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# ANTIMICROBIAL USE AND RESISTANCE INITIATIVES OF USDA-APHIS NAHMS

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## Overview

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- USDA AMR Action Plan and U.S. National Action Plan (CARB)
- Traditional data collection efforts
- Proposed data collection initiatives
- Relationship with FDA Guidances and Veterinary Feed Directive




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## U.S. National Strategy and Action Plan for Combating Antibiotic-Resistant Bacteria

Roadmap to confront AMR via multiple partners and stakeholders:

- Slow the Emergence and Prevent Spread of Resistant Infections
- Strengthen National One-Health Surveillance
- Advance Development and Use of Rapid and Innovative Diagnostic Tests
- Accelerate R&D for New Antibiotics, Other Therapeutics, and Vaccines
- Improve International Collaboration and Capacities



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## USDA AMR Action Plan

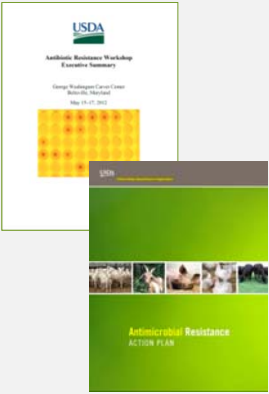
Aligned with US National Action Plan

Approach to address knowledge gaps

Develop effective, practical mitigation strategies

Help prolong the effectiveness of antibiotics to treat both people and animals.

Obtain and disseminate science-based, actionable information about antibiotic drug use, its potential role in the development of antibiotic resistance in bacteria in food-producing animals, and the relationship of drug use and resistance patterns to livestock management practices





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## USDA AMR Action Plan

NAHMS traditional and proposed studies span all objectives

- Determine/model patterns, purposes, impacts of AM use in food-producing animals (FPA)
- Monitor susceptibility/resistance in selected bacteria in FPA, production environments, meat, and poultry
- Identify feasible management practices, alternatives, other mitigations to reduce AMR in bacteria associated with FPA and production environments

Activities: voluntary, comprehensive, integrated

- Surveillance and monitoring
- Research and development
- Education/extension/outreach



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## Traditional NAHMS Commodity Studies

General farm management and veterinary practices

- Based on stakeholder needs assessment
- Antimicrobial use data collected at approximately 5-year intervals

Biological sampling

- Serosurveys
- Bacterial isolation, antimicrobial susceptibility

Rotate 5-10 years, depending on species

- Cross-sectional



Year	Study
2016	Equine (2015-16)
	Goat and Kid Death Loss
	Cattle and Calves Death Loss
2017	Beef Cow-calf
	Antibiotic Use (Feedlot and Swine)
2018	Goats
2019	Aquaculture

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## Confidential Data Protection

### Confidential Information Protection and Statistical Efficiency Act (CIPSEA)

- Federal Information Security Management Act of 2002
- Confidentiality protections for data acquired from the public for statistical purposes
- Data are protected from Freedom of Information Act (FOIA) requests
- Disclosure punishable as a Class E Felony

### NAHMS' data protection

- NAHMS is a statistical unit for data collection under CIPSEA
- NAHMS data collection under the USDA AMR Action Plan has CIPSEA protection



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## Traditional NAHMS Antimicrobial Use Data Collection

### Antimicrobial use in feed/water

- Qualitative global use (y/n)
- Use of named products/classes
- Quantitative use (percentage of animals) and duration of use
- Indication/purpose for use
- Dose in grams/ton



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16. During the last 6 months, were any medications given by feed for any reason to nursery pigs? ..... v3001  Yes  No  DK

[If Question 16 = No or Don't Know, SKIP to Question 18.]

Question 17—Primary Reason Codes	
1 – Growth promotion	5 – Polyserositis/meningitis treatment
2 – Disease prevention/control	6 – Parasite treatment/deworming
3 – Respiratory disease treatment	7 – Other treatment
4 – Enteric (intestinal or GI) disease treatment	(specify: _____) v3002oth

17. [Show medication list to respondent.] For any medications given by feed for any reason during the last 6 months to nursery pigs, enter the primary reason given [enter one code only from list above], average starting age (in weeks since birth) of pigs when medications began, total number of days medication was given in feed, and dose in grams per ton.



Active ingredient	Trade name (example)		Primary reason code	Average starting age (weeks)	Total days in feed per age group	Dose (g/ton)
a. Bacitracin Methylene Disalicylate	BMD; Pennitracin	v3002/ a/b/c	_____	_____	_____	_____
b. Bacitracin Zinc	Albac	v3003/ a/b/c	_____	_____	_____	_____
c. Bambermycins	Flavomycin	v3004/ a/b/c	_____	_____	_____	_____
d. Carbadox	Mecadox	v3005/ a/b/c	_____	_____	_____	_____

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## Traditional NAHMS Antimicrobial Use Data Collection

- Antimicrobial use by injection
  - Primary product/class used for a given indication
  - Percentage of animals treated for a given disease condition (e.g., respiratory, digestive, lameness)
  - In some cases, information is collected on percentage of retreatments needed
  - Percentage of animals mass treated (metaphylaxis)

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### Section 3—Shipping Fever Prevention

For the next several questions, the term "mass treated" means to treat a group of cattle, such as all or most of the cattle in a pen, to prevent or reduce an outbreak of disease. Another term for mass treatment is metaphylaxis.

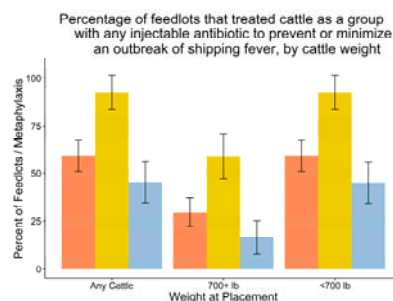
1. Of the [Section 1] cattle placed on feed, what percentage were mass treated with any injectable antibiotic to prevent or reduce an outbreak of shipping fever? [If no cattle in a category, enter NA.]
  - a. Cattle less than 700 lb when placed ..... f301 %
  - b. Cattle 700 lb or more when placed ..... f302 %

2. Of the **cattle mass treated** with an injectable antibiotic to **prevent** or reduce an outbreak of shipping fever, what percentage were mass treated with the following injectable antibiotics?
 

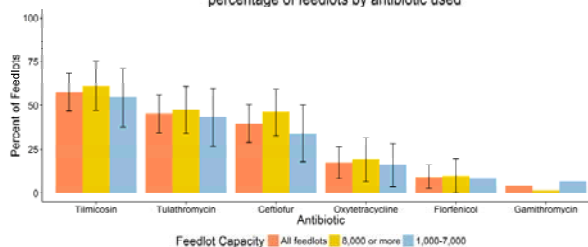
	Percent cattle less than 700 lb when placed	Percent cattle 700 lb or more when placed
a. Tilmicosin (Micotil®)..... f303/ f312	_____ %	_____ %
b. Gamithromycin (Zactran®)..... f304/ f313	_____ %	_____ %
c. Florfenicol (Nuflor®)..... f305/ f314	_____ %	_____ %
d. Ceftiofur (Naxcel®, Excenel®, Excede®)..... f306/ f315	_____ %	_____ %
e. Oxytetracycline (e.g., Oxy-Tet100™, LA200®, Biomyacin®)..... f307/ f316	_____ %	_____ %
f. Penicillin (e.g., Aquacillin)..... f308/ f317	_____ %	_____ %
g. Amoxicillin (e.g., Amoxi-Inject®)..... f309/ f318	_____ %	_____ %
h. Tulathromycin (Draxxin®)..... f310/ f319	_____ %	_____ %

## Metaphylaxis

### Percent feedlots treating with injectable antibiotic



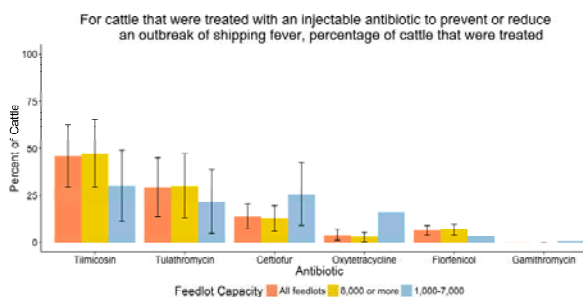
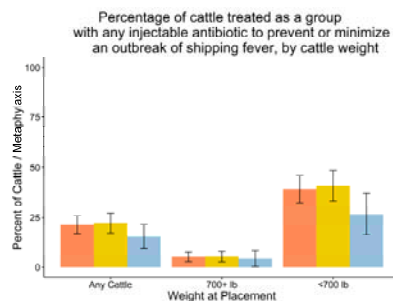
For feedlots that treated cattle as a group with an injectable antibiotic to prevent or reduce an outbreak of shipping fever, percentage of feedlots by antibiotic used



Source: NAHMS Beef 2011

## Metaphylaxis

Percent cattle treated with injectable antibiotic



Source: NAHMS Beef 2011

## Metaphylaxis Decision Criteria

Criterion	Very Important in Decision to Treat (%)
Known history of lack of vaccination against respiratory pathogens	74.3 (4.1)
Appearance of cattle at arrival	74.1 (4.2)
Source of cattle, such as from sale barn	66.7 (4.3)
Shipping fever problems in cattle previously received from the same source	64.2 (4.4)
Occurrence of respiratory disease in some of the cattle from the pen/group	58.8 (4.5)
Long shipping distance (increased stress and shrinkage)	56.4 (4.3)
Season (e.g., winter vs summer)	33.3 (4.2)
Arrival weight	27.1 (3.8)

Source: NAHMS Beef 2011



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## Traditional NAHMS Antimicrobial Use Data Collection

### Context for antimicrobial use

- Sources of information used for product selection
- Ancillary treatments
  - Probiotics
  - Vaccines



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## Traditional NAHMS Study Biological Sampling

- Initially collected fecal samples from individual animals; changed to composite samples and increased number of herds
- Initially performed *Salmonella* culture
- Added other organisms and antimicrobial susceptibility testing
  - *E. coli*
  - *Campylobacter*
  - *Enterococcus*
  - MRSA
  - *Listeria*



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Species	2007	2008
Cattle	10.1	10.1
Swine	10.1	10.1
Other	10.1	10.1

## Limitations of NAHMS Antimicrobial Use Data

Data are collected in terms of percentage of animals receiving or percentage of operations using a specific antibiotic and purpose for use

- Does not directly provide quantitative metrics
  - Animal Daily Doses, Defined Daily Doses
  - Total kg were estimated from 2006 Swine study
- Prolonged period between data collections: 5-10 years depending on species



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## Proposed Initiatives from the USDA AMR Action Plan

**Annual Antimicrobial Use Surveys**

- Swine operations
- Cattle on Feed
- Support for collaborators

**Longitudinal AM Use and Resistance Studies**

- Swine operations
- Cattle on Feed

Funding dependent

APHIS Info Sheet

Antimicrobial Resistance  
Center for Education and Control Tools

April 2016

**Proposed Initiatives from the USDA Antimicrobial Resistance Action Plan**

On December 2014, the U.S. Department of Agriculture (USDA) released an Antimicrobial Resistance Action Plan to guide future activities related to antimicrobial resistance (AMR). The plan includes several key initiatives, including the following:

**Annual Antimicrobial Use Surveys**

The plan calls for the USDA to conduct annual surveys of antimicrobial use in swine operations and cattle on feed. These surveys will provide valuable data on the amount and types of antimicrobials used, which can help inform future research and policy. The surveys will be conducted in a systematic and consistent manner, and the results will be shared with the public.

**Longitudinal AM Use and Resistance Studies**

The plan also calls for the USDA to conduct longitudinal studies of antimicrobial use and resistance in swine operations and cattle on feed. These studies will track the use of antimicrobials over time and monitor the development of resistance. The results of these studies will be used to inform future research and policy.

**Support for Collaborators**

The plan calls for the USDA to provide support for collaborators, including researchers, veterinarians, and producers. This support will be provided in the form of grants, technical assistance, and other resources. The goal is to build a strong network of collaborators who can work together to address the challenges of AMR.

**Education and Outreach**

The plan calls for the USDA to conduct education and outreach activities to raise awareness of AMR among the public, producers, and veterinarians. These activities will include the development of educational materials, the organization of workshops and conferences, and the use of social media and other communication channels.

**Research and Development**

The plan calls for the USDA to support research and development activities that are aimed at reducing the use of antimicrobials and preventing the development of resistance. This research will include the development of new antimicrobials, the development of vaccines, and the development of alternative therapies.

**Policy and Regulation**

The plan calls for the USDA to review and update existing policies and regulations related to the use of antimicrobials. This review will take into account the latest scientific evidence and the needs of the industry. The goal is to ensure that the regulatory framework is robust and effective.

**International Cooperation**

The plan calls for the USDA to engage in international cooperation and coordination with other countries to address the global nature of AMR. This cooperation will include the sharing of information, the development of joint research and policy initiatives, and the organization of international conferences and workshops.

**Monitoring and Evaluation**

The plan calls for the USDA to establish a system for monitoring and evaluating the progress of the Action Plan. This system will include the development of key performance indicators, the collection of data, and the regular reporting of progress to the public.


**Transparency and Accountability**

The plan calls for the USDA to be transparent and accountable in its implementation of the Action Plan. This transparency will be achieved through the regular publication of progress reports, the holding of public hearings, and the solicitation of public input.

**Conclusion**

The USDA Antimicrobial Resistance Action Plan is a comprehensive and ambitious plan that will help to address the challenges of AMR. By implementing the initiatives outlined in the plan, the USDA can help to reduce the use of antimicrobials, prevent the development of resistance, and protect the health of humans and animals.

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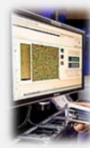
## Annual Antimicrobial Use Survey Specifications

Initial contact with operation via NASS

- Voluntary participant information provided to VS

APHIS-VS collects and controls data

- VS field veterinarian visits operation/site
- Works with producers to collect appropriate data
- Personal information removed
- NAHMS: data entry, validation, analysis, reporting



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## Annual Antimicrobial Use Questionnaires

Request data on previous year's antimicrobial use, focusing on feed and water uses

Stewardship

Administered under CIPSEA protection, so confidentiality of respondents is assured

USDA has no regulatory authority over use of antimicrobials



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Veterinary Services

## Cattle on Feed Antibiotic Use 2017


National Animal Health Monitoring System  
2150 Centre Ave Bldg B  
Fort Collins, CO 80526  
Form Approved  
OMB Number  
Approval expires: xxxxx

The information you provide will be used for statistical purposes only. In accordance with the Confidential Information Protection provisions of Title V, Subtitle A, Public Law 107-347 and other applicable Federal laws, your responses will be kept **confidential** and will not be disclosed in identifiable form to anyone other than employees or agents. By law, every employee and agent has taken an oath and is subject to a jail term, a fine, or both, if he or she willfully discloses ANY identifiable information about you or your operation. Response is **voluntary**.

Please make corrections to names, address, and Zip code, if necessary.

We need to know about all cattle and calves on feed for the slaughter market, regardless of ownership, on the total acres operated.

- **Include** cattle being fed by you for others.
- **Exclude** any of your cattle being custom fed in feedlots operated by others.
- **Exclude** cattle being "backgrounded" only for sale as feeders, for later placement on feed in another feedlot, or to be returned to pasture.
- **Exclude** cows and bulls being fed by you for the slaughter market.




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## Longitudinal Antimicrobial Use and Resistance Studies

- Repeated data collection on farms over longer period can help measure effectiveness of policies and interventions
- Coupled with other data, such as those from slaughter plants and retail meat, can evaluate microbial and gene flow in food production system and the influence of on-farm antimicrobial use on bacterial susceptibility

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## Longitudinal Antimicrobial Use and Resistance Studies

- 3+ years
- Visits 3-4 times per year
- Questionnaires for AM use and other farm/health management data
- Biological sampling and analysis
- Voluntary participation
- Enroll ~200 cooperating operations
- Swine and feedlot cattle initially

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## Impacts of FDA Guidance

FDA AMR mitigation strategy:

- phase out growth-promotion use of medically-important antimicrobials;
- phase in veterinary oversight of remaining therapeutic use of such drugs



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## FDA Guidances

FDA GFI 209 (2012): "Limit medically important antimicrobial drugs to uses in FPA that are considered necessary for assuring animal health and that include veterinary oversight or consultation".

FDA GFI 213 (2013): spells out the process for achieving the objectives laid out in GFI 209. Processes for pharmaceutical companies to withdraw growth-promotion claims from labels of products containing medically important antimicrobials from FDA GFI 152. Companies have until December 31, 2016 to make the changes.

VFD (2015): 21 CFR 558.6; update 1996 VFD rule to bring into compliance with GFI 209, require valid VCPR.

FRN (September 2016): Establishing Appropriate Durations of Therapeutic Administration

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## NAHMS Resource Materials

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Reports posted at:

<http://www.aphis.usda.gov/nahms>

Hard copies available by request or join mailing list:

NAHMS  
2150 Centre Ave., Bldg B, MS 2E7  
Fort Collins, CO 80526-9117



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## Other References

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USDA AMR Action Plan

◦ [www.usda.gov/documents/usda-antimicrobial-resistance-action-plan.pdf](http://www.usda.gov/documents/usda-antimicrobial-resistance-action-plan.pdf)

U.S. National Action Plan for Combating Antibiotic Resistant Bacteria

◦ [www.whitehouse.gov/sites/default/files/docs/national\\_action\\_plan\\_for\\_combating\\_antibiotic-resistant\\_bacteria.pdf](http://www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibiotic-resistant_bacteria.pdf)

U.S. FDA-CVM Guidances and VFD

◦ [www.fda.gov/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/default.htm](http://www.fda.gov/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/default.htm)



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Questions?

