ANTIMICROBIAL SUSCEPTIBILITY TESTING IN STATE VETERINARY DIAGNOSTIC LABORATORIES IN THE UNITED STATES

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PENNSYLVANIA DEPT AGRICULTURE
PENNSYLVANIA VETERINARY LAB
- AAVLD Labs
- NAHLN Labs
- LIRN and University/Research/Clinic
Primary Lab methods for AST

[Diagram showing antibiotic susceptibility tests for susceptible and resistant organisms, including minimum inhibitory concentration test and disk diffusion test.]
What do labs report-not

- **Antibiograms**
- **Disclaimer-Efficacy/Residue issues**
  - Drugs tested
  - Results: Susceptible, Resistant, Intermediate or NI
  - MIC
- **Trends**
AAVLD Working Group with NAHLN

Joint working group; AAVLD, FDA, CLSI and APHIS-VS.

- Overall charge; develop recommendations for standardized surveillance of AMR in animal pathogens

Survey developed in collaboration with the WG
AAVLD Bacteriology Committee,
NAHMS group at CEAH and NVSL
Survey

- 52/132 responses received (39.3% Dargatz et al 2017)

- AAVLD/NAHLN/VetLIRN diagnostic laboratories, clinics, commercial entities

- 21 questions covering antibiotic susceptibility testing; current practices, testing volume based on animal and bacterial species, molecular dx capabilities

- >50% of all labs use CLSI Vet-01 (formerly M31) Performance standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals
Antimicrobial Susceptibility Test (AST) Methods

Methods most commonly used by labs:

- 71.4% - Disk diffusion
- 61.2% - Commercial broth microdilution
  - Top three systems – Sensititre®, Vitek®, BioMic®
- 42.9% - Both disk diffusion + microdilution

94% of labs use standardized methods and QC procedures for interpreting AST data

61.2% - Automatically interpreted by commercial system
Sources of Bacterial Isolates

94.2% – clinical cases
- research projects
- monitoring/surveillance programs

◦ Collaborations with public health
◦ Environmental testing
◦ Clinical studies
Animal Sources

98,788 tests
51.3% – Dogs
14.4% – Cattle
8.6% – Swine
8.5% – Horses
7.9% – Cats

Remaining categories (in order):
- Poultry, Sheep/Goat, Wildlife, Zoo/Exotic Animal Species, Aquatic, Other Companion Animal
Bacteria Most Frequently Tested
(all animal species)-Top 6

1. Escherichia coli
2. Pseudomonas aeruginosa
3. Staphylococcus spp (including coag neg Staph)
4. Pasteurella multocida
5. Salmonella spp
6. Staphylococcus aureus
Sharing AST Information

77.6% - do not share AST data with other entities
  ◦ 46% - have not been asked
  ◦ 32% - against confidentiality policy
  ◦ 14% - against QA policy
  ◦ 8% - LIMS system incompatible
  ◦ 8% - Other
    ◦ Lack of personnel/too labor intensive
NAHLN and LIRN Objectives

- DEVELOP PROCESS FOR TRACKING AMR DATA
- STANDARDIZED METHODOLOGY, INTERPRETATION, & REPORTING MECHANISMS.
- DEPLOY ACROSS MULTIPLE LABORATORIES
- IDENTIFY INFO IMPORTANT TO VETERINARY D LAB COMMUNITY REGARDING TRENDS IN AMR
- FACILITATE ANTIMICROBIAL STEWARDSHIP.

NAHLN: 19 LABORATORIES SELECTED
LIRN- 4 LABS WITH 5 SOURCE LABS
### Pathogen/animal species-NAHLN

<table>
<thead>
<tr>
<th>Bacterial pathogen</th>
<th>Animal Species</th>
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<tbody>
<tr>
<td><em>Escherichia coli</em></td>
<td>cattle, swine, poultry, horses, dogs, cats</td>
</tr>
<tr>
<td><em>Salmonella enterica</em></td>
<td>cattle, swine, poultry, horses, dogs, cats</td>
</tr>
<tr>
<td><em>Mannheimia haemolytica</em></td>
<td>cattle</td>
</tr>
<tr>
<td><em>Staphylococcus intermedius group</em></td>
<td>dogs, cats</td>
</tr>
</tbody>
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*Includes S. intermedius, S. pseudintermedius and S. delphini.
Pennsylvania integrated surveillance for antimicrobial resistance in foodborne pathogens

- PA DEPT OF HEALTH
- UNIVERSITY OF PENNSYLVANIA
- PENN STATE UNIVERSITY
- PA DEPT AGRICULTURE
- GETTYSBURG COLLEGE
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