SYSTEMS FOR MONITORING FARM-LEVEL ANTIMICROBIAL USAGE:
OVERVIEW AND GUIDELINES FOR SET-UP

Wannes Vanderhaeghen, PhD, MSc
Wannes.vanderhaeghen@amcra.be
CONTENTS

• A short history of the ‘AACTING’ network
• The AACTING-project
• Overview of farm-level antimicrobial usage monitoring systems
• www.aactinge.org
• AACTING guidelines
ABBREVIATIONS – DEFINITIONS

• AMU: antimicrobial use/usage
• AMR: antimicrobial resistance
• DCS: data-collection system
  ~ Any system collecting, quantifying, benchmarking and reporting AMU data at farm level
  ~ Monitoring system
  ~ System
AMCRA

- Centre of expertise on AntiMicrobial Consumption and Resistance in Animals (npo)
- Rational reduction of antimicrobial usage
- Work across government and sectors
- Unit ‘Advice and communication’ (since 2012)
  - Advise and communicate
- Unit ‘Data-analysis’ (since 2014)
  - Analyse Belgian farm-level antimicrobial usage
A SHORT HISTORY OF THE ‘AACTING’ NETWORK

“How are other countries organising the collection and analysis of farm-level AMU?” ...

“Who is involved in those ‘systems’?”
A SHORT HISTORY OF THE ‘AACTING’-NETWORK

• Amsterdam, 2014
  - 22 participants, 7 countries + ESVAC

MINUTES

Meeting: Informal meeting on quantification and monitoring of antibiotic consumption at farm level.
Date: Wednesday October 1, 2014, 14:00-17:00
Location: Board Room, Royal Tropical Institute, Amsterdam, The Netherlands
Participants: Walter Obritzhauser (Austria)
            Evelyne De Graef, Jeroen Dewulf, Merel Postma, Wannes Vanderhaeghen, Veerle Piessens, Bénédicte Callens, Bart Hoet (Belgium)
            Nana Hee Dupont, Amanda Brinch Kruse, Elisabeth Okholm Nielsen (Denmark)
            Jordi Torren (ESVAC)
            Lucia Callens (ESVAC)

Opening

1. Meeting targets
   – Exchange of **knowledge** and **experience** regarding monitoring of AB use at farm level within an economic context
   – Establish a **network** among people involved in the monitoring

2. Who’s who?
A SHORT HISTORY OF THE ‘AACTING’-NETWORK

4. Conclusions

This meeting should be the start of a continued exchange of knowledge and experience between those European countries where initiatives concerning the collection, analysis and communication of antibiotic consumption data in animals have been, are being or will be established.

To this end, a shared Dropbox folder and a closed LinkedIn group will be launched. Furthermore, a

• Ghent, 2015
  – 1st workshop on collection and analysis of veterinary antimicrobial consumption at herd-level
    o 21 participants, 8 countries
A SHORT HISTORY OF THE ‘AACTING’ NETWORK

- Copenhagen, 2016
  - 2nd workshop
    - 30 participants, 12 countries + ESVAC
  - Proposal for transnational project through JPI-AMR funding

⇒ AACTING!

Network on quantification of veterinary Antimicrobial consumption at herd level and Analysis, Communication and benchmarkING to improve responsible use
CONTENTS

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AACTING—PROJECT BACKGROUND

• AMU ⇒ AMR

• ... to measure is to know! (and improve...)

• Sales data
  - National reports, ESVAC, OIE, ...
  - National policy-making
  - Less detailed analysis

• Farm-level AMU data
  - Guiding farm- or sector-specific practices
AACTING—PROJECT BACKGROUND

• ‘Universal’ challenges and choices when setting-up farm-level DCS
• Lack of harmonization among existing DCS
  - Type and detail of collected data
  - Indicator(s) for reporting AMU
  - Criteria for acceptable or problematic AMU

⇒ Difficult to compare and to learn
AACTING—PROJECT AIMS

1. **Overview** of existing systems for farm-level AMU monitoring → review paper

2. Develop **guidelines** describing (best) practices for collecting, analysing (= quantifying), benchmarking and reporting farm-level AMU
AACTING—PROJECT AIMS

3. Develop **website** gathering relevant and up-to-date information about existing monitoring systems and other initiatives/information on (quantification of) farm-level AMU.

4. Organise an International **Conference** on the topic
A short history of the ‘AACTING’ network

The AACTING-project

Overview of farm-level antimicrobial usage monitoring systems

www.aacting.org

AACTING guidelines
OVERVIEW OF FARM-LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

16 countries

Austria
PHAROS

Belgium
Sanitel-MED
AB Register
BIGAME

Canada
CIPARS

Czechia
DLN cattle
Q VET pigs

Germany
HIT
QS
VetCab-S

Denmark
Vetstat

Ireland
Teagasc
UCD

Finland
Animal Health ETT (poultry)

The Netherlands
Sector Quality Systems

Italy
ClassyFarm

Norway
VetReg

Spain
NDVAP
ARP

Sweden
Poultry Meat Association
SBA

Switzerland
IS-ABV
SuisSano

UK
BPC-ASG
eMB-pigs
## Overview of Farm-Level Antimicrobial Usage Monitoring Systems

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16 countries, 22 systems
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11 countries
13 systems
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7 countries, 9 systems
7 countries, 7 systems
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4 countries, 4 systems
OVERVIEW OF FARM-LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

• Three features of the DCS
  -(Main) funding
    - Private vs. governmental
# Overview of Farm-Level Antimicrobial Usage Monitoring Systems

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**Private Systems**: SIKAVA (Finland), AH ETT (poultry), BPC-ASG, eMB-pigs, SQS.

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OVERVIEW OF FARM–LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

• Three features of the DCS
  – (Main) funding
    o Private vs. governmental
  – Coverage
    o Full coverage
    o Partial coverage
      ➢ Non-random, large part of sector, (mostly) compulsory
    o Sample survey
      ➢ Small, random yet representative part of sector, voluntary
OVERVIEW OF FARM-LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

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  - Participation
    - Voluntarily vs. compulsory
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OVERVIEW OF FARM-LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

• Other important questions
  - Who is responsible for data-input?
  - How is AMU quantified?
    o Technical units of measurement?
    o Indicators?
  - Benchmarking?
  - Reporting at farm level?
OVERVIEW OF FARM-LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

• Quantification of AMU
  - Indicator = numerator / denominator
    o Numerator: technical units of measurement
    o Denominator: biomass or population at risk of AMU
  - Weight-based
    o E.g. mg/PCU, mg/kg
  - Dose-based
    o E.g. DDD/year, ADD/100 animals/day, ...
  - Count-based
    o E.g. treatment frequency (HIT), IFTA (CLIPP), ...
OVERVIEW OF FARM-LEVEL ANTIMICROBIAL USAGE MONITORING SYSTEMS

• Benchmarking
  - “The categorization of a party’s AMU following a comparison with the AMU of a predefined population of similar parties, with AMU for all parties being quantified in a similar manner.”
  - Full/partial coverage systems currently active and benchmarking
    - Belgium, Germany (HIT and QS), Denmark, France (CLIPP), the Netherlands,
    - Including vets: the Netherlands, (Austria?)
Contents

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• AACTING guidelines
Welcome to the website of the AACTING network on quantification, benchmarking and reporting of veterinary antimicrobial usage (AMU) at farm level. This website assembles information on worldwide existing monitoring systems for farm level veterinary AMU and provides guidelines for setting up such systems as well as analysing and reporting those AMU data for the purpose of antimicrobial stewardship.

This website and the AACTING project were funded by JPI-AMR.

SYSTEMS FOR QUANTIFICATION OF ANTIMICROBIAL USAGE
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**AACTING GUIDELINES**

- **Aim**
  - Provide useful support for design or revision of farm-level AMU DCS
    - Aspects to consider
    - Suggestions
  - Basis for future collection of harmonised farm-level data within and among countries
  - Maximise the establishment of stewardship at farm-level
**Aacting guidelines**

- Target audience
  - Global
  - All stakeholders
    - Involved in designing and setting up DCS for AMU at farm-level
    - Using AMU data for analysis and benchmarking
    - ‘End-users’ of the data: farmers, veterinarians, etc.
    - With an interest in the outcomes of the analysis (retail, competent authorities, consumers, etc.)
  - Difficult in countries without medicines registration and regulations
4.1. **Data collection**

The following points should be considered when setting up the data collection system:

a. **Determine the AMU monitoring objectives.** This will define the desired outputs, the extent of the data collection (e.g. comprehensive monitoring including all farms vs. a representative sample of farms, collection of data by animal species vs. by production stage or type) and the required resources. When aiming for a full coverage system, it might be helpful to start with a pilot study on a sample of farms first.

b. **Identify the data sources** (e.g. prescription records, farm records, veterinary practice records, ...).  

4.2. **Data analysis**

c. **Determine which AMU-indicator fits best with the goals of the entire system and the AMU monitoring objectives.** Several AMU indicators are available and all of them have different characteristics (Collineau et al., 2017). It is not the aim of this guidance to recommend one particular indicator for analysing and reporting farm-level AMU, as the choice of indicator will reflect several considerations, such as the objectives of the monitoring system, the type of AMU data collected and the extent of data coverage.

The formula to determine the number of defined daily doses (DDD) per 100 animal days is provided below as an example (variations on this formula are discussed further).

\[
\sum_{i=1}^{n} \text{amount } A_i \text{ in period } P (\text{mg}) = \text{DDD}_i (\text{mg/kg/day}) \times \text{# animal days in period } P \text{ (days)} \times \text{standard or average weight (kg)} \times 100
\]

Where \( A_i \) = amount (in mg) of active ingredient \( i \) used in period \( P, i = 1, 2, ..., n \); \( \text{DDD}_i = \text{Defined Daily Dose of active Ingredient } i \text{ (in mg/kg/day)} \); \# animal days in period \( P = \text{# animals present daily during } P \times P \text{ (in days)} \); standard weight = standard animal weight at treatment (in kg) (Timmerman et al., 2006; Callens et al., 2012; Pardon et al., 2012; Persoons et al., 2012).

The outcome of this formula provides the percentage of time an animal of a standard weight is
Aacting Guidelines

4.3. Benchmarking

Benchmarking is a powerful tool for raising awareness and promoting antimicrobial stewardship. When benchmarking farms or other parties, e.g. veterinarians, based on farm-level AMU, the following aspects should be considered:

a. Decide who to benchmark. Are only farms benchmarked or will veterinarians or other parties also be included.

b. Determine the reference group. This is the group against which the result of the specific farm is compared to. Ideally each farm is compared to a reference group that is as representative as possible (e.g. comparable production system for the animal species in question, region, etc.). Keep the sample

4.4. Reporting

Reporting on the outcome of the AMU quantification is of critical importance; otherwise the data cannot be used by stakeholders. Farm level AMU data, when explained and communicated properly, is very useful for guiding the antimicrobial stewardship efforts.

a. Determine the target groups for reporting. Different types of reporting are required when communicating to 1) the individual farmer or veterinarians on their specific use, 2) the animal industry and 3) the broader (national) audience.
   - Individual farmers/vets should receive clear reports describing their use in comparison to a certain reference population if possible (see benchmarking above). Ideally the report should also provide an indication of the evolution of the use over time.
Future

• AACTING-consortium continues
  – Network for exchanging knowledge and experience ⇒ everybody is welcome!

• Updates of website and Annex

• Review

• 2nd International Conference
  “Quantification, Benchmarking and Stewardship of Veterinary Antimicrobial Usage”
**Conclusions**

- Clear need to learn and be informed about what is happening around the world
- First ever overview of existing DCS for farm-level AMU
- Website
- Guidelines
- Open for expansion
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THANK YOU FOR YOUR ATTENTION...

... QUESTIONS?