The need for cooperation from a One Health perspective to restrain the threat of AMR

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National Risk diagram

- Catastrophic: Worst credible flood
- Very serious: Nuclear disaster
- Serious: National power failure, Multiple terrorist attack, Mineral shortage
- Substantial: Internet failure, Criminal subversion of vital business, Societal unrest in cities
- Limited: Severe influenza pandemic, Animal disease crisis, Violent loner

Antibiotic resistance
Topics
• What are the main features of this threat?
• Why is it so difficult to tackle this problem?
• Which strategies do we need and what are our priorities? → One Health policy and AMR programme

Objective Dutch AMR programme
1. Reduction of carriersonship, infections and mortality due to HRMO
2. 50% reduction of ‘unnecessary used’ antibiotics
3. 50% reduction of avoidable health care associated infections
What constitutes the threat of AMR?

Hospitals
- MRSA, CRE, VRE, Cdiff, ....
- A-teams for infection prevention and outbreak control
- Search and Destroy
- Continuous attention on new types or variants (surveillance and analysis)

Nursery homes
- Occurrence not well known
- Infection prevention needs attention
- Older and vulnerable people (at risk)
- Population is aging
What constitutes the threat of AMR?
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Transmission of resistance genes

Animals → humans

Whole genome sequencing: analysis of genetic transfer

Figure 1. Minimal spanning tree based on multilocus sequence typing of extended-spectrum β-lactamase-producing Escherichia coli isolates. A, The 3 source groups: chicken meat (yellow), human carriers (green), and blood cultures (red). B, The phylogenetic groups: A (dark blue), B1 (light blue), B2 (cyan), D (brown), and E (purple). Representative sequence types are shown as numbers. Black connecting lines indicate single-locus variants; gray connecting lines indicate double-locus variants; dashed connecting lines indicate strains with ≥3 loci that are different; and shadowing indicates that >2 sequence types belong to 1 clonal complex.
AMR in the environment

(HR)MO levels in wastewater (ca 100 sewage treatment plants)

Influent

Effluent
Surveillance

Trends in antibiotic resistance (prevalence of four different Multi-resistant micro-organisms)
Surveillance

Trends in antibiotic use in hospitals
Surveillance

Health care associated infections

Incidence of surgery site infections (example: orthopedic)
Surveillance & stewardship

HA

- HIS
- Data-warehouse
- EVS, etc
- Toolbox
- Rapportage

MedWorq /VipCalculus (voor de pilot)

- Data collection
- cleaning
- Data-bestand

RIVM

- Bestand (bijv. csv)
- Rapportage

Analyse op basis van indicatoren

Complexiteit proces ligt hier

Input voor surveillance

Input for stewardship GP’s
Importance of cooperation between professionals within healthcare, GP’s and public health

AMR control on three levels:
• patient (cure)
• institution (quality of care)
• between care institutions and/or public health
Enhancing cooperation

10 regional networks

= University Medical Centre
= topclinical hospital

Institutions in each network
• Hospitals
• Medical microbiological laboratories (MML)
• Long care institutions
• Public Health Service
• GP’s

Team of professionals
Information to public and professionals, creating risk awareness
Summary Dutch One Health strategy

• Infection prevention, proper antibiotic use and outbreak control

• Adequate surveillance in all sectors (human health, animals, food, environment) → stewardship

• Enhancing cooperation between sectors, professionals, organizations and countries?

• Research and development: new antibiotics, therapeutics and treatment strategies, rapid diagnostics

• Communication and awareness

• International collaboration