United States Department of Agriculture

Animal and Plant Health Inspection Service

Veterinary Services

National Animal Health Monitoring System

July 2008

# Small Enterprise Chicken Study, 2007

## Reference of Management Practices on Small Enterprise Chicken Operations in the United States, 2007

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# Introduction

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

Layers '99 was NAHMS' first national study on poultry baseline health and management. 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 about bird health, bird movement, and biosecurity practices on backyard flocks, gamefowl breeder flocks, and at live-poultry markets.

The Small Enterprise Chicken Study, 2007 is NAHMS' third study of the poultry industry. The study provides national information on biosecurity practices and bird movement on operations with 1,000 to 19,999 chickens. The study was conducted in August 2007 and was based upon a statistically selected sample of 2,511 operations.

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:/nahms.aphis.usda.gov

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## Terms Used in This Report

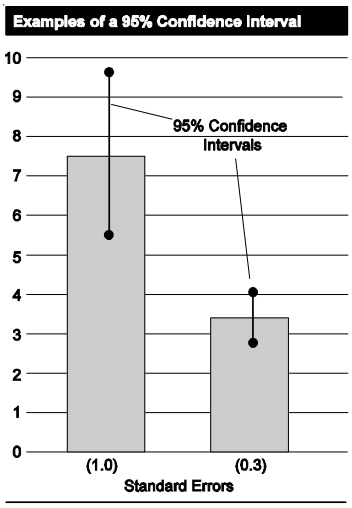
**Birds:** Poultry and other birds, including pet birds.

**Contract Status:**
*Contract operations*—Operations under contract with a poultry company, whereby the poultry company owns the birds and might provide feed and other services, and the operation provides housing and labor.
*Independent (noncontract) operations*—Operations that own and raise their own birds.

**Flock size:** Flock size is based on the reported maximum number of chickens present on the operation from October 2006 through September 2007. This number of chickens might have been outside the range of the 1,000-to-19,999-chickens control data from the NASS list sampling frame used for selecting participating operations. Therefore, small flocks (1,000 to 9,999 chickens) included some flocks with fewer than 1,000 chickens, and large flocks (10,000 to 19,999 chickens) included some flocks with 20,000 or more chickens during the year.

**Hatchlings:** Newly hatched chicks up to a few days old.

**Pet birds:** Bird breeds not normally used for food and usually housed in cages in the home, e.g., parrots, cockatiels, parakeets, finches, and canaries.




**Population estimates:** Estimates in this report are provided with a measure of precision called the standard error. A 95-percent confidence interval can be approximated 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 (—).

**Poultry:** Birds usually raised for meat and/or eggs for human consumption, including breeding birds and gamebirds raised and released for hunting.

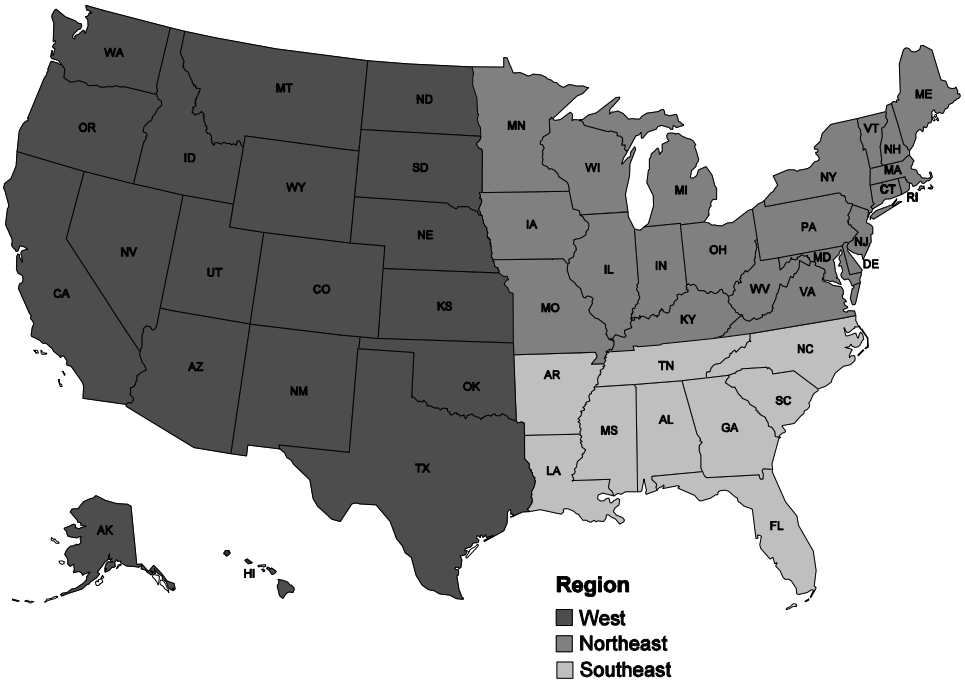
**Regions**

**West:** Alaska, Arizona, California, Colorado, Hawaii, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, Wyoming

**Northeast:** Connecticut, Delaware, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, Wisconsin

**Southeast:** Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee.

## Small-Enterprise Chicken, 2007 Study-Regional Breakdown



# Section I: Population Estimates

## A. General

### 1. Bird distribution

Operations were selected for this study from a list of farms that had between 1,000 and 19,999 chickens at some point in time, although only two of three operations (67.5 percent) had chickens present from October 2006 through September 2007.

a. Percentage of operations that had any chickens present from October 2006 through September 2007, by region:

**Percent Operations**

| Region | | | | | | | |
|---|---|---|---|---|---|---|---|
| West | | Northeast | | Southeast | | All Operations | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| 68.6 | (3.4) | 70.7 | (1.9) | 65.5 | (1.4) | 67.5 | (1.1) |

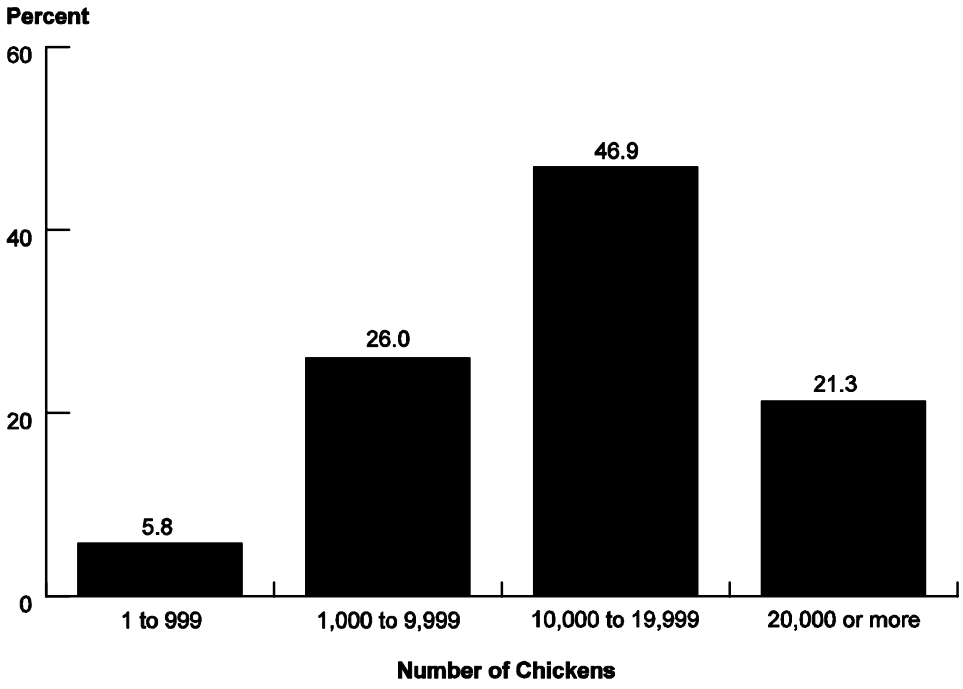
**NOTE: All remaining tables are based on operations that had chickens at some point from October 2006 through September 2007.**

Peak inventory was reported for two 6-month periods: October 2006–April 2007 and May 2007–September 2007. Fewer than 1 of 10 operations (5.8 percent) reported that the largest number of chickens they had on-hand on any one day from October 2006 through September 2007 was 999 or fewer, while about 2 of 10 (21.3 percent) reported they had 20,000 or more on any one day.

b. Percentage of operations by largest number of chickens on-hand on any one day during the following time periods, and by region:

| | Percent Operations | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Region | | | | | | | |
| | West | | Northeast | | Southeast | | All Operations | |
| Time Period/ Number of Chickens | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| October 2006-September 2007 | | | | | | | | |
| 1 to 999 | 10.5 | (2.3) | 11.9 | (1.5) | 1.1 | (0.4) | 5.8 | (0.6) |
| 1,000 to 9,999 | 28.9 | (4.1) | 38.7 | (2.2) | 17.6 | (1.3) | 26.0 | (1.1) |
| 10,000 to 19,999 | 39.4 | (4.6) | 35.8 | (2.1) | 55.2 | (1.8) | 46.9 | (1.3) |
| 20,000 or more | 21.2 | (3.9) | 13.6 | (1.7) | 26.1 | (1.7) | 21.3 | (1.2) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |
| October 2006-April 2007 | | | | | | | | |
| 0 | 0.5 | (0.5) | 2.7 | (0.8) | 1.0 | (0.4) | 1.6 | (0.4) |
| 1 to 999 | 11.1 | (2.3) | 12.2 | (1.5) | 1.1 | (0.4) | 6.0 | (0.6) |
| 1,000 to 9,999 | 30.5 | (4.2) | 37.4 | (2.2) | 18.3 | (1.3) | 26.1 | (1.1) |
| 10,000 to 19,999 | 39.1 | (4.6) | 34.9 | (2.0) | 55.1 | (1.8) | 46.5 | (1.3) |
| 20,000 or more | 18.8 | (3.7) | 12.8 | (1.7) | 24.5 | (1.6) | 19.8 | (1.1) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |
| May 2007-September 2007 | | | | | | | | |
| 0 | 0.0 | (--) | 1.6 | (0.6) | 0.8 | (0.3) | 1.0 | (0.3) |
| 1 to 999 | 12.8 | (2.3) | 11.9 | (1.5) | 1.2 | (0.4) | 6.1 | (0.6) |
| 1,000 to 9,999 | 30.2 | (3.5) | 39.1 | (2.2) | 20.2 | (1.3) | 27.7 | (1.1) |
| 10,000 to 19,999 | 37.6 | (4.2) | 33.8 | (2.1) | 53.3 | (1.8) | 45.0 | (1.3) |
| 20,000 or more | 19.4 | (3.6) | 13.6 | (1.7) | 24.5 | (1.6) | 20.2 | (1.1) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

**Percentage of Operations by Largest Number of Chickens On-hand on any One Day from October 2006 through September 2007**

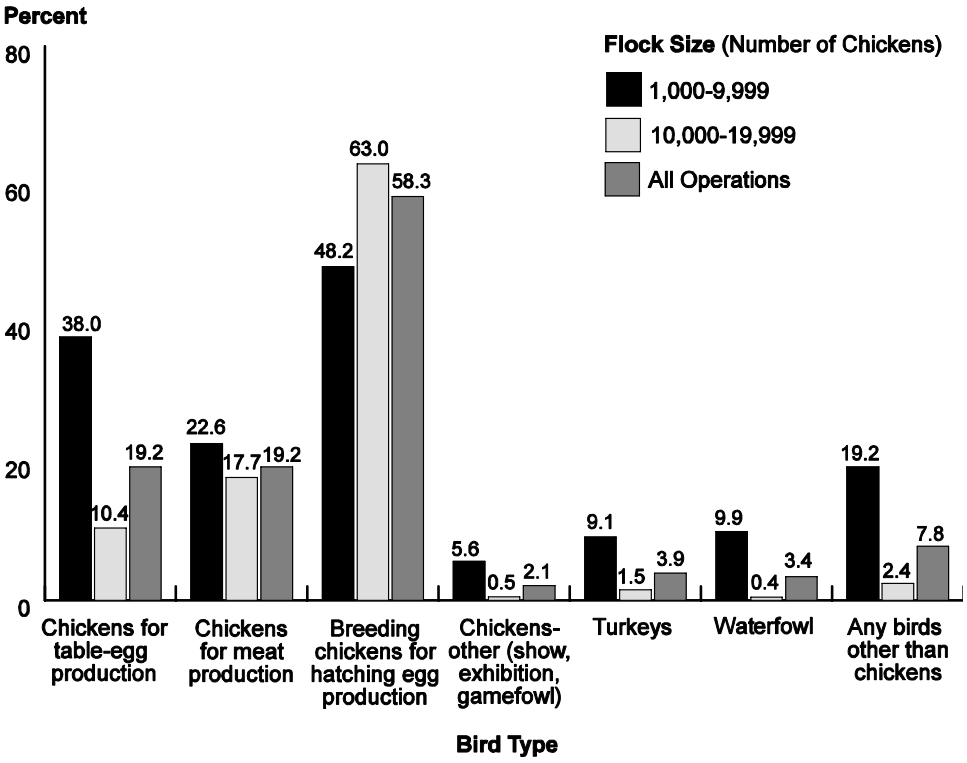


Operations reported their current inventory by bird type. Over half the operations (58.3 percent) had breeding chickens, ranging from 48.2 percent of small operations to 63.0 percent of large operations. A higher percentage of small operations had chickens for table-egg production and birds other than chickens, compared with large operations.

c. Percentage of operations by type of birds on the operation the day the questionnaire was completed, and by flock size:

| | **Percent Operations** | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Bird Type** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Chickens for table-egg production | 38.0 | (2.4) | 10.4 | (1.1) | 19.2 | (1.0) |
| Chickens for meat production | 22.6 | (1.8) | 17.7 | (1.1) | 19.2 | (0.9) |
| Breeding chickens for hatching-egg production (including hens, roosters, etc.) | 48.2 | (2.4) | 63.0 | (1.6) | 58.3 | (1.3) |
| Chickens–other (show, exhibition, gamefowl) | 5.6 | (1.2) | 0.5 | (0.2) | 2.1 | (0.4) |
| Turkeys | 9.1 | (1.4) | 1.5 | (0.5) | 3.9 | (0.5) |
| Waterfowl | 9.9 | (1.4) | 0.4 | (0.2) | 3.4 | (0.5) |
| Pigeons, doves | 2.7 | (0.8) | 0.2 | (0.2) | 1.0 | (0.3) |
| Gamebirds (quail, pheasant) | 2.9 | (0.8) | 0.1 | (0.1) | 1.0 | (0.3) |
| Guinea fowl | 5.0 | (1.1) | 0.0 | (--) | 1.6 | (0.3) |
| Pet birds (e.g., parrots, parakeets) | 1.3 | (0.5) | 0.1 | (0.1) | 0.5 | (0.2) |
| Other | 1.9 | (0.7) | 0.3 | (0.2) | 0.8 | (0.3) |
| Any birds other than chickens | 19.2 | (1.9) | 2.4 | (0.6) | 7.8 | (0.7) |
| Any birds | 92.3 | (1.4) | 89.8 | (1.1) | 90.6 | (0.9) |

**Percentage of Operations by Type of Birds on the Operation the Day the Questionnaire was Completed, and by Flock Size**




Nearly all large operations had only one type of bird, while over one in four small operations (26.1 percent) had multiple types of birds.

d. Percentage of operations with more than one bird type* on the operation the day the questionnaire was completed, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 26.1 | (2.1) | 3.5 | (0.7) | 10.7 | (0.8) |

*Bird type categories defined on p 7.

Operations with specific bird types may or may not have had other types of birds. Three chicken production types are examined in the table below. Nearly half the operations with table-egg layers (44.1 percent) and one-third of operations with broilers (32.6 percent) also had other bird types, while only 5.9 percent of operations with breeding chickens had other bird types.

e. For operations with the following types of chickens on the operation the day the questionnaire was completed, percentage of operations with more than one bird type* on the day the questionnaire was completed:

**Percent Operations**

**Bird Type**

| **Chickens for Table-egg Production** | | **Chickens for Meat Production** | | **Breeding Chickens for Hatching-egg Production** (Including Hens, Roosters, etc.) | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 44.1 | (3.2) | 32.6 | (2.7) | 5.9 | (0.9) |

*Bird type categories defined on p 7.

In each of the categories, about half the operations with more than one bird type (table e above.) had birds other than chickens.

f. For operations with the following types of chickens on the operation the day the questionnaire was completed, percentage of operations with birds other than chickens on the day the questionnaire was completed:

**Percent Operations**

**Bird Type**

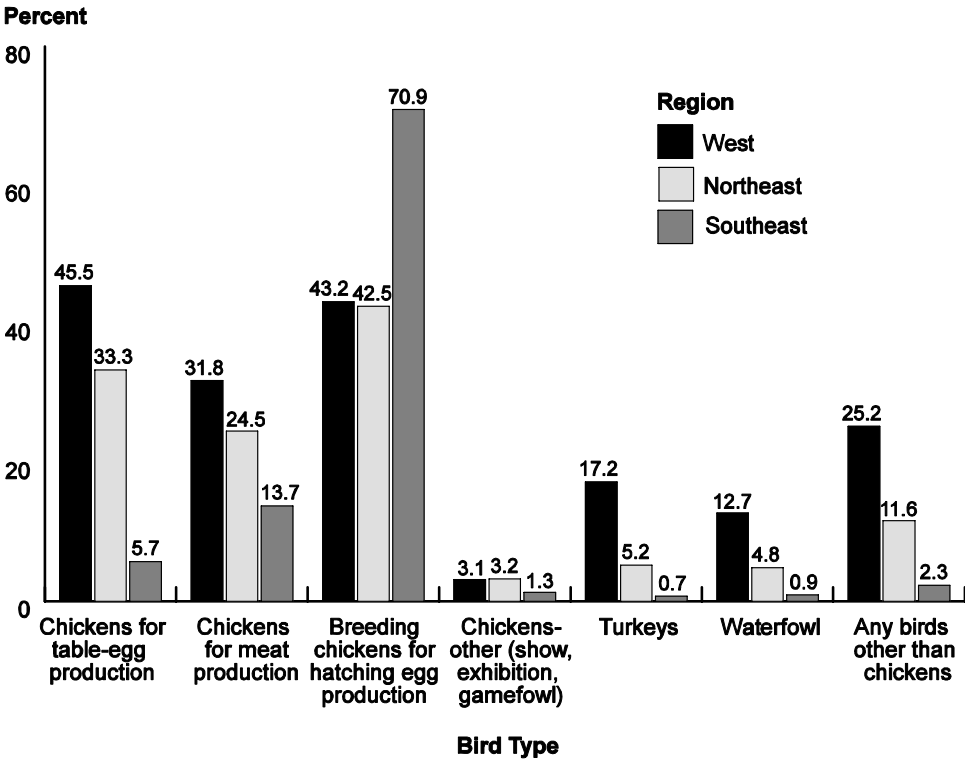
| **Chickens for Table-egg Production** | | **Chickens for Meat Production** | | **Breeding Chickens for Hatching-egg Production** (Including Hens, Roosters, etc.) | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 27.8 | (2.8) | 19.8 | (2.3) | 2.8 | (0.6) |

The type of birds present on operations varied by region. The Southeast region had the lowest percentage of operations with chickens for table-egg production and the highest percentage of operations with breeding chickens. The West region had the highest percentage of operations with birds other than chickens.

g. Percentage of operations by type of birds on the operation the day the questionnaire was completed, and by region:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | Region | | | | | |
| | West | | Northeast | | Southeast | |
| Bird Type | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Chickens for table-egg production | 45.5 | (4.0) | 33.3 | (2.2) | 5.7 | (0.9) |
| Chickens for meat production | 31.8 | (3.7) | 24.5 | (1.7) | 13.7 | (1.1) |
| Breeding chickens for hatching-egg production (including hens, roosters, etc.) | 43.2 | (3.9) | 42.5 | (2.3) | 70.9 | (1.6) |
| Chickens–other (show, exhibition, gamefowl) | 3.1 | (1.3) | 3.2 | (0.9) | 1.3 | (0.4) |
| Turkeys | 17.2 | (2.8) | 5.2 | (1.0) | 0.7 | (0.3) |
| Waterfowl | 12.7 | (3.0) | 4.8 | (1.0) | 0.9 | (0.3) |
| Pigeons, doves | 2.7 | (1.4) | 1.3 | (0.5) | 0.6 | (0.3) |
| Gamebirds (quail, pheasant) | 4.5 | (1.8) | 0.9 | (0.5) | 0.5 | (0.3) |
| Guinea fowl | 5.3 | (1.8) | 2.2 | (0.7) | 0.6 | (0.3) |
| Pet birds (e.g., parrots, parakeets) | 1.3 | (0.9) | 0.2 | (0.2) | 0.6 | (0.3) |
| Other | 0.0 | (--) | 1.2 | (0.6) | 0.7 | (0.3) |
| Any birds other than chickens | 25.2 | (3.1) | 11.6 | (1.5) | 2.3 | (0.5) |
| Any birds | 94.7 | (2.3) | 92.1 | (1.4) | 88.9 | (1.2) |

**Percentage of Operations by Type of Birds on the Operation the Day the Questionnaire was Completed, and by Region**



Birds other than chickens accounted for 2.7 percent of birds on operations. Breeding chickens accounted for over one-half of birds (52.4 percent).

h. Percentage of birds by type of birds on the operation the day the questionnaire was completed, and by flock size:

| | Percent Birds | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Bird Type** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Chickens for table-egg production | 16.6 | (2.3) | 13.0 | (2.4) | 13.4 | (2.2) |
| Chickens for meat production | 8.6 | (1.3) | 33.8 | (2.5) | 31.1 | (2.3) |
| Breeding chickens for hatching-egg production (including hens, roosters, etc.) | 62.2 | (3.7) | 51.3 | (2.4) | 52.4 | (2.2) |
| Chickens–other (show, exhibition, gamefowl) | 1.0 | (0.6) | 0.3 | (0.2) | 0.4 | (0.2) |
| Turkeys | 9.2 | (3.7) | 1.4 | (1.0) | 2.2 | (1.0) |
| Waterfowl | 0.9 | (0.2) | 0.0 | (0.0) | 0.1 | (0.0) |
| Pigeons, doves | 0.0 | (0.0) | 0.0 | (0.0) | 0.0 | (0.0) |
| Gamebirds (quail, pheasant) | 0.6 | (0.3) | 0.0 | (0.0) | 0.1 | (0.0) |
| Guinea fowl | 0.6 | (0.4) | 0.0 | (--) | 0.1 | (0.0) |
| Pet birds (e.g., parrots, parakeets) | 0.0 | (0.0) | 0.0 | (0.0) | 0.0 | (0.0) |
| Other | 0.3 | (0.3) | 0.2 | (0.2) | 0.2 | (0.2) |
| Total | 100.0 | | 100.0 | | 100.0 | |

Chickens for table-egg production ranged from 4.7 percent of birds in the Southeast region to 34.5 percent in the West region. Breeding chickens accounted for nearly two-thirds of birds in the Southeast region (63.0 percent).

i. Percentage of birds by type of birds on the operation the day the questionnaire was completed, and by region:

| | Percent Birds | | | | | |
|---|---|---|---|---|---|---|
| | Region | | | | | |
| | West | | Northeast | | Southeast | |
| Bird Type | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Chickens for table-egg production | 34.5 | (10.7) | 23.7 | (4.8) | 4.7 | (1.0) |
| Chickens for meat production | 20.6 | (6.8) | 35.6 | (4.3) | 31.1 | (2.8) |
| Breeding chickens for hatching-egg production (including hens, roosters, etc.) | 28.0 | (5.8) | 39.2 | (3.8) | 63.0 | (2.7) |
| Chickens–other (show, exhibition, gamefowl) | 0.1 | (0.1) | 0.1 | (0.1) | 0.6 | (0.3) |
| Turkeys | 15.9 | (7.5) | 0.9 | (0.5) | 0.2 | (0.2) |
| Waterfowl | 0.3 | (0.1) | 0.2 | (0.1) | 0.0 | (0.0) |
| Pigeons, doves | 0.0 | (0.0) | 0.0 | (0.0) | 0.0 | (0.0) |
| Gamebirds (quail, pheasant) | 0.6 | (0.3) | 0.0 | (0.0) | 0.0 | (0.0) |
| Guinea fowl | 0.0 | (0.0) | 0.2 | (0.1) | 0.0 | (0.0) |
| Pet birds (e.g., parrots, parakeets) | 0.0 | (0.0) | 0.0 | (0.0) | 0.0 | (0.0) |
| Other | 0.0 | (--) | 0.1 | (0.1) | 0.4 | (0.2) |
| Total | 100.0 | | 100.0 | | 100.0 | |

## B. General Management

### 1. Operation type

Nearly all large operations and over half of small operations (95.8 and 54.1 percent, respectively) operated under a contract with a poultry company. This high percentage of contract farms may reflect the high number of breeding farms that fall into the flock size targeted for this study.

a. Percentage of operations that operated under a contract with a poultry company, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 54.1 | (2.3) | 95.8 | (0.7) | 82.6 | (0.9) |

Photo courtesy of USDA photo library

Nearly all operations in the Southeast region (96.9 percent) operated under a contract with a poultry company.

b. Percentage of operations that operated under a contract with a poultry company, by region:

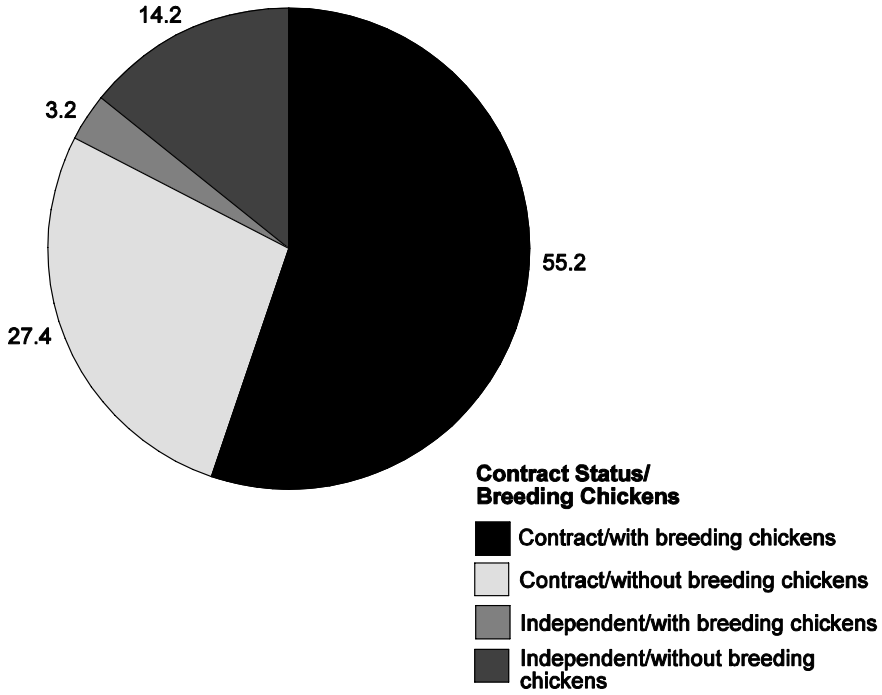
| Percent Operations | | | | | |
|---|---|---|---|---|---|
| Region | | | | | |
| West | | Northeast | | Southeast | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| 59.8 | (3.6) | 66.0 | (2.1) | 96.9 | (0.6) |

Over half of operations were contract farms with breeding chickens (55.2 percent). Independent (noncontract) operations accounted for 17.4 percent of operations and 7.1 percent of chickens.

c. Percentage of operations and percentage of chickens on those operations, by contract status and presence of breeding chickens for hatching-egg production on the day the questionnaire was completed:

| Contract Status/ Breeding Chickens | Percent Operations | Standard Error | Percent Chickens | Standard Error |
|---|---|---|---|---|
| Contract/with breeding chickens | 55.2 | (1.3) | 54.4 | (2.2) |
| Contract/without breeding chickens | 27.4 | (1.2) | 38.5 | (2.3) |
| Independent (noncontract)/with breeding chickens | 3.2 | (0.5) | 0.9 | (0.2) |
| Independent (noncontract)/without breeding chickens | 14.2 | (0.9) | 6.2 | (1.7) |
| Total | 100.0 | | 100.0 | |

**Percentage of Operations by Contract Status and Presence of Breeding Chickens for Hatching-egg Production on the Day the Questionnaire was Completed**

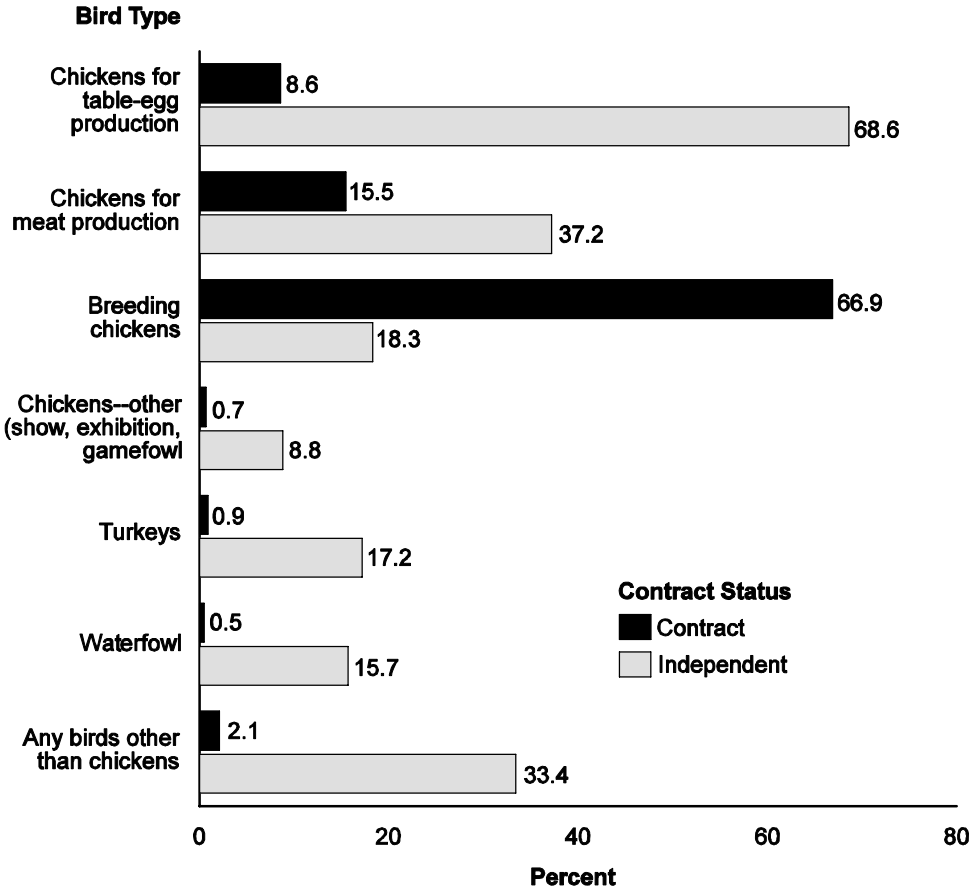


About 7 of 10 independent (noncontract) operations (68.6 percent) had chickens for table-egg production compared with less than 1 of 10 contract operations (8.6 percent). About 7 of 10 contract operations had breeding chickens (66.9 percent) compared with approximately 2 of 10 independent (noncontract) operations (18.3 percent). One-third of independent operations (33.4 percent) had birds other than chickens, compared with 2.1 percent of contract operations.

d. Percentage of operations by type of birds on the operation the day the questionnaire was completed, and by contract status:

| | **Percent Operations** | | | |
|---|---|---|---|---|
| | **Contract Status** | | | |
| | **Contract** | | **Independent** (Noncontract) | |
| **Bird Type** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Chickens for table-egg production | 8.6 | (0.9) | 68.6 | (3.1) |
| Chickens for meat production | 15.5 | (1.0) | 37.2 | (2.9) |
| Breeding chickens for hatching egg production (including hens, roosters, etc.) | 66.9 | (1.4) | 18.3 | (2.7) |
| Chickens–other (show, exhibition, gamefowl) | 0.7 | (0.3) | 8.8 | (2.0) |
| Turkeys | 0.9 | (0.3) | 17.2 | (2.5) |
| Waterfowl | 0.5 | (0.2) | 15.7 | (2.2) |
| Pigeons, doves | 0.3 | (0.2) | 4.5 | (1.3) |
| Gamebirds (quail, pheasant) | 0.4 | (0.2) | 4.1 | (1.2) |
| Guinea fowl | 0.3 | (0.2) | 7.8 | (1.8) |
| Pet birds (e.g., parrots, parakeets) | 0.2 | (0.1) | 1.9 | (0.9) |
| Other | 0.5 | (0.2) | 2.6 | (1.2) |
| Any birds other than chickens | 2.1 | (0.5) | 33.4 | (3.1) |
| Any birds | 89.5 | (1.0) | 95.4 | (1.3) |

**Percentage of Operations by Type of Birds on the Operation the Day the Questionnaire was Completed, and by Contract Status**



Nearly half of independent (noncontract) operations (46.5 percent) had multiple types of birds on the premises, while nearly all contract operations (97.0 percent) had only a single bird type.

e. Percentage of operations with more than one bird type* on the operation the day the questionnaire was completed, by contract status:

**Percent Operations**

**Contract Status**

| **Contract** | | **Independent** (Noncontract) | |
|---|---|---|---|
| **Percent** | **Std. Error** | **Percent** | **Std. Error** |
| 3.0 | (0.6) | 46.5 | (3.3) |

*Bird type categories defined on p 7.

A higher percentage of small operations considered part of their operation to be natural, organic, or free-range compared to large operations. Over half of layer operations (55.8 percent) were cage-free. Note: Only 7 percent of these cage-free layer operations had breeding layers and 99 percent had table-egg layers (data not shown).

f. Percentage of operations that defined any part of the poultry operation in the following way, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|---|
| **Defined As* . . .** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Natural (no feed additives fed) | 35.3 | (2.5) | 18.7 | (1.4) | 24.0 | (1.2) |
| Organic | 13.1 | (1.8) | 4.5 | (0.8) | 7.3 | (0.8) |
| Free-range or pasture raised | 21.2 | (2.0) | 2.3 | (0.5) | 8.3 | (0.7) |
| Cage-free (egg layers only) | 61.0 | (4.3) | 47.6 | (5.9) | 55.8 | (3.5) |

*Based on producers interpretation of these definitions.

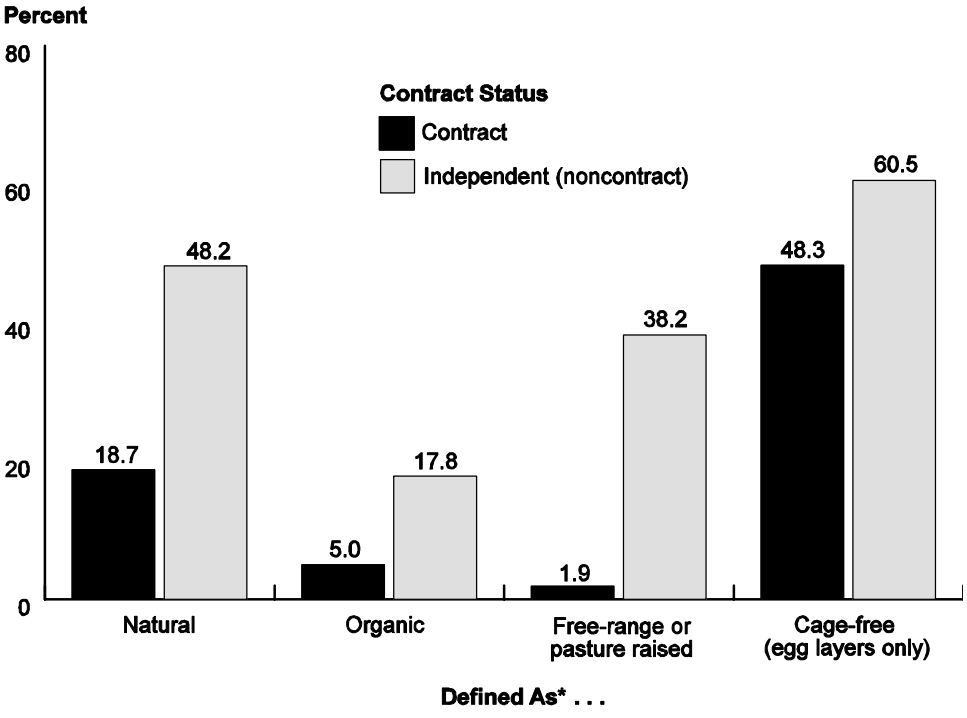
A higher percentage of independent (noncontract) operations than contract operations considered part of their operation to be natural, organic, or free-range.

g. Percentage of operations that defined any part of the poultry operation in the following way, by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| **Defined As* . . .** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Natural (no feed additives fed) | 18.7 | (1.3) | 48.2 | (3.4) |
| Organic | 5.0 | (0.7) | 17.8 | (2.7) |
| Free-range or pasture raised | 1.9 | (0.5) | 38.2 | (3.2) |
| Cage-free (egg layers only) | 48.3 | (6.1) | 60.5 | (4.2) |

*Based on producers interpretation of these definitions.

**Percentage of Operations that Defined Any Part of the Poultry Operation in the Following Way, by Contract Status**




*Based on producers interpretation of these definitions.

A lower percentage of operations in the Southeast region considered part of their operation to be natural, organic, or free-range, compared with operations in the West and Northeast regions.

h. Percentage of operations that defined any part of the poultry operation in the following way, by region:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | Region | | | | | |
| | West | | Northeast | | Southeast | |
| Defined As* . . . | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Natural | 33.7 | (4.5) | 33.8 | (2.3) | 16.1 | (1.5) |
| Organic | 15.0 | (3.7) | 11.8 | (1.7) | 3.0 | (0.7) |
| Free-range or pasture raised | 19.3 | (3.3) | 15.4 | (1.7) | 2.0 | (0.5) |
| Cage-free (egg layers only) | 41.6 | (7.1) | 66.3 | (4.5) | 39.4 | (7.9) |

*Based on producers interpretation of these definitions.

Two-thirds of operations that considered part of their operation to be organic (65.7 percent) were certified as an organic operation.

i. For operations that considered any part of the poultry operation organic, percentage that were certified as an organic operation:

| Percent Operations | Standard Error |
|---|---|
| 65.7 | (5.4) |

**2. Outdoor access**

A higher percentage of small operations than large operations allowed poultry outdoor access.

a. Percentage of operations in which any poultry[1] had outdoor access[2], by season and by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Season** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| October 2006–April 2007 | 28.3 | (2.2) | 2.6 | (0.6) | 10.7 | (0.8) |
| May–September 2007 | 31.2 | (2.2) | 3.1 | (0.6) | 12.0 | (0.8) |

[1]Including gamebirds.
[2]Either free-ranging in outdoor pens or housed indoors with the ability to go outside.

A smaller percentage of operations in the Southeast region allowed birds outdoor access compared with operations in the West and Northeast regions.

b. Percentage of operations in which any poultry[1] had outdoor access[2], by season and by region:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Region** | | | | | |
| | **West** | | **Northeast** | | **Southeast** | |
| **Season** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| October 2006–April 2007 | 26.8 | (4.0) | 20.8 | (1.9) | 1.6 | (0.4) |
| May–September 2007 | 28.9 | (4.1) | 24.0 | (2.0) | 1.6 | (0.4) |

[1]Including gamebirds.
[2]Either free-ranging in outdoor pens or housed indoors with the ability to go outside.

About half of independent (noncontract) operations allowed birds outdoor access, while very few contract operations did so.

c. Percentage of operations in which any poultry[1] had outdoor access[2], by season and by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| **Season** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| October 2006–April 2007 | 2.4 | (0.5) | 49.3 | (3.3) |
| May–September 2007 | 3.2 | (0.6) | 53.7 | (3.3) |

[1]Including gamebirds.
[2]Either free-ranging in outdoor pens or housed indoors with the ability to go outside.

About two-thirds of operations with any birds other than chickens allowed birds outdoor access, compared with less than 10 percent of operations with chickens only.

d. Percentage of operations in which any poultry[1] had outdoor access[2], by season and by presence of any birds other than chickens (table revised 8/29/08):

| | Percent Operations | | | |
|---|---|---|---|---|
| | Any Birds Other than Chickens | | | |
| | Yes | | No | |
| **Season** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| October 2006–April 2007 | 61.2 | (5.4) | 6.5 | (0.7) |
| May–September 2007 | 66.4 | (5.3) | 7.5 | (0.8) |

[1]Including gamebirds.
[2]Either free-ranging in outdoor pens or housed indoors with the ability to go outside.

On operations that allowed outdoor access, about three-fourths of birds in the flock had outdoor access, on average.

e. For operations in which any poultry had outdoor access, average percentage of birds in the flock with outdoor access, by season:

| Season | Average Percent | Standard Error |
|---|---|---|
| October 2006–April 2007 | 78.0 | (3.1) |
| May–September 2007 | 79.6 | (2.9) |

Birds were able to leave the property (even if they did not) on about one-fourth (23.2 percent) of operations that allowed outdoor access.

f. For operations in which any poultry had outdoor access, percentage of operations in which any birds were able to leave the property (whether they did or not):

| Percent Operations | Standard Error |
|---|---|
| 23.2 | (3.7) |

Birds were fed outdoors on less than half of operations that allowed poultry outdoor access.

g. For operations in which any poultry had outdoor access, percentage of operations by method used most often to distribute feed to birds outdoors:

| Method | Percent Operations | Standard Error |
|---|---|---|
| Not fed outdoors | 53.8 | (3.9) |
| Feed scattered on the ground | 8.5 | (2.3) |
| Fed in an open trough | 18.2 | (3.2) |
| Fed using a covered feeder | 19.5 | (2.9) |
| Total | 100.0 | |

Birds came indoors to drink on over half of operations that allowed poultry outdoor access.

h. For operations in which any poultry had outdoor access, percentage of operations by method used most often to deliver water to birds outdoors:

| Method | Percent Operations | Standard Error |
|---|---|---|
| Must come indoors to drink | 54.7 | (4.0) |
| Drink from a body of surface water (e.g., pond, lake, or stream) | 2.2 | (1.1) |
| Drink from an open or partially covered trough or bell waterer | 32.6 | (3.7) |
| Drink from an enclosed water receptacle (e.g., sipper/nipple waterer) | 10.5 | (2.3) |
| Total | 100.0 | |

**3. Bird removal**

Live poultry were removed from the operation at some time during the year on 8 of 10 small operations (77.8 percent) and on 9 of 10 large operations (90.9 percent).

a. Percentage of operations in which any live poultry (including gamebirds) were permanently removed (i.e., sold, given away, or removed through contract) during the previous 12 months, by flock size:

| Percent Operations | | | | | |
|---|---|---|---|---|---|
| **Flock Size** (Number of Chickens) | | | | | |
| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 77.8 | (2.1) | 90.9 | (1.0) | 86.7 | (1.0) |

For operations that removed poultry, most operations removed birds one time during the year. Less than one in five operations that removed birds did so five or more times during the year.

b. For operations in which any live poultry (including gamebirds) were permanently removed (i.e., sold, given away, or removed through contract) during the previous 12 months, percentage of operations by number of times birds were removed, and by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

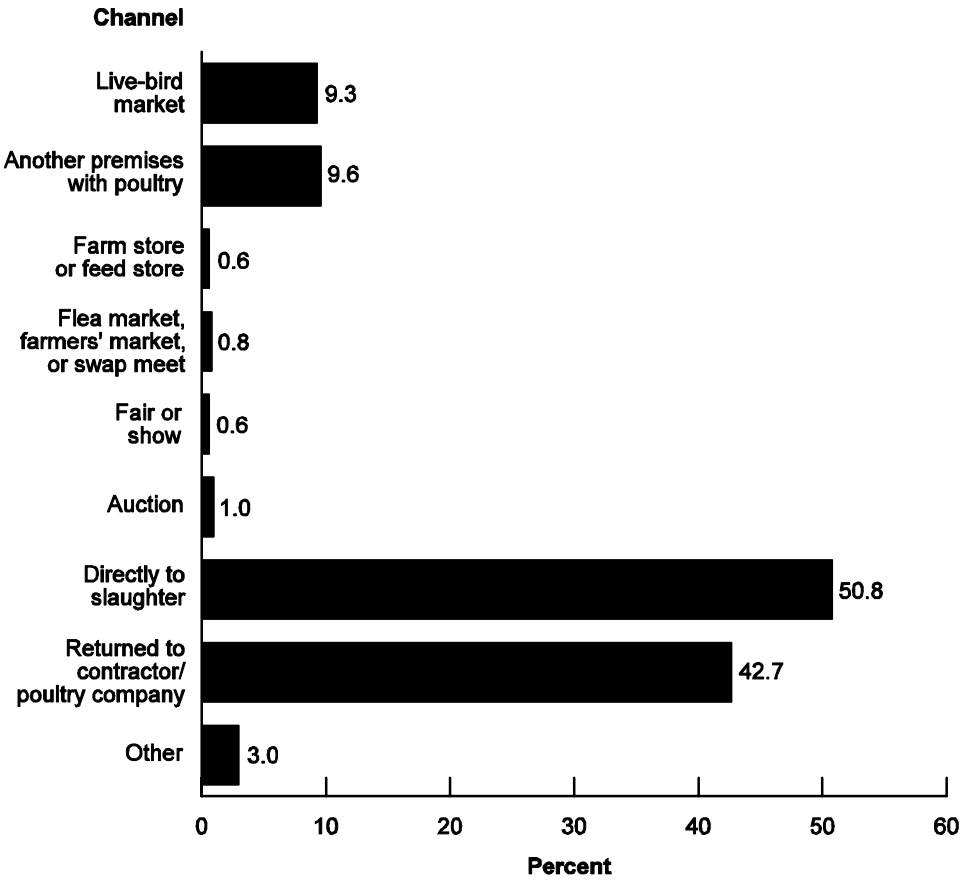
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|---|
| **Times** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 1 | 64.9 | (2.7) | 64.7 | (1.7) | 64.7 | (1.4) |
| 2 to 4 | 14.0 | (2.0) | 18.8 | (1.5) | 17.5 | (1.2) |
| 5 or more | 21.1 | (2.4) | 16.5 | (1.2) | 17.8 | (1.1) |
| Total | 100.0 | | 100.0 | | 100.0 | |

The most common channels for removing live birds were directly to slaughter and returning birds to the contractor. Less than 1 of 10 operations that removed birds (9.3 percent) sent the birds to a live-bird market.

c. For operations in which any live poultry (including gamebirds) were permanently removed (i.e., sold, given away, or removed through contract) during the previous 12 months, percentage of operations by channel through which live birds were removed, and by flock size:

| | **Percent Operations** | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Channel** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Live-bird market | 14.8 | (2.3) | 7.2 | (1.0) | 9.3 | (1.0) |
| Another premises with poultry (including gamebirds) | 13.9 | (2.1) | 8.1 | (1.1) | 9.6 | (1.0) |
| Farm store or feed store | 1.6 | (0.8) | 0.3 | (0.2) | 0.6 | (0.3) |
| Flea market, farmer’s market, or swap meet | 2.7 | (0.9) | 0.1 | (0.1) | 0.8 | (0.3) |
| Fair or show | 1.7 | (0.9) | 0.2 | (0.2) | 0.6 | (0.3) |
| Auction | 3.6 | (1.2) | 0.1 | (0.1) | 1.0 | (0.3) |
| Directly to slaughter (slaughter facility or home slaughter) | 52.1 | (3.2) | 50.3 | (1.9) | 50.8 | (1.7) |
| Returned to contractor or poultry company | 29.0 | (3.0) | 47.8 | (1.9) | 42.7 | (1.6) |
| Other | 7.2 | (1.7) | 1.4 | (0.5) | 3.0 | (0.6) |

**For Operations that Permanently Removed Live Poultry, Percentage of Operations by Channel Through Which Live Birds Were Removed**



Over 20 percent of independent (noncontract) operations permanently removed birds via the live-bird market and via another premises with poultry.

d. For operations in which any live poultry (including gamebirds) were permanently removed (i.e., sold, given away, or removed through contract) during the previous 12 months, percentage of operations by channel through which live birds were removed, and by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| Channel | Percent | Std. Error | Percent | Std. Error |
| Live-bird market | 7.4 | (0.9) | 21.5 | (3.7) |
| Another premises with poultry (including gamebirds) | 7.2 | (0.9) | 28.4 | (4.3) |
| Farm store or feed store | 0.0 | (--) | 5.4 | (2.2) |
| Flea market, farmer's market, or swap meet | 0.0 | (--) | 6.6 | (2.1) |
| Fair or show | 0.2 | (0.2) | 3.7 | (1.8) |
| Auction | 0.2 | (0.1) | 7.1 | (2.4) |
| Directly to slaughter (slaughter facility or home slaughter) | 50.1 | (1.8) | 57.0 | (4.6) |
| Returned to contractor or poultry company | 48.2 | (1.8) | 3.8 | (2.0) |
| Other | 1.9 | (0.5) | 10.8 | (3.0) |

Birds were transported an average distance of 150.8 miles to slaughter.

e. For operations that removed live poultry through the following channels, average distance (miles) transported from operation to destination:

| Channel* | Average Distance (Miles) | Standard Error |
|---|---|---|
| Live-bird market | 140.5 | (22.7) |
| Another premises with poultry (including gamebirds) | 46.0 | (9.0) |
| Directly to slaughter (slaughter facility or home slaughter) | 150.8 | (12.1) |
| Returned to contractor/poultry company | 67.3 | (7.5) |

*Estimates not reported for other channels due to small sample size.

**4. Source of birds**

One-third of operations (33.5 percent) placed day-old chicks or hatchlings on the operation during the previous 12 months.

a. Percentage of operations in which any day-old chicks or hatchlings were placed on the operation during the previous 12 months, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 36.5 | (2.3) | 32.1 | (1.5) | 33.5 | (1.3) |

Large operations were more likely to have multiple placements of day-old chicks or hatchlings compared with small operations.

b. For operations in which any day-old chicks or hatchlings were placed on the operation during the previous 12 months, percentage of operations by number of times placed and by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|---|
| **Times** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 1 | 30.7 | (3.8) | 9.0 | (1.8) | 16.6 | (1.8) |
| 2 to 4 | 36.2 | (3.9) | 47.0 | (3.0) | 43.3 | (2.4) |
| 5 or more | 33.1 | (3.5) | 44.0 | (3.0) | 40.1 | (2.2) |
| Total | 100.0 | | 100.0 | | 100.0 | |

A higher percentage of independent (noncontract) operations placed day-old chicks than contract operations (61.4 and 27.7 percent, respectively), which is consistent with independent operations having more meat-type birds and contract operations having more breeding birds.

c. Percentage of operations in which any day-old chicks or hatchlings were placed on the operation during the previous 12 months, by contract status:

**Percent Operations**

**Contract Status**

| **Contract** | | **Independent** (Noncontract) | |
|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 27.7 | (1.3) | 61.4 | (3.3) |

Birds older than hatchlings were placed on about half of operations during the previous 12 months.

d. Percentage of operations in which any older birds (not day-old chicks or hatchlings) were placed on the operation during the previous 12 months, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 49.0 | (2.5) | 50.6 | (1.7) | 50.1 | (1.4) |

Birds older than hatchlings were usually placed on the operation one time during the year.

e. For operations in which any older birds (not day-old chicks or hatchlings) were placed on the operation during the previous 12 months, percentage of operations by number of times placed and by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Times** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 1 | 77.8 | (3.2) | 87.0 | (1.7) | 84.2 | (1.6) |
| 2 to 4 | 15.7 | (2.9) | 12.1 | (1.7) | 13.2 | (1.5) |
| 5 or more | 6.5 | (1.7) | 0.9 | (0.5) | 2.6 | (0.6) |
| Total | 100.0 | | 100.0 | | 100.0 | |

A higher percentage of contract operations placed birds older than hatchlings compared with independent (noncontract) operations (55.2 and 26.1 percent, respectively), which may be due in part to the introduction of spiking males on breeding farms.

f. Percentage of operations in which any older birds (not day-old chicks or hatchlings) were placed on the operation during the previous 12 months, by contract status:

| Percent Operations | | | |
|---|---|---|---|
| **Contract Status** | | | |
| **Contract** | | **Independent** (Noncontract) | |
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 55.2 | (1.6) | 26.1 | (3.0) |

The majority of operations that placed older birds (80.8 percent) obtained the birds directly from another poultry premises. About one in five operations (19.1 percent) obtained birds from a poultry wholesaler or dealer.

g. For operations that placed older birds during the previous 12 months, percentage of operations that used the following sources:

| Source | Percent Operations | Standard Error |
|---|---|---|
| Poultry wholesaler or dealer | 19.1 | (1.9) |
| Directly from another premises with poultry (including gamebirds) | 80.8 | (1.9) |
| Farm store or feed store | 0.4 | (0.3) |
| Flea market, farmer's market, or swap meet | 0.2 | (0.2) |
| Fair or show | 0.5 | (0.3) |
| Auction market | 0.6 | (0.3) |
| Other | 6.0 | (1.1) |

For operations that obtained birds directly from another premises during the previous 12 months, the source premises was 51.5 miles away from the operation, on average.

h. For operations that used the following sources of older birds, average usual distance (miles) from source to operation:

| Source* | Average Usual Distance (Miles) | Standard Error |
|---|---|---|
| Poultry wholesaler or dealer | 58.3 | (10.5) |
| Directly from another premises with poultry (including gamebirds) | 51.5 | (9.5) |

*Estimates not reported for other sources due to small sample size.

**5. Bird movement**

Very few operations took poultry to a location in which birds were present and then returned the birds to the operation.

a. Percentage of operations in which any poultry (including gamebirds) were taken to another location where birds were present (e.g. fair or show) and then returned to the operation during the previous 12 months, by flock size:

| Percent Operations | | | | | |
|---|---|---|---|---|---|
| **Flock Size** (Number of Chickens) | | | | | |
| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 3.2 | (0.9) | 0.1 | (0.1) | 1.1 | (0.3) |

A higher percentage of independent (noncontract) operations took poultry to a location in which birds were present and then returned the birds compared with contract operations.

b. Percentage of operations in which any poultry (including gamebirds) were taken to another location where birds were present (e.g. fair or show) and then returned to the operation during the previous 12 months, by contract status:

| Percent Operations | | | |
|---|---|---|---|
| **Contract Status** | | | |
| **Contract** | | **Independent** (Noncontract) | |
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 0.2 | (0.2) | 5.2 | (1.5) |

### 6. Eggs

About three-fourths of operations (73.9 percent) removed hatching or table eggs from the operation.

a. Percentage of operations that sold, gave away, or removed through contract, any hatching or table eggs, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 69.9 | (2.2) | 75.8 | (1.3) | 73.9 | (1.1) |

Nearly 90 percent of operations that removed eggs were contract farms.

b. For operations that sold, gave away, or removed eggs, percentage of operations by contract status:

| **Contract Status** | **Percent Operations** | **Standard Error** |
|---|---|---|
| Contract with poultry company | 88.9 | (0.9) |
| Independent (noncontract) | 11.1 | (0.9) |
| Total | 100.0 | |

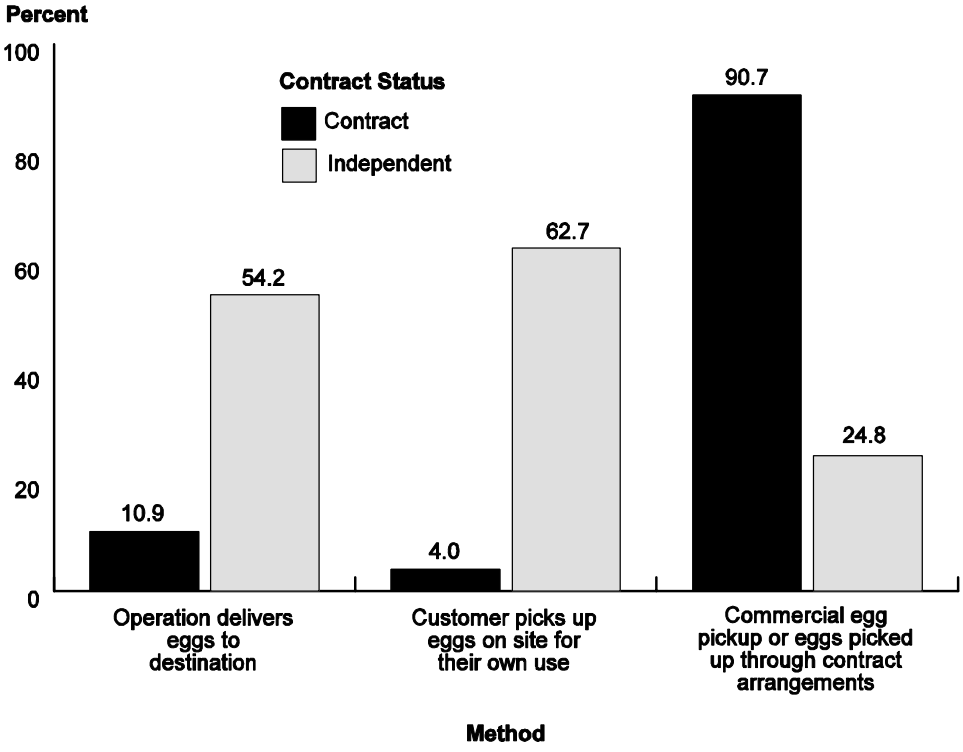
Over 90 percent of contract operations that removed eggs removed at least some eggs via commercial egg pickup or contract arrangement, while over half of independent (noncontract) operations delivered at least some of their eggs to their destination or had customers pick up eggs on-site.

c. For operations that sold, gave away, or removed any hatching or table eggs, percentage of operations by egg-distribution method and by contract status:

**Percent Operations**

| | **Contract Status** | | | |
|---|---|---|---|---|
| | **Contract** | | **Independent** (Noncontract) | |
| **Method** | **Percent** | **Standard Error** | **Percent** | **Standard Error** |
| Operation delivers eggs to destination | 10.9 | (1.8) | 54.2 | (5.0) |
| Customer picks up eggs on site for their own use | 4.0 | (1.2) | 62.7 | (4.9) |
| Commercial egg pickup or eggs picked up through contract arrangements | 90.7 | (1.6) | 24.8 | (4.5) |

**For Operations that Sold, Gave Away, or Removed Eggs, Percentage of Operations by Egg-Distribution Method and by Contract Status**




Eggs were removed from operations about two times per week on average.

d. For operations that used the following egg-distribution methods, average number of times per week eggs were removed:

| Method | Average (Times/Week) | Standard Error |
|---|---|---|
| Operation delivers eggs to destination | 2.0 | (0.1) |
| Customer picks up eggs on site for their own use | 2.7 | (0.3) |
| Commercial egg pickup or eggs picked up through contract arrangements | 2.0 | (0.0) |

Cartons were used on a higher percentage of independent (noncontract) operations than contract operations (92.6 and 79.8 percent, respectively) and were generally not reused by another operation. Racks were used by a higher percentage of contract operations than independent (noncontract) operations (94.9 and 77.6 percent, respectively). For contract operations that removed eggs, 63.2 percent shared racks with other operations.

e. For operations that sold, gave away, or removed any hatchings or table eggs, percentage of operations in which egg cartons, crates, flats, or racks were also used on another operation, by contract status:

| | Percent Operations Used on Another Operation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | | Don't Know | | No | | Not Used on Operation | | |
| Equipment | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Total |
| Contract | | | | | | | | | |
| Cartons | 6.6 | (1.2) | 8.4 | (1.5) | 64.8 | (2.4) | 20.2 | (2.0) | 100.0 |
| Crates | 5.9 | (1.2) | 9.0 | (1.5) | 62.0 | (2.5) | 23.1 | (2.1) | 100.0 |
| Flats | 39.5 | (2.5) | 8.3 | (1.4) | 42.2 | (2.5) | 10.0 | (1.5) | 100.0 |
| Racks | 63.2 | (2.4) | 9.7 | (1.5) | 22.0 | (2.1) | 5.1 | (1.1) | 100.0 |
| Independent (noncontract) | | | | | | | | | |
| Cartons | 18.7 | (3.7) | 3.8 | (2.0) | 70.1 | (4.5) | 7.4 | (2.7) | 100.0 |
| Crates | 10.8 | (3.0) | 2.8 | (1.4) | 69.0 | (4.5) | 17.4 | (3.8) | 100.0 |
| Flats | 26.3 | (4.5) | 4.4 | (2.1) | 60.0 | (4.8) | 9.3 | (2.5) | 100.0 |
| Racks | 10.7 | (3.4) | 1.4 | (1.0) | 65.5 | (4.6) | 22.4 | (3.9) | 100.0 |

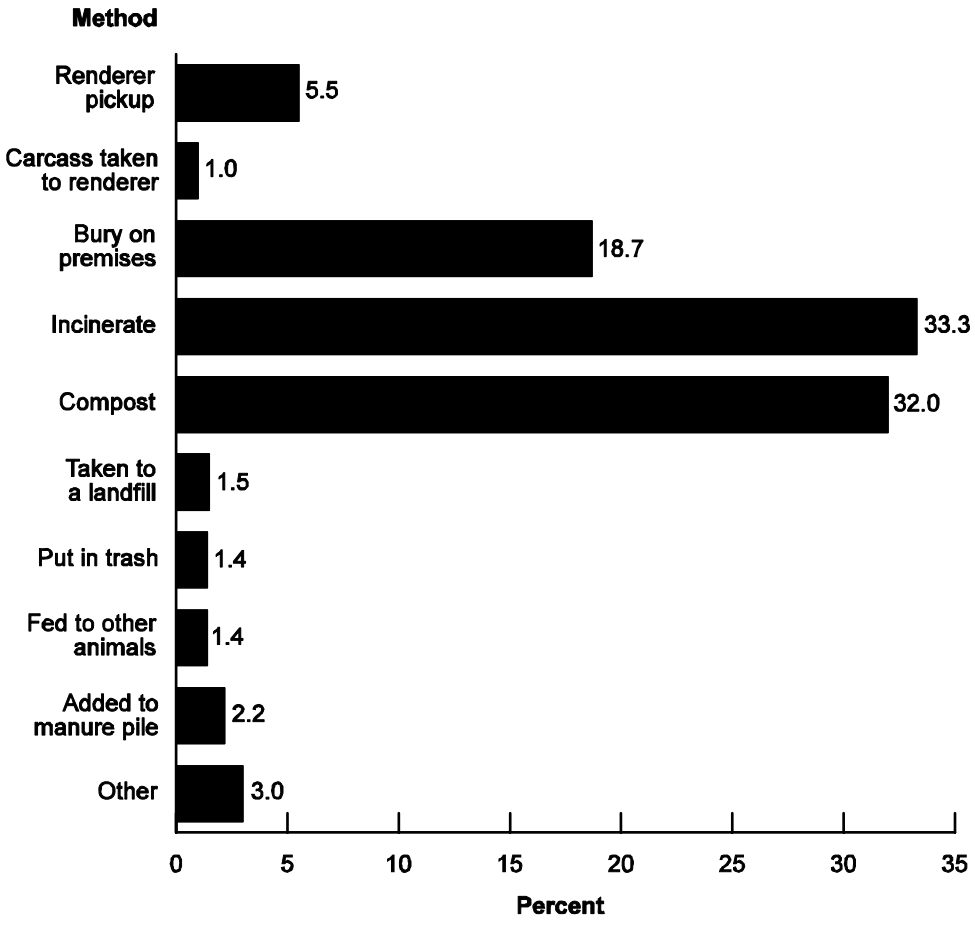
**7. Carcass disposal**

The most common carcass disposal methods were incineration and composting. Rendering was used by a total of 6.5 percent of operations.

a. Percentage of operations by primary method used to dispose of dead birds, including frozen carcasses, and by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Method** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Renderer pickup | 3.6 | (0.9) | 6.4 | (0.8) | 5.5 | (0.6) |
| Carcass taken to renderer | 1.5 | (0.6) | 0.9 | (0.3) | 1.0 | (0.3) |
| Bury on premises | 25.2 | (2.2) | 15.7 | (1.2) | 18.7 | (1.0) |
| Incinerate | 21.0 | (2.1) | 38.9 | (1.7) | 33.3 | (1.3) |
| Compost | 33.9 | (2.5) | 31.0 | (1.6) | 32.0 | (1.3) |
| Taken to a landfill | 3.1 | (0.9) | 0.8 | (0.3) | 1.5 | (0.3) |
| Put in trash (picked up) | 1.1 | (0.5) | 1.5 | (0.4) | 1.4 | (0.3) |
| Fed to other animals | 3.3 | (0.9) | 0.5 | (0.2) | 1.4 | (0.3) |
| Added to manure pile | 5.0 | (1.1) | 0.9 | (0.3) | 2.2 | (0.4) |
| Other | 2.3 | (0.8) | 3.4 | (0.6) | 3.0 | (0.5) |
| Total | 100.0 | | 100.0 | | 100.0 | |

**Percentage of Operations by Primary Method Used to Dispose of Dead Birds, Including Frozen Carcasses**



The most common carcass disposal method in the Southeast region was incineration (40.8 percent of operations). Composting was the most common method in the Northeast region (51.9 percent of operations). In the West region, incineration and composting were the primary methods of carcass disposal (38.2 and 28.2 percent of operations, respectively).

b. Percentage of operations by primary method used to dispose of dead birds, including frozen carcasses, and by region:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | Region | | | | | |
| | West | | Northeast | | Southeast | |
| Method | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Renderer pickup | 8.8 | (2.6) | 1.4 | (0.5) | 7.6 | (1.0) |
| Carcass taken to renderer | 1.7 | (1.3) | 1.0 | (0.5) | 0.9 | (0.4) |
| Bury on premises | 12.2 | (2.7) | 14.3 | (1.7) | 22.6 | (1.4) |
| Incinerate | 38.2 | (4.5) | 20.0 | (2.0) | 40.8 | (1.9) |
| Compost | 28.2 | (4.2) | 51.9 | (2.5) | 20.0 | (1.5) |
| Taken to a landfill | 3.2 | (1.4) | 1.4 | (0.5) | 1.4 | (0.5) |
| Put in trash (picked up) | 2.2 | (1.1) | 1.5 | (0.6) | 1.1 | (0.4) |
| Fed to other animals | 1.1 | (0.8) | 3.0 | (0.9) | 0.4 | (0.2) |
| Added to manure pile | 2.2 | (1.0) | 5.1 | (1.1) | 0.3 | (0.2) |
| Other | 2.2 | (1.5) | 0.4 | (0.3) | 4.9 | (0.8) |
| Total | 100.0 | | 100.0 | | 100.0 | |

The most common carcass disposal methods for contract operations were incineration and composting (37.3 and 31.4 percent of operations, respectively). The most common carcass disposal methods for noncontract operations were composting and burial (34.5 and 25.2 percent of operations, respectively).

c. Percentage of operations by primary method used to dispose of dead birds, including frozen carcasses, and by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| **Method** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Renderer pickup | 5.8 | (0.7) | 4.3 | (1.3) |
| Carcass taken to renderer | 1.1 | (0.3) | 0.9 | (0.5) |
| Bury on premises | 17.2 | (1.1) | 25.2 | (3.1) |
| Incinerate | 37.3 | (1.5) | 14.0 | (2.3) |
| Compost | 31.4 | (1.4) | 34.5 | (3.3) |
| Taken to a landfill | 1.0 | (0.3) | 4.2 | (1.3) |
| Put in trash (picked up) | 0.9 | (0.3) | 3.8 | (1.3) |
| Fed to other animals | 0.5 | (0.2) | 5.5 | (1.6) |
| Added to manure pile | 1.3 | (0.4) | 6.5 | (1.7) |
| Other | 3.5 | (0.6) | 1.1 | (0.6) |
| Total | 100.0 | | 100.0 | |

Renderers picked up carcasses 4.5 times during the previous 3 months, on average.

d. For operations that used renderer pickup, average number of times during the previous 3 months carcasses had been picked up by a renderer:

| Average | Standard Error |
|---|---|
| 4.5 | (0.9) |

**8. Manure disposal**

Litter or manure remained on the property on more than half of small operations, while the majority of large operations hauled litter or manure off the property at least once per year.

a. Percentage of operations by frequency that poultry litter or poultry manure was hauled off the property, and by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|---|
| **Frequency** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Litter or manure remains in house or is spread or stored on property | 52.9 | (2.6) | 31.9 | (1.7) | 38.5 | (1.4) |
| Litter or manure hauled off at least once per month | 5.6 | (1.2) | 4.6 | (0.7) | 4.9 | (0.6) |
| Litter or manure hauled off at least once per year | 39.0 | (2.5) | 60.3 | (1.7) | 53.6 | (1.4) |
| Litter or manure hauled off at least once every 2 years | 2.1 | (0.8) | 1.7 | (0.5) | 1.8 | (0.4) |
| Litter or manure hauled off at least once every 3 or more years | 0.4 | (0.2) | 1.5 | (0.4) | 1.2 | (0.3) |
| Total | 100.0 | | 100.0 | | 100.0 | |

Operations seldom spread litter from another poultry operation on their fields.

b. Percentage of operations that spread litter from another poultry operation on their fields during the previous 12 months, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 8.3 | (1.5) | 4.8 | (0.8) | 5.9 | (0.7) |

Operations that spread litter from another poultry operation on their fields did so 1.5 times per year, on average.

c. For operations that spread litter from other poultry farms on their fields, average number of times litter was spread during the previous 12 months, and average distance from the source farm:

| Average Number of Times | Std. Error | Average Distance (Miles) | Std. Error |
|---|---|---|---|
| 1.5 | (0.1) | 5.2 | (0.8) |

**9. Bird observation**

Birds were observed on nearly all operations 7 days per week by someone who would recognize a bird health problem.

Percentage of operations by number of days per week birds were observed by someone (including the operator) who would notice a health problem, and by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | Flock Size (Number of Chickens) | | | | | |
| | Small (1,000-9,999) | | Large (10,000-19,999) | | All Operations | |
| Number Days per Week | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| 0 | 1.7 | (0.7) | 0.8 | (0.3) | 1.1 | (0.3) |
| 1 to 6 | 3.9 | (1.0) | 4.2 | (0.7) | 4.1 | (0.6) |
| 7 | 94.4 | (1.2) | 95.0 | (0.8) | 94.8 | (0.7) |
| Total | 100.0 | | 100.0 | | 100.0 | |

## C. Biosecurity

### 1. Worker contact with birds

Very few operations had personnel that worked on another operation with live or dead birds or that had pet birds or poultry at home.

a. Percentage of operations in which any paid or unpaid workers (including operator and family members) had the following types of bird contact, by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Type of Contact** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Work on other operations or for another business that handles live or dead birds | 4.9 | (1.1) | 2.9 | (0.6) | 3.6 | (0.6) |
| Have pet birds or poultry at home | 3.7 | (0.9) | 1.1 | (0.4) | 1.9 | (0.4) |

For operations in which workers had contact with birds at another business or at home, about two workers on average had this type of contact.

b. For operations in which paid or unpaid workers had the following types of bird contact, average number of workers per operation, by type of contact:

| **Type of Contact** | **Average (Number Workers)** | **Standard Error** |
|---|---|---|
| Work on other operations or for another business that handles live or dead birds | 2.3 | (0.3) |
| Have pet birds or poultry at home | 1.7 | (0.2) |

Workers from about one-third of operations (35.7 percent) visited a feed mill or feed store during the previous year. Less than 2 percent of operations reported worker visits to live-bird markets or rendering facilities.

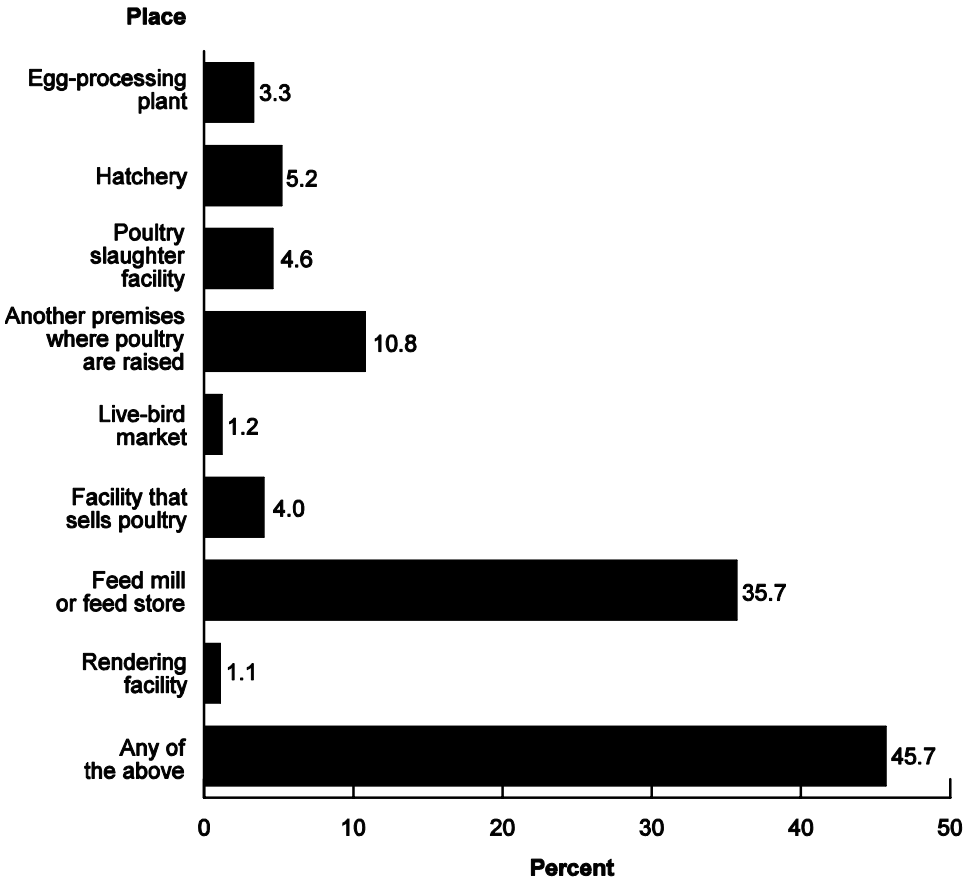
c. Percentage of operations in which any paid or unpaid workers (including operator and family members) visited the following types of places during the previous 12 months, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| | **Small** (1,000-9,999) | | **Large** (10,000-19,999**)** | | **All Operations** | |
|---|---|---|---|---|---|---|
| **Place** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Egg processing plant | 4.4 | (1.2) | 2.7 | (0.5) | 3.3 | (0.5) |
| Hatchery | 7.2 | (1.4) | 4.3 | (0.7) | 5.2 | (0.6) |
| Poultry slaughter facility | 9.0 | (1.3) | 2.5 | (0.6) | 4.6 | (0.6) |
| Another premises where poultry are raised | 14.7 | (1.8) | 9.0 | (1.0) | 10.8 | (0.9) |
| Live-bird market | 2.7 | (0.8) | 0.5 | (0.3) | 1.2 | (0.3) |
| Facility that sells poultry (e.g., auction, flea market, swap meet) | 7.5 | (1.4) | 2.4 | (0.6) | 4.0 | (0.6) |
| Feed mill or feed store | 42.2 | (2.6) | 32.6 | (1.7) | 35.7 | (1.4) |
| Rendering facility | 1.5 | (0.7) | 1.0 | (0.3) | 1.1 | (0.3) |
| Any of the above | 54.5 | (2.6) | 41.6 | (1.8) | 45.7 | (1.4) |

**Percentage of Operations in Which Any Paid or Unpaid Workers (Including Operator and Family Members) Visited the Following Types of Places During the Previous 12 Months**



Less than 1 percent of operations in the Southeast region had any workers visit a live-bird market or rendering facility (0.2 percent and 0.6 percent, respectively).

d. Percentage of operations in which any paid or unpaid workers (including operator and family members) visited the following types of places during the previous year, by region:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | Region | | | | | |
| | West | | Northeast | | Southeast | |
| Place | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Egg processing plant | 9.2 | (2.6) | 5.2 | (1.1) | 1.0 | (0.4) |
| Hatchery | 7.1 | (2.4) | 8.5 | (1.4) | 2.8 | (0.6) |
| Poultry slaughter facility | 7.2 | (2.5) | 7.7 | (1.2) | 2.2 | (0.5) |
| Another premises where poultry are raised | 10.4 | (2.6) | 16.9 | (1.9) | 7.1 | (1.0) |
| Live-bird market | 6.3 | (2.5) | 1.4 | (0.5) | 0.2 | (0.1) |
| Facility that sells poultry (e.g., auction, flea market, swap meet) | 4.5 | (1.9) | 6.6 | (1.3) | 2.4 | (0.6) |
| Feed mill or feed store | 45.6 | (5.2) | 37.5 | (2.5) | 32.8 | (1.8) |
| Rendering facility | 2.2 | (1.4) | 1.8 | (0.7) | 0.6 | (0.3) |
| Any of the above | 61.6 | (4.4) | 52.7 | (2.5) | 38.5 | (1.9) |

A smaller percentage of contract operations than independent (noncontract) operations had worker visits to any of the specified types of facilities, except renderer.

e. Percentage of operations in which any paid or unpaid workers (including operator and family members) visited the following types of places during the previous year, by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| Method | Percent | Standard Error | Percent | Standard Error |
| Egg processing plant | 1.9 | (0.4) | 8.9 | (1.9) |
| Hatchery | 3.8 | (0.6) | 12.0 | (2.3) |
| Poultry slaughter facility | 2.5 | (0.5) | 14.6 | (2.2) |
| Another premises where poultry are raised | 8.8 | (0.9) | 20.5 | (2.7) |
| Live bird market | 0.6 | (0.3) | 4.2 | (1.2) |
| Facility that sells poultry (e.g., auction, flea market, swap meet) | 3.0 | (0.6) | 8.9 | (1.9) |
| Feed mill or feed store | 33.6 | (1.6) | 46.4 | (3.4) |
| Rendering facility | 1.1 | (0.4) | 1.3 | (0.7) |
| Any of the above | 41.3 | (1.6) | 66.2 | (3.2) |

Feed mills or feed stores were visited approximately two times per month on average (24.3 times/year) and were located an average of 14.6 miles from the operation. Although egg processing plants had the highest average number of visits per year, there was substantial variability in the number of visits that operations made to plants.

f. For operations in which employees visited the following places, average number of times per year visited and average distance traveled one way:

| | **Average Number of Times/Year** | | **Average Distance Traveled** (Miles) | |
|---|---|---|---|---|
| **Place** | **Average** | **Std. Error** | **Average** | **Std. Error** |
| Egg processing plant | 41.3 | (16.9) | 66.6 | (18.0) |
| Hatchery | 13.7 | (4.2) | 70.5 | (19.2) |
| Poultry slaughter facility | 28.9 | (10.6) | 44.4 | (8.1) |
| Another premises where poultry are raised | 25.5 | (6.1) | 35.0 | (8.6) |
| Live-bird market | 13.0 | (5.4) | 45.5 | (8.6) |
| Facility that sells poultry (e.g., auction, flea market, swap meet) | 6.6 | (1.4) | 44.1 | (9.6) |
| Feed mill or feed store | 24.3 | (2.2) | 14.6 | (1.1) |
| Rendering facility | 11.7 | (3.8) | 15.8 | (3.7) |

**2. Worker requirements**

Over half of operations always required workers entering the bird area to use clean boots or shoe covers, footbaths, or wash their hands after handling birds (54.8, 56.3, and 69.7 percent of operations, respectively). Three-fourths of operations (74.8 percent) always required some type of footwear precaution. Use of footbaths and scrubbing boots are not considered as effective as clean boots and shoe covers.

a. Percentage of operations by frequency that the following biosecurity practices were required for workers (including the flock owner) entering the bird production area:

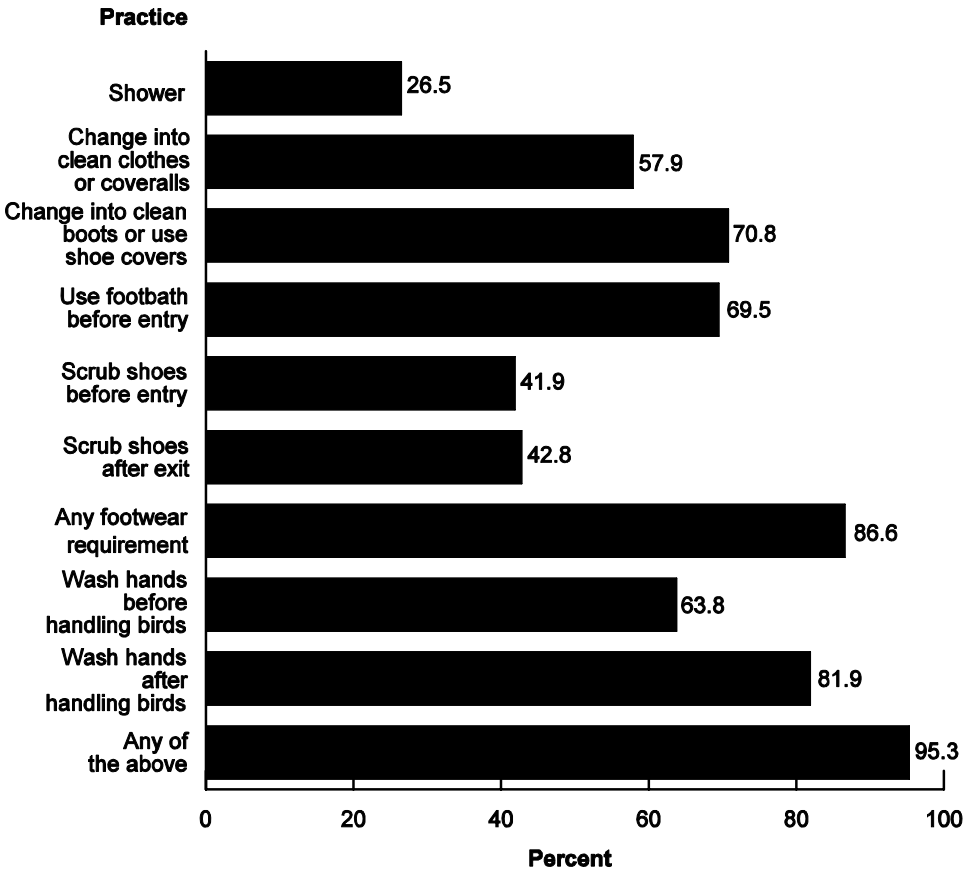
| | Percent Operations | | | | | | |
|---|---|---|---|---|---|---|---|
| | Frequency | | | | | | |
| | Always | | Sometimes | | Never | | |
| Practice | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Total |
| Shower | 15.1 | (1.1) | 11.4 | (1.0) | 73.5 | (1.3) | 100.0 |
| Change into clean clothes or coveralls | 41.2 | (1.4) | 16.7 | (1.1) | 42.1 | (1.4) | 100.0 |
| Change into clean boots or use shoe covers | 54.8 | (1.4) | 16.0 | (1.1) | 29.2 | (1.3) | 100.0 |
| Use footbath before entry | 56.3 | (1.4) | 13.2 | (1.0) | 30.5 | (1.3) | 100.0 |
| Scrub shoes before entry | 25.9 | (1.3) | 16.0 | (1.1) | 58.1 | (1.5) | 100.0 |
| Scrub shoes after exit | 26.2 | (1.3) | 16.6 | (1.1) | 57.2 | (1.5) | 100.0 |
| Any footwear requirement | 74.8 | (1.2) | 11.8 | (0.9) | 13.4 | (1.0) | 100.0 |
| Wash hands before handling birds | 47.6 | (1.5) | 16.2 | (1.1) | 36.2 | (1.4) | 100.0 |
| Wash hands after handling birds | 69.7 | (1.3) | 12.2 | (1.0) | 18.1 | (1.1) | 100.0 |

In general, large operations were slightly more likely than small operations to have the specified worker biosecurity requirements.

b. Percentage of operations in which the following biosecurity practices were always or sometimes required for workers (including the flock owner) entering the bird production area, by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Practice** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Shower | 20.4 | (2.1) | 29.3 | (1.6) | 26.5 | (1.3) |
| Change into clean clothes or coveralls | 50.4 | (2.6) | 61.4 | (1.7) | 57.9 | (1.4) |
| Change into clean boots or use shoe covers | 65.3 | (2.4) | 73.4 | (1.6) | 70.8 | (1.3) |
| Use footbath before entry | 54.6 | (2.5) | 76.5 | (1.5) | 69.5 | (1.3) |
| Scrub shoes before entry | 40.5 | (2.6) | 42.5 | (1.8) | 41.9 | (1.5) |
| Scrub shoes after exit | 40.1 | (2.6) | 44.2 | (1.8) | 42.8 | (1.5) |
| Any footwear requirement | 75.7 | (2.1) | 91.7 | (1.0) | 86.6 | (1.0) |
| Wash hands before handling birds | 59.6 | (2.6) | 65.8 | (1.7) | 63.8 | (1.4) |
| Wash hands after handling birds | 78.1 | (2.2) | 83.7 | (1.3) | 81.9 | (1.1) |
| Any of the above | 90.6 | (1.5) | 97.6 | (0.6) | 95.3 | (0.6) |

**Percentage of Operations in Which Following Biosecurity Practices Were Always or Sometimes Required for Workers (Including the Flock Owner) Entering the Bird Production Area**



In general, a higher percentage of contract operations required the specified worker biosecurity practices compared with noncontract operations.

c. Percentage of operations in which the following biosecurity practices were always or sometimes required for workers (including the flock owner) entering the bird area, by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| Practice | Percent | Standard Error | Percent | Standard Error |
| Shower | 28.6 | (1.5) | 16.8 | (2.6) |
| Change into clean clothes or coveralls | 62.6 | (1.6) | 36.4 | (3.2) |
| Change into clean boots or use shoe covers | 75.3 | (1.4) | 49.4 | (3.4) |
| Use footbath before entry | 77.6 | (1.3) | 31.0 | (3.2) |
| Scrub shoes before entry | 44.2 | (1.6) | 29.9 | (3.3) |
| Scrub shoes after exit | 45.0 | (1.6) | 31.8 | (3.2) |
| Any footwear requirement | 92.5 | (0.9) | 58.1 | (3.3) |
| Wash hands before handling birds | 65.3 | (1.6) | 57.2 | (3.4) |
| Wash hands after handling birds | 83.5 | (1.2) | 74.0 | (3.0) |
| Any of the above | 98.1 | (0.4) | 81.9 | (2.6) |

### 3. Visitors

The most common types of visitors were service persons employed by the poultry company, catch crew, and feed delivery personnel (79.8, 77.3, and 83.7 percent of operations respectively). These types of visitors were more common on large operations than small operations. A higher percentage of small operations had customer and nonbusiness visitors compared with large operations.

a. Percentage of operations that had the following types of visitors during the previous 12 months, by flock size:

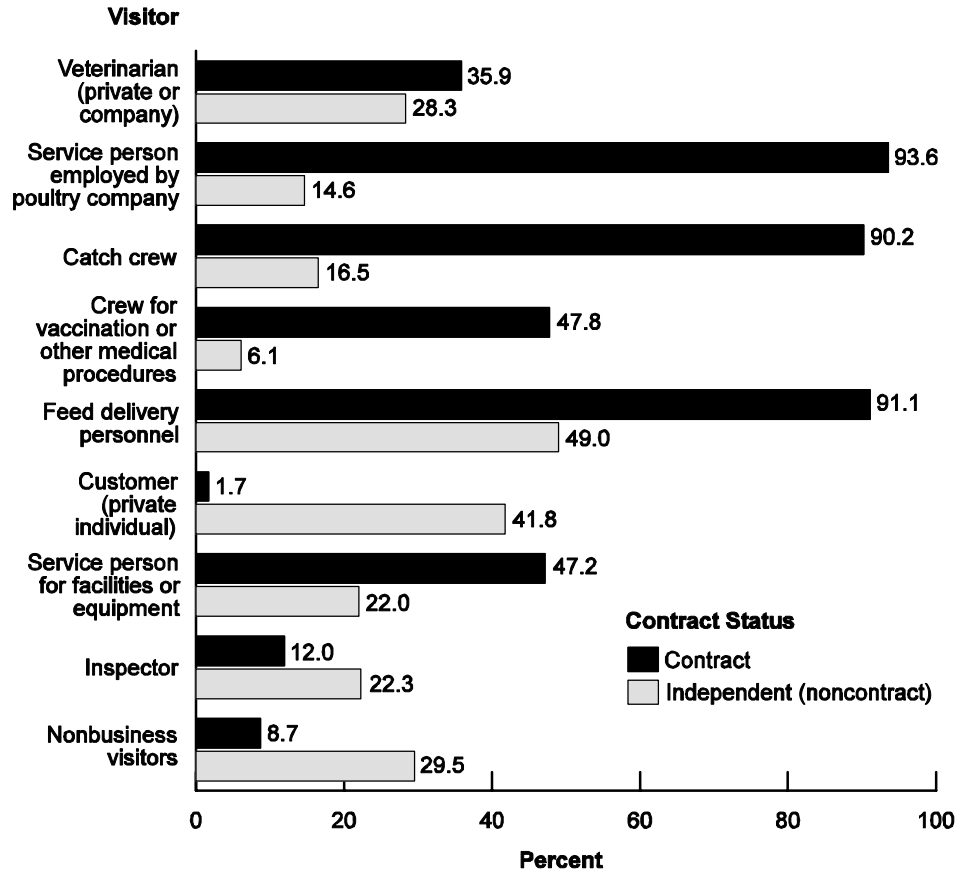
| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Visitor** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Veterinarian (private or company) | 31.1 | (2.4) | 36.1 | (1.7) | 34.5 | (1.4) |
| Service person employed by poultry company | 52.6 | (2.4) | 92.3 | (1.0) | 79.8 | (1.0) |
| Catch crew | 49.5 | (2.5) | 90.1 | (1.1) | 77.3 | (1.1) |
| Crew for vaccination or other medical procedures | 27.3 | (2.4) | 46.5 | (1.8) | 40.4 | (1.4) |
| State or Federal veterinarian or animal-health worker | 15.1 | (1.8) | 12.4 | (1.1) | 13.2 | (0.9) |
| University veterinarian or cooperative extension agent | 4.5 | (1.0) | 4.6 | (0.7) | 4.5 | (0.6) |
| Feed delivery personnel | 66.4 | (2.4) | 91.6 | (1.0) | 83.7 | (1.1) |
| Nutritionist or feed company representative | 10.5 | (1.6) | 8.3 | (1.0) | 9.0 | (0.9) |
| Customer (private individual) | 21.4 | (2.0) | 2.8 | (0.6) | 8.6 | (0.8) |
| Bird wholesaler, buyer, or dealer (including live-bird market owner) | 5.7 | (1.2) | 2.4 | (0.5) | 3.4 | (0.5) |
| Service person for facilities or equipment (e.g., meter reader, plumber, electrician, etc.) | 30.8 | (2.4) | 48.2 | (1.8) | 42.8 | (1.4) |
| Inspector (e.g., county health inspector or official to certify birds as organic) | 15.8 | (2.0) | 13.1 | (1.2) | 13.9 | (1.0) |
| Other people visiting for business purposes | 7.5 | (1.4) | 7.4 | (1.0) | 7.4 | (0.8) |
| Nonbusiness visitors (e.g., school groups, friends, or neighbors just coming by to see the birds) | 21.6 | (2.1) | 8.0 | (1.0) | 12.3 | (0.9) |

A higher percentage of contract operations had service persons, catch crews, vaccination crews, and feed delivery visits, compared with independent (noncontract) operations. More than 4 of 10 noncontract operations (41.8 percent) had customer visits compared with 1.7 percent of contract operations.

b. Percentage of operations that had the following types of visitors during the previous 12 months, by contract status:

| | Percent Operations | | | |
|---|---|---|---|---|
| | Contract Status | | | |
| | Contract | | Independent (Noncontract) | |
| Visitor | Percent | Standard Error | Percent | Standard Error |
| Veterinarian (private or company) | 35.9 | (1.6) | 28.3 | (3.0) |
| Service person employed by poultry company | 93.6 | (0.8) | 14.6 | (2.4) |
| Catch crew | 90.2 | (1.0) | 16.5 | (2.6) |
| Crew for vaccination or other medical procedures | 47.8 | (1.6) | 6.1 | (1.6) |
| State or Ffederal veterinarian or animal-health worker | 12.6 | (1.0) | 16.3 | (2.4) |
| University veterinarian or cooperative extension agent | 4.0 | (0.6) | 7.2 | (1.6) |
| Feed delivery personnel | 91.1 | (0.9) | 49.0 | (3.4) |
| Nutritionist or feed company representative | 7.1 | (0.9) | 18.0 | (2.6) |
| Customer (private individual) | 1.7 | (0.5) | 41.8 | (3.4) |
| Bird wholesaler, buyer, or dealer (including live-bird market owner) | 2.3 | (0.5) | 9.1 | (1.9) |
| Service person for facilities or equipment (e.g., meter reader, plumber, electrician, etc.) | 47.2 | (1.6) | 22.0 | (2.8) |
| Inspector (e.g., county health inspector or official to certify birds as organic) | 12.0 | (1.1) | 22.3 | (3.0) |
| Other people visiting for business purposes | 6.7 | (0.8) | 10.8 | (2.1) |
| Nonbusiness visitors (e.g., school groups, friends, or neighbors just coming by to see the birds) | 8.7 | (0.9) | 29.5 | (3.0) |

**Percentage of Operations that had the Following Types of Visitors During the Previous 12 Months, by Contract Status**



On operations that had the specified visitors, service persons employed by the poultry company, feed delivery personnel, and customers each visited operations more than 45 times per year, on average.
Note: Although the average number of veterinarian visits was 6.5, two-thirds of operations with veterinarian visits had only 1 or 2 visits, and 2.5 percent had 50 or more visits.

c. For operations that had the following types of visitors, average number of visits per year:

| Visitor | Average Number Visits | Standard Error |
|---|---|---|
| Veterinarian (private or company) | 6.5 | (0.8) |
| Service person employed by poultry company | 50.4 | (0.9) |
| Catch crew | 4.2 | (0.4) |
| Crew for vaccination or other medical procedures | 7.5 | (0.5) |
| State or Federal veterinarian or animal-health worker | 7.5 | (2.1) |
| University veterinarian or cooperative extension agent | 9.0 | (3.4) |
| Feed delivery personnel | 45.4 | (0.7) |
| Nutritionist or feed company representative | 15.6 | (2.3) |
| Customer (private individual) | 72.4 | (10.6) |
| Bird wholesaler, buyer, or dealer (including live-bird market owner) | 11.7 | (5.6) |
| Service person for facilities or equipment (e.g., meter reader, plumber, electrician, etc.) | 11.1 | (0.7) |
| Inspector (e.g., county health inspector or official to certify birds as organic) | 3.6 | (0.6) |
| Other people visiting for business purposes | 14.3 | (3.2) |
| Nonbusiness visitors (e.g., school groups, friends, or neighbors just coming by to see the birds) | 15.6 | (2.7) |

The majority of operations had some type of visitor enter the bird production area. Over 90 percent of large operations had visits from service persons employed by the poultry company and catch crews (table C.3a), which would necessitate entering the bird production area.

d. Percentage of operations in which any of the visitor types listed in the previous table entered the bird production area, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 73.4 | (2.2) | 93.3 | (0.9) | 87.0 | (0.9) |

Courtesy of USDA photo library

For operations in which visitors entered the bird production area, over 45 percent of operations always required these visitors to change clothing, change boots or use shoe covers, use footbaths, wash hands after handling birds, or park away from the bird area.

e. For operations that allowed visitors in the bird production area, percentage of operations by frequency of biosecurity practices required for visitors:

| | Percent Operations | | | | | | |
|---|---|---|---|---|---|---|---|
| | Frequency | | | | | | |
| | Always | | Sometimes | | Never | | |
| Practice | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Total |
| Change into clean clothes or coveralls | 46.8 | (1.6) | 7.9 | (0.9) | 45.3 | (1.6) | 100.0 |
| Change into clean boots or use shoe covers | 54.7 | (1.6) | 7.7 | (0.8) | 37.6 | (1.5) | 100.0 |
| Use footbath before entry | 47.1 | (1.6) | 7.7 | (0.8) | 45.2 | (1.6) | 100.0 |
| Scrub shoes before entry | 26.0 | (1.4) | 10.7 | (1.0) | 63.3 | (1.5) | 100.0 |
| Scrub shoes after exit | 26.7 | (1.4) | 9.9 | (1.0) | 63.4 | (1.5) | 100.0 |
| Any footwear requirement | 63.5 | (1.5) | 5.7 | (0.7) | 30.8 | (1.5) | 100.0 |
| Wash hands before handling birds | 38.2 | (1.5) | 10.6 | (1.0) | 51.2 | (1.6) | 100.0 |
| Wash hands after handling birds | 45.8 | (1.6) | 9.5 | (1.0) | 44.7 | (1.6) | 100.0 |
| No contact with other birds at least 24 hr before entering | 26.6 | (1.4) | 11.3 | (1.0) | 62.1 | (1.6) | 100.0 |
| Park away from bird area | 45.1 | (1.6) | 10.6 | (1.0) | 44.3 | (1.6) | 100.0 |

Overall, biosecurity requirements for visitors were similar for large and small operations.

f. For operations that allowed visitors in the bird production area, percentage of operations in which the following biosecurity practices were always or sometimes required for visitors, by flock size:

**Percent Operations**

**Flock Size** (Number of Chickens)

| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
|---|---|---|---|---|---|---|
| **Practice** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| Change into clean clothes or coveralls | 52.3 | (3.1) | 55.5 | (1.8) | 54.7 | (1.6) |
| Change into clean boots or use shoe covers | 58.7 | (3.0) | 63.7 | (1.8) | 62.4 | (1.5) |
| Use footbath before entry | 46.8 | (3.1) | 57.8 | (1.8) | 54.8 | (1.6) |
| Scrub shoes before entry | 37.2 | (3.0) | 36.5 | (1.8) | 36.7 | (1.5) |
| Scrub shoes after exit | 36.9 | (3.0) | 36.5 | (1.8) | 36.6 | (1.5) |
| Any footwear requirement | 64.2 | (2.9) | 71.1 | (1.7) | 69.2 | (1.5) |
| Wash hands before handling birds | 47.7 | (3.1) | 49.2 | (1.9) | 48.8 | (1.6) |
| Wash hands after handling birds | 54.3 | (3.1) | 55.6 | (1.8) | 55.3 | (1.6) |
| No contact with other birds at least 24 hr before entering | 37.0 | (3.1) | 38.3 | (1.8) | 37.9 | (1.6) |
| Park away from bird area | 57.1 | (3.1) | 55.2 | (1.8) | 55.7 | (1.6) |
| Any of the above | 78.0 | (2.5) | 82.7 | (1.4) | 81.5 | (1.2) |

The percentage of contract operations that required visitors to use a footbath was nearly twice that of noncontract operations (57.7 and 30.5 percent, respectively).

g. For operations that allowed visitors in the bird production area, percentage of operations in which the following biosecurity practices were always or sometimes required for visitors, by contract status:

**Percent Operations**

**Contract Status**

| Practice | Contract | | Independent (Noncontract) | |
|---|---|---|---|---|
| | Percent | Standard Error | Percent | Standard Error |
| Change into clean clothes or coveralls | 56.3 | (1.7) | 41.4 | (4.6) |
| Change into clean boots or use shoe covers | 63.3 | (1.6) | 54.4 | (4.4) |
| Use footbath before entry | 57.7 | (1.7) | 30.5 | (4.4) |
| Scrub shoes before entry | 37.4 | (1.6) | 30.2 | (4.5) |
| Scrub shoes after exit | 36.9 | (1.6) | 33.6 | (4.5) |
| Any footwear requirement | 70.7 | (1.5) | 57.5 | (4.4) |
| Wash hands before handling birds | 48.8 | (1.7) | 49.5 | (4.7) |
| Wash hands after handling birds | 55.0 | (1.7) | 56.4 | (4.7) |
| No contact with other birds at least 24 hr before entering | 37.9 | (1.7) | 39.5 | (4.7) |
| Park away from bird area | 55.2 | (1.7) | 58.0 | (4.6) |
| Any of the above | 81.9 | (1.3) | 77.2 | (3.6) |

**4. Shared equipment**

Sharing equipment from one poultry operation with another was not a common practice.

a. Percentage of operations that shared equipment (including equipment loaned, borrowed, or co-owned) with another poultry operation during the previous 12 months, by flock size:

| Percent Operations | | | | | |
|---|---|---|---|---|---|
| **Flock Size** (Number of Chickens) | | | | | |
| **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 7.9 | (1.4) | 15.8 | (1.3) | 13.3 | (1.0) |

For operations that shared equipment, the majority of operations (57.9 percent) did so only once during the previous year, while 13.9 percent did so five or more times.

b. For operations that shared equipment (including equipment loaned, borrowed, or co-owned) with another poultry operation during the previous 12 months, percentage of operations by number of times equipment was shared and by flock size:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | **Flock Size** (Number of Chickens) | | | | | |
| | **Small** (1,000-9,999) | | **Large** (10,000-19,999) | | **All Operations** | |
| **Times** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** | **Pct.** | **Std. Error** |
| 1 | 64.5 | (9.6) | 56.6 | (4.5) | 57.9 | (4.1) |
| 2 to 4 | 29.9 | (9.2) | 27.8 | (4.1) | 28.2 | (3.8) |
| 5 or more | 5.6 | (3.9) | 15.6 | (3.2) | 13.9 | (2.8) |
| Total | 100.0 | | 100.0 | | 100.0 | |

**5. Contact with other animals**

Rodents or evidence of rodents were observed in the bird production area at least sometimes on three-fourths of operations (73.9 percent).

a. Percentage of operations by frequency that the following type of animals—or evidence thereof—were seen in the bird production area:

| | Percent Operations | | | | | | |
|---|---|---|---|---|---|---|---|
| | Frequency | | | | | | |
| | Usually | | Sometimes | | Never | | |
| Animal Type | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Total |
| Wild waterfowl | 0.7 | (0.2) | 6.6 | (0.7) | 92.7 | (0.8) | 100.0 |
| Wild birds other than waterfowl | 4.0 | (0.6) | 18.7 | (1.2) | 77.3 | (1.2) | 100.0 |
| Rodents | 7.3 | (0.8) | 66.6 | (1.4) | 26.1 | (1.3) | 100.0 |
| Wild animals other than rodents (e.g., feral cats, raccoons, skunks, opossums) | 1.9 | (0.4) | 24.2 | (1.2) | 73.9 | (1.3) | 100.0 |
| Poultry from a neighbor | 0.0 | (--) | 0.8 | (0.2) | 99.2 | (0.2) | 100.0 |

Courtesy of USDA photo library

About half the operations in which poultry had outdoor access reported evidence of wild birds other than waterfowl and evidence of wild animals in the bird production area.

b. Percentage of operations in which the following types of animals—or evidence thereof— were usually or sometimes seen in the bird production area, by presence of any poultry with outdoor access:

| | Percent Operations | | | | | |
|---|---|---|---|---|---|---|
| | Any Poultry* with Outdoor Access | | | | | |
| | Yes | | No | | All Operations | |
| Animal Type | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Wild waterfowl | 13.2 | (2.9) | 6.5 | (0.8) | 7.3 | (0.8) |
| Wild birds other than waterfowl | 45.8 | (4.1) | 19.4 | (1.3) | 22.7 | (1.2) |
| Rodents | 67.2 | (3.9) | 74.9 | (1.4) | 73.9 | (1.3) |
| Wild animals other than rodents (e.g., feral cats, raccoons, skunks, opossums) | 51.3 | (4.1) | 22.5 | (1.3) | 26.1 | (1.3) |
| Poultry from a neighbor | 0.0 | (--) | 0.9 | (0.3) | 0.8 | (0.2) |

*Including gamebirds

Wild birds and animals, or evidence thereof, were less commonly observed in the feed storage area than in the bird production area (table C5a).

c. Percentage of operations by frequency that the following types of animals—or evidence thereof— were seen in the feed storage area:

| | Percent Operations | | | | | | |
|---|---|---|---|---|---|---|---|
| | Frequency | | | | | | |
| | Usually | | Sometimes | | Never | | |
| Animal Type | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Total |
| Wild waterfowl | 0.2 | (0.1) | 1.2 | (0.3) | 98.6 | (0.3) | 100.0 |
| Wild birds other than waterfowl | 1.2 | (0.3) | 12.5 | (1.0) | 86.3 | (1.0) | 100.0 |
| Rodents | 2.5 | (0.5) | 43.9 | (1.5) | 53.6 | (1.5) | 100.0 |
| Wild animals other than rodents (e.g., feral cats, raccoons, skunks, opossums) | 0.2 | (0.1) | 11.6 | (1.0) | 88.2 | (1.0) | 100.0 |
| Poultry from a neighbor | 0.0 | (--) | 0.1 | (0.1) | 99.9 | (0.1) | 100.0 |

**6. Water on property**

Nearly two-thirds of operations (63.5 percent) had a pond, lake, or stream on the property.

a. Percentage of operations with a pond, lake, or stream on the property, by flock size:

| Percent Operations | | | | | |
|---|---|---|---|---|---|
| **Flock Size** (Number of Chickens) | | | | | |
| Small (1,000-9,999) | | Large (10,000-19,999) | | All Operations | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| 55.3 | (2.6) | 67.2 | (1.7) | 63.5 | (1.4) |

Over half of operations in each region had a pond, lake, or stream on the property.

b. Percentage of operations with a pond, lake, or stream on the property, by region:

| Percent Operations | | | | | |
|---|---|---|---|---|---|
| Region | | | | | |
| West | | Northeast | | Southeast | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| 62.6 | (4.1) | 55.5 | (2.5) | 68.7 | (1.8) |

The percentage of operations with a pond, lake, or stream on the property was similar for operations with and without outdoor access for poultry.

c. Percentage of operations with a pond, lake, or stream on the property, by presence of any birds with outdoor access:

| Percent Operations | | | |
|---|---|---|---|
| Any Poultry* with Outdoor Access | | | |
| Yes | | No | |
| Percent | Standard Error | Percent | Standard Error |
| 57.9 | (4.0) | 64.2 | (1.5) |

*Including gamebirds

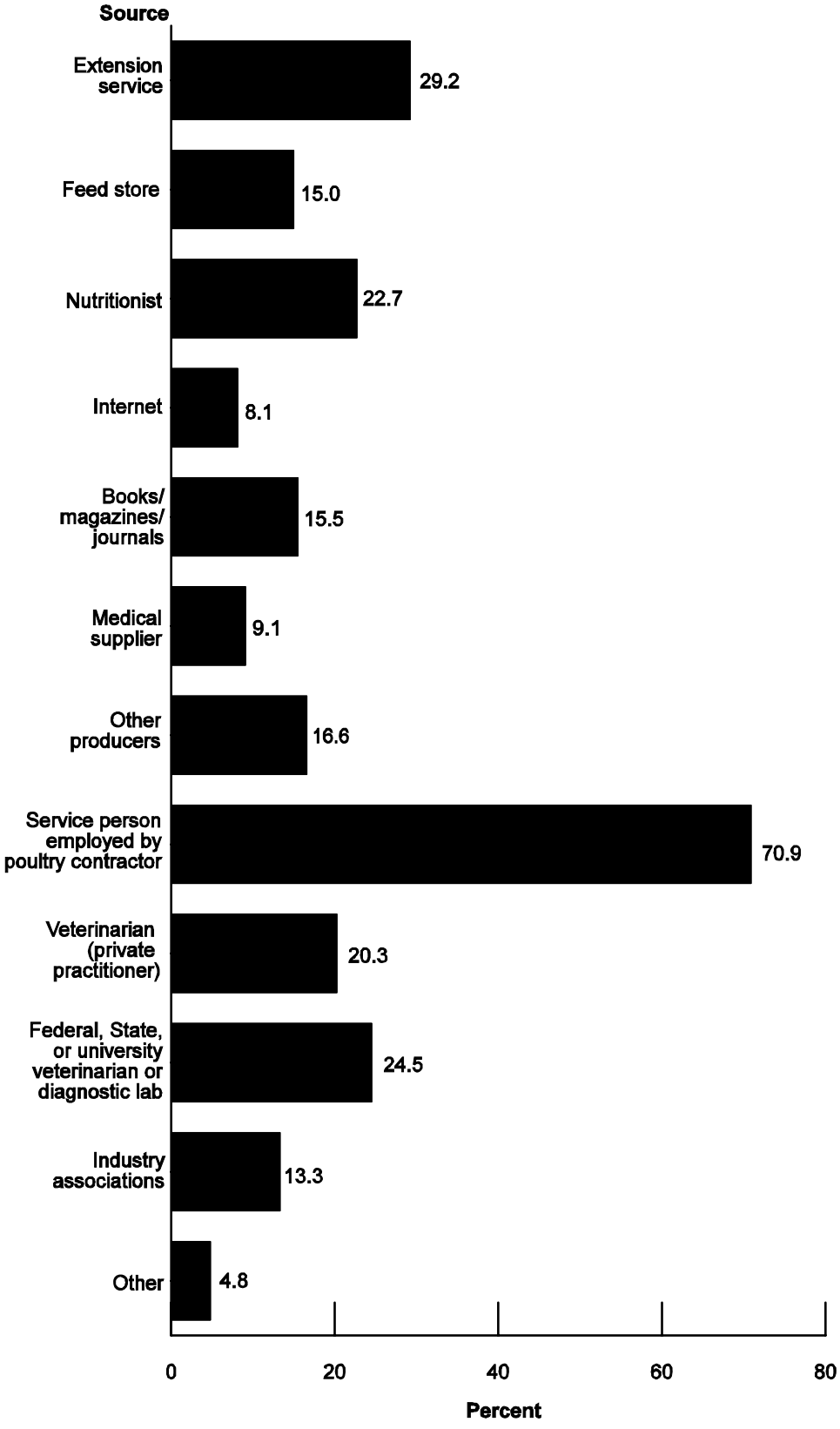
## D. Information Sources

The most important source for bird health information was a service person employed by a poultry contractor (70.9 percent of operations).

Percentage of operations by importance of the following bird health information sources:

| | Percent Operations | | | | | | |
|---|---|---|---|---|---|---|---|
| | Importance | | | | | | |
| | Very Important | | Somewhat Important | | Not Important | | |
| Source | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Total |
| Extension service | 29.2 | (1.3) | 30.6 | (1.4) | 40.2 | (1.5) | 100.0 |
| Feed store | 15.0 | (1.0) | 19.3 | (1.2) | 65.7 | (1.4) | 100.0 |
| Nutritionist | 22.7 | (1.2) | 23.9 | (1.3) | 53.4 | (1.5) | 100.0 |
| Internet | 8.1 | (0.8) | 20.6 | (1.2) | 71.3 | (1.3) | 100.0 |
| Books/magazines/journals | 15.5 | (1.1) | 37.6 | (1.4) | 46.9 | (1.5) | 100.0 |
| Medical supplier/salesperson | 9.1 | (0.8) | 20.2 | (1.2) | 70.7 | (1.3) | 100.0 |
| Other producers | 16.6 | (1.1) | 34.4 | (1.4) | 49.0 | (1.5) | 100.0 |
| Service person employed by a poultry contractor | 70.9 | (1.2) | 9.4 | (0.9) | 19.7 | (1.1) | 100.0 |
| Veterinarian (private practitioner) | 20.3 | (1.2) | 19.4 | (1.2) | 60.3 | (1.4) | 100.0 |
| Federal, State, or university veterinarian or diagnostic lab | 24.5 | (1.3) | 24.5 | (1.3) | 51.0 | (1.5) | 100.0 |
| Industry associations or organizations | 13.3 | (1.0) | 25.4 | (1.3) | 61.3 | (1.4) | 100.0 |
| Other | 4.8 | (0.6) | 19.0 | (1.2) | 76.2 | (1.3) | 100.0 |

**Percentage of Operations that Considered the Following Bird Health Information Sources Very Important**



## E. Conclusions

The NAHMS Small Enterprise Chicken Study, 2007 provides insight into which types of operations comprise the small enterprise segment of the chicken industry, and provides information on the biosecurity and bird movement practices of these operations.

The study targeted operations in the United States with 1,000 to 19,999 chickens, based on a sample selected from the NASS list frame. About two-thirds of these operations had chickens at some time between October 2006 and September 2007. Information was gathered regarding these operations' biosecurity and bird movement practices.

Over half of operations were contract operations with breeding birds, and one-fourth were contract operations without breeding birds. Only 17 percent of operations were independent (noncontract) operations.

Broiler breeder farms usually have from 8,000 to 12,000 chickens, and many farms have 1 to 2 houses. As a result, a large number of commercially contracted broiler breeder farms were probably captured in the study population, especially in the Southeast region. Contract broiler houses now generally have more than 18,000 to 20,000 birds each. Some have in excess of 30,000 birds each. Broiler farms with one to two houses are becoming rare. Most have at least three houses, so not many contract broiler farms were captured in this study. The same is true for commercial table-egg flocks, which have become very large operations, some with in excess of 2 million birds.

Many cases in which either the contract category, the large category, or the Southeast region were different from the other groups in the study may be due at least in part to this phenomenon of capturing a lot of contract breeders in these three categories. Breeder farms tend to have strict biosecurity requirements due to the value of the birds and the difficulty of replacing the birds if they are lost to a disease outbreak. Therefore, it is not surprising that in this study contract operations generally practiced better biosecurity than independent operations.

A higher percentage of contract operations required biosecurity measures such as showering, clean clothing, footwear precautions, and hand washing compared to independent operations.

A higher percentage of independent operations than contract operations allowed birds outdoor access. A higher percentage of operations with birds other than chickens allowed birds outdoor access compared to operations with chickens only. Birds on operations with outdoor access naturally had greater exposure to wild birds and other animals, posing disease introduction risks.

A higher percentage of contract operations had visits from service persons, catch crews, vaccination crews, and feed deliveries compared with independent operations, while a higher percentage of independent operations had customer and nonbusiness visitors.

Movement of birds to locations in which other birds were present (shows, fairs, etc.) was rare. Employee contact with birds off the operation (at home, etc.) was also rare.

While independent operations had more introductions of day-old chicks and hatchlings, contract operations had more introductions of older birds, which may be due in part to the introduction of spiking males on breeder farms. However, it should be noted that other than introduction of spiking males, breeder farms tend to practice all-in, all-out management.

A basic understanding of all segments of the poultry industry will help us to better prepare for potential disease outbreaks.

# Section II: Methodology

## A. Sampling and Estimation

### 1. Operation selection

The NASS list frame was used to select operations with 1,000 to 19,999 chickens. The control data—including inventory information— were primarily based upon data from the 2002 Census of Agriculture. The list was sorted by type of operation (layer or broiler) and flock size (1,000 to 9,999 and 10,000 to 19,999 chickens) within each State. A systematic random sample was selected, with the number of operations allocated to each State proportional to the number of operations in that State. All States were included in the sample.

### 2. Population inferences

Inferences cover the population of operations with 1,000 to 19,999 chickens in the United States. All respondent data were statistically weighted to reflect the population from which they were selected. The inverse of the probability of selection for each operation was the initial selection weight. This weight was adjusted by the sum of weights for all operations divided by the sum of weights for respondent operations (including those with no chickens from October 2006 through September 2007), within two-type, two-size, and seven-region strata.

## B. Data Collection

Questionnaires were mailed out in August 2007, followed 2 weeks later by a reminder survey to nonrespondents. Nonrespondents to both mailings were contacted by telephone in September 2007 and surveys were completed via telephone interview.

## C. Data Analysis

### 1. Validation and estimation

Data were entered into a SAS data set. Validation checks were performed to identify numeric extremes, improper categorical responses, skip patterns not followed, and relational checks. Weighted point estimates were generated using SUDAAN software, which accounts for the sampling design and weighting.

### 2. Response rate

Although very few operations refused participation (7.0 percent), nearly 20 percent of selected operations were inaccessible, indicating that the list for this population may be outdated.

| Response Category | Frequency | Percent |
|---|---|---|
| Completed – mail | 964 | 38.4 |
| Completed – telephone | 825 | 32.8 |
| Refusal | 175 | 7.0 |
| Inaccessible | 499 | 19.9 |
| Office hold (contact withheld) | 48 | 1.9 |
| Total | 2,511 | 100.0 |

# Appendix I: Sample Profile

## A. Responding Operations

### 1. Number of respondents by region

| Region | Number |
|---|---|
| West | 188 |
| Northeast | 584 |
| Southeast | 1,017 |
| Total | 1,789 |

### 2. Number of respondents by presence of chickens October 2007 through September 2008

| Presence of Chickens | Number |
|---|---|
| Yes | 1,191 |
| No | 598 |
| Total | 1,789 |

### 3. For operations with chickens, number of respondents by region

| Region | Number |
|---|---|
| West | 124 |
| Northeast | 407 |
| Southeast | 660 |
| Total | 1,191 |

### 4. For operations with chickens, number of respondents by flock size

| Flock Size | Number |
|---|---|
| Small (1,000-9,999) | 393 |
| Large (10,000-19,999) | 798 |
| Total | 1,191 |

**5. For operations with chickens, number of respondents by contract status**

| Contract Status | Number |
|---|---|
| Contract | 941 |
| Independent (noncontract) | 244 |
| Did not report | 6 |
| Total | 1,191 |

# Appendix II: Special Tabulation by NASS Based Upon the 2002 Census of Agriculture

**1. Number of farms and number of chickens on the farms, by region**

| | Region | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | West | | Northeast | | Southeast | | United States | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| **Broilers** | | | | | | | | |
| Farms | 7,979 | 21.0 | 14,817 | 39.1 | 15,141 | 39.9 | 37,937 | 100.0 |
| Chickens (millions) | 161 | 11.6 | 278 | 20.0 | 951 | 68.4 | 1,390 | 100.0 |
| Small Enterprise Farms* | 143 | 10.5 | 485 | 35.5 | 737 | 54.0 | 1,365 | 100.0 |
| Chickens on Small Enterprise Farms* (millions) | 1.1 | 7.1 | 4.4 | 28.4 | 10.0 | 64.5 | 15.5 | 100.0 |
| **Layers** | | | | | | | | |
| Farms | 36,322 | 36.9 | 45,085 | 45.9 | 16,908 | 17.2 | 98,315 | 100.0 |
| Chickens (millions) | 81 | 24.2 | 175 | 52.4 | 78 | 23.4 | 334 | 100.0 |
| Small Enterprise Farms* | 249 | 10.9 | 644 | 28.2 | 1,388 | 60.9 | 2,281 | 100.0 |
| Chickens on Small Enterprise Farms* (millions) | 2.5 | 9.6 | 5.9 | 22.6 | 17.7 | 67.8 | 26.1 | 100.0 |
| **Total (All Chickens)** | | | | | | | | |
| Farms | 39,046 | 32.4 | 51,473 | 42.7 | 30,072 | 24.9 | 120,591 | 100.0 |
| Chickens (millions) | 242 | 14.0 | 453 | 26.3 | 1,029 | 59.7 | 1,724 | 100.0 |
| Small Enterprise Farms* | 357 | 10.0 | 1,117 | 31.3 | 2096 | 58.7 | 3570 | 100.0 |
| Chickens on Small Enterprise Farms* (millions) | 3.6 | 8.7 | 10.1 | 24.6 | 27.4 | 66.7 | 41.1 | 100.0 |

*Farms with 1,000 to 19,999 chickens

**2. Small-enterprise farms as a percentage of all farms with chickens and percentage of chickens on small-enterprise farms, by type:**

**Percentage**

**Region**

| | West | | Northeast | | Southeast | | United States | |
|---|---|---|---|---|---|---|---|---|
| **Type** | **Farms** | **Chickens** | **Farms** | **Chickens** | **Farms** | **Chickens** | **Farms** | **Chickens** |
| Broilers | 1.8 | 0.7 | 3.3 | 1.6 | 4.9 | 1.1 | 3.6 | 1.1 |
| Layers | 0.7 | 3.1 | 1.4 | 3.4 | 8.2 | 22.7 | 2.3 | 7.8 |
| All Chickens | 0.9 | 1.5 | 2.2 | 2.2 | 7.0 | 2.7 | 3.0 | 2.4 |