Methods and challenges in data and information sharing in the Danish Integrated Surveillance for Antimicrobials and Antimicrobial Resistance system (DANMAP)

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Outline

• Introduction to DANMAP
• Data used in DANMAP
• How data are used, examples
• Dissemination information
• Challenges
• EU/Global perspective
• Concluding remarks
Danish Integrated Antimicrobial Monitoring and Research Programme

- Since 1995

- Collaborative project:
  - Danish Veterinary Institut
  - Danish Food & Veterinary Adm.
  - Danish Medicines Agency
  - Statens Serum Institut

- Yearly report since 1997

http://www.danmap.org
Aim of the DANMAP programme

To Investigate associations between use of antimicrobial agents in animals and humans and occurrence of resistance among bacteria from animals, food, and humans
The perfect world.....
Several Ministries involved......

Monitoring Network for reporting infectious pathogens in humans, animals, foodstuffs and feedstuffs in Denmark

Source: Annual report in Zoonosis in Denmark, 2014

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Multiple sources of data.....

Organisation of DANMAP
Sources of AMR data – veterinary side

• Samples are collected by
  – DFVA personnel or
  – Food business operators according to DFVA sampling plans or as part of national surveillance

• Samples are examined by
  – the DFVA laboratory in Ringsted – AMR surveillance projects
  – Industry laboratories – National Salmonella surveillance
  – DTU Food laboratory – Salmonella serotyping and MIC of industry isolates and WGS of ESC
  – DTU Vet Laboratory – Clinical samples

• Data collected at DTU Food and DTU Vet
  – DANMAP, Danish Antimicrobial Resistance monitoring and Research Programme
  – EFSA Data Collection Framework
Sources of AMR data – human side

• Samples are collected by
  – GP
  – Hospital

• Samples are examined by
  – Departments of Clinical Microbiology (DCM)
  – SSI

• Data collected at the Unit for Antibiotic Resistance and Staphylococci from the Departments of Clinical Microbiology
Sources of consumption data

• **Veterinary side**
  – Pharmacies, Veterinarians, feedmills
  – Data collated in Vetstat, DVFA
  – Analysed for DANMAP at DTU Food

• **Human side**
  – Pharmacies, incl. hospital pharmacies
  – Data collated in Register of Medicinal Product Statistics
  – Analysed for DANMAP at SSI
Figure 5.9. Total somatic hospital consumption (DBD) by leading groups of antimicrobial agents (J01), Denmark
Total antimicrobial consumption for humans

Figure 5.1. Total consumption of antimicrobial agents (J01) in humans by sector, Denmark

Source. DANMAP 2014
Antimicrobial consumption – animals, DK, 2014

Total veterinary consumption in tonnes (114) in 2014; 2% reduction compared to 2013

Figur 4.2. Live biomass (mill kg) and antimicrobial consumption (kg) in main animal species, Denmark

Note: The live biomass is estimated from census data (pigs, cattle and pet animals) and production data (poultry, fur animals, aquaculture). For poultry: the figures comprise only the biomass for the main production types (turkey and broiler production). The live biomass estimates for cattle, broiler, turkey, fur animals, aquaculture and pet animals based on 2012 data. The estimation procedures are described in Chapter 9.
Antimicrobial consumption in Denmark 1990-2014

No prophylactic use
Restrictions on sales
Vet. Advisory Service contracts

Source. DANMAP 2014
Antimicrobial consumption in pigs

Consumption 14 % compared with 2009

- Total consumption in pigs reduced by 5% (DAPD).
  - 2% weaners
  - 7% slaughterpigs
  - 5% sows and piglets
  - Same levels as in 2008

- Most frequently used:
  - tetracyklines, penicillines, pleuromutilines, makrolider
  - Reduction mainly caused by a reduced usage of tetracyklines and to a lesser extent reduced use of pleuromutilines and makrolides

Source. DANMAP 2014
Consumption of critically important antimicrobials in pigs and cattle

- 3. and 4. generation cephalosporines:
  - Pigs: reduced to almost zero (3-4 kg).
  - Cattle: reduced since 2008:
    - Intramammary (4kg)
    - systemic (29kg)
    - Voluntary stop, July 2014
  - Poultry: intet forbrug

- Fluoroquinolones (19 kg):
  - Ca. 47% (9 kg) pets
  - Pigs (4 kg)
  - Fur animals (mink) (almost zero)
  - Horses (6 kg)

Figure 4.5. Consumption of 3rd and 4th generation cephalosporins in pigs and cattle, Denmark
Antimicrobial resistance – S. Typhimurium in pigs, pig meat and humans, 2010-2014
Antimicrobial resistance – C. Jejuni in broiler, broiler meat and humans, 2010-2014
Communication of data

- The **DANMAP report** is sent to a large number of people both in and outside of Denmark

- **Press releases** (3-4) are made from the new report every year

- Data are reported in EPI-News

- A yearly symposium on the European Antibiotic awareness day (Nov 18th)

- Two half yearly meetings with the microbiologists at the hospital labs

- Data are used for the EFSA/ECDC, EARS-Net (ECDC) and WHOnet
DANMAP website – [www.danmap.org](http://www.danmap.org)

DANMAP

Welcome to the DANMAP website. DANMAP is the Danish Programme for surveillance of antimicrobial consumption and resistance in bacteria from animals, food and humans.

Download the new DANMAP report
The new DANMAP 2014 report is now available

EAAD
Information about the European Antibiotic Awareness Day

Contact
Contact information

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Challenges – Dataflow
– example from the veterinary side

**Raw data**
- DVFA data – From LIMS – DVFA DWH - Automated transfer to DTU DWH
- DTU data - From labsystem (ESTER) – DTU Datawarehouse

**Data validation**
- Import into SAS
- Harmonisation of variable and labels to DANMAP format
- Only one isolate/serotype per epidemiological unit
- 2015 merged with historic DANMAP datasets stored in Oracle

**Data transmission**
- Loading of EFSA catalogues and pick lists in web application and XML functions
- Mapping of metadata – translation between DANMAP format and EFSA XML codes
- EFSA XLM codes for metadata, MIC ranges and EFSA cut-offs added to the Oracle dataset
- Validation and submission to EFSA via through Data Collection Framework
Challenges - Data information needs

Where? Where? Where?
Who? Who? Who?
What? What? What?
How? How? How?
When? When? When?
Why? Why? Why?
Challenges - the 4 C’s of Integrated Surveillance

Collaboration:
- Data exchange

Coordination:
- Control activities

Central collection of data:
- Monitoring trends
- Comprehensive analysis
- Programme evaluation

Communication:
- Regular meetings
- Direct and informal contact

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**Reporting – EU level**

Directive 2003/99/EC (Zoonoses directive)

- **Animal, food** and feed monitoring &
  Foodborne outbreaks

- **Communicable** human diseases

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**EFSA**
European Food Safety Authority

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**ECDC**
European Centre for Disease Prevention and Control

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European Antimicrobial Resistance Surveillance - Network
WHONET software for AMR data

- Free software for analyzing AMR data
- Used all over the world at DCMs and for national surveillance
- Different kinds of analyzes, graphs, cluster alerts, resistance profiles, %RIS, automated analyzes etc.
Concluding Remark

One Health

Integrated food safety program
Thank you for your attention!

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