ANTIMICROBIAL USE AND RESISTANCE INITIATIVES OF USDA-APHIS NAHMS

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Overview

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
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

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.
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

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Equine (2015–16)</td>
</tr>
<tr>
<td></td>
<td>Goat and Kid Death Loss</td>
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<tr>
<td>2017</td>
<td>Cattle and Calves Death Loss</td>
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<tr>
<td></td>
<td>Beef Cows (1-2)</td>
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<tr>
<td>2018</td>
<td>Antibiotic Use (Feedlot and Swine)</td>
</tr>
<tr>
<td></td>
<td>Goats</td>
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<tr>
<td>2019</td>
<td>Aquaculture</td>
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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

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
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)
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 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
   b. Cattle 700 lb or more when placed

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?

<table>
<thead>
<tr>
<th>Percent cattle less than 700 lb when placed</th>
<th>Percent cattle 700 lb or more when placed</th>
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</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>a. Tilmicosin (Micotil®)</td>
<td></td>
</tr>
<tr>
<td>b. Gamithromycin (Zaxstran®)</td>
<td></td>
</tr>
<tr>
<td>c. Florfenicol (Nuflox®)</td>
<td></td>
</tr>
<tr>
<td>d. Ceftiofur (Naxcel®, Excenel®, Excide®)</td>
<td></td>
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<tr>
<td>e. Oxytetracycline(e.g., Oxy-Tet100™, LA200B, Bimycin®)</td>
<td></td>
</tr>
<tr>
<td>f. Penicillin (e.g., Aquacillin)</td>
<td></td>
</tr>
<tr>
<td>g. Amoxicillin (e.g., Amoxi-Inject®)</td>
<td></td>
</tr>
<tr>
<td>h. Tulathromycin (Draxxin®)</td>
<td></td>
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</tbody>
</table>

Metaphylaxis

Percent feedlots treating with injectable antibiotic

Source: NAHMS Beef 2011
Metaphylaxis
Percent cattle treated with injectable antibiotic

Metaphylaxis Decision Criteria

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

Source: NAHMS Beef 2011
Traditional NAHMS Antimicrobial Use Data Collection

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

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*
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
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

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
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

Cattle on Feed
Antibiotic Use
2017

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 employer 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.
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

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
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

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
NAHMS Resource Materials

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

Other References

USDA AMR Action Plan

U.S. National Action Plan for Combating Antibiotic Resistant Bacteria
http://www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibiotic-resistant_bacteria.pdf

U.S. FDA-CVM Guidances and VFD
http://www.fda.gov/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/default.htm
Questions?