# Assigning defined daily/course doses for antimicrobials used in broiler production in Pakistan and comparing them with the European Medicines Agency values.

AACTING

Herd level antimicrobial consumption in animals
Collect | Analyze | Benchmark | Communicate

4th Conference, Vienna, Austria
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Qamer Mahmood
DVM, PhD candidate
Ghent University, Belgium

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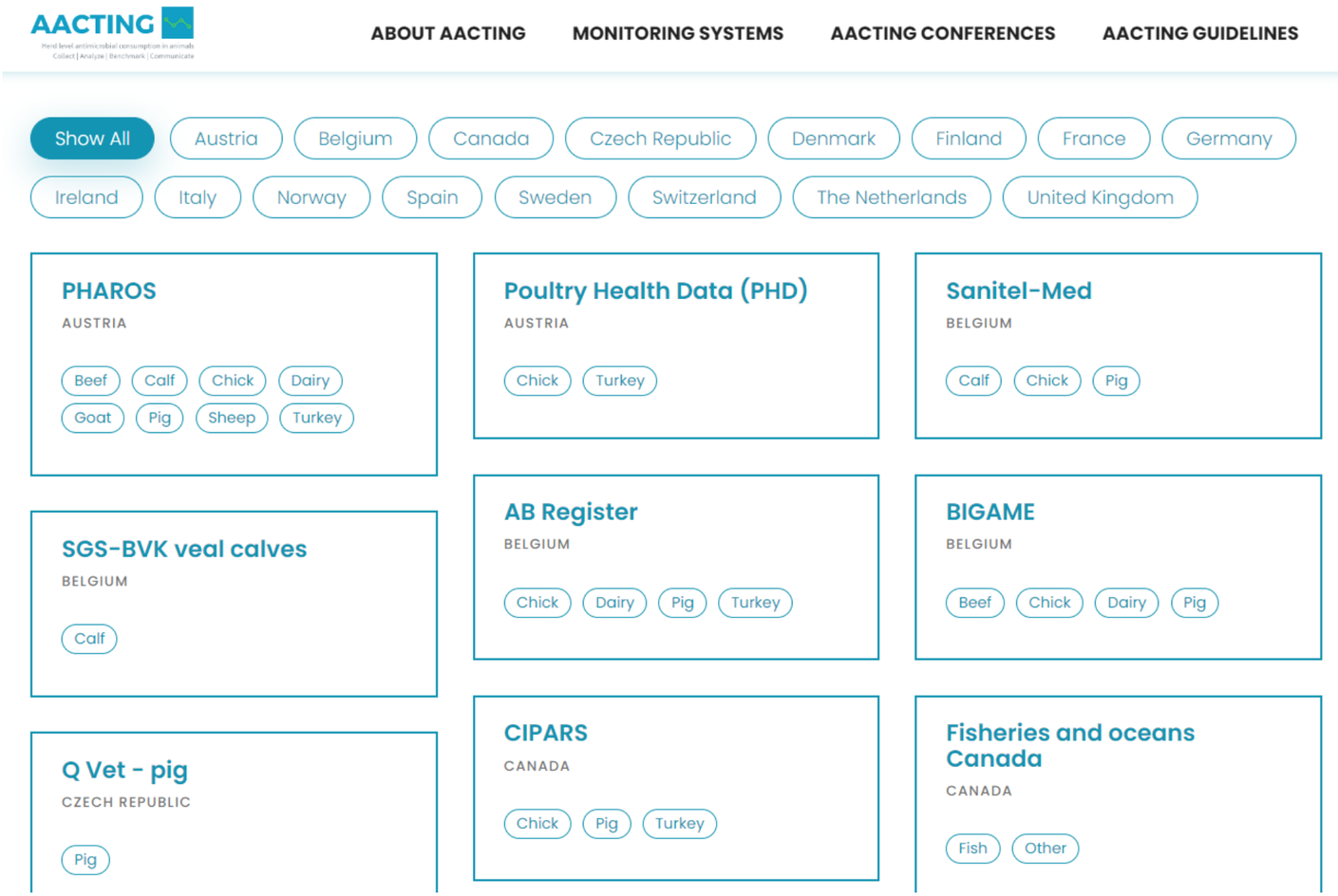
# AMU monitoring at farm level

- Substantial AMU reduction in high income countries
- No comparable monitoring system exist in LMICs

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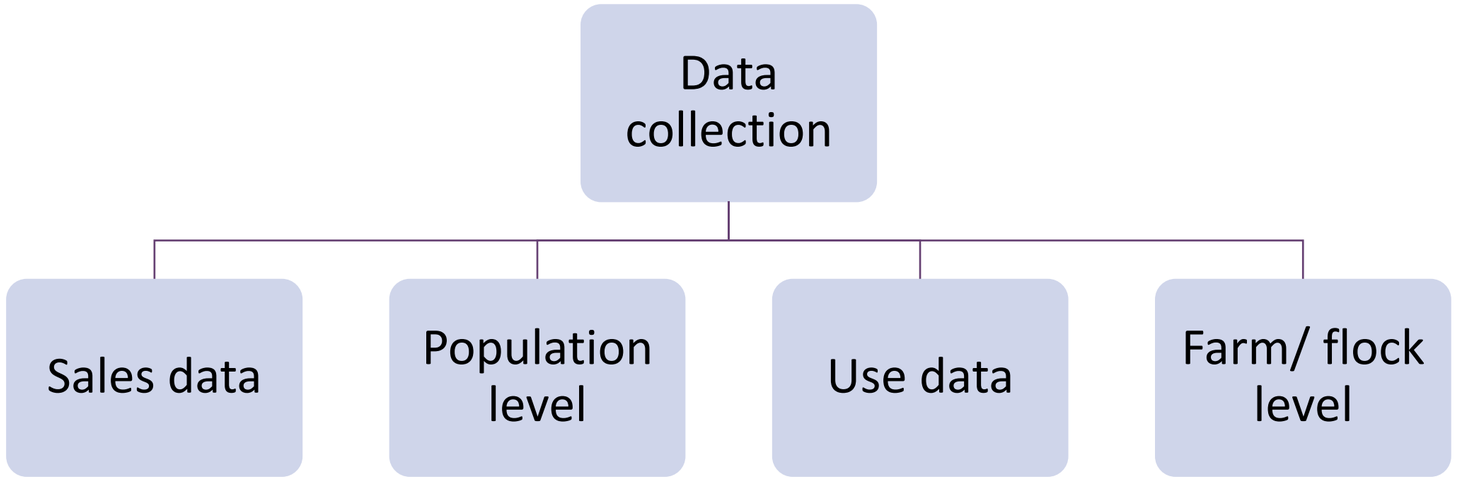
AACTING, 2021

# AMU quantification

- Weight-based indicators
  - mg/PCU
  - Limitations?
- Dose-based indicators
  - DDD, DCD
  - Why dose-based indiocators?
- Treatment Incidence (TI)?

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Sanders et al., 2020

# Treatment Incidence

$$TI = \frac{\text{Total amount of active substance administered (mg)}}{\text{Dose (mg/kg)} \times \text{number of days at risk} \times \text{kg of animal at risk}} \times 100 \text{ AAR}$$

**Defined daily dose ($DDD_{vet}$)**

**Defined course dose ($DCD_{vet}$)**

**ESVAC**

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Joosten et al. 2019

# Defined doses

- **DDD**: average dose of a drug for its main indication **per day** per kg of animal

- **DCD**: average dose of a drug for its main indication **per treatment course** per kg of animal

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European Medicines Agency, 2016

# Objective

- To establish **DDD$_{vet\ pk}$** and **DCD$_{vet\ pk}$** for broilers
- To enable farm-level quantification and comparison of AMU across Pakistan



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# Data collection

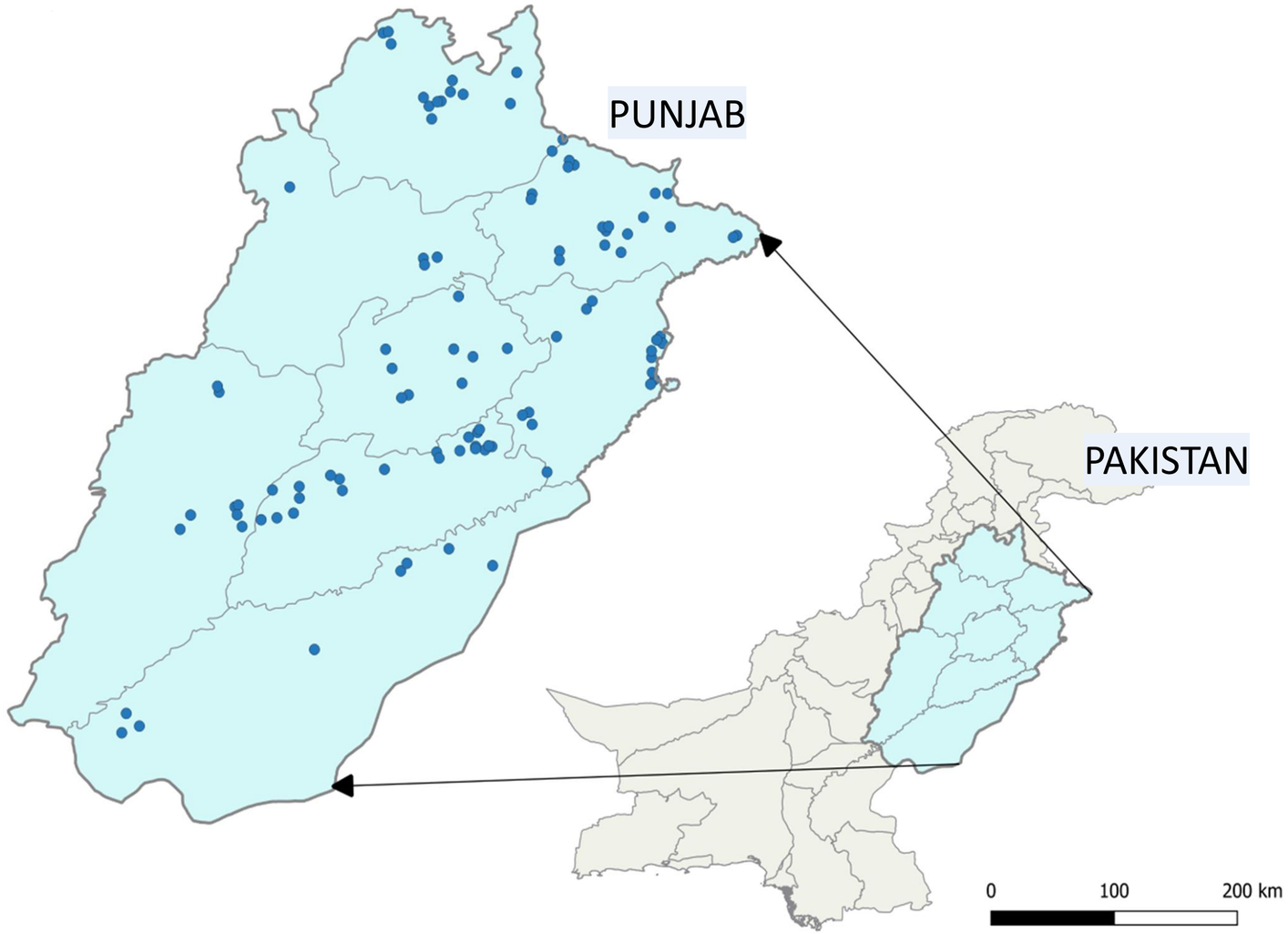
Punjab, Pakistan

100 broiler farms

Whole production cycle

Farm record registers

SPCs

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# Assigning $DDD_{vet\ pk}$ and $DCD_{vet\ pk}$

- Active moiety
- Dosage in mg/kg
- Standard feed & water
- Synergestic effect

**Standardization**

**$DDD_{vet\ pk}$**

Mean recommended dose for all similar active substances with same route

Mean recommended dose × mean treatment duration

**$DCD_{vet\ pk}$**

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European Medicines Agency, 2015

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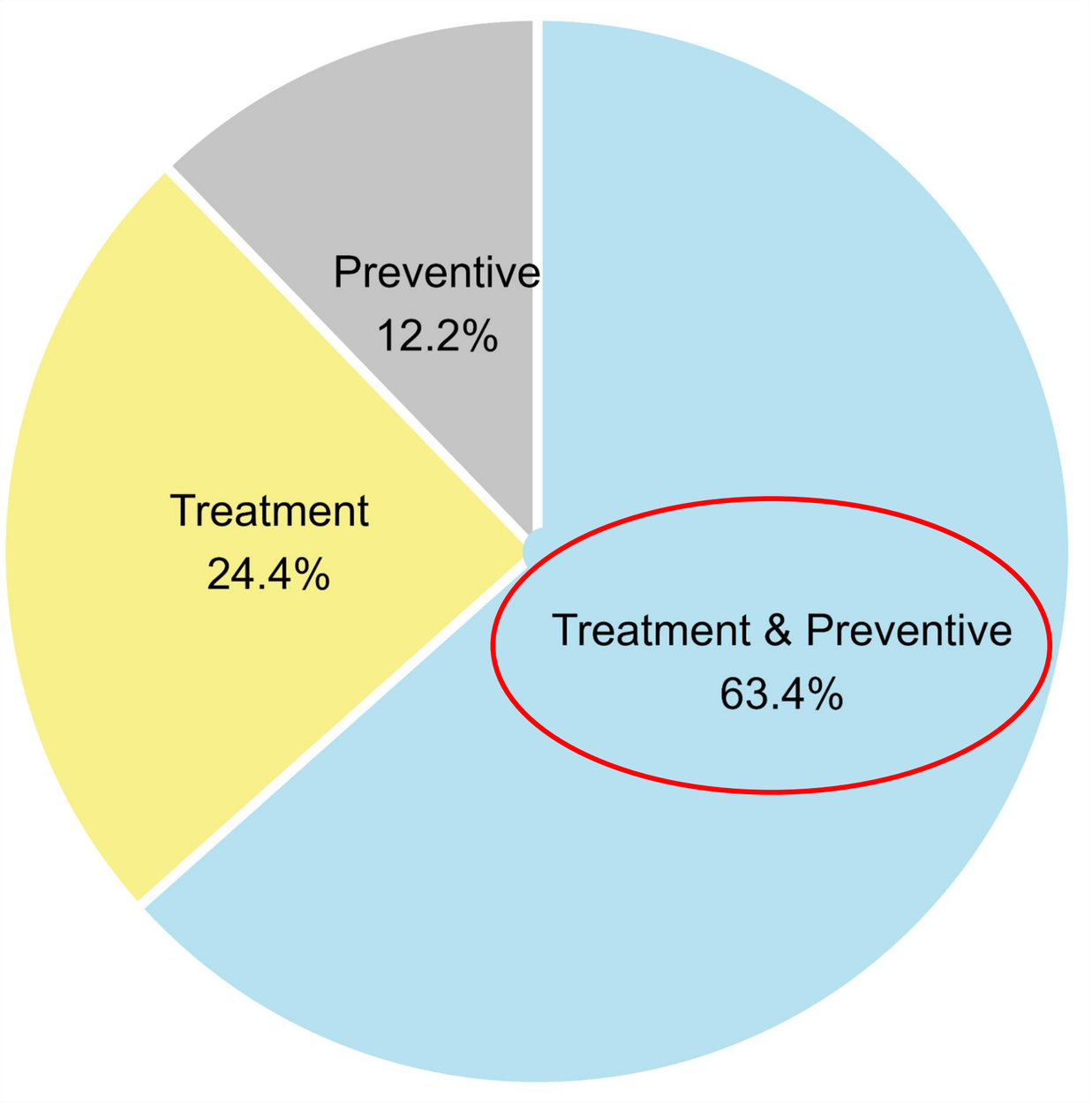
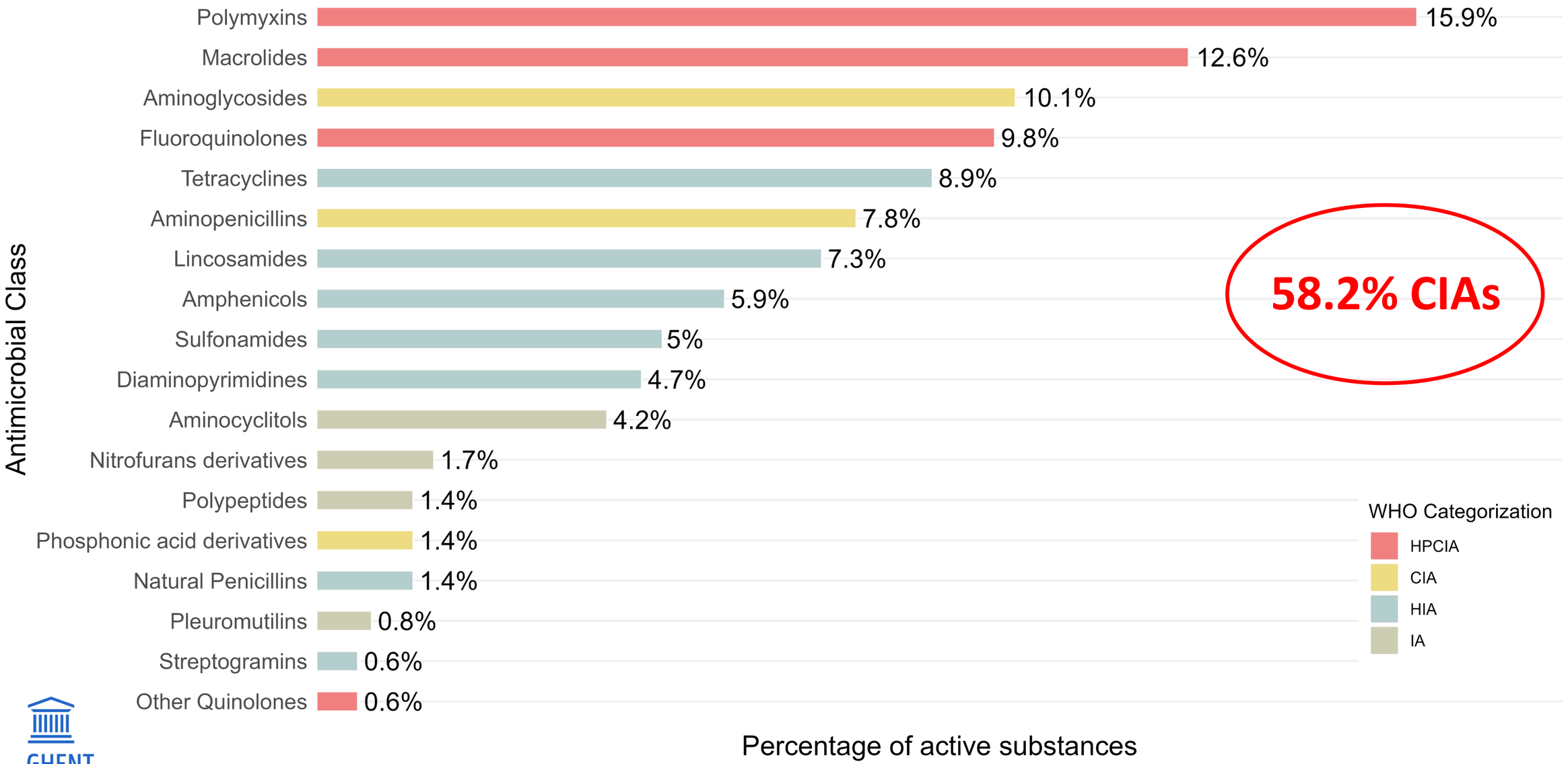
# Recommended doses in SPCs




**DDD for preventive antimicrobials?**

- $DDD_{vet\ pk}$ treatment for 88% (36/41) active substances
- $DDD_{vet\ pk}$ preventive for 76% (31/41) active substances

# Choice of active substances

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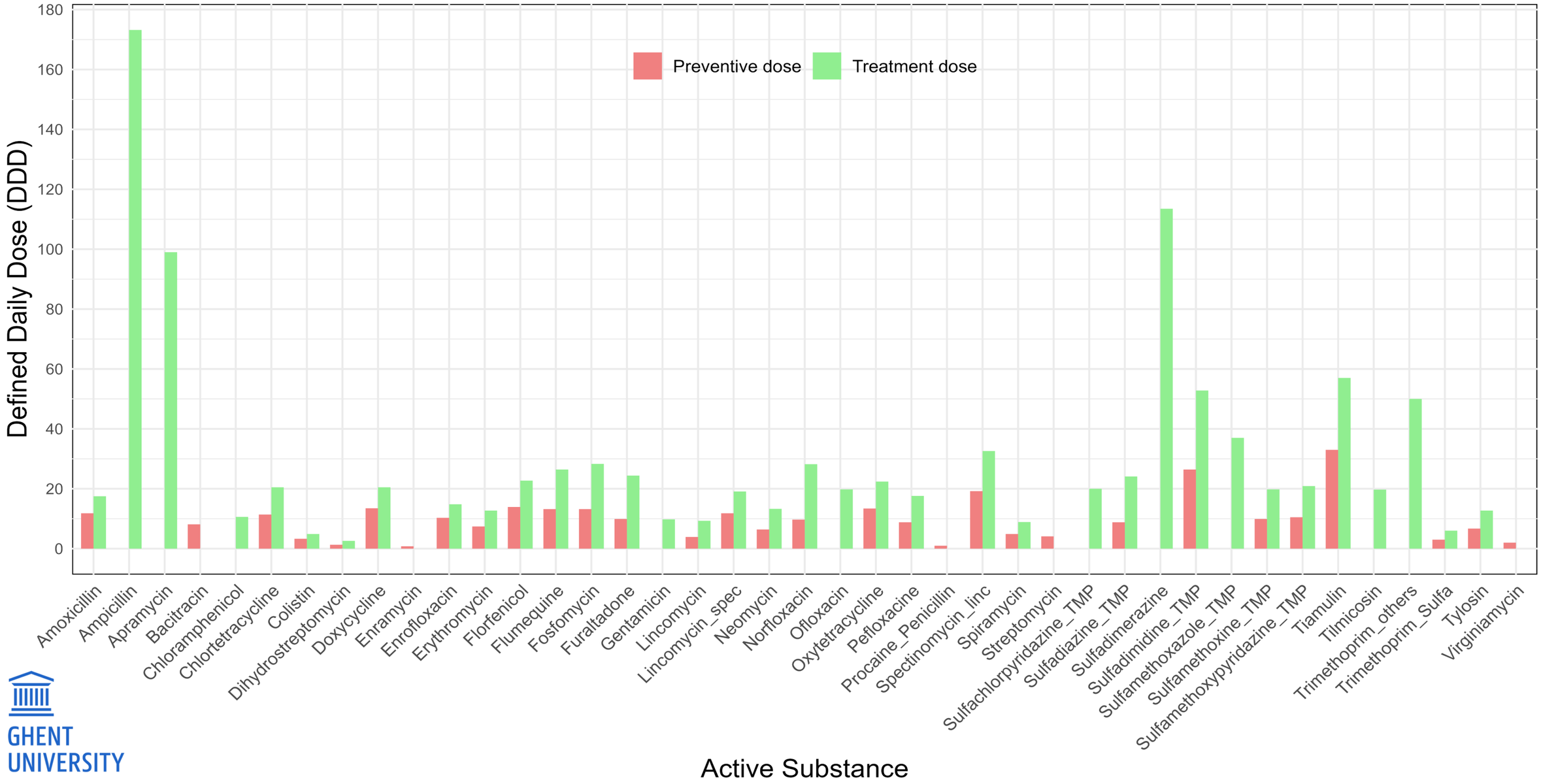
CIAs for human medicine, WHO, 2019

# Defined daily doses

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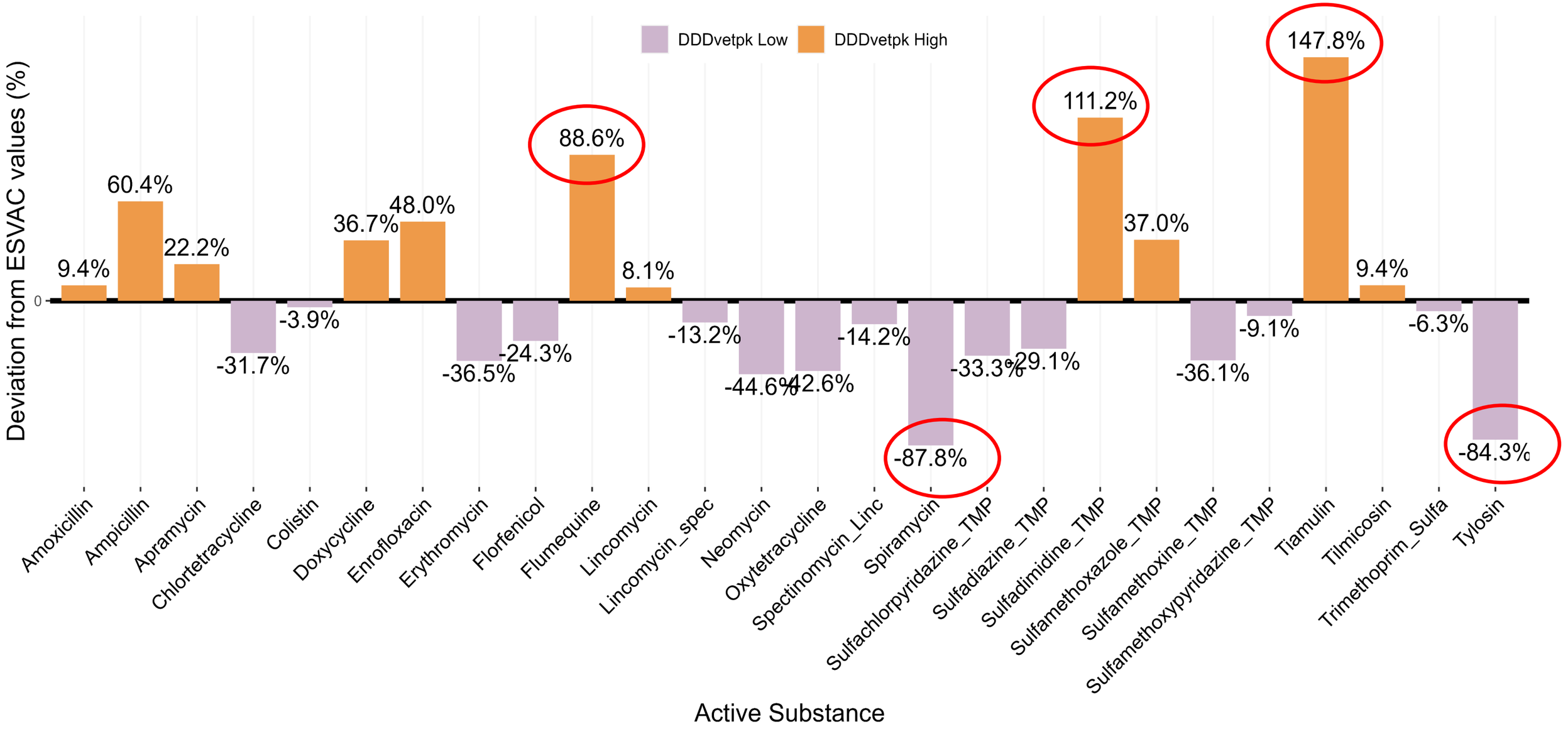
# Comparison with ESVAC DDDvet values



# Comparison with ESVAC DDDvet values

- Possible reasons for difference between Pakistani and EMA doses?

- What is the correct dose?

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# Key findings

- $DDD_{vet\ pk}$ & $DCD_{vet\ pk}$ list for Pakistan
- Difference with ESVAC values
- Alarming choice of AM classes (HPCIA>IA)
- **AGPs** in addition to treatment and preventive use
- **Variation in recommended doses** (AMX 4-26mg/kg, CTC, 7-32mg/kg, etc.)
- **Inconsistencies in units** (only 11 % in mg/kg, g/L, ml/L, g/ton, g/kg, kg/ton, IU/kg, ml/gallon, etc.)
- **AS compositions** (12 various units: mg/g, g/ml, g/kg, mg/ml, IU/g, MIU, g/L etc.)

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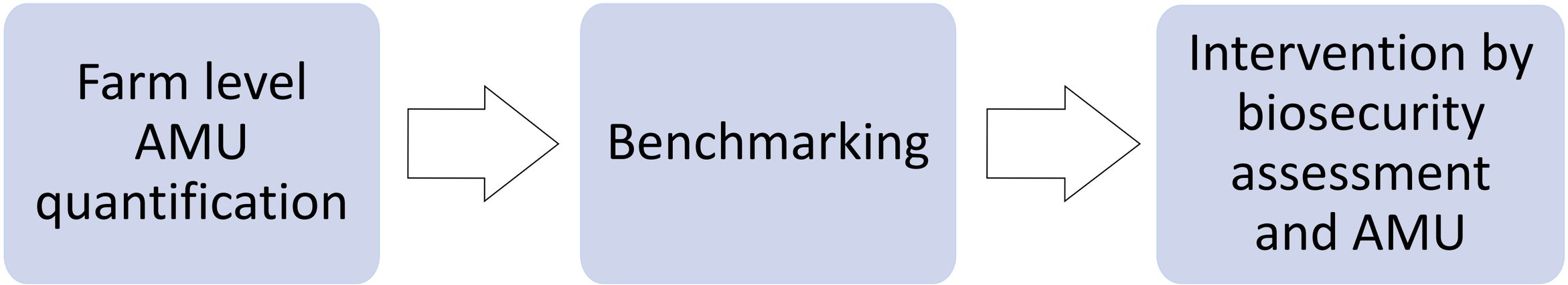
# Next steps

What we plan to do further?

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# Next steps

What **policymakers** can do?

List of authorized veterinary antimicrobials in Pakistan

Establish SPCs and improve drug standardization procedures

Restrict/ phase out CIAs and AGPs

National-level DDD list

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# Thank you for your attention!

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# Acknowledgements


Veterinary Epidemiology Unit

Dept. of Internal medicine, Reproduction & Population Medicine

**Ghent university, Belgium**

Email: Qamer.mahmood@ugent.be


Qamer Mahmood

Ph.D. candidate

Prof. Ilias Chantziaras

Co-promotor

Prof. Jeroen Dewulf

Promotor/ Team head

**LinkedIn >**

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