AMURAP

Antimicrobial Use and Resistance in Animal Production

Antimicrobial use in medicated feeds on Irish pig farms in 2016: quantitative data and the consequences of using different treatment indicators

AACTING International Conference
27th February 2018

Presented by Lorcan O'Neill MVB

UCD DUBLIN

eagasc
Agriculture and Food Development Authority

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

AMURAP 2017 - 2020

AntiMicrobial Use and Resistance in Animal Production

Dr James Gibbons (UCD)
Principle Investigator

Poultry

Dr Edgar Garcia Manzanilla
(Teagasc)

Pig

Assoc. Prof. Nola Leonard (UCD)

Antimicrobial Resistance

Project Objectives

- antimicrobial use
- antimicrobial resistance
- economic consequences of AMU and disease

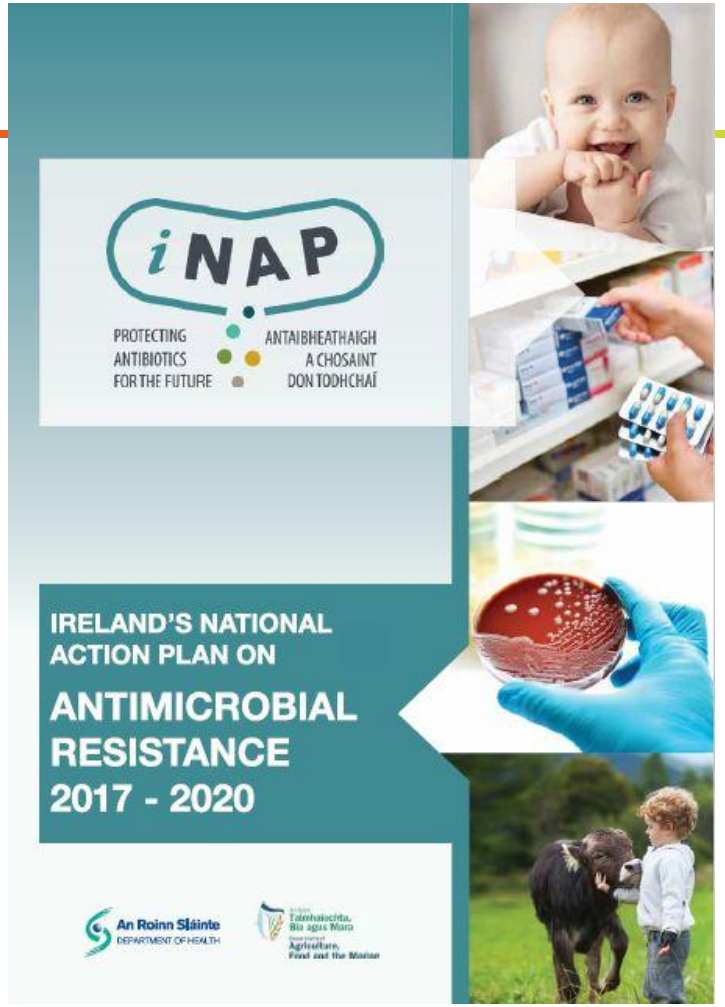
UCD DUBLIN

teagasc
Agriculture and Food Development Authority

AMURAP 2017 - 2020

Commissioned by the Department of Agriculture Food and the Marine (DAFM)

- responsible for implementation of AMU monitoring system
- priority: pigs & poultry (2018)
- AMURAP reports to DAFM are aiding in development of database



UCD DUBLIN

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

eagasc
Agriculture and Food Development Authority

Study Objectives

Antimicrobial use in medicated feeds

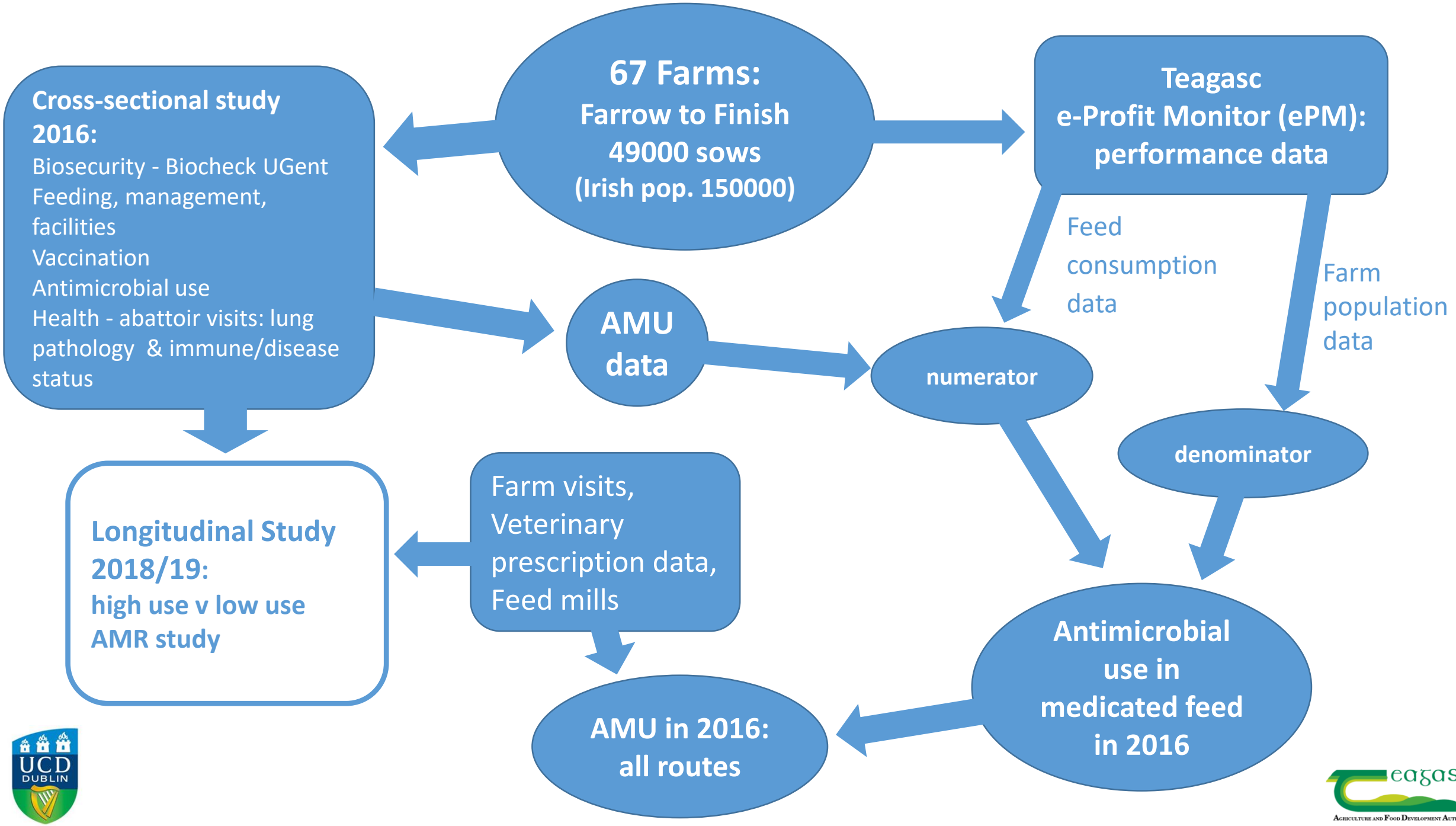
- quantities used
- patterns of use

Determine the effect of different indicators on the interpretation of AMU data

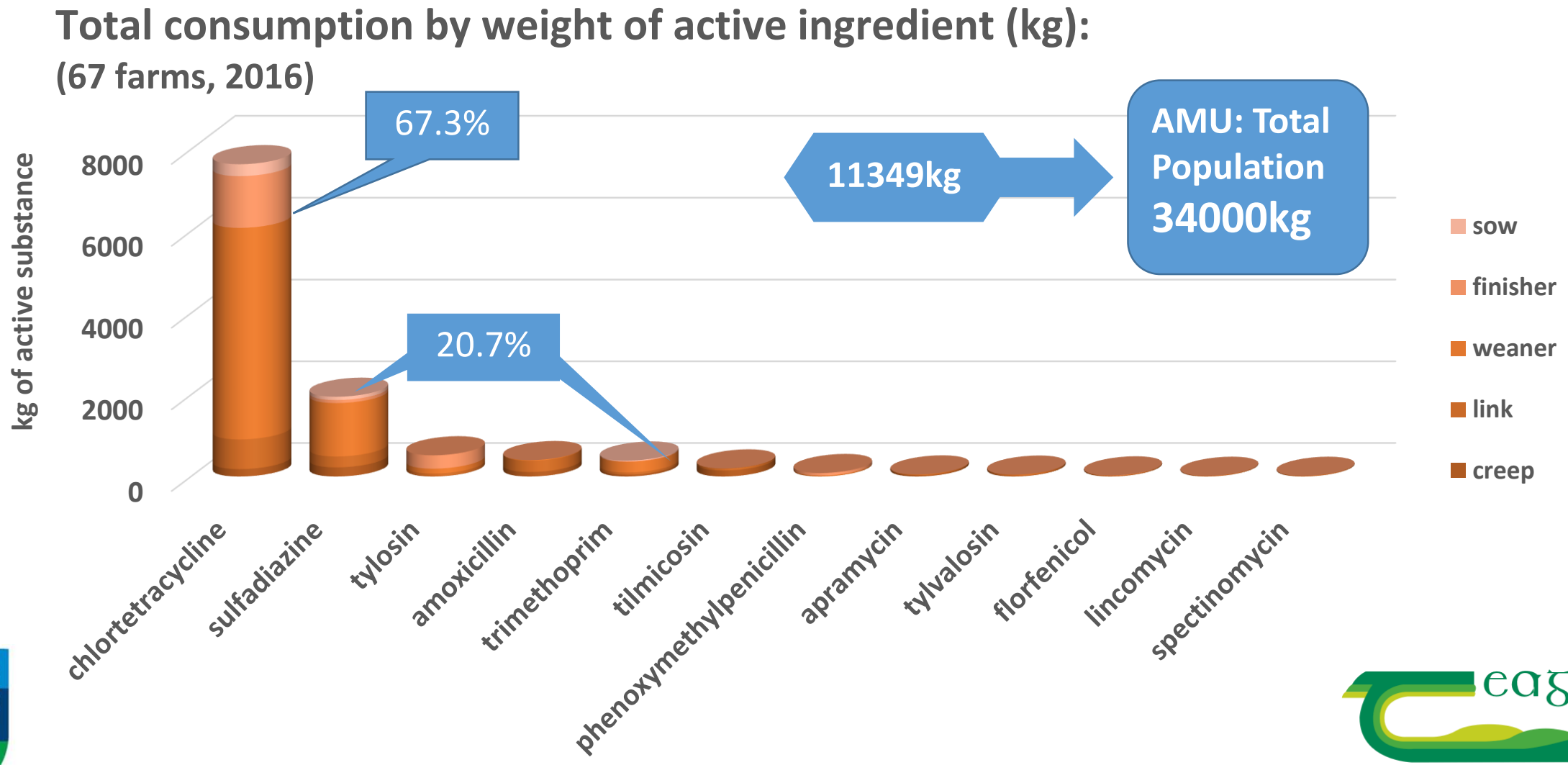
- does it affect the benchmark?

UCD DUBLIN

eagasc
Agriculture and Food Development Authority


67 Farms:
Farrow to Finish
49000 sows
(Irish pop. 150000)
Cross-sectional study 2016:
Biosecurity - Biocheck UGent
Feeding, management, facilities
Vaccination
Antimicrobial use
Health - abattoir visits: lung pathology & immune/disease status
Teagasc e-Profit Monitor (ePM): performance data
Feed consumption data
Farm population data
AMU data
numerator
denominator
Longitudinal Study 2018/19:
high use v low use AMR study
Farm visits, Veterinary prescription data, Feed mills
AMU in 2016: all routes
Antimicrobial use in medicated feed in 2016

Antimicrobial Consumption in Medicated Feed



UCD DUBLIN

eagasc
Agriculture and Food Development Authority

Patterns of Use

CREEP:
7 - 14 days p.w. (+/- nursery)

77.6% of farms

LINK:
7 - 14 days

76.1% of farms

WEANER:
4 - 6 weeks

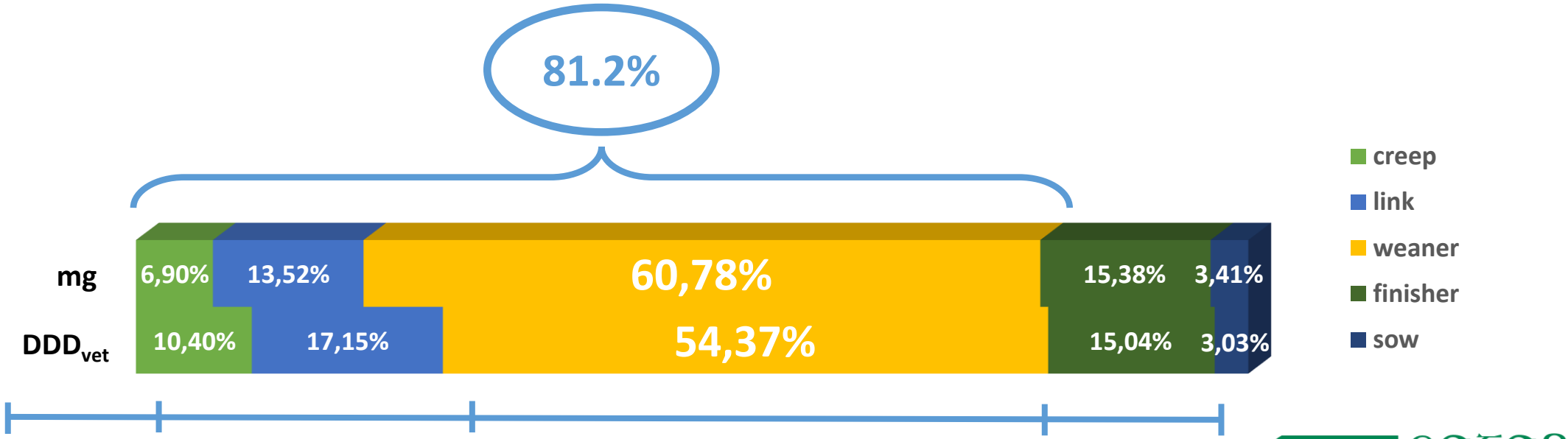
53.7% of farms

FINISHER:
10 - 12 weeks

19.4% of farms

SOW:
Medicated feed provided for 5 - 10 days once or twice per year.
20.9% of farms

10.4% of farms did not use medicated diets



UCD DUBLIN

eagasc
Agriculture and Food Development Authority

Benchmarking: Comparison of Indicators

Several options exist!

Which is best??

$$\text{indicator} = \frac{\text{numerator}}{\text{denominator}}$$

4 numerators and 3 denominators were applied to the data

UCD DUBLIN

teagasc

Agriculture and Food Development Authority

Numerators

Milligram of active ingredient

Defined Daily Doses

- DDD_{vet} - as defined by ESVAC (EMA 2016)
- DDD_{irl} - defined for each active ingredient; derived from SPC documents for antimicrobial oral premix products in Ireland
- DDD_{irl_comb} - as per DDD_{irl} but combination products treated as 1 dose

Tylosin

DDD_{vet} = 12mg/kg

DDD_{irl} = 4.5mg/kg

(1 DDD_{vet} = 2.7 DDD_{irl})

Trimethoprim sulfadiazine

DDD_{vet} = 2 doses

DDD_{irl_comb} = 1 dose

DDD_{irl} - and DDD_{irl_comb} were defined for this project only!

UCD DUBLIN

eagasc

Agriculture and Food Development Authority

Denominators

Population Correction Unit - as defined by ESVAC (EMA 2011)

- requires movement data (available for the sample)

Kg liveweight sold - slaughter weight of finisher pigs and culled sows

- understood by the farmer
- may be a suitable way to communicate AMU to the farmer

Average weight of biomass present

- census data for the farm
- weights for each stage as proposed by ESVAC (EMA 2013)
- indicators using this denominator were expressed per ‘kg animal year’

UCD DUBLIN

eagasc
AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

Antimicrobial consumption in medicated feeds expressed using the 12 indicators

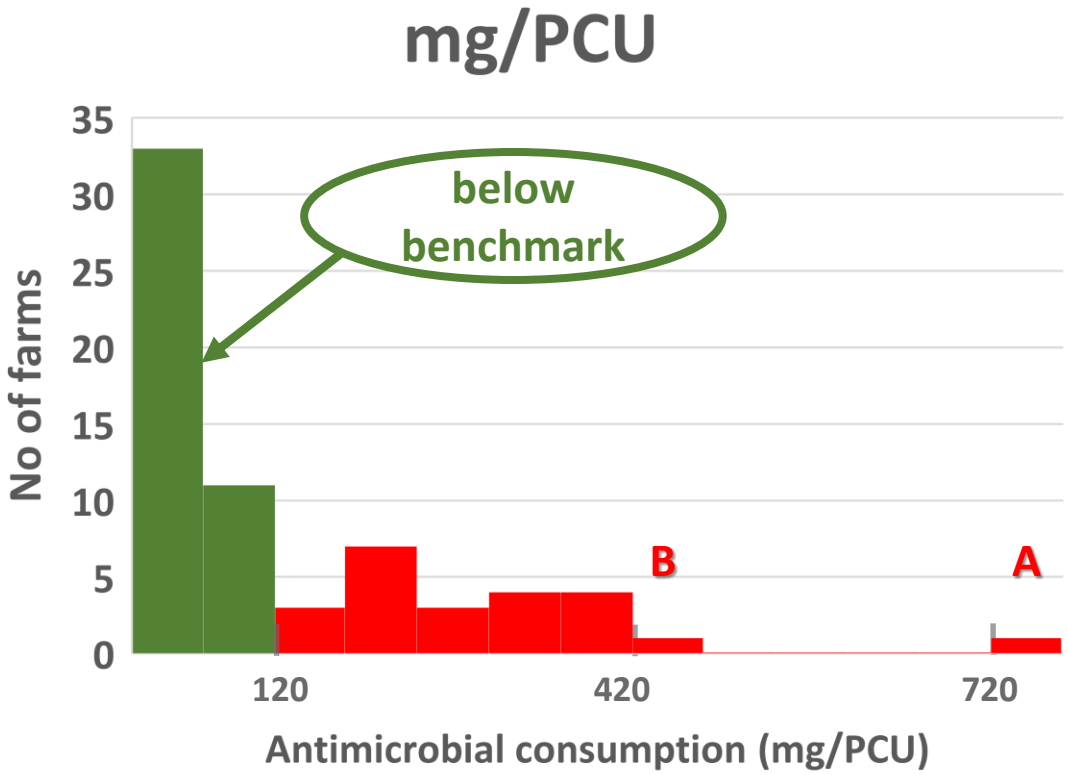
	NUMERATOR			
DENOMINATOR	**mg**	**DDD_{vet}**	**DDD_{irl}**	**DDD_{irl_comb}**
Population Correction Unit (PCU)	123.7 (34.3%*)	6.2 (32.8%)	9.5 (29.9%)	8.2 (31.3%)
Liveweight sold (kg)	85.1 (37.3%)	4.3 (32.8%)	6.6 (29.9%)	5.7 (31.3%)
Average weight of biomass (kg)	422.0 (31.3%)	21.4 (32.8%)	32.1 (29.9%)	27.4 (31.3%)

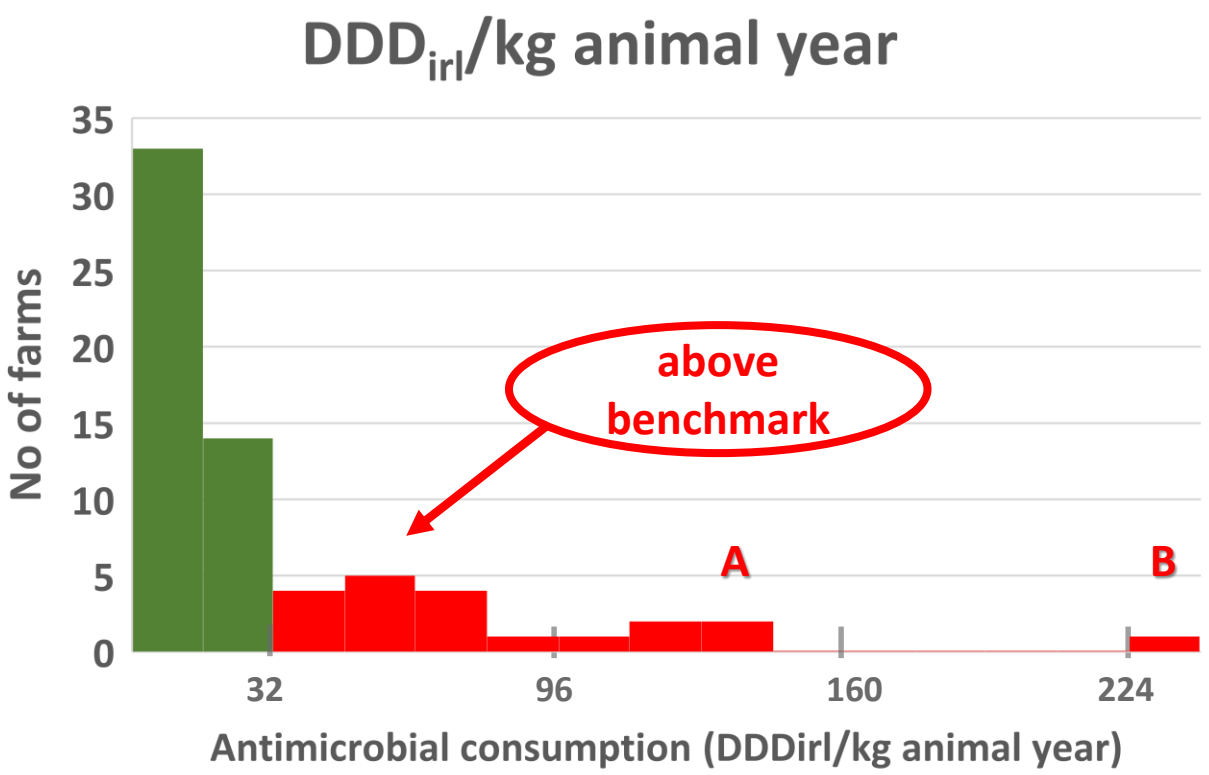
UCD DUBLIN

*Benchmark set at mean value (figure in parenthesis represents number of farms above benchmark)

eagasc
Agriculture and Food Development Authority

Distribution Patterns





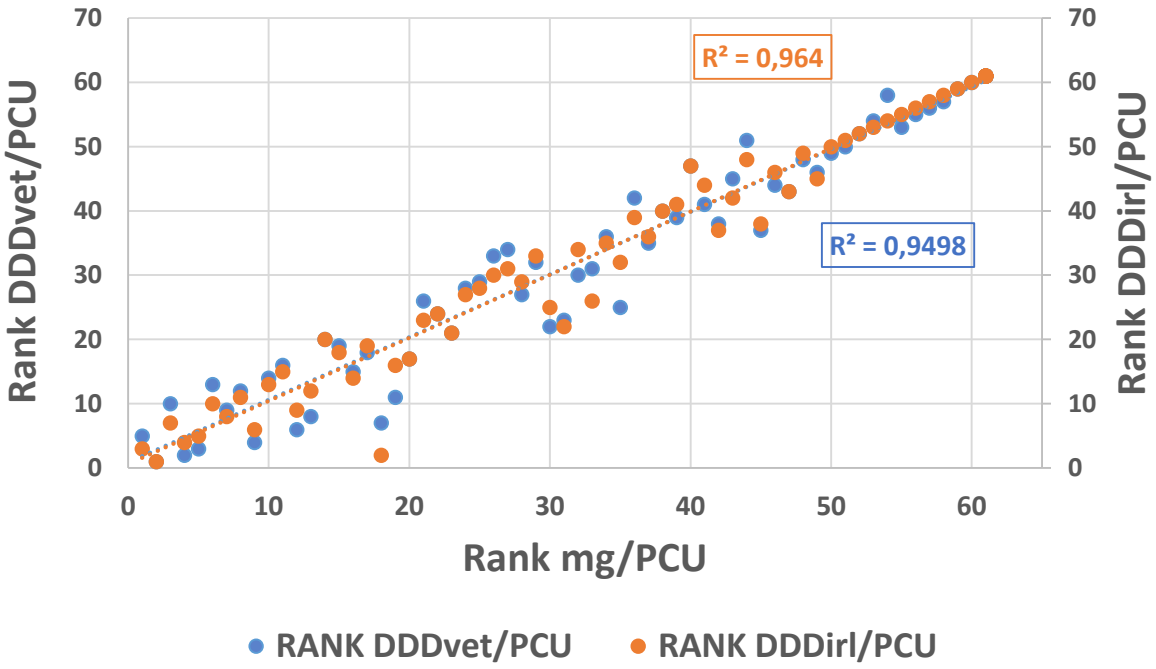
8 farms (11.9%) were above the benchmark for some indicators but not for others
19 farms (28.4%) were above the benchmark for all 12 indicators

UCD DUBLIN

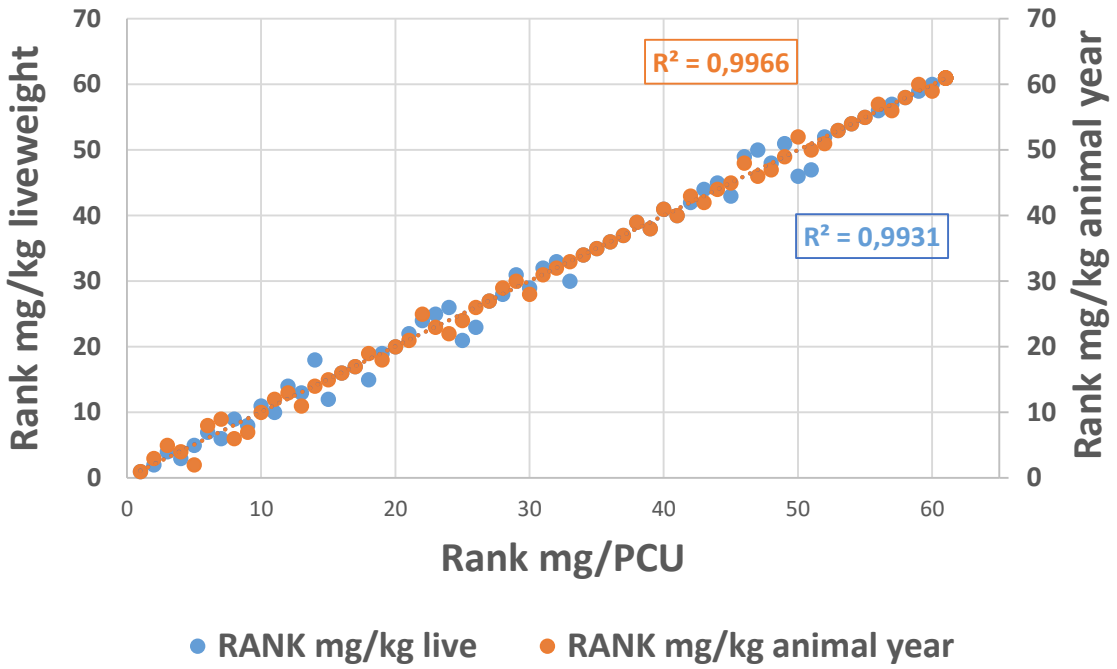
teagasc
Agriculture and Food Development Authority

Effect of Indicator on Farm Ranking

Comparison of Ranks for DDDvet/PCU and DDDirl/PCU vs mg/PCU



Comparison of Ranks for mg/kg liveweight and mg/kg animal year vs mg/PCU



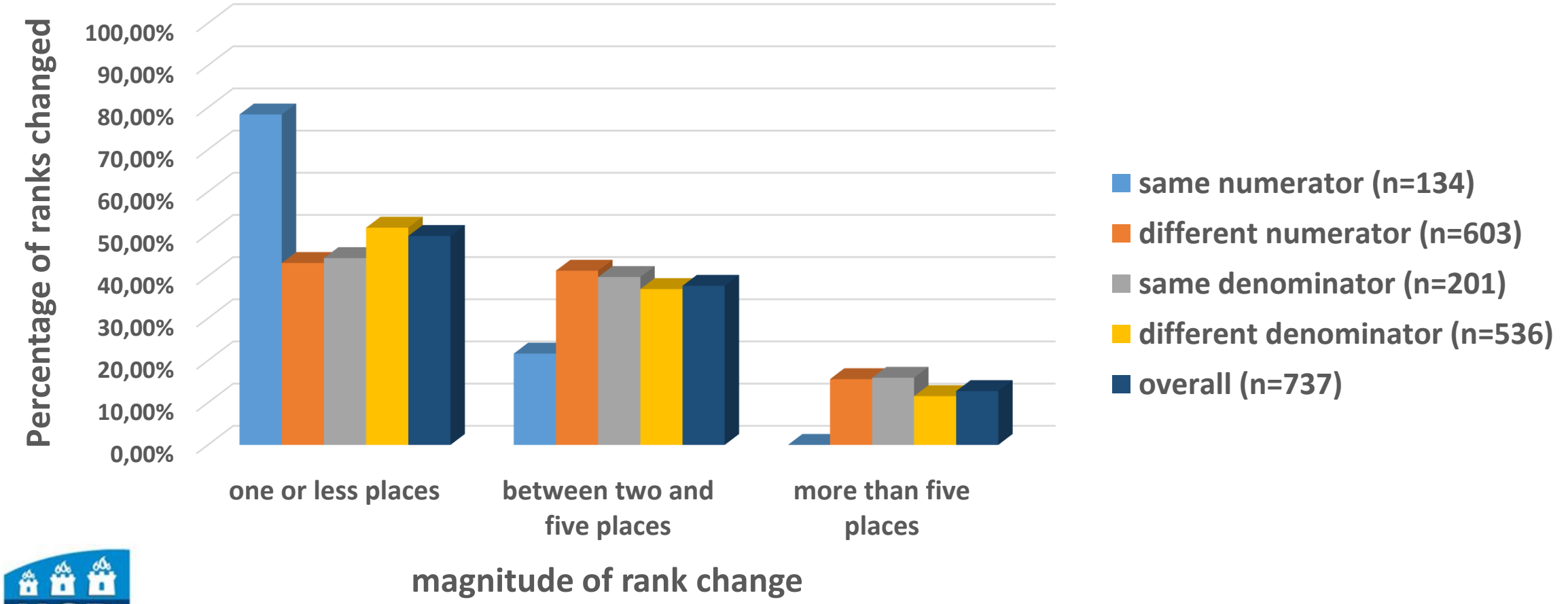
Change of numerator:
greater variability in rankings across indicators

Change of denominator:
less variability in rankings across indicators

UCD DUBLIN

teagasc
Agriculture and Food Development Authority

Comparsion of farm rankings in each indicator compared to rank in mg/PCU



UCD DUBLIN

teagasc
Agriculture and Food Development Authority

Conclusions

- Consumption of antimicrobials in medicated feed in Ireland
  - sample = 11.3 tonnes => population ~ 34 tonnes
  - 81.2% administered to pigs under 13 weeks of age; 60.1% in weaner diet
- Using different indicators to benchmark AMU
  - numerator had more influence on the effect of indicator
  - observed effect at population level was small
  - important changes were observed for particular farms
  - particular systems may promote certain AMU practices or disadvantage others
  - consider using separate indicators for internal and external benchmarking
- Primary objective of monitoring AMU is to **reduce AMR**
  - in ideal world, this would guide correct choice of indicator

UCD DUBLIN

eagasc
Agriculture and Food Development Authority

Thank You!

Acknowledgements:

Project is funded by Department of Agriculture Food and the Marine

Grant ref. number: 15 S 676

UCD DUBLIN

eagasc

Agriculture and Food Development Authority