

# Ruminant and Equine Antiparasitic Drug Use and Antiparasitic Resistance Survey

## Introduction

Welcome to the FDA Center for Veterinary Medicine Ruminant and Equine Antiparasitic Drug Use and Antiparasitic Resistance Survey. We appreciate your participation. It is important that your knowledge and experience are considered by the FDA as part of an overall strategy to address antiparasitic drug resistance. You were chosen to participate in the survey because of your membership in a veterinary professional organization, as a veterinarian, veterinary parasitologist, researcher, and others interested and involved with equine or food animal medicine and/or parasitology issues.

The purpose of this survey is to gather information from members of the veterinary and veterinary parasitology community regarding antiparasitic drugs and the awareness of antiparasitic drug resistance. The survey will query subjects on topics including: (1) awareness of the issues related to antiparasitic drug resistance, (2) methods currently being used to detect and/or monitor for antiparasitic drug resistance, (3) management practices being used or recommended to manage or reduce antiparasitic drug resistance and (4) labeling and marketing considerations for antiparasitic drugs. FDA will share the results of the survey with the public as part of its educational efforts.

Please take a few minutes to answer the following questions by selecting the appropriate answer choice or entering the requested information, where applicable. You can advance through the pages of the questionnaire by clicking the "Next" button at the bottom of each page. We anticipate that the survey should take about 30 minutes to complete.

If you have any questions about the survey, please contact Janis Messenheimer, DVM at (240) 276-8348 or [janis.messenheimer@fda.hhs.gov](mailto:janis.messenheimer@fda.hhs.gov).

OMB Approval: [to be added upon approval]

## Survey Entry Question

**\*Your participation in this survey is strictly voluntary. You may answer as many or as few questions as you would like. However, your answers will be most helpful if you answer all the questions. There are no known risks if you decide to participate in this survey, nor are there any costs for participating in the survey. Your answers will be anonymous and confidential. Information will be kept confidential in accordance with 18 USC 1905 and 21 USC 331(j), as well as section 301(j) of the Federal Food Drug and Cosmetic Act. All responses will be reported as aggregated responses.**

**You may exit from the survey and then come back to complete the survey at a later time. If you participate in the survey using a shared network access (for example wireless network or shared computer), other individuals may not be able to participate in the survey and will need to use another access point.**

**You may have received the link to this survey through another professional organization that you are a member of. Please complete the survey only once.**

**By choosing yes below:**

- **you voluntarily agree to participate in the survey**
- **you attest that you are at least 18 years of age**
- **you attest that you have not previously completed this survey.**

**If you do not wish to participate in the survey, please decline participation by choosing 'No' to exit the survey. Please choose 'Yes' below if you consent to taking the survey and are ready to begin.**

- Yes Continue to Page 3**
- No End of Survey**

## Education

**Which one of the following options best describes your credentials?**

- DVM
- PhD or MS in Veterinary Parasitology
- Both
- Other (please specify)

**Which one of the following options best describes your current employment type?**

- Academia/ Research
- Private practice
- Government/ Regulatory
- Industry
- Retired/ Not actively employed
- Student

## Geographic Region

**In which region of the world is your professional experience based? Select one of the options below.**

- United States Continue to Page 5
- United States and another region of the world Continue to Page 5
- Region of the world other than the United States Continue to Exclusion, Page 62

## United States

**In which region of the United States is the majority of your professional experience based? Please choose one.**

- Northwest- WA, OR, ID
- West - CA, NV
- Northern Rockies and Plains - MT, WY, ND, SD, NE
- Southwest - UT, CO, AZ, NM
- Upper Midwest - MN, WI, MI, IA
- Ohio Valley - MO, IL, IN, OH, WV, KY, TN
- South- KS, OK, TX, AR, LA, MS
- New England/ Mid-Atlantic - ME, NH, VT, NY, MA, RI, CT, NJ, DE, MD, PA
- Southeast - VA, NC, SC, GA, AL, FL'
- Hawaii, American Samoa, Guam, Northern Mariana Islands
- Puerto Rico, U.S. Virgin Islands
- Alaska
- Other (please enter other region not listed or specify multiple regions if applicable.)

Continue to Page 7 if United States Only

Continue to Page 6 if United States and another region of the world

## World Region Outside of United States

**In which region of the world other than the United States is your professional experience based? Select one or more of the options below.**

- Africa
- Asia
- Australia/ New Zealand
- Canada
- Europe
- South America
- Other (please specify)

## Practice or Focus Area

**Which one of the following best describes your current practice or focus area?**

- Companion animal predominant or exclusive Continue to Exclusion, Page 62
- Equine predominant or exclusive Continue to Page 9
- Bovine predominant or exclusive Continue to Page 9
- Small ruminant predominant or exclusive Continue to Page 9
- Mixed animal/ multiple animal species Continue to page 9
- Other (please specify) Continue to Page 8

## Experience

**This survey is restricted to experiences in equine, bovine or small ruminant species. Do you have experience with any of the following: horses, cattle, or small ruminants?**

- Yes, I have experience with horses, cattle, or small ruminants. Continue to Page 9
- No, I do not have any experience with horses, cattle, or small ruminants. Continue to Exclusion, Page 62



## Focus Area

**What percentage of your practice, employment or research is devoted to the following groups of animals? Please fill in text boxes adjacent to the animals that you have experience with.**

Equine - Pleasure/ Performance	<input type="text"/>
Equine - Racetrack	<input type="text"/>
Beef Cattle	<input type="text"/>
Dairy Cattle	<input type="text"/>
Swine	<input type="text"/>
Poultry	<input type="text"/>
Sheep	<input type="text"/>
Goats	<input type="text"/>
Small Animal (cats/dogs)	<input type="text"/>
Other (please specify species and percentage)	<input type="text"/>

## General Questions on Antiparasitic Resistance

**For the purposes of this survey, antiparasitic drug resistance is defined as the decreased effectiveness of an antiparasitic drug for parasite species and stages for which it was previously effective. This may include a moderate decline in how well the drug works initially, a shorter duration of efficacy requiring more frequent treatments, or a complete failure of the therapeutic regimen.**

**For each of the following species/ classes of animals, please indicate if you are aware of high, moderate, or low/ no prevalence of antiparasitic drug resistance in the United States. If you do not have sufficient experience with a species or do not know whether or not there is resistance in a species, please choose "unable to evaluate".**

	Aware of high prevalence	Aware of moderate prevalence	Aware of low/ no prevalence	Unable to evaluate
Adult horses (3 years old and older)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Young horses (less than 3 years old)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dairy cattle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cow-calf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Background/stockers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feedlot cattle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sheep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Goats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## General Questions on Antiparasitic Resistance

**For the purposes of this survey, antiparasitic drug resistance is defined as the decreased effectiveness of an antiparasitic drug for parasite species and stages for which it was previously effective. This may include a moderate decline in how well the drug works initially, a shorter duration of efficacy requiring more frequent treatments, or a complete failure of the therapeutic regimen.**

**For each of the following species/ classes of animals, how would you characterize the level of risk for the development (or expansion) of antiparasitic drug resistance in the United States? If you do not have sufficient experience or knowledge in a species to evaluate risk, please choose "unable to evaluate".**

	High risk	Moderate risk	Low risk	Unable to evaluate
Adult horses (3 years old and older)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Young horses (less than 3 years old)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dairy cattle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cow-calf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Background/Stockers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feedlot cattle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sheep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Goats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## General Questions on Antiparasitic Resistance

**For the purposes of this survey, antiparasitic drug resistance is defined as the decreased effectiveness of an antiparasitic drug for parasite species and stages for which it was previously effective. This may include a moderate decline in how well the drug works initially, a shorter duration of efficacy requiring more frequent treatments, or a complete failure of the therapeutic regimen.**

**Have you experienced or witnessed antiparasitic drug resistance in horses, cattle or small ruminants in the United States in the past three years?**

- Yes Continue to Page 13
- No
- Uncertain

For No/ Uncertain answers:

If current focus area chosen was Mixed Animal/ Multiple animal species or Other - continue to Page 14

If current focus area chosen was Bovine pred./ excl. - continue to Page 15

If current focus area chosen was Equine pred./ excl. - continue to Page 29

If current focus area chosen was Small Ruminant pred./ excl. - continue to Page 43

## General Questions on Antiparasitic Resistance

Please list the antiparasitic drug resistance cases that you have experienced or witnessed in horses, cattle or small ruminants in the United States within the past three years.

Choose one answer from each drop down menu for the target animal/drug/administration route/parasite of each example of parasite resistance that you provide.

	Target Animal/Class	Drug or drug class	Route of administration	Parasite
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
8	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other (please specify species, antiparasitic drug, route, and parasite)

Target Animal: Adult horses(3 years old and older), Young horses(less than 3 years old), Dairy Cattle, Cow/ Calf, Background/ stockers, Feedlot cattle, Sheep, Goats

Antiparasitic Drug: Fenbendazole, Multiple benzimidazoles, Oxfendazole, Albendazole, Multiple macrocyclic lactones, Ivermectin, Eprinomectin, Moxidectin, Doramectin, Pyrantel, Morantel, Levamisole, Piperazine, Other, Not determined

Route: Oral, Pour-on, Injection

Parasite: Large strongyles, Small strongyles (Cyathostomes), Parascaris equorum, Oxyuris equi, Strongyloides, Ostertagia, Nematodirus, Cooperia, Haemonchus, Teladorsagia, Trichostrongylus, Bunostomum, Ascaris, Oesophagostomum, Hyostrongylus, Trichuris, Capillaria, Other, Not determined

Those who chose Bovine Predominant/ Exclusive will continue to Page 15

Those who chose Equine Predominant/ Exclusive will continue to Page 29

Those who chose Small Ruminants Predominant/ Exclusive will continue to Page 43

Those who chose Mixed Animal Practice/ Multiple animal species or Other will continue to Page 14

## Target animal selection

**For the next portion of this survey, it will be helpful for FDA to know whether you are basing your answers on experience with horses, cattle or small ruminants. Please choose the species/ target animal class that represents the animal you have the greatest experience or concern.**

- Horses Continue to Page 28
- Cattle Continue to Page 15
- Small ruminants Continue to Page 43
- I do not have experience with horses, cattle or small ruminants Continue to Exclusion, Page 62

## Treatment Decisions - Cattle

**Are you involved in making any recommendations or treatment decisions regarding parasite treatment or control in cattle?**

- Yes Continue to Page 16
- No Continue to Page 21

## Treatment Decisions - Cattle

**What proportion of your clients involves you in decisions about parasite treatment and control?**

- Less than 25%
- 25% to less than 50%
- 50% to less than 75%
- 75% or more
- This question does not apply to me



## Treatment Decisions - Cattle

**There are many ways to determine which antiparasitic drug to use or recommend to treat an animal or group of animals. For cattle, which of the following sources of information or methods do you use most often to determine which antiparasitic drug to use or recommend? Please select up to three.**

- Information from veterinary continuing education conferences
- Marketing and promotional materials for antiparasitic drugs
- Product label indications to determine if the drug is expected to work for the parasites I am attempting to treat
- Experience of other veterinarians in my practice or institution
- Use what I previously used for the animal(s) unless the animal owner gives information to suggest that the drug is not working anymore
- Peer-reviewed scientific journal articles
- Test the drug in the animal population and determine if it is effective based on an evaluation of fecal egg counts

## Treatment Decisions - Cattle

**In your professional experience, which of the following do you use or recommend most often to determine if an antiparasitic drug is effective in cattle? Please select up to three.**

- If there is no evidence of parasitism after treatment, conclude that the drug was effective
- Rely on the opinion of the farmer/producer/animal owner regarding the effectiveness of the antiparasitic drug
- Conduct a fecal analysis after treatment (without fecal egg count)
- Evaluate fecal egg counts pre- or post-treatment
- Evaluate fecal egg counts pre- and post-treatment (eg. Fecal Egg Count Reduction Test (FECRT))
- Make the determination based on resolution of clinical signs of parasitism (eg. ill-thrift, diarrhea, etc), if present at the time of treatment
- Use production data (milk production, weight gains, reproductive parameters) to determine if the drug is effective

## Treatment Decisions - Cattle

**If you determine an antiparasitic drug is not effective, what are your initial recommendations for the producer/ animal owner? Please rate up to two choices that you do most often.**

	First choice	Second choice
Recommend animal management changes (cull animal(s), transfer to dry lot, quarantine, etc.)	<input type="radio"/>	<input type="radio"/>
Recommend pasture management changes (multispecies grazing, controlling forage height, rotational grazing, etc.)	<input type="radio"/>	<input type="radio"/>
Start or continue fecal analysis as needed	<input type="radio"/>	<input type="radio"/>
Recommend treatment with another antiparasitic drug	<input type="radio"/>	<input type="radio"/>
Other (please specify in comment box below)	<input type="radio"/>	<input type="radio"/>

Other option or comment

## Treatment Decisions - Cattle

Please indicate the number of treatments per year that you recommend for routine deworming in cattle.

Number of treatments

Cattle less than 18 months of age

Options for both age groups:  
Less than one treatment per year  
One treatment per year

Cattle 18 months of age or older

More than one treatment per year  
Not applicable - treatment depends on fecal egg count or other individualized treatment plan

Comment (if desired)

Do you recommend rotating antiparasitic drugs for routine deworming in cattle?

Please choose from menu

Cattle less than 18 months of age

Options for both age groups:  
Yes, I recommend rotation  
No, I do not recommend rotation

Cattle 18 months of age or older

Other (please specify)

Do you use or recommend the use of two or more antiparasitic drugs at the same time in individual animals?

- Yes  
 No

If yes, please list the drugs you use together in cattle.

## Detection and Management of Resistance - Cattle

**Do you perform or recommend fecal examination procedures to detect and/or quantify parasite eggs in cattle?**

- Yes Continue to Page 22
- No Continue to Page 26

## Detection and Management of Resistance - Cattle

Please select the options below that best describe the fecal examination procedures you use or recommend to detect and/or quantify fecal eggs in cattle.

	Fecal Float Solution	Method/technique
1	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>

Other (explanation if "other" selected above)

Solution choices: None-direct or saline smear, Zinc sulfate, Sheathers, Modified sheathers, Magnesium sulfate, Saturated salt, Sodium nitrate, Sugar-salt, Other, Unknown, Not sure what my lab uses

Method/technique choices: Direct smear, Saline smear, Simple flotation, Sedimentation, Centrifugation, McMasters, Modified McMasters, Wisconsin, Modified Wisconsin, FLOTAC, Other, Unknown, Not sure what my lab uses

## Detection and Management of Resistance - Cattle

**Do you use larval cultures to identify parasite species in cattle?**

- Yes
- No
- I am not familiar with the use of larval culture

**Do you use or recommend the fecal egg count reduction test (FECRT) to determine treatment efficacy in cattle that are treated with an antiparasitic drug?**

- Yes Continue to Page 24
- No Continue to Page 26
- I am not familiar with the FECRT Continue to Page 26

## Detection and Management of Resistance - Cattle

**Which one of the following statements best represents the method you use or recommend to determine fecal egg count reduction in cattle?**

- FECRT based on a comparison of pre- and post- treatment fecal egg counts of a treated group/animal
- FECRT based on a comparison of post-treatment fecal egg counts of a treated and an untreated-control group/animal
- FECRT includes pre- and post-treatment fecal egg counts from both a treated and an untreated-control group/animal

Other (please specify)

**Which one of the following best represents the type of samples you use or recommend to conduct the fecal egg count reduction test (FECRT)?**

- Composite fecal sample (fecal samples from individual animals mixed together)
- Fecal samples from individual animals



## Detection and Management of Resistance - Cattle

**What is the FECRT calculation cut-off value you use or recommend to determine if treatment with an antiparasitic drug is effective?**

- Greater than or equal to 80%
- Greater than or equal to 85%
- Greater than or equal to 90%
- Greater than or equal to 95%
- Greater than or equal to a previous FECRT result
- Other (please specify)

## Detection and Management of Resistance - Cattle

**Which of the following management practices do you most often implement or recommend for a parasite control program in cattle? Please select up to three choices.**

- Maintain a portion of the worm population that is not exposed to the antiparasitic and can go on to establish in a host (refugia)
- Implementation of quarantine procedures
- Pasture management- multispecies grazing, controlling forage height, rotational grazing, etc.
- Selection for parasite resistant animals
- Alternative techniques (copper wire particles or fungi, etc)
- Age specific treatment recommendations (for example, minimizing treatment of adult animals)
- Use of two or more antiparasitic drugs at the same time in individual animals
- Strategic deworming (treating when majority of parasites are in the animal and not in the environment)
- I have not implemented or recommended any management practices for parasite control
- Other

## Detection and Management of Resistance - Cattle

**Have you changed the management practices you implement or recommend for parasite control in cattle in response to antiparasitic drug resistance? Please choose one answer.**

- No, because I have not experienced any resistance
- No, because changes have not been necessary
- Yes, in response to information about resistance
- Yes, in response to resistance that I have experienced
- Other (please specify)

## Continue survey

**If you would like to repeat the Treatment Decisions and Detection and Management of Resistance portions of the survey for a different animal species or class, please choose one of the options below. Otherwise to continue to the final portion of the survey, please choose 'Continue with survey'.**

- Horses Continue to Page 29
- Small ruminants Continue to Page 43
- Continue with survey Continue to Page 58

## Treatment Decisions - Horses

**Are you involved in making any recommendations or treatment decisions regarding parasite treatment or control in horses?**

- Yes Continue to Page 30
- No Continue to Page 35

## Treatment Decisions - Horses

**What proportion of your clients involves you in decisions about parasite treatment and control?**

- Less than 25%
- 25% to less than 50%
- 50% to less than 75%
- 75% or more
- This question does not apply to me

## Treatment Decisions - Horses

**There are many ways to determine which antiparasitic drug to use or recommend to treat an animal or group of animals. In horses, which of the following sources of information or methods do you use most often to determine which antiparasitic drug to use or recommend in horses? Please select up to three.**

- Information from veterinary continuing education conferences
- Marketing and promotional materials for antiparasitic drugs
- Product label indications to determine if the drug is expected to work for the parasites I am attempting to treat
- Experience of other veterinarians in my practice or institution
- Use what I previously used for the animal(s) unless the animal owner gives information to suggest that the drug is not working anymore
- Peer-reviewed scientific journal articles
- Test the drug in the animal population and determine if it is effective based on an evaluation of fecal egg counts

## Treatment Decisions - Horses

**In your professional experience, which of the following do you use or recommend most often to determine if an antiparasitic drug is effective in horses? Please select up to three.**

- If there is no evidence of parasitism after treatment, conclude that the drug was effective
- Rely on the opinion of the farmer/producer/animal owner regarding the effectiveness of the antiparasitic drug
- Conduct a fecal analysis after treatment (without fecal egg count)
- Evaluate fecal egg counts pre- or post-treatment
- Evaluate fecal egg counts pre- and post-treatment (eg. Fecal Egg Count Reduction Test (FECRT))
- Make the determination based on resolution of clinical signs of parasitism (eg. ill-thrift, diarrhea, etc), if present at the time of treatment



## Treatment Decisions - Horses

**If you determine an antiparasitic drug is not effective, what are your initial recommendations for the animal owner? Please rate up to two choices that you do most often.**

	First choice	Second choice
Recommend animal management changes (segregation by age, minimization of horses per acre, etc.)	<input type="radio"/>	<input type="radio"/>
Recommend pasture management changes (regular removal of manure, composting, routine mowing and harrowing of pasture, etc.)	<input type="radio"/>	<input type="radio"/>
Change to a selective treatment program in which treatments are given based on level of fecal egg counts.	<input type="radio"/>	<input type="radio"/>
Start or continue fecal analysis as needed	<input type="radio"/>	<input type="radio"/>
Recommend treatment with another antiparasitic drug	<input type="radio"/>	<input type="radio"/>
Other (please specify in comment box below)	<input type="radio"/>	<input type="radio"/>
Other option or comment		
<input type="text"/>		

## Treatment Decisions - Horses

**Please indicate the number of treatments per year that you recommend for routine deworming in horses.**

Frequency of treatments

Horses less than 1 year of age

Horses 1 year of age or older

Comment (if desired)

Options for both age groups:

One to two treatments per year

Three to four treatments per year

Five to six treatments per year

Seven or more treatments per year

Not applicable/treatment depends on

fecal egg count or other

individualized treatment plan

**How frequently do you rotate or recommend an animal owner rotate antiparasitic drugs for routine deworming in horses?**

Horses less than 1 year of age

Horses 1 year of age or older

Comment (if desired)

Options for both age groups:

Multiple times per year

Yearly

Less frequently than yearly

Never

**Do you use or recommend the use of two or more antiparasitic drugs at the same time in individual horses?**

Yes

No

If yes, please list the drugs you use together in horses.

## Detection and Management of Resistance - Horses

**Do you perform or recommend fecal examination procedures to detect and/or quantify parasite eggs in horses?**

- Yes Continue to Page 36
- No Continue to Page 40

## Detection and Management of Resistance - Horses

Please select the options below that best describe the fecal examination procedures you use or recommend to detect and/or quantify fecal eggs in horses?

	Fecal Float Solution	Method/technique
1	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>

Other (explanation if "other" selected above)

Solution choices: None-direct or saline smear, Zinc sulfate, Sheathers, Modified sheathers, Magnesium sulfate, Saturated salt, Sodium nitrate, Sugar-salt, Other, Unknown, Not sure what my lab uses

Method/technique choices: Direct smear, Saline smear, Simple flotation, Sedimentation, Centrifugation, McMasters, Modified McMasters, Wisconsin, Modified Wisconsin, FLOTAC, Other, Unknown, Not sure what my lab uses

## Detection and Management of Resistance - Horses

**Do you use larval cultures to identify parasite species in horses?**

- Yes
- No
- I am not familiar with the use of larval culture

**Do you use or recommend the fecal egg count reduction test (FECRT) to determine treatment efficacy in horses that are treated with an antiparasitic drug?**

- Yes Continue to Page 38
- No Continue to Page 40
- I am not familiar with the FECRT Continue to Page 40

## Detection and Management of Resistance - Horses

**Which one of the following statements best represents the method you use or recommend to determine fecal egg count reduction in horses?**

- FECRT based on a comparison of pre- and post- treatment fecal egg counts of a treated group/animal
- FECRT based on a comparison of post-treatment fecal egg counts of a treated and an untreated-control group/animal
- FECRT includes pre- and post-treatment fecal egg counts from both a treated and an untreated-control group/animal

Other (please specify)

**Which one of the following best represents the type of samples you use or recommend to conduct the fecal egg count reduction test (FECRT)?**

- Composite fecal sample (fecal samples from individual animals mixed together)
- Fecal samples from individual animals

## Detection and Management of Resistance - Horses

**What is the FECRT calculation cut-off value you use or recommend to determine if treatment with an antiparasitic drug is effective?**

- Greater than or equal to 80%
- Greater than or equal to 85%
- Greater than or equal to 90%
- Greater than or equal to 95%
- Greater than or equal to a previous FECRT result
- Other (please specify)

## Detection and Management of Resistance - Horses

**Which of the following management practices do you most often implement or recommend for a parasite control program in horses? Please select up to three choices.**

- Maintain a portion of the worm population that is not exposed to the antiparasitic drug and can go on to establish in a host (refugia)
- Implementation of quarantine procedures
- Pasture management- multispecies grazing, controlling forage height, rotational grazing, etc.
- Age specific treatment recommendations (for example, minimizing treatment of adult animals)
- Use of two or more antiparasitic drugs at the same time in individual animals
- Strategic deworming (treating when majority of parasites are in the animal and not in the environment)
- I have not implemented or recommended any management practices for parasite control

Other (please specify)



## Detection and Management of Resistance - Horses

**Have you changed the management practices you implement or recommend for parasite control in horses in response to antiparasitic drug resistance? Please choose one answer.**

- No, because I have not experienced any resistance
- No, because changes have not been necessary
- Yes, in response to information about resistance
- Yes, in response to resistance that I have experienced
- Other (please specify)

## Continue Survey

**If you would like to repeat the Treatment Decisions and Detection and Management of Resistance portions of the survey for a different animal species or class, please choose one of the options below. Otherwise to continue to the final portion of the survey, please choose 'Continue with survey'.**

- Cattle Continue to Page 15
- Small ruminants Continue to Page 43
- Continue with survey Continue to Page 58

## Treatment Decisions - Small Ruminants

**Are you involved in making any recommendations or treatment decisions regarding parasite treatment or control in small ruminants?**

- Yes Continue to Page 44
- No Continue to Page 49

## Treatment Decisions - Small Ruminants

**What proportion of your clients involves you in decisions about parasite treatment and control?**

- Less than 25%
- 25% to less than 50%
- 50% to less than 75%
- 75% or more
- This question does not apply to me

## Treatment Decisions - Small Ruminants

**There are many ways to determine which antiparasitic drug to use or recommend to treat an animal or group of animals. Which of the following sources of information or methods do you use most often to determine which antiparasitic drug to use or recommend? Please select up to three.**

- Information from veterinary continuing education conferences
- Marketing and promotional materials for antiparasitic drugs
- Product label indications to determine if the drug is expected to work for the parasites I am attempting to treat
- Experience of other veterinarians in my practice or institution
- Use what I previously used for the animal(s) unless the animal owner gives information to suggest that the drug is not working anymore
- Peer-reviewed scientific journal articles
- Test the drug in the animal population and determine if it is effective based on an evaluation of fecal egg counts

## Treatment Decisions - Small Ruminants

**In your professional experience, which of the following do you use or recommend most often to determine if an antiparasitic drug is effective in small ruminants? Please select up to three.**

- If there is no evidence of parasitism after treatment, conclude that the drug was effective
- Rely on the opinion of the farmer/producer/animal owner regarding the effectiveness of the antiparasitic drug
- Conduct a fecal analysis after treatment (without fecal egg count)
- Evaluate fecal egg counts pre- or post-treatment
- Evaluate fecal egg counts pre- and post-treatment (eg. Fecal Egg Count Reduction Test, FECRT)
- Make the determination based on resolution of clinical signs of parasitism (eg. FAMACHA system for *H. contortus*, ill-thrift, diarrhea, etc), if present at the time of treatment
- Use production data (milk production, weight gains, reproductive parameters) to determine if the drug is effective

## Treatment Decisions - Small Ruminants

**If you determine an antiparasitic drug is not effective, what are your initial recommendations for the producer/ animal owner? Please rate up to two choices that you do most often.**

	First choice	Second choice
Recommend animal management changes (cull animals, quarantine, implement FAMACHA, etc.)	<input type="radio"/>	<input type="radio"/>
Recommend pasture management changes (multispecies grazing, controlling forage height, rotational grazing, etc.)	<input type="radio"/>	<input type="radio"/>
Start or continue fecal analysis as needed	<input type="radio"/>	<input type="radio"/>
Recommend treatment with another antiparasitic drug	<input type="radio"/>	<input type="radio"/>
Other (please specify in comment box below)	<input type="radio"/>	<input type="radio"/>

Other option or comment

## Treatment Decisions - Small Ruminants

Please indicate the number of treatments per year that you recommend for routine deworming in small ruminants.

Number of treatments

Options for both age groups:

Less than one treatment per year

One treatment per year

Two treatments per year

Three or more treatments per year

Not applicable - treatment depends

on fecal egg count, FAMACHA,

or other individualized

treatment plan

Sheep or goats less than one year of age

Sheep or goats one year of age or older

Other (please specify)

How frequently do you rotate or recommend that an animal owner rotate antiparasitic drugs for routine deworming in small ruminants?

Frequency of rotation

Options for both age groups:

Multiple times per year

Yearly

Less frequently than yearly

Never

Sheep or goats less than one year of age

Sheep or goats one year of age or older

Other (please specify)

Do you use or recommend the use of two or more antiparasitic drugs at the same time in individual animals?

Yes

No

If yes, please list the drugs you use together in small ruminants.



## Detection and Management of Resistance - Small Ruminants

**Do you perform or recommend fecal examination procedures to detect and/or quantify parasite eggs in small ruminants?**

- Yes Continue to Page 50
- No Continue to Page 55

## Detection and Management of Resistance - Small Ruminants

Please select the options below that best describe the fecal examination procedures you use or recommend to detect and/or quantify fecal eggs in small ruminants. You may fill out more than one method per target animal.

	Fecal Float Solution	Method/technique
1	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>

Other (explanation if "other" selected above)

Solution choices: None-direct or saline smear, Zinc sulfate, Sheathers, Modified sheathers, Magnesium sulfate, Saturated salt, Sodium nitrate, Sugar-salt, Other, Unknown, Not sure what my lab uses

Method/technique choices: Direct smear, Saline smear, Simple flotation, Sedimentation, Centrifugation, McMasters, Modified McMasters, Wisconsin, Modified Wisconsin, FLOTAC, Other, Unknown, Not sure what my lab uses

## Detection and Management of Resistance - Small Ruminants

**Do you use larval cultures to identify parasite species in small ruminants?**

- Yes
- No
- I am not familiar with the use of larval culture

**Do you use or recommend the fecal egg count reduction test (FECRT) to determine treatment efficacy in small ruminants that are treated with an antiparasitic drug?**

- Yes Continue to Page 52
- No Continue to Page 54
- I am not familiar with the FECRT Continue to Page 54

## Detection and Management of Resistance - Small Ruminants

**Which one of the following statements best represents the method you use or recommend to determine fecal egg count reduction?**

- FECRT based on a comparison of pre- and post- treatment fecal egg counts of a treated group/animal
- FECRT based on a comparison of post-treatment fecal egg counts of a treated and an untreated-control group/animal
- FECRT includes pre- and post-treatment fecal egg counts from both a treated and an untreated-control group/animal

Other (please specify)

**Which one of the following best represents the type of samples you use or recommend to conduct the fecal egg count reduction test (FECRT)?**

- Composite fecal sample (fecal samples from individual animals mixed together)
- Fecal samples from individual animals

## Detection and Management of Resistance - Small Ruminants

**What is the FECRT calculation cut-off value you use or recommend to determine if treatment with an antiparasitic drug is effective?**

- Greater than or equal to 80%
- Greater than or equal to 85%
- Greater than or equal to 90%
- Greater than or equal to 95%
- Greater than or equal to a previous FECRT result
- Other (please specify)

## Detection and Management of Resistance - Small Ruminants

**Other methods to detect or monitor antiparasitic drug resistance include egg hatching, larval migration test, larval development assay, worm counts, molecular based tests, etc.**

**Do you use tests/methods other than the fecal egg count reduction test to detect or monitor antiparasitic drug resistance?**

- Yes
- No

If, yes, please list the tests you use

## Detection and Management of Resistance - Small Ruminants

**Which of the following management practices do you most often implement or recommend for a parasite control program in small ruminants?**

**Please select up to three choices.**

- Maintain a portion of the worm population that is not exposed to the antiparasitic \* and can go on to establish in a host (refugia)
- Implementation of quarantine procedures
- Pasture management- multispecies grazing, controlling forage height, rotational grazing, etc.
- Selection for parasite resistant animals
- Alternative techniques (copper wire particles or fungi, etc)
- Age specific treatment recommendations (for example, minimizing treatment of adult animals)
- Use of two or more antiparasitic drugs at the same time in individual animals
- Strategic deworming (treating when majority of parasites are in the animal and not in the environment)
- I have not implemented or recommended any management practices for parasite control
- Other (please specify)

## Detection and Management of Resistance - Small Ruminants

**Have you changed the management practices you implement or recommend for parasite control in small ruminants in response to antiparasitic drug resistance? Please choose one answer.**

- No, because I have not experienced any resistance
- No, because changes have not been necessary
- Yes, in response to information about resistance
- Yes, in response to resistance that I have experienced
- Other (please specify)



## Continue Survey

**If you would like to repeat the Treatment Decisions and Detection and Management of Resistance portions of the survey for a different animal species or class, please choose one of the options below. Otherwise to continue to the final portion of the survey, please choose 'Continue with survey'.**

- Cattle Continue to Page 15
- Horses Continue to Page 29
- Continue with survey Continue to Page 58

# Ruminant and Equine Antiparasitic Drug Use and Antiparasitic Resistance Survey

## Marketing and Labeling Information

**Product labeling is one way to provide information about the indications and use of an antiparasitic drug. How helpful or unhelpful would you find the following choices if added to an antiparasitic drug label?**

	Very unhelpful	Somewhat unhelpful	Neither helpful nor unhelpful	Somewhat helpful	Very helpful
Recommendations for how to detect antiparasitic drug resistance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Warnings regarding antiparasitic drug resistance if warranted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management recommendations to minimize the development of antiparasitic drug resistance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comment (if desired)

## Marketing and Labeling

**Freedom of Information (FOI) Summaries are available electronically through <http://www.fda.gov/AnimalVeterinary/Products/default.htm> which summarize the safety and effectiveness information submitted to support the approval of animal drugs.**

**Were you aware of the availability of FOI Summaries?**

- Yes
- No

If yes, which parts of the FOI Summary do you find most useful?

## Marketing and Labeling

**In your opinion, should approved combinations of antiparasitic drugs be available over-the-counter or by prescription-only in the United States?**

Yes

No

Undecided

Over-the-counter

Prescription-only

Explanation, if desired

## Wrap Up

**In your opinion, what are the roles/responsibilities, if any, of the following groups in managing the use of antiparasitic drugs to minimize the development of antiparasitic drug resistance?**

Veterinarians

Regulatory agencies

Academia/ Science

Producers/ Animal owners

Pharmaceutical companies

Producer groups and affiliated organizations

**Is there any additional information you would like to convey that has not yet been covered in this questionnaire relative to antiparasitic drug resistance and/or antiparasitic drugs?**

End of Survey

## Acknowledgment

**Thank you for your interest in the FDA Center of Veterinary Medicine Food Animal Antiparasitic Drug Use and Antiparasitic Resistance Survey. The FDA values your input but at this time we are restricting our collection to those with experience in equine, bovine and small ruminant species in the United States. If you would like to share any comments or concerns that you have experienced regarding antiparasitic drug use or antiparasitic resistance, please use the comment form below.**

**If you have any questions about the survey, please contact Janis Messenheimer, DVM at (240) 276-8348 or [janis.messenheimer@fda.hhs.gov](mailto:janis.messenheimer@fda.hhs.gov).**

**To exit the survey, please choose "Exit the survey"**

Exit the survey

Please comment if desired.