



Rijksinstituut voor Volksgezondheid  
en Milieu  
*Ministerie van Volksgezondheid,  
Welzijn en Sport*

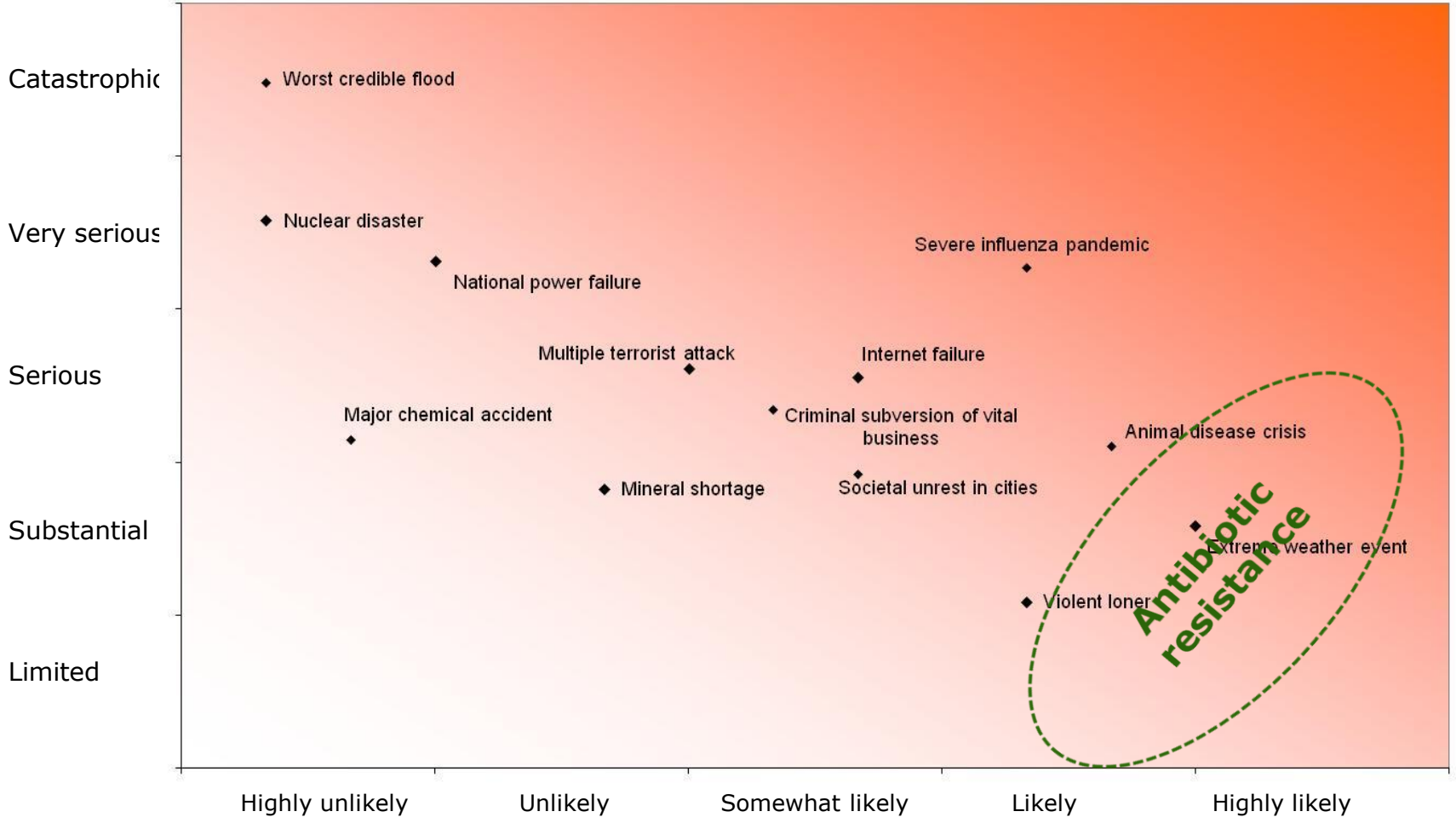
# The need for cooperation from a One Health perspective to restrain the threat of AMR

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# National Risk diagram





# 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 carriage, 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?



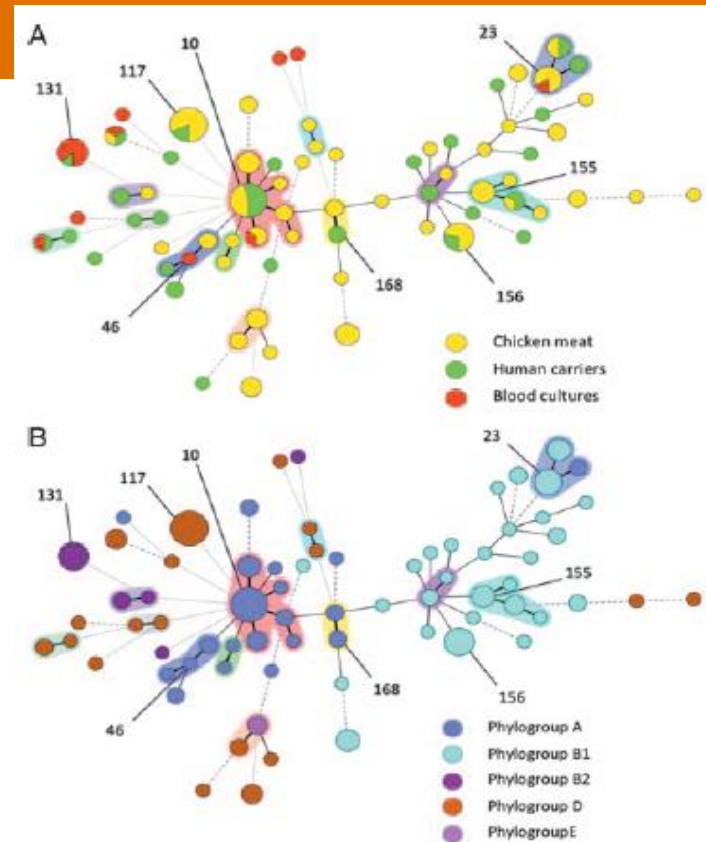
# What constitutes the threat of AMR?



Transmission of resistance genes

Animals → humans

*Whole genome sequencing: analysis of genetic transfer*

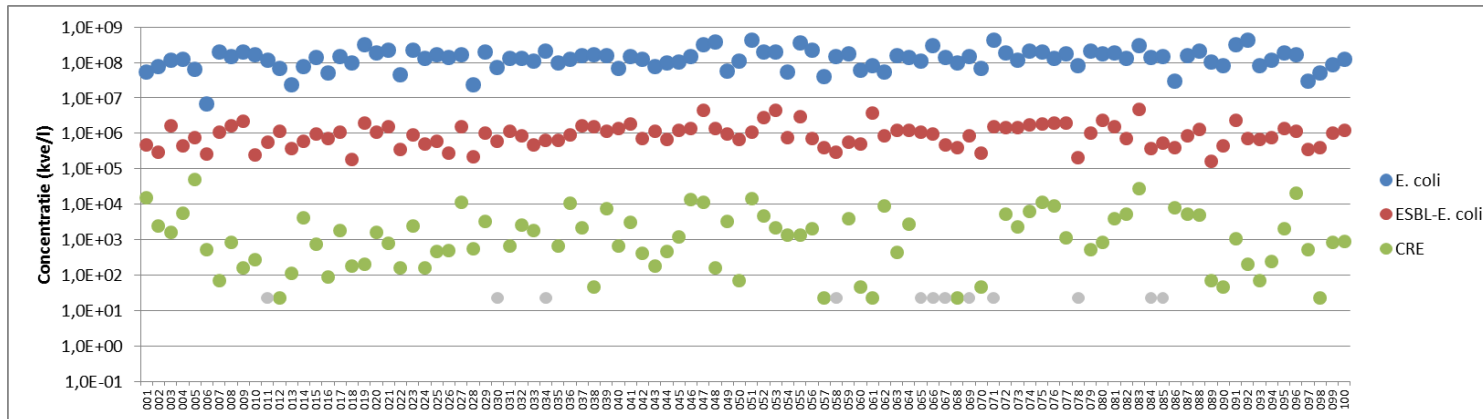


**Figure 1.** Minimal spanning tree based on multilocus sequence typing of extended-spectrum  $\beta$ -lactamase-producing *Escherichia coli* isolates. *A*, The 3 source groups: chicken meat (yellow), human carriers (green), and blood cultures (red). *B*, The phylogenetic groups: A (dark blue), B1 (light 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  $\geq 3$  loci that are different; and shadowing indicates that  $> 2$  sequence types belong to 1 clonal complex.

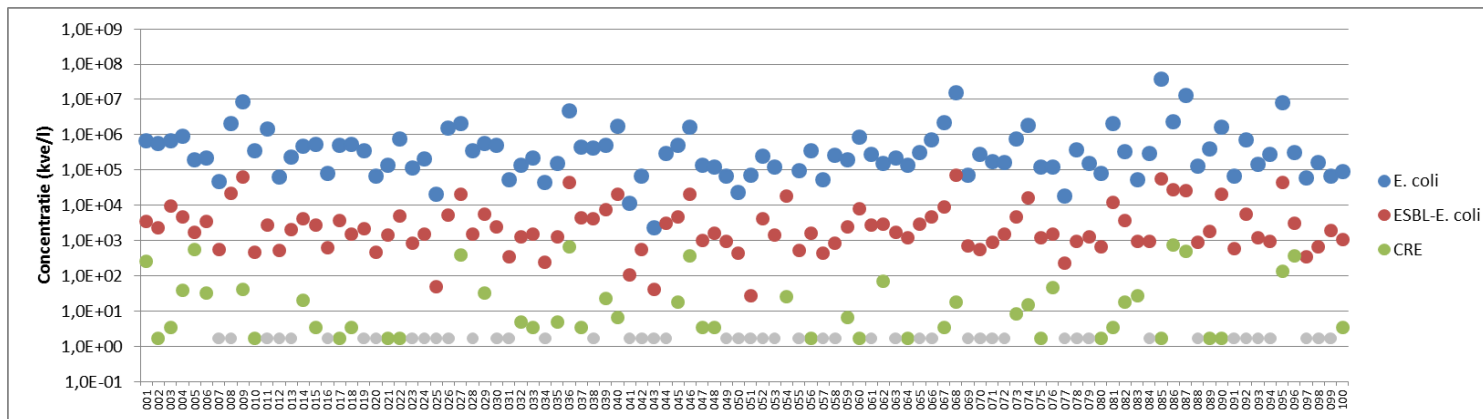
# AMR in the environment



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



Influent



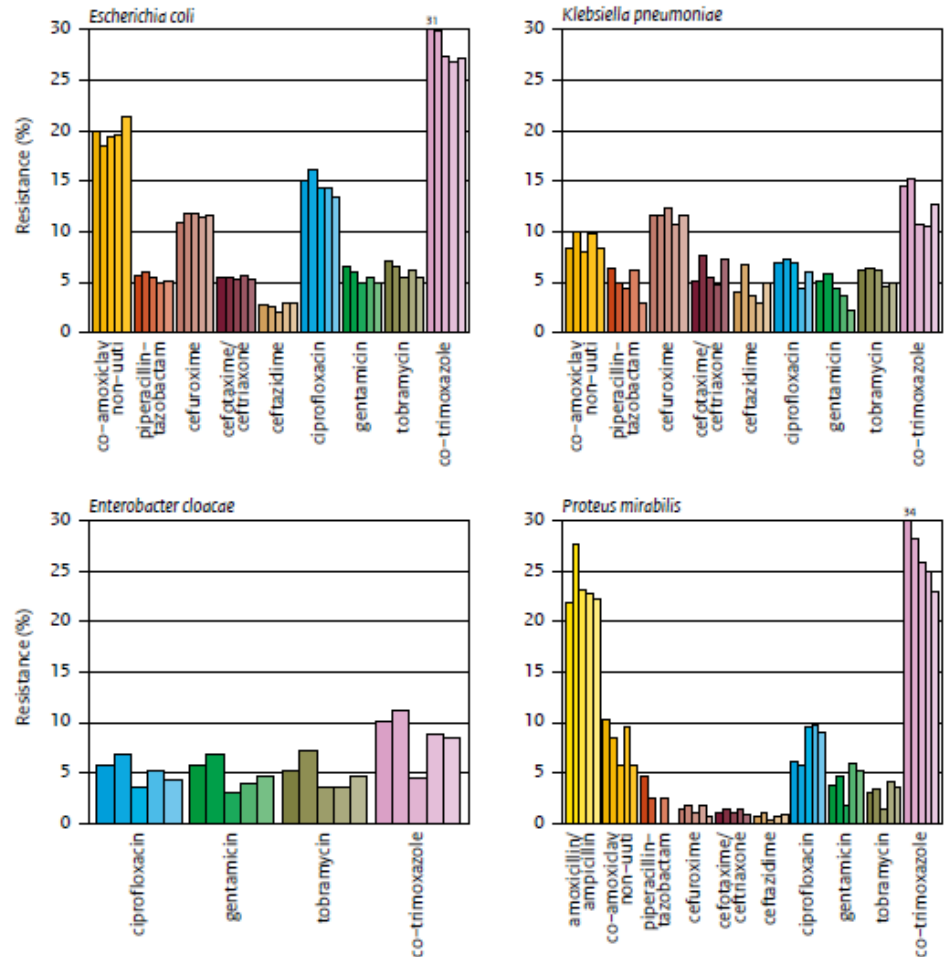
Effluent



# Surveillance

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

**Figure 4.3.4.1** Trends in antibiotic resistance (from left to right 2011 to 2015) among clinical blood isolates of *E. coli*, *K. pneumoniae*, *E. cloacae*, *P. mirabilis*, and *P. aeruginosa* from patients admitted to inpatient departments (incl. intensive care units) in ISIS-AR.



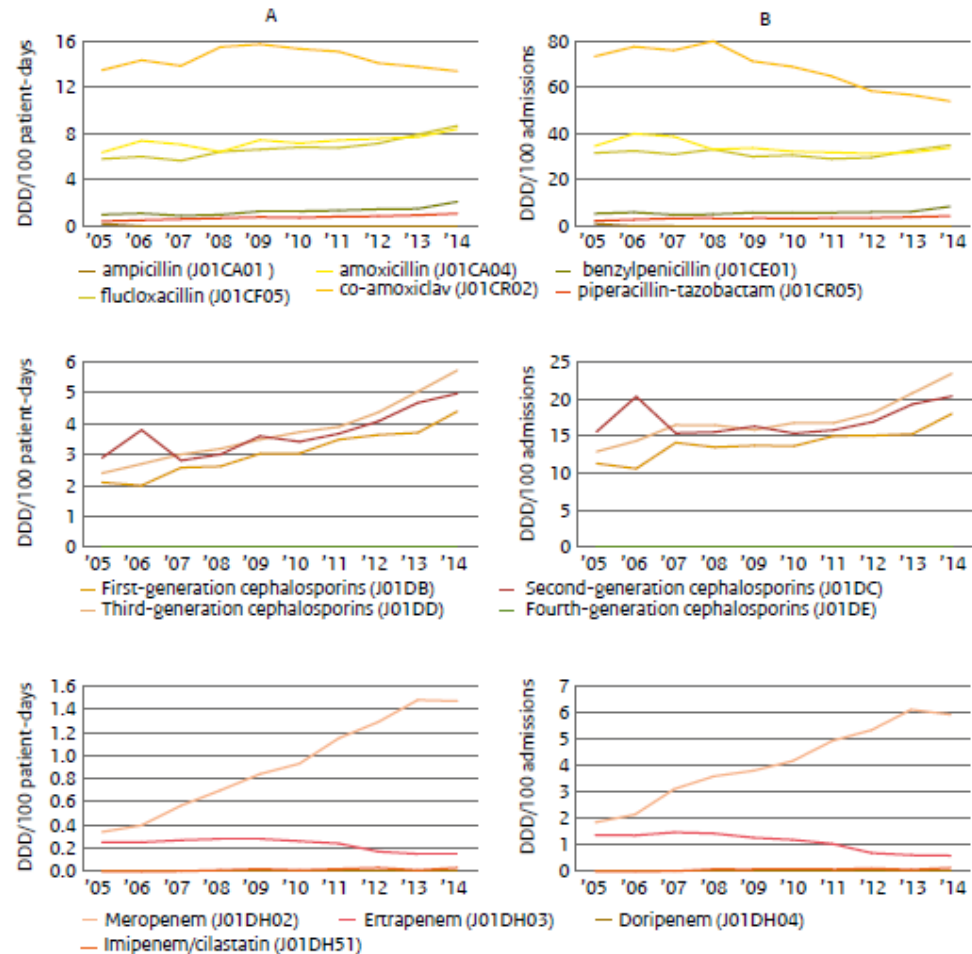




# Surveillance

## Trends in antibiotic use in hospitals

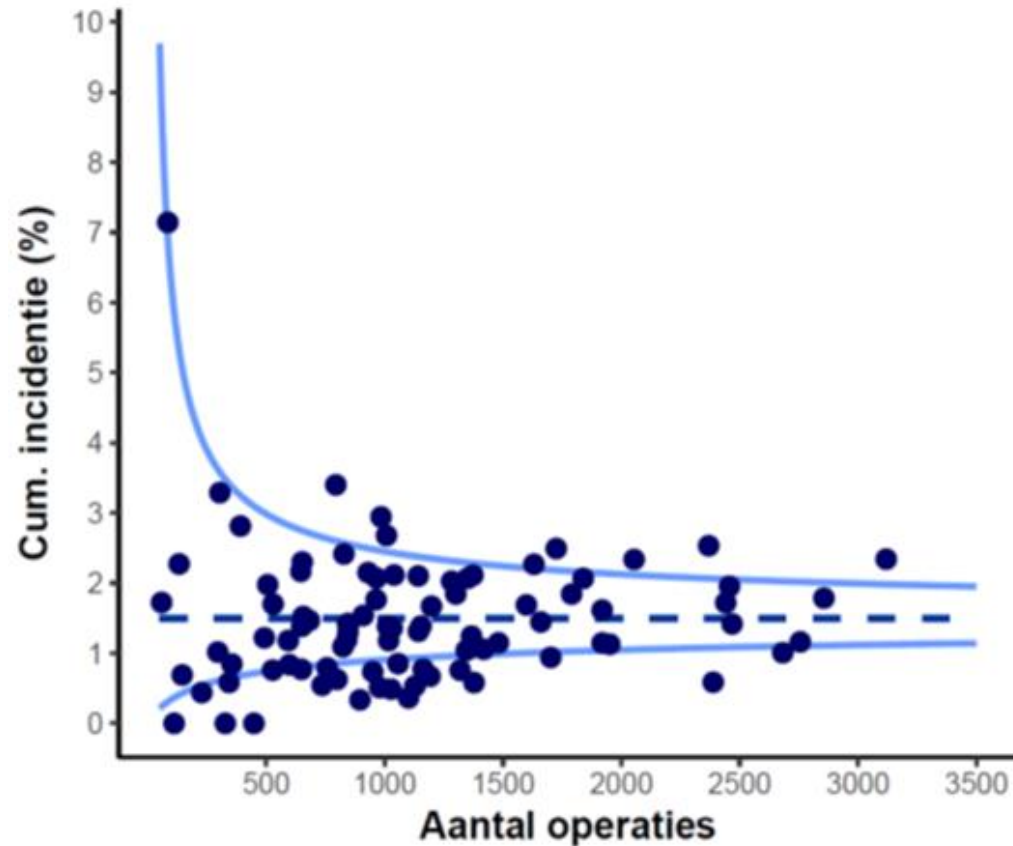
**Figure 3.3** Use of beta-lactams in hospitals, expressed as DDD/100 patient-days (A) and DDD/100 admissions (B), 2005-2014 (Source:SWAB).





# Surveillance

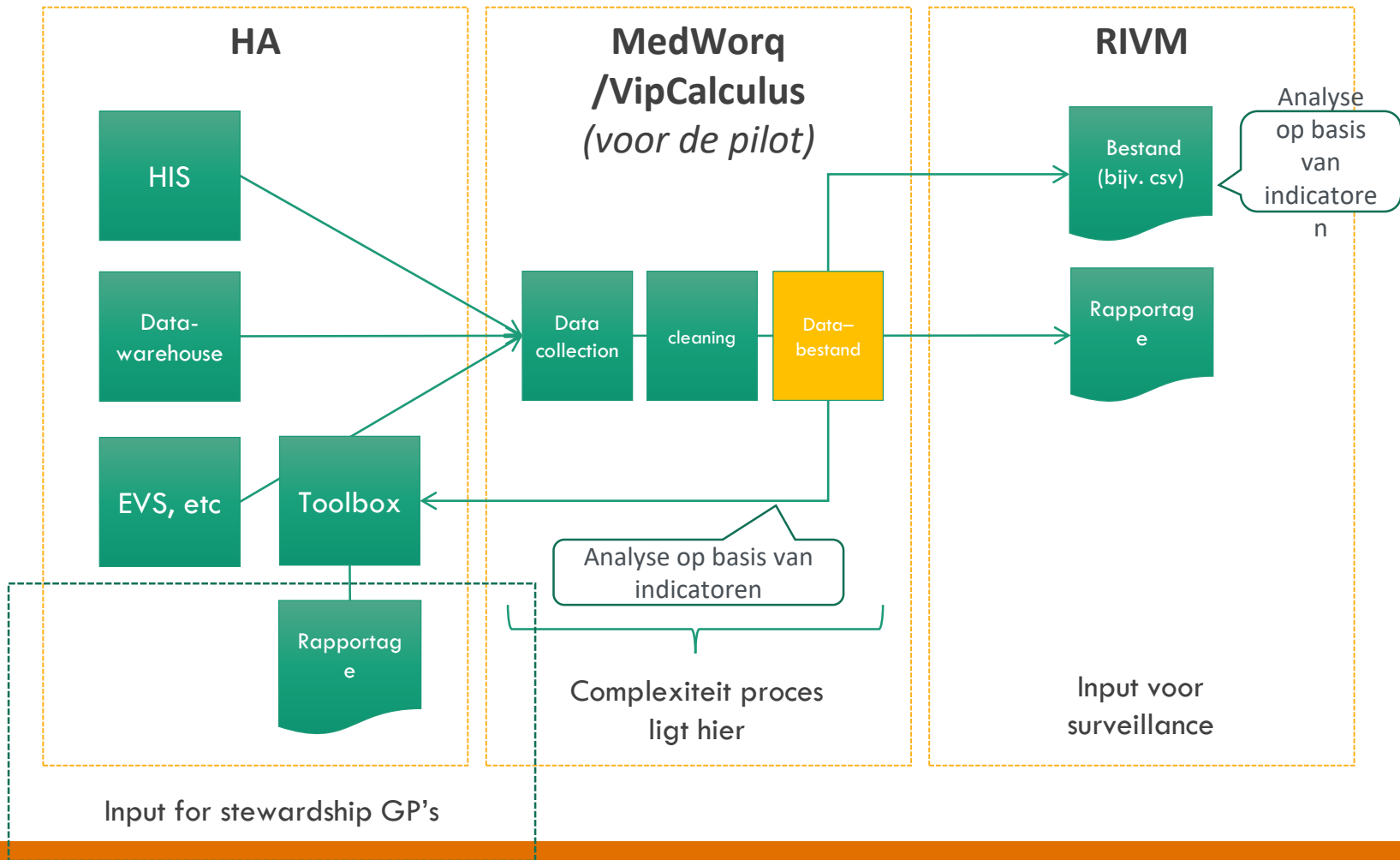
Health care  
associated infections



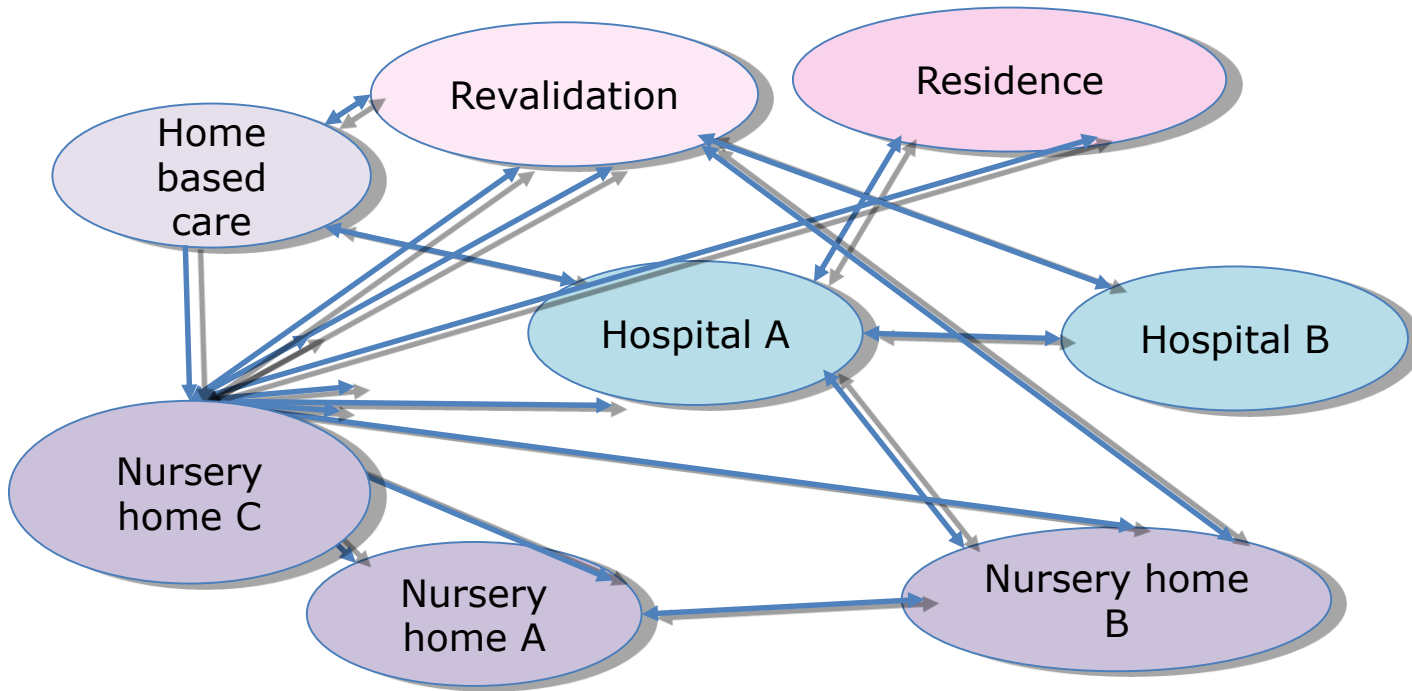
*Incidence of surgery site infections (example: orthopedic)*



# Surveillance & stewardship



# Enhancing cooperation



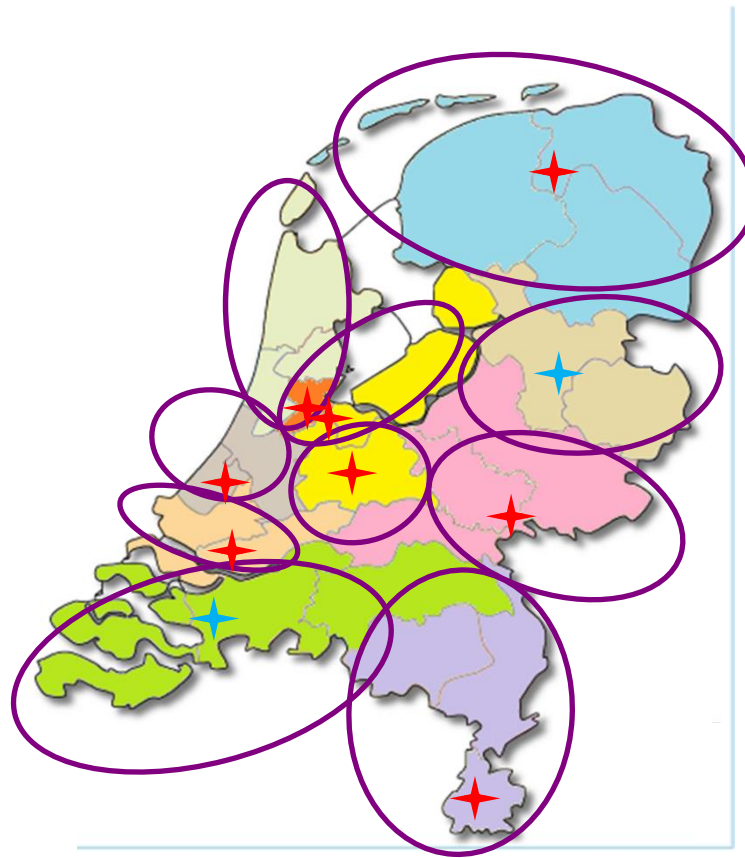
Importance of cooperation between professionals within healthcare, GP's and public health

AMR control on three levels:

- patient (cure)
- institution (quality of care)
- between care institutions and/or public health



## 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



## Voorkom besmetting met resistente bacteriën

Was je handen, na contact met:

- 
- 
- 

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### VOORZICHTIG OM ANTIBIOTICA

EDEREENBETERVAN.NL

**WAT IS ANTIBIOTICARESISTENTIE**

Als bacteriën een antibioticum weerstaan, kunnen ze niet meer worden dood gemaakt. Dit is gevaarlijk voor de gezondheid van mensen en dieren. Daarom is het belangrijk om antibiotica alleen te gebruiken als dat nodig is. Het gebruik van antibiotica moet worden beperkt en alleen worden gegeven als dat nodig is. Het gebruik van antibiotica moet worden beperkt en alleen worden gegeven als dat nodig is.

GA VOORZICHTIG OM MET ANTIBIOTICA  
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# 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