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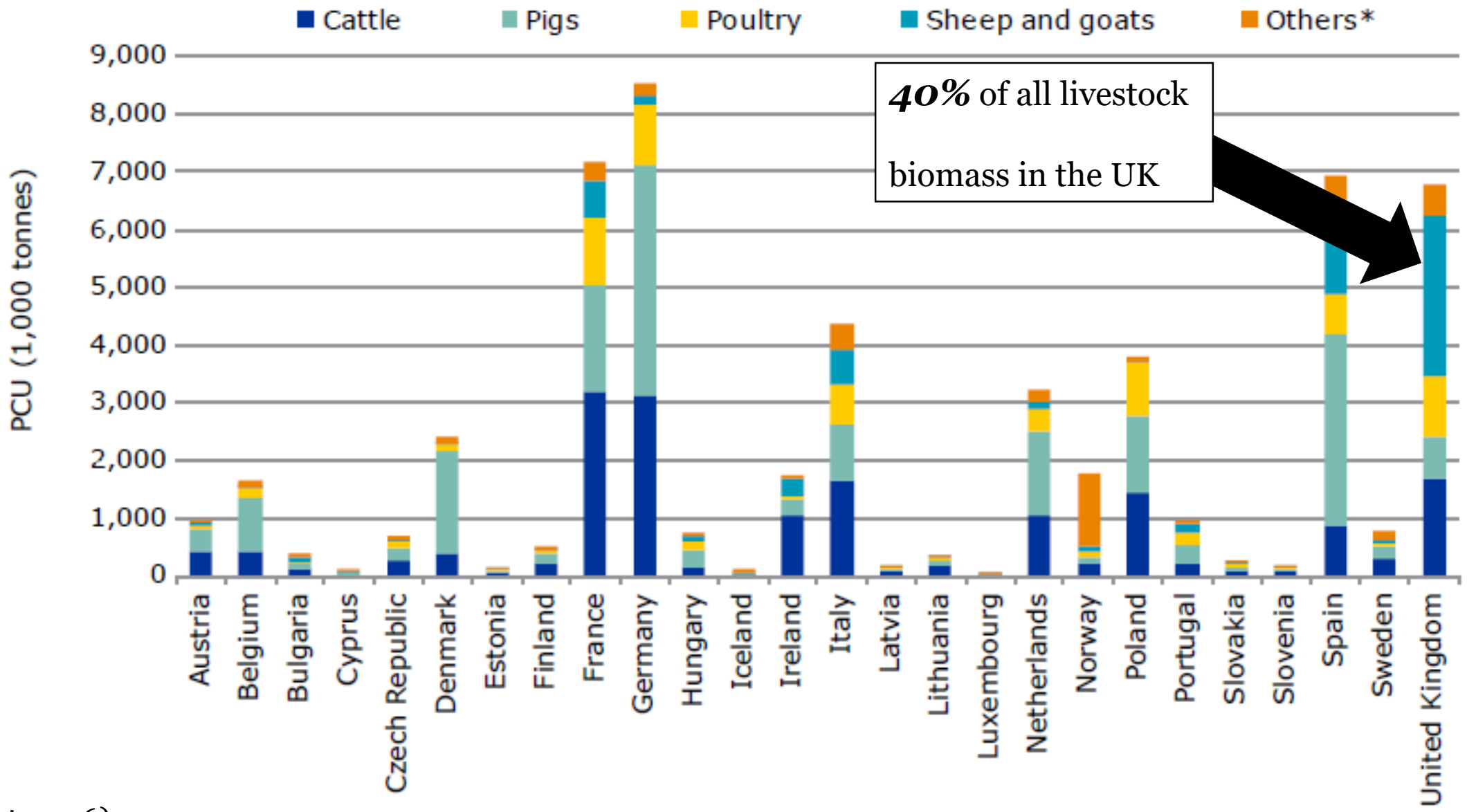
Antibiotic usage in the British sheep industry

Dr Peers Davies

Figure 2. The denominator (PCU) and its distribution by the food-producing animal species, including horses, (PCU = 1 kg), by country, for 2013



(ESVAC report 2016)

Current Estimates and Data Sources

- No published, quantitative estimates of antimicrobial usage in sheep
- Farmer completed usage surveys are prone to bias
- Statutory farmer recorded medicine usage perceived to be variable and incomplete
- Veterinary Practice prescribing records represent the most reliable, complete estimate (max) of antimicrobial usage

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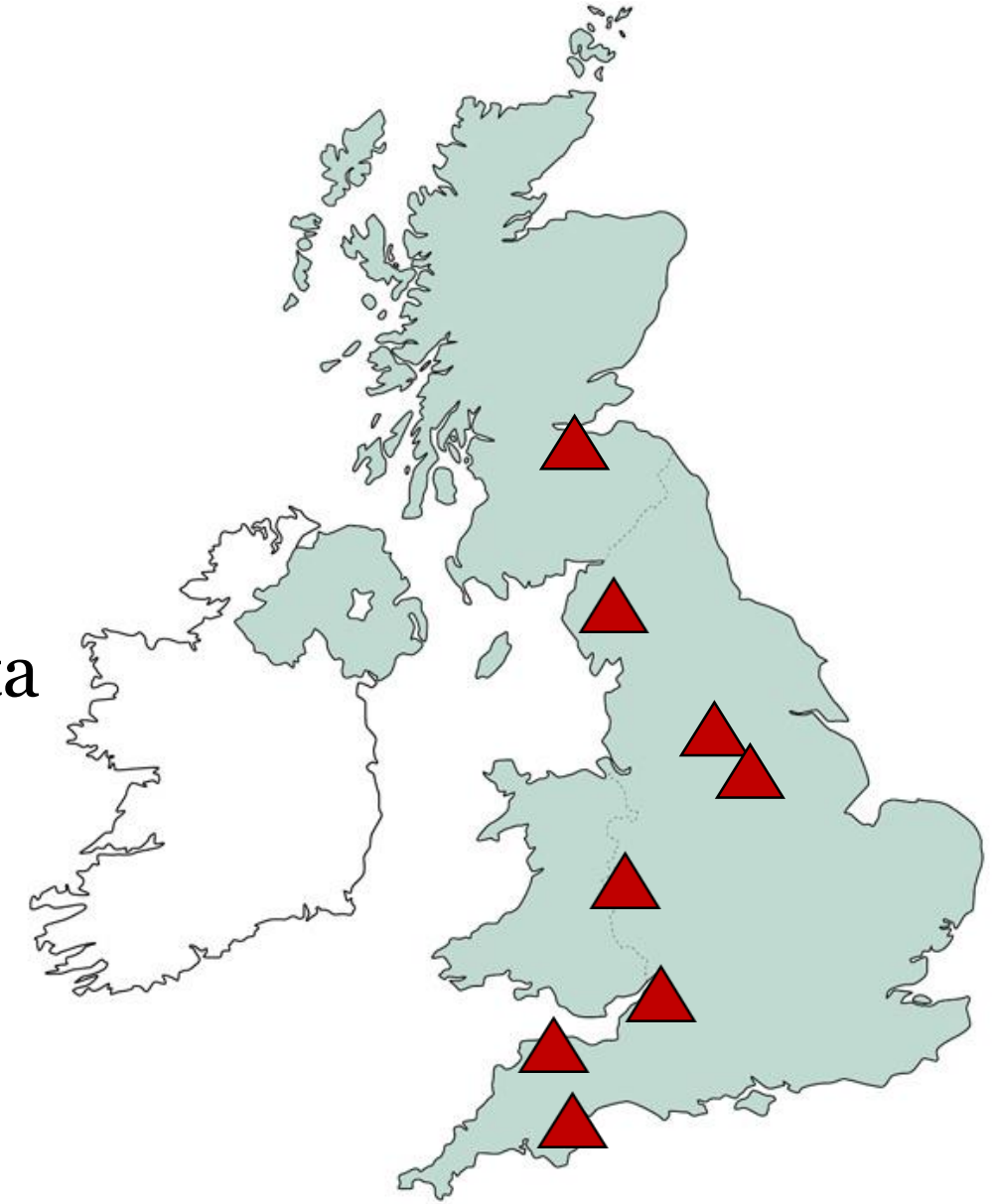
Methodology

- Antibiotic prescription data for veterinary practices
- Wide geographical distribution
- Compatible medicine prescribing/sales data base
- Currently recorded or ability to collect key farm/flock level information



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Flock inclusion criteria

- Minimum flock size 100 ewes
- No other farmed livestock on the farm
- All prescriptions/purchases for the same 12 month reference period
  (July 2015 to July 2016)

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Flock level variables

- Breeding flock size in reference period
- Number of store lambs purchased
- Flock Stratification (Hill, Upland, Lowland)
- Management system (Organic / Conventional)

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Antimicrobial Usage Metrics

- mg/Population Corrected Unit – (ESVAC)
- mg/Population Corrected Unit – (UK – hill corrected)
- DDD and UDD
- DCD_{LAMB}

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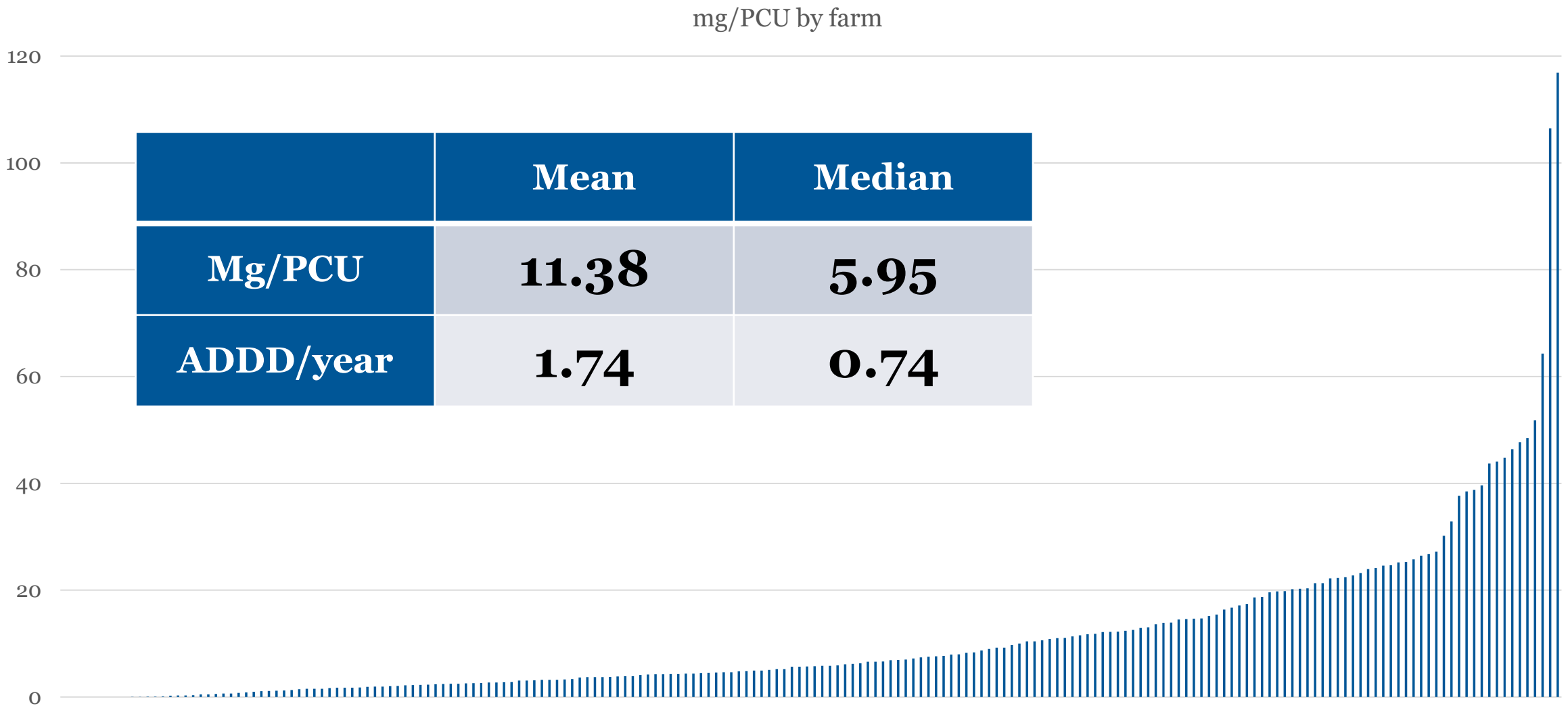
Results

	Mean	Median
Mg/PCU	11.38	5.95
ADDD/year	1.74	0.74



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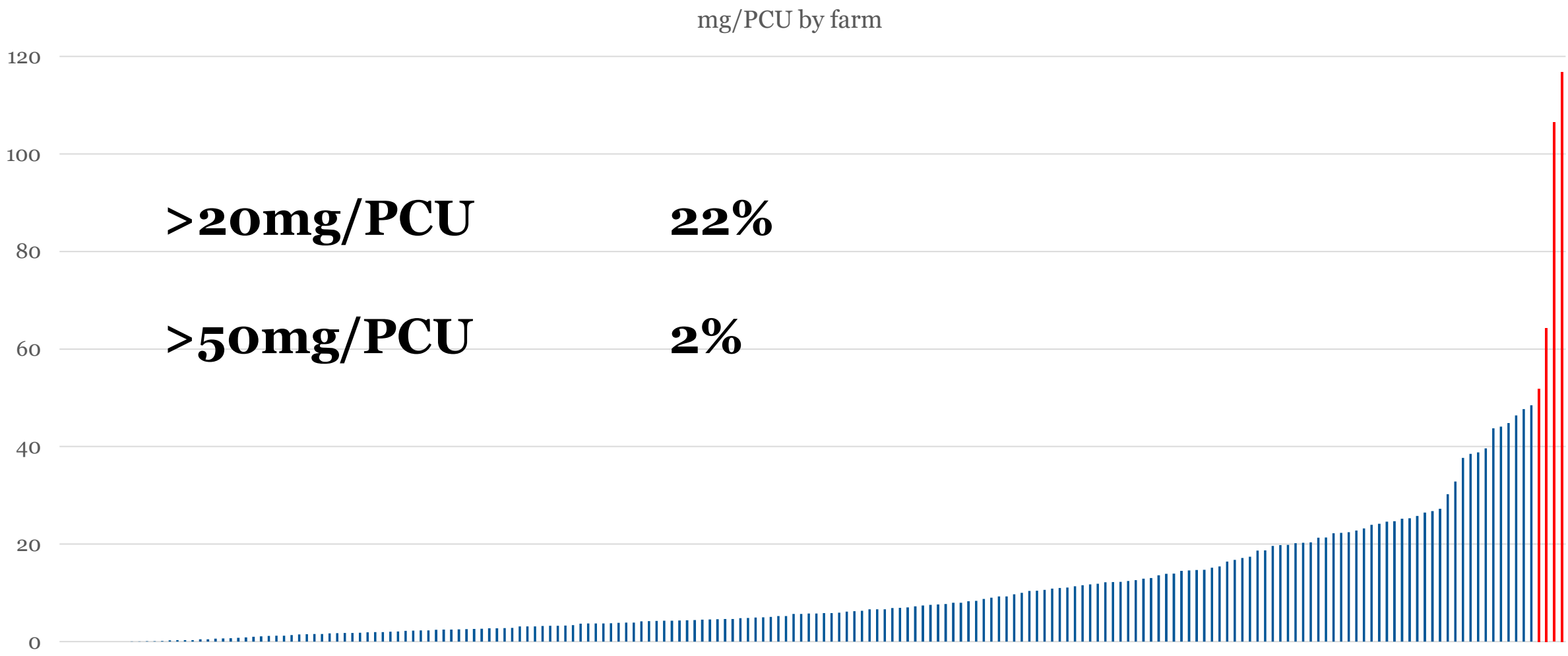
Results



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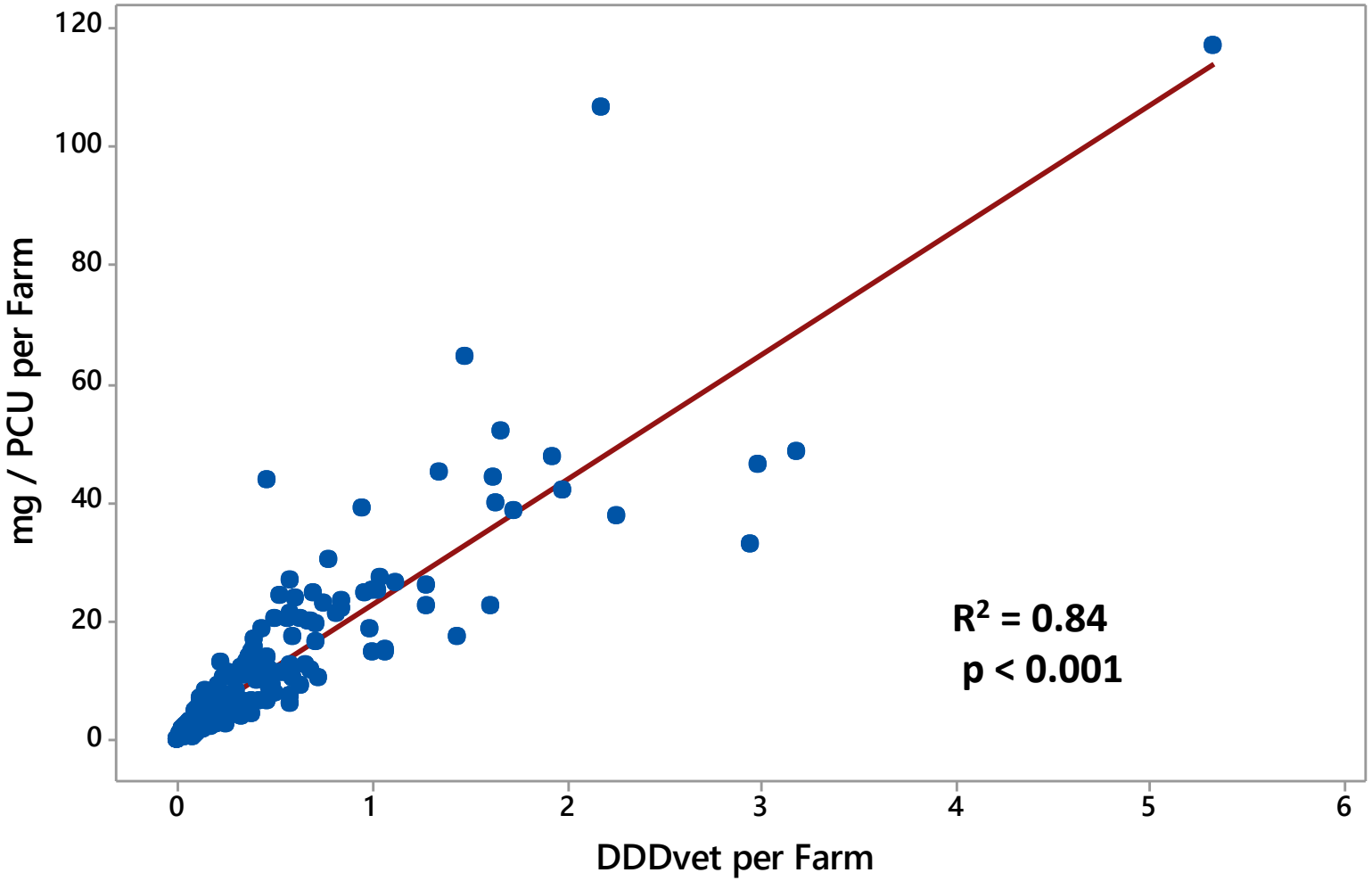
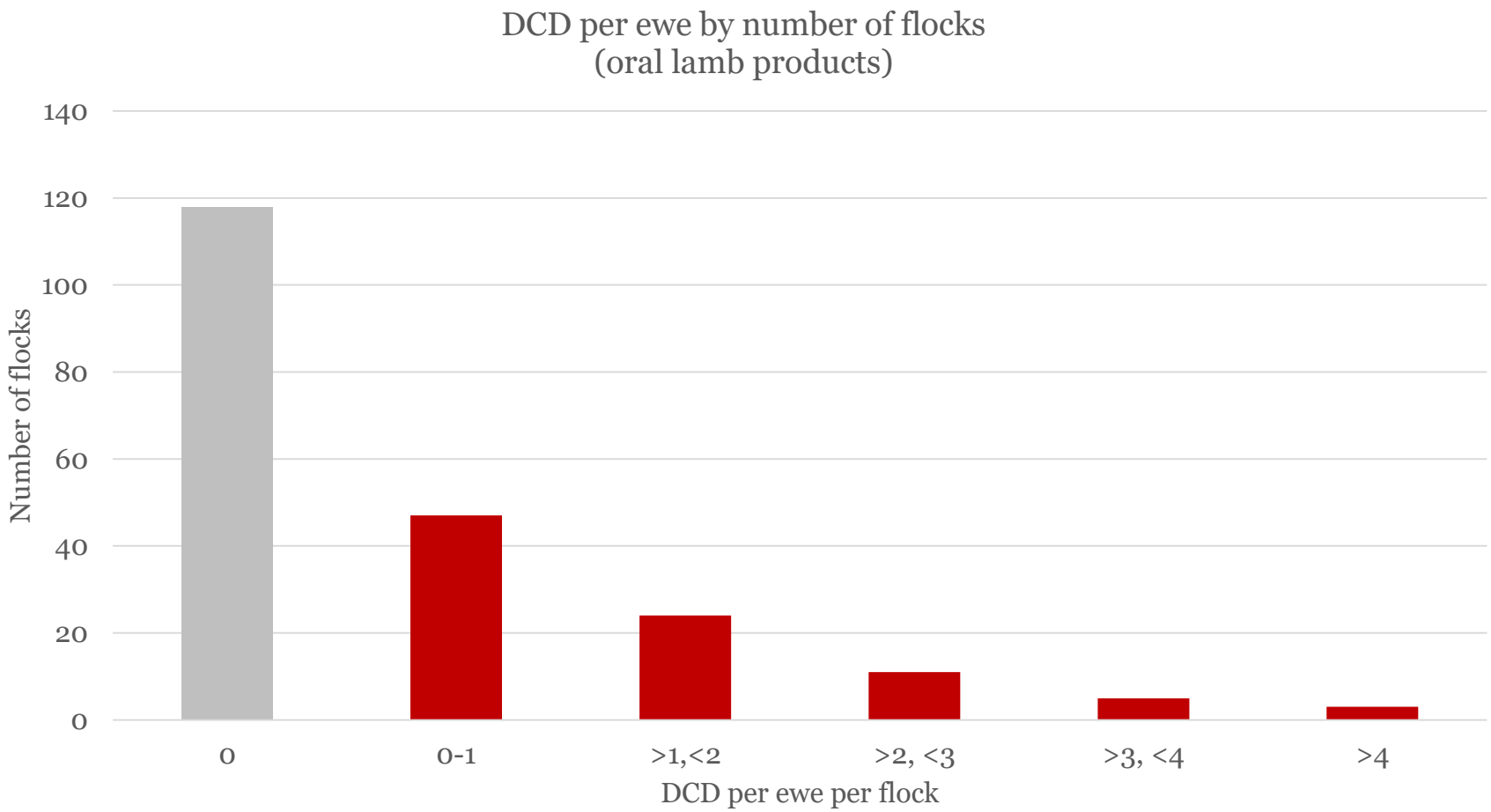
Metrics of usage per farm mg/PCU vs DDDvet



Hidden impact of Oral antibiotic prophylaxis in lambs



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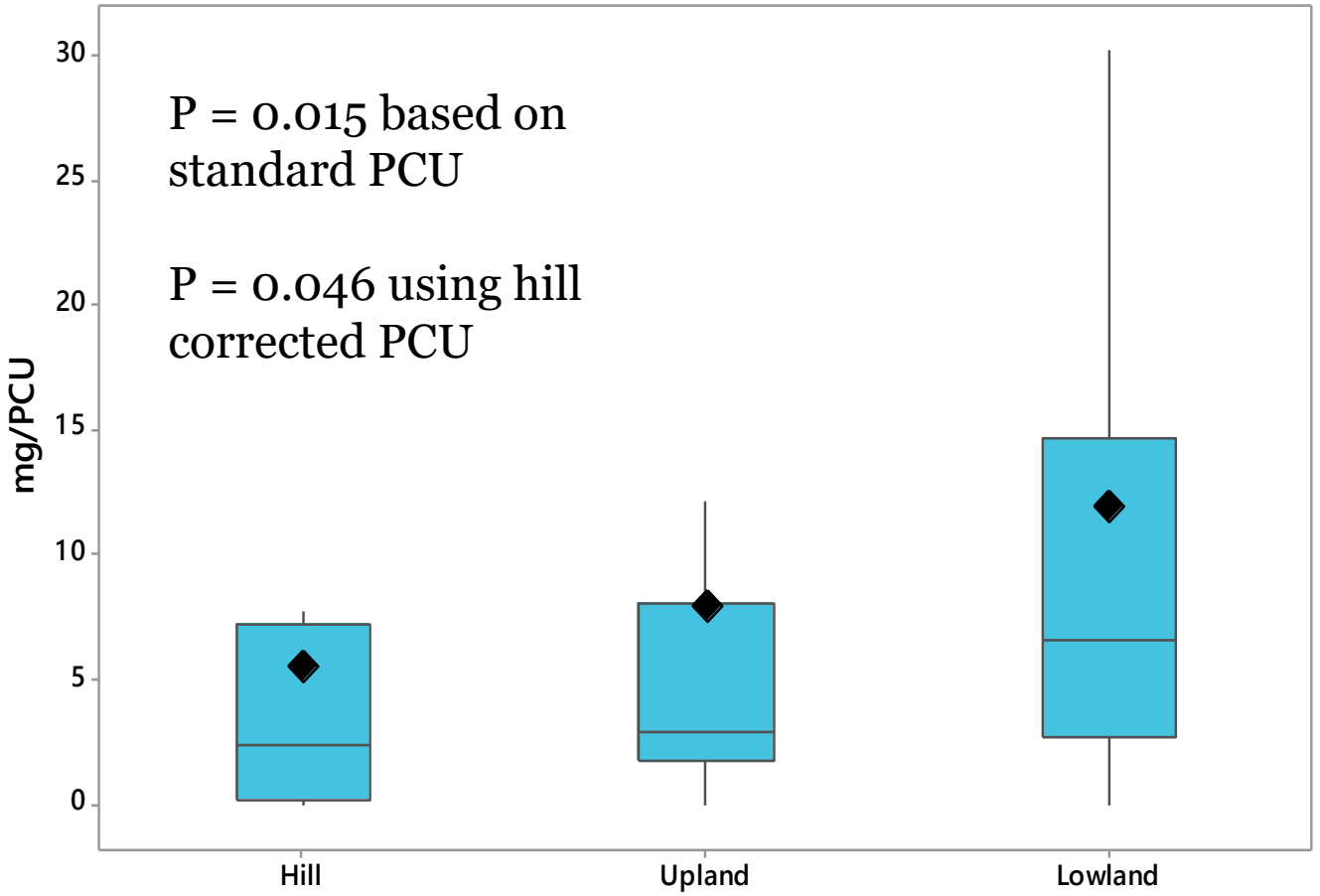
Comparing Flocks

Flock Stratification

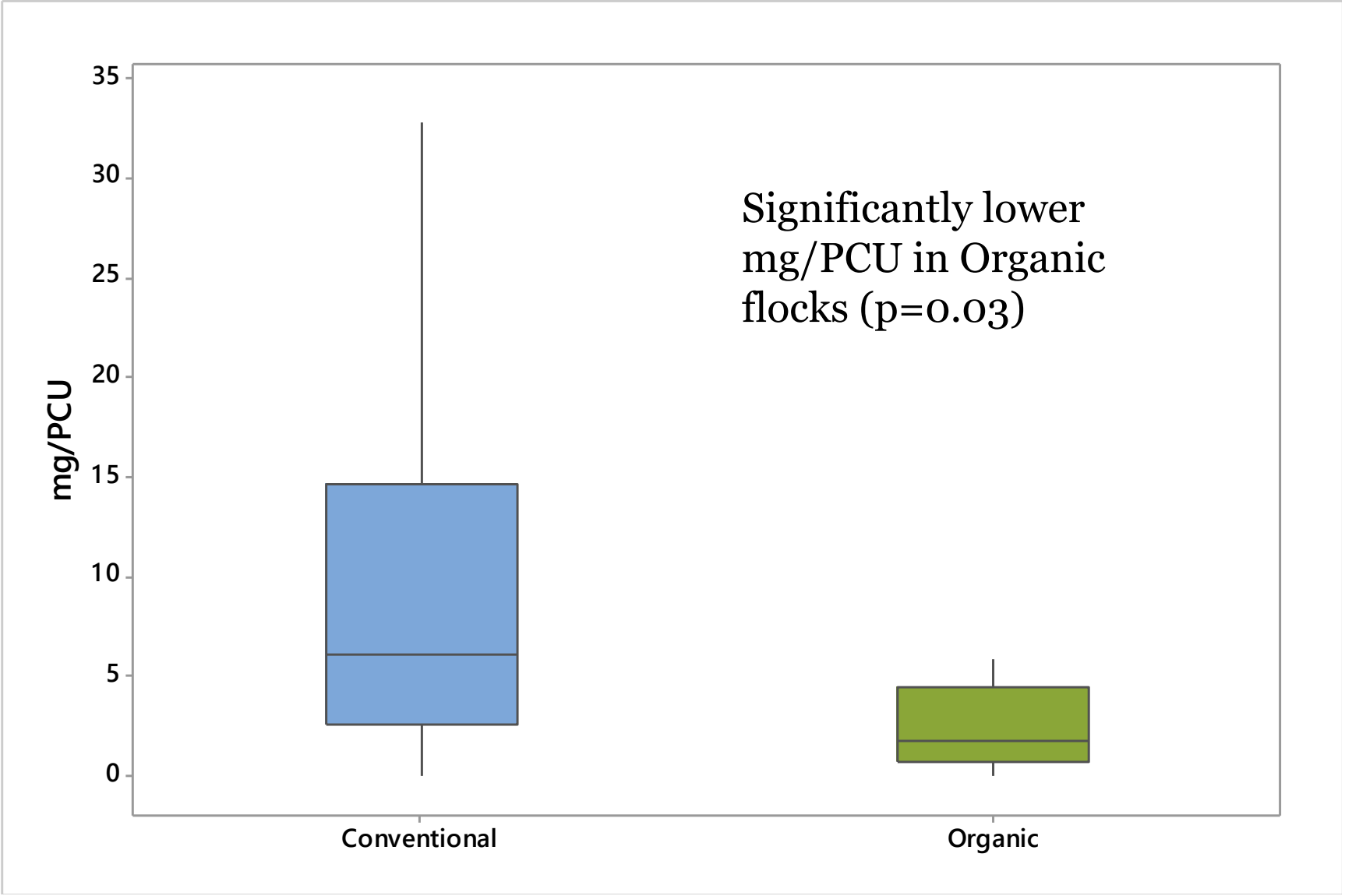
Accounting for different ewe body weight and reproductive performance

Hill & Upland Flock PCU correction

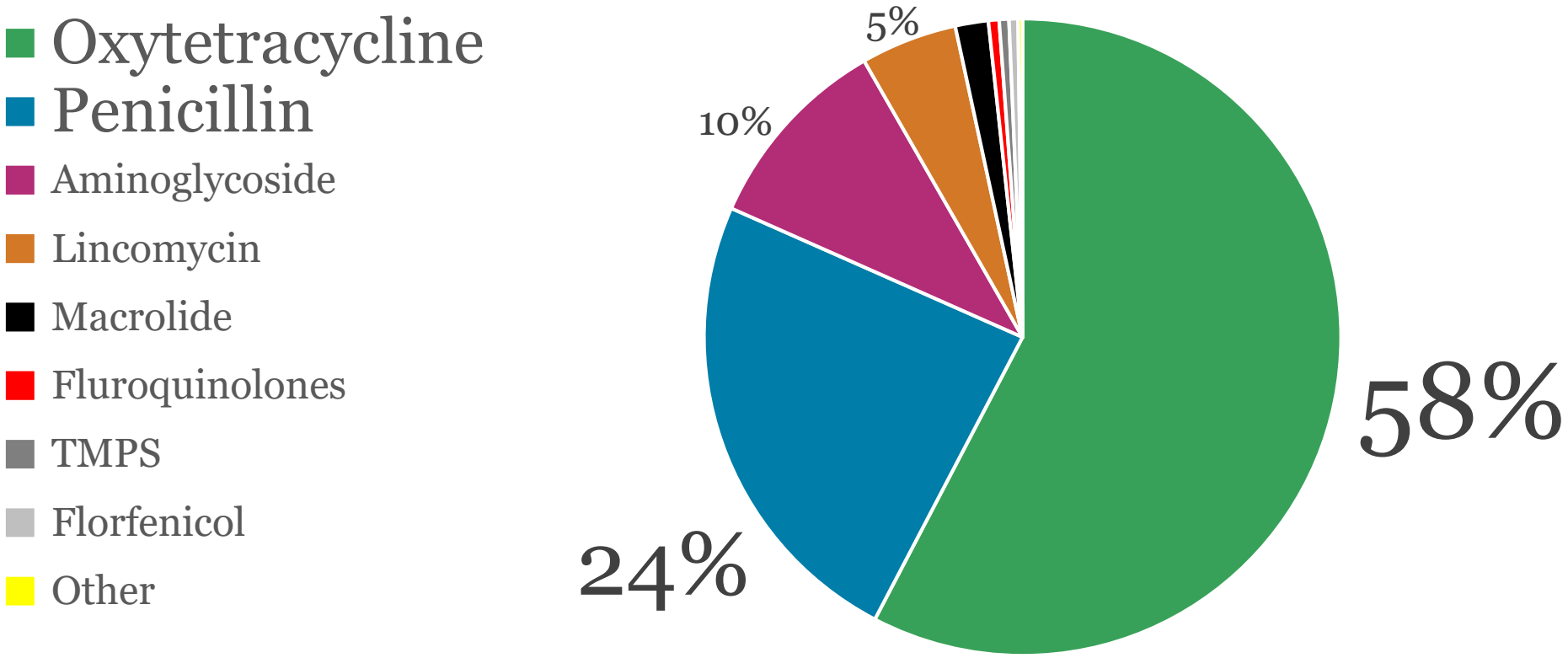
- 55kg ewe (hill) vs 75kg ewe (lowland)
- 1.15 lambs per ewe Vs 1.54 lambs per ewe
- 16 kg vs 20kg lamb life average body weight



Management system



Variation in usage by active ingredient



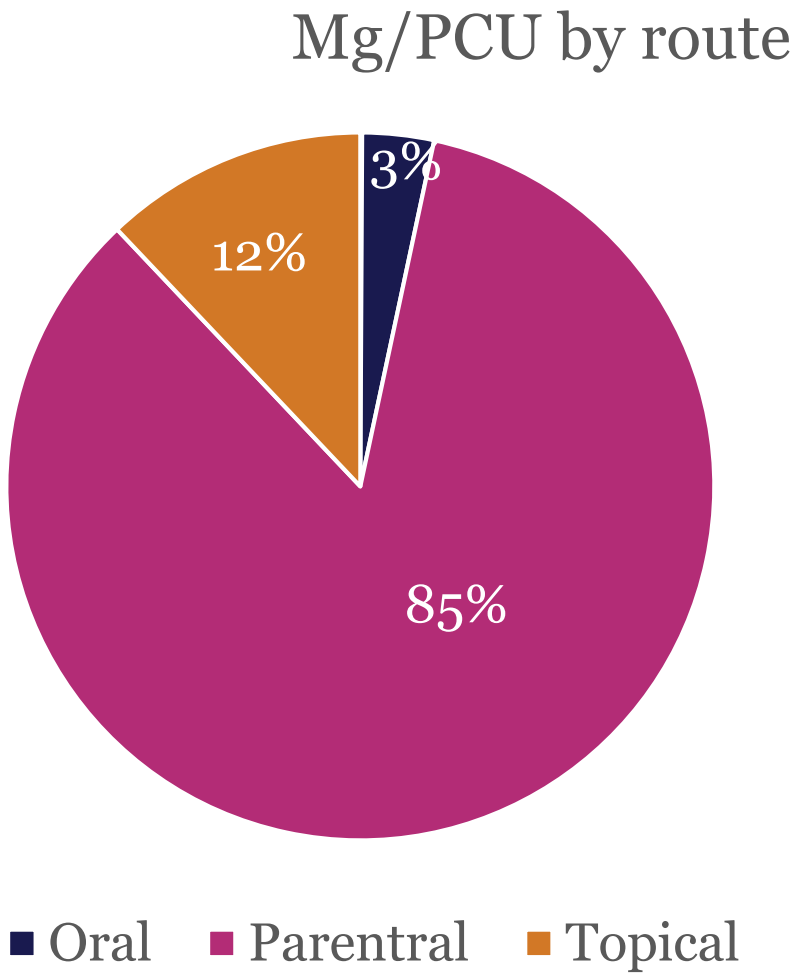
CIA represent < 1% of antibiotic usage

Variation in usage by route

Parenteral Use of OTC and Penicillin dominates

Oral and Topical preparations represent a significant minority of the mg/PCU

Current ESVAC do not include topical or tablet products DDD and DCD definitions underestimate the true use in sheep & lambs



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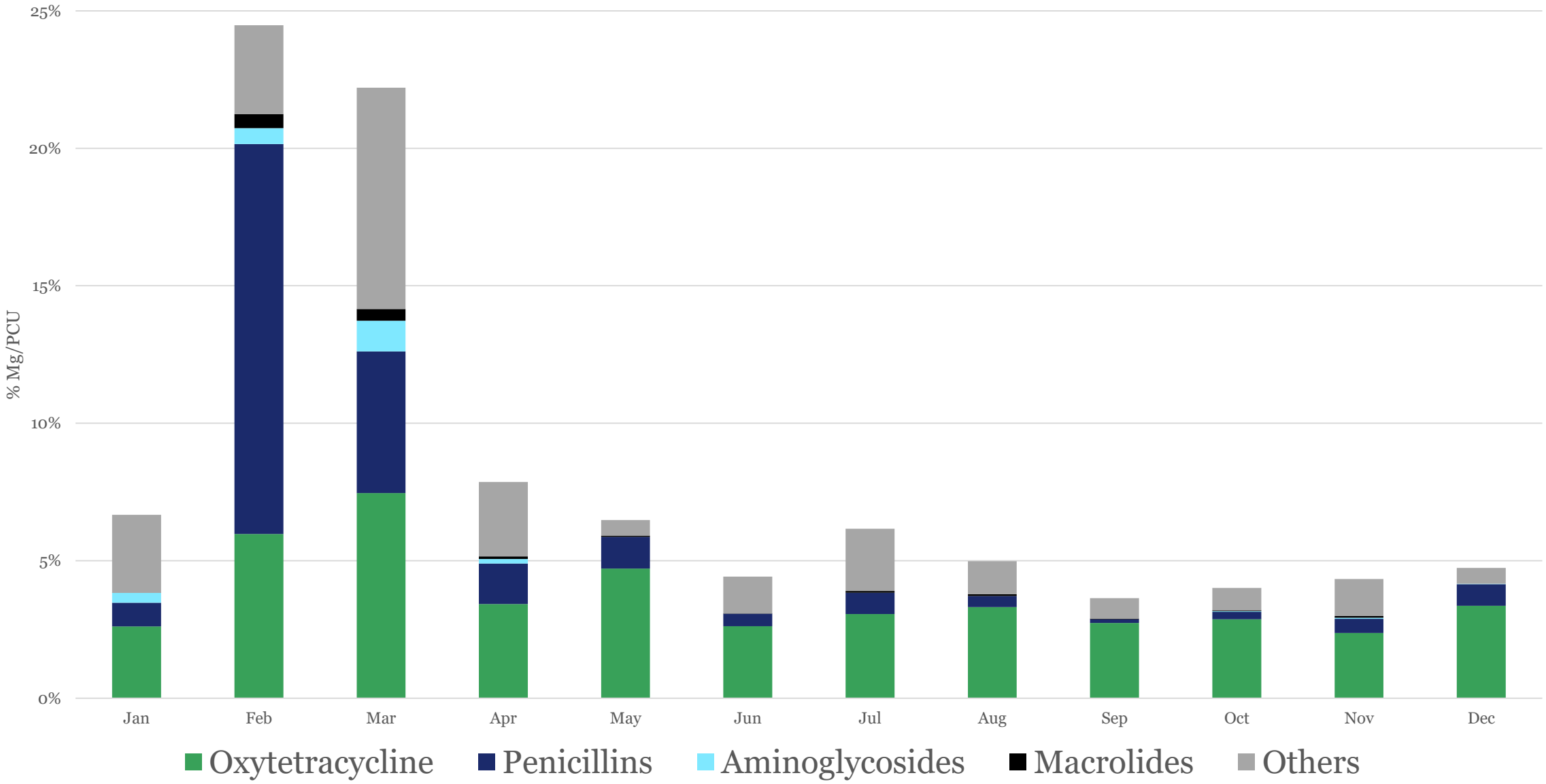
Seasonality of Antibiotic usage



‘High’ vs ‘Low’ usage flocks

Low (bottom 25%)

- No Fluoroquinolones
- No Antimicrobial footbaths

- Lower usage of All groups

High (top 25%)

- Smaller flocks
- Potentially more intensively managed

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What are antibiotics prescribed for?

Treatment Diagnosis	Aminoglycosides	Penicillins (including extended spectrum)	Macrolides	Oxytetracycline	Lincomycin	% Total mg/PCU by cause
Abortion				5.4% (1)		3.2%
Colibacillosis	43.4% (11)					2.2%
Lambing (inc dystocia, prolapse)		29.4% (18)				9.7%
Lameness (inc CODD, FR, ID)	24.6% (1)	34.5% (13)	75.6% (10)	85.1% (23)	100.0% (4)	**65.5%**
Listeriosis		0.3% (1)				0.1%
Mastitis		10.3% (4)				3.4%
Metritis		0.4% (1)				0.1%
Ophthalmic		1.7% (5)		9.2% (4)		6.0%
Pneumonia		0.4% (1)		0.3% (1)		0.3%
Polyarthritis	32.0% (2)	18.8% (9)	24.4% (4)			8.2%
Not recorded		4.3% (5)				1.4%
% Total mg/PCU by antibiotic class	2.0%	26.8%	6.3%	63.5%	1.3%	

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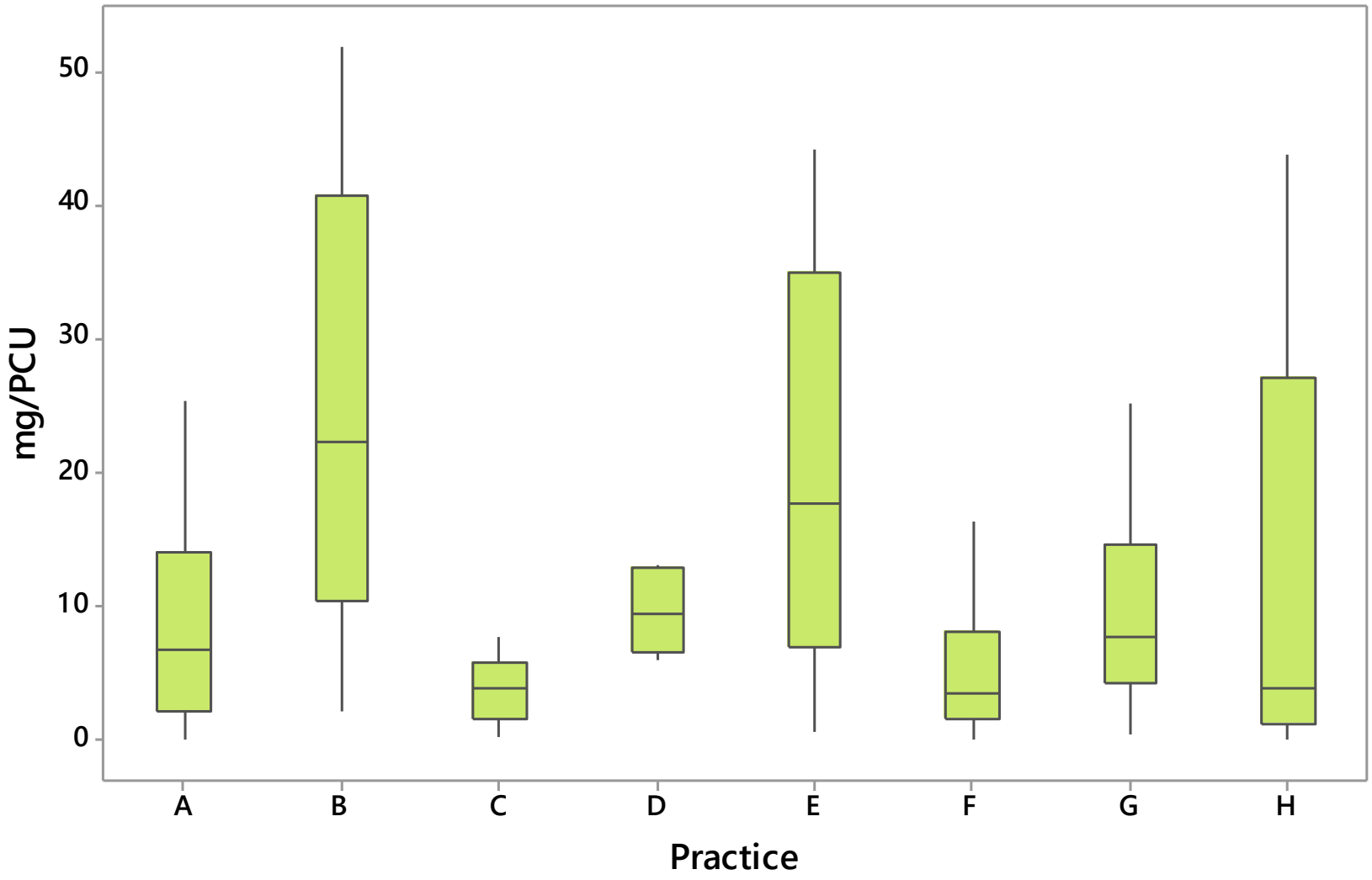
Variation between veterinary practices



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Multi-level Modelling & Variance Partitioning

- Significantly lower antibiotic usage in hill flocks compared to lowland flocks

- Multilevel regression model of the logPCU apportioned **79 %** of variation at the Farm level and **21%** at the practice level

UK Livestock sectors set Targets for AMU reduction of 10% in sheep by 2020

RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE
ruma

Paper

Paper

Quantitative analysis of antibiotic usage in British sheep flocks

Peers Davies, John G Remnant, Martin J Green, Emily Gascoigne, Nick Gibbon, Robert Hyde, Jack R Porteous, Kiera Schubert, Fiona Lovatt, Alexander Corbishley

Current ongoing research

Quantitative analysis of usage patterns at farm level over multiple years

Correlation with disease prevalence and preventative health strategies at the farm level including vaccination

Thank you