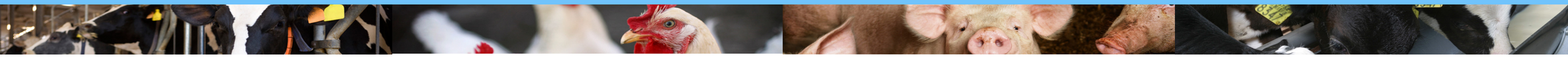
The critical factors for a nationwide major reduction of antimicrobial use in animals in the Netherlands with a parallel reduction in antimicrobial resistance

Jaap Wagenaar [1,2,3], Inge van Geijlswijk[1,3], Johan Mouton[3,4], Dik Mevius[1,2], Kees Veldman[2], José Jacobs[1,3], Dick Heederik [1,3]

1. Faculty of Veterinary Medicine, Utrecht University, Utrecht, the Netherlands; 2. Central Veterinary Institute of Wageningen UR, Lelystad, the Netherlands
3. The Netherlands Veterinary Medicines Authority (SDa), Utrecht, the Netherlands; 4. Erasmus MC, Rotterdam, the Netherlands



Background and approach

After a doubling of antimicrobial use (AMU) in Dutch livestock between 1990 and 2007, measures were initiated by the Dutch Government, livestock sectors and the Royal Dutch Veterinary Association (KNMvD) to reduce the use of antimicrobials. Major triggers for action were the emergence of multi-resistant bacteria (LA-MRSA and ESBL producing bacteria) in livestock, and the concerns about public health implications of the livestock sector in general. One of the decisions was to establish the Netherlands Veterinary Medicines Authority (SDa). This independent body was founded with the tasks to:

- collect the antimicrobial usage (AMU) data of all Dutch pig, poultry, veal calf and dairy farms (~42,000 units);
- define benchmark targets for AMU in pigs, dairy cattle, veal calves and poultry (Figure 1 – broilers);
- report annual trends in AMU;
- identify frequent or mis-users/prescribers;

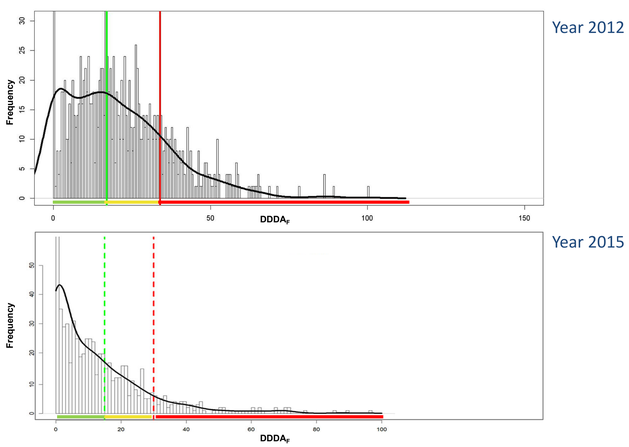


Figure 1: Benchmarking broiler farms 2012 (upper figure) and 2015 (lower figure) with target (—), signaling (—) and action (—) tresholds; number of farms (Y-axis) and Defined Daily Dose Animal/year (X-axis). Shows change in distribution of farms over the years.

Reduction targets were set by the government at 20%, 50% and 70% reduction in 2010, 2013 and 2015, respectively, with reference to 2009. Several other actions were performed at different levels; e.g. report of the Dutch Health Council, the development of treatment guidelines, and the implementation of new legislation (e.g. ban on prophylactic use). Parallel to these actions, continuous monitoring of resistance in commensal *E. coli* had already been set up in livestock from 1998 onwards, enabling measurement of trends in resistance.

Results

- From 2007-2015 there was a reduction in AMU of ~65% (sales data: Figure 2; DDDA per sector: Figure 3);
- The total reduction of AMU in 2015 compared to 2009 (reference year) was 58.4%.
- Use of 3rd/4th-gen cephalosporins is very low; use of fluoroquinolones has been strongly reduced;
- From 2011-2015 there was a 68% reduction in use of colistin.

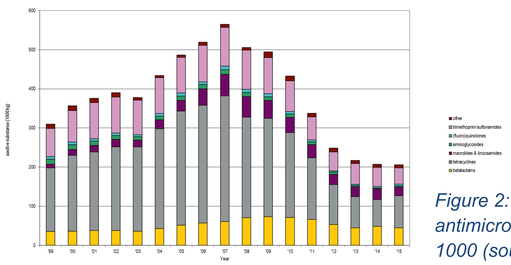


Figure 2: sales data of antimicrobials in 2015 in kg X 1000 (source: FIDIN)

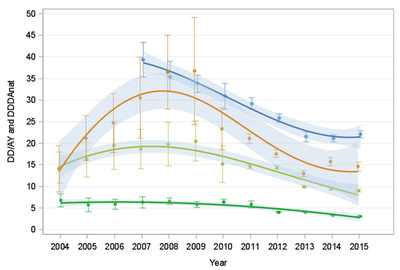


Figure 3: trends of usage per sector as expressed as Defined Daily Dose Animal. Blue: veal calves: orange: poultry; light green: pigs; dark green: dairy cattle.

- The enforced 1-to-1 relationship of farmers and veterinarians, enabled to develop the Veterinary Benchmark Indicator allowing to compare prescription levels between veterinarians.
- The Dutch surveillance program for AMR (MARAN) performed by the Dutch NRL showed a decreasing trend in resistance in commensal *E. coli* for different sectors (Figure 4).

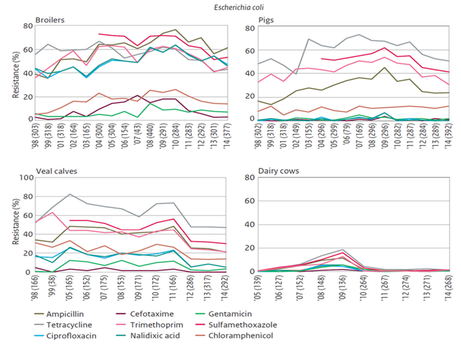


Figure 4: antimicrobial resistance in commensal E. coli in the Dutch surveillance of AMR in healthy food producing animals

Key factors and conclusions

- Reduction of AMU in food producing animals has shown to be feasible in a country with large and intensive livestock production - the Netherlands is the 2nd exporter in the world of agricultural products.
- All activities were carried out following the precautionary principle.
- The achievements have been made possible by a pro-active role and commitment of all parties involved: private sector, government, veterinarians, scientists, and SDa.
- The SDa has played a crucial role by making the use of antimicrobials transparent for all farms, by benchmarking livestock farms (action, signaling and target) and by benchmarking veterinarians.
- The government played a crucial role by setting targets.

SDa Autoriteit
Netherlands Veterinary Medicines Authority
Diergeneesmiddelen

Universiteit Utrecht

Contact: j.wagenaar@uu.nl