Vetstat - monitoring of antimicrobial consumption

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Outline

- Vetstat- structure and content
- Quantification of drug consumption
- Antimicrobial use for Danish cattle- 2007 to 2011
A brief introduction to Vetstat

Growing concern regarding antimicrobial resistance

WHO recommendation to monitor antimicrobial consumption

Vetstat initiated in 2000
A brief introduction to Vetstat

Vetstat aims:

• To monitor veterinary usage of drugs in animal production

• To help practitioners in their work as farm advisors

• To provide transparency as a basis for ensuring compliance with rules and legislation

• To provide data for pharmaco-epidemiological research
A brief introduction to Vetstat

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It-based relational database

Owned and managed by the Ministry of Food, Agriculture and Fisheries.
Brief facts on Denmark

- National herd register
Brief facts on Denmark

• National herd register

• All antimicrobials are prescription-only
Brief facts on Denmark

- National herd register

- All antimicrobials are prescription-only

- Legislation to curb antimicrobial use
All medicated feed sold

Production animals

Pharmacies

Veterinary practitioners

Feed mills
Companion animals

Veterinary practitioners

Pharmacies

Feed mills

Production animals

Drugs used or sold by veterinary practitioner (only prod. animals)

All veterinary drugs sold

All medicated feed sold

Vetstat
All veterinary drugs sold

Drugs used or sold by veterinary practitioner (only prod. animals)

Veterinary practitioners

Pharmacies

Companion animals

Feed mills

Production animals

3%

5%

92%
Each entry must include:
- Date of sale
- ID of prescribing vet
- ID of reporting entity
- Nordic commodity number
- Quantity
- ATC/ATCvet-code
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For use in herds:
- Receiving herd-ID
- Animal species
- Age group
- Diagnostic group

Drugs used or sold by veterinary practitioner (only prod. animals)

Companion animals

Veterinary practitioners

Pharmacies

Production animals

Feed mills
Cattle - age groups in Vetstat

- Cows and bulls
- Calves < 12 months
- Heifers and steers > 12 months
User-access to Vetstat data

- National consumption presented by the Ministry of Food, Agriculture and Fisheries

- Vetstat.dk – detailed data

- Since spring 2012 public access
Potential pitfalls

• No automatic linking species/age/diagnostic group – 1.4% in 2011 (1405/100.021 entries)
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• Incorrect ID of prescribing veterinarian
Potential pitfalls

- No automatic linking species/age/diagnostic group – 1.4% in 2011 (1405/100,021 entries)

- Incorrect ID of prescribing veterinarian

- Lacking registrations by veterinary practitioners - estimated 10% in 2011
Quantification of drug consumption

Kg active compound
Quantification of drug consumption

Kg active compound

• ÷ potency
Quantification of drug consumption

**Kg active compound**

- $\div$ potency

**Animal Daily Doses (ADD)**

- Daily maintenance dose per live animal for the main indication

\[
ADD = \frac{\text{Total amount of active compound AM sold/used (mg)}}{\text{dosage pr kg live animal (DMDkg)} \times \text{standard weight of animal}}
\]
Quantification of drug consumption

Kg active compound

- ÷ potency

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- ÷ population
Quantification of drug consumption

Kg active compound

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Animal Daily Doses per 100 animals per day

\[ ADD \text{ pr 100 animals pr day} = \frac{ADD \text{ used}}{\text{number of pen places} \times \text{days}} \]
ADD per 100 animals per day

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Animal Daily Doses (ADD) per 100 animals per day
Quantification of drug consumption- animal weight

<table>
<thead>
<tr>
<th>Age group</th>
<th>Standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows, bulls</td>
<td>600 kg</td>
</tr>
<tr>
<td>Calves &lt;12 months</td>
<td>100 kg</td>
</tr>
<tr>
<td>Heifers, steers &gt; 12 months</td>
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Age group \(\rightarrow\) large effect on ADD
**Calculation examples**

**ADD**

100 mL EthacilinVet - 300 mg benzylpenicillinprocain/mL

for treatments of cows (15mg/kg)

\[
ADD = \frac{100 \text{mL product} \times 300 \text{mg/mL}}{15 \text{mg/kg} \times 600 \text{kg}} = 3.33 \text{ADD}
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Calculation examples

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**ADD per 100 animals per day**

150 ADDs (cows/bulls) for herd with 400 pen places in January (31 days)

\[
ADD \text{ pr 100 animals pr day} = \frac{150 \text{ ADD used}}{400 \text{ pen places} \times 31 \text{ days}} \times 100 = 1.2
\]
Antimicrobial consumption in Danish cattle

Total kg AM

- 2007
- 2008
- 2009
- 2010
- 2011

Legend:
- Feed-mill
- Pharmacy
- Veterinary practitioner
Antimicrobial consumption in Danish cattle

![Bar chart showing antimicrobial consumption in Danish cattle from 2007 to 2011.](chart.png)

- **Total kg AM**
- **2007**
- **2008**
- **2009**
- **2010**
- **2011**

Legend:
- **Calves <12 months**
- **Cows and bulls**
- **Heifers and steers >12 months**
- **Invalid age group**
Antimicrobial consumption in Danish cattle

ADDs (mio)

25
20
15
10
5
0

2007 2008 2009 2010 2011

Calves <12 months  Cows and bulls  Heifers and steers >12 months
Antimicrobial consumption in Danish cattle
Antimicrobial consumption in Danish cattle

ADD %

- Gastro-intestinal system
- Joints, limbs, hooves, CNS, skin
- Reproduction, urogenital system
- Udder
- Invalid diagnostic group
- Metabolism, digestion, circulation
- Respiratory system
Effect of number of animals

To evaluate consumption, one needs to know the number of animals “available for treatment” – or at least some estimate of the population size

Objective:

To describe the consequences of using three different ways to measure number of animals when reporting the yearly antimicrobial consumption
Effect of number of animals

Animal population measurements

• Number of pen places

• Number of pigs slaughtered in Denmark (~ 2 x pen places)

• Number of pigs slaughtered in Denmark + number of exported growers (~30 kg) and finishers
Effect of number of animals – reporting consumption

Danish consumption of antibiotics for pigs 2005-2010

Kg active compound AB

- 2005
- 2006
- 2007
- 2008
- 2009
- 2010

Breeding animals, piglets
Weaners, small growers
Large growers, finishers
Effect of number of animals – reporting consumption

Danish consumption of antibiotics for pigs 2005-2010

- Breeding animals, piglets
- Weaners, small growers
- Large growers, finishers
- Gram AB/pig (pen places)
- Gram AB/pig (slaughtered in Denmark)
- Gram AB/pig (slaughtered + live export)
Trends in live export

Live pigs exported from Denmark (15-110 kg live weight)
Effect of number of animals

• Difficult to make accurate numbers on animal population per year

• Important to take export into account
  ➢ ~ 95% of all growers exported ≥30 kg
  ➢ Not including exports → skewed result in comparisons.

• When reporting the antimicrobial consumption per pig, it might be prudent always to describe exactly how “number of pigs” are being calculated
In conclusion

- Great opportunity to assess AM usage both at a national level and a herd level

- Caution when interpreting Vetstat data
In conclusion

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• Consider:
  ➢ potential erroneous data
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  ➢ effect of calculation methods
In conclusion

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• Consider:
  ➢ potential erroneous data
  ➢ lacking registrations
  ➢ effect of calculation methods
  ➢ changes in population
Thank you for your attention – any questions?

Acknowledgements
We thank The Pig Levy Fund for financial support.