Catalyzing innovation and access to AMR diagnostics for animals

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### 6+ innovative high-impact treatments are needed per decade

<table>
<thead>
<tr>
<th>Report/strategy</th>
<th>Target (therapeutics)</th>
<th>Extrapolation for 10 years</th>
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</thead>
<tbody>
<tr>
<td><strong>IDSA 10x20</strong></td>
<td>10 “new systemic” over 10 years</td>
<td>10</td>
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<tr>
<td><strong>AMR Review</strong></td>
<td>15 “new”, of which at least 4 “breakthrough”, over a decade</td>
<td>15 (of which 4 breakthrough)</td>
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<td><strong>GUARD</strong></td>
<td>One additional “high-need” per year</td>
<td>10</td>
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<tr>
<td><strong>DRIVE-AB</strong></td>
<td>16-20 “truly innovative” over 30 years</td>
<td>5-7</td>
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<tr>
<td><strong>U.S. NAP 2020-2025</strong></td>
<td>Three “new” by 2025</td>
<td>6</td>
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<tr>
<td><strong>BARDA Strategic Plan 2022-2026</strong></td>
<td>Three “novel” by 2026</td>
<td>6</td>
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What’s my target for new antimicrobial classes for animals?
What’s my target for new antimicrobial classes for animals?

Innovation needs to reduce and improve use of current antimicrobials
“AMR diagnostics?”
Animal health
Animal management
Veterinary care
Human behaviour

Causes of the problem

The problem

Antimicrobial use

AMR

The end result
Innovation needs

- Diagnose AMR
- Characterize AMR

Surveillance
Source attribution
Research
Clinical management
Innovation needs

- Identify optimal treatments
- Reduce/improve AMU
- Reduce disease
- Rule out bacterial disease
- Detect disease
- Support decisions
- Characterize AMR
- Diagnose AMR
- Reduce AMR
- Monitor changes
- Identify optimal treatments
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- Rule out bacterial disease
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- Characterize AMR
- Diagnose AMR
- Reduce AMR
- Monitor changes
Typical Diagnostic Testing Challenges

- Recognize need
- Have access to a good test
- Choose a test
- Collect appropriate specimen
- Transport to lab
- Interpret results
- Have tools to act

• Very limited access to much of the above where most animals are raised
Examples of innovation opportunities

• Rapid, easy, low-cost, temperature stable animal-side pathogen detection tests
  • Differentiation of bacterial vs viral disease
    • Antimicrobial yes/no decisions
    • Confidence in not treating
  • Rapid infection control intervention implementation
  • Detection of high consequence diseases
  • Disease knowledge to implement future prevention strategies
  • Application of evidence-based/targeted treatments
• Multiplex testing
  • More efficient and cost-effective testing
  • Identification of emerging issues
  • Surveillance data to inform future action

• Biomarkers
  • Detection of disease
  • Confidence in when not to treat

• Tests that differentiate vaccine from infection
Most of those directly apply to human innovation needs too

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- Biomarkers
  - Detection of *disease*
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Challenges

• Massive public sector funding gap between human and animal research sectors

• Lower private sector priority for animal innovation because of lower potential financial return

• Serial vs parallel development in humans/animals
  • Missed opportunities
  • Delayed access
  • Inefficiency
  • Transferring rejected technologies to animal applications vs prioritizing promising technologies
Diagnostic Innovation Challenges

• Financial
  • Who benefits vs who pays?
  • Cost of testing vs empirical treatment
  • Economic realities for production animals

• Application
  • Technical/personnel requirements
  • Field vs laboratory performance
  • Field stability

• Logistical
  • Diverse ‘animal’ market
  • Diverse range of countries, production systems...
What would happen if we put low cost animal-side WGS into every farm and vet clinic?
New diagnostic tests are only useful if they lead to action (or targeted inaction)

- Decision support
- Veterinary support
- Preventives and appropriate therapeutics
- Alternative treatments
- Containment practices
- Improved management practices
• We need rapid, accessible diagnostic innovations to improve animal health and optimize antimicrobial use

• We also need myriad parallel health system, communications, management and other innovations to ensure we have innovation to action
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