



United States Department
of Agriculture

Animal and Plant Health
Inspection Service

Veterinary Services

March 2023

National Animal Health Monitoring System (NAHMS)

Sheep 2024 Study Field Manual





Contents of VS Manual

VS MANUAL SECTIONS

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VS Training Topics

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SHEEP 2024 VS TRAINING TOPICS

Study and Industry Overview

- Study Overview
- Objectives
- Study Timelines
- Coordinator Tips and Tricks
- Tableau Dashboard Use and Management
- Qualtrics Overview
- Sheep Industry Overview

VS Questionnaire and Biologics Training

- **VS Questionnaire Training**

- **Biologic Overview**

- **Biologic Collection:**
 - **Timeline and Benefits**

 - **Collection Instructions and Videos**

 - **Kit Materials and Laboratory Submission**

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Study Background and Contacts

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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

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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

USDA Center for Epidemiology and Animal Health
NRRC Building B, M.S. 2E7 2150 Centre Avenue
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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NAHMS Sheep 2024 Study Informational Flyer

What is the NAHMS Sheep 2024 Study?

The U.S. Department of Agriculture's National Animal Health Monitoring System (NAHMS) conducts a national sheep study approximately every 10 years. The upcoming Sheep 2024 study will support industry groups and research efforts with new and valuable information on sheep health and management. The study consists of two phases and includes biological sampling and two questionnaires.

Who is Eligible to Participate in the Study?

A random selection of almost 5,000 sheep operations with at least 1 ewe located in the study States (see dark shaded States in the map) will be asked to participate. While participation is voluntary, it is important to obtain high quality data. National Agricultural Statistics Service (NASS) will contact selected participants in January and February 2024. Participants will be asked to provide their contact information to NAHMS in order to complete the second phase of the study, which begins in April 2024 and continues through July 2024.



Why Should I Participate in the Study?

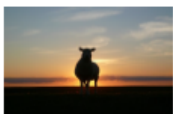
Information from the study will help develop new treatments, controls, and prevention mechanisms for sheep diseases. The results will also guide future research and education. Participants will not only represent themselves but also the producers who were not selected for the study.



Eligible operations will receive FREE testing for enteric microbes, gastrointestinal parasites, and lameness pathogens.

What are the Next Steps?

If you don't currently receive NASS censuses or surveys, sign up at www.agcounts.usda.gov/static/get-counted.html. If NASS contacts you in January 2024, please agree to complete the NAHMS Sheep 2024 study. Until then, you can help spread the word to other producers about the importance of the 2024 study.



To access reports from previous NAHMS studies or information on upcoming studies, visit www.aphis.usda.gov/nahms or scan the QR code.

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SHEEP 2024 STUDY SCHEDULE AND WEBINARS

STUDY SCHEDULE

Study Process	Date
NASS Data Collection	January 2024 – February 2024
Coordinator/Field Training	TBD—March 2024
NASS consent form and participant turnover *NAHMS Coordinators will sign an ADM-043 and a Representative Agreement with NASS during a face to face meeting	TBD- Early March 2024
VMO visits	April – July 2024
Biologics Collection	April – July 2024

NAHMS SHEEP 2024 WEBINARS

Topic
Welcome and study overview
NASS – turnover, consent forms, NASS training schools
Questionnaire Review
Qualtrics Overview
Biologics Review

All webinars can be found on the NAHMS Sheep 2024 website:

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveillance/nahms/sheep_questionnaires

ADD IN LINK TO CLOUD IF WE PLAN TO KEEP DOCUMENTS THERE TOO

STATUS UPDATE SCHEDULE

We will be setting up Tableau Dashboards for each State that you will have access to. This should help with tracking.

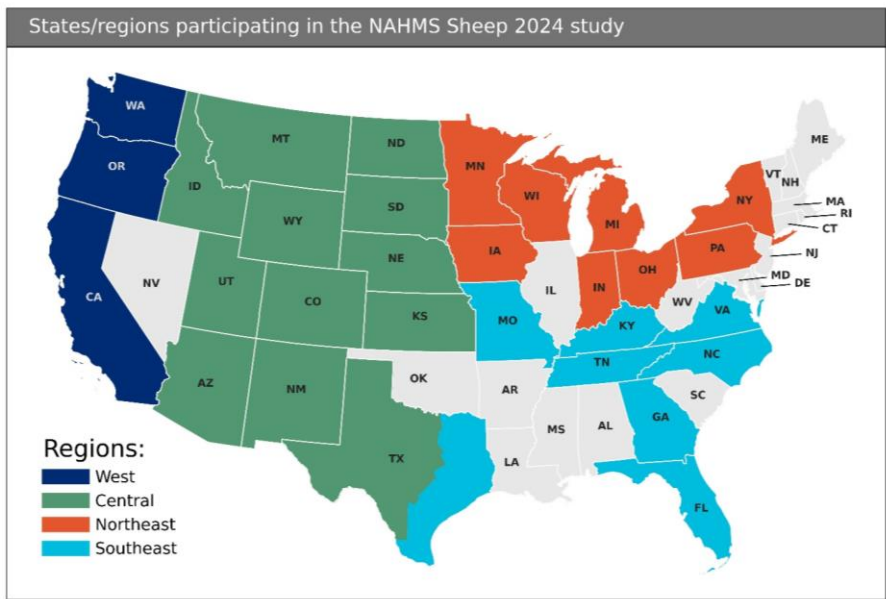
- 1st status report due the end of April
- 2nd status report due the end of May
- 3rd status report due the end of June

Sheep 2024 EXPECTED WORKLOAD PROJECTIONS

2023

State	NASS Operations	NASS Complete	Turnover	VMO Complete	Biologics Complete
AZ	127	67	44	25	16
CA	616	324	209	118	74
CO	264	139	90	51	32
FL	123	65	42	24	15
GA	147	78	51	29	18
ID	147	78	51	29	18
IA	168	89	58	33	21
IN	131	69	45	26	17
KS	131	69	45	26	17
KY	133	70	45	26	17
MI	124	66	43	25	16
MN	149	79	51	29	18
MO	154	81	53	30	19
MT	147	78	51	29	18
NE	147	78	51	29	18
NM	147	78	51	29	18
NC	136	72	47	27	17
ND	147	78	51	29	18
NY	136	72	47	27	17
OH	134	71	46	26	17
OR	256	135	87	49	31
PA	144	76	49	28	18
SD	147	78	51	29	18
TN	148	78	51	29	18
TXE ²	163	86	56	32	20
TXW ²	407	214	138	78	49
UT	127	67	44	25	16
VA	127	67	44	25	13
WA	240	126	81	46	29
WI	169	89	58	33	21
WY	147	78	51	29	18
Total	4,770	2,516	1,632	928	587

²**Eastern TX counties include:** Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bowie, Brazoria, Brazos, Brooks, Burleson, Caldwell, Calhoun, Cameron, Camp, Cass, Chambers, Cherokee, Collin, Colorado, Dallas, Delta, De Witt, Duval, Ellis, Fannin, Fayette, Fort Bend, Franklin, Freestone, Galveston, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Harris, Harrison, Henderson, Hidalgo, Hopkins, Houston, Hunt, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kaufman, Kenedy, Kleberg, Lamar, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, McMullen, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, Shelby, Smith, Starr, Titus, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Wharton, Willacy, Wilson, Wood, Zapata



SHEEP 2024 COORDINATOR LIST

State	Name	Email	Phone Number(s)
AZ			
CA			
CO			
FL			
GA			
ID			
IA			
IN			
KS			
KY			
MI			
MN			
MO			
MT			
NE			
NM			
NC			
ND			
NY			
OH			
OR			
PA			
SD			
TN			
TX			

UT			
VA			
WA			
WI			
WY			
30 Total States			

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SHEEP 2024 COORDINATOR SHIPPING ADDRESSES

Please confirm this is where you want study materials sent.

State	Name	Shipping Address
AZ		
CA		
CO		
FL		
GA		
ID		
IA		
IN		
KS		
KY		
MI		
MN		
MO		
MT		
NE		
NM		
NC		
ND		

SHEEP 2024 COORDINATOR SHIPPING ADDRESSES

Please confirm this is where you want study materials sent.

NY		
OH		
OR		
PA		
SD		
TN		
TX		
UT		
VA		
WA		
WI		
WY		

NAHMS CONTACTS AND SITES

CONTACTS

Name	Title	Phone Number	E-Mail
Dr. Amy Delgado	CEAH Director	(970) 494-7302	amy.h.delgado@usda.gov
Dr. Natalie Urie	Study Lead Vet/Epi	(970) 494-7151	natalie.j.urie@usda.gov
Dr. Katherine Marshall	NAHMS Associate Director	(970) 494-7259	katherine.l.marshall@usda.gov
Dr. Alyson Wiedenheft	Biologics Coordinator	(970) 494-7290	alyson.m.wiedenheft@usda.gov
Ms. Abby Zehr	Field Liaison	(970) 494-7252	abigail.c.zehr@usda.gov


NAHMS Sheep 2024 Website

Study materials, including outreach material, training videos, Tableau tracking dashboards and pdf questionnaires, can be found at the following web address:


https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveillance/nahms/sheep_questionnaires

NAHMS Sheep 2024 Qualtrics Links

Surveys and collection records will be completed online through Qualtrics and can be found at the following links:

Survey	Link	QR Code
Internal Parasite Composite Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/ife/form/SV_cAWVomyZPUkq9qC	

<p>Enteric Microbe Collection Record</p>	<p>https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_5swPfurvMQOTBpY</p>	
<p>Serum and Swab Collection Record</p>	<p>https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_0xQ0CwOvQII5y74</p>	
<p>VS Questionnaire</p>	<p>https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_2mjfJiOmaGpUNGS</p>	

Office Use Only Survey	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_ezjlvGmZkalmqC	
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NAHMS EMAIL

Abigail.C.Zehr@usda.gov

Please send emails for kit requests and questions to Abby Zehr. You may also scan and email documents to Abby.

Note: Initial kit orders will be placed by NAHMS according to State turnover numbers, but additional kits can be requested by emailing Abby.

NAHMS MAILING ADDRESS

USDA:APHIS: VS: NAHMS
2150 Centre Avenue Bldg. B., Mail Stop 2E7
Fort Collins, CO 80526

Please send questionnaires, by UPS, to the attention of Abby Zehr. Please ensure your shipments have a tracking number.

NAHMS SHEEP 2024 TABLEAU WORKBOOK

A Tableau workbook will be updated throughout the study to track the progress of the study. This workbook will include a Directory for field staff, State level data, farm assignments, questionnaire status, biologics status, and biologics kit orders. A link to the Tableau workbook can be found at the NAHMS Sheep 2024 Website (see previous page).



VS Visit

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BEFORE THE VISIT

This section covers several topics regarding the VS field visit. It is important to thoroughly review this material before you make the initial call to the Producers. You should read through the Sheep 2024 Launch Sheet and the Sheep 2024 Timeline and Biological Benefits Sheet (Section 2) to familiarize yourself with the different aspects of the Sheep 2024 Study. Also, please look through the VS Initial Questionnaire (Section 4) before you call the Producers so that you can give them an idea of the types of questions we will be asking.

- a. Coordinators will meet with NASS Regional Field Officers by **March 2024** to sign an ADM-043 form and a NASS Representative Agreement. During the in-person visit, the coordinators will receive the consent forms for operations that agreed to be contacted to learn more about the VS phase.
- b. VS Veterinary Medical Officers (VMOs) and Animal Health Technicians (AHTs) should meet with NAHMS coordinators to sign the ADM-043 form and receive contact information for the assigned operations.

2024 NAHMS GENERAL SHEEP MANAGEMENT QUESTIONNAIRE INFORMATION

The data from the General Sheep Management Questionnaire (GSMQ) completed by the NASS Enumerators is collected January-February 2024. The paper consent forms for the Producers who agreed to have their names turned over (turnover data) to VS (and who you will be contacting) is scheduled to be given to the Sheep 2024 NAHMS Coordinators by March 31, 2024.

To meet confidentiality requirements, NASS must obtain the Producer's written permission to release the Producer's name, address, telephone number, email address, and contact notes to APHIS personnel. Signing the consent form does not obligate the Producer to participate in the rest of the study. Respondents do not need to make a decision about participating in the VS phase (Phase II) of the study until the time of the visit by the VS data collector. The VS data collector can explain the purpose and scope of the VS Phase during the visit. Some Producers may need encouragement from you to participate in the VS phase. One way you can encourage participation is by discussing the benefits of the study to both the individual and the sheep industry, found in the Sheep 2024 Study Launch Sheet and the Sheep 2024 Timeline and Biological Benefits Sheet (Section 2). It is important to promote this study when you speak to the Producers.

STUDY MATERIALS

You will receive the following materials from your NAHMS coordinator:

- **Producer Education Packet**

The material in this packet will provide the Producer with general information about this study along with other useful information related to the sheep industry. We encourage you to go through the packet with the Producer during your visit.

- **Producer Agreement**

The Producer Agreement is the contract between APHIS and the Producer. Both pages of the Producer Agreement must be filled out completely and signed before any farm information is obtained.

- **VS Questionnaires**

The VS Initial Questionnaire (Section 4) will be administered during the visit by VS or State representatives between April and July 2024. NAHMS will ensure that VS data collectors have an iPad which will be used to administer the questionnaire in Qualtrics, an electronic software. In the case of an emergency (e.g., if the iPad dies while you're in the field or has other issues), then you may use a paper form as a back-up option.

Paper copies of the needed materials will be sent to NAHMS State Coordinators and will also be available on the NAHMS website.

- **VS Reference Cards**

Reference cards contain pertinent information such as lists of vaccines, anthelmintic, and antibiotics, along with trade/brand names that can be used to help the Producer answer some of the questions. These reference cards are attached to the VS Initial Questionnaire, can be found in specific biologic kits, and are located in [Section 6](#) of this manual.

- **Biologic Sampling Kits and Collection Forms**

Kits to collect and record biologic samples will be shipped to the Area Office, NAHMS Coordinators, or directly to field staff. NAHMS is going to pre-order kits for Coordinators based on the NASS turnover data. Using the turnover data should help prevent excessive kit orders. Additional kits can be ordered through NAHMS by Coordinators or field staff as needed. The kits include sample collection forms, shipping information, and necessary supplies to complete the collection. [See Section 5](#) for more information regarding the biological collection.

PREPARATION FOR THE INTERVIEW

Review Questionnaire

Familiarize yourself with the VS Questionnaire in the VS Questionnaire Manual section ([Section 4](#)) and the biological sampling collection procedures available in the Biologics Manual section ([Section 5](#)).

Watch the Training Videos

Training videos can be found on the NAHMS Sheep 2024 website:

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveillance/nahms/sheep_questionnaires

- VS training manual video (recorded from VS training sessions)
- Enteric microbe fecal sampling, GI parasite composite fecal sampling, and blood and swab sampling videos

Contact the Producer

Call the Producer and identify yourself. Using the phone script ([Section 3 Page 6](#)), explain you are contacting them to provide information about participation in Phase II of the NAHMS Sheep 2024 Study and that their name and phone number was provided to you by NASS

because they requested to be contacted regarding participation in the next phase of the study. Please fill out the "Contact Attempt History" matrix found in the "Office Use Only" Qualtrics link.

It is important to administer the questionnaire to the person that is most knowledgeable about the operation. This person needs to have the authority to participate in the study and will need to sign the Producer Agreement.

Make an appointment to complete the interview. If directions provided by NASS are not clear, get directions to the site, and then explain what will be covered and how long it will take (about 1.25 hours to review the program and complete the VS Questionnaires with additional time needed to collect the biologics). **Tell the Producer that it will help to have production records available during the interview in order to answer some of the questions. You may email the cheat sheet, link of the questionnaire, or the paper copy of the questionnaire to the Producer prior to the visit so that they will be able to answer the questionnaire more accurately during your in-person interview.**

If the Producer agrees to complete the interview, ask the Producer what biologics they are interested in. This way you will have the appropriate biological kits ready for your visit.

*It may be useful to **provide the Producer your name and telephone number** when you speak for the first time. This will allow the Producer to contact you with any questions or concerns prior to the interview or after the interview.*

PHONE SCRIPT FOR CONTACTING THE PRODUCER

Phone Script: Hello, I am *(give your name and position)*. I am calling about your participation in Phase II of the National Animal Health Monitoring System Sheep 2024 study. Do you have a few minutes to talk to me now, or is there a better time for me to call you back?

(If they say now is OK time to talk, continue.)

I am hoping to provide you with further information about the NAHMS Sheep 2024 study. If you are willing to participate, I would like to schedule a time to meet with you to complete Phase II of the study, which includes free biological testing for gastrointestinal parasites, lameness pathogens and enteric microbes.

Just as a reminder, you would have gotten a few informational items about Phase II of the study when you met with *(name of the NASS representative, if available)*, the National Agricultural Statistics Services representative on *(mention the date consent form from NASS was signed)*. Do you have any questions I could answer on the phone today about the Phase II of the NAHMS sheep study?

(Once you have answered their questions about Phase II then provide them with information that would be helpful to know for answering the VS questionnaire.)

Having records on hand can help reduce the time spent answering questions. The types of records you might want to have available would include:

- Inventory (births, abortions, ages)
- Vaccinations
- Disease presence and testing (including deworming)
- Death losses
- Antibiotic use

Are you interested in completing the following biological testing?

- Gastrointestinal parasite testing
 - NOTE: Operation must not have dewormed in the past 60 days to be eligible
- Blood collection for serum bank
- Fecal pathogen testing to look for *E. coli*, *Salmonella*, *Campylobacter*, and *Enterococcus*
- Interdigital swabs to test for *lameness pathogens*

When would you be available to meet with me – either in person or over the phone?

Can you give me directions to where I can meet you to complete the consent form, the questionnaire, and provide any testing you are interested in? Would you like an emailed copy of the questionnaire prior to our meeting to familiarize yourself with its contents?

Thank you for your willingness to participate in the study.

MATERIAL TO BRING TO THE VS VISIT

- Sheep 2024 VS Training Manual
- Sheep 2024 Producer Education Packet
- Charged iPad and stylus, and phone for hotspot if WiFi is not available
- Paper copies of all questionnaires and collection records in case WiFi or data signal is not strong
- Biological Sampling Kits (1 Enteric Pathogen kit, 1 Composite GI Parasite Kit, and 1 Blood/Swab Kit)
- Gloves, lubricant, saran wrap, and tinfoil
- Vacutainer Needles (if you prefer different gauges or lengths than what is provided)
- Pen
- Business cards

PRODUCER INFORMED CONSENT INSTRUCTIONS

The Sheep 2024 Producer Informed Consent is the contract between APHIS and the Producer.

Confidentiality

The Producer Informed Consent specifically state that data collected by NAHMS will be kept confidential and will not be used for regulatory purposes. The exception to data confidentiality is the suspicion or diagnosis of a dangerously contagious, infectious, or exotic disease foreign to the United States on the Producer's premises, such as foot-and-mouth disease.

Signatures

At the bottom of the first page of the Sheep 2024 Producer Agreement, the Federal or State data collection (YOU) signs on the appropriate line. The Producer or authorized representative signs and dates on the line indicated.

Contact Information

The producer will enter their contact information so you can return biologics results when they are received.

Biological Sampling Agreement

The Producer must agree to participate in each type of biological sampling offered. Participation in any of the biological sampling is voluntary. For example, if the Producer agrees to complete all biological sampling then they must click "**I AGREE TO PARTICIPATE**" for each biologic sampling and sign on the Producer Agreement.

VS QUESTIONNAIRE INFORMATION

The VS Questionnaire is completed during the VS in-person interview. The questionnaire includes questions about herd management and sales practices, vaccination and testing practices, disease control, illness, deaths, nutrition management, and opinions on the significance of health problems. The VS Questionnaire should be administered to all participating operations with 1 or more sheep on the operation.

During the administration of the VS Questionnaire, read all questions to the Producer and follow instructions carefully. **DO NOT LEAVE ANY QUESTIONS BLANK** unless instructed to skip. **Questions left blank hinder data validation and analysis because it is not known if the question was missed accidentally or if the Producer did not have an answer.** We may request you re-contact the Producer for missing data or clarification. Providing a copy of the questionnaire to the Producer to follow along may be helpful.

*If the response is zero (0), enter the number 0; **do not leave the response blank.** If the Producer does not know, work with him or her to try to estimate the answer. If the Producer does not have an answer, use DK or NA (described below) to indicate why the question was not answered. **Please write in the margins to explain unusual circumstances or answers.***

If the Producer doesn't know, circle "DK" in the response line or write in "DK" and explain in the margin the problem the Producer had with the question. If a question is not applicable to the Producer, circle "NA" in the response line or write in "NA" and again explain in the margin.

If the answer is unusual or quality of the data is questionable, record the answer and write notes next to the question explaining the abnormal data. Do not hesitate to write comments directly on the questionnaire. We would rather have a lengthy explanation for a strange answer than no explanation at all. If an answer does not make sense and has no explanation, we may have your coordinator ask you to explain the answer.

At times during the interview, a Producer may feel uncomfortable providing the requested data without consulting records. Producers should be given additional time to look up the information or report it by telephone to you later as long as the timeliness of data submission is not adversely affected. Also, some Producers may be reluctant to provide estimates where records are not available. In this case, the Producer should be encouraged to respond, and the circumstances for the response should be noted in the margin next to the pertinent question. We will take these notes into account when assessing overall data quality for the operation/questionnaire.

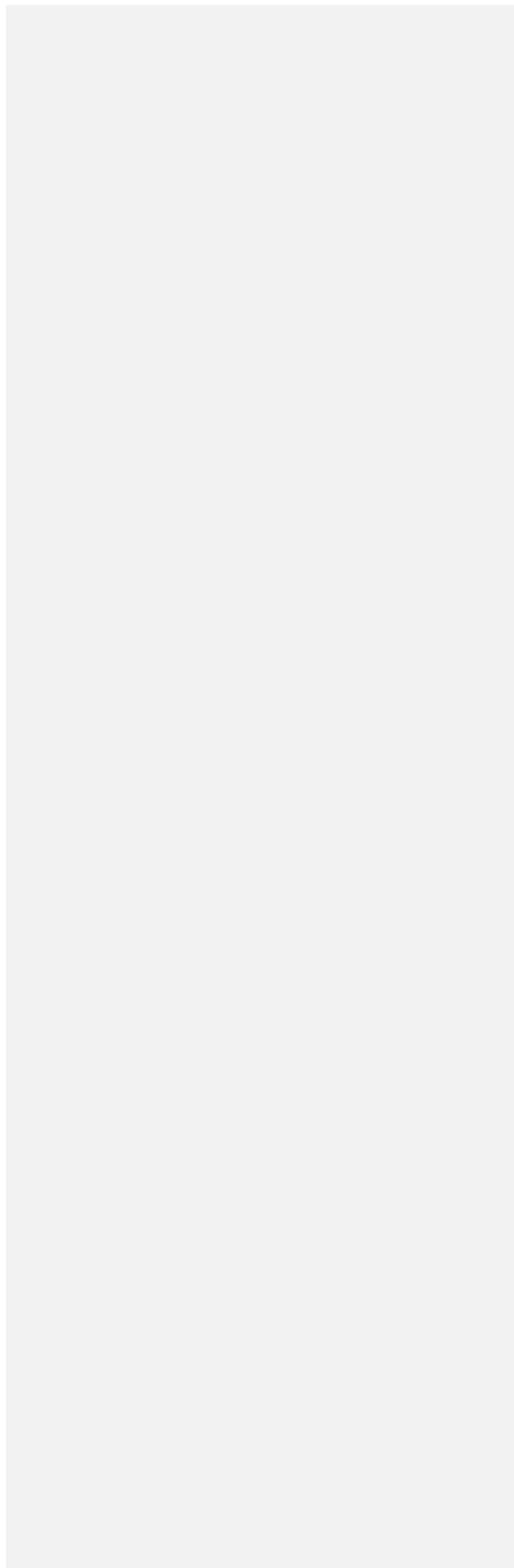
*NAHMS is a voluntary program. **If the Producer doesn't want to answer a question, respect this request, make a note on the questionnaire, and move on to the next question.***

Return the completed questionnaire to your NAHMS Coordinator within 3 working days of the visit.

Nonrespondent Documentation

We must account for all operations turned over by NASS. If a Producer declines to participate or could not be reached, complete the "Office Use Only" section of the questionnaire. Include the State, operation number, interviewer's initials, date, time spent talking with the Producer, travel time (if any), data collector information, contact attempt history, and the Producer's reason for declining in the "Office Use Only" section. Send this page to the coordinator within 3 days.

You may copy the final page of the questionnaire to complete for non-respondents.



SHEEP 2024 VS VISIT QUESTIONNAIRE GUIDE

Read all questions to the Producer and follow instructions carefully. **Do not leave any questions blank** unless instructed to skip. Questions left blank hinder data validation and analysis because it is not known if the question was missed accidentally or if the Producer did not have an answer. We may request you re-contact the Producer for missing data or clarification.

Do not hesitate to write comments directly on the questionnaire. We would rather have a lengthy explanation for a strange answer than no explanation at all. If an answer does not make sense and has no explanation, we might have to ask your Coordinator to ask you to explain the answer, delaying data entry.

Note: If the response is zero (0), enter the number 0; do not leave the response blank. If the Producer does not know, work with him or her to try to estimate the answer. If the Producer does not have an answer, **use DK for Don't Know or NA for Not Applicable** to indicate why the question was not answered. **Please write in the margins to explain unusual circumstances or answers.**

At times during the interview, a Producer may feel uncomfortable providing the requested data without consulting records. Producers should be given additional time to look up the information or report it by telephone to you later as long as the timeliness of data submission is not adversely affected. Also, some Producers may be reluctant to provide estimates where records are not available. In this case, the Producer should be encouraged to respond, and the circumstances for the response should be noted in the margin next to the pertinent question. We will take these notes into account when assessing overall data quality for the site.

INITIAL INFORMATION

NAHMS ID

Enter the 6-digit ID number assigned by NASS.


Note: The 6-digit combination of the State FIPS Code and Operation numbers is referred to as the Farm ID or NAHMS ID. For example, 21 1167 would be a Farm (NAHMS) ID for the State of KY.

NASS will provide an EPAID ID (see example below) on the consent form. The EPAID ID will contain 3 extra zeroes between the State FIPS and the operation number. For example, 21 000 1167 is an EPAID ID. Please ignore the 3 middle zeroes when you record the Farm (NAHMS) ID.

EPAID Example:

NATIONAL AGRICULTURAL STATISTICS SERVICE
2017 NAHMS BEEF COW-CALF STUDY CONSENT FORM

For release of information for:



21 300045140 1 1 2643 280325 0
SURVEY CODE=21-300042201-JXWWWV

() -
STR 2 260
20 177
0 21798 21798

(Consenting Operator: Hereafter referred to as YOU)

The USDA's Animal and Plant Health Inspection Service's (APHIS) National Animal Health Monitoring System (NAHMS) is implementing a study of U.S. beef cow-calf operations with at least 4 beef cow-calf operations.

NOTES:

The first two digits are the state FIPS code

The last four digits are the operation ID

EPAID: 210001167

This means the NAHMS ID for this operation will be the FIPS code and the operation ID, or 211167

Interviewer's Initials

Enter up to three initials.

Date

Enter the interview date in MM/DD/YY format.

Time

Enter the time you arrived at the operation in HH:MM format using military time.

Question Types

SECTION A: INVENTORY

The following definitions may be useful when completing this section of the questionnaire:

Lamb: A sheep less than 1 year old.

Preweaned: A lamb that is still nursing or being fed milk replacer.

Ewe: A female sheep.

Ram: A male sheep.

Wether: A castrated ram.

SECTION B: BREEDING MANAGEMENT

The following definitions may be useful when completing this section of the questionnaire:

SECTION C: LAMBING MANAGEMENT

The following definitions may be useful when completing this section of the questionnaire:

SECTION D: LAMB CROP MANAGEMENT

The following definitions may be useful when completing this section of the questionnaire:

Pasteurization: A process, named after scientist Louis Pasteur, that applies heat to destroy pathogens in foods. For the dairy industry, the terms "pasteurization," "pasteurized" and similar terms mean the process of heating every particle of milk or milk product, in properly designed and operated equipment, to a specific temperature and held continuously at or above that temperature for at least the corresponding specified time. The most common method of pasteurization in the United States today is High Temperature Short Time (HTST) pasteurization, which uses metal plates and hot water to raise milk temperatures to at least 161° F for not less than 15 seconds, followed by rapid cooling.

SECTION E: CULLING MANAGEMENT

The following definitions may be useful when completing this section of the questionnaire:

SECTION F: BIOSECURITY

The following definitions may be useful when completing this section of the questionnaire:

SECTION G: SHEEP HEALTH MANAGEMENT

The following definitions may be useful when completing this section of the questionnaire:

Caprine Arthritis Encephalitis (CAE): The CAE virus causes arthritis in adult goats and encephalitis in kids between 2 and 6 months old. Infection can also lead to hard udder or mastitis, reduced milk production, chronic pneumonia, and progressive weight loss. Some goats can be infected without showing any clinical signs, thus serving as a hidden source of infection for other goats in the herd. The virus can be transmitted through ingestion of infected goat milk or colostrum; contact with contaminated blood, saliva, respiratory secretions, or vaginal secretions; contact with contaminated equipment, such as milking equipment, needles, or tattooing equipment; and breeding of noninfected animals with infected animals. Economic losses associated with CAE include loss of milk production (may be up to 30%), early culling, and shorter lifespan and reduced growth of offspring.

Caseous Lymphadenitis (CL): CL is characterized by abscesses in the skin, lymph nodes, and internal organs. CL is caused by a bacterium, *Corynebacterium pseudotuberculosis*. 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 bacteria also can be spread 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.

Herd Health Management Plan: A set of written protocols that directly relate to the management of animal health on the operation, including key factors such as disease control measures (e.g. vaccination and quarantine protocols), disease testing and/or necropsy protocols, feed and water resource management, or structural/enclosure management.

Isolation or Quarantine: Physical separation of an animal or group of animals from other sheep on the operation, with no physical contact allowed.

Johne's Disease: A contagious disease of cattle and other ruminants, including sheep, that results in weight loss despite a normal appetite and proper nutrition. Diarrhea can also occur, but is less common in sheep than in cattle. The disease is caused by the bacterium *Mycobacterium avium* subspecies *paratuberculosis*, which can survive in the environment for up to a year and remain infectious to ruminants. 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.

(Definitions continued)

Sore mouth (orf, contagious ecthyma): Sore mouth is caused by a pox virus and is highly contagious in sheep, especially young lambs. 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 viable virus, can fall off the animal and remain in the environment, providing a source of infection for other animals. Although the virus is zoonotic, the sores that infected people can contract are not infective for other people. However, they may be painful and last for 2 months, but they usually heal without scarring.

SECTION H: PARASITE CONTROL

The following definitions may be useful when completing this section of the questionnaire:

The questions in this section refer to all lambs and adult sheep. Feed includes milk, milk replacer and starter.

Note: The reference period for this section is January 1, 2023 through December 31, 2023.

SECTION I: LAMENESS

SECTION J: ANTIMICROBIAL USE IN FEED AND WATER

The following definitions may be helpful in completing this section of the questionnaire:

Coccidiostat: Coccidiostats are any of a group of chemical agents mixed in feed or drinking water to control parasitic coccidiosis in animals. Coccidiostats inhibit the growth but does not kill the coccidia (*Eimeria* spp).

Ionophore: An antibiotic for disease prevention or growth promotion. Ionophores are unique antibiotics that are particularly successful at targeting protozoan lifecycles and inhibiting growth. Their use is confined to production animals and are primarily used to control coccidiosis in animals.



SECTION K: HEALTH CONDITIONS AND LOSSES

OFFICE USE ONLY

This is the conclusion of the interview. The purpose of this section is to provide NAHMS with information about the time and people spent completing this questionnaire. Additionally, this section provides a bit more information regarding data quality, which is taken into consideration when entering the data.

Top Box: Operation Information

In the box at the beginning of the Office Use Only Section enter the State FIPS ID, the operation number, your initials, and the date the interview was completed.

Commented [MRMA3]: Not sure how this looks in Qualtrics

Item 1: Total Interview Time

Enter the total time it took to complete the interview. Be sure to include the time it took to discuss the program and complete the questionnaire. If more than one data collector was present, such as a VMO and AHT, enter the time combined for both people.

Item 2: Total Travel Time

Enter the total time it took to drive to your ODS to the interview and back. If more than one data collector was present, such as a VMO and AHT, enter the time combined for both people.

Item 3: Data Collectors

Enter the number of people in each category present for the interview.

Item 4: Data Quality

Enter the response code that best describes the status of the questionnaire for this operation. If the operation completed the questionnaire enter '99'. If the operation did not complete the questionnaire, choose the response code that best fits the Producer's reason for not completing the questionnaire. If the operation was not eligible to complete the questionnaire enter response code '06'.

Item 5: Producer data quality

Select the option that best described the data quality of this questionnaire. If a large majority of the data is missing or large sections were skipped and records were not consulted, then data quality should be considered poor. If the whole questionnaire was completed and records were consulted, then data quality should be considered good to excellent.

Item 6: Field data quality

Select the option that best described the data quality of this questionnaire. If a large majority of the data is missing or large sections were skipped and records were not consulted, then data quality should be considered poor. If the whole questionnaire was completed and records were consulted, then data quality should be considered good to excellent.

Commented [MRMA4]: What's the difference between producer data quality and field data quality?

Comments:

Please use this section to provide any more insight that you believe will be valuable for NAHMS when reviewing the questionnaire.

Signature:

Please sign that you have reviewed and completed this questionnaire.

QUALTRICS OVERVIEW

Biologics Manual

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COMPONENTS OF BIOLOGICS: OVERVIEW

- 1. Enteric Microbe Testing:** VS-collected fecal samples will be tested for *Salmonella*, *E. coli*, *Campylobacter*, and *Enterococcus* (sample subset). Antimicrobial susceptibility testing will also be done on the isolates. Duplicate fecal samples will be collected from up to 25 sheep, with samples taken from 5 sheep in each of the following sheep types (using this priority order): pregnant ewes, nursing ewes, preweaned lambs, weaned lambs, and open ewes. If one sheep type is not present on the operation, collect extra samples from the highest priority sheep type, to up to 10 sheep in each type. Producer reports containing results for *Salmonella*, *E. coli*, and *Campylobacter* will be generated, and sealed reports will be sent to Coordinators for distribution within 3 months of sample collection.
- 2. GI Parasite Composite:** VS-collected composite fecal samples will be tested for GI parasites. Fecal egg counts of *Trichostrongylus* spp will performed on all composites. A subset of the samples (based on regions) will undergo resistance testing using The DrenchRite[®], a diagnostic alternative to the laborious task of performing fecal egg count reduction tests (FECRT), to determine the effectiveness of dewormers. VS will be responsible for collecting fecal samples from 6-10 sheep. Producer reports containing FECs of *Trichostrongylus* spp. for the composites samples will be generated, and sealed reports will be sent to Coordinators for distribution within 3 months of sample collection. Additional resistance results will be included for those operations that receive DrenchRite[®] testing.
- 3. Blood and Serum Banking:** Up to 25 blood samples from ewes greater than 15 months of age will be collected by VS, in tiger top SST tubes. Additionally, up to 15 blood samples will be collected in purple-top EDTA tubes. The serum and blood will be aliquoted and stored at NVSL for future research into diseases of concern to the sheep industry. **No results will not be returned to the Producer.** Sheep that have this blood sample taken can participate in lameness testing looking for foot rot pathogens.
- 4. Lameness Pathogen Testing:** Sterile cotton swabs will be used for interdigital swab samples collected by VS. Up to 25 ewes that had serum samples collected can have interdigital swabs collected. Producer reports containing results for the detection of potential lameness (foot rot) pathogens will be generated, and sealed reports will be sent to Coordinators for distribution within 3 months of sample collection.

BIOLOGICS DESIGN

Fecal Collection: Enteric Microbe Kit Fecal testing for microbes and detection of antimicrobial resistance (AMR)

VS Fecal Collection

- Up to 25 sheep sampled
- Collect samples from 5 sheep from each of the following sheep types (in this order): Pregnant ewes, nursing ewes, preweaned lambs, weaned lambs, and open ewes. If one sheep type is not present on the operation, collect extra samples from the highest priority sheep type, to up to 10 sheep (ie, if no preweaned lambs are present, collect from up to 5 more pregnant ewes).
- Two samples/sheep: At least 5 pellets in whirl-pak bag and 5 pellets in a tube

*NCSU: North Carolina State University
**NVSL: National Veterinary Services Laboratory
***ISU: Iowa State University

Samples shipped to NCSU* in EM Kit Box

- Samples tested for *Salmonella*, *E.coli*, and *Enterococcus* (subset).
- *E.coli* isolates tested for antimicrobial susceptibility
- *Salmonella* and *E.coli* results reported to participants

Isolates shipped to NVSL**

- *Salmonella* and *Enterococcus* isolates tested for antimicrobial susceptibility
- Results **are not** reported to participants

Samples shipped to ISU***

- Samples tested for *Campylobacter*
- *Campylobacter* isolates tested for antimicrobial susceptibility
- Isolate results reported to participants

Fecal Collection: GI Parasite Composite Kit Fecal testing for *Trichostrongylus* spp and anthelmintic resistance

VS and Producer Fecal Collection

- Sample from 6-10 sheep that have not been dewormed in the previous 60 days
- Collect 5-6 pellets collected per sheep
- Make a composite with the samples and form into cigar shape.

Samples shipped to LSU** in P Kit Box**

- Sample tests include *Trichostrongylus* spp Fecal Egg Counts and specific regions will have a DrenchRite® to test for anthelmintic resistance
- Results reported to participants

****LSU: Louisiana State University

Blood and swab collections: Blood/Swab Kit

Testing for: serum and blood bank (future testing) and lameness (foot rot) pathogens (*Treponema spp.*, *Dichelobacter nodosus*, *Fusobacterium necrophorum*)

VS Blood (Serum): Tiger Top SST Tube Collection

- Sample from ewes at least 15 months of age
- Sampling numbers:
1-19 ewes on the operation.....Sample all ewes
20-49 ewes on the operation.....Sample 20 ewes
50 or more ewes on the operation.....Sample 25 ewes
- Fill one 8ml-tiger top tube/sheep

VS Blood Purple Top Tube Collection

- Sample from ewes at least 15 months of age
- Up to 15 sheep Fill one 10ml-purple top tube/sheep

VS Interdigital Swab Collection

- Sample from same ewes sampled as for tiger-top blood samples
- Swab the interdigital skin of at least 2 feet per ewe
- Insert the swab into the plastic tube, breaking off the stick inside the tube.
- Take digital photo of any suspected foot rot

Tiger top and purple top blood tubes sent to NVSL* Serology in BS Kit Box

- Blood (serum) is processed and serum is aliquoted (4 sets) and cataloged for serum bank
- 4 sets of each serum sample for serum bank used for future research
- 4 set of each blood sample for blood bank used for future research
- Results **are not** reported to participants

Swab sent to NVSL ARS in BS Kit Box

- Samples test for presence of lameness (foot rot) pathogens: *Treponema spp.*, *Dichelobacter nodosus*, and *Fusobacterium necrophorum*
- Results reported to participants

* NVSL: National Veterinary Services Laboratory

**ARS: Agricultural Research Service

SAMPLING PLAN

If an operation has 50 or more sheep, the following sampling plan can be used:

Biologic Kit Type	Testing	Sample type	Sheep sample number	Sheep type	Sample per Sheep
Enteric Pathogen	Enteric pathogens	Fecal Pellets	*5	Pregnant ewes	10 pellets, divided into 1 bag and 1 tube
Enteric Pathogen	Enteric pathogens	Fecal Pellets	*5	Nursing ewes	10 pellets, divided into 1 bag and 1 tube
Enteric Pathogen	Enteric pathogens	Fecal Pellets	*5	Open ewes	10 pellets, divided into 1 bag and 1 tube
Enteric Pathogen	Enteric pathogens	Fecal Pellets	*5	Preweaned lambs	10 pellets, divided into 1 bag and 1 tube
Enteric Pathogen	Enteric pathogens	Fecal Pellets	*5	Weaned lambs	10 pellets, divided into 1 bag and 1 tube
GI Parasite Composite	GI parasites	Fecal Pellets	**6-10	Sheep and lambs	5-6 pellets
Blood and Swab	Blood banking	Blood-serum	***25	ewes >15 month old	Tiger top 8ml tube
Blood and Swab	Blood banking	Blood	***25	Subset of blood-serum ewes	Purple top 10ml tube
Blood and Swab	Lameness pathogens	Interdigital Swab	***25	ewes (same as blood-serum ewes)	Nasal Swab (red cap)

*** If one sheep type is not present on the operation, collect extra samples from the highest priority sheep type, to up to 10 sheep of each type. Sample from no more than 25 sheep per operation.**

****Composite sample**

*****If collecting both tiger top and purple top blood tubes, collect tiger top blood tubes first.**

If the operation has fewer than 50 ewes, use the following sampling plan for blood and nasal swab samples:

1-19 ewes on the operation..... Sample all ewes

20-49 ewes on the operation..... Sample 20 ewes

50 or more ewes on the operation Sample 25 ewes

KIT ORDERS AND COLLECTION SCHEDULE

KIT ORDERS

NAHMS will place 2 rounds kit orders based on State turnover numbers. The first round of kits will be to State Coordinators for distribution BEFORE the study starts. The second round of kits will be sent to State Coordinators for distribution soon AFTER the study begins. Additional kits can be requested by emailing Alyson Wiedenheft at alyson.m.wiedenheft@usda.gov

BIOLOGICS COLLECTION TIMELINE

***VS Collection: Collection dates are April 2024 – July 2024**

Fecal Collection Scheduling: Schedule: Please try to follow the fecal collection schedule or contact us if you need an exception.

Group 1: Collection dates are April 1 – July

Group 2: Collection dates are April–May 30

Group 3: Collection dates are June 1 – July 31

Group 1: Collection dates are April 1 – July 31
TX

Group 2: Collection dates are April–May 30
South West (KY, NC, GA, FL)
North East (MI, PA, OH, MN)
Central (NM, SD, NE KS, MT, CO)
West (CA)

Group 3: Collection dates are June 1 – July 31
South West(TN, VA, MO)
North East (IA, WI, IN, NY)
Central (AZ, WY, UT, ND, ID)
West (OR, WA)

*We recommend, for liability reasons, that VMOs are present during VS collection. AHTs are welcome to assist VMOs with the collection.

COLLECTION AND SHIPPING DAYS

Kit	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Enteric Pathogen	Collect*	Collect	Collect	Collect**			
		Ship	Ship	Ship			
GI Parasite Composite	Collect*	Collect	Collect	Collect**			
		Ship	Ship	Ship			
Blood/ Swab	Collect*	Collect	Collect	Collect	Collect***	Collect***	Collect***
		Ship****	Ship****	Ship****			

*Samples collected on Sunday must be kept refrigerated until they can be shipped. Most FedEx sites are closed on Sundays. Fecal samples must be shipped within 24 hours of collection.

Fecal samples collected on Wednesday must be shipped on the **same day. Fecal samples should not be collected Thursday-Saturday.

***Blood and swab samples collected on Thursday-Sunday must be kept refrigerated until they can be shipped on the following Monday. These sampling days apply only to operations that do not want fecal samples taken or will have fecal samples collected on a different day (Sunday-Wednesday).

Digital Collection Record: Tips and links

Make sure you charge your iPad and stylus before you visit the operation.

Use your phone hot spot to connect your iPad to the network.

The QR code and the URL to the Collection Record will be on the instructions that are included in the kits.

Multiple collection record tabs can be opened at once on the iPad. We recommend opening all the both the enteric microbe tab and the GI parasite composite tab and toggle back and forth between the two collection records.

The number zero is often recognized as the letter o, so using the keypad for number is recommended.

Survey	Link	QR Code
GI Parasite Composite Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_cAWVomyZPUkq9qC	
Enteric Microbe Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_5swPfurvMQOTBpY	
Blood and Swab Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_0xQ0CwOvQlI5y74	



National Animal Health Monitoring System (NAHMS)

Enteric Microbe Collection Record

NAHMS ID:

Primary collector:

Name

Phone number

Enteric Kit # on labels:

How many sheep will data be collected for?



National Animal Health Monitoring System (NAHMS)

NAHMS Sheep 2024 Internal Parasite Composite Collection Record

- Sample should be kneaded and formed into a composite cigar shape while still fresh.
- Ship within 24 hours of collection on Monday through Wednesday.
- If sample cannot be formed into a composite cigar shape on site, store in the refrigerator for less than 24 hours before kneading/shaping/wrapping, and shipping.

IF POSSIBLE, COLLECT SAMPLES FROM SHEEP THAT ARE SUSPECTED TO HAVE HIGHER LEVELS OF PARASITES.

NAHMS ID: (6 digits)

Parasite Kit ID:

What is the total number of animals you sampled? (Should equal the number of sheep listed below)



National Animal Health Monitoring System (NAHMS)

Blood and Swab Collection Record

Sample ewes that are at least 15 months of age.

NAHMS ID:
(6 digits)

Kit #:
(Printed on labels)

Primary Collector Information

Name

Phone



Animal and
Plant Health
Inspection
Service

Veterinary
Services

NAHMS Sheep 2024 Enteric Microbe Individual Sample Collection Record

National Animal Health
Monitoring System

2150 Centre Ave, Bldg B
Fort Collins, CO 80526

Form Approved
OMB Number xxxx
Expires: xxxx

Supplies sent to Coordinators: Lubricant

Kit contents:

25 small Whirl-pak® bags, 25 polystyrene tubes, 2 gallon sized Ziploc® bags, 2 ice packs, 1 liner bag, 1 large insulated cooler, and paperwork that includes instructions, submission form, duplicate labels, and 1 FedEx airbill addressed to NCSU in Raleigh, NC. You will need to provide your own gloves. Clean gloves are needed for each animal.

Collection Instructions

Collect fecal samples Sunday-Wednesday. Collect **duplicate** fecal samples from 5 sheep from each of the following sheep types: pregnant ewes, nursing ewes, preweaned lambs, weaned lambs, and open ewes. If one sheep type is not present on the operation, collect extra samples from the highest priority sheep type, to up to 10 sheep. **The sample priority order is pregnant ewes, nursing ewes, preweaned lambs, weaned lambs, and open ewes.**

Fresh samples are a must. Collect from the rectum or immediately off the ground while samples are still warm. Rectal retrieval might not be possible on some sheep (e.g. preweaned lambs).



Collect AT LEAST 10 fecal pellets from each animal. For each animal, place 5 fecal pellets into one Whirl-pak® bag and 5 fecal pellets in a polystyrene tube. On the duplicate labels provided, write the sheep's name or ID and attach the labels onto the bag and tube for each sheep. Make sure you label the tubes with the correct sample numbers and IDs.

Close the labeled Whirl-pak® and tubes for each animal and divide them into 2 Ziploc® bags.

Place your Whirl-pak® bag samples into one gallon sized Ziploc® bag **labeled NCSU** and the second tube sample in a second gallon sized Ziploc® bag **labeled ISU**. Once all labeled samples are placed into the Ziplocs®, secure the Ziploc® bags closed. Place both gallon sized Ziploc® bags into 1 liner bag. Cool down samples with ice packs, but do not freeze the samples. If necessary, replace ice packs with frozen ones before shipping.

RECTAL RETRIEVAL


To avoid contamination from common organisms on the ground, rectal retrieval is best. Rectal retrieval might not be possible on some sheep (e.g. preweaned lambs), and fresh off the ground samples are acceptable.

	<p>1. Apply lubricating jelly to the glove before entering the rectum.</p> <ul style="list-style-type: none">➤ Lightly stroking the rectum might encourage defecation.		<p>2. Collect duplicate samples.</p> <ul style="list-style-type: none">➤ Retrieve a minimum of 10 pellets per animal (5 pellets for one Whirl-pak® bag and 5 pellets for the tube).
<p>3. On each label, write the sheep's name or ID and attach them on to a Whirl-pak® bag and a tube. Place the labeled Whirl-pak® and tube inside separate gallon sized Ziploc® bags.</p> <p>4. Continue collecting samples from other sheep using a clean glove for each animal.</p>			

Collection Record

Fill out the pink submission form and the digital collection record.

Use the QR code or the URL below to access the Enteric Microbe Digital Collection Record.

Enteric Microbe Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_5swPfurvMQOTBpY	
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Shipping Instructions

Ship on Sunday-Wednesday. Keep samples cool and ship within 24 hours of collection. Wednesday collections must be shipped the same day. Do not collect or ship samples Thursday through Saturday.

Place all the samples in the liner bag and tie shut. Place an ice pack on the top and bottom of the samples. Add filler to box if necessary. Close the insulated cooler box.

Place the filled out pink submission form on top of the cooler lid and seal the cardboard box.

Secure the box and ship to NCSU in Raleigh, North Carolina, within 24 hours. Ship only Monday-Wednesday.

Enteric Microbe Collection Record

NAHMS ID	Primary collector:	Date:	Enteric Kit # on labels:
6 digits <small>eid</small>	Name and phone number <small>ename/eph</small>	(mm/dd/yy) <small>edate</small>	<small>ekit</small>

e101	e102	e103m/e103y	e104	e105	e106a-d	e107a-e/107oth	e108	e109a-e/109otha-othc
1. Sample #	2. Sheep name or ID	3. Age (months or years)	4. Sheep Type 1= pregnant ewe 2=nursing ewe 3=preweaned lamb 4=weaned lamb 5=open ewe	5. IF sheep type =1 or 2, provide date lambled or expected date to lamb (mm/dd/yy)	6. Sheep housing 1= housed in individual pens 2=housed with other sheep of same type (column 4) 3=housed with other sheep types (column 4) 4=housed with other livestock (specify livestock) <i>[List all that apply]</i>	7. Condition(s) in past 30 days 1=diarrhea 2=fever 3=respiratory infection 4=thin 5=other (specify) <i>[List all that apply]</i>	8. Did this animal receive individual antimicrobial therapy in the last 30 days? (Yes/No) <i>[If No, SKIP column 9]</i>	9. Which individual antibiotic(s) were given in the last 30 days? <i>[See reference card and enter code]</i>
1		__ mo OR __ yr						
2		__ mo OR __ yr						
3		__ mo OR __ yr						
4		__ mo OR __ yr						
5		__ mo OR __ yr						
6		__ mo OR __ yr						
7		__ mo OR __ yr						
8		__ mo OR __ yr						
9		__ mo OR __ yr						
10		__ mo OR __ yr						

1. Sample #	2. Sheep name or ID	3. Age (months or years)	4. Sheep Type 1= pregnant ewe 2=nursing ewe 3=preweaned lamb 4=weaned lamb 5=open ewe	5. IF sheep type =1 or 2, provide date lambbed or expected date to lamb. (mm/dd/yy)	6. Sheep housing 1= housed in individual pens 2=housed with other sheep of same type (column 4) 3=housed with other sheep types (column 4) 4=housed with other livestock (specify livestock) <i>[List all that apply]</i>	7. Condition(s) in past 30 days 1=diarrhea 2=fever 3=respiratory infection 4=thin 5=other (specify) <i>[List all that apply]</i>	8. Did this animal receive individual antimicrobial therapy in the last 30 days? (Yes/No) [If No, SKIP column 9]	9. Which individual antibiotic(s) were given in the last 30 days? <i>[See reference card and enter code]</i>
11		__ mo OR __ yr						
12		__ mo OR __ yr						
13		__ mo OR __ yr						
14		__ mo OR __ yr						
15		__ mo OR __ yr						
16		__ mo OR __ yr						
17		__ mo OR __ yr						
18		__ mo OR __ yr						
19		__ mo OR __ yr						
20		__ mo OR __ yr						

1. Sample #	2. Sheep name or ID	3. Age (months or years)	4. Sheep Type 1= pregnant ewe 2=nursing ewe 3=preweaned lamb 4=weaned lamb 5=open ewe	5. IF sheep type =1 or 2, provide date lambded or expected date to lamb. (mm/dd/yy)	6. Sheep housing 1= housed in individual pens 2=housed with other sheep of same type (column 4) 3=housed with other sheep types (column 4) 4=housed with other livestock (specify livestock) <i>[List all that apply]</i>	7. Condition(s) in past 30 days 1=diarrhea 2=fever 3=respiratory infection 4=thin 5=other (specify) <i>[List all that apply]</i>	8. Did this animal receive individual antimicrobial therapy in the last 30 days? (Yes/No) [If No, SKIP column 9.]	9. Which individual antibiotic(s) were given in the last 30 days? <i>[See reference card and enter code]</i>
21		___ mo OR ___ yr						
22		___ mo OR ___ yr						
23		___ mo OR ___ yr						
24		___ mo OR ___ yr						
25		___ mo OR ___ yr						

Were samples: ₁ stored overnight OR ₂ shipped the same day as collected? estore

How many people in each category helped with the collection of the individual fecal samples?

_____ Fed VMO evmo _____ Fed AHT eaht _____ State government estate _____ Producer eprod _____ Other, specify eoth/eothsp:

Total sample time _____ hours ehr

NAHMS Sheep 2024

Enteric Microbe Submission Form

NAHMS ID:
6 digits

Date:
mm/dd/yy

Kit #:
Printed on labels

1. Number of fecal samples?

0-25

ENTERIC MICROBE ITEMS OF NOTE

1. We recommend collecting the GI parasite composite samples at the same time.
2. Digital Collection Record: Have the digital record up and record data for each sheep as you go. You can have both the GI parasite composite and the enteric microbe collection record tabs open and toggle back and forth between the two collection records.
3. The term “sheep type” is used in the collection record. For this study, use this term to place the sheep sampled into the following categories:
 - a. Pregnant ewe
 - b. Nursing ewe
 - c. Preweaned lamb
 - d. Weaned lamb
 - e. Open ewe
4. Collection schedule: Both the Enteric and Fecal Parasite laboratory have a maximum number of samples it can accept per week. Please schedule your farm visit and sample collection according to the collection schedule. Please communicate with NAHMS will to discuss the scheduling options, if needed.
[add schedule here]
5. The sampling priority order for the sheep was designed by the laboratory to best achieve our biological goals. If one sheep type is not present on the operation, collect extra samples from the highest priority sheep type, to up to 10 sheep. Sample from no more than 25 sheep per operation. Please be sure to sample sheep in this order:
 - a. Pregnant ewes- sample 5 sheep
 - b. Nursing ewes- sample 5 sheep
 - c. Preweaned lambs- sample to 5 sheep
 - d. Weaned lambs- sample 5 sheep
 - e. Open ewes- sample 5 sheep
6. Collect 10 pellets per animal (15 if you are also collecting parasite composite samples); five pellets will go in one small whirlpak bag and five pellets will go in tube. If a sheep is short on fecal pellets, collect at least 5 pellets for the whirlpak bag. After labeling and sealing both bag and the tube for each sheep, place the whirlpak bag into the gallon sized ziplock labeled NCSU. Place the tubes into the gallon sized ziplock labeled ISU. This will keep the sets together for the laboratories.
7. Use a clean glove and lubricant for each animal. Rectal retrieval is best, but ground samples are acceptable if necessary (e.g. preweaned lamb).
8. Please use the antibiotics reference card included with the enteric microbe kit paperwork to fill out the column about the antimicrobial therapy found on the collection record. The reference cards can be found in the reference card tab in this manual. This reference card is the same as the one used to answer the VS questionnaire antibiotics questions.

9. A producer report with results for *Salmonella*, *E. coli*, *Campylobacter* will be sent to Coordinators for distribution within 3 months of collection. Since only a subset of samples will be tested for *Enterococcus*, this microbe will not be include in the report. An example of the enteric microbe producer report is on the following pages.

National Animal Health Monitoring System (NAHMS) Enteric Microbe Report

Date of report:

ID:

Dear participant,

Thank you for participating in the enteric microbe testing portion of the NAHMS Sheep 2024 Study. This report contains testing results for *Salmonella*, Shiga toxin-producing *E. coli* (STEC), and *Campylobacter* performed on sheep at your operation. Please consider sharing these results with your veterinarian.

If you have questions about the accuracy of your results, please contact Dr. Alyson Wiedenheft, the NAHMS biologics coordinator at Alyson.M.Wiedenheft@usda.gov.

Background on *Salmonella*, *E. coli*, and *Campylobacter*:

The bacteria *Salmonella*, *E. coli*, and *Campylobacter* all can inhabit the intestinal tract of sheep and can be shed in their feces. Sheep that are shedding these enteric microbes can have clinical signs such as diarrhea or fever, or can appear totally healthy. *E. coli* are normal (commensal) flora of the intestines of humans and animals, and while many subtypes are harmless, others, like *E. coli* O157:H7, can cause disease by producing a toxin called Shiga toxin.

When enteric microbes are shed in sheep feces, they can cause infections in other animals and humans and can contaminate the environment. Thus, it is important to take precautions when working with sheep that are known to be shedding these enteric microbes.

Overview of Enteric Microbe Testing Performed and Results Reported:

Fecal samples collected from sheep on your operation were tested for the presence of *Salmonella*, Shiga toxin-producing *E. coli* (STEC), and *Campylobacter*.

The presence ("Positive") or absence ("Negative") of the microbes in the samples are reported for each Sheep sampled. For some animals, there may not be enough fecal samples to complete all the testing. If an insufficient amount of fecal sample was submitted, the column will read "NA."

Enteric Microbe RESULTS:

Individual Sheep Results:

Sample #	Sheep ID	<i>Salmonella</i>	STEC <i>E. coli</i>	<i>Campylobacter</i>
1		Positive	Negative	Positive
2		Negative	Negative	Negative
3		Negative	Negative	Negative
4		Negative	Negative	Negative
5		Negative	Negative	Negative
6		Negative	Negative	Negative
7		Negative	Negative	NA

For positive results:

Enteric Microbe Results Interpretation: One or more of the sheep tested from your operation were positive for *Salmonella*, Shiga toxin-producing *E. coli* (STEC), and/or *Cryptosporidium* in their feces on the day sampled. You may want to share these results with your veterinarian.

Or if all negative results:

Enteric Microbe Results Interpretation: None of the sheep tested from your operation were positive for *Salmonella*, Shiga toxin-producing *E. coli* (STEC), or *Campylobacter* in their feces on the day sampled. Fecal microbes can be shed intermittently, therefore a negative test result does not mean your sheep will never shed these microbes. If any of your sheep experience clinical signs consistent with an enteric microbe infection, you may wish to consult your veterinarian about submitting additional samples for testing.



Animal and
Plant Health
Inspection
Service

Veterinary
Services

NAHMS Sheep 2024 GI Parasite Composite Collection Record

National Animal Health
Monitoring System

2150 Centre Ave, Bldg B
Fort Collins, CO 80526

Form Approved
OMB Number xxxx-xxxx
Expires:

Sampling materials:

- Supplies sent to Coordinators: Plastic wrap, aluminum foil, and lubricant
- Kit contents: 2 gallon sized Ziploc® bags, 2 quart sized Whirl-pak® bags, 2 tongue depressors, 2 ice packs, 2 liner bag (one to use as a trash bag), 1 medium insulated cooler, and paperwork that includes instructions, submission form, labels, and 1 FedEx airbill addressed to LSU in Baton Rouge, LA.
- You will need to provide you own gloves.

Collection Instructions



1. **Collect samples Sunday-Wednesday. Sample sheep that have not been dewormed in the previous 60 days.**
2. Samples from 6 to 10 (more is better) sheep or lambs are **pooled into one sample**.
3. From each sheep, collect 5-6 fecal pellets. Collect samples from the rectum when possible. Rectal retrieval might not be possible on some sheep (e.g. preweaned lambs), and fresh off the ground samples are acceptable. Place pellets from all sheep in the same Ziploc® bag to form a composite sample.
4. Samples must be fresh (not petrified). Do not exclude diarrhea samples.
5. **Make a composite sample with the fecal pellets.**
If needed, add a very small amount of water the bag to moisten the feces making it easier to work with. With the samples in the bag, squish the contents until you have a soft composite of feces.
6. **Wrap the sample tightly in plastic wrap and aluminum foil, excluding all air.**
Tear off approximately 12 inches plastic wrap and aluminum foil and 12 inches of plastic wrap. Using the tongue depressor, dump the composite of feces onto a sheet of plastic wrap, fold the plastic wrap over the feces and kneed it like dough until the sample is in a “cigar” shape. Wrap tightly in the plastic wrap, then wrap the “cigar” tightly in aluminum foil and place the wrapped feces into a clean Whirl-pak® bag, again excluding all air from the bag.
7. Attach the label to the bag and fill in the the NAHMS ID.
8. Keep the samples cool but **DO NOT FREEZE**.
9. Fill out the pink submission form and the digital collection form.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is xxxx-xxxx. The time required to complete this information collection is estimated to average 2.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.



**NAHMS-xxx
xxxxx**

RECTAL RETRIEVAL

To avoid contamination from common organisms on the ground, rectal retrieval is best. Rectal retrieval might not be possible on some sheep (e.g. preweaned lambs), and fresh off the ground samples are acceptable.


	<p>1. Apply lubricating jelly to the glove before entering the rectum.</p> <ul style="list-style-type: none"> Lightly stroking the rectum might encourage defecation. 		<p>2. Retrieve a minimum of 5-6 pellets per animal.</p> <ul style="list-style-type: none"> Place pellets from all sheep the same plastic bag.
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Prepare the Pooled Samples

	<p>1. Knead the bag until individual fecal pellets cannot readily be seen.</p> <ul style="list-style-type: none"> If needed, add a very small amount of water to give a consistency of thick paste. 		<p>2. Dump composite onto plastic wrap and form a "cigar" shaped.</p> <p>3. Wrap the sample tightly in plastic wrap, then aluminum foil, excluding all air.</p>
	<p>4. Place the cigar shaped composite into a Whirl-pak® and place the Whirl-pak® into a clean Ziploc®.</p> <ul style="list-style-type: none"> Again, squeeze out excess air of the double bagged sample. 		<p>5. Attach a label on the outer bag and write the NAHMSID on the label.</p> <p>6. Keep the samples cool but do not freeze.</p>

Collection Record

Fill out the pink submission form and the digital collection record. Use the QR code or the URL below to access the GI Parasite Composite Collection Record.

GI Parasite Composite Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_cAWVomyZPUkq9qC	
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Shipping Instructions

1. **Ship on Sunday-Wednesday.** Keep samples cool and ship within 24 hours of collection. Wednesday collections must be shipped the same day. Do not collect or ship samples Thursday through Saturday.
2. Place all the samples in the liner bag and tie shut. Place an ice pack on the top and bottom of the samples. Add filler to the box if necessary. Close the insulated cooler box.
3. Place the filled out pink submission form on top of the cooler lid and seal the cardboard box.
4. Secure the box and ship to LSU, in Baton Rouge, LA, within 24 hours. A shipping airbill is provided in the kit. **Ship only Sunday-Wednesday.**

NOTE: Remove or black out all extraneous labels on outside of box.

NAHMS Sheep 2024 GI Parasite Composite Collection Record

- Sample should be kneaded and formed into a composite cigar shape while still fresh.
- Ship within 24 hours of collection on Monday through Wednesday.
- If sample cannot be formed into a composite cigar shape on site, store in the refrigerator for less than 24 hours before kneading/shaping/wrapping, and shipping.

NAHMS ID: (6 digits)	Parasite Kit ID:	Collection Date: (mm/dd/yy)
--------------------------------	-------------------------	---------------------------------------

IF POSSIBLE, COLLECT SAMPLES FROM SHEEP THAT ARE SUSPECTED TO HAVE HIGHER LEVELS OF PARASITES.

1. What is the total number of animals you sampled?
(Should equal the number of ages listed above) _____ head
2. For each animal sampled, select the animal class and enter the age in years or months.

Age (years or months)	Breed (enter code from Breed Reference Card or specify "other breed")	Class (pregnant ewe, nursing ewe, preweaned lamb, weaned lamb, open ewe, ram, or wether)

4. What is the total number of sheep in your flock?..... _____ flock total
5. Were any of the following used to select the sheep that were sampled?
 - a. Animal showed clinical signs ₁ Yes ₃ No
 - i. **IF YES**, what were the signs?
 - Diarrhea ₁ Yes ₃ No
 - Weight loss..... ₁ Yes ₃ No
 - Poor hair coat..... ₁ Yes ₃ No

Anemic (based on FAMACHA) ₁ Yes ₃ No

Other signs ₁ Yes ₃ No (specify: _____)

b. Other reasons sheep were selected for sampling?
(specify: _____) ₁ Yes ₃ No

6. Are you using copper wire particle boluses or other alternative dewormer treatments?

₁ Yes ₃ No

IF YES, please list: _____

7. Have these sheep EVER been treated with a dewormer? ₁ Yes ₃ No

IF YES, what date were they last treated? _____ mm/dd/yy

IF YES, check all product(s) used the last time they were treated.

₁ Albendazole (Valbazen®),

₅ Levamisole (Tramisol®, Levasole®, Prohibit®)

₂ Fenbendazole (Safeguard®, Panacur®)

₆ Pyrantel (Strongid®)

₃ Ivermectin (Ivomec®)

₇ Morantel (Rumatel®)

₄ Moxidectin (Cydectin®)

OR LIST HERE: _____

8. Which best describes the management of the sampled sheep during the past 30 days?

₁ Open range (large unfenced acreage)

₂ Fenced range (large fenced acreage)

₃ Fenced farm (cultivated pasture or browse)

₄ Dry lot (pen which does not allow grazing and is not meant for finishing sheep on a high-energy diet for slaughter)

₅ Other (specify: _____)

How many people in each category helped with the collection of the individual fecal samples?

_____ Fed VMO _____ Fed AHT _____ State Gov't

_____ Producer _____ Other, specify: _____

Not counting Producer time, how many hours did it take everyone to collect and prepare the samples for shipping: _____ hours

How many round-trip hours did it take for everyone to get to the farm and back: _____ hours

NAHMS Sheep 2024 GI Parasite Composite Submission Form

NAHMS ID:
6 digits

Date:
mm/dd/yy

Kit #:
Printed on labels

Number of animals included in composite sample: _____
6-10

GI PARASITE COMPOSITE ITEMS OF NOTE

1. We recommend collecting the enteric microbe samples at the same time. For one sheep that will have all samples collected, you separate the samples into 3 sets. First, put the composite samples in one quart sized whirlpak bag. You will then place the enteric samples for each sheep into a smaller individual whirlpak bag and a tube.
2. Digital Collection Record: Have the digital record up and record data for each sheep as you go. You can have both the GI parasite composite and the enteric microbe collection record tabs open and toggle back and forth between the two collection records.
3. You will need to bring plastic wrap, aluminum foil, lubricant, and gloves to the operation for sample collection.
4. Use a clean glove and lubricant for each animal. Rectal retrieval is best, but ground samples are acceptable if necessary (e.g. preweaned lambs).
5. Do not exclude sheep with diarrhea or exhibiting other signs of gastrointestinal nematode infection.
6. Only include sheep that have not been dewormed in the previous 60 days.
7. How to make a composite sample: Samples from 6-10 sheep can be collected and pooled into one sample. Place 5-6 pellets per animal into the same quart sized whirlpak bag. Remove the air from the bag and seal. Knead the bag until individual fecal pellets cannot be seen. You may need to add some water drops to get the fecal composite into the consistency of thick paste. Lay out a sheet of plastic wrap and aluminum foil, and dump out the composite onto the plastic wrap. Then form composite into a cigar shape, then wrap the sample tightly in the plastic wrap followed by wrapping it in aluminum foil. Place wrapped composite into a clean whirlpak bag, excluding air from the bag. You can watch a video of fecal composite collection here:
8. At the time of collection, feces should be placed in a cooler with ice packs to keep the sample cool and can be placed in the refrigerator overnight if they are not shipped same day. DO NOT FREEZE the composite sample and try not to place the sample directly on ice packs as that could inhibit hatching of eggs.
9. Producer reports containing FECs of *Trichostrongylus* spp. for the composites samples will be generated, and sealed reports will be sent to Coordinators for distribution within 3 months of sample collection. Additional resistance results were be included for those operations that receive DrenchRite® testing.

National Animal Health Monitoring System (NAHMS) GI Parasite Composite Report

Date of report:

ID:

Dear Participant,

Thank you for participating in the parasite portion of the NAHMS Sheep 2024 Study. This report contains the results of the internal parasite testing performed on the sheep at your operation. Consider sharing these results with your veterinarian so that they can assist you in determining if you a need to modify your deworming protocols.

If you have questions about the accuracy of your results, please contact Dr. Alyson Wiedenheft, the NAHMS biologics coordinator, at Alyson.M.Wiedenheft@usda.gov.

Overview of Parasite Testing:

Control of internal parasite infection in sheep is considered an essential aspect of routine management. Internal parasite control is based both on good husbandry and the use of anthelmintics. The first step in an effective deworming program is to determine the level of infection and the type of internal parasites on the sheep operation. Trichostrongyles (a family of stomach worms, including *Haemonchus contortus*-the “Barber Pole Worm”) are considered the most important internal parasites in sheep industry. Specifically, *Haemonchus contortus* infections are especially dangerous to sheep. Composite (pooled) testing of the fecal samples will provide a baseline herd level egg count of Trichostrongyles.

Fecal Egg Count (FEC):

These results describe a baseline (pre-deworming) fecal egg count (FEC) for trichostrongyles reported as eggs per gram (EPG) at the herd level. An FEC is calculated for the composite sample and is used to estimate the parasitic load for the herd. For this study, a low FEC is considered to be less than 300 EPG, a moderate FEC is between 300-1000 EPG, and a high FEC is greater than 1000 EPG.

Subset: Anthelmintic Resistance Test

A subset of the composite samples will be tested for anthelmintic resistance using the DrenchRite® Larval Development Assay (LDA). This test is an alternative to the Fecal Egg Count Resistance Test to determine the effectiveness of anthelmintics.

TRICHOSTRONGYLE RESULT:

Fecal Egg Count at Herd Level: 300 EPG

Fecal Egg Count Interpretation: For this study, a low FEC is considered to be less than 300 EPG, a moderate FEC is between 300-1000 EPG, and a high FEC is greater than 1000 EPG.

Subset: DrenchRite® Larval Development Assay (LDA):

Anthelmintic class:

Anthelmintic class:

Anthelmintic class:

Anthelmintic class:

Subset: DrenchRite® LDA Interpretation:



Animal and
Plant Health
Inspection
Service

Veterinary
Services

NAHMS Sheep 2024 Blood & Swab Sample Collection Record

National Animal Health
Monitoring System

2150 Centre Ave, Bldg B
Fort Collins, CO 80526

Form Approved
OMB Number xxx
Approval expires: xxx

Sample Collection Overview

The blood samples collected in the tiger top SST tubes and purple top EDTA tubes will be stored and used for research that will benefit the sheep industry. Ewes that have blood samples collected can also have interdigital swab samples collected. These swabs will be tested with PCR to detect the presence of bacteria that cause foot rot. Swab results will be sent to all participants.

Samples can be collected any day of the week, but samples can only be shipped Sunday-Wednesday. Keep samples cool in a refrigerator until the next shipping day. If possible, blood samples in the tiger top tubes should be spun down once clotted.

Kit Contents

This kit contains supplies for blood collection and interdigital swab samples. Please remove any extra or unused supplies before shipping samples. In this kit you will find:

- 25, 8.5-ml tiger top SST blood tubes
- 15, 10 ml purple top EDTA blood tubes
- 1 tube divider box
- 35, 18-gauge, 1" vacutainer needles
- 3 vacutainer holders
- 25 interdigital swabs
- 25 tongue depressors
- 2 liner bags, gallon sized Ziploc® bags, 2 ice packs, 2 absorbent sheets
- Ballpoint pen for filling out the Collection Records
- Sarstedt marker for labeling tubes
- 1 large insulated cooler box and shipping box
- Paperwork including instructions, submission form, labels, and 1 FedEx airbills addressed to NVSL

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is xxx-xxxx. The time required to complete this information collection is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Blood Collection Instructions

Tiger Top SST Blood Tubes

Collect from ewes that are at least 15 months of age. Ewes can be pregnant if the Producer is comfortable with the sampling. **Sample a maximum of 25 ewes. Include ewes that have suspected lameness or footrot if you will be collecting interdigital swabs:**

Number of Ewes on an Operation	Sample Number
1 to 19 ewes	Sample all ewes
20 to 49 ewes	Sample 20 ewes
50 or more ewes	Sample 25 ewes

Fill 1 tiger top tube per ewe using the provided needles and vacutainer holder. If you prefer syringes or different length needle, you will need to provide your own. (Collect purple top tops at this time. See instructions below).

Use the preprinted red labels numbered 1a through 25a to label the red-top tube samples. Using the Sarstedt marker, write the NAHMS ID and the sheep name/ID on the label. Make sure the labels are secure on the tubes.

The lab will appreciate it if you can let the samples in the red-top tubes clot and then spin them down. Please place tubes in the tube divider boxes in numeric order.

Purple top EDTA Blood tubes

Collect from up to 15 ewes that had blood collected using the Tiger top SST tubes.

Use the preprinted purple labels numbered 1b through 25b to label the red-top tube samples. Note, you will only use 15 of the 25 provided labels. Be sure to use the correct sample label for each blood tube. Using the Sarstedt marker, write the NAHMS ID and the sheep name/ID on the label. Make sure the labels are secure on the tubes

Interdigital Swab Instructions

Use one swab sample for each ewe that had blood collected in a tiger top blood tube. The sample numbers and sheep IDs need to match the samples from the tiger top blood tubes.


Remove any mud and debris from the interdigital space with a tongue depressor. Use a clean tongue depressor for each sheep. Swab the interdigital skin of at least 2 feet per ewe. Vigorously rub the cotton swab back and forth in the interdigital space. If lameness or footrot is suspected, be sure to swab suspected foot. If lameness or footrot is suspected, take a photograph of the suspected foot.

Insert the swab into the plastic tube, breaking off the stick inside the tube. Close the plastic tube. Use the preprinted blue swab labels numbered 1c through 25c to label plastic swab tube. Using the **Sarstedt marker, write NAHMS ID and the Sheep name/ID on each the label.** Make sure the labels are secure on the tubes.

Place the swab samples in the gallon sized Ziploc®.

Collection Record for all Samples

Fill out the pink submission form and the digital collection record. Use the QR code or the URL below to access the Blood Swab Collection Record.

Blood and Swab Collection Record	https://usdaanimalhealth.gov1.qualtrics.com/jfe/form/SV_0xQ0CwOvQlI5y74	
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Shipping

Keep samples cool in a refrigerator until the next shipping day. **Ship only Sunday-Wednesday.**

Place the blood box filled with blood samples, two absorbent sheets, and two ice packs inside a liner bag. Add the Ziploc® of swab samples. Remove excess air from the liner bag and tie shut. Place this liner bag with the blood and swab samples inside the cooler box. Close the cooler lid.

Place the filled out pink submission form on top of the cooler lid and seal the cardboard box. Secure the shipping box and attach the **airbill addressed to NVSL** onto the shipping box. **Ship only Monday-Wednesday.**

Blood and Swab Collection Record

NAHMS ID:
6 digits

rid

Date:

mm/dd/yy
rdate

Kit #:

Printed on
labels rkit

Total ewe inventory TODAY:

rdnum

Sample ewes that are at least 15 months of age.

r101	r102	r103y	r104/r104oth	r105	R106	r107a-e	r108	R109	R110	r111	r112
Label number	Ewe ID	Age (years)	Breed Code <i>[See breed reference card]</i>	Ewe status 1=Nursing 2=Pregnant 3=Open	If Ewe status is nursing or pregnant then please list the most recent lambing date mm/dd/yyyy	Clinical History: 1=Abortion in previous 12 months 2=Runny nose 3=Thin 4=Diarrhea 5=Other <i>[List all that apply]</i>	Comment or specify other clinical history	Tiger top tube collected? Place a checkmark for YES	Purple top blood tube collected? Place a checkmark for YES	Interdigital Swab Collected? Place a checkmark for YES	Lameness or footrot suspected and photo taken? Place a checkmark for YES
1											
2											
3											
4											
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15											
16											
17											
18											
19											
20											
	Continue collection if there are 50 or more ewes on the operation.										
21											
22											
23											
24											
25											

How many people in each category helped with the collection of the blood and swab samples?

_____ Fed VMO rvm0 _____ State government rst
 _____ Fed AHT raht _____ Producer rprod
 _____ Other (specify: _____) roth

Total sample time: _____ hours rhr

Primary collector name and phone: _____ rname/rph

NAHMS Sheep 2024 Blood and Swab Submission Sheet

NAHMS ID:
6 digits

Date:
mm/dd/yy

Kit #:
Printed on labels

1. Number of **Tiger Top SST Tubes** submitted? _____
0-25
2. Number of **Purple Top EDTA Tubes** submitted? _____
0-15
3. Number of **Cotton Swabs** submitted? _____
0-25

BLOOD AND SWAB COLLECTION ITEMS OF NOTE

1. Both the blood box and the swabs will be shipped to NVSL in the BS kit box.
2. Please review the sampling guidelines for each biologic sample for this kit. Also, please follow the collection instructions provided in the collection record for each biologic sample collected. Here is a summary of those sampling instructions:
 - a. Serum (red-top blood tube) collection
 - If collecting both tiger top and purple top blood tubes on the same sheep, collect tiger top tubes first
 - Sample from ewes at least 15 months of age
 - If fewer than 20 ewes on the operation, sample all ewes on the operation
 - If 20-49 ewes on the operation, sample 20 ewes on the operation
 - If 50 or more ewes on the operation, sample 25 ewes on the operation
 - b. Blood (purple-top blood tube) collection
 - Collect from the same sheep as the tiger top tops
 - Match the sample number on the label to the tiger top tube
 - Maximum 15 samples/operation
 - c. Interdigital Swab
 - Use one swab sample for each ewe that had blood collected in a tiger top blood tube.
 - Match the number on the label to the blood tubes
 - Take photographs with the iPad if any lameness or footrot is suspected and submit the photograph with the digital collection form.
3. Only ewes that have serum (tiger top blood tube) collection will have the option to have interdigital swab collection.
4. Producer reports with interdigital pathogen testing results will be sent to Coordinators in a sealed envelope for distribution within 3 months of collection. Examples of the Interdigital Pathogen Report can be found on the following pages.

National Animal Health Monitoring System (NAHMS) Lameness Pathogen Report

Date of report:
ID:

Dear participant,

Thank you for participating in the lameness pathogen report testing portion of the NAHMS Sheep 2024 Study. This report contains results of the interdigital swabs collected from sheep at your operation. Please consider sharing these results with your veterinarian.

If you have questions about the accuracy of your results, please contact Dr. Alyson Wiedenheft, the NAHMS biologics coordinator Alyson.M.Wiedenheft@usda.gov.

Background on Lameness Pathogens:

Lameness on a sheep operation can reduce both animal production and animal quality of life. The lameness can be caused from infectious agents resulting as scald/interdigital dermatitis, foot-rot, or contagious ovine digital dermatitis (CODD), or non-infectious agents resulting such injury. Foot-rot is the main cause of lameness in sheep. It is important to identify the causes of lameness in sheep to provide effective treatment and management.

Reported Results:

Interdigital swab samples collected from sheep on your operation were tested for pathogens of the predominant hoof diseases (scald/interdigital dermatitis, foot-rot, or CODD) by established PCR methods. The presence (positive) or absence (negative) of these pathogens on the swabs will be reported at for each animal.

Individual Sheep Lameness Pathogen Test Results:

Sample #	Sheep ID	<i>Dichelobacter spp.</i>	<i>Fusobacterium spp.</i>	Other lameness pathogens
1		negative	negative	negative
2		positive	positive	positive
3		negative	negative	negative
4		negative	negative	negative
5		negative	negative	negative
6		negative	negative	negative

Interpretation of results

Positive:

One or more of the sheep tested on your operation were found to have lameness pathogens in their interdigital swab samples. You may want to share these results with your veterinarian so that a treatment and lameness reduction plan can be made.

Negative: None of the sheep tested on your operation tested positive for lameness pathogens in their interdigital swab samples. If your sheep are experiencing lameness, you may want to share these results with your veterinarian.

Sheep 2024 Antibiotics Reference Card [Use same card for CER and Questionnaire]

Antibiotics given in the drinking WATER- Section F, Question 5		
Code	Antibiotic class	Example antibiotics
1	Sulfonamides	Albon®,(Sulfadimethoxine soluble powder), Sulfadimethoxine 12.5% oral solution, Sulforal, Sulfasol soluble powder, Di-Methox 12.5% oral solution, Di-Methox 12.5% soluble powder, SMZ-Med® 454 soluble powder, Sulfa, Sulmet® solution, Sulmet® soluble powder
2	Tetracyclines	Aureomycin®, A-Mycin, Chlortetracycline, Chloronex™, Aureomycin® Soluble Powder, Pennchlor® 64 soluble powder, Terramycin® soluble powder, Oxytetracycline HCL, Agrimycin®, Oxymycin, Oxytet 343, Pennox® 343, Tetroxy® 343, Tetroxy® 25, Tetracycline soluble powder, Duramycin 10, Tetramycin, Tetrachel, Tetramed® 324, Tet-Sol® 324, Tetrasol soluble powder
3	Other (specify: _____)	

Antibiotics given in the FEED - Section F, Question 7		
Code	Antibiotic class	Example antibiotics
4	Tetracyclines	Aureomycin®, Aueromycin® 50, Aueromycin® 4G crumbles, CTC 4G Crumbles, CTC 8G Crumbles, CTC 10G Crumbles, Chlortetracycline Crumble
5	Aminoglycoside	Neomycin
7	Other (specify: _____)	
8	Other (specify: _____)	

PLEASE TURN OVER FOR OTHER ANTIBIOTICS

Antibiotics given for SPECIFIC TREATMENT			
	Code	Antibiotic class	Example antibiotics
ORAL BOLUS	9	Sulfonamides	Supra Sulfa III bolus, Sustain III bolus, Albon
	10	Tetracyclines	5/Way calf scour bolus, Calf Scour Bolus, Oxy 500 calf bolus, Terramycin scours tablets
	11	Other (specify: _____)	
DRENCH	12	Sulfonamides	Albon®, (Sulfadimethoxine soluble powder), Sulfadimethoxine 12.5% oral solution, Sulforal, Sulfasol soluble powder, Di-Methox 12.5% oral solution, Di-Methox 12.5% soluble powder, SMZ-Med® 454 soluble powder, Sulfa, Sulmet® solution, Sulmet® soluble powder, SulfadiVed solution
	13	Tetracyclines	Aureomycin®, A-Mycin, Chlortetracycline, Chloronex™, Aureomycin® Soluble Powder, Pennchlor® 64 soluble powder, Terramycin® soluble powder, Oxytetracycline HCL, Agrimycin®, Oxymycin, Oxytet 343, Pennox® 343, Tetroxy® 343, Tetroxy® 25, Tetracycline soluble powder, Duramycin 10, Tetramycin, Tetrachel, Tetramed® 324, Tet-Sol® 324, Tetrasol soluble powder, TC Vet 324
	14	Aminoglycoside	Neomycin soluble powder, Neo-Sol® soluble, NeoMed® soluble, Neo-Sol® 50, Neo-Sol® Oral, Spectinomycin Oral, Spectam®, SpectoGard®
	15	Lincosamides	Lincomycin soluble, LS-50, Lincomycin-spectinomycin soluble
	16	Other (specify: _____)	
INJECTABLE	17	Beta-lactams	Agri-Cillin, Bactracillin G, Norocillin, Pen-Aqueous, Penicillin Injectable, Penject, PenOne Pro, PenOne RWT, Pro-Pen-G, Bactracillin G, BenzaPen 48, Combi-Pen-48, Dura-Pen, Penject+B, Aquacillin, Agri-cillin, Polyflex
	18	Macrolides	Tylan 50 or 200, TyloVed, Micotil, Draxxin, ZACTRAN, Zuprevo
	19	Cephalosporins	Ceftiflex, Excede, Excenel, Naxcel
	20	Florfenicol	Loncor, ResflorGOLD, Norfenicol, Nuflor, NuflorGOLD
	21	Sulfonamides	Di-Methox, Sulfabiotic, SulfaMed
	21	Tetracyclines	300 PRO LA, Agrimycin 100 or 200, Bio-Mycin 200, Duramycin 72-200 or 100, Hexasol, Liquamycin LA-200, Noromycin 300 LA, Oxybiotic 100 or 200, Oxytet 100 or 200, Terra-Vet 100 or 200, Vetrimycin 100 or 200
	22	Aminoglycosides	Gentamicin, , Gentocin, Gallimycin, Erythromycin
	23	Other (specify _____)	
TOPICAL/ Eyes	24	Topical ointments	Triple antibiotic ointment (neomycin, polymyxin B, bacitracin), Mupirocin
	25	Eye drops/ ointments	Gentak/Genoptic eye drops, Terramycin ophthalmic ointment (oxytetracycline and polymyxin B), AKTob, Tobrasol, Tobrex (tobramycin) ophthalmic ointment or solution,
	26	Other (specify _____)	
INTRAMAMMARY USE FOR EWES ONLY	22	Lactating intramammary products	Today® (cephaparin), Cefa-Lak® (cephapirin), Dariclox® (cloxacillin), Pirsue® (pirlimycin hydrochloride), Masti-Clear™ (penicillin), Polymast™ (hetacillin potassium), Amoximast® (amoxicillin), Hetacin-K® (hetacillin potassium), Spectramast® LC (ceftiofur hydrochloride)
	23	Dry ewe intramammary products	Spectramast® DC (ceftiofur hydrochloride), Tomorrow® (cephapirin benzathine), Cefa-Dri (cephapirin benzathine), Bovaclox™, Dry-Clox®, Dry-Clox® intramammary infusion, Orbenin®-DC (cloxacillin benzathine), Gallimycin-Dry (erythromycin), Biodry® (novobiocin), Vet Go Dry™/ Hanford's US (penicillin G procaine), Quartermaster® Dry Doe Treatment (penicillin G procaine/dihydrostreptomycin), Albadry Plus® Suspension (penicillin G procaine/novobiocin)
	24	Other (specify _____)	

Sheep 2024 Anthelmintic Reference Card

POUR-ON ANTHELMINTICS			
Code	Trade Name	Active Ingredient	Class
1	Agri-Mectin	Ivermectin	Avermectins
2	Bimectin	Ivermectin	Avermectins
3	Privermectin	Ivermectin	Avermectins
4	Promectin B	Ivermectin	Avermectins
5	Dectomax	Doramectin	Avermectins
6	Eprinex	Eprinomectin	Avermectins
7	Ivermax (BM)	Ivermectin	Avermectins
8	Ivermax (FP)	Ivermectin	Avermectins
9	Ivermax (NB)	Ivermectin	Avermectins
10	Iver-On	Ivermectin	Avermectins
11	Noromectin	Ivermectin	Avermectins
12	Cydectin	Moxidectin	Avermectins

ORAL USE ANTHELMINTICS (Drench, Tube)			
Code	Trade Name	Active Ingredient	Class
13	Safe-Guard Dewormer	Fenbendazole	Benzimidazoles
14	Safe- Guard Dewormer for Beef & Dairy Cattle and Goats	Fenbendazole	Benzimidazoles
15	Valbazen	Albendazole	Benzimidazoles
16	Ivomec Drench for Sheep	Ivermectin	Avermectins
17	Privermectin Drench for Sheep	Ivermectin	Avermectins
18	Cydectin Oral Drench for Sheep	Moxidectin	Avermectins
19	Prohibit Soluble Drench Powder	Levamisole Hydrochloride	Imidazothiazoles
20	LevaMed Soluble Drench Powder	Levamisole Hydrochloride	Imidazothiazoles
21	Levasole Sheep Wormer Boluses	Levamisole Hydrochloride	Imidazothiazoles
22	Safe-Guard Beef and Dairy Cattle Dewormer (290G)	Fenbendazole	Benzimidazoles
23	Safe-Guard Horse & Cattle Dewormer 92 G Paste 10%	Fenbendazole	Benzimidazoles
24	Panacur Beef & Cattle Dewormer	Fenbendazole	Benzimidazoles
25	Panacur Equine & Cattle Dewormer (92 G) Paste 10 %	Fenbendazole	Benzimidazoles
26	Panacur Cattle Dewormer Suspension 10%	Fenbendazole	Benzimidazoles
27	Synanthic Bovine Dewormer Suspension 9.06%	Oxfendazole	Benzimidazoles
28	Synanthic Bovine Dewormer Suspension 22.5%	Oxfendazole	Benzimidazoles
29	Ivermectin Paste 1.87% Paste Dewormer	Ivermectin	Avermectin
30	Zimecterin 1.87% Paste Dewormer for equids	Ivermectin	Avermectin
31	Zimecterin Gold 1.55% Paste Dewormer for equids	Ivermectin, Praziquantel	Avermectin,
32	Quest Plus Gel Dewormer for equids	Moxidectin, Praziquantel	Avermectin,
33	Safe- Guard Paste 10% for Horses	Fenbendazole	Benzimidazoles
34	Pin-X	Pyrantel Pamoate	Tetrahydropyrimidines
35	StrongidT	Pyrantel Pamoate	Tetrahydropyrimidines

INJECTABLE USE ANTHELMINTICS			
Code	Trade Name	Active Ingredient	Class
36	Alverin Plus Injection for Cattle	Ivermectin/ clorsulon	Avermectins, Benzenesulphnamides
37	Agri-Mectin Injection for Cattle and Swine	Ivermectin	Avermectins
38	Agri-Mectin plus Clorsulon	Ivermectin/ clorsulon	Avermectins, Benzenesulphnamides
39	Bimectin	Ivermectin	Avermectins
40	Promectin Injection for Cattle and Swine	Ivermectin	Avermectins
41	Dectomax	Doramectin	Avermectins
42	Ivermax 1% Injection	Ivermectin	Avermectins
43	Ivermax Plus	Ivermectin/ clorsulon	Avermectins, Benzenesulphnamides
44	Noromectin Injection for Cattle and Swine	Ivermectin	Avermectins
45	Noromectin Plus Injection for Cattle	Ivermectin/ clorsulon	Avermectins, Benzenesulphnamides
46	Cyductin Injectable Solution	Moxidectin	Avermectins
47	Levasole Injectable Solution 13.65%	Levamisole phosphate	Imidazothiazoles
48	Ivomec 1% Subcutaneous Injection	Ivermectin	Avermectins
49	Ivomec Plus 1% Subcutaneous Injection (Ivomec+ Curatram)	Ivermectin/ clorsulon	Avermectins, Benzenesulphnamides

FEED USE ANTHELMINTICS			
Code	Trade Name	Active Ingredient	Class
50	Goat Care 2x	Morantel Tartrate	Tetrahydropyrimidines
51	Mor-Max Goat Dewormer	Morantel Tartrate	Tetrahydropyrimidines
52	Positive Pellet	Morantel Tartrate	Tetrahydropyrimidines
53	Rumatel 88	Morantel Tartrate	Tetrahydropyrimidines
54	Safe-Guard Medicated Dewormer for Beef & Dairy Cattle	Fenbendazole	Benzimidazoles
55	Safe- Guard Dewormer 20%	Fenbendazole	Benzimidazoles
56	SAFE-GUARD 20% Salt: Free-choice mineral	Fenbendazole	Benzimidazoles

Sheep 2024 Breed Reference Card

Code	BREED	Code	BREED
1	American Blackbelly	25	Leicester Longwool
2	American Como	26	Lincoln
3	Barbados Blackbelly	27	Montadale
4	Black Welsh Mountain	28	Mottle-faced, brockle, or speckle-faced crossbred
5	Blueface Leicester	29	Navajo-Churro
6	Booroola Merino	30	Oxford
7	Border Leicester	31	Panama
8	California Red	32	Polypay
9	California Variegated Mutant (CVM)	33	Rambouillet
10	Columbia	34	Rideau Arcott
11	Coopworth	35	Romanov
12	Corriedale	36	Romney
13	Costwold	37	Shetland
14	Debouillet	38	Shropshire
15	Delaine-Merino	39	Southdown
16	Dorper	40	St. Froix
17	East Friesian	41	Suffolk
18	Finnsheep	42	Targhee
19	Hampshire	43	Tunis
20	Icelandic	44	Wensleydale
21	Jacob	45	Wiltshire Horn
22	Karakul	46	Other crossbred, specify
23	Katahdin	47	Other breed, specify
24	Lacaune		