Appendix B. Survey Question Mapping and Analysis Plan

I. Survey Objectives

This survey is designed to elicit information from veterinarians and veterinary parasitologists to answer the following questions:

1. What experience do individuals report regarding antiparasitic drug use and antiparasitic drug resistance?
    1.1. Is there current awareness of antiparasitic drug resistance in target animals?
    1.2. What target animal/drug/route of administration/parasite resistance relationships do individuals report?
    1.3. Which information sources do individuals use when determining which antiparasitic drugs to use or recommend?
    1.4. Do individuals recommend concurrent multiple antiparasitic drugs and/or rotation of antiparasitic drugs in individual or groups of animals
2. Which strategies for detecting, monitoring, and/or managing antiparasitic resistance do respondents commonly use?
    2.1. Which methods do individuals use to detect parasites, determine if treatment is effective, or manage resistance?
    2.2. Is the choice of parasite control practices related to awareness or experience of antiparasitic drug resistance?

~~3.~~ Which types of information would best assist end users in the safe and effective use of antiparasitic drugs?
    3.1. What additional types of information could FDA use that would best assist end users in the safe and effective use of antiparasitic drugs?
    3.2. Is there evidence that there is awareness of FDA's current methods of disseminating information about indications and use of approved drugs (i.e., FOI Summaries)?

II. Survey Questions

The individual survey questions are listed on the following pages. For Questions 10 to 38, the questions are followed by the objective that each question addresses and the planned analysis for results.

1. SURVEY CONSENT CONFIRMS THAT SURVEY IS VOLUNTARY, RESPONDENT IS OVER 18, AND THAT RESPONDENT HAS NOT PREVIOUSLY COMPLETED THE SURVEY.

2. Q. WHICH ONE OF THE FOLLOWING OPTIONS BEST DESCRIBES YOUR CREDENTIALS?

A. DVM; PhD or MS in Veterinary Parasitology; Both; or Other (please specify).

3. Q. WHICH ONE OF THE FOLLOWING OPTIONS BEST DESCRIBES YOUR CURRENT EMPLOYMENT TYPE?

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

4. Q. IN WHICH REGION OF THE WORLD IS YOUR PROFESSIONAL EXPERIENCE BASED? SELECT ONE OF THE FOLLOWING OPTIONS.

A. United States; United States and another region of the world; Region of the world other than the United States

[Those without US experience will be directed to the disqualification page.]

5. Q. IN WHICH REGION OF THE UNITED STATES IS THE MAJORITY OF YOUR PROFESSIONAL EXPERIENCE BASED? PLEASE CHOOSE ONE.

A. 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.)

[US Region – States are aggregated into one of the nine climate regions as outlined by NOAA (http://www.ncdc.noaa.gov/temp-and-precip/us-climate-regions.php) with additional choices for: Hawaii; Alaska; US Caribbean jurisdictions, U.S. Pacific jurisdictions and Other. Parasite epidemiology and climate differ by region. Regional differences may influence respondents' answers. Use of aggregated region also protects confidentiality of individuals. Other text responses will be coded according to the American National Standards Institute (ANSI) codes.]

6. Q. IN WHICH REGION OF THE WORLD OTHER THAN IN THE UNITED STATES IS YOUR PROFESSIONAL EXPERIENCE BASED? SELECT ONE OR MORE OF THE OPTIONS BELOW.

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

[Other text responses will be coded using Codes for the Representation of Names of Countries (ISO 3166) as prepared by the International Organization for Standardization.]

7. WHICH ONE OF THE FOLLOWING BEST DESCRIBES YOUR CURRENT PRACTICE OR FOCUS AREA?

A. Companion animal predominant or exclusive; Equine predominant or exclusive; Bovine predominant or exclusive; Small ruminant predominant or exclusive; Mixed animal/-multiple animal species; Other (please specify).

[Respondents choosing "Companion animal predominant or exclusive" will be directed to the disqualification page. Respondents choosing "Other" will be directed to the bovine, equine and small ruminant experience page. The rest will continue onto general questions.]

Question 8 is for those who choose "Other" practice or focus area.

8. Q. 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?

A. Yes, I have experience with horses, cattle, or small ruminants; No, I do not have any experience with horses, cattle, or small ruminants.

[Respondents with applicable experience will continue with the survey. Respondents who indicate that they do not have applicable experience will be directed to the exclusion page.]

9. Q. WHAT PERCENTAGE OF YOUR PRACTICE, EMPLOYMENT, OR RESEARCH AREA IS DEVOTED TO THE FOLLOWING GROUPS OF ANIMALS? PLEASE FILL IN THE TEXT BOXES ADJACENT TO THE ANIMALS THAT YOU HAVE EXPERIENCE WITH.

A. Numerical response for each of the following categories: Equine - Pleasure/ Performance; Equine – Racetrack; Beef Cattle; Dairy Cattle; Swine; Poultry; Sheep; Goats; Small Animal (cats/dogs); Other (please specify species and percentage)

Descriptive Analysis for Questions 1-9:

Respondent Characteristics

	Percent of Respondents (n)
Credential Type	
DVM	
PhD or MS in Veterinary Parasitology	
Both	
Other	
Employment Type	
Academia/-Research	
Private Practice	
Government/-Regulatory	
Industry	
Retired/Not actively employed	
Student	
Region of World	
United States only	
United States and another region of the world *	
Region of the United States	
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)	
Other (includes Hawaii, American Samoa, Guam, Northern Mariana Islands; Puerto Rico, U.S. Virgin Islands; Alaska)	*May parse out individually depending on number of respondents*
Percent ≥ 30% Cattle	
Percent ≥ 30% Horses	
Percent ≥ 30% Small Ruminants (Sheep or Goats)	

As part of the assessment regarding whether the sample is representative, the percent of respondents that report primary experience in each region will be examined. This information will be compared to published national surveys.

	Percent of respondents that list >30% of focus area		
	Horses (n)	Cattle (n)	Small Ruminants (n)
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)			
Other (includes Hawaii, American Samoa, Guam, Northern Mariana Islands; Puerto Rico, U.S. Virgin Islands; Alaska)			

Regional differences may influence respondents' answers. As credential type will be one variable used for measurement of association, examination of possible regional confounding is necessary.

	Percent of respondents that list >30% of focus area					
	Horses (n)		Cattle (n)		Small Ruminants (n)	
	DVM	MS/PhD	DVM	MS/PhD	DVM	MS/PhD
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)						
Other (includes Hawaii, American Samoa, Guam, Northern Mariana Islands; Puerto Rico, U.S. Virgin Islands; Alaska)						

10. Q. 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".

SPECIES/ CLASSES OF ANIMALS: ADULT HORSES (3 YEARS OLD AND OLDER); YOUNG HORSES (LESS THAN 3 YEARS OLD); DAIRY CATTLE; COW-CALF; BACKGROUND/STOCKERS; FEEDLOT CATTLE; SHEEP; GOATS

A. Aware of high prevalence; Aware of moderate prevalence; Aware of low/-no prevalence; Unable to evaluate

OBJECTIVE: 1.1

ANALYSIS: Fisher exact by credential type stratified by target animal. If the number of observations and distribution of data warrants, simple logistic regression will be performed to determine if credential type or animal class is associated with awareness of resistance.

Percent (n) of respondents that list ≥30% of focus area in major target species/ class

	High Prevalence	Moderate Prevalence	Low/ No Prevalence	Unable to Evaluate
Adult horses				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Young horses				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Dairy cattle				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Cow-calf				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Background/ stockers				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Feedlot				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Sheep				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Goats				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				

Measure of association of level of awareness in respondents with ≥30% of focus area in major target species/ class

	High Prevalence	Moderate Prevalence	Low/ No Prevalence
Target animal/ class			
Adult horses			
Young horses			
Dairy cattle			
Cow-calf			
Background/-stockers			
Feedlot			
Sheep			
Goats			
Credential type			
DVM			

DVM and MS/PhD or MS/PhD in Veterinary Parasitology

Awareness of antiparasitic drug resistance will be considered in future measurement of association and experience with resistance may vary with region. Analysis of awareness by region will determine whether future analyses will need to be adjusted for region.

	Percent (n) of respondents that list ≥30% of focus area								
	Cattle (n)			**Horses (n)**			**Small Ruminants (n)**		
	Aware of High/Mod resistance	Aware of Low/No resistance	Unable to evaluate	Aware of High/Mod resistance	Aware of Low/No resistance	Unable to evaluate	Aware of High/Mod resistance	Aware of Low/No resistance	Unable to evaluate
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)									
Other (includes Hawaii, American Samoa, Guam, Northern Mariana Islands; Puerto Rico, U.S. Virgin Islands; Alaska)									

11. Q. 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".

Species/-classes of animals: Adult horses (3 years old and older); Young horses (less than 3 years old); Dairy cattle; Cow-calf; Background/stockers; Feedlot cattle; Sheep; Goats

A. High Risk; Moderate Risk; Low Risk; Unable to Evaluate

OBJECTIVE: 1.1

ANALYSIS: Measurement of association between ordinal level of risk and respondent characteristics stratified by species as in Question 11 above.

Percent (n) of respondents that list ≥30% of focus area in target species

Credential Type	High Risk	Moderate Risk	Low Risk	Unable to Evaluate
Adult horses				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Young horses				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Dairy cattle				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Cow-calf				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Background/-stockers				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Feedlot				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Sheep				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Goats				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				

Measure of association that respondents that list >30% of focus area in target species report level of risk

	High Risk	Moderate Risk	Low Risk
Adult horses			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Young horses			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Dairy cattle			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Cow-calf			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Background/-stockers			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Feedlot			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Sheep			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Goats			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			

12. Q. 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 THE UNITED STATES IN HORSES, CATTLE, OR SMALL RUMINANTS IN THE PAST THREE YEARS?

A. Yes; No; Uncertain

OBJECTIVE: 1.1

ANALYSIS: Frequency of experiencing or witnessing antiparasitic drug resistance as defined in the survey and respondent characteristics. Measurement of association for outcome of experiencing resistance by credential type stratified by target animal class and adjusted for region if warranted.

	Percent of respondents (n) that list ≥30% of focus area in target species that have experienced resistance		
Credential type	Yes (n)	No (n)	Uncertain (n)
Equine – Pleasure/-Performance			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Equine - Racetrack			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Beef cattle			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Dairy cattle			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Sheep			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Goats			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			

Experience of resistance will be considered in future measurement of association and experience with resistance may vary with region. Analysis of experience by region will inform whether future analyses will need to be adjusted for region.

	Percent of respondents (n) that list ≥30% of focus area in aggregated target species that have experienced resistance		
Region	Horses (n)	Cattle (n)	Small Ruminants (n)
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)			
Other (includes Hawaii, American Samoa, Guam, Northern Mariana Islands; Puerto Rico, U.S. Virgin Islands; Alaska)			

Credential type	Measure of association between experiencing resistance and credential type
Equine – Pleasure/-Performance	
DVM	
DVM and MS/PhD or MS/PhD in Veterinary Parasitology	
Equine - Racetrack	
DVM	
DVM and MS/PhD or MS/PhD in Veterinary Parasitology	
Beef Cattle	
DVM	
DVM and MS/PhD or MS/PhD in Veterinary Parasitology	
Dairy Cattle	
DVM	
DVM and MS/PhD or MS/PhD in Veterinary Parasitology	
Sheep	
DVM	
DVM and MS/PhD or MS/PhD in Veterinary Parasitology	
Goats	
DVM	
DVM and MS/PhD or MS/PhD in Veterinary Parasitology	

13. Q. PLEASE LIST THE ANTIPARASITIC DRUG RESISTANCE CASES THAT YOU HAVE EXPERIENCED OR WITNESSED IN HORSES, CATTLE, OR SMALL RUMINANTS IN THE UNITED STATES IN 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.

A1. Target Animal/Class: Adult horses (3 years old and older), Young horses (less than 3 years old), Dairy cattle, Cow-calf, Background/stockers, Feedlot cattle, Sheep, Goats

A2. Drug or drug class: Fenbendazole, Multiple benzimidazoles, Oxfendazole, Albendazole, Multiple macrocyclic lactones, Ivermectin, Eprinomectin, Moxidectin, Doramectin, Pyrantel, Morantel, Levamisole, Piperazine, Other, Not determined

A3. Route of Administration: Oral, Pour-on, Injection

A4. 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

OBJECTIVE: 1.1, 1.2

ANALYSIS: Descriptive analysis of drugs, routes of administration and parasites stratified by target animal species/class, respondent characteristics. Frequencies will be reported, but results will not be generalized to all US practitioners or provide an estimation of prevalence of antiparasitic drug resistance by animal, route of administration, drug, or parasite.

Percent (n) of total reports for target animal class reporting a parasite resistance relationship

	Adult Horses	Young horses	Dairy Cattle	Cow-calf	Background/ stockers	Feedlot	Sheep	Goats	Total
Drug or drug class									
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									
Whipworms									
Other									
Not determined									

14. Q. [For those who chose "Mixed animal/-multiple animal species" or "Other"] 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?

A. Horses; Cattle; Small ruminants

[Individuals will then be directed to target animal section chosen]

15. Q. Are you involved in making any recommendations or treatment decisions regarding parasite treatment or control in [cattle, horses, small ruminants]?

A. Yes; No *[Respondents who choose "No" will be directed to parasite detection questions and not reported in analysis for this section.]*

16. Q. What proportion of your clients involves you in decisions about parasite treatment and control?

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

OBJECTIVE: 1.1

ANALYSIS: Frequency and percentage of responses by practice type and region for individuals with employment type "Private Practice" and cross-tabulation by awareness of antiparasitic drug resistance

Percent (n) of respondents reporting proportion of clients involving them in antiparasitic drug use decisions

	<25%	25% to <50%	50% to <75%	≥75%
Credential Type				
DVM				
DVM and MS/PhD or MS/PhD in Veterinary Parasitology				
Private practitioners reporting ≥30% of focus area in target species (cattle and small ruminant categories will be combined)				
Cattle				
Horses				
Small Ruminants				

Percent (n) of respondents reporting proportion of clients that involve them in antiparasitic drug use decisions

With knowledge of species and ≥30% focus area	<25%	25% to <50%	50% to <75%	>75%
Cattle				
Aware of High/-Moderate resistance				
Aware of Low/-No resistance				
Horses				
Aware of High/-Moderate resistance				
Aware of Low/-No resistance				
Small Ruminants				
Aware of High/-Moderate resistance				
Aware of Low/-No resistance				

17. Q. THERE ARE MANY WAYS TO DETERMINE WHICH ANTIPARASITIC DRUG TO USE OR RECOMMEND TO TREAT AN ANIMAL OR GROUP OF ANIMALS. FOR [CATTLE, HORSES, SMALL RUMINANTS], WHICH OF THE FOLLOWING WAYS DO YOU USE MOST OFTEN? PLEASE SELECT UP TO THREE.

A1. Information from veterinary continuing education conferences

A2. Marketing and promotional materials for antiparasitic drugs

A3. Product label indications to determine if the drug is expected to work for the parasites I am attempting to treat

A4. Experience of other veterinarians in my practice or institution

A5. Use what I previously used for the animal(s) unless the animal owner gives information to suggest that the drug is not working anymore.

A6. Peer-reviewed scientific journal articles

A7. Test the drug in the animal population and determine if it is effective based on an evaluation of fecal egg counts

OBJECTIVE: 1.3

ANALYSIS: Frequency of responses chosen for each answer choice will be reported for all respondents and subsets of employment type and US region. Descriptive statistics will be employed to summarize the data.

Percent (n) of respondents who chose each answer choice

	A1	A2	A3	A4	A5	A6	A7
Cattle (of those reporting ≥30% of focus area)							
Horses (of those reporting ≥30% of focus area)							
Small Ruminants (of those reporting ≥30% of focus area)							
DVM							
DVM and MS/PhD or MS/PhD in Veterinary Parasitology							

18. Q. 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, HORSES, SMALL RUMINANTS]? PLEASE SELECT UP TO THREE.

A1. If there is no evidence of parasitism after treatment, conclude that the drug was effective

A2. Rely on the opinion of the farmer/producer/animal owner regarding the effectiveness of the antiparasitic drug

A3. Conduct a fecal analysis after treatment (without fecal egg count)

A4. Evaluate fecal egg counts pre- OR post-treatment

A5. Evaluate fecal egg counts pre- AND post-treatment (e.g., Fecal Egg Count Reduction Test (FECRT))

A6. [Cattle, Horses] Make the determination based on resolution of clinical signs of parasitism (eg., ill-thrift, diarrhea, etc), if present at the time of treatment

A6. [Small Ruminants] 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

A7. [Cattle, Small Ruminants] Use production data (milk production, weight gains, reproductive parameters) to determine if the drug is effective

OBJECTIVE: 2.1

ANALYSIS: Frequency of responses chosen for each choice by credential type and target animal class will be reported. Descriptive statistics will be employed to summarize the data.

	Percent (n) of respondents who chose each answer choice						
	A1	A2	A3	A4	A5	A6	A7
Cattle (of those reporting ≥30% of focus area)							
Horses (of those reporting ≥30% of focus area)							
Small Ruminants (of those reporting ≥30% of focus area)							
DVM							
DVM and MS/PhD or MS/PhD in Veterinary Parasitology							

19. Q. IF YOU DETERMINE AN ANTIPARASITIC DRUG IS NOT EFFECTIVE, WHAT ARE YOUR INITIAL RECOMMENDATIONS FOR A PRODUCER/-ANIMAL OWNER? PLEASE RATE UP TO TWO CHOICES THAT YOU DO MOST OFTEN.

[Each choice below may be chosen as a First or Second Choice]

A1. [Cattle] Recommend animal management changes (cull animal(s), transfer to dry lot, quarantine, etc.)

A1. [Horses] Recommend animal management changes (segregation by age, minimization of horses per acre, etc.)

A1. [Small ruminant] Recommend animal management changes (cull animal(s) quarantine, implement FAMACHA, etc.)

A2. [Cattle] Recommend pasture management changes (multispecies grazing, controlling forage height, rotational grazing, etc.)

A2. [Horses] Recommend pasture management changes (regular removal of manure, composting, routine mowing and harrowing of pasture, etc.)

A2. [Small Ruminants] Recommend pasture management changes (multispecies grazing, controlling forage height, rotational grazing, etc.)

A3. [Horses] Change to a selective treatment program in which treatments are given based on level of fecal egg counts.

A4. Start or continue fecal analysis as needed

A5. Recommend treatment with another antiparasitic drug

A6. Other (please specify in comment box below)

OBJECTIVE: 1.4

ANALYSIS: Frequency distribution by respondent credentials and awareness of resistance and adjusted by region if sufficient observations exist and adjustment is warranted.

	Percent (n) first or second choice												
	Cattle				Horses					Small Ruminants			
	A1	A2	A4	A5	A1	A2	A3	A4	A5	A1	A2	A4	A5
Overall													
Credential Type													
DVM													
DVM and MS/PhD or MS/PhD in Veterinary Parasitology													
Aware of Resistance													
Aware of High/-Moderate resistance													
Aware of Low/-No resistance													

20. Q. PLEASE INDICATE THE NUMBER OF TREATMENTS PER YEAR THAT YOU RECOMMEND FOR ROUTINE DEWORMING IN [CATTLE, HORSES, SMALL RUMINANTS].

[Each question has two drop down menus for age class: young animals (less than 18 months of age for cattle, less than 3 years of age for horses, less than one year of age for small ruminants) and adult animals (18 months of age and older for cattle, 3 years of age and older for horses, one year of age and older for small ruminants].

A. [Cattle] Less than one treatment per year; One treatment per year; More than one treatment per year; Not applicable - treatment depends on fecal egg count or other individualized treatment plan.

A. [Horses] 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.

A. [Small Ruminants] 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.

OBJECTIVE: 1.4

ANALYSIS: Percent of respondents who choose each frequency.

	Percent (n) choosing frequency													
Young Animals	**Cattle <18 months**				**Horses <3 years**					**Small Ruminants <1 year**				
Respondents reporting ≥30% of focus area in target animal species or class	<1 per year	1 per year	>1 per year	N/A	1-2 per year	3-4 per year	5-6 per year	7 + per year	N/A	<1 per year	1 per year	2 per year	3+ per year	N/A
Overall														
Credential Type														
DVM														
DVM and MS/PhD or MS/PhD in Veterinary Parasitology														
Aware of Resistance														
Aware of High/ Moderate resistance														
Aware of Low/-No														

resistance			

	Percent (n) choosing frequency													
Adult Animals	**Cattle ≥ 18 months**				**Horses ≥ 3 years**					**Small Ruminants ≥ 1 year**				
Respondents reporting ≥30% of focus area in target animal species or class	<1 per year	1 per year	>1 per year	N/A	1-2 per year	3-4 per year	5-6 per year	7 + per year	N/A	<1 per year	1 per year	2 per year	3+ per year	N/A
Overall														
Credential Type														
DVM														
DVM and MS/PhD or MS/PhD in Veterinary Parasitology														
Aware of Resistance														
Aware of High/ Moderate resistance														
Aware of Low/-No resistance														

21. Q. [CATTLE] DO YOU RECOMMEND ROTATING ANTIPARASITIC DRUGS FOR ROUTINE DEWORMING IN CATTLE?

Q. [HORSES AND SMALL RUMINANTS] HOW FREQUENTLY DO YOU ROTATE OR RECOMMEND AN ANIMAL OWNER ROTATE ANTIPARASITIC DRUGS FOR ROUTINE DEWORMING IN [HORSES, SMALL RUMINANTS]?

[Each question has two drop down menus for age class: young animals (less than 18 months of age for cattle, less than 3 years of age for horses, less than one year of age for small ruminants) and adult animals (18 months of age and older for cattle, 3 years of age and older for horses, one year of age and older for small ruminants].

A. [Cattle] Yes, I recommend rotation; No, I do not recommend rotation; Other (please specify)

A. [Horses and Small ruminant] Multiple times per year; Yearly; Less frequently than yearly; Never; Other (please specify)

OBJECTIVE: 1.4

ANALYSIS: Percent of respondents who use or recommend rotational deworming for cattle, horses, small ruminants. Percent of respondents by frequency of rotation will be reported for horses and small ruminants. Measurement of association as appropriate will be reported for each target animal class (e.g., Fisher exact, chi-square, logistic regression) for credential type and awareness of antiparasitic drug resistance, stratified by age and adjusted by region if warranted.

Percent (n) or respondents choosing frequency of rotation of antiparasitic drugs for routine deworming

Young Animals	Cattle		Horses				Small Ruminants			
Respondents reporting ≥30% of focus area in target animal species or class	Yes	No	> 1 per Year	1 per Year	<1 per Year	Never	> 1 per Year	1 per Year	<1 per Year	Never
Credential type										
DVM										
DVM and MS/PhD or MS/PhD in Veterinary Parasitology										
Awareness										
Aware of High/-Moderate resistance										
Aware of Low/-No resistance										
Experience of resistance										
Report experience										
Do not report experience										

Adult Animals	Cattle		Horses				Small Ruminants			
Respondents reporting ≥30% of focus area in target animal species or class	Yes	No	> 1 per Year	1 per Year	<1 per Year	Never	> 1 per Year	1 per Year	<1 per Year	Never
Credential type										
DVM										
DVM and MS/PhD or MS/PhD in Veterinary Parasitology										
Awareness										
Aware of High/ Moderate resistance										
Aware of Low/-No resistance										
Experience of resistance										
Report experience										
Do not report experience										

Measure of association that respondents who report >30% of focus area to corresponding target animal class recommend rotating antiparasitic drugs

	Young animals	Adult animals
Cattle		
DVM only compared to MS/PhD in Veterinary Parasitology or both		
Awareness of high/-moderate resistance compared to awareness of low/-no resistance		
Report of experience with resistance compared to no report of experience with resistance		
Horses		
DVM only compared to MS/PhD in Veterinary Parasitology or both		
Awareness of high/-moderate resistance compared to awareness of low/-no resistance		
Report of experience with resistance compared to no report of experience with resistance		
Small Ruminants		
DVM only compared to MS/PhD in Veterinary Parasitology or both		
Awareness of high/-moderate resistance compared to awareness of low/-no resistance		
Report of experience with resistance compared to no report of experience with resistance		

22. Q. DO YOU USE OR RECOMMEND THE USE OF TWO OR MORE ANTIPARASITIC DRUGS AT THE SAME TIME IN INDIVIDUAL ANIMALS. IF YES, PLEASE LIST THE DRUGS YOU USE TOGETHER IN [CATTLE, HORSES, SMALL RUMINANTS].

A. Yes; No

OBJECTIVE: 1.4

ANALYSIS: Measurement of association between respondent characteristics and comparison of those who use two or more drugs by report of experience with antiparasitic drug resistance and awareness, adjusted for region as warranted. Open answer question will elicit types of combinations presently being used. These will be summarized, but no further associations will be examined for particular drugs used.

Percent (n) of respondents that use two or more antiparasitic drugs in the same animal at the same time

	Cattle		Horses		Small Ruminants	
	Use	Do not use	Use	Do not use	Use	Do not use
Respondents reporting ≥30% of focus area in target animal species or class						
DVM						
DVM and MS/PhD or MS/PhD in Veterinary Parasitology						
Awareness						
Aware of High/-Moderate resistance						
Aware of Low/-No resistance						
Report of experience of resistance						
Report of experience of resistance						
No report of experience of resistance						

Measure of association for recommending or using concurrent use of multiple antiparasitic drugs

	Cattle	Horses	Small Ruminants
Respondents reporting ≥30% of focus area in target animal species or class			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Awareness			
Aware of High/-Moderate resistance			
Aware of Low/-No resistance			
Report of experience of resistance			
Report of experience of resistance			
No report of experience of resistance			

23. DO YOU PERFORM OR RECOMMEND FECAL EXAMINATION PROCEDURES TO DETECT AND/OR QUANTIFY PARASITE EGGS IN [CATTLE, HORSES, SMALL RUMINANTS]?

Screening question for skip logic utilization. Those who choose yes will continue to Question 24; those who choose no will be directed to Question 30.

24. Q. 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, HORSES, SMALL RUMINANTS].

Solution: 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: Direct smear; Saline smear; Simple flotation; Sedimentation; Centrifugation; McMasters; Modified McMasters; Wisconsin; Modified Wisconsin; FLOTAC; Other; Unknown; Not sure what my lab uses

OBJECTIVE: 2.1

ANALYSIS: Frequency of responses stratified by target animal if number of observations warrant. Analysis will center on whether respondents are using methods considered appropriate by veterinary parasitologists to detect and quantify eggs at a detection level that is sufficient to monitor antiparasitic drug resistance.

		Most frequent fecal examination procedure reported			
		Awareness		**Report experience resistance**	
Respondents with ≥30% of focus area	All	Aware of High / Moderate resistance	Aware of Low/ No resistance	Yes	No
Cattle					
DVM					
DVM and MS/PhD or MS/PhD in Veterinary Parasitology					
Horses					
DVM					
DVM and MS/PhD or MS/PhD in Veterinary Parasitology					
Small Ruminants					
DVM					
DVM and MS/PhD or MS/PhD in Veterinary Parasitology					

Likelihood that respondents with advanced parasitology degrees chose this method most frequently compared to those without advanced degrees

Three most frequently reported methods	**Cattle**	**Horses**	**Small Ruminants**
Method 1			
Method 2			
Method 3			

25. Q. DO YOU USE OR RECOMMEND LARVAL CULTURES TO IDENTIFY PARASITE SPECIES? [CATTLE, HORSES, SMALL RUMINANTS]

A. Yes; No; I am not familiar with the use of larval culture

OBJECTIVE: 2.1

ANALYSIS: Percent of respondents who use or recommend larval cultures to identify parasite species.

Respondents reporting ≥30% of focus area in target animal species or class	**Percent (n) of respondents who use or recommend larval culture**								
	Cattle			**Horses**			**Small Ruminants**		
	Yes	No	Unfamiliar	Yes	No	Unfamiliar	Yes	No	Unfamiliar
Credential type									
DVM									
DVM and MS/PhD or MS/PhD in Veterinary Parasitology									
Awareness									
Aware of High/-Moderate resistance									
Aware of Low/-No resistance									
Report of experience of resistance									
Report of experience of resistance									
No report of experience of resistance									

26. Q. DO YOU USE OR RECOMMEND THE FECAL EGG COUNT REDUCTION TEST (FECRT) TO DETERMINE TREATMENT EFFICACY IN [CATTLE, HORSES, SMALL RUMINANTS] THAT ARE TREATED WITH AN ANTIPARASITIC DRUG?

A. Yes; No; I am not familiar with the FECRT

OBJECTIVE: 2.1

ANALYSIS: Frequency or respondents who use FECRT to determine treatment efficacy in animals treated with an antiparasitic drug. Measurement of association between use of FECRT and credential type, awareness of antiparasitic drug resistance, and report of experience of or witnessing antiparasitic drug resistance as appropriate will be reported. Statistical method of analysis will depend on number of responses per category received.

Percent (n) respondents who use FECRT to determine if resistance in present in animals that are treated with an antiparasitic drug

Respondents reporting ≥30% of focus area in target animal species or class	**Cattle**		**Horses**		**Small Ruminant**	
	Yes	No	Yes	No	Yes	No
Credential type						
DVM						
DVM and MS/PhD or MS/PhD in Veterinary Parasitology						
Awareness						
Aware of High/-Moderate resistance						
Aware of Low/-No resistance						
Report of experience of resistance						
Report of experience of resistance						
No report of experience of resistance						

Measure of association for use of FECRT to determine if antiparasitic drug resistance is present in animals that are treated with an antiparasitic drug

Respondents reporting ≥30% of focus area in target animal species or class	**Cattle**	**Horses**	**Small Ruminant**
Credential type			
DVM			
DVM and MS/PhD or MS/PhD in Veterinary Parasitology			
Awareness			
Aware of High/-Moderate resistance			
Aware of Low/-No resistance			
Report of experience of resistance			
Report of experience of resistance			
No report of experience of resistance			

[Respondents who indicate that they do not use or that they are unfamiliar with the fecal egg count reduction test (FECRT) will be directed to Question 30 for those completing the Small Ruminants section or Question 31 if completing the Cattle or Horses section.]

27. Q. WHICH ONE OF THE FOLLOWING STATEMENTS BEST REPRESENTS THE METHOD YOU USE OR RECOMMEND TO DETERMINE FECAL EGG COUNT REDUCTION IN [CATTLE, HORSES, SMALL RUMINANTS]?

A1. FECRT based on a comparison of pre- and post- treatment fecal egg counts of a treated group/ animal

A2. FECRT based on a comparison of post-treatment fecal egg counts of a treated and an untreated-control group/ animal

A3. FECRT includes pre- and post-treatment fecal egg counts from both an untreated--control and treated group/-animal

A4. Other (please specify)

OBJECTIVE: 2.1

ANALYSIS: Descriptive analysis or measurement of association as warranted between use and credential type, awareness and experience of antiparasitic drug resistance, adjusted by region if necessary.

Percent (n) of respondents who use FECRT to determine if resistance in present in animals that are treated with an antiparasitic drug

	Cattle			**Horses**			**Small Ruminant**		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Respondents reporting ≥30% of focus area in target animal species/ class									
Credential type									
DVM									
DVM and MS/PhD or MS/PhD in Veterinary Parasitology									
Awareness									
Aware of High/-Moderate resistance									
Aware of Low/-No resistance									
Report of experience of resistance									
Report of experience of resistance									
No report of experience of resistance									

Measure of association for use of FECRT to determine if resistance in present in animals that are treated with an antiparasitic drug choose sampling method.	Cattle			Horses			Small Ruminant		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Respondents reporting ≥30% of focus area in target animal species/-class									
Credential type									
DVM									
DVM and MS/PhD or MS/PhD in Veterinary Parasitology									
Awareness									
Aware of High/-Moderate resistance									
Aware of Low/-No resistance									
Report of experience of resistance									
Report of experience of resistance									
No report of experience of resistance									

28. Q. WHICH OF THE FOLLOWING BEST REPRESENTS THE TYPE OF SAMPLES YOU USE OR RECOMMEND TO CONDUCT THE FECAL EGG COUNT REDUCTION TEST (FECRT) IN [CATTLE, HORSES, SMALL RUMINANTS]?

A1. Composite fecal sample (fecal samples from individual animals mixed together)

A2. Fecal samples from individual animals

OBJECTIVE: 2.1

ANALYSIS: Descriptive analysis or measurement of association between use and respondent characteristics. Measurement of association between type of sample used and credential type, awareness and experience of antiparasitic drug resistance, adjusted by region if necessary.

	Types of fecal samples used for FECRT					
	Cattle		Horses		Small Ruminant	
	A1	A2	A1	A2	A1	A2
Respondents reporting ≥30% of focus area in target animal species or class						
Credential type						
DVM						
DVM and MS/PhD or MS/PhD in Veterinary Parasitology						
Awareness						
Aware of High/-Moderate resistance						
Aware of Low/-No resistance						
Report of experience of resistance						
Report of experience of resistance						
No report of experience of resistance						

	Measure of association that respondents use sampling method for FECRT					
	Cattle		Horses		Small Ruminant	
	A1	A2	A1	A2	A1	A2
Respondents reporting ≥30% of focus area in target animal species or class						
Credential type						
DVM						
DVM and MS/PhD or MS/PhD in Veterinary Parasitology						
Awareness						
Aware of High/-Moderate resistance						
Aware of Low/-No resistance						
Report of experience of resistance						
Report of experience of resistance						
No report of experience of resistance						

29. Q. WHAT IS THE FECRT CALCULATION CUTOFF VALUE YOU USE OR RECOMMEND TO DETERMINE IF TREATMENT WITH AN ANTIPARASITIC DRUG IS EFFECTIVE? [CATTLE, HORSES, SMALL RUMINANTS]

A. 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)

OBJECTIVE: 2.1

ANALYSIS: Fisher exact test stratified by major target animal class. Examination of the impact of credential type or region on the percent of individuals that utilized FECRT. Analysis to determine if individuals that report greater awareness of antiparasitic drug resistance or have experienced antiparasitic drug resistance utilize a higher cutoff value for the FECRT.

Respondents reporting ≥30% of focus area in target animal species or class	Percent of respondents who use value to determine efficacy of antiparasitic drug											
	Cattle				Horses				Small Ruminant			
	≥80%	≥85%	≥90%	≥95%	≥80%	≥85%	≥90%	≥95%	≥80%	≥85%	≥90%	≥95%
Credential type												
DVM												
DVM and MS/PhD or MS/PhD in Veterinary Parasitology												
Awareness												
Aware of High/-Moderate resistance												
Aware of Low/-No resistance												
Report of experience of resistance												
Report of experience of resistance												
No report of experience of resistance												

Respondents reporting ≥30% of focus area in target animal species or class	Measure of association that respondent used particular FECRT value to determine efficacy of antiparasitic drug											
	Cattle				Horses				Small Ruminant			
	≥80%	≥85%	≥90%	≥95%	≥80%	≥85%	≥90%	≥95%	≥80%	≥85%	≥90%	≥95%
Credential type												
DVM												
DVM and MS/PhD or MS/PhD in Veterinary Parasitology												
Awareness												
Aware of High/-Moderate resistance												
Aware of Low/-No resistance												
Report of experience of resistance												
Report of experience of resistance												
No report of experience of resistance												

30. Q. [SMALL RUMINANTS ONLY] OTHER METHODS TO DETECT OR MONITOR ANTIPARASITIC DRUG RESISTANCE INCLUDE EGG HATCHING TEST, LARVAL MIGRATION, 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?

A. Yes; No

OBJECTIVE: 2.1

ANALYSIS: Descriptive analysis, measurement of association between use and credential type, awareness and experience of antiparasitic drug resistance, adjusted by region if warranted.

Respondents reporting ≥30% of focus area in Small Ruminants	Percent (n) respondents who use other methods to detect or monitor antiparasitic drug resistance.	
	Yes	No
Credential type		
DVM		
DVM and MS/PhD or MS/PhD in Veterinary Parasitology		
Awareness		
Aware of High/-Moderate resistance		
Aware of Low/-No resistance		
Report of experience of resistance		
Report of experience of resistance		
No report of experience of resistance		

Respondents reporting ≥30% of focus area in Small Ruminants	**Measure of association that respondents use other methods to detect or monitor antiparasitic drug resistance.** Yes	No
Credential type		
DVM		
DVM and MS/PhD or MS/PhD in Veterinary Parasitology		
Awareness		
Aware of High/-Moderate resistance		
Aware of Low/-No resistance		
Report of experience of resistance		
Report of experience of resistance		
No report of experience of resistance		

31. Q. WHICH OF THE FOLLOWING MANAGEMENT PRACTICES DO YOU MOST OFTEN IMPLEMENT OR RECOMMEND FOR A PARASITE CONTROL PROGRAM IN [CATTLE, HORSES, SMALL RUMINANTS]? PLEASE SELECT UP TO THREE CHOICES.

A1. 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)

A2. Implementation of quarantine procedures

A3. Pasture management – multispecies grazing, controlling forage height, rotational grazing, etc.

A4. [Cattle, Small Ruminants] Selection for parasite resistant animals

A5. [Cattle, Small Ruminants] Alternative techniques (copper wire particles or fungi, etc.)

A6. Age--specific treatment recommendations (for example, minimizing treatment of adult animals);

A7. Use of two or more antiparasitic drugs at the same time in individual animals

A8. Strategic deworming (treating when majority of parasites are in the animal and not in the environment)

A9. I have not implemented or recommended any management practices for parasite control

A10. Other (please specify)

OBJECTIVE: 2.2

ANALYSIS: Descriptive analysis. Measurement of association between use and credential type, awareness of and experience with antiparasitic drug resistance, adjusted for region if warranted.

Management practices chosen by respondents reporting ≥30% of focus area in target animal species/ class

	Cattle									Horses								Small Ruminant								
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A1	A2	A3	A6	A7	A8	A9		A1	A2	A3	A4	A5	A6	A7	A8	A9
DVM																										
DVM and MS/PhD or MS/PhD in Veterinary Parasitology																										
Awareness																										
Aware of High/ Moderate resistance																										
Aware of Low/-No resistance																										
Report of experience of resistance																										
Report of experience of resistance																										
No report of experience of resistance																										

Measure of association that respondents reporting >30% of focus area in target animal species/ class choose individual management choice.

	Cattle									Horses								Small Ruminant								
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A1	A2	A3	A6	A7	A8	A9		A1	A2	A3	A4	A5	A6	A7	A8	A9
DVM																										
DVM and MS/PhD or MS/PhD in Veterinary Parasitology																										
Awareness																										
Aware of High/ Moderate resistance																										
Aware of Low/-No resistance																										
Report of experience of resistance																										
Report of experience of resistance																										
No report of experience of resistance																										

32. Q. HAVE YOU CHANGED THE MANAGEMENT PRACTICES YOU IMPLEMENT OR RECOMMEND FOR PARASITE CONTROL IN [CATTLE, HORSES, SMALL RUMINANTS] IN RESPONSE TO ANTIPARASITIC DRUG RESISTANCE? PLEASE CHOOSE ONE ANSWER.

A1. No, because I have not experienced any resistance

A2. No, because changes have not been necessary

A3. Yes, in response to information about resistance

A4. Yes, in response to resistance that I have experienced

A5. Other (please specify)

OBJECTIVE: 2.2

ANALYSIS: Descriptive analysis of responses. Also examines internal validity of survey. Individuals who report that they have not been aware of or experienced antiparasitic drug resistance should not have changed management practices due to experience with antiparasitic drug resistance. The information gained from this question will also inform interpretation of responses to question 31 above.

Have you changed management practices that you implement or recommend for parasite control?

	No, no resistance	No, not necessary	Yes, information	Yes, experience
Awareness				
Aware of High/-Moderate resistance				
Aware of Low/-No resistance or No knowledge of resistance				

33. Q. 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?

A. Recommendations for how to detect antiparasitic drug resistance; Warnings regarding antiparasitic drug resistance if warranted; Management recommendations to minimize the development of antiparasitic drug resistance

A1. Very unhelpful

A2. Somewhat unhelpful

A3. Neither helpful nor unhelpful

A4. Somewhat helpful

A5. Very helpful

OBJECTIVE: 3.2

ANALYSIS: Descriptive analysis by respondent characteristics. Likelihood that respondents find choice somewhat helpful or very helpful.

	Percent of respondents choosing rating of helpfulness of additions to product label.														
	Recommendations for detection					Warnings of resistance if warranted					Management recommendations				
	A1	A2	A3	A4	A5	A1	A2	A3	A4	A5	A1	A2	A3	A4	A5
Credential type															
DVM															
DVM and MS/PhD or MS/PhD in Veterinary Parasitology															
Awareness															
Aware of High/-Moderate resistance															
Aware of Low/-No resistance															
Report of experience of resistance															
Report of experience of resistance															
No report of experience of resistance															

	Measure of association between reporting suggestion somewhat or very helpful and credential type, level of awareness of resistance, and experience of resistance.														
	Recommendations for detection					Warnings of resistance if warranted					Management recommendations				
	A1	A2	A3	A4	A5	A1	A2	A3	A4	A5	A1	A2	A3	A4	A5
Credential type															
DVM															
DVM and MS/PhD or MS/PhD in Veterinary Parasitology															
Awareness															
Aware of High/-Moderate resistance															
Aware of Low/-No resistance															
Report of experience of resistance															
Report of experience of resistance															
No report of experience of resistance															

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

A. Yes; No

OBJECTIVE: 3.1

ANALYSIS: Outcome of interest is respondents' awareness and use of Freedom of Information Summaries especially by awareness, credential, and report and awareness of antiparasitic drug

resistance. Responses will not be generalized to all veterinarians or veterinary parasitologists, but may suggest that further educational outreach or research is needed.

Respondents reporting ≥30% of focus area in target animal species or class	Percent (n) respondents who were aware of the availability of FOI Summaries					
	Cattle		Horses		Small Ruminants	
	Yes	No	Yes	No	Yes	No
Credential type						
DVM						
DVM and MS/PhD or MS/PhD in Veterinary Parasitology						
Awareness						
Aware of High/-Moderate resistance						
Aware of Low/-No resistance						
Report of experience of resistance						
Report of experience of resistance						
No report of experience of resistance						

35. IN YOUR OPINION, SHOULD APPROVED COMBINATIONS OF ANTIPARASITIC DRUGS BE AVAILABLE OVER-THE-COUNTER OR BY PRESCRIPTION ONLY?

Choices

Over--the--counter: Yes; No; Undecided

Prescription only: Yes; No; Undecided

OBJECTIVE: 3.2

ANALYSIS: Descriptive analysis for method of commercial availability by credential type, awareness of resistance and experience with resistance.

Percent (n) respondents who report that combination antiparasitic drugs should be commercially available over the counter or prescription.

	Cattle				Horses				Small Ruminants			
	OTC		Rx		OTC		Rx		OTC		Rx	
Respondents reporting ≥30% of focus area in target animal species or class	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Credentials												
DVM												
DVM and MS/PhD or MS/PhD in Veterinary Parasitology												
Awareness												
Aware of High/-or-Moderate resistance												
Aware of Low/-No resistance												
Report of experience of resistance												
Report of experience of resistance												
No report of experience of resistance												

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

Groups: Veterinarians; Regulatory agencies; Academia/ Science; Producers/ Animal owners; Pharmaceutical companies; Producer groups and affiliated organizations

OBJECTIVE: 3.1

Analysis: Open ended question, responses to be tallied by respondent characteristics. If there are enough similar responses, frequency of different types of responses will be given.

37. 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?

Analysis: Open ended question, responses to be tallied by respondent characteristics. If there are enough similar responses, frequency of different types of responses will be given.

III. Survey Objectives— Question Matrix

Survey Objectives		Questions																							
		10	11	12	13	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31	32	33	34	35	36
1	1.1	X	X	X	X	X																			
	1.2				X																				
	1.3						X																		
	1.4								X	X	X	X													
2	2.1							X					X	X	X	X	X	X	X						
	2.2																			X	X				
3	3.1																						X		X
	3.2																					X		X	