AMR monitoring in Veterinary Medicine
Industry Initiatives

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2000 - 2003 US FDA, Antibiotic resistance monitoring, risk assessment and scientific support for veterinary antibiotic registration

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Over 80 peer reviewed papers and conference presentations, 2 books and 9 book chapters
## Global Surveillance Programs

### Veterinary examples

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Global Surveillance Programs

All the national programs focus predominantly on foodborne and commensal bacteria.

The data generated from these surveillance programs are used for registration purposes, as an indicator for the emergence of resistance and for National Risk Assessment and subsequent Risk Management guidelines.

It is therefore important to ensure that the data being generated is of uniform quality and interpreted using a single interpretive criteria.
Need for Harmonisation

Franklin et al (2001) published a guideline on the harmonisation of surveillance programmes in animals on behalf of the Office International des Epizooties (OIE).

- a) animal species(categories (including age) to be sampled
- b) for food sampling, the relative merits of sampling at the abattoir and retail outlet should be considered. In addition to food of domestic origin, food of foreign origin may also be considered, possibly at the port of entry of the products
- c) sampling strategy to be employed, for example: active or passive collection of samples; random, stratified or systematically collected samples; statistically based sampling or opportunistic sampling
- d) samples to be collected (faeces, carcass, raw and/or processed food)
- e) bacterial species to be isolated
- f) antimicrobials to be used in susceptibility testing
- g) standardised susceptibility testing
- h) quality control – quality assurance
- i) type of quantitative data to be reported
- j) database design for appropriate data extraction
- k) analysis and interpretation of data
- l) reporting (consideration of transparency of reporting and interests of stakeholders)
Need for Harmonisation

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Editorial

Assessing the antimicrobial susceptibility of bacteria obtained from animals
Stefan Schwarz, Peter Silley, Shabbir Simjee, Neil Woodford, Engeline van Duijkeren, Alan P. Johnson and Wim Gaastra


Review

Harmonisation of resistance monitoring programmes in veterinary medicine: an urgent need in the EU?
Peter Silley, Anno de Jong, Shabbir Simjee, Valérie Thomas
Clinical vs. Epidemiologic

- **Clinical Resistance**
  - Isolates are not inhibited by the usually achievable concentrations of the agent with normal dosage schedules and/or fall in the range where specific microbial resistance mechanisms are likely (e.g. β-lactamases), and clinical efficacy has not been reliable in treatment studies

- **Epidemiological (Resistance)**
  - Isolate is defined as non-wild type (NWT) by the presence of an acquired or mutational resistance mechanism to the antibiotic. Isolates may or may not respond clinically to antimicrobial treatment
Sample Collection

Salmonella is a perfect example as different serotypes are prevalent in different points of the food chain.

DANMAP and SVARM include Salmonella from sub-clinical and clinical infections in animals, while VAV only collect Salmonella from healthy animals at slaughter.

MARAN pools data from all Salmonella from animals and human sources.
These finding highlight that antimicrobial resistance in isolates from slaughter animals entering the food chain would be much more informative than that observed in diagnostic isolates when assessing the public health impact of antimicrobial usage.
Choice of Antibiotic

Although same class representatives maybe used and the data extrapolated this is not always appropriate.

As an example the most common fluoroquinolones used are ciprofloxacin and enrofloxacin but it must be understood that there are differences in intrinsic antimicrobial activity thus the epidemiological cut-off values are different.
Choice of Antibiotic

EUCAST distributions for ciprofloxacin (epidemiological cut-off $\leq 0.032 \, \mu g/ml$) and enrofloxacin (epidemiological cut-off $\leq 0.125 \, \mu g/ml$) are shown, it can be seen that there is a two dilution difference.

Irrespective of the arguments concerning the appropriate epidemiological cut-off value it is necessary to understand that data interpretation needs to consider what antimicrobial has been used in the surveillance programme.
The CEESA Programs

Given some of the discrepancies encountered while comparing data from national surveillance programs the CEESA programs aim to generate Pan-European antibiotic susceptibility data that can be compared across the EU by:

- using an identical sampling point in all EU countries
- using a single laboratory to generate susceptibility data
- using a uniform interpretive criteria to analyse the data
The CEESA Programs

Under the umbrella of CEESA (Centre Européen d’Etudes pour la Santé Animale - European Animal Health Center) four surveillance programs are described:

1. VetPath (15 years)
   This program examines the antimicrobial susceptibility of major disease causing bacterial pathogens in food animals

2. EASSA (15 Years)
   European Antimicrobial Susceptibility Surveillance in Animals
   This program examines the antimicrobial susceptibility of foodborne and commensal bacteria in food animals

3. ComPath (5 years)
   This program examines the antimicrobial susceptibility of major disease causing bacterial pathogens in companion animals

4. MycoPath (5 years)
   This program examines the antimicrobial susceptibility of major disease causing mycoplasma species from food animals
Conclusions

As can be seen the CEESA programs are extremely detailed and take a great deal of time and financial investments from the participating companies.

However, until national monitoring programs are harmonised across the EU and more widely across the globe it’s very difficult to compare the national data, the CEESA programs are the only international harmonised monitoring programs that generate susceptibility data using standardised collection, isolation, susceptibility testing and interpretive criteria.