Environmental Health and One Health

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Why is the concept of One Health necessary to the future success of CARB/NAP?

Antibiotic Resistant Bacteria (ARB)
Antibiotic Resistance Genes (ARG)
Antibiotics and Metabolites
Concept of One Health

after Linton AH (1977), modified by Irwin RJ
Concept of One Health

Woolhouse and Ward, Science 2013
What are the barriers to adopting One Health as part of the NAP and how would you suggest we could address these?

Antibiotic Resistant Bacteria (ARB)
Antibiotic Resistance Genes (ARG)
Antibiotics and Metabolites

???

Negative Health Outcomes
Systematic Review

• Objective: To summarize the evidence of studies assessing the dissemination of antibiotic resistant bacteria (ARB) and antibiotic resistance genes (ARG) from anthropogenic sources into the environment

• Question: “Are environmental levels of ARB and ARG higher in close proximity to, or downstream from, known or suspected sources compared to areas more distant from or upstream from these sources?”
# Systematic Review – Risk of Bias

<table>
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<tr>
<th>Bias / Rubric</th>
<th>Selection bias</th>
<th>Information bias</th>
<th>Confounding</th>
<th>Overall</th>
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Data Gaps and Concerns

- Quantities of antibiotics used and excreted
- Fate and transport of ARB, ARG and antibiotic metabolites
- Efficacy of waste management systems
- Environmental selection of resistance and role of horizontal gene transfer
What will it take to adopt a One Health strategy?

- Clear definition of objectives to guide research and interventions
- Attention to the design of a monitoring system
- Interdisciplinary teams
- Funding