

Taking on Antimicrobial Resistance

The Dutch approach

Prof. Jaap Wagenaar DVM, PhD

with input from Christianne Bruschke, DVM PhD (CVO)

Department of Infectious Diseases and Immunology,
Faculty of Veterinary Medicine, Utrecht University, Utrecht - NL

Wageningen Bioveterinary Research, Lelystad - NL
j.wagenaar@uu.nl



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The Netherlands

$\times 10^6$

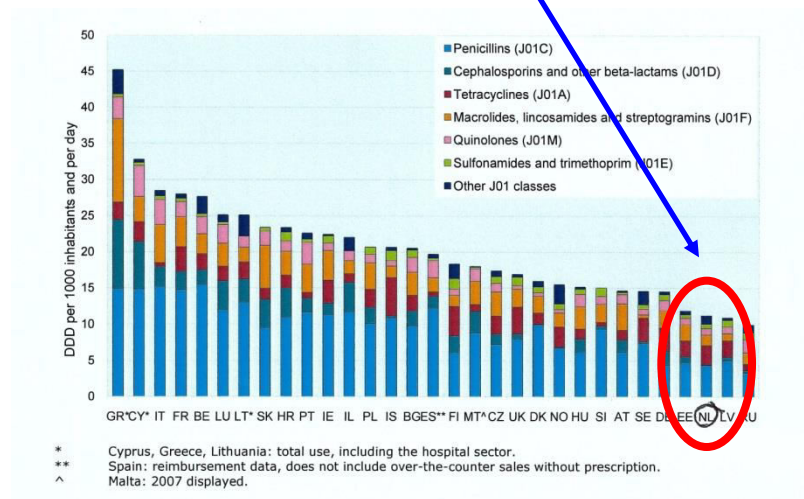
people	17,0
dairy cows	1,6
veal calves	0,9
pigs	13,0
chicken	104,0

2nd in exporting of
agricultural products



Triggers for reduction policy (1)

Humans



Animals

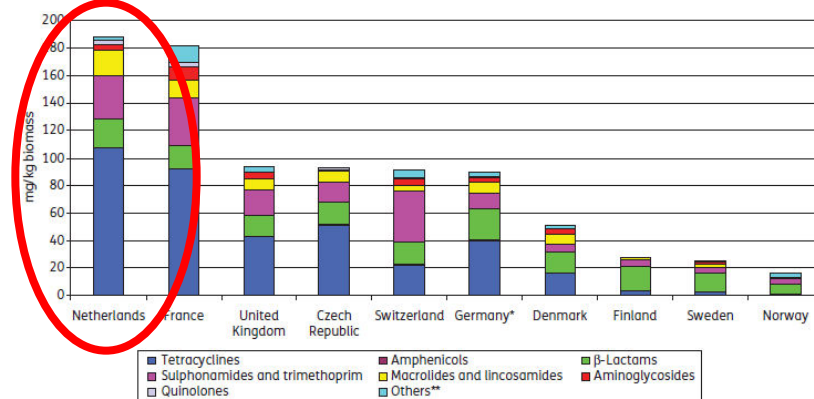


Figure 1. Amounts, in mg, of veterinary antibacterial agents sold in 2007 per kg biomass of pig meat, poultry meat and cattle meat produced plus estimated live weight of dairy cattle. *2005 data. **The substances included vary from country to country.

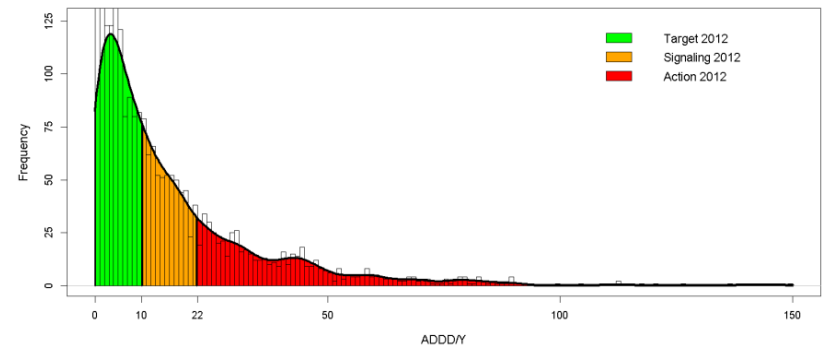
Triggers for reduction policy (2)

- Emergence of **resistant bacteria in livestock** and their **risk for transmission** to humans (e.g. Livestock Associated-MRSA, ESBLs))
- Growing concern about possible **human health implications** of livestock production in the Netherlands
- Primary motivation in **public health**
- Precautionary principle



Key elements of reduction policy

- **Reduction targets:** -20% in 2011; -50% in 2013; -70% in 2015.
- **Transparency:** all antimicrobial use for each farm registered in mandatory central databases (surveillance of AMU)
- **Benchmarking and defining AMU-targets for sectors** by the independent Veterinary Medicines Authority (SDa)



- **Self-regulation by animal production sectors**, combined with public surveillance and enforcement



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Government

- Reduction targets
- Stringent enforcement
- New legislation:
 - Ban on prophylactic use (2011)
 - Antimicrobials administered exclusively by veterinarian, unless farmer complies with strict conditions
 - Susceptibility testing mandatory for 3rd choice antimicrobials (3rd, 4th gen. cephalosporins and fluoroquinolones)

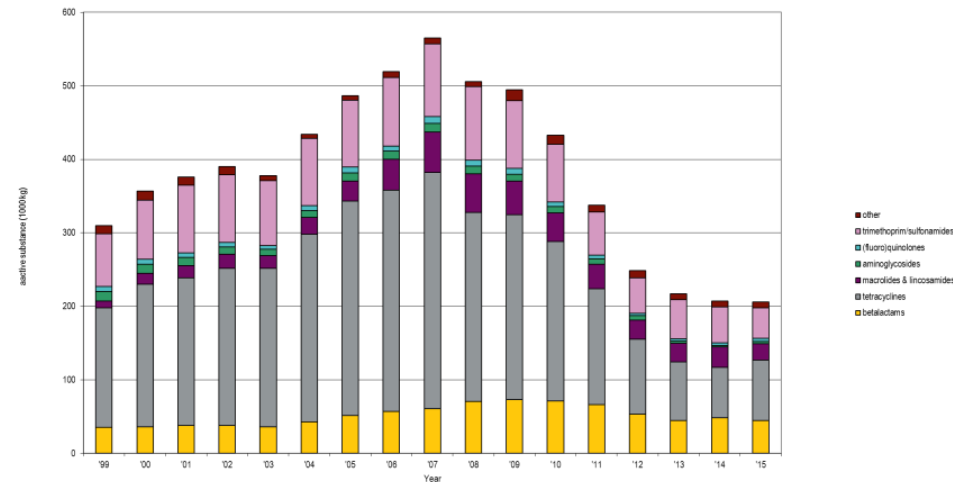


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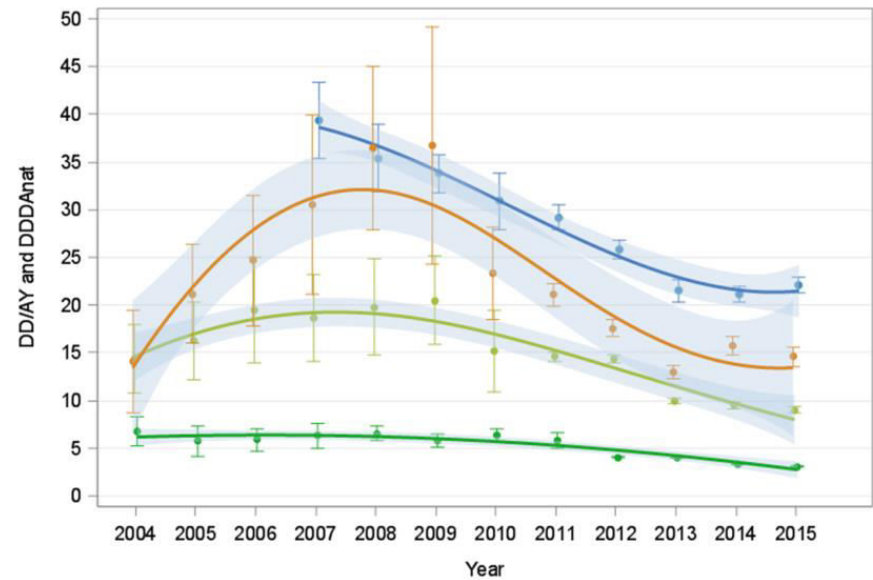
Effect of policy

Sales data of antimicrobials in the Netherlands



- ~ 65% reduction (2007-2015)
- 58.4% reduction in 2015 to reference year 2009
- Fluoroquinolones and 3rd/4th-gen cephalosporines usage reduced to a minimum
- 68% reduction in use of colistin (2011-2015)

DDD/AY for different sectors

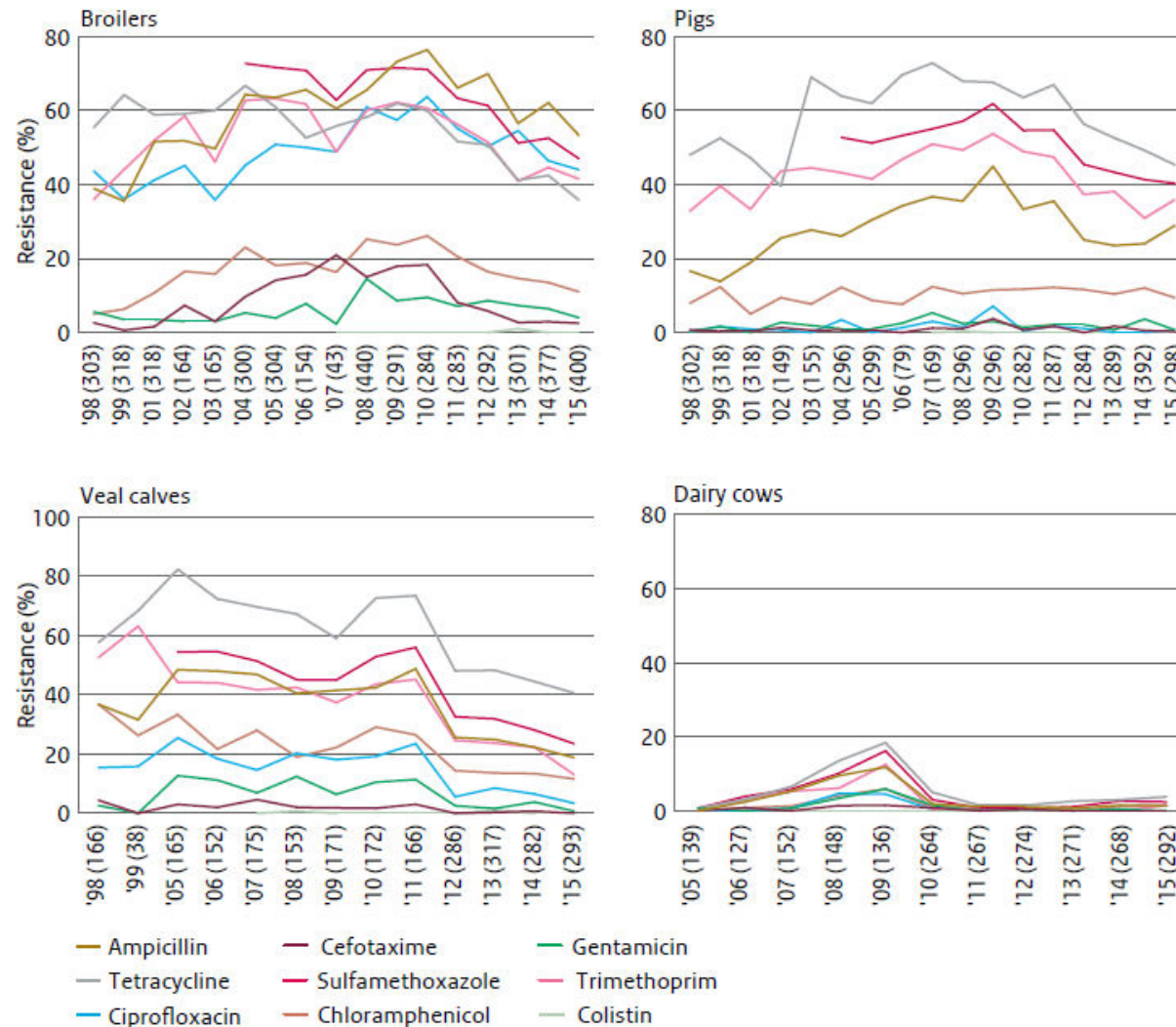


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Surveillance of antimicrobial resistance in commensal *E. coli*

Figure Eco01 Trends in resistance (%) of *E. coli* isolated from broilers, slaughter pigs, veal calves and dairy cattle in the Netherlands from 1998-2015.



Key factors for success

- Action taken by all parties involved, meaning commitment (industry, government, veterinarians, scientists, medicines authority)
- One Health approach: collaboration agriculture and public health on all levels
- Private sector well organized enabling public-private cooperation and the possibility to use the Production Chain Quality Systems
- Transparency of AMU – all use by prescription only



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Summary of outcomes

- Huge reduction in AMU has shown to be feasible followed by a reduction in AMR
- Change in attitude of Dutch farmers regarding use of antimicrobials
- Use of antimicrobials as management tool has been replaced by e.g. biosecurity, vaccination, herd health management supervised by veterinarian
- No serious effects (if any) on animal health
- Reduction has shown to be possible in a country with a very large and intensive livestock sector; the 2nd exporter of agricultural products in the world



Future

- Animal husbandry without antimicrobials is impossible – what is acceptable usage? (welfare, economics)
- Set new benchmarks
- Include other sectors, focus on the high using farms
- Effect in humans?
- Research on low level residues in manure and environment
- Preparedness for carbapenem resistance in the food chain



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EFFORT: Ecology from Farm to Fork Of microbial drug Resistance and Transmission (2014-2018)

Objectives

- Understanding the epidemiology of AMR in the food chain
- Understanding the ecology of AMR in the microbial communities
- Understanding the relative contribution of the exposure routes of AMR from animals to humans
- Understanding the economic impact and animal welfare aspects of AMR in the food chain
- Sampling in 9 European countries (pigs and poultry) + smaller sectors in a selection of countries

Output of EFFORT

- AMR: comparison between phenotypic resistance (*E. coli*) and metagenomics (genes)
- Exposure of AMR to humans through food of animal origin
- Relation AMU and farm management – AMR
- Environmental contamination with AMR organisms
- Effect (and feasibility) of interventions on AMR
- Relation AMU and economic and welfare aspects
- Knowledge about successful clones (plasmids)



"The Triumph of Death" by Flemish painter Pieter Breugel in his mid-16th-century reflects the social upheaval and terror that followed plague.

Image courtesy Museo del Prado, Madrid



Actions by different actors

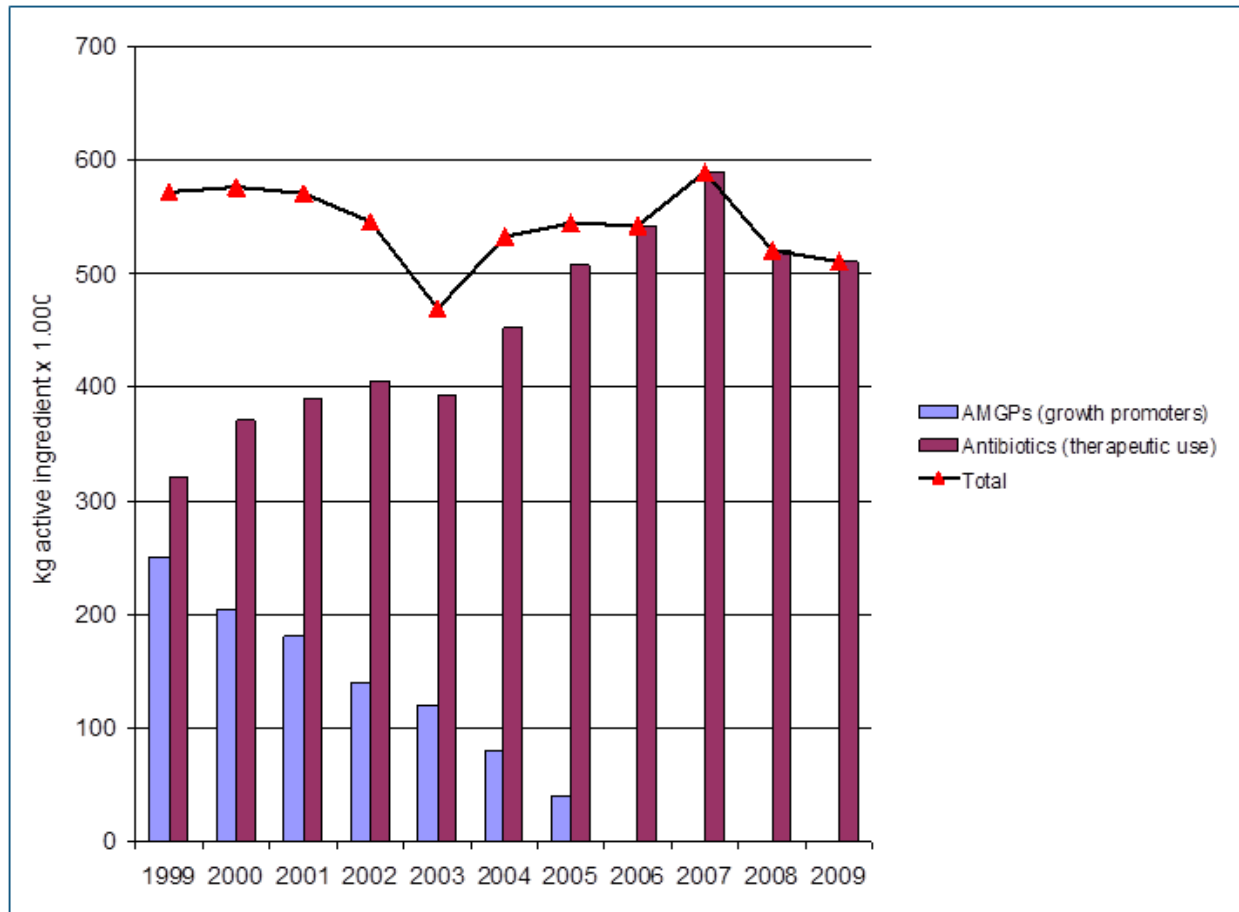
Advices of the Health Council

- Reduce AMU in livestock
- Ban the use of critically Important Antimicrobials for human use (WHO-list) – cephalosporines, fluoroquinolones
- Redefine 1st, 2nd, 3rd choice antimicrobials (selection for ESBLs)

Covenant with private parties

- All antimicrobial use on farms transparent by end of 2011
- Bench marking allowing identification of high users/prescribers
- 1 to 1 relationship between a vet and a farmer
- Farm health and farm treatment plan

Effect of the ban of AGPs on Dutch AMU in animals



Other measures and actors

Topic

- Premedicated feed
- Preventive use of antibiotics
- Conditions for administering of AB by farmers themselves
- Checks for 'correct' use of antibiotics
- New formularies guidelines

Action/actor

- Forbidden (private)
- Forbidden (government)
- Rules set by the government
- Carried out by the Food Authority
- Set by the association of vets

Critical success factors

- Public pressure
- All parties involved (stakeholders)
- Clear targets defined by the government
- Measures initiated by well organised private animal production sectors and veterinary association; implementation by private sectors with using their production chain quality systems; enforcement of law by government
- Usage fully transparent: from > 42,000 farms DDDAs available
- Independent institution (SDa) accepted by all parties involved
- All antimicrobials on prescription

