Veterinary Medicines Directorate

Supplementary Material 1 - Sales & Usage

UK-VARSS 2025

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S1.1 Further details on the methodology

Data collection and validation

Pharmaceutical companies supplied annual sales of all authorised veterinary antibiotics to the VMD in accordance with the Veterinary Medicines Regulations. Upon receipt, data were collated and validated, and product data entries were compared to those submitted in previous years. If there were large discrepancies between data provided in successive years, data validity was investigated and queried with the pharmaceutical company. Sales data contained in returned Periodic Safety Update Reports (PSURs) for antibiotic veterinary medicinal products were also compared to the sales data returned by the pharmaceutical companies, and any discrepancies investigated.

Tonnes of active ingredient

The weight of antibiotic active ingredient sold is calculated by multiplying the quantitative composition of active ingredient for each product, taken from the Summary of Product Characteristics (SPC), by the number of units sold as reported by the pharmaceutical companies. For some active ingredients that are either prodrugs or expressed in International Units (IU), a conversion factor is applied. These conversion factors are recommended by the European Medicines Agency (EMA) in the framework of the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) project.

The data reported here are presented according to the ATCvet Classification System for veterinary medicinal products shown in Table S1.1.1 of Supplementary Material 1. Sales of dermatological preparations and preparations for sensory organs (described as ‘other’ route of administration in this and previous UK-VARSS reports) are not included in calculations. Sales of these products have remained stable and account for no more than 3 tonnes of active ingredient (Table S1.1.2 of Supplementary Material 1).

Mg/kg for food-producing animals

Trends in sales of antibiotics over time are determined by taking into consideration variations in the size and number of the animal population. To achieve this, sales data for food producing animals were analysed using the latest methodology formulated by the European Medicines Agency and represents the weight of the food producing animal population (in kg) at risk by using standardised weights that represent the average living weight or average weight at time of slaughter.

Mg/kg can be considered as the average quantity of active ingredient sold per kg bodyweight of food-producing animal in the UK based on an estimated living weight/ weight at slaughter and enables year-on-year comparisons to be made. For a full explanation please Chapters 1.1.1 and 2.1.1 of the 2024 VARSS report.

Harmonised indicators for antibiotic use have also been developed by the Quadripartite (The Quadripartite partnership consist of the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (WOAH) and the United Nations Environment Programme (UNEP)). These include a core indicator measuring total volume of sales or usage based on a mg/kg biomass metric. Global data using this metric is presented by region in the WOAH's Animuse portal.

Published European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) (2009-2023) reports are available from: https://www.ema.europa.eu/en/veterinary-regulatory/overview/antimicrobial-resistance/european-surveillance-veterinary-antimicrobial-consumption-esvac.

The first European Sales and Use of Antimicrobials for Veterinary Medicine (ESUAvet) annual surveillance reports using the latest methodology was published in March 2025

The data reported in Chapter 1 of the main report are presented according to the Anatomical Therapeutic Chemical Classification System for veterinary medicinal products (ATCvet) as shown in Table S1.1.1. Topical products are not included in the tonnes or mg/kg calculations, see Table S1.1.2.

Table S1.1.1: Categories and ATCvet codes of antibiotic veterinary medicinal products included in the data.

Veterinary antibiotic category	ATCvet codes
Antibiotics for intestinal use	QA07AA; QA07AB
Antibiotics for intrauterine use	QG01AA; QG01AE; QG01BA; QG01BE; QG51AA; QG51AG
Antibiotics for systemic use	QJ01
Antibiotics for intramammary use	QJ51
Antibiotics for antiprotozoal use (solely sulfonamides)	QP51AG

Table S1.1.2: shows the sales for other antibiotic products, which include topical preparations and those for sensory organs, for example aerosols, creams, gels, shampoos and ear and eye medications. These are not included in the tonnes or mg/kg calculations.

Administration Route	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Other routes	2.3	1.9	2.4	2.4	2.5	2.6	2.1	2.6	2.3	2.1	4.2	3.9

S1.2 : Weight of animal population at risk

When assessing antibiotic sales, it is important that the demographics of the animal population potentially exposed to treatment are also considered, (see Annex D of the main report for data limitations). The European Union published their new methodology for monitoring sales and use data here - Guideline on the reporting of antimicrobial sales and use in animals at the EU level – denominators and indicators (europa.eu). Table S1.2.1 shows the calculated weight of animal population at risk using the new ESUAvet metric, whereas Table S1.2.2 shows the weight using the original ESVAC metric. Full details on the previous methodology to calculate the PCU can be found in the 2011 ESVAC report (which includes data from 2005 to 2009).

Sales Data

Key similarities and differences from the existing (mg/PCU) methodology are as follows:

Similarities	Differences
Antibiotic use includes all antibiotic products except topicals (e.g. skin, ear and eye products)	Living cattle categories added and living dairy cow weight also increased from 425kg to 595kg
For some living animal categories (breeding sows, living sheep and living horses) the weights stay the same	Slaughter animal weights now represent the liveweight at slaughter, rather than the average weight at time of treatment (this is significantly higher).
The categories remain the same for all food producing animals for pigs, sheep, meat poultry, fish and horses	Denominator weights added for goats, laying hens and ducks
The finfish weights denominator has stayed the same (based on liveweight of fish slaughtered)	Sales mg/kg will not incorporate all antibiotic use (not just food producing animals when tablets were excluded)

The data for determining the livestock population size were sourced from the following:

- Living animals (livestock) - Livestock populations in the United Kingdom - GOV.UK (www.gov.uk)
- Slaughter animals (cattle, sheep and pig) - Latest cattle, sheep and pig slaughter statistics - GOV.UK (www.gov.uk)
- Slaughter poultry - Latest poultry and poultry meat statistics - GOV.UK (www.gov.uk)
- TRACES import and export data - Overseas trade data table - UK Trade Info
- Living goat data https://assets.publishing.service.gov.uk/media/6579b33a0467eb000d55f6f3/structure-june-uktimeseries-14dec23.ods

Table 1.2.1: Total food-producing animal weights (based on ESUAvet categories) from 2014 to 2025.

Please note that for horses, population data are obtained from the British Equestrian Trade Association survey which is run every 5 years.

Animal species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cattle	4611.6	4645.5	4639.5	4632.2	4554.4	4472.1	4396.5	4414.8	4401.4	4328.2	4288.1	4239.5
Poultry	2604.1	2758.6	2865.6	2950.4	3072.7	3001.0	3104.5	3106.3	3005.2	3025.8	3035.3	3020.3
Sheep and goats	2967.6	2942.5	2981.2	3056.1	2965.4	2963.4	2884.5	2875.2	2904.0	2801.0	2710.5	2668.8
Pigs	1338.4	1337.2	1365.1	1325.5	1352.0	1394.0	1380.8	1427.1	1406.2	1269.1	1301.0	1296.8
Horses	395.2	377.6	377.6	377.6	377.6	338.8	338.8	338.8	338.8	290.4	290.4	290.4
Fish	177.0	193.1	187.3	177.3	203.6	168.8	217.5	204.5	220.2	183.0	186.9	204.4
Total	**12093.8**	**12254.5**	**12416.3**	**12519.1**	**12525.8**	**12338.1**	**12322.6**	**12366.6**	**12275.8**	**11897.5**	**11812.3**	**11720.3**

Table 1.2.2: PCU in 1,000 tonnes by food-producing animal species from 2014 to 2025.

Animal species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sheep and goats	2827.4	2800.6	2841.4	2913.7	2826.8	2820.7	2745.8	2745.0	2769.9	2667.0	2586.6	2545.0
Cattle	1728.6	1743.5	1786.1	1781.6	1784.5	1775.7	1776.0	1748.1	1763.2	1739.2	1772.0	1724.1
Poultry	1040.1	1106.6	1148.5	1180.8	1233.1	1201.6	1250.8	1248.8	1207.4	1213.6	1213.6	1205.8
Pigs	768.5	767.8	783.8	763.2	776.8	800.3	791.9	816.7	799.3	724.4	740.5	737.1
Horses	395.2	377.6	377.6	377.6	377.6	338.8	338.8	338.8	338.8	290.4	290.4	290.4
Fish	177.0	193.1	187.3	177.3	203.6	168.8	217.5	204.5	220.2	183.0	186.9	204.4
Total PCU	**6936.8**	**6989.3**	**7124.8**	**7194.1**	**7202.4**	**7106.0**	**7120.7**	**7101.9**	**7098.9**	**6817.6**	**6790.1**	**6706.9**

Table S1.2.3: Weights assigned to each animal category in kg used to calculate the old metric (mg/PCU) and the new metric (mg/kg) for food-producing animals.

a) Cattle

Animal category	PCU kg weights (old metric)	New category weights (new metric)	Source
Male less than 1 year (not for slaughter)	N/A	314	National records: all male cattle less than 1 year – Dec plus all female cattle less than 1 year – Dec minus calves and young cattle for slaughter and estimate living dairy heifers
Male 1 to less than 2 years	425 (previously only at slaughter)	500	National records: all male cattle aged between 1 and 2 years – Dec
Male, 2 years or over	425 (previously only at slaughter)	680	National records: All male cattle, aged 2 years or more – Dec
Female, 1 to less than 2 years	200 (previously only at slaughter)	440	National records: All female cattle (beef), aged between 1 and 2 years – Dec
Female, 2 years or over	425 (previously only at slaughter)	564	All female cattle (beef) aged 2 years or more – including breeding herd and other female cattle – Dec
Calves and young cattle for slaughter	140	314	UK annual slaughter statistics (calves)
Imported/exported cattle < 1 year of age for fattening	140	140	Overseas trade data EU: CN code 01022929 01022910 and 01022949 01022999
Imported/exported cattle > 1 year of age for fattening		314	Overseas trade data EU: CN code 01022921 and 01022941
Imported/exported cattle < 1 year of age for slaughter	425	500	Overseas trade data EU: CN codes 01022959 and 01022969
Imported/exported cattle > 1 year of age for slaughter		623	Overseas trade data EU: CN codes 01022951 01022961 and 01022991

Living dairy cows	425	595	National records: Female cattle aged 2 years of more, total breeding herd, Dairy herd - Dec
Female calves < 1 year, not for slaughter	N/A	314	No records but assume the same as the number of Heifers 1 to less than 2 years.
Heifer, 1 to less than 2 years, not for slaughter	N/A	440	National records: Female cattle, aged between 1 and 2 years, Dairy – Dec
Heifer, 2 years or over, not for slaughter	N/A	564	National records: Female cattle, aged 2 years or more, Other Female Cattle, Dairy - Dec

b) Pigs

Animal category	PCU kg weights (old metric)	New category weights (new metric)	Source
Slaughter pigs	65	120	National records: Sum of clean pigs and sows and boars
Breeding sows >50kg	240	240	National records: Female Breeding herd - June
Imported/exported pigs for fattening	25	25	Overseas trade data EU: CN code 01039110
Imported/exported pigs for slaughter	65	120	Overseas trade data EU: CN code 01039219 01039211

c) Poultry

Animal category	PCU kg weights (old metric)	New category weights (new metric)	Source
Slaughter broilers	1	2.4	National records: Broilers plus boiling fowl UK
Laying Hens	N/A	2.4	National records: Hens and pullets laying eggs for eating UK
Imported/exported chickens for slaughter	1	2.4	Overseas trade data EU: CN Code 01059400
Slaughter turkeys	6.5	13.2	National records: Turkeys UK

Imported/exported turkeys	1	13.2	Overseas trade data EU: CN Code 0105 99 30
Slaughtered ducks	1.75 (BPC)	4.2	Antibiotic use data
Imported/exported ducks for slaughter	1	4.2	Overseas trade data EU: CN Code 0105 99 10

d) Sheep and goats

Animal category	PCU kg weights (old metric)	New category weights (new metric)	Source
Slaughter sheep	20	29	National records: Sheep and lambs plus Ewes and Rams slaughtered - Dec
Live sheep	75	75	National records: Total Sheep and Lambs – June
Imported/exported sheep for slaughter	20	29	Overseas trade data EU: CN Code 01041030 01041080
Live goats	N/A	65	National records: Living goats
Imported/exported goats for slaughter	20	21	Overseas trade data EU: CN Code 01042090

e) Horses

Animal category	PCU kg weights (old metric)	New category weights (new metric)	Source
Living horses	400	400	National Records

f) Aquaculture

Animal category	PCU kg weights (old metric)	New category weights (new metric)	Source
Atlantic salmon	Please note that for fish, data from Eurostat is given in 1,000 tonnes slaughtered fish as live weight.		National Records

Companion Animal Weights

For cats and dogs, the weight of the population at risk is calculated in a different way and shown in table S1.2.4. This is used for the dog and cat mg/kg and DDDVet/animal calculations. Population data was sourced from the Peoples Dispensary for Sick Animals PAW Report survey data, and mean adult cat and dog weights were provided by the VetCompass.

Table S1.2.4: Weights, in 1,000 tonnes of a) dogs and b) cats from 2014 to 2025

a)

Dogs	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population (in 1,000s) heads	8,100	9,300	9,400	9,300	8,900	9,900	10,100	9,600	10,200	11,000	10,600	11,100
Mean weight (in kg)	17.6	17.1	17.0	16.8	16.7	16.6	16.4	16.4	16.3	16.1	16.4	16.4
Total weight of dogs (in 1,000 tonnes)	142.6	159.0	159.8	156.2	148.6	164.3	165.6	157.4	166.3	177.1	173.8	182.0

b)

Cats	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population (in 1,000s) heads	10,500	11,100	11,000	10,300	11,100	10,900	10,900	10,700	11,100	11,000	10,800	10,500
Mean weight (in kg)	4.1	4.1	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Total weight of cats (in 1,000 tonnes)	43.1	45.5	46.2	43.3	46.6	45.8	45.8	44.9	46.6	46.2	45.4	44.1

VetCompass methods for calculation of standard bodyweight by species

Standard species bodyweights were calculated using clinical data on millions of animals under primary veterinary care in the UK derived from the RVC VetCompass database. A point mean population bodyweight describes the mean of the bodyweights of all individual animals in the population at a specific point in time. However, as animals tend to be weighed at *ad hoc* times when presented for routine veterinary care, veterinary records cannot provide the current updated bodyweights of all animals at any one single point in time. For example, juvenile animals weighed several weeks or months previously are likely to have a much higher bodyweight at a later point in time. The VetCompass method for calculation of standard point mean bodyweight by species solved this problem by modelling the bodyweight over time for all animals based on the available information on species and age along with recorded bodyweight values. Estimation of point mean population bodyweight that accounts for juvenile growth was achieved in four stages. Initially Loess models were used to define from observed data the age at which the juvenile growth period transitioned into stable adult weight for each species. Secondly, linear mixed effects models were developed to predict the magnitude and pattern of change in bodyweight expected during the identified juvenile growth phase. Thirdly, the proportional increase in bodyweight was estimated for all individual juvenile animals from their last recorded weight in the clinical record prior to the target date for point mean calculation. For adult animals, the most recent recorded bodyweight prior to the point mean target date was included without adjustment. Finally, the point mean species bodyweight was calculated from the estimated point bodyweights of all individual animals at the target date of 31st December for each year for annual reporting. Targeting of the last day of each year aimed to achieve the most representative annual mean bodyweight by maximising the number of bodyweight measurements in each annual data set. Outside this specific application the methods described are suitable for use on any selected target date. For the most recent full year of VetCompass data in 2024, calculations were derived from a sample of approximately 3 million dogs, 2 million cats, 220,000 rabbits, and 62,000 guinea pigs across 1,800 veterinary practices in the United Kingdom.

S1.3: Daily dose figures (DDDVet) used for calculating DDDVet/animal in dogs, cats and horses.

Table S1.3.1: Length of activity, average daily dose rate and DDDVet figures (in mg/kg) used for calculating the DDDVet for each active ingredient/ formulation for dogs and cats.

a) Dogs

Ingredient	Formulation	Length of activity	Average daily dose rate	DDDVet (mg/kg)
Amoxicillin*	Tablets/ Oral Solution	1.0	20.0	20.0
Ampicillin	Tablets	1.0	20.0	20.0
Cephalexin	Tablets	1.0	30.0	30.0
Cefovecin	Injection	14.0	8.0	0.6
Clindamycin	Tablets/ Oral Solution	1.0	11.0	11.0
Doxycycline	Tablets	1.0	10.0	10.0
Enrofloxacin	Tablets/ Injection	1.0	5.0	5.0
Marbofloxacin	Tablets/ Injection	1.0	2.0	2.0
Metronidazole	Tablets	1.0	50.0	50.0
Metronidazole-spiramycin	Tablets	1.0	35.9	35.9
Oxytetracycline	Tablets	1.0	50	50
Pradofloxacin	Tablets	1.0	3.0	3.0
Trimethoprim-sulfadiazine	Tablets/ Injection	1.0	30.0	30.0

* Includes those in combination with clavulanic acid, although clavulanic acid is not counted as an active ingredient

b) Cats

Ingredient	Formulation	Length of activity	Average daily dose rate	DDD (mg/kg)
Amoxicillin*	Tablets/ Oral Solution	1.0	20.0	20.0
Cephalexin	Tablets	1.0	30.0	30.0
Cefovecin	Injection	14.0	8.0	0.6
Clindamycin	Tablets/ Oral Solution	1.0	11.0	11.0
Doxycycline	Tablets	1.0	10.0	10.0
Enrofloxacin	Tablets/ Injection	1.0	5.0	5.0
Marbofloxacin	Tablets/ Injection	1.0	2.0	2.0
Metronidazole	Tablets/ Oral Solution	1.0	50.0	50.0
Metronidazole-spiramycin	Tablets	1.0	35.9	35.9
Pradofloxacin	Tablets	1.0	3.0	3.0
Pradofloxacin	Oral Solution	1.0	5.0	5.0
Trimethoprim-sulfadiazine	Tablets/ Injection	1.0	30.0	30.0

* Includes those in combination with clavulanic acid – although clavulanic acid is not counted as an active ingredient)

Table S1.3.2: DDDVet figures (in mg/kg) used for calculating the DDDVet/animal metric for horses.

Antibiotic Class	DDDVet (mg/kg)
1st and 2nd Generation Cephalosporins	30
3rd and 4th Generation Cephalosporins	2.2
Fluoroquinolones	6.875
Macrolides	15
Aminoglycosides	6.6
Penicillins	50
Sulfonamides	60
Tetracyclines	20
Nitroimidazoles	45
Chloramphenicol	100
Polymyxin B	12
Rifampicin	10
Lincosamides	8

S1.4: Antibiotic active ingredients authorised for use in animals

Table S1.4.1: Antibiotic active ingredient organised by class, authorised species and administration route for 2025.

a) Tetracyclines

Active ingredient	Authorised species	Administration route
Chlortetracycline	Cats, cattle, chickens, dogs, ducks, horses, pigs, sheep, turkeys	Oral/water, premix, topical
Doxycycline	Cats, cattle, chickens, dogs, pigs, turkeys	Oral/water, tablet
Oxytetracycline	Cats, cattle, chickens, dogs, horses, pigs, salmon, sheep, trout	Injectable, oral/water, premix, topical, tablet
Tetracycline	Cattle, chickens, pigs, turkeys	Intrauterine

b) Trimethoprim/sulfonamides

Active ingredient	Authorised species	Administration route
Sulfadiazine	Cats, cattle, dogs, horses, pigs, chicken, sheep	Injectable, intramammary suspension, oral/water, premix, tablet
Sulfadimethoxine	Pigeons	Oral/water
Sulfadimidine	Cattle, pigs, sheep	Injectable
Sulfadoxine	Cattle, horses	Injectable
Sulfamethoxazole	Chickens, pigs	Oral/water
Trimethoprim	Bearded dragon, cats, cattle, chickens, dogs, horses, pigs, turkeys	Injection, oral/water, premix, tablet

c) Beta-lactams: first generation cephalosporins

Active ingredient	Authorised species	Administration route
Cefalexin	Cats, cattle, dogs	Intramammary, injectable, oral/water, tablet
Cefalonium	Cattle	Intramammary suspension
Cefapirin	Cattle	Intramammary suspension, intrauterine suspension

d) Beta-lactams: third generation cephalosporins

Active ingredient	Authorised species	Administration route
Cefoperazone	Cattle	Intramammary suspension
Cefovecin	Cats, dogs	Injectable
Ceftiofur	Cattle, horses, pigs	Injectable

e) Beta-lactams: fourth generation cephalosporins

Active ingredient	Authorised species	Administration route
Cefquinome	Cattle	Intramammary suspension

f) Beta-lactams: penicillins

Active ingredient	Authorised species	Administration route
Amoxicillin	Cats, cattle, chickens, dogs, ducks pigs, sheep, turkeys	Intramammary suspension, injectable, oral/water, premix, tablet
Ampicillin	Cats, cattle, dogs, pigs, sheep	Intramammary suspension
Benzylpenicillin	Cattle, horses, pigs	Injectable
Cloxacillin	Cats, cattle, dogs, horses, sheep	Eye ointment, intramammary suspension,
Phenoxymethylpenicillin	Chickens, pigs	Oral/water, premix

g) Aminoglycosides

Active ingredient	Authorised species	Administration route
Apramycin	Cattle, chickens, pigs, rabbits	Oral/water, premix
Dihydrostreptomycin	Cattle, horses, pigs, sheep	Injectable
Framycetin	Cats, cattle, dogs	Injectable, intramammary suspension
Gentamicin	Cats, dogs, horses, pigs, rabbits	Ear drops, eye drops, gel, injectable
Kanamycin	Cattle	Intramammary suspension
Neomycin	Cats, cattle, dogs, duck, goose, horses, partridge, pigs, quail, sheep, turkeys, chickens	Injectable, intramammary suspension, oral/water
Paromomycin	Cattle, goats, pigs, sheep	Oral/water, premix
Spectinomycin	Chickens, pigs	Oral/water, premix,
Streptomycin	Cats, cattle, dogs, horses, sheep	Injectable, intramammary suspensions, oral/solution

h) Fluoroquinolones

Active ingredient	Authorised species	Administration route
Danofloxacin	Cattle, pigs	Injectable
Enrofloxacin	Cats, cattle, chickens, dogs, exotic animals, goats, ornamental birds, pigs, rabbits, reptiles, rodents, sheep, turkeys	Injectable, oral/water, tablet
Marbofloxacin	Cats, cattle, dogs, pigs,	Injectables, oral/water, tablet, topical
Orbifloxacin	Dogs	Ear drops
Pradofloxacin	Cats, dogs	Oral/water, tablet

i) Macrolides

Active ingredient	Authorised species	Administration route
Gamithromycin	Cattle, pigs, sheep	Injectable
Spiramycin	Cats, dogs	Tablet
Tildipirosin	Cattle	Injectable
Tilmicosin	Cattle, chickens, pigs, rabbits, sheep, turkeys	Injectable, oral/water, premix
Tulathromycin	Cattle, pigs, sheep	Injectable
Tylosin	Cattle, chickens, pigs, turkeys	Injectable, oral/water, premix
Tylvalosin	Chickens, game birds, pigs,turkeys,	Oral/water, premix

j) Other: amphenicols

Active ingredient	Authorised species	Administration route
Florfenicol	Cattle, dogs, pigs, salmon, sheep	Injectable, oral/water, premix, topical

k) Other: lincomycins

Active ingredient	Authorised species	Administration route
Lincomycin	Cats, Cattle, chickens, dogs, pigs	Injectables, intramammary solution, oral/water, premix
Clindamycin	Cats, dogs	Oral/water, tablet
Pirlimycin	Cattle	Intramammary solution

l) Other: pleuromutilins

Active ingredient	Authorised species	Administration route
Tiamulin	Chickens, pigs, turkeys, rabbits	Injectable, oral/water, premix

m) Other: polymyxins

Active ingredient	Authorised species	Administration route
Colistin	Cattle, chickens, pigs, sheep, turkeys	Oral/water, premix
Polymyxin B	Cats, dogs	Cutaneous suspensions, ear drops

n) Other: other antibiotics

Active ingredient	Authorised species	Administration route
Fusidic acid	Cats, dogs, rabbits	Ear drops, gel

Certain active ingredients included in the results in chapters 3 and 4 are not authorised for use in food-producing animals. These antibiotics (listed below) are however included in the test panels to monitor emergence or risk of resistance to those antibiotics in bacteria in people or because no breakpoints are available for the antibiotic for which testing ideally should be taking place.

Table S1.4.2: Antibiotics not authorised for use in food-producing animals.

Antibiotic class	Active ingredient
Aminoglycosides	Amikacin
Amphenicols	Chloramphenicol
Beta-lactams: 3rd generation cephalosporins	Cefotaxime
Beta-lactams: 3rd generation cephalosporins	Cefpodoxime
Beta-lactams: 3rd generation cephalosporins	Ceftazidime
Beta-lactams: 4th generation cephalosporins	Cefepime
Beta-lactams: Carbapenems	Ertapenem
Beta-lactams: Carbapenems	Imipenem
Beta-lactams: Carbapenems	Meropenem
Macrolides	Azithromycin
Fluoroquinolones	Ciprofloxacin
Quinolones	Nalidixic acid
Other anti-infectives and antiseptics	Furazolidone

S1.5: Cascade prescribing

The cascade is a legislative provision in the Veterinary Medicines Regulations that allows a veterinary surgeon to prescribe unauthorised medicines that would not otherwise be permitted, for example, imported medicines or a medicine licensed for another animal species or human use. The principle of the cascade is that, if there is no suitable veterinary medicine authorised in the UK to treat a condition, the veterinary surgeon responsible for the animal may in particular circumstances (for example to avoid causing unacceptable suffering) treat with an unauthorised medicine. The cascade is a risk-based decision tree, and prescribing decisions in accordance with the cascade should be made on a case-by-case basis.

Food-producing animals may only be treated under the Cascade with medicines whose pharmacologically active substances are listed in the Table of Allowed Substances in Commission Regulation EU No. 37/2010 if prescribing under the cascade in Northern Ireland. When prescribing under the cascade in GB for food-producing species all substances contained must be substances with have a Maximum Residue Limit (MRL) and do not fall within the scope of assimilated Regulation (EC) No 470/2009. Further details can be found in the Cascade Prescribing Guidance

Step	Permitted Source
Step 1	Veterinary medicine product with Marketing Authorisation valid in NI for indicated species and condition, under conditions of Special Import Certificate
Step 2	Veterinary medicine product with marketing authorisation valid in GB, NI or UK-wide for a different species or condition. Products not authorised within the UK or GB require a Special Import Certificate.

Step 3	No veterinary medicine included in step 1 or not available in GB, human medicine with a MA valid in GB,NI or UK wide OR an authorised veterinary medicine from outside the UK. Requires a Special Import Certificate for imported animal medicines. Food producing animals the medicines must be authorised for a food-producing species.
Step 4	If there is not a veterinary medicine as described in Step 1 or not available in GB. An extemporaneous preparation prepared by a vet, pharmacist or person holding an appropriate Manufacturers authorisation

In order to legally import medicines for use under the cascade in GB you must apply for a Special Import Certificate from the Special Import Scheme. Failure to obtain a certificate for an imported medicine is an offence under the Regulations. For NI the exception to this requirement is when sourcing veterinary medicines from GB, which do not require a certificate.

The data used in this report do not include data on sales of imported or human antibiotics used in animals in accordance with the prescribing cascade in the sales chapter, as currently there is no mechanism by which such information can be obtained. The understanding is that use of human products in food-producing animal species is not extensive, due to issues with longer withdrawal periods when using such products. The VMD continues to explore methods that can accurately incorporate information on the amounts of antibiotics imported into or exported out of the UK, as well as methods that can accurately incorporate sales of antibiotics licensed for humans that are sold for animal use under the cascade prescribing system. Products imported are able to be included in the usage chapter for relevant species.

S1.6: Sales of antibiotics for food-producing animal species (mg/kg)

Table S1.6.1: Active ingredient in mg/kg of antibiotics sold for food-producing animals from 2014 to 2025 (A) and HP-CIAs (B).

Please note, the figures in the total sales row are rounded to the nearest integer. This explains any discrepancy between the overall total and the classes' totals. Also, because of the heightened interest in and the low use of HP-CIA classes, the sales of fluoroquinolones, third and fourth generation cephalosporins and colistin are presented in a separated section of the table. Total includes all classes (including HP-CIAs).

A)

Antibiotic Class	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Tetracyclines	14.9	13.4	8.6	7.5	6.8	5.9	5.9	5.5	4.8	5.2	4.8	5.2	-65%
Penicillins	6.5	5.6	4.6	4.2	3.9	4.3	4.6	4.3	4.2	3.9	4.1	3.3	-49%
Trimethoprim-sulfonamides	6.2	5.9	4.5	2.7	3.0	3.2	3.2	3.0	2.3	1.8	1.7	1.4	-77%
Aminoglycosides	2.1	2.0	1.2	1.5	1.5	1.9	1.7	1.7	1.8	1.6	1.6	2.1	1%
Macrolides	4.1	3.1	2.3	1.9	1.3	1.3	1.7	1.5	1.3	1.4	1.6	1.6	-61%
Pleuromutilins	1.0	1.3	0.8	0.8	0.7	1.2	0.6	0.5	0.6	0.8	0.8	1.0	-3%
Lincosamides	0.6	0.5	0.3	0.2	0.2	0.3	0.4	0.3	0.4	0.5	0.4	0.6	5%
Amphenicols	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	95%
1st and 2nd generation cephalosporins	0.1	0.1	0.1	0.04	0.04	0.05	0.08	0.08	0.07	0.07	0.07	0.06	5%
Aminocoumarins	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0	0	-100%
HP-CIAs	0.38	0.36	0.22	0.15	0.12	0.09	0.08	0.06	0.06	0.06	0.06	0.07	-71%
Total	**36.0**	**32.5**	**22.9**	**19.3**	**17.9**	**18.7**	**18.7**	**17.4**	**15.7**	**15.9**	**15.6**	**15.9**	**-56%**

B)

HP-CIAs	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Fluoroquinolones	0.2	0.2	0.1	0.09	0.08	0.08	0.06	0.05	0.06	0.05	0.05	0.06	-71%
3rd and 4th generation cephalosporins	0.11	0.10	0.08	0.06	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	-93%
Colistin	0.07	0.07	0.01	0.0006	0.002	0.001	0.00004	0	0	0	0	0	-100%
Total HP-CIA	**0.38**	**0.36**	**0.22**	**0.15**	**0.12**	**0.09**	**0.08**	**0.06**	**0.06**	**0.06**	**0.06**	**0.07**	**-82%**

Table S1.6.2: Total sales in mg/kg (new metric) and mg/PCU (old metric) from 2014 to 2025.

Total sales of antibiotics for food-producing animals	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Mg/PCU (old metric)	62.8	57.0	39.9	33.6	31.1	32.5	32.3	30.3	27.2	27.7	27.1	27.7	-56%
Mg/kg (new metric)	36.0	32.5	22.9	19.3	17.9	18.7	18.7	17.4	15.7	15.9	15.6	15.9	-56%

Table S1.6.3: Active ingredient in mg/kg of antibiotics sold for food-producing animals by route of administration from 2014 to 2025.

Please note, the In-water/milk category includes oral powders and oral solutions, and the administration route classed as “Other” includes intramammary dry and lactating cow, intrauterine preparations, bolus preparations and oral pastes.

Administration route	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
In-water/milk	9.9	9.1	7.0	6.2	6.6	7.5	8.0	7.9	7.5	8.0	8.3	7.9	-20%
In-feed	22.1	18.9	11.9	8.5	7.1	7.3	7.0	5.5	4.6	4.7	4.2	5.1	-77%
Injectable	3.6	4.0	3.6	4.3	3.9	3.6	3.4	3.8	3.4	2.9	2.8	2.7	-27%
Other	0.5	0.5	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	-61%
Total	**36.0**	**32.5**	**22.9**	**19.3**	**17.9**	**18.7**	**18.7**	**17.4**	**15.7**	**15.9**	**15.6**	**15.9**	**-56%**

S1.7: Sales of intramammary products licensed for cattle (in courses per dairy cow)

Table S1.7.1: Sales of (A) dry and lactating cow intramammary products in courses per dairy cow from 2014 to 2025 and (B) HP-CIA sales of dry and lactating intramammary products in courses per dairy cow from 2014 to 2025.

(A) Dry and lactating cow intramammary products.

Intramammary product DCDvet	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Dry cow tubes	0.62	0.73	0.61	0.54	0.65	0.58	0.48	0.55	0.45	0.55	0.49	0.45	-28%
Lactating cow tubes	0.89	0.80	0.82	0.69	0.78	0.60	0.51	0.40	0.38	0.37	0.36	0.28	-69%

(B) HP-CIA sales of dry and lactating intramammary products.

Intramammary product DCDvet	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Combination of lactating and dry cow HP-CIAs	0.37	0.33	0.24	0.17	0.12	0.03	0.07	0.02	0.01	0.01	0.01	0.01	-96%

S1.8: Total sales of antibiotics for all animals (tonnes)

Table S1.8.1: Active ingredient in tonnes of antibiotics sold for all animals from 2014 to 2025.
Please note, the figures in the total sales row are rounded to the nearest integer.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Total Sales (tonnes)	452	411	299	256	238	243	242	228	205	200	194	195	-57%

Table S1.8.2: Active ingredient in tonnes of HP-CIAs sold for all animals from 2014 to 2025.
Please note, the figures in the total sales row are rounded to the nearest integer.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Total HP-CIA sales (tonnes)	4.78	4.62	2.86	2.01	1.65	1.27	1.08	0.90	0.91	0.82	0.79	0.83	-83%

S1.9: Total sales of antibiotics by species indication (tonnes)

Table S1.9.1: Active ingredient in tonnes and (percentage of total sales) of antibiotics sold for the animal species categories: food-producing animals, companion animals and combination of food- companion animals from 2014 to 2025.

Note that this section includes products licensed for the combination of food-producing animals and rabbits under food-producing animals. This is because these products are licensed for farmed rabbits and there are no rabbits being farmed for food in the UK. The companion animal category includes dogs, cats, reptiles, rodents, ornamental birds, cage birds, pigeons, exotic animals, reptiles, bearded dragons, rabbits and horses.

Animal species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Food producing animals	392 (87)	356 (87)	241 (81)	197 (77)	182 (77)	186 (77)	190 (78)	171 (75)	155 (76)	154 (77)	153 (79)	159 (81)
Combination of food and companion animals	23 (5)	24 (6)	23 (8)	27 (11)	25 (11)	28 (11)	23 (10)	25 (11)	22 (11)	19 (9)	17 (9)	15 (8)
Companion animals	37 (8)	31 (8)	35 (12)	32 (12)	31 (13)	29 (12)	29 (12)	32 (14)	28 (14)	27 (13)	24 (12)	21 (11)

S1.10: Harmonised outcome indicators for antibiotic use (mg/kg)

Table S1.10.1: Harmonised outcome indicators for antibiotic consumption in food-producing animal species in the UK; Primary indicator (A) and secondary indicators (B), 2014 to 2025.

(A)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Sales (mg/kg)	36.0	32.5	22.9	19.3	17.9	18.7	18.7	17.4	15.7	15.9	15.6	15.9

(B)

Sales per selected antimicrobial class (mg/kg)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Fluoroquinolones	0.20	0.20	0.13	0.09	0.08	0.08	0.06	0.05	006	0.05	0.05	0.06
3rd and 4th generation cephalosporins	0.11	0.10	0.08	0.06	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Colistin	0.07	0.07	0.01	0.001	0.002	0.001	0.00004	0	0	0	0	0

S2.1: Further details on the methodology

Pigs

The antibiotic use data in pigs were extracted from the electronic Medicines Book for Pigs (eMB), developed by the pig sector with support from the VMD, and launched by the Agriculture and Horticulture Development Board Pork (AHDB-Pork) in 2016.

The scope and limitations of the data (as provided by AHDB-Pork) are presented below:

- These data are national, aggregated figures for antibiotic use calculated from individual unit data held in the eMB for pig farms across the UK.
- eMB uptake to date has been voluntary and this sample may not be representative for the whole of the UK.
- In terms of pig production, this eMB data covers English slaughter pigs only for 2015 and 2016, and UK slaughter pigs for 2017 to 2025.
- The eMB data as a percentage of the total clean pig slaughter figures for the relevant region are:

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
57	63	87	88	94	99	96	97	98	97	98

- The data are input by producers and, although clear outliers have been identified and queried, AHDB is not able to validate every individual producer's data. However, at a national, aggregated level, the data provide an estimation of national use and allow year-on-year comparisons to be made.
- The data for 2025 were extracted from eMB in May 2026 and these figures will now be fixed as the reference levels for 2025.
- The eMB database and the calculations within it are subject to a series of quality assurance checks to ensure national aggregated figures are as accurate as possible. As a result of this process, the eMB system is continuing to develop and work to further improve data accuracy is ongoing.

Meat poultry

The British Poultry Council (BPC) provided antibiotic use data for the poultry meat (chicken, turkey and duck) sectors. BPC runs BPC Antibiotic Stewardship, which covered 83% of UK meat poultry production in 2025. This process of data collection started in 2012, and producers are responsible for submitting quarterly (chicken, duck) or annual (turkey and all

breeders) antibiotic use data in the form of an aggregate spreadsheet. BPC then collate the data and report use by sector in their annual report. This includes the overall annual amount of active ingredient used (in tonnes), which covers both breeders and producers.

For the producers, this is then compared with the population at risk of treatment to create a mg/kg use figure. BPC calculates the population at risk of treatment by using annual slaughter numbers. The process of calculating the quantity of antibiotic active ingredient has been validated by the VMD.

Laying hens

The collection of antibiotic use data for the laying hen industry is organised by the British Egg Industry Council (BEIC). Sharing these data with BEIC is mandatory through the Lion Scheme, a farm assurance scheme which represents over 90% of the UK laying hen industry.

All egg producers, pullet rearers and breeding companies are required to report any use of an antibiotic to their subscriber. This is then reported to the BEIC on a quarterly basis. The BEIC collated aggregate annual antibiotic pack level data and provided it to the VMD, who carried out the calculations and validation of the use by active ingredient using ESVAC methodology. Denominator data are available from monthly records of the total number of birds in the scheme, averaged over the year.

The data published here as ‘actual bird days/100 bird days at risk’ represent the average number of days treatment administered per chicken over a 100-day period.

Gamebirds

The Game Farmer’s Association (GFA) and the British Veterinary Poultry Association (BVPA) gamebird subcommittee coordinated a comprehensive, voluntary data collection exercise to measure the use of antibiotics throughout the sector for 2025. This involved collection of in-feed medication records from game feed producers/ feedmills (which supply 95% of game farmers and rearers) and prescribing records from specialist gamebird vets (of which 75% of game farmers and rearers are clients).

Each company was asked to provide a spreadsheet showing the amount of antibiotics used in 2025. GFA aggregated the results and provided them to the VMD, who then used ESVAC methodology to calculate the amount of antibiotic active ingredient administered by the game sector.

Note that a mg/kg figure has not been included, as the European methodology does not include a standardised method for gamebirds.

Salmon

- The salmon use data were collected by Salmon Scotland from all veterinary practices treating salmon in Scotland and therefore represent 100% of Scottish salmon production.
- Estimated production for 2025 is 195,182T (Marine Directorate Production Survey 2024).
- It should also be noted that salmon have a three-year production cycle, so the tonnes of fish produced in any one year do not fully represent the overall salmon population that may require treatment. Consequently, the mg/kg metric may overestimate use when compared with sectors where the entire production cycle occurs within a single year.

Trout

The trout data was collected from the main veterinary practices dealing with trout in England and Scotland and represent approximately 90% of UK trout production.

Dairy and Sheep

The antibiotic use data for sheep and dairy were extracted from the Medicine Hub for Ruminants which was developed by the ruminant industry with support from the VMD and launched by the Agriculture and Horticulture Development Board (AHDB) in 2021.

The scope and limitations of the data (as provided by Medicine Hub) are presented below:

- For dairy and sheep, these data are aggregated figures for antibiotic use calculated from individual enterprise data held in the Medicine Hub for participating sheep flocks and dairy herds across the UK.
- Medicine Hub uptake to date has been voluntary and this sample may not be reflective of the antibiotic use situation across the whole of the UK.
- The data are supplied by farmers, their vets, or bulk data holders and, although clear outliers have been identified and queried, AHDB is not able to validate every individual farmer's data. However, at an aggregated level, the data provide an initial indication of use within the sample provided.
- The data for 2025 were extracted from Medicine Hub on 10 September 2026.
- The Medicine Hub database and the calculations within it are subject to a series of quality assurance checks to ensure aggregated antibiotic use figures are as accurate as possible. The Medicine Hub system is continuing to develop and work to further improve data accuracy is ongoing.

Calf antibiotic sales analysis methodology

The calf antibiotic sales analysis includes oral powder and oral solution products specifically authorised for use in pre-ruminant calves. In the UK, we have antibiotic sales data that covers 100% products sold from Marketing Authorisation Holders and use data for 80-90% of the following livestock sectors: laying hen, pigs, gamebirds and meat poultry.

The methodology involves removing the extrapolated use data of the livestock sectors from the sales data for these products.

To determine the biomass of calves under 6 months of age:

- The average number from the June and December census are taken for both male and female calves <1 year. Note this approach is taken as the number of calves under 6 months is not published.
- This is then divided by 2 (to provide an estimate of the number of male and female calves (<6 months) and multiplied by the average weight for the male and female calves <6 months (taken from the CHAWG AMU metric).

Companion animals and equine

Mg/kg for dogs and cats

In this metric, mg refers to the weight of an antibiotic active ingredient sold for use in dogs and cats. As with the mg/PCU metric, topical products (e.g. those for treating eye, ear and skin infections) are excluded. The denominator is the estimated weight of the whole dog and cat population at risk. The total number of dogs and cats in the UK is estimated using statistics from the PDSA PAW report, which is a survey that is representative of the UK pet-owning population. This is then multiplied by the average weight of a dog and cat, which has been provided by the Royal Veterinary College using the VetCompass system (see S1.2 in Supplementary Material 1 for further details).

The metric is calculated separately for dogs and cats, with the amount of antibiotic active ingredient separated by dog and cat. For products authorised for more than one species, the relative amount of total product sold which is consumed by dogs and cats has been estimated. Estimates are obtained by the VMD from stratification data provided by the Marketing Authorisation Holder (MAH) for each product. The stratification data indicates the percentage of each product which is estimated to have been used in dogs and/or cats +/- other species commonly seen in small animal practice (e.g. rabbits, rodents and exotics) were considered. Products indicated for dogs and/or cats alongside horses and/or food producing animals were not considered, as it is harder to accurately provide stratification estimates for these products, which are primarily injectables and are used increasingly in food producing animals. Therefore, the figures reported will slightly underestimate overall use.

The average number of Daily Defined Doses per animal per year (DDDVet/animal) for dogs and cats

The main issues with using mg/kg for trend monitoring in dogs and cats are that it underestimates the use of long-acting injectables (which are very commonly used in cats). For this reason, dog and cat (companion animal) trend sales data for systemic antibiotics is presented and calculated using the average number of Daily Defined Doses (DDDVet) per animal per year (DDDVet/animal). This metric has been developed alongside, and with the support of, the RUMA Companion Animal and Equine group.

The DDDVet is defined as the assumed average dose per kg animal treated per species per day. These standard daily doses are extracted from the Summary of Product Characteristics (SPC) for each antibiotic product. If there is a dose range, then the lowest dose was chosen, and where the dose rate varies between products with the same active ingredient/ route of administration, then the median dose rate was selected. For long-acting products, the DDDVet is calculated by dividing the dose by the duration of activity for that product. A full list of the DDDVet figures used for each active ingredient/ route of administration can be found in S1.3 of Supplementary Material 1.

The DDDVet/animal is calculated (for each active ingredient/ route of administration and for both dogs and cats) using the method below:

$$\frac{\text{Total amount of active ingredient (mg)}}{\text{(DDDVet (mg/kg/day) * total animal population weight at risk (kg))}}$$

The results are then added together to get the total figure. The mg of antibiotic active ingredient and total weight of animal population at risk is calculated in the same way as described above for the mg/kg calculation.

Equine DDDVet Methodology

Data presented in the report is collected by the British Equine Veterinary Association (BEVA) as part of the MonitorME scheme. The DDDVet is defined as the assumed average dose per kg animal treated per species per day. In the 2025 calculations, 140,075 horses represented a sample of the equine population (19% of the total UK horse population). Standard equine dose rates that are considered to be used in the field were used to estimate the average number of days per year that each horse received an antibiotic for the Defined Daily Dose metric. This data is available in section 1.3 of Supplementary Material 1.

To determine the DDDVet, submitting practices extracted anonymised data from their Practice Management System to provide the following data:

- Total mg used for each antibiotic class active ingredient by route of administration

- To provide the average weight of the population – the number of horses treated during the calendar year (including horses that did not receive antibiotics) and their average weight if available was used. A standard weight of 500kg was applied where average weights were not provided.

The equine DDDVet/animal is calculated using the method below (for each active ingredient/route of administration):

$$\frac{\text{Total amount of active ingredient (mg)}}{\text{(DDDVet x average weight of reviewed equine population)}}$$

The results of each active ingredient are then added together to total the DDDVet Equine value.

S2.2 Usage of veterinary antibiotics for pigs (in mg/kg)

Table S2.2.1: Usage recorded for active ingredient in mg/kg of antibiotics in eMB Pigs by antibiotic class; 2015 to 2025.

Please note that the antibiotic class referred to as "Other" includes lincosamides, amphenicols, polymyxins, fluoroquinolones and 3rd and 4th generation cephalosporins.

Antibiotic Class	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2015 to 2025
Tetracyclines	67.8	47.8	32.8	26.8	24.5	21.5	17.7	13.6	16.0	14.9	12.3	-82%
Penicillins	21.3	15.9	13.2	12.3	11.7	12.4	10.3	8.4	9.1	9.2	8.4	-60%
Trimethoprim-sulfonamides	38.1	16.9	12.2	10.6	10.4	9.7	8.2	5.3	5.8	7.2	6.2	-84%
Aminoglycosides	2.0	1.7	2.1	3.2	3.8	5.5	5.0	4.7	6.7	6.8	5.8	186%
Macrolides	17.8	16.7	9.4	6.1	5.3	6.6	5.7	5.1	5.6	5.3	4.9	-73%
Other	2.9	2.5	1.5	1.9	2.3	2.7	1.8	2.6	3.1	4.4	4.3	48%
Pleuromutilins	9.9	4.4	5.8	3.1	6.1	2.6	1.9	1.8	2.9	2.3	2.8	-71%
Total	**159.9**	**105.8**	**78.6**	**63.9**	**64.2**	**61.0**	**50.7**	**41.5**	**49.2**	**50.0**	**44.8**	**-72%**

Table S2.2.2: HP-CIA usage, depicted in active ingredient of antibiotics, in mg/kg recorded in eMB Pigs from 2015 to 2025.

Antibiotic Class	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2015 to 2025
Fluoroquinolones	0.061	0.027	0.044	0.030	0.020	0.026	0.015	0.006	0.004	0.005	0.006	-90%
3rd and 4th generation cephalosporins	0.011	0.005	0.008	0.006	0.003	0.004	0.004	0.001	0.003	0.003	0.003	-97%
Colistin	0.492	0.122	0.006	0.008	0.001	0	0	0	0	0	0	-100%
Total	**0.564**	**0.154**	**0.059**	**0.043**	**0.024**	**0.030**	**0.019**	**0.007**	**0.004**	**0.005**	**0.007**	**-99%**

S2.3: Usage of veterinary antibiotics for meat poultry (in tonnes and mg/kg)

Table S2.3.1: Active ingredient in tonnes of antibiotics used by all members of BPC Antibiotic Stewardship by antibiotic class from 2014 to 2025.

Please note, the category penicillins include amoxicillin and phenoxymethylpenicillin and antibiotics in the class referred to as “Other” includes pleuromutilins, fluoroquinolones, colistin and products under the cascade. Also, both fluoroquinolones and colistin are HP-CIAs.

Antibiotic Class	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2014 to 2025
Penicillins	19.8	14.2	10.6	8.2	10.2	12.9	15.1	12.2	12.1	9.6	10.1	7.4	-63%
Tetracyclines	30.6	24.1	9.1	3.3	2.5	4.0	2.5	1.6	1.8	2.3	1.9	2.0	-94%
Aminoglycosides	5.5	3.6	1.2	0.9	1.1	1.0	1.5	1.7	1.2	1.6	0.7	0.9	-84%
Trimethoprim-sulfonamides	1.2	1.0	1.6	0.9	1.2	1.1	1.0	0.9	0.8	1.1	0.7	0.6	-47%
Lincosamides	2.4	1.6	0.5	0.4	0.6	0.5	0.8	0.8	0.6	0.8	0.3	0.2	-91%
Macrolides	2.7	1.1	0.5	0.6	0.5	0.06	0.1	0.01	0.02	0.03	0.01	0.09	-97%
Other, including:	1.3	0.58	0.14	0.06	0.02	0.02	0.01	0.06	0.001	0.007	0.002	0.004	-99.8%
Fluoroquinolones (kg)	1,131	540	122	38	17.3	14.6	12.1	56.6	1.3	5.1	2.2	1.8	(-1129 kg)
Colistin (kg)	121	40	8	0	0	0	0	0	0	0	0	0	(-121 kg)
Total	**63.5**	**46.2**	**23.7**	**14.4**	**16.2**	**19.7**	**21.0**	**17.3**	**16.6**	**15.4**	**13.7**	**11.2**	**-78%**

Table S2.3.2: Active ingredient in mg/kg of antibiotics used by all members of BPC Antibiotic Stewardship by species from 2014 to 2025.

Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2014 to 2025
Turkeys	108.1	98.4	42.6	22.3	23.0	20.7	12.7	21.0	17.4	16.6	19.7	18.1	-83%
Broilers	20.3	11.4	7.1	4.1	5.2	7.3	6.8	5.7	5.9	5.6	4.7	3.8	-19%
Ducks	6.3	3.4	1.4	1.4	0.7	0.7	1.1	0.7	0.1	0.2	0.2	0.3	-95%

S2.4: Usage of veterinary antibiotics for laying hens (in % bird days)

Table S2.4.1: Antibiotic use in percentage bird days by members of the BEIC Lion Code from 2016 to 2025.

Please note, the class referred to as “Other” includes fluoroquinolones, colistin (both of which are HP-CIAs), sulfonamides, and lincosamides.

Antibiotic	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2016 to 2025
Tetracyclines	0.26	0.31	0.33	0.41	0.26	0.18	0.14	0.13	0.14	0.14	-48%
Pleuromutilins	0.25	0.17	0.11	0.12	0.10	0.10	0.05	0.03	0.05	0.04	-83%
Penicillins	0.06	0.02	0.05	0.05	0.05	0.02	0.02	0.04	0.05	0.04	-23%
Macrolides	0.04	0.06	0.04	0.06	0.03	0.02	0.02	0.01	0.02	0.02	-59%
Aminoglycosides	0.02	0.01	0.02	0.04	0.03	0.01	0.01	0.01	0.02	0.02	-26%
Other:	0.034	0	0.0002	0.003	0.002	0.0008	0.00	0.00	0.0013	0.0019	-95%
Fluoroquinolones	0.002	0	0	0	0	0	0	0	0.0007	0.0003	-86%

Colistin	0.028	0	0	0	0	0	0	0	0	0	-100%
Total	**0.67**	**0.57**	**0.55**	**0.68**	**0.47**	**0.33**	**0.23**	**0.22**	**0.28**	**0.25**	**-62%**

S2.5: Usage of veterinary antibiotics for gamebirds (in tonnes)

Table S2.5.1: Active ingredient in tonnes of antibiotics used by the gamebird industry, recorded by GFA from 2016 to 2025.

Please note the class referred to as "Other" includes aminoglycosides, amphenicols, colistin, fluoroquinolones, lincomycins, macrolides, trimethoprim-sulfonamides. Also, both fluoroquinolones and colistin are HP-CIAs.

Antibiotic	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2016 to 2025
Tetracyclines	14.4	8.1	5.4	5.4	2.9	4.5	3.5	5.1	5.5	6.2	-57%
Pleuromutilins	3.5	3.2	2.6	2.5	1.5	2.4	2.0	3.0	3.0	3.2	-9%
Penicillins	1.2	0.8	0.8	1.3	0.8	1.5	0.8	1.6	2.1	1.4	19%
Other:	1.0	0.4	0.5	0.8	0.5	0.5	0.4	0.3	0.5	0.6	-38%
Fluoroquinolones (kg)	63	50	47	58	22	26	23	28	45.1	15	-76%
Colistin (kg)	0.6	0	0	0	0	0	0	0	0	0	-100%
Total	**20.0**	**12.6**	**9.2**	**10.0**	**5.7**	**8.9**	**6.7**	**9.9**	**11.1**	**11.4**	**-43%**

S2.6: Usage of veterinary antibiotics for salmon (mg/kg)

Table S2.6.1: Active ingredient in mg/kg of antibiotics used on Scottish salmon farms from 2017 to 2025.

Antibiotic	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2017 to 2025
Oxytetracycline	13.8	3.9	10.2	25.3	37.2	12.7	12.4	1.1	3.1	-78%
Florfenicol	2.2	2.7	3.3	4.0	5.9	5.9	12.4	7.1	9.3	326%
Oxolinic acid	0.12	0.08	0.02	0.01	0.00	0.00	0.00	0.00	0.00	-100%
Amoxicillin	0.004	0	0	0	0	0	0	0	0	-100%
Total	**16.1**	**6.7**	**13.5**	**29.3**	**43.1**	**18.6**	**24.8**	**8.1**	**12.4**	**-23%**

S2.7: Usage of veterinary antibiotics for trout (mg/kg)

Table S2.7.1: Active ingredient in mg/kg of antibiotics used on a sample of trout farms from 2017 to 2025.

Antibiotic	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change 2017 to 2025
Oxytetracycline	7.3	3.8	5.1	7.7	4.3	40.0	3.7	2.6	1.9	-73%
Oxolinic acid	6.6	5.8	2.4	4.3	3.2	2.2	1.8	1.5	4.0	-40%
Florfenicol	4.4	2.2	1.9	1.9	1.4	2.0	1.4	1.1	1.0	-77%
Amoxicillin	0.9	1.2	0.2	0	0	0	0	0	0	-100%
Total	**19.2**	**13.0**	**9.7**	**13.9**	**9.0**	**44.1**	**6.9**	**5.1**	**6.9**	**-64%**

S2.8: Usage of veterinary antibiotics for sheep (mg/kg)

Table S2.8.1: Active ingredient in mg/kg of veterinary antibiotics used in sheep in 2024 to 2025.

Please note that the class referred to as “Other” includes trimethoprim-sulfonamides, amphenicols, aminocoumarins, and 1st generation cephalosporins.

Antibiotic Class	2024	2025
Tetracyclines	2.7	2.1

Penicillins	2.5	1.4
Aminoglycosides	0.6	0.4
Macrolides	0.4	0.2
Lincosamides	0.09	0.03
Other	0.08	0.04
HP-CIAs	0.0005	0.0008
Total	**6.3**	**4.3**

S2.9: Usage of veterinary antibiotics for cattle (mg/kg)

Table S2.9.1: Active ingredient in mg/kg of veterinary antibiotics used in cattle in 2024 to 2025.

Please note that the class referred to as "Other" includes 1st and 2nd generation cephalosporins, amphenicols, lincosamides, aminocoumarins, and pleuromutilins.

Antibiotic Class	2024	2025
Penicillins	2.6	2.4
Trimethoprim-sulfonamides	1.2	1.2
Aminoglycosides	1.0	1.2
Tetracyclines	0.8	0.8
Macrolides	0.6	0.6
Other	0.6	0.7
HP-CIAs	0.003	0.003
Total	**6.8**	**6.8**

S2.10 Sales of veterinary antibiotics for cattle (mg/kg)

Table S2.10.1: Active ingredient in mg/kg of sales of injectable HP-CIA products licenced for cattle, 2014 to 2025.

Antibiotic	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Injectable HP-CIA products licenced for cattle (mg/kg)	0.41	0.40	0.36	0.27	0.20	0.10	0.12	0.09	0.08	0.08	0.08	0.08	-81%

S2.11 Sales of oral products licensed for calves (DDDVet)

Table S2.11.1: Active ingredient in DDDVet of sales of oral products licenced for calves.

Antibiotic Class	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change Since 2016
Oral products licensed for calves	1.79	2.08	1.91	2.42	2.10	2.18	2.35	2.76	3.86	5.03	181%

S2.12 Usage of veterinary antibiotics for horses (in DDDVet/kg)

Table S2.12.1: Active ingredient (DDDVet/kg) of antibiotics by antibiotic class used in horses in 2024 to 2025.

Antibiotic Class	2024	2025
Trimethoprim-sulfonamides	0.49	0.47
Tetracyclines	0.46	0.45
Fluoroquinolones	0.07	0.0
Aminoglycosides	0.06	0.0
Penicillins	0.05	0.0
3rd and 4th generation cephalosporins	0.03	0.0
Other	0.02	0.14
Total	**1.17**	**1.05**

S2.13: Sales of veterinary antibiotics for dogs and cats (in DDDVet/kg)

Table S2.13.1: Active ingredient (DDDVet/kg) of antibiotics by antibiotic class sold for use in (A) dogs from 2014 to 2025 (B) cats from 2014 to 2025.

Please note, antibiotic classes listed as “Other” include other aminopenicillins (amoxicillin and ampicillin), trimethoprim-sulfonamides, metronidazole-spiramycin. Some antibiotic classes have been rounded to two decimals places for ease of comparison.

A) Active ingredient by antibiotic class sold for use in dogs.

Antibiotic Class	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Amoxicillin-clavulanic acid (aminopenicillin)	2.37	1.45	1.71	1.97	1.87	1.63	1.41	1.91	1.57	1.40	1.24	1.17	-51%
Cephalexin (1st generation cephalosporin)	1.11	0.85	0.84	0.77	0.80	0.66	0.58	0.63	0.61	0.48	0.42	0.35	-69%
Clindamycin (lincosamide)	0.46	0.37	0.39	0.35	0.38	0.32	0.28	0.31	0.27	0.26	0.22	0.20	-56%
Fluoroquinolones	0.32	0.23	0.23	0.20	0.21	0.16	0.18	0.18	0.14	0.13	0.12	0.10	-67%
Metronidazole (imidazole derivative)	0.0	0.0	0.09	0.17	0.21	0.20	0.21	0.16	0.16	0.11	0.11	0.07	100%
Tetracyclines	0.16	0.15	0.13	0.15	0.08	0.06	0.08	0.11	0.08	0.08	0.07	0.05	-71%
Cefovecin (3rd generation cephalosporin)	0.10	0.06	0.09	0.09	0.09	0.08	0.07	0.08	0.07	0.05	0.05	0.04	-63%
Other	0.36	0.33	0.41	0.16	0.12	0.07	0.03	0.04	0.04	0.04	0.04	0.05	-88%
Total	**4.89**	**3.45**	**3.90**	**3.85**	**3.77**	**3.19**	**2.84**	**3.42**	**2.94**	**2.55**	**2.27**	**2.03**	**-58%**

B) Active ingredient by antibiotic class sold for use in cats.

Antibiotic Class	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Change since 2014
Amoxicillin-clavulanic acid (aminopenicillin)	0.99	0.75	0.69	0.71	0.66	0.61	0.83	1.11	0.91	1.16	1.13	1.16	17%
Cefovecin (3rd generation cephalosporin)	1.37	0.78	1.28	1.26	1.15	1.20	1.06	1.05	0.96	0.80	0.74	0.62	-55%
Metronidazole (imidazole derivative)	0.0	0.0	0.07	0.14	0.16	0.16	0.19	0.19	0.18	0.16	0.11	0.09	100%
Tetracyclines	0.05	0.05	0.05	0.05	0.04	0.04	0.06	0.11	0.07	0.09	0.08	0.06	23%
Clindamycin (lincosamide)	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	33%
Fluoroquinolones	0.07	0.06	0.06	0.07	0.13	0.05	0.06	0.06	0.05	0.05	0.04	0.04	-49%
Cephalexin (1st generation cephalosporin)	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	-46%
Other	0.08	0.07	0.04	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	-85%
Total	**2.63**	**1.78**	**2.26**	**2.34**	**2.23**	**2.14**	**2.28**	**2.60**	**2.26**	**2.33**	**2.18**	**2.05**	**-22%**

S2.14: Antibiotic Use Coverage

Table S2.14.1: UK coverage of antibiotic use data presented in UK-VARSS by sector (%), 2014 to 2025.

Sector	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Salmon	N/A	N/A	N/A	100	100	100	100	100	100	100	100	100
Pigs	N/A	57	63	87	88	94	99	96	97	98	97	98
Gamebirds	N/A	N/A	90	90	90	90	90	90	90	90	90	90
Laying Hens	N/A	N/A	90	90	90	90	90	90	90	90	90	90
Trout	N/A	N/A	N/A	90	90	90	90	90	90	90	90	90
Meat Poultry	87	88	83	88	86	76	91	87	85	83	86	83
Dairy	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	32	30	39	49
Sheep	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9	11	8	11
Beef	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6	N/A	N/A	N/A
Horses	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25	19