,744
Georgia	506	8,993
North Carolina	435	5,796
Alabama	426	1,468
Pennsylvania	267	23,488
Texas	182	15,021
Ohio	126	27,784
Iowa	104	51,278
Indiana	87	25,549
California	73	18,990
Missouri	62	6,435
Wisconsin	62	4,728
Minnesota	57	9,379
New England[5]	25	5,761
Florida	23	8,070
Nebraska	21	9,221
Illinois	17	3,930
Washington	16	6,464
Michigan	14	12,022
19-State total	3,045	248,121
U.S. total	3,986	284,575

[1]Farms with 3,200 or more layers (including table egg layers and breeders)..
[2]NASS 2007 Census of Agriculture.
[3]On farms with 30,000 or more table egg layers.
[4]NASS Chickens and Eggs report, March 2013.
[5]Connecticut and Maine.

Appendix III: Study Objectives and Related Outputs

1. Update previously collected information on layer farm management practices relevant to *Salmonella* Enteritidis
   - "Part I: Reference of Health and Management Practices on Table-Egg Farms in the United States, 2013," June 2014
   - "Part III: Trends in Health and Management Practices Table-Egg Farms in the United States, 1999–2013," October 2014
   - **"Part IV: Reference of Organic Egg Production in the United States, 2013," November 2014**
   - "Management Practices on Certified Organic Table-Egg Farms in the United States," info sheet, November 2014
   - "Trends in Management Practices on U.S. Table-Egg Farms," info sheet, November 2014

2. Estimate the prevalence of *Salmonella* Enteritidis on layer farms and investigate risk factors for *Salmonella* Enteritidis
   - "Part II: Control and Prevention of *Salmonella* Enteritidis on Table-Egg Farms in the United States," August 2014
   - *"Salmonella* Enteritidis on Table-Egg Farms in the United States," info sheet, November 2014

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