B.   Collections of Information Employing Statistical Methods

1. Describe the potential respondent universe and any sampling or other respondent selection methods to be used.

The respondent universe will be all table egg farms in 19 States, registered with the Food and Drug Administration (FDA) in compliance with the FDA final rule regarding *Salmonella* Enteritidis prevention and control. Per this rule, all shell egg producers with 3,000 or more laying hens must be registered by July 9, 2012. Examination of the 2007 Census of Agriculture summary information (the last publication of all State-level farm and inventory information by size) shows that these 19 States account for 76 percent of table egg farms with 3,200 or more layers in the U.S.[1] and 87 percent of hens on farms with 30,000 or more hens in the U.S.[2] and 78 percent of table eggs produced[2] (Appendix A, pg 12).

Sampling from the population of producers with 3,000 or more hens will be stratified by size (3,000 – 29,999/30,000+) within each State in order to be consistent with the previous NAHMS study of operations with 30,000 or more layers, conducted in 1999 and to facilitate the analysis of trends.

2. Describe the procedures for the collection of information including:

Statistical methodology for stratification and sample selection:

▢ Stratification – A total of 19 States were selected for inclusion in the study based on resident populations of table egg producers and laying hens. The States were selected based upon each State's contribution to the U.S. total number of table egg operations and the number of laying hens.

Sampling methodology —1,344 farms will be selected from FDA's table egg farm list frame. The sample will be selected as a stratified random sample with the strata being both State and operation size. Operation size is based on total laying hen inventory on the FDA list frame. The State-level allocation will be based on a weighted proportion of the number of operations in the State and the laying hen inventory relative to the U.S. levels for table egg farms with 3,000 or more laying hens. The percentage of the 19 State total for the population of (3,000+) farms in the State will get a weight of 0.4 and the percentage of laying hens will get a weight of 0.6. The allocation will be adjusted to move some of the sample from States with a large amount of samples to other States with fewer samples. Within States the State-level sample will be allocated within size strata using the same strategy as for the State-level allocation.

a. Estimation procedures:
The sampling design is a stratified random sample with unequal probabilities of selection between strata. The statistical estimation will be undertaken using either SAS survey procedures or SUDAAN. Both software packages use a Taylor series expansion to estimate appropriate variances for the stratified, weighted data.

b. Degree of accuracy needed:
The study has been designed with a goal of 80 percent power, 95 percent confidence and a coefficient of variation less than 20 percent. With a total of 504 good

respondents (278 small operations and 226 large operations) APHIS can achieve proportion estimates of 50 percent ±5 percent, 20 percent ±4 percent, and 10 percent ±3 percent within each size group and 50 percent ±3 percent, 20 percent ±2 percent, and 10 percent ±1.5 percent overall, assuming no design effect. Minimal design effect is expected because any increase in variance due to unequal selection probabilities or clustering is expected to be offset by a reduction in variance due to stratification. Assuming a 60 percent response rate, a sample size of 840 operations will need to be selected.

   c. **Unusual problems requiring specialized sampling procedures and data collection cycles:**

- There are no unusual problems requiring specialized sampling procedures and data collection cycles.

3. Describe methods to maximize response rates and to deal with issues of non-responses:

Study Design:

- Many proven questions have been repeated from the previous NAHMS poultry study conducted in 1999.

- The study minimizes collection of data to that which is absolutely necessary to meet the stated objectives.

- The Poultry specialist for NAHMS has made numerous contacts and collaborative efforts to identify the information needs of the industry and the best way to ask for that information via questionnaire.

- A pre-survey letter will be sent along with an information sheet explaining the study. Upon personal contact by the data collector, the information sheet will again be presented to the personal interview selectee.

Contacting Respondents:

- A pre-survey letter and information sheet announcing the study will give respondents more information on the study and why participation is important.

- Producers will be called by the data collector 3 to 5 times followed by an on-farm visit before they are listed as refused or inaccessible.

- The APHIS designated data collector will set up a convenient time for the producer to complete the questionnaire.

- Data collectors will arrive at the premises at the mutually agreed upon time.

Data Collection Steps:

Data will be collected in a single in-person interview.

 Participating producers will be told they will get a copy of the summary reports for all collected data.

Data Analysis Steps:

If the respondents differ substantially from the non respondents there will be the potential for bias. If possible, non-response bias will be evaluated by use of auxillary information. The complex sampling design necessitates the use of weights which reflect the initial sample selection probabilities (the inverse of the selection interval). Weights of non respondents will be transferred to responding operations that are most similar, based on State and size strata. This data will be available from the FDA list frame. Within categories, the sum of weights of the respondents and non-respondents will be divided by only the sum of the weights of the respondents. This factor will be used to adjust the weights of the respondents within the category. All weights for non respondents will be set to zero.

1. *Describe any tests of procedures or methods to be undertaken.*

Initially, the questionnaire will receive extensive review by a wide variety of experts including researchers, extension, veterinarians/poultry health specialists and epidemiologists. The proposed questionnaire will be tested during the pretest phase involving less than 10 respondents. Results of these pretests will be utilized to refine the information collection in order to reduce respondent burden and improve the usefulness of the information.

2. *Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and /or analyze the information for the agency.*

The statistical aspects of the design were coordinated by Ms. Christine Kopral, Statistician, USDA: APHIS, Veterinary Services, CEAH, Fort Collins, CO, (970) 494-7125.

The contact person for data collection is:

- Dr. John Clifford, Deputy Administrator, USDA: APHIS, Veterinary Services, Washington, DC (202) 447-6835.

Analysis of the data will be accomplished by NAHMS veterinarians, epidemiologists, and statisticians under the direction of:

- Dr. Bruce Wagner, National Animal Health Monitoring System, USDA: APHIS, VS, CEAH, 2150 Centre Avenue, Building B MS2E7, Fort Collins, CO 80526-8117 (970) 494-7256.

Appendix A. U.S. Commercial Table Egg Operations

	U.S.	19 States	Percent
Farms with 3,200+ laying hens[1]	3986	3045	76
Table egg laying hen inventory on farms with 30,000+ laying hens (x 10^3), Dec. 2008[2]	279650	243688	87
Table egg production (x10^6), Nov. 2008[2]	6470	5032	78

[1] 2007 Census of Agriculture (includes table eggs and eggs for hatching)

[2] NASS Chickens and Eggs Report, Jan. 2009

1/30/2021