Antimicrobial resistance surveillance in food animals: Learnings from DANMAP

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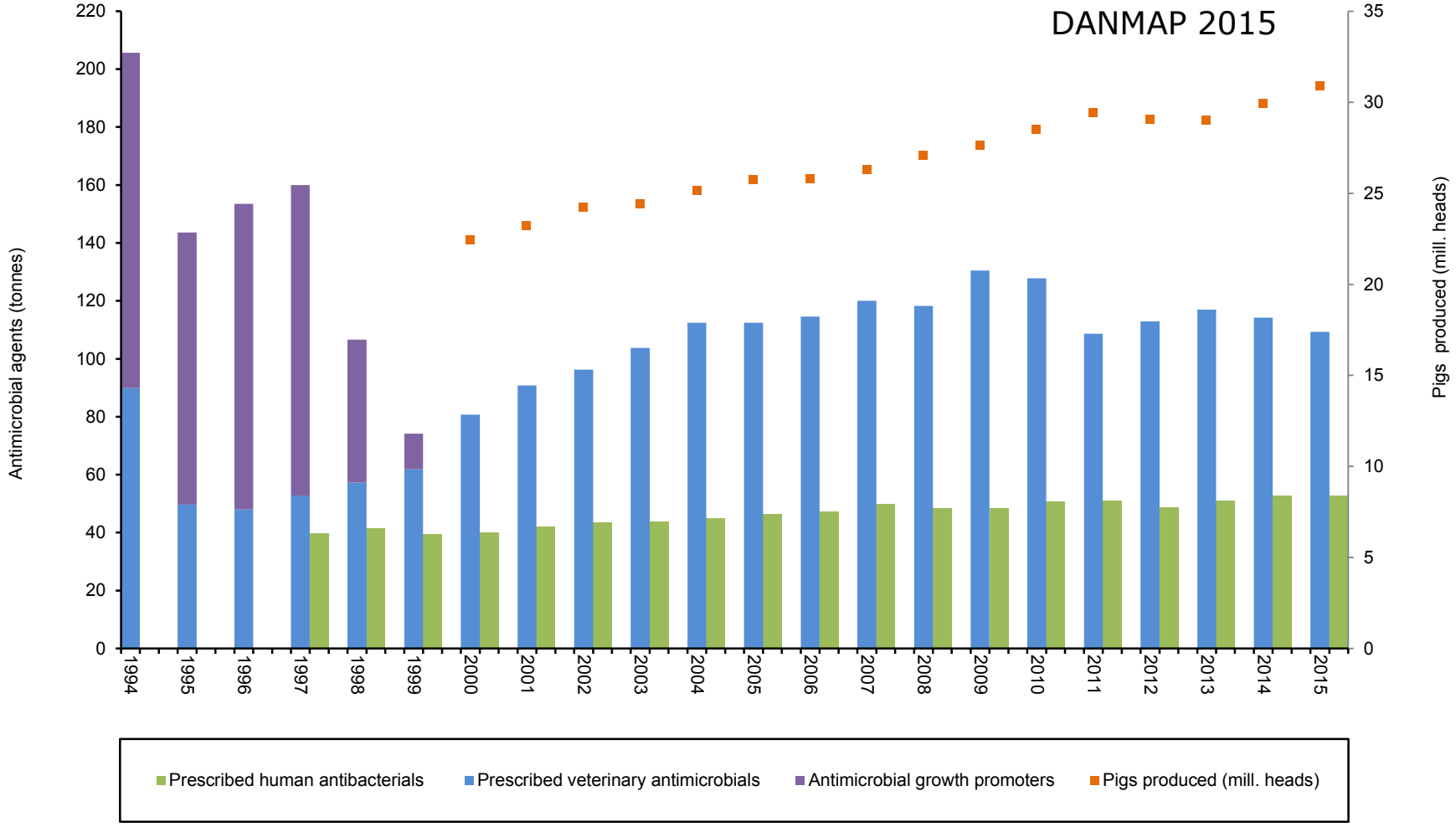
Trend in use of antimicrobials in Denmark



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DANMAP objectives

– Monitor antimicrobial resistance in
  - Zoonotic bacteria
  - Indicator bacteria (E. coli/ enterococci)
  - Animal pathogens

  from production animals and meat (Danish and imported)

– Monitor resistance in bacteria fra humans
  - Zoonotic bacteria (domestic/travel associated)
  - Human pathogens

– Monitor antimicrobial usage in production animals and in humans

– Explore association between antimicrobial usage and resistance

DANMAP – sample collection for AMR

- Sampling of food animals is done at slaughter plants
  - stratified random sample
  - covers 90-95 % of Danish farms
    - ⟶ representative measures of level of resistance in the animal populations
  - testing of bacterial isolates using microbroth dilution
  - results published in annual reports: www.DANMAP.org

- Caveats
  - Procedure OK for monitoring trends
  - Basis for determining transfer of AMR between animals and humans
  - Sensitivity for detection of new AMR phenotypes is low

- The future
  - Whole community sequencing to detect ALL resistance genes?

VetStat – herd level monitoring of antimicrobial use

Objectives

- to obtain data to inform prudent use strategies and for risk mangement
- to contribute to clarification of the complex epidemiology of resistance through investigations on the relationsship between use of antibiotic and resistence.
- to inform veterinarians in their choice of treatment strategies

Key premises – monitoring consumption

- The **legal** infrastructure is important
  - All antibiotics are prescription only
  - Danish veterinarians do not have a significant income from selling medicine
  - Sale of antimicrobials from wholesalers only to licensed pharmacies
  - All sale to end-users exclusively from licensed pharmacy or similar organisation (dealers), excp. medicated feed
  - 94% of all antibiotics for production animals are being sold directly from pharmacies to farmer

The European approach to monitoring antimicrobial consumption

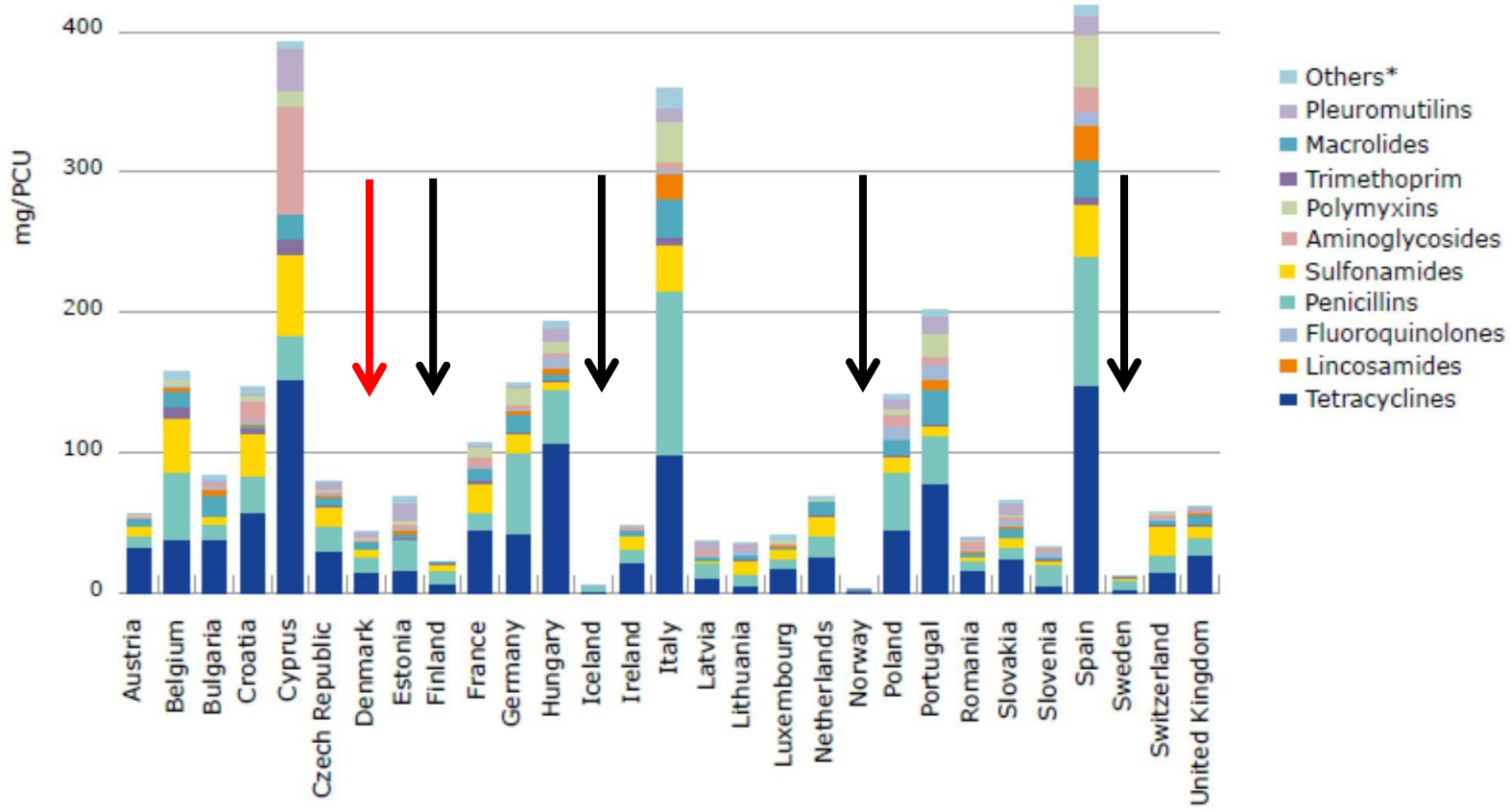
- Carried out by European Medicines Agency
  - the ESVAC project

- Data based on reporting from wholesalers or holders of marketing authorisations

- Denominator information – the population correction unit – PCU
  - the number of animals X the weight at time most likely of treatment
  - 1 PCU = 1 kg of animal treated

ESVAC – monitoring animal consumption in Europe

Figure 8. Sales for food-producing species, in mg/PCU, of the various veterinary antimicrobial classes, for 29 Europe countries, in 2014[1]

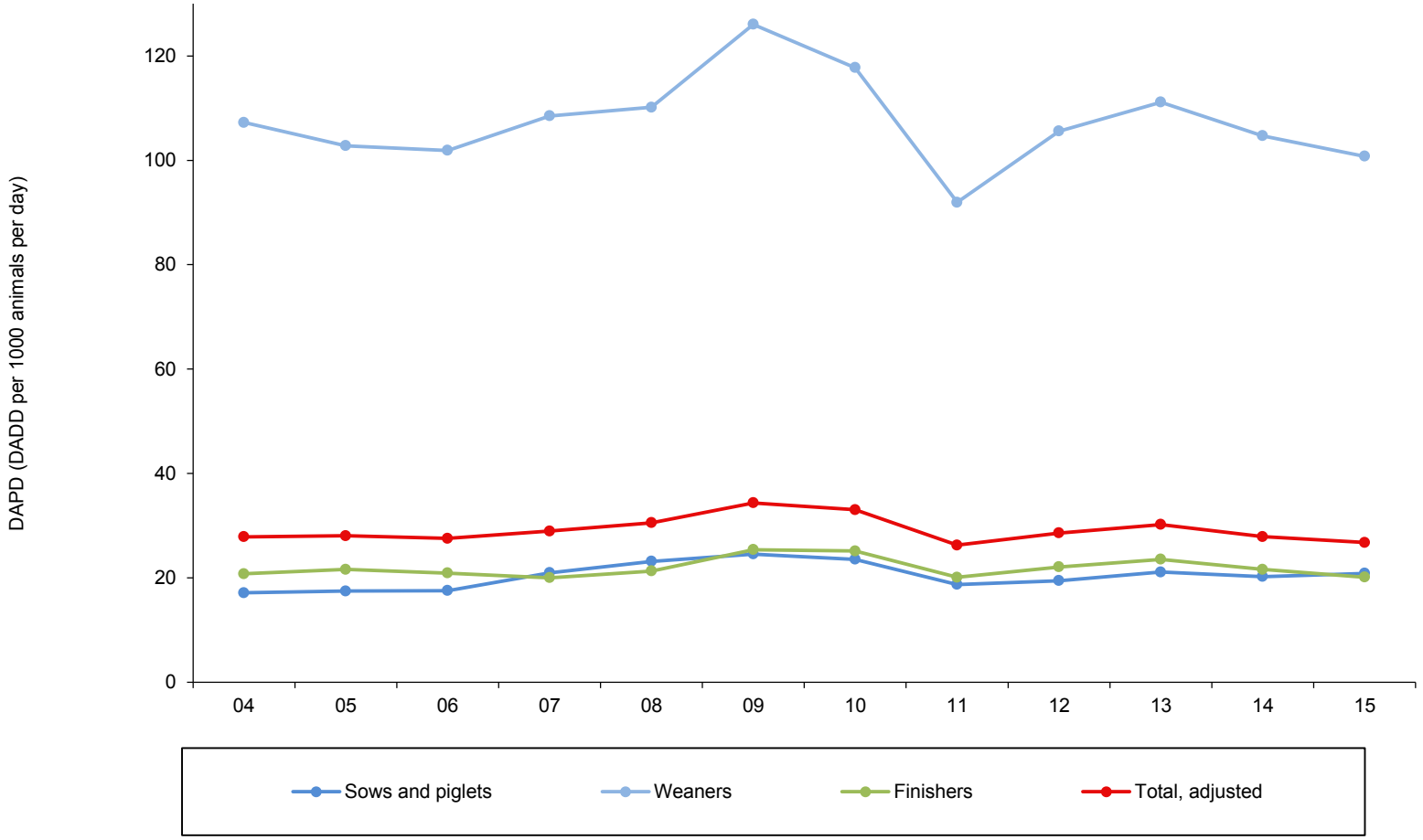


Use of DANMAP data by risk managers

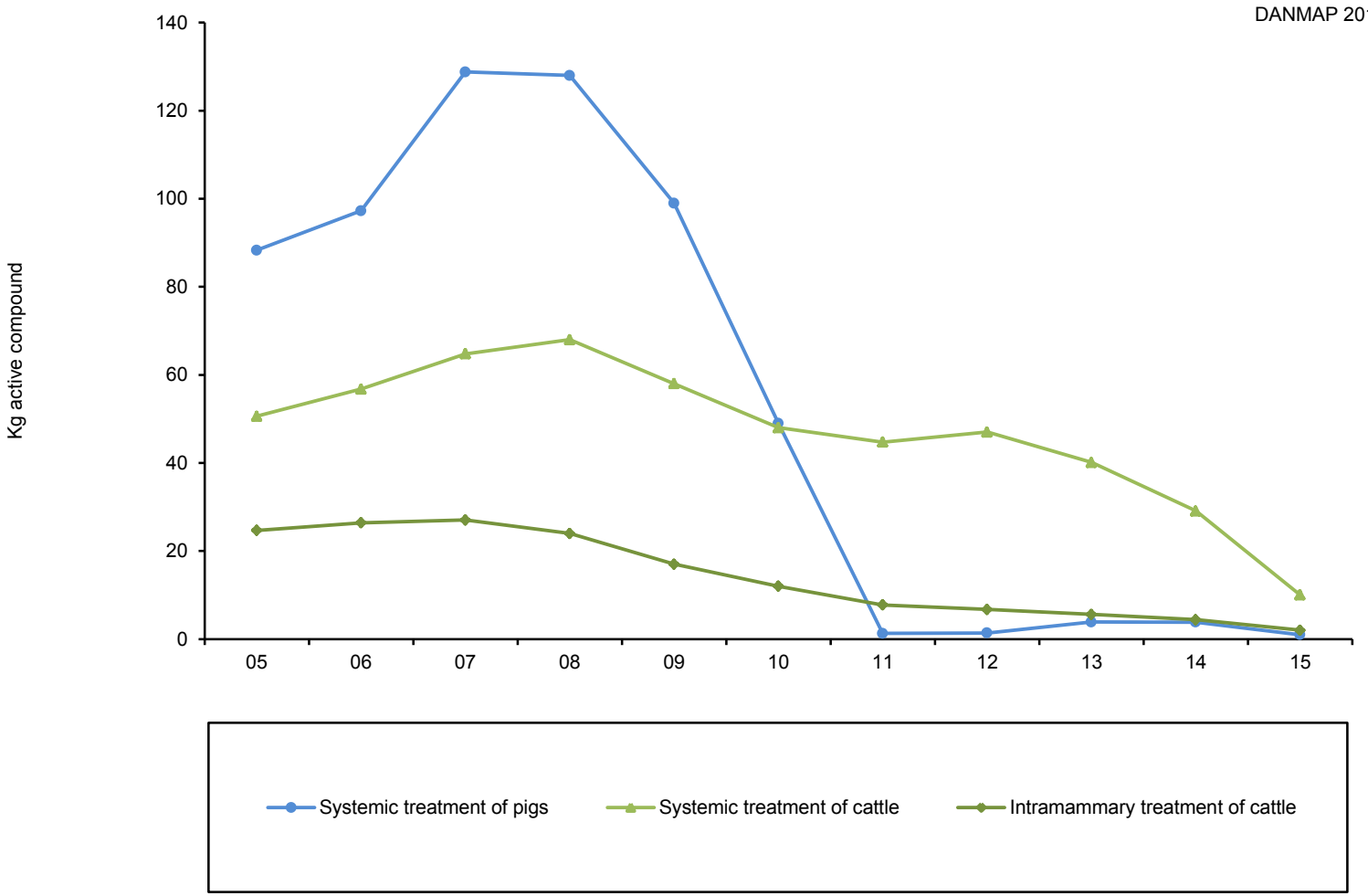
- Data on consumption of antimicrobials are used
  - to inform prudent use guidelines
  - for setting of targets

- Herd level monitoring allows the veterinary authorities to target farms with high consumption of antimicrobials
  - farmers are required to implement preventive disease measures in collaboration with their veterinary practitioner
  - Carrot and stick: if a herd stays below a set threshold it is free to use prescription medicines with a minimum of vet supervision; if not, stricter supervision is mandatory, driving up expenses

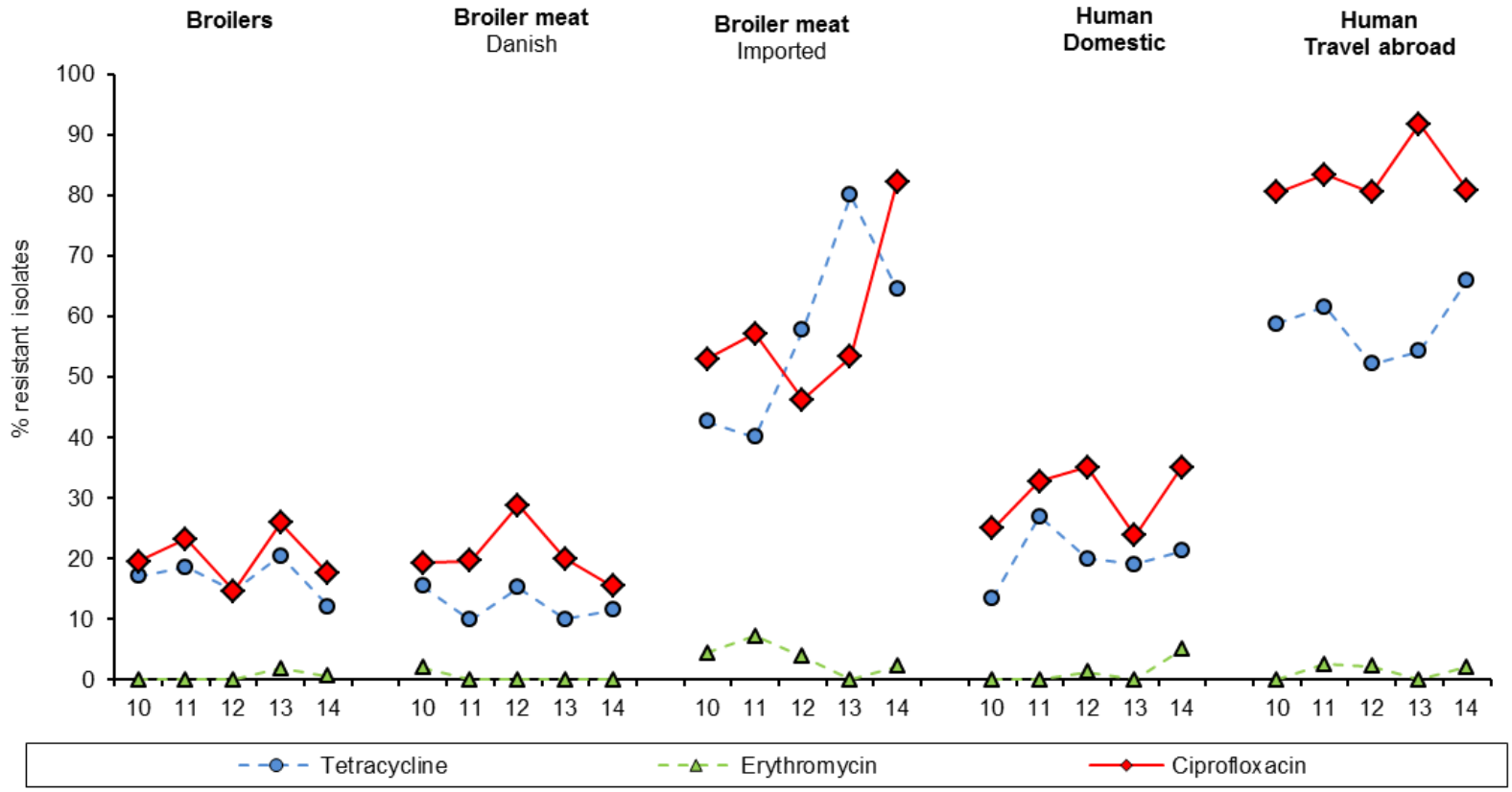
Animal use of AB: the dilemma



Cephalosporin use 2005-15, kg. active comp.



Resistance in Campylobacter jejuni



In summary

- We face a global pandemic of resistance genes, caused by indescriminate use of antimicrobials in animals, but also in humans and in plant protection

- All countries must work to eleminate overuse – antimicrobials should not be used in lieu of good hygiene and adequate biosecurity

- A legal infrastructure – with necessary follow-up – on permitted usage is highly necessary to curb excess consumption

- It is necessary to cultivate an understanding by all in the society that antimicrobial resistance is a serious issue that threatens human life and welfare

- The dilemma: **economic** sustainability vs. **societal** sustainability

Thank you for your attention

Useful links

- EU harmonized monitoring of AMR

http://www.ecolex.org/details/legislation/commission-implementing-decision-2013652eu-on-the-monitoring-and-reporting-of-antimicrobial-resistance-in-zoonotic-and-commensal-bacteria-lex-faoc128428/

- Antimicrobial growth promoters

http://www.eea.europa.eu/publications/environmental_issue_report_2001_22/issue-22-part-09.pdf

- ESVAC reports and strategies

http://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/document_listing/document_listing_000302.jsp

- Biosecurity on broiler farms

www.camcon-eu.net