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(NASS)

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National Animal Health Monitoring System (NAHMS)

NAHMS Sheep 2024 Study General Sheep Management Questionnaire (GSMQ)

Interviewer's Manual

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Chapter 1 – General Information

BACKGROUND

The NAHMS Sheep 2024 study is jointly conducted by the National Agricultural Statistics Service (NASS) and the National Animal Health Monitoring System (NAHMS). NAHMS is an information-gathering and disseminating organization within the Animal and Plant Health Inspection Service (APHIS), an agency of the U.S. Department of Agriculture.

The purpose of the NAHMS program is to collect and analyze animal health and management data on U.S. livestock and poultry to provide scientifically sound and current information. The information is intended to benefit both livestock producers and the general public to facilitate efficient production, promote animal welfare, and help ensure a safe and high-quality food supply.

The NAHMS program is not designed to detect, regulate, or eradicate major epidemic diseases but rather to learn about management practices, the environment in which the animals are located, and exposure to infectious diseases to help inform research, education, and policy. The NAHMS program measures the occurrence of livestock diseases and public health concerns and reports the findings to stakeholders.

NAHMS began in 1983, with the first few years collecting animal health and economic data for various types of livestock through several State programs. Since 1989, surveys have been national in scope and have focused on hogs, dairy cattle, cow-calf operations, cattle-on-feed operations, equids, catfish, poultry, goats, and sheep. Most of these projects involved NASS State offices and National Association of State Departments of Agriculture (NASDA) field enumerators.

In 1996, NAHMS conducted its first sheep study. The NAHMS Sheep 2024 study will be the fourth study of the sheep industry.

PURPOSE OF THE NAHMS SHEEP 2024 STUDY

The NASS component of the NAHMS Sheep 2024 study focuses on sheep health and management practices used on sheep operations. It will allow us to evaluate sheep health and management practices relating to the control of infectious diseases and other management strategies. Background information, including sheep inventory, will allow us to evaluate the health and management of the U.S. sheep industry at the national and regional levels.

OBJECTIVES OF THE NAHMS SHEEP 2024 STUDY

- Describe management and biosecurity practices associated with, and producer-reported occurrence of, common economically important diseases in sheep.
- Describe antimicrobial stewardship on sheep operations and estimate the prevalence of enteric pathogens and antimicrobial resistance patterns.
- Describe management practices producers use to control internal parasites and reduce anthelmintic resistance.
- Describe changes in animal health, nutrition, and management practices in the U.S. sheep industry from 1996–2024.
- Provide a serologic and DNA bank for future research.

HOW NAHMS SHEEP STUDY INFORMATION IS USED

Information gathered in NAHMS studies is used to:

- Provide information to individual sheep producers to enhance sheep health and production.
- Help sheep producers and their private veterinarians identify health problems and take early action.
- Recommend changes in sheep-management practices that will reduce health problems.
- Identify specific healthcare studies and research projects that need to be conducted.
- Provide industry groups with baseline information regarding their industry on a national level.
- Allow small ruminant research funding agencies to understand potential priorities for further investigation of small ruminant health and management.
- Define healthcare areas that need more emphasis in veterinary and sheep owner education programs.
- Help scientists identify costly and concerning sheep health problems.
- Help drug companies decide which new products to develop.
- Assist government policymakers in decisions affecting the food-animal industry.
- Benefit consumers by facilitating more efficient production of quality meat, milk, fiber, and other products.

<p>Some of these points (especially the first two) may be useful in persuading a reluctant owner/manager to participate in the survey.</p>

BENEFITS OF PARTICIPATION IN THE NAHMS SHEEP 2024 STUDY

The information collected will be useful to individual producers, the sheep industry, animal health officials, and veterinary groups.

Benefits to Individual Producers

1. Participating producers will receive a variety of reports and information sheets that will enable them to compare their operation—including management decisions and practices—with others in the sheep industry. These publications will present study data on a national, regional, and operation-size basis for general management and production topics as well as specific health-related issues.
2. Participating producers will receive an educational packet of information on common sheep diseases and topics covered in the study.
3. Producers will receive biological test results for:
 - Gastrointestinal parasites and, if applicable, resistance to dewormers,
 - Results from lameness pathogen testing for common foot rot pathogens, and
 - Fecal cultures for *E. coli*, *Campylobacter*, *Salmonella*.

Benefits to the Sheep Industry

This study will enhance industry awareness and provide a more thorough knowledge base about sheep health and management. The items listed below will provide sheep industry groups and university extension the background needed to guide producer education and ultimately improve the health and productivity of sheep in the United States.

- General management and feeding practices by the type and size of the operation.
- Knowledge of current disease prevention and biosecurity practices on sheep operations.
- Benchmark data on important sheep health management practices and the health of sheep in the United States.
- Knowledge of the occurrence of diseases important to productivity.
- Improved understanding of disease preparedness on sheep operations.
- Sheep marketing strategies used by producers.
- Wool management and methods for marketing.
- Information important for policymakers and industry stakeholders.
- Identification of educational needs and opportunities related to sheep health.

Benefits to Veterinary Services, Universities, and Researchers

For practitioners, universities, industries, and media involved with the sheep industry, descriptive reports summarizing all data will be available for comparative analysis and interpretation.

- Information collected will provide basic parameters for animal disease models, including those used to plan for handling outbreaks of foreign animal diseases.
- Veterinary Services personnel will have a better understanding of the spectrum of the sheep industry and a baseline for industry knowledge in the event of an emergency response.
- The information collected will help to characterize the need for further research and education.
- The information increases awareness and knowledge of the industry and diseases important to it, promoting research interest and guidance for topics at agricultural universities.
- Researchers will use the background information provided by this study on the sheep industry to support grant applications.
- Describing the use of gastrointestinal parasite prevention methods nationally will provide useful information for the Southern Consortium of Small Ruminant Parasite Control.

The following Sheep 2024 Study Launch Sheet (next 2 pages) and Biologics Benefits Sheet (the following 2 pages), produced by NAHMS, provide more information about the Sheep 2024 study.



NAHMS Sheep 2024 Study

Study Launch

In January 2024, the USDA's National Animal Health Monitoring System (NAHMS), in collaboration with the National Agricultural Statistics Service (NASS), will conduct its fourth national study of the U.S. sheep industry. Sheep 2024 will take an in-depth look at U.S. sheep operations and provide the industry with new and valuable information regarding priority health and management issues facing the U.S. sheep industry.

Background

Priority health and management issues facing the sheep industry were identified from over 1,000 responses to a needs assessment survey and through communications with sheep producer associations, veterinarians, and university and extension experts. Approximately 4,900 sheep producers with 1 or more ewes from 30 of the Nation's major sheep-producing States (see dark shaded States in the map) will have the opportunity to participate in the study.



Study Objectives

The NAHMS Sheep 2024 study is designed to provide stakeholders with valuable information about the U.S. sheep industry. This study will:

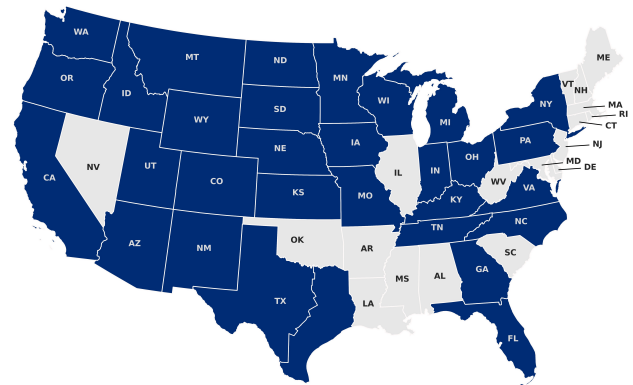
- ◆ Describe occurrence of common, economically important diseases of sheep as well as management and biosecurity practices associated with those diseases.
- ◆ Describe antimicrobial stewardship on sheep operations and estimate the prevalence of enteric microbes and antimicrobial resistance patterns;
- ◆ Describe management practices producers use to control internal parasites and reduce resistance to dewormers;
- ◆ Describe changes in animal health, nutrition, and management practices in the U.S. sheep industry from 1996–2024; and
- ◆ Provide serum to include in the serologic bank for future research.

Study Activities

Participation in any NAHMS study is voluntary. If an operation is selected to participate in the Sheep 2024 study, and decides to do so, their answers will represent many other producers in their State.

In January 2024, representatives from NASS will contact selected producers to complete a questionnaire. For operations that are eligible to continue in the study, representatives from USDA's Veterinary Services will schedule a visit from April to June 2024 to administer a second questionnaire, perform a free lameness evaluation, and collect interdigital swabs and blood and fecal samples. NAHMS will return results to the producers.

States/regions participating in the NAHMS Sheep 2024 study



"The NAHMS Sheep 2024 study is the fourth comprehensive survey of flock health, management practices, and other important factors in the U.S. sheep industry. This study will provide the American Sheep Industry and other organizations, sheep researchers, and policymakers with valuable information on the priority issues facing our business. I fully support this effort and strongly encourage all selected producers to participate fully."

Susan Shultz, Immediate Past President
American Sheep Industry

Opportunities for Free Biological Sampling

Producers who fully participate in the study will have the option to complete biological sampling of their sheep. Fecal samples will be tested for gastrointestinal parasites and enteric microbes, including *Salmonella*, *E. Coli*, and *Campylobacter*. Interdigital swabs will be tested for foot rot pathogens. Respondents will receive their test results, and results are confidential. Interested producers can participate in any or all of the sampling opportunities.



Scientific Approach

NAHMS was established to collect accurate and valuable information on animal health and management in the United States. Since 1990, NAHMS has developed national estimates on disease prevalence and other factors related to the health of U.S. sheep, bison, beef cattle, dairy cattle, swine, goat, equine, poultry, and catfish populations.

NAHMS studies are national in scope, science-based, statistically valid, collaborative, voluntary, and anonymous.

Benefits of the Sheep 2024 Study

Participating producers will receive:

- ◆ Results of gastrointestinal parasite and enteric microbe testing
- ◆ Information about lameness and results from lameness pathogen testing

The sheep industry will benefit from:

- ◆ Benchmark data on important sheep health management practices and the health of sheep in the United States
- ◆ Improved understanding of disease preparedness on sheep operations
- ◆ Information important for policy makers and industry stakeholders
- ◆ Identification of educational needs and opportunities related to sheep health

"By participating in the Sheep 2024 Study, you help guide efforts that advance the American sheep industry. This survey helps researchers, industry organizations, and veterinarians understand what U.S. sheep producers are facing in order to promote applied research and extension efforts to help develop solutions to health and management issues. The more input we receive from the survey, the better we can respond to the needs of the industry."

**Jaelyn Whaley, Sheep Extension Field Specialist,
South Dakota State University**

Confidentiality

Because NAHMS relies on voluntary participation, the privacy of every participant is protected. No name or contact information will be associated with individual data, and no data will be reported in a way that could reveal the identity of a participant. Data are presented only in an aggregate manner.

NAHMS is recognized as a statistical unit by the Office of Management and Budget. All information acquired for the NAHMS Sheep 2024 study will be used for statistical purposes only and treated as confidential in accordance with the Confidential Information Protection and Statistical Efficiency Act (CIPSEA). Data collected under CIPSEA are protected from Freedom of Information requests.

- Please visit www.agcounts.usda.gov/static/get-counted.html and sign up to be counted in future surveys. This ensures that we report the best information to support U.S. agriculture.



For More Information

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Fort Collins, CO 80526-8117 Phone: 866-907-8190
Email: NAHMS@usda.gov
Or visit NAHMS at: www.aphis.usda.gov/nahms
#793.1121

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NAHMS Sheep 2024 Study

Timeline

The National Animal Health Monitoring System (NAHMS) Sheep 2024 study is designed to provide participants and industry stakeholders with benchmarking information on the U.S. sheep industry. Information collected will contribute to critically important data that will inform disease management and preparedness strategies to safeguard the sheep industry. This document describes the timeline and participant benefits for the NAHMS Sheep 2024 study. The study will start in January 2024 in the top 30 sheep producing states on operations with 1 or more ewes. For more study information, please refer to the NAHMS Sheep 2024 Launch Sheet and the Informational Flyer.

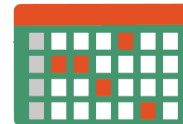


Phase I: NASS Contact

- General Sheep Management Questionnaire
 - Administered by National Agricultural Statistics Service (NASS) staff.
 - Operations with 1 or more ewes in 30 States.
- Consent Form for Phase II
 - Producer consent for contact from Veterinary Services (VS) for operations with 20 or more ewes.

January–February 2024

**NATIONAL AGRICULTURAL
STATISTICS SERVICE (NASS)**



Phase II: VS Contact

- VS Questionnaire (health and management)
- Biological Testing
 - **Fecal Parasite Test:** Fecal egg counts on a composite fecal collection will provide information about parasite burden. Select operations will be examined for dewormer effectiveness. To allow for accurate test results, **sheep should not be dewormed 60 days prior to sampling.**
 - **Enteric Microbe Test:** Detection and antimicrobial susceptibility testing of *Salmonella*, *E. coli*, and *Campylobacter* in your sheep.
 - **Lameness Pathogens Test:** Swabs will be tested for lameness pathogens on the operation.

April–July 2024

VETERINARY SERVICES (VS)

Reports

- Individual Biologic Test Results
 - Operation-specific biologic test results mailed to producers in a sealed envelope.
- Interactive Dashboards and Reports
 - Reference guides and targeted reports for benchmarking and analyzing trends in the industry.
- Manuscripts, Information Sheets, and Infographics
 - Focused analyses on important issues to the industry.

Summer 2024–Onward



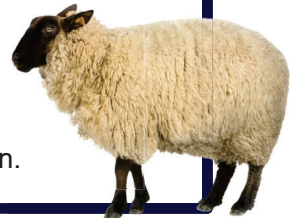
NAHMS Sheep 2024 Study

Benefits

Safeguarding the U.S. Sheep Industry

Collectively, selected sheep producers play an important role in safeguarding the U.S. sheep industry. Information provided in the Sheep 2024 study will:

- Provide transparent, credible information on U.S. sheep industry practices.
- Assist policymakers and industry stakeholders in making more informed decisions affecting the sheep industry. Results will also allow producers to compare their production management with other sheep producers in their region.



Fecal Parasite Test: \$600 Value*

Fecal samples from individual sheep will be combined and a composite fecal egg count will be provided to determine the overall gastrointestinal (GI) parasite burden on the operation. Common GI parasite eggs found in sheep include *Haemonchus*, *Ostertagia*, and *Trichostrongylus* spp. Select operations will have the sample tested for dewormer resistance using the DrenchRite Assay.

- Sheep should not be dewormed 60 days prior to sampling.

Fecal Microbe Test: \$1500 Value*

Fecal samples from individual sheep will be tested for the following fecal microbes. Positive cultures will be tested for antimicrobial susceptibility. Participants will receive individual animal results for:

- *Salmonella*
- *E. coli*
- *Campylobacter*



Lameness Pathogens Test: \$1100 Value*

Interdigital swabs from selected sheep will be tested for lameness pathogens, which tend to cause digital dermatitis and foot rot. Participants will receive individual animal results for:

- *Treponema* spp.
- *Dichelobacter nodosus* (causes foot rot)
- *Fusobacterium necrophorum*

* Values are based on estimated average cost at diagnostic laboratories for samples taken from 20 sheep and include both diagnostic testing and confidential results.

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OVERVIEW OF NASS DATA COLLECTION (PHASE I)

The NAHMS Sheep 2024 study NASS data collection period will occur from the end of December 2023 through February 2024. The target population is sheep operations with 1 or more ewes in the 30 study states¹. The sample size will be 4,940 operations, with most of the operations indicating that they had 1 or more ewes on the NASS 2023 Sheep and Goats survey. There are two important points regarding this study's sample and sampling timeline.

1. **California operations:** Of the 4,940 operations making up the total sample, 972 will be from California, and the remaining 3,968 will be from the other 29 study states. The 3,968 operations will be operations that completed the NASS 2023 Sheep and Goats survey and indicated that they had 1 or more ewes. Some, but not all, of the operations from California will have indicated that they had one or more ewes on the NASS 2023 Sheep and Goats survey, so those California operations will see one special question regarding ownership of ewes on January 1, 2023.
2. **Coordinated operations:** For the operations with 500 or more ewes that were also selected for the NASS 2024 Sheep and Goats survey, State offices will mail a pre-survey letter, study launch sheet, and biological benefits sheet in late December 2023. Those operations will then be enumerated at the same time as the NASS 2024 Sheep and Goats survey. For all other operations, the State offices will mail a pre-survey letter, study launch sheet, and biological benefits sheet in mid-January 2024. Then, a packet containing a survey letter, consent form, and questionnaire will be mailed to producers in late January 2024. A pressure sealed reminder letter will be mailed shortly after. Data collection will then take place from late January through February 2024.

Your supervisor will provide you access to the documents the producers receive, including the study launch sheet, biological benefits sheet, consent form, and the General Sheep Management Questionnaire (GSMQ), so you may refer to them during the interview. These materials will also be available on the NAHMS Sheep Studies webpage:

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveillance/nahms/nahms_sheep_studies. Producers may complete the questionnaire electronically by computer-assisted web interview (CAWI), through a mailed questionnaire, or via a computer-assisted telephone interview (CATI) or computer-assisted personal interview (CAPI).

The GSMQ asks for information about herd inventory, general management, feed and housing management, shearing and wool marketing, movement and marketing, identification, and biosecurity and health management. Collection of the GSMQ is the first phase of the NAHMS Sheep 2024 study. At the conclusion of the GSMQ interview, you will provide information about Phase II of the study, including the benefits of participation. You will ask respondents with 20 or more ewes who complete the GSMQ to indicate consent for the opportunity to participate in Phase II of the study (Section H, Item 1). This consent permits NASS to turn the respondent's name and contact information over to NAHMS for the opportunity to participate in Phase II of the study. Consent does not obligate the respondent to participate in Phase II, but it is the only way they will have the chance to participate. While obtaining consent, you should briefly explain

¹ Arizona, California, Colorado, Florida, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Montana, Nebraska, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, Wyoming

the NAHMS program and what the second phase includes. A brief overview of Phase II is provided below.

Information provided in this manual will focus on Phase I of the study, the General Sheep Management Questionnaire (GGMQ), and your role in the data-collection process.

OVERVIEW OF NAHMS DATA COLLECTION (PHASE II)

Phase II of the NAHMS Sheep 2024 study will occur from April through July 2024. It will involve a face-to-face interview with a Veterinary Medical Officer (VMO) or Animal Health Technician (AHT). Producers with 20 or more ewes on January 1, 2024, who completed the General Sheep Management Questionnaire (Phase I of the study) and indicated consent in Section H, Item 1, are eligible to continue to Phase II. All phases of the study are voluntary, and even if the respondent indicates consent for the opportunity to participate in Phase II, they may choose to no longer participate at any time.

Operations that continue with Phase II of the study will be eligible to participate in biologic sample collection to test fecal samples for gastrointestinal parasites, interdigital swabs to test for lameness pathogens, enteric microbes including *Salmonella*, *E. coli*, and *Campylobacter*, and blood samples that will be stored for future research approved by the sheep industry.

NAHMS SHEEP 2024 STUDY COORDINATORS

NAHMS has designated one or two VMOs in each state to serve as the State Coordinator and Co-coordinator for Phase II of the NAHMS Sheep 2024 study. A list of the NAHMS Sheep 2024 study coordinators and co-coordinators will be provided to you during training and can also be obtained from your State NASS office. They can help answer regional or state-specific sheep industry questions if they arise.

DATA CONFIDENTIALITY AND CIPSEA

NAHMS is a recognized statistical unit by the U.S. Office of Management and Budget (OMB). All information acquired for the NAHMS Sheep 2024 study will only be used for statistical purposes. All questionnaire information from Phase I will be treated as confidential in accordance with the Confidential Information Protection and Statistical Efficiency Act (CIPSEA). Only summary estimates based on the inference population will be reported. Data collected under CIPSEA are protected from Freedom of Information Act (FOIA) requests.

CIPSEA allows NASS agents to collect data limited to statistical use only. All information collected during the NAHMS Sheep 2024 study is protected from disclosure in identifiable form (i.e., the respondent's identity will not be disclosed). All identifiable information must be secured when not in use. All publications will use statistical aggregates and must clear a disclosure review process prior to distribution. No individual-level survey responses will be published.

Please note that the protection provided by CIPSEA applies only to this study. Activities initiated by the respondent unrelated to this study, such as testing for movement or sale, may cause unrelated regulatory action.

Chapter 2 – Enumerator Procedures

BEFORE CONTACT WITH RESPONDENTS

A pre-survey letter will be mailed to the sampled operations requesting their participation and notifying them that a NASS representative will contact them via telephone to set up a convenient time to complete the survey if they do not complete it electronically or mail it in. The NAHMS Sheep 2024 Study Launch Sheet and Biologics Benefits Sheet were included with the pre-survey letter to provide background information about the study.

As part of your job on the NAHMS Sheep 2024 study, you must provide respondents with an explanation of the NAHMS program and explain what to expect from and gain by participating in the study. Your explanation should be based on information from:

- Your training workshop and training materials,
- The NAHMS Sheep 2024 Study Launch Sheet and Biologics Benefits Sheet,
- The General Sheep Management Questionnaire (GSMQ), and
- This manual (especially the producer and study benefits from Chapter 1).

Respondents may ask questions about the NAHMS program based on the pre-survey letter and other materials they received. If they have questions that you cannot answer, respondents can phone either the NASS RFO or the NAHMS Coordinator directly (contact information is available from the Regional NASS office).

WHOM TO INTERVIEW

If possible, interview the person who primarily manages the sheep on the operation. This person may be the primary owner of the sheep or the operation, but this is not always the case. Information collected from other people is often less accurate. If the person you contact says someone else is more knowledgeable, interview the more knowledgeable person. There may be sections of the questionnaire that require the response of a different person who is knowledgeable about that section.

Encourage producers to have the operation records on hand. If records are used, the information provided will likely be more accurate, and the interview will take less time.

SPECIAL SITUATIONS

Private Veterinary Practitioners

Some producers may express concern about the involvement of the Veterinary Medical Officer (VMO) during Phase II of the study. They may feel this will conflict with the services provided by their veterinarian. Explain that the VMO will be glad to explain the program to the producer's veterinarian and that industry and veterinary organizations have participated in designing and reviewing the questionnaires. The VMO is not meant to replace their current veterinarian. VMOs will not give producers veterinary advice about their operation but will likely answer questions if they arise. The VMO's job is to provide professional expertise in collecting accurate animal health and production data.

Serious Diseases

Some producers may be apprehensive about the VMO's enforcement and quarantine power regarding certain contagious animal diseases. Explain that the on-farm tests are **not** for epidemic or regulatory-type diseases like scrapie. The VMO will enter the production areas **only** for those optional tests the producer agrees to complete. VMO interviews regarding management practices can be done in the producer's home, office, or local coffee shop. The VMO questionnaires are not intended to detect the presence of any regulatory-type diseases. NAHMS is a non-regulatory unit; therefore, any data provided cannot be used for regulatory action on the operation.

"Out of Scope" Operations

APHIS considers certain types of farm operations to be "out of scope" for the GSMQ. These include university, extension, experimental, and institutional farms whose production is primarily used for **noncommercial** purposes. **Do not complete a GSMQ** for these operations.

BURDEN STATEMENT

Federal regulations require that an estimate of the average time required to complete the questionnaire be provided. The burden statement's average time requirement represents the average completion time expected based on the number of OMB-allowed pretests of the questionnaire. The average expected interview time to complete the GSMQ is 60 minutes. However, this is expected to vary depending on whether the producer consults records and the types of records consulted during the interview.

GENERAL STEPS TO CONTACTING AND COMPLETING AN INTERVIEW

You should receive up-to-date lists of producers to contact to complete the GSMQ from your supervisor.

1. Attempt to contact a sheep producer from your list. Formulate and practice an introduction that briefly explains the survey and gains the producer's cooperation. Say it in your own words so it is comfortable to share and be prepared to answer the producer's questions. You can use the information from the launch sheet, Chapter 1 of this manual, or other materials to explain why you are calling and the benefits of study participation. The interview should take an average of 60 minutes to complete. Some benefits are restated below.
 - a. For the individual producer
 - i. Respondents will receive biological test results for gastrointestinal parasites and, if applicable, resistance to dewormers; testing for lameness pathogens, including those that cause foot rot; and *E. coli*, *Campylobacter*, and *Salmonella*.
 - ii. An educational packet on common sheep diseases and topics covered in the study.
 - iii. Reports and information sheets that will enable them to compare their operation—including management decisions and practices—with others in the sheep industry.
 - b. For the sheep industry

- i. The information from this study provides baseline information on the health and management of sheep in the United States. It is used by the sheep industry and academic and government researchers and decision-makers to develop trade and education programs and advance sheep disease research and prevention.
 - ii. Your response helps ensure that the baseline information about the sheep industry from this survey is as accurate and representative as possible and reflects what is actually happening in the United States.
2. If the operation is in business and willing to continue with the interview, walk through it with them. If the respondent received a paper survey in the mail, they could follow along using that version. Otherwise, the survey will be available online for the respondent to follow along with if they would like. These materials will be available on the NAHMS webpage as well: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveillance/nahms/nahms_sheep_studies (or go to <https://www.aphis.usda.gov/nahms> and click on the “Sheep Studies” link on the front page). This point would be a good time to remind them to retrieve any records that may help cut time out of the interview.
 - a. If the operation is out of business or otherwise out of scope for the study, mark the appropriate response code in Section H, Item 5 (response codes 2 or 7) in the GSMQ. These should be rare because most operations will have been in business and had one or more ewes on January 1, 2023.
 - b. If they are unwilling to do so, even with the benefits of the study outlined for them, indicate this in Section H, Item 5 (response code 3).
3. Once the interview is complete and you reach Section H, explain the benefits of participating in Phase II of the study and go through the consent form with them, if needed. A copy would have been mailed to them so they can follow along if that is helpful. Indicate the respondent's willingness to consent to have the opportunity to participate in Phase II in Section H, Item 1. Then, continue through the rest of Section H, ensuring that the respondent's contact information is up to date in Section H, Items 2 and 3 and that the proper response code is recorded in Section H, Item 5. Thank the respondent for their time.
4. Ensure that the survey information is turned in to your supervisor and clarify any issues with the questionnaire with your supervisor if they have questions about any of the responses.

Chapter 3 – General Instruction, Question and Response Formats

This chapter provides information about conventions used throughout the questionnaire, how to enter responses, and examples of the types of questions used.

Sometimes, you must probe the respondent to get an adequate answer to a question. It would be best if you probed when the respondent can't answer the question, when the answer isn't enough to record, when you think the answer may be incorrect because it doesn't fit with other information already obtained, and when you think the respondent didn't understand the question.

Please be careful not to lead the respondent to a particular response. Simply restate the question or the response to encourage the respondent to keep thinking about it.

UNKNOWN OR DECLINED RESPONSES

At times during the interview, a respondent may feel uncomfortable providing the requested data without consulting records. Respondents should be given additional time to look up the information or report it by telephone to you later if the timeliness of data submission is not adversely affected. Also, some respondents may be reluctant to provide estimates if they don't have records. In this case, the respondent should be encouraged to provide an answer, and the circumstances for the response should be noted in the questionnaire.

If the answer is unusual or the quality of the data is questionable, record the answer and write comments next to the question. Do not hesitate to include comments with responses. We would rather have a lengthy explanation for a perplexing answer than no explanation at all.

IMPORTANT NOTE: Unknown response/ decline to answer

Always enter a response for every question unless you are instructed to do otherwise. **If the respondent declines to answer a question or does not know the answer, indicate “DK” (don't know) or “Declined” in the questionnaire.** When the data are analyzed later, it is very important to know if the respondent declined to answer a question, did not know the answer, or if the answer should have been zero, “no,” or “none.” **By responding to every part of every question, you, as the enumerator, will improve the quality of the data and the information published as the result of this study.**

EXTERNAL PROJECT AGREEMENTS (EPA) ID

The EPA ID, or External Project Agreement Identification, number is composed of two parts. The first two digits are the State FIPS code for the State with which the producer's operation is associated. The second part is a unique ID code for the operation. The EPA ID will be underneath the bar code and look like the following.

EPA ID = 480000147

Ensure that the EPA ID number is correctly displayed or noted on the questionnaire and that the 2-digit FIPS code for the State makes sense for the operation being contacted.

RECORDING NONRESPONDENTS

We must account for all 4,940 operations in the sample in Section H, Item 5 (the interview response code).

- If a respondent declines to participate, complete all questions the respondent agreed to complete and then complete Section H. Ensure the EPA ID is recorded on the questionnaire, mark the interview response code as 3 in Section H, Item 5, and then complete the rest of the Office Use box.
- If a producer is otherwise out of scope (didn't have any sheep or lambs on January 1, 2024, were out of business, or out of scope), ensure the EPA ID is recorded, mark Item A.1. as "No," mark the interview response code as 1, 2, or 7, as appropriate, and then complete the rest of the Office Use box.
- If the producer was not contacted (inaccessible or office hold), ensure the EPA ID is recorded, mark the interview response code as 8 or 9, as appropriate, and then complete the rest of the Office Use box.

STUDY TIMEFRAME

Most questions will refer to the 2023 calendar year. Only a few questions may refer to a different time frame or general practices that will not have a time frame referenced. Some questions refer to specific groups of sheep, such as ewes, lambs, rams, or wethers.

When asking these questions, be sure to emphasize the time frame and sheep class referenced so they are clear in the respondent's mind.

INSTRUCTION FORMATS

The questionnaire has instructions throughout for the enumerator, the interviewee, or both. These instructions provide important information about response coding, question skips, cell references, flow, and question completion. Please note that some instruction examples will be built into the program if you use Blaise software for data collection.

INSTRUCTION EXAMPLE A (Item B.2.): This question has an example of instructions within a question. The [Select one] may be read aloud to the respondent as it could resolve the question whether to choose a single or multiple choices.

2. Compared to your inventory on January 1, 2024, how many sheep do you expect to have in 5 years?
[Select one]

2002

- 1 ☐ None
- 2 ☐ Fewer [Go to Item 5 on page 5]
- 3 ☐ About the same [Go to Item 5 on page 5]
- 4 ☐ More [Go to Item 5 on page 5]

INSTRUCTION EXAMPLE B (Item A.5.): When a reference to a previous item is enclosed in the “stem” in parentheses, you should FILL IN the data entered in that previous item when you read the question. For example, if the response for Item 3 was “35,” you should say “35” in place of the “(Item 3)” when you read the question below. In addition, the instructions below item “g” stating that “Total must equal Item 3” is an additional check for you as the enumerator to verify for this question. If the total of Items 5.a.–5.g. does not equal the total from Item 3, work with the respondent to find the numbers to ensure that the totals equal one another.

<p>5. On January 1, 2024, of the total sheep and lambs on the operation (Item 3), how many sheep had the following primary uses? For lambs, report the uses for which they are intended. Do not report the same sheep or lambs in multiple categories.</p>	
	Head
a. Meat production.....	1012
b. Wool production.....	1013
c. Show, competition, 4-H, or club lambs.....	1014
d. Seedstock/breeding stock.....	1015
e. Milk production (include milk for cheese or other products).....	1016
f. Brush control, fire suppression, or solar grazing.....	1017
g. Other (Specify: 0118 _____).	1018
[Total must equal Item 3]	
	Item 3

INSTRUCTION EXAMPLE C (Item B.11.): This example indicates a skip and should not be read aloud.

<p>11. Did your operation use genetic testing to control for scrapie or select scrapie-resistant sheep?</p>	
<p>2038</p> <p><input type="checkbox"/> Yes</p>	<p><input type="checkbox"/> No [Go to Item 13]</p>

INSTRUCTION EXAMPLE D (Items A.1. and C.1.): Prompts such as includes and excludes or additional terms and other instructions for respondents are included beneath the primary question text or are enclosed in **parentheses**. You should read these to the respondent to help clarify the question.

<p>1. During 2023, for how many months did your operation manage the majority of the sheep in the following primary locations during daylight hours?</p>	
	Months
a. Open range (unfenced acreage with herder).....	3001
b. Fenced range (uncultivated fenced acreage).....	3002
c. Fenced farm (cultivated pasture or browse).....	3003
d. Outdoor dry lot (pen with dirt, concrete, or other surface not used for grazing).....	3004
e. Indoors (enclosed building).....	3005
[Total must equal 12 months]	
	12 months

INSTRUCTION EXAMPLE E: Parenthetical instruction for “Other (Specify_____)” tells the responder and interviewer alike that a choice of “Other” requires a write-in of what specifically they meant by the “Other.”

11. What did your operation do with the majority of its unsold wool? [Select one]

4023

- 1 ☐ Stored in bags or bales on the farm or at a warehouse
- 2 ☐ Given away (included if given to the shearer)
- 3 ☐ Thrown away
- 4 ☐ Used for alternative purposes (such as bedding, mulch, insulation, spinning)
- 5 ☐ Other (Specify: 0423 _____)
- 6 ☐ NA - This operation did not have any unsold wool

REMINDER: CONFIRM AN “OTHER” IS TRULY AN “OTHER”

Ensure that the “Other” answer does not fit any of the provided categories. If you think it possibly fits into another category, place it in the most appropriate category and include a note to explain the logic behind the placement. Always attempt to get a “Specify” to an “Other.”

QUESTION FORMATS

Numeric, Count, or Percent Questions

Respondents will be asked questions requiring them to respond in various units (for example, number of head, percent of total, number of months, etc.). **Record responses in the units required.** If a respondent answers in a different unit, work with them or independently to convert it to the required unit and record the converted data response box. You may record the unconverted response and convert it later if needed. For numeric questions, if the answer is “Zero” or “None,” enter “0.” If the respondent declines to answer or does not know, mark the response as “Declined.” Be sure to number-check responses. Be sure the total adds up correctly according to the instructions and confirm the total with the respondent. Always include notes about answers that appear unusual or are outside the expected range.

*It's important in Quantity questions to **always** answer it. For example, in Example A below, if no sheep or lambs were placed on an outdoor dry lot, enter “0.”*

QUESTION EXAMPLE A (Item C.1.): Here, the quantity under consideration is the **number of months**. Indicate how many months any sheep or lambs from the operation were placed on each location listed during the last 12 months. The total of options a.– e. should add up to 12 months.

1. During 2023, for how many months did your operation manage the majority of the sheep in the following primary locations during daylight hours?

	Months
a. Open range (unfenced acreage with herder).....	3001
b. Fenced range (uncultivated fenced acreage).....	3002
c. Fenced farm (cultivated pasture or browse).....	3003
d. Outdoor dry lot (pen with dirt, concrete, or other surface not used for grazing).....	3004
e. Indoors (enclosed building).....	3005
[Total must equal 12 months]	12 months

Yes/No Questions

Many questions ask for a “Yes” or “No” response. Some questions may have a “Don’t Know” or “Not Applicable” option. If a “Don’t Know” or “Not Applicable” option is not offered, and if the respondent answers with one of these responses, or if a respondent declines to answer a specific question, mark the question as “Don’t Know,” “NA,” or “Declined” and leave a note regarding the response.

QUESTION EXAMPLE B (Item D.4.): Here is an example of a yes/no question that also includes “Don’t Know” and “Not Applicable” response options.

4. During 2023, did the person who sheared the majority of your sheep clean and disinfect the handpiece, cutters, or combs between operations?				
4007	1 <input type="checkbox"/> Yes	2 <input type="checkbox"/> Don't know	3 <input type="checkbox"/> No	4 <input type="checkbox"/> NA - Shearing equipment not used on another operation

Check Box Questions

Many questions will require you to check a box. Some will ask that the respondent only check one box, and others will instruct that the respondent check all that apply.

QUESTION EXAMPLE C (Item B.7.): This example requires that you check only one box. There is a possibility that one answer doesn’t fit or that two fit as a primary method for maintaining production records. Perhaps the respondent keeps handwritten records and then enters them into a software program later. In that case, code “4” could be checked, and you can explain further in the “Any other method (Specify_____)” option.

7. During 2023, what was your operation's primary system for maintaining sheep production records? [Select one]	
2007	
1 <input type="checkbox"/>	Livestock or sheep management software (Specify:0206_____)
2 <input type="checkbox"/>	Other electronic record-keeping (spreadsheets, Word documents, etc.)
3 <input type="checkbox"/>	Handwritten records
4 <input type="checkbox"/>	Any other method (Specify:0207_____)
5 <input type="checkbox"/>	Did not maintain sheep and lamb production records [Go to Item 9 on page 6]

QUESTION EXAMPLE D (Item C.2.): This example requires that you check all that apply. Any combination of Items 2.a.–2.e. are allowed. Item 2.f. is provided to indicate that none of the above items apply and should be checked if the respondent does not place their sheep or lambs on the types of land indicated in 2.a.–2.e. In that case, it should be the only item that is checked.

2. During 2023, were any of this operation's sheep or lambs placed on the following types of land? [Select all that apply]	
a. Public land, including public, industrial, and grazing association (PIGA) land.....	3006 1 <input type="checkbox"/>
b. Grazing association land.....	3007 1 <input type="checkbox"/>
c. Leased, private land.....	3008 1 <input type="checkbox"/>
d. Harvested fields for grazing.....	3009 1 <input type="checkbox"/>
e. Irrigated land.....	3010 1 <input type="checkbox"/>
f. This operation's sheep are not placed on any of the above types of land.....	3011 1 <input type="checkbox"/>

Scale or Category Questions

These questions often involve check boxes grouped under headings in some order (i.e., increasing or decreasing) as you read from left to right. Only the box under one heading can be checked per question.

QUESTION EXAMPLE E (Item G.7.): The scale response “decreases” as you go from left to right. Check the most applicable box for each practice, whether it was “Always,” “Sometimes,” or “Never.”

7. During 2023, how often were any visitors that had contact with sheep required to take the following measures?		Always	Sometimes	Never
a. Change into clean clothes or overalls.....	7025	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
b. Use a footbath before entry.....	7026	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
c. Change into clean boots or use shoe covers.....	7027	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
d. Scrub shoes before or immediately after entry into sheep production area.....	7028	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
e. Wash hands before handling sheep.....	7029	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
f. No contact with other livestock for at least 24 hours before visiting.....	7030	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
g. Park away from sheep area.....	7031	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
h. Please check here if there were not visitors or no visitors had contact sheep.....	7032	1 <input type="checkbox"/>		

QUESTION EXAMPLE F (Item G.13.): Here is another example of the scale response, which “increases” as you go from left to right. Check the most applicable box for each practice.

13. Have you or any of your family members or employees ever suspected or been confirmed with the following diseases? [Select one in each row]		Not suspected	Suspected, but not confirmed	Confirmed by a doctor or laboratory
a. Q fever.....	7067	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
b. Sore mouth (orf).....	7068	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>

Matrix Questions

These question types are reserved for times when there are multiple bits of information to be collected on different yet related topics. The name “matrix” is used because the information goes into cells at the junction of a row and a column. This type of question is used sparingly because although a lot of information can be collected at once, it can be burdensome to the responder. These types of questions, especially, would benefit from a respondent being able to follow along using a copy of the questionnaire, whether it is the copy mailed to them or an electronic copy online.

QUESTION EXAMPLE G (Item E.11.): This requires the quantity of sheep broken out by age class (across the columns) **and** the reason sheep permanently left the farm (down the rows). When asking questions like these, it helps to show the respondent the question. In this case, it helps to read the question starting with: “Of the total (read the number from Item 10a) lambs (under 1 year old) that were permanently removed from this operation, how many were direct sales to consumer or ethnic market?” You would attack this question one response line at a time until the responder got the gist of the question, making the full preamble with the stem unnecessary.

Also, note that there are checkboxes across the columns to check if the respondent had no sheep of the given type. Here, you would check “None” for the columns for which the respondent did not permanently remove the given type of sheep.

11. Of the live sheep and lambs that were permanently removed (Item 10), how many were permanently removed through the following channels? If none of the given type of sheep was permanently removed, check the box at the top of the column.

	Number of head		
	Lambs (under 1 year old)	Cull sheep	Breeding or other sheep
Check none if the sheep type was not permanently removed.....	5062 <input type="checkbox"/> None	5072 <input type="checkbox"/> None	5082 <input type="checkbox"/> None
a. Direct sales to consumer or ethnic market.....	5063	5073	5083
i. Of these direct sales, how many were slaughtered on the operation?.....	5064	5074	5084
b. Direct sales to slaughter plant/packer.....	5065	5075	5085
c. Moved to a feedlot separate from this operation.....	5066	5076	5086
d. Direct sale to a backgrounder (non feedlot feeders).....	5067	5077	5087
e. Direct sales to another sheep producer..... INCLUDE 4-H/show sales	5068	5078	5088
f. Auction/sale barn.....	5069	5079	5089
g. Buyer/dealer for resale.....	5070	5080	5090
h. Slaughtered for personal use	5071	5081	5091
[Total must equal the total for that age class from Item 10]	[Item 10a]	[Item 10b]	[Item 10c]

Chapter 4 – Questions of Note

A few questions that deserve special attention during the interview are listed below, along with guidance for each.

Section A, Item 1 – Screener for any sheep or lambs on January 1, 2024

This question should be asked of all respondents to the questionnaire.

If the respondent did not have any sheep or lambs (regardless of ownership and including Barbados and all hair breed sheep) on the operation on January 1, 2024, then mark “No” and skip to the response code (Section H, Item 5 on page 24).

If the respondent had any sheep or lambs on the operation on January 1, 2024, mark “Yes” as the response and continue.

1. On January 1, 2024, were any sheep or lambs, regardless of ownership, on this operation? INCLUDE Barbados and all hair breed sheep
0584 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No [Go to Section H, Item 5 on page 24]

Section A, Item 1a – Screener for any ewes on January 1, 2023 (for operations in California only)

This question will only be asked of operations in California.

The question looks very similar to A.1., with two crucial differences. First, the question asks about the presence of any ewes one year and older (rather than any sheep or lambs as in A.1.). Second, the question asks whether any ewes one year and older were on the operation on January 1, 2023 (rather than on January 1, 2024, as in A.1.).

No skip logic is associated with any response to this question, so seek a response and continue.

a. On January 1, 2023, were any ewes 1 year and older, regardless of ownership, on this operation? INCLUDE Barbados and all hair breed sheep
1584 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No

Section H, Item 1 – Consent to the opportunity to participate in Phase II

This question should be asked of all respondents who complete the GSMQ and who have any sheep or lambs on the operation on January 1, 2024 (that is, A.1. equals “Yes”). This question is important as it is the only way for the respondent to continue to Phase II of the study and have the opportunity to test their sheep at no cost to them. Introduce the question by reading the prompt prior to the question.

“Thank you for completing the first phase of this study. Phase II of this study includes a follow-up questionnaire and the chance to test your sheep for gastrointestinal parasites, pathogens that could cause foot rot or digital dermatitis, and enteric pathogens (*E. coli*, *Salmonella*, and *Campylobacter*).”

If they consent to the opportunity to participate in Phase II of the study, they are not obligated to participate in Phase II, and they can stop participation at any time. If the respondent has more questions about their consent, please review the benefits of the study with them (see Chapter 1) and review the informed consent form with them. They would have received a copy in the mail, but if they don't, they can access one at

https://www.aphis.usda.gov/animal_health/nahms/sheep2024-nassconsent.pdf.

Mark the appropriate response to the consent question. If the respondent consents, mark "Yes" and continue in Section H by confirming contact information with the best contact for Phase II in Items 2 and 3. If the respondent does not consent, mark "No," and if the respondent does not have at least 20 ewes (from Item A.2.a. earlier in the questionnaire), skip to Item 4.

Section H - Conclusion

Thank you for completing the first phase of this study. Phase II of this study includes a follow-up questionnaire and the chance to test your sheep for gastrointestinal parasites, pathogens that could cause foot rot or digital dermatitis, and enteric pathogens (*E. coli*, *Salmonella*, and *Campylobacter*).

See the Informed Consent Form included in this mailing or at https://www.aphis.usda.gov/animal_health/nahms/sheep2024-nassconsent.pdf for more information about Phase II of this study.

1. If you have 20 or more ewes, would you like the opportunity to participate in Phase II of this study?

8001 1 ☐ Yes [Continue] 3 ☐ No [Go to Item 4 on page 24] 4 ☐ Fewer than 20 ewes [Go to Item 4 on page 24]

Section H, Item 5 – Response code

This question should be completed for all of the questionnaires. It is critically important for analysis that all response codes are known for all 4,940 operations sampled.

If the respondent completed the questionnaire, there are three possible response codes, depending on the outcome of the consent question (Section H, Item 1). The response code would be 4 if the respondent completed the GSMQ but had fewer than 20 ewes, it would be 5 if the GSMQ was completed and the respondent consented to the opportunity to participate in Phase II, and would be 6 if the GSMQ was completed, but the respondent refused consent.

Even if the contact was unsuccessful or was an office hold, the respondent refused participation, the respondent was out of business or otherwise out of scope, or had no sheep on January 1, 2024, the response code should be recorded in this question.

5. Enter interview response code. [Select one]

8008

- | | |
|---|--|
| 1 <input type="checkbox"/> Zero sheep on January 1, 2024 | 6 <input type="checkbox"/> Complete, Phase II consent refused |
| 2 <input type="checkbox"/> Out of business | 7 <input type="checkbox"/> Out of scope for General Sheep Management Questionnaire |
| 3 <input type="checkbox"/> Refusal of General Sheep Management Questionnaire | 8 <input type="checkbox"/> Office hold |
| 4 <input type="checkbox"/> Complete, fewer than 20 ewes, no Phase II consent form offered | 9 <input type="checkbox"/> Inaccessible |
| 5 <input type="checkbox"/> Complete, Phase II consent given | |

Chapter 5 – Terms and Definitions

Enumerators working on the NAHMS Sheep 2024 study should be familiar with the following terms and definitions used in the questionnaire or common terms used by sheep producers and managers and may be part of the responses given during the interview.

Abortion: Expulsion of a dead or non-viable fetus prior to the time of normal lambing. The fetus typically lacks normal hair covering the body.

Antibiotic: A chemical compound generally produced by molds that inhibits and/or kills certain bacteria. Antibiotics are used against illnesses caused by bacteria.

Antimicrobial: Any substance of natural, semisynthetic, or synthetic origin that kills or inhibits the growth of microorganisms but causes little or no damage to the host. Technically, all antibiotics are antimicrobials, but not all antimicrobials are antibiotics. For the purposes of this questionnaire, however, the terms ‘antimicrobial’ and ‘antibiotic’ are considered synonymous, and the term antibiotic is used in the questionnaire because it is more familiar to producers.

Auction: Refers to an auction sale or auction barn where sheep and other animals are sold to the highest bidder.

Backgrounder: An operation that takes weaned lambs and raises them to a certain age or weight before returning them to the operation or sending them to a feedlot.

Bluetongue: A disease caused by a reovirus that is spread by biting insects, mainly in the southern and western parts of the United States. The disease causes swelling and sloughing of the mucous membranes, especially around the mouth and tongue.

Breed (n.): Animals having a common origin and characteristics that distinguish them from other groups within the same species. In this questionnaire, breeds are grouped with other similar breeds, either by face color, wool type, or purpose.

Breed (v.): To have ewes serviced by a ram or using advanced reproductive technologies such as artificial insemination or embryo transfer. Not all ewes that have been bred will be pregnant.

Brucellosis (pronounced ‘broo-se-lo-sis’): Bacterial disease of mammals that can cause abortions in ewes and inflamed testicles and reduced fertility in rams. There are many species of *Brucella*, but the most common species that infect sheep is *B. ovis*. When *Brucella* first enters a herd, an outbreak of abortions and perinatal mortality may occur; these outbreaks are commonly referred to as abortion storms. However, rams may become persistently infected with *B. ovis*, resulting in a spread of the disease and reduced fertility. *Brucella melitensis* may also infect sheep; it is not currently in the United States, but is found in Mexico. *Brucella abortus*, a cause of brucellosis in cattle, can also affect sheep; however, due to eradication programs in the United States, disease with this bacterium in sheep is rare. Brucellosis caused by *B. melitensis* and *B. abortus* can affect humans, causing an illness with recurrent flu-like symptoms (undulant fever) or high fever known as “Malta fever.” *B. ovis* does not cause illness in humans.

Campylobacteriosis: This disease in sheep can be asymptomatic, cause gastrointestinal disease, infertility, and abortions. *C. fetus* and *C. jejuni* are common species in sheep that result in late-term abortions, stillborn, or weak lambs. *Campylobacter* can spread within the flock through feed contaminated with fecal matter and through environmental contamination.

Caseous lymphadenitis (CL): CL is characterized by abscesses in the skin, lymph nodes, and internal organs, and is caused by the *Corynebacterium pseudotuberculosis* bacterium. Abscesses can break open to the skin surface, leading to spread of the bacteria through wounds or abraded skin and via ingestion of contaminated feed or grass. In many animals, the organism disseminates to the lungs and nearby lymph nodes, causing respiratory problems and the spread of the bacteria by the respiratory route. Economic losses related to CL include condemnation and trim of infected carcasses, devaluation of hides, and decreased meat yield and reproductive efficiency.

Castration: The removal of male testicles or to otherwise make a male incapable of breeding. A castrated male sheep is called a wether.

Chlamydiosis: This disease is also known as enzootic abortion of ewes (EAE) and is caused by the bacterium *Chlamydia abortus*. The disease commonly results in abortions of ewes or delivery of full-term stillborn lambs, or weak lambs that do not survive longer than 48 hours.

Coccidiosis: A intestinal tract infection in sheep caused by protozoa called coccidia. *Eimeria* spp. are a common coccidia that infect sheep. Coccidiosis is one of the most common causes of diarrhea in goats between three weeks and five months of age. Coccidiosis is commonly seen around the time of weaning due to increased stress.

Commercial complete feed: A feed that is purchased at a feed store and provides all of the necessary nutrients for the animal. It may be purchased in small bags or in bulk. It will make up a large portion of the animal's diet. Commercial complete feeds will commonly be in a pelleted format and labelled for a specific class of animal, such as a growing lamb or pregnant ewes.

Cooperative pool: A group of producers that pool their products, such as wool, to sell to a buyer.

Crop residue/by-product: Material that is left after a crop has been harvested is considered a crop residue or by-product. These residues are frequently fed to livestock and may include the stalks, stems, leaves, or seed pods of harvested crops.

Cull: Adult animals permanently removed from the herd. Operations cull animals for various reasons such as old age or infertility, disease or injury, to reduce herd size for reasons such as high feed costs, or to improve genetics or desirable phenotypic traits.

Cysticercosis: This disease is caused by a tapeworm called *Taenia* spp. and causes significant economic loss due to the trimming of sheep carcasses at slaughter. The tapeworm is carried by dogs, both domestic and wild. Certain species of *Taenia* can infect humans and may result in neurological disease.

Direct sale: Selling method by which the producer's sheep, wool, meat, or milk are purchased directly off the farm or ranch. Approaches for direct sales may include internet or video marketing.

Dry lot: An enclosed area without vegetation where the animals can move about freely.

Enterotoxemia/overeating disease: A disease of sheep and goats, especially under one year of age, caused by *Clostridium perfringens* with types C and D being the most common forms. The disease commonly causes death with limited clinical signs. However, some animals may show central nervous signs, abdominal discomfort, or profuse and/or watery diarrhea.

Ewe: A female sheep.

Flock-level and animal-level identification (ID): Flock identification uses a tag, brand, or other marker that indicates a sheep is a member of an operation's flock. Individual identification is unique and applied to each animal so it can be distinguished from all other sheep in the flock.

Footrot: A disease that affects the feet of sheep and is commonly caused by *Dichelobacter nodosus* and *Fusobacterium necrophorum*. Sheep with footrot will appear mildly to severely lame. These bacteria cause a lesion between the toes that makes the skin red and is often foul-smelling. If it is not treated it will break down the hoof wall resulting in severe lameness.

Hair sheep: Breeds of sheep who produce hair instead of wool. The hair has little if any scale or crimp and little ability to bind into yarn. There are a large variety of breeds of hair sheep in the U.S. including Dorper, Katahdin, American and Barbados Blackbelly sheep, and St. Croix sheep.

Internal parasites: Internal parasites (usually worms) are a leading cause of disease in sheep. A high parasite burden can cause anemia, watery feces, bottle jaw, and, in severe cases, death. Inappropriate use of dewormers (anthelmintics) has caused the worms to become resistant to the deworming agents, which is making it much harder to control parasites in flocks.

Johne's (pronounced —Yo-knees) disease: A contagious disease of cattle and other ruminants, including sheep, that results in weight loss and diarrhea despite a normal appetite. Johne's disease may also be referred to as paratuberculosis. Diarrhea is less common in sheep than in cattle. The disease is caused by *Mycobacterium avium* subspecies, which can survive on an infected premises for up to a year and infect any ruminant. The primary mode of transmission is fecal-oral, including ingestion of contaminated feed, water, or bedding. Lambs can be infected by nursing an udder soiled with contaminated fecal material. The bacterium also can be transmitted through milk and colostrum, as well as in utero. Infected animals shed the bacteria for months or years before they develop clinical signs, resulting in heavy contamination of pastures before it is known the disease is present. Sheep sharing pasture with infected cattle are susceptible to infection.

Lamb: A young sheep, usually less than one year old.

Lambing: The process of a ewe giving birth.

Market sheep or lambs: Animals raised and marketed primarily for sale.

Milk sheep: Sheep that are raised primarily to produce milk. Most often they will be common dairy sheep breeds such as East Friesian and Lacaune, but other breeds may be kept for milk too.

Mottle or speckle-faced: A sheep or lamb with splotchy coloring on the face, usually black/white or brown/white. These sheep are most often cross-bred sheep. Frequently, they will have a dam that has a white face and a sire that has a black face.

Neurologic signs: Problems associated with the nervous system. Animals with neurologic problems can exhibit odd behaviors such as: circling, tremors, lip smacking, loss of coordination, rubbing against fences. They may be dull, depressed, aggressive, or comatose and can appear weak, stagger, or assume abnormal postures. Neurologic signs are the predominant clinical signs of scrapie.

Off the operation: Refers to sites distinct from the current premises. A site, such as grazing land, that's located off the operation might be owned by the same producer or by someone else.

Ovine Progressive Pneumonia (OPP): A slowly progressive viral disease of adult sheep caused by an ovine lentivirus. Most sheep do not show clinical signs of OPP, but the sheep that do, typically don't display signs until 2 years of age or older because of the virus's long incubation period. Often, the first sign noticed is a general loss of body condition referred to as thin ewe syndrome. Weight loss occurs despite the affected sheep having normal appetites. Another common sign of OPP is increased breathing effort at rest; animals tire easily and may be seen trailing the flock. These sheep are often called lungers. Secondary bacterial infection is very common and results in additional signs such as fever, cough, lethargy, and nasal discharge. OPP infection also can cause hard bag, an enlarged, firm udder with reduced or no milk flow. Infection with OPP virus also may cause other problems such as meningitis and encephalitis. Clinical signs include an unsteady gait, twitching, or stumbling, which can progress to hind limb or total paralysis. Arthritis may accompany OPP infection. Pain and swelling of the joints and a shortened gait are common.

Pasture: Areas with plants, such as grass, grown for feeding or grazing animals.

Primary use: This refers to the primary use of the sheep regardless of the breed. For example, a producer might have a Suffolk sheep that is a pet for his child. This sheep would be considered an 'other' primary use and described as a pet.

Q fever (coxiellosis): An infectious disease caused by the bacterium *Coxiella burnetii*. Q fever can infect a variety of animals, including ruminants such as sheep and goats. In ruminants, Q fever may cause very few signs, or it may result in abortion in pregnant animals. Q fever can infect humans, either through contact with infected animals or through contaminated and unpasteurized milk or milk products. Humans that become sick may develop flu-like symptoms, including fever, chills, fatigue, and muscle pain.

Quarantine: Physical separation of an animal or group of animals from other sheep on the operation, with no physical contact allowed. Quarantining new additions can help prevent the spread of disease.

Ram: A male sheep, usually kept for breeding purposes.

Replacement lambs: Lambs that are retained to be used for breeding in the flock.

Ringworm: A contagious itching skin disease occurring in small circular patches caused by fungus.

Scrapie: A fatal, degenerative disease affecting the central nervous system of sheep and goats. Infected flocks that contain a high percentage of susceptible animals can experience significant production losses. In these flocks, over a period of several years, the number of infected animals increases and the age at onset of clinical signs decreases making these flocks economically unviable. Animals sold from infected flocks spread scrapie to other flocks. The presence of scrapie in the United States also prevents the export of breeding stock, semen, and embryos to many other countries.

Seedstock/breed stock: Animals that are intended to be used for breeding, most often due to their superior genetics.

Shearing: Using shears to clip wool from sheep.

Sheep: Term describing both ewes and rams together.

Sore mouth (orf, contagious ecthyma): Sore mouth is caused by a poxvirus and is highly contagious in goats, especially young kids. Sores caused by the virus usually occur around the mouth and teats but can also occur on the legs, vulva, and face. Scabs, which contain virus, can fall off the animal and remain viable in the environment, providing a source of infection for other animals. The virus is zoonotic, meaning it can infect people. Infected people can develop sores that may be painful and last for 2 months, but the sores usually heal without scarring. This disease is not transmitted from infected people to noninfected people.

Toxoplasmosis: This disease is caused by the protozoan *Toxoplasma gondii* and can cause reproductive losses in sheep. Sheep generally become infected with *T. gondii* by intestine oocysts excreted in cat feces. Ewes who become infected the first time during their pregnancy may abort, or may deliver stillborn, mummified, or weak lambs. Humans may also become infected with *T. gondii*, however very few symptoms are seen in humans.

Tuberculosis (TB): Bovine tuberculosis is a contagious, infectious, communicable disease of animals and humans caused by *Mycobacterium bovis*. It is commonly a chronic, debilitating disease but occasionally may assume an acute, rapidly progressive course. TB is a widespread zoonosis of global magnitude and affects nearly all species of vertebrates. Disease is spread by direct contact, inhalation of droplets expelled from infected lungs, and ingestion of contaminated feed or milk.

Unweaned lamb: A lamb still nursing an ewe or otherwise consuming milk.

Veterinary Client Patient Relationship (VCPR): A VCPR exists when a veterinarian knows sheep well enough to be able to diagnose and treat any medical conditions they develop. The VCPR allows the veterinarian to take responsibility for making clinical judgments about the sheep, accepting the responsibility for providing them with medical care, keeping a written record of the sheep's medical care, advising the owner about the benefits and risks of different treatment options, and providing oversight of treatment, compliance (follow through on their recommendations) and outcome. A VCPR is established when a veterinarian examines the animals in person and is maintained by regular veterinary visits as needed to monitor the animals' health. More information available at <https://www.avma.org/public/PetCare/Pages/VCPR-FAQs.aspx>.

Veterinary Feed Directive (VFD): A written order (paper or electronic) by a licensed veterinarian approving the use of an antibiotic in feed, in the context of a valid veterinarian-client-patient relationship. Since the full implementation of FDA Guidance for Industry #213 on January 1, 2017, a VFD is required for use of medically important antibiotics in feed. The use of medically important antibiotics for production purposes (e.g., growth promotion) is illegal. Medically important antibiotics may only legally be used for therapeutic purposes.

Warehouse: Place that sorts and stores wool before it is sold to processors.

Weaned lamb: A lamb that is no longer nursing an ewe or otherwise drinking milk.

Weaning: Removal of lambs from milk (or liquid ration), whether it is from their mother or an alternative feeding system.

Wether: A castrated male sheep. This term comes from the word 'bellwether', which was the practice of placing a bell around the neck of the sheep which would lead the flock. This sheep would frequently be a castrated male sheep.

Withdrawal period: Refers to the time it takes the body to break down an antibiotic until it is no longer present. This will vary depending on the drug, the animal species, and whether the animal product is milk or meat. The withdrawal period may also be referred to as a withhold period.

Wool: The fleece shorn from sheep. Wool's scaling and crimp make it easier to spin the fleece helping the individual fibers attach to each other, so that they stay together. Wool is spun into yarn or thread and eventually made into garments.

Wool breeds: Primarily sheep breeds selected for their wool quality alongside their adaptability to environmental and forage conditions, milking ability, and longevity. In general, these sheep tend to have white faces and common breeds of wool sheep include Merino and Rambouillet.

Described below are the individuals involved in administration of this questionnaire:

Enumerator: Refers to the individual administering (i.e., asking the questions) for the NAHMS Sheep 2024 General Sheep Management Questionnaire. Throughout this manual, the enumerator is often referred to as “you.”

Regional Field Offices (RFO): NASS has 12 regional offices across the country, each of which is responsible for the statistical work in several states.

Respondent: The individual who answers the questions in the NAHMS General Sheep Management Questionnaire. Throughout this manual, the respondent is often referred to as the producer.

Supervisor: The NASDA or NASS supervisor who oversees the enumerators.