One Health Data Reporting, Sharing, and Collaborating

Laura Goodman
Cornell University College of Veterinary Medicine
Animal Health Diagnostic Center / NY State Veterinary Diagnostic Laboratory Ithaca, NY
laura.goodman@cornell.edu
Strategies for One Health antimicrobial resistance data sharing

• A meeting for animal and public health laboratories and stakeholders
  – Vet diagnostics (academic, state, corporate)
  – State public health and agriculture
  – Researchers
  – Federal agencies (CDC, FDA, USDA, NCBI)

• Sponsored by the CDC-supported New York Integrated Food Safety Center of Excellence

• Held May 3 - 4, 2018 at the Cornell College of Veterinary Medicine, Ithaca, NY
Meeting Goals

1. Assess current capacities for antibiotic susceptibility testing (AST) and whole genome sequencing (WGS), banking isolates, and reporting results.

2. Promote One Health surveillance and facilitate discussion of effective models and best practices for exchange of information.

3. Discuss issues of client confidentiality and barriers to data exporting.

4. Produce a report with assessment of current collection capabilities and gaps.
**Meeting Highlights**

**GOAL 2**
Strengthen National One-Health Surveillance Efforts to Combat Resistance

**Capacity survey (2015-16)**
- Published in JVDI (Dargatz et al. 2017)
- Based on ~100,000 ASTs
- E. Coli most common pathogen
- Disk diffusion, broth microdilution

**FDA Pilot Study (2017)**
- Completed, manuscript submitted
- Focus on **building lab capacity for AST, WGS, and banking**
- Surveillance expanded in 2018-19
- Integrating data with NARMS

**USDA Pilot Study (2018)**
- Completed, final report pending
- Focus on **secure data messaging**
- Expanding, adding WGS in 2019
- Developing interactive website for data reporting

**Accomplishments from the Veterinary Diagnostics Community**
### Minimum metadata – for all species

<table>
<thead>
<tr>
<th>Data to be included</th>
<th>Not included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host species</td>
<td>Lab accession number</td>
</tr>
<tr>
<td>Sample type (e.g. feces, respiratory, wound swab)</td>
<td>Referring clinician</td>
</tr>
<tr>
<td>Collection date</td>
<td>Animal owner</td>
</tr>
<tr>
<td>State of origin (most human isolates lack this information!)</td>
<td>Animal name</td>
</tr>
<tr>
<td>Case type</td>
<td></td>
</tr>
<tr>
<td>Lab methods</td>
<td></td>
</tr>
</tbody>
</table>

A tiered system with a 3rd party protector of identifiable information proposed as a possible safeguard for confidentiality.
WGS overcomes lack of standardization in veterinary susceptibility testing


NARMS and NCBI emerged as “best practice” common databases for AST, WGS, and metadata.
Most extreme cases highlight importance of companion animal surveillance

**E. coli, canine lung (2017)**

- aac(3)-Iid (gentamicin)
- aadA1 (streptomycin)
- aph(3')-Ib (streptomycin)
- aph(3')-Ia (kanamycin)
- aph(6)-Id (streptomycin)
- blaCMY-2 (penicillins, amoxi-clav, cephalosporins)
- blaTEM-1 (penicillins)
- catA1 (phenicols)
- dfrA14 (trimethoprim)
- mph(A) (macrolides)
- qacL (disinfectants)
- sul2, sul 3 (sulfonamides)
- tet(B) (tetracycline)
- gyrA mutations (fluoroquinolones)

**E. coli, canine lung (2018)**

- aac(3)-Iid (gentamicin)
- aadA1, A2, A5 (streptomycin)
- aph(3')-Ib (streptomycin)
- aph(3')-Ia (kanamycin)
- aph(6)-Id (streptomycin)
- blaEC (cephalosporins)
- blaTEM-1 (penicillins)
- catA1, cmlA1, floR (phenicols)
- dfrA12, 17 (trimethoprim)
- Inu(F) (lincosamide)
- mph(A) (macrolides)
- qacL, qacEdelta1 (disinfectants)
- sul1, sul2, sul 3 (sulfonamides)
- tet(B, M) (tetracycline)

Data available at nebi.nlm.nih.gov/pathogens/
Meeting outcomes

Next steps

- Ongoing NY state pilot project
  - Veterinary *Salmonella* antibiogram shared with public health stakeholders
  - Established agreement for sharing de-identified isolates and metadata with our state health department
  - Developing procedures for rapid data release during outbreaks

- Incorporate more animal health resistance data into NARMS and NCBI from public/academic and corporate labs

Suggestions for the next National Action Plan

1. Include data sharing initiatives through the CDC Integrated Food Safety CoEs
2. Expand veterinary diagnostic capacity building through FDA Vet-LIRN and USDA NAHLN
3. Add corporate veterinary labs to federal surveillance networks
4. Support the NCBI Pathogen Detection team to add veterinary pathogens to their pipelines
5. Establish an environmental monitoring network using advanced molecular detection approaches
6. Active surveillance of imported dogs for infectious diseases
Acknowledgments

Cornell University CVM
• Patrick Mitchell
• Renee Anderson
• Brittany Chilson
• Rebecca Franklin-Guild
• Anil Thachil
• Belinda Thompson
• Gen Meredith
• Lorin Warnick
• François Elvinger

NY Integrated Food Safety Center of Excellence
• Andie Newman
• Martin Wiedmann
• Elizabeth Dufort
• Renato Orsi

CDC NCEZID
• Megin Nichols
• Dawn Sievert
• Misha Robyn

FDA Vet-LIRN
• Olga Ceric
• Sarah Nemser
• Renate Reimschuessel

NARMS
• Greg Tyson - FDA
• Heather Tate – FDA
• Jean Whichard - CDC

USDA NAHLN
• Beth Harris

NYS Dept. of Ag and Markets
• David Smith

laura.goodman@cornell.edu