Veterinary
Medicines
Directorate

Highlights

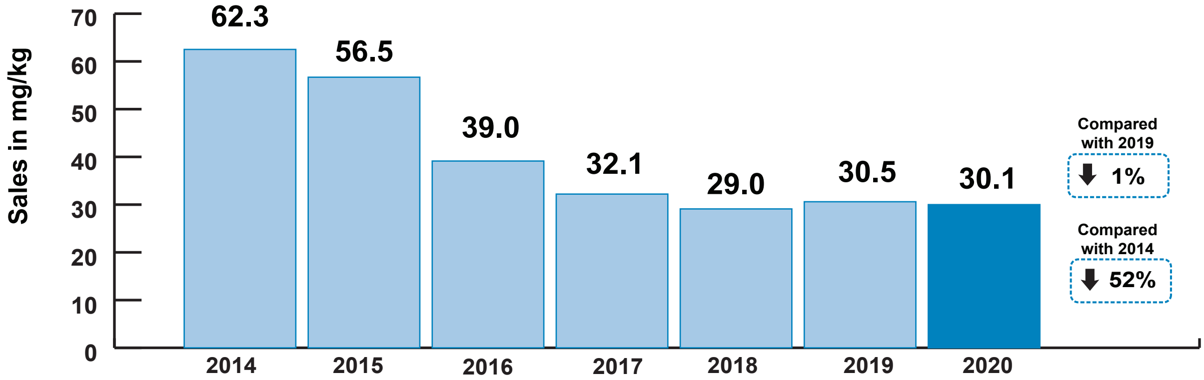
UK-VARSS 2020

Published November 2021

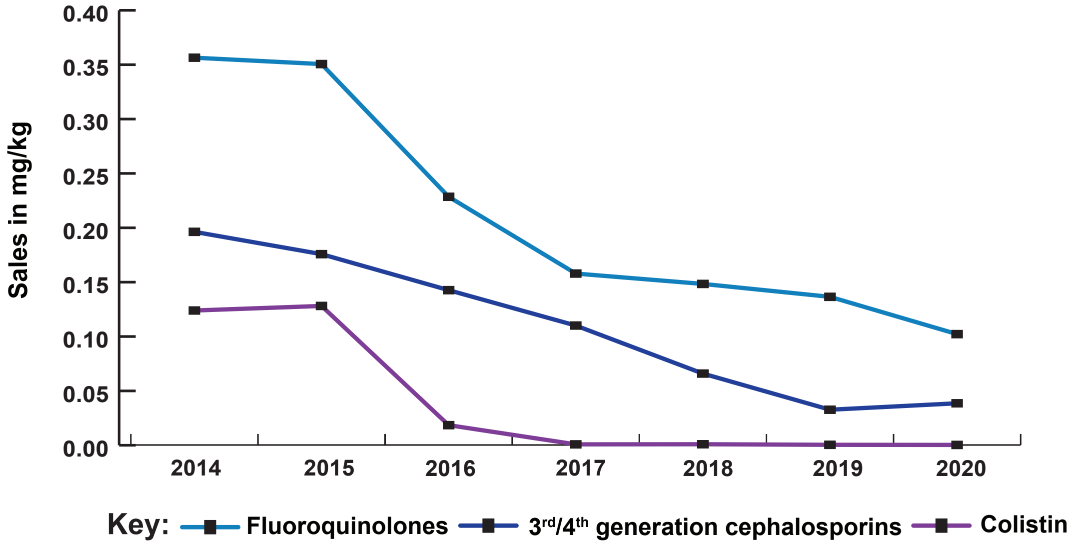
Antibiotic sales

Sales for food-producing animals (mg/kg)

Sales of veterinary antibiotics for use in food-producing animals, adjusted for animal population, were 30.1 mg/kg; a 0.3 mg/kg (1%) decrease since 2019 and a 32.2 mg/kg (52%) decrease since 2014.



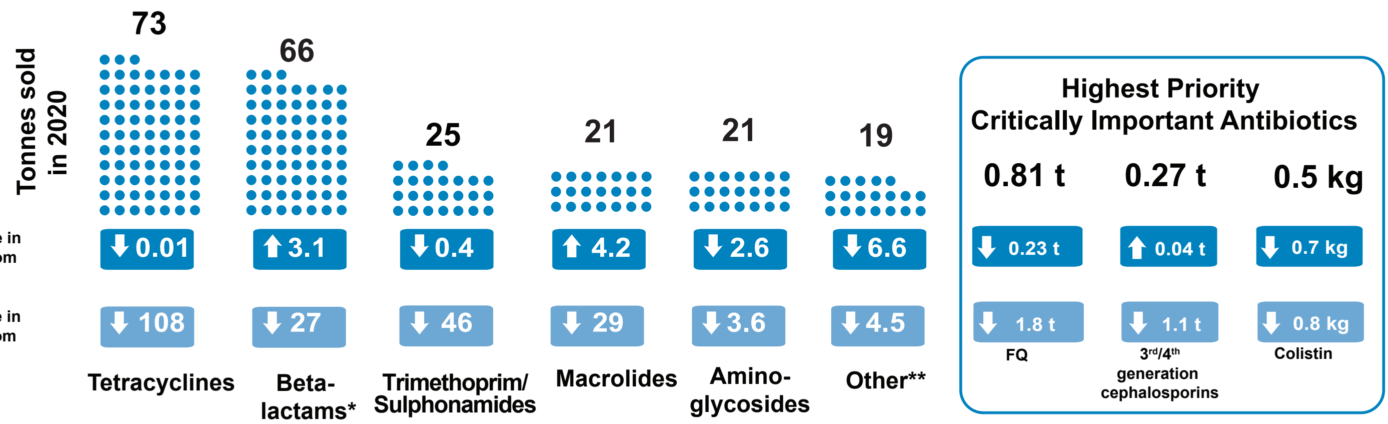
Sales of Highest Priority Critically Important Antibiotics (HP-CIAs) in food-producing animals account for 0.5% of total sales and have dropped by 0.03 mg/kg since 2019 and 0.5 mg/kg (79%) since 2014.



In 2020 the total quantity of antibiotic active ingredient sold in the UK was 226.0 tonnes.

	2014	2015	2016	2017	2018	2019	2020	Compared with 2014	Compared with 2019
Total sales (all animals, tonnes)	447	406	293	246	223	229	226	↓ 49%	↓ 1%

Sales of HP-CIAs reduced by 0.18 tonnes between 2019 and 2020 (from an already low level) and have now fallen by 3.7 tonnes (77%) since 2014. Tetracyclines remain the most sold antibiotic class (32% of total sales), followed by beta-lactams (29% of total sales). Sales of HP-CIAs in all animal species represent a small proportion (0.48%) of the overall antibiotic sales.



● = 1 tonne
t = tonnes
FQ = fluoroquinolones
* Includes 3rd and 4th generation cephalosporins.
** Includes amphenicols, lincomycins, pleuromutilins, steroidal antibiotics and polymyxins (including colistin).

Antibiotic usage

Antibiotic usage refers to the amount of antibiotics prescribed and/or administered per sector. The data have been collected and provided to the VMD by the animal industry on a voluntary basis.

Antibiotic usage by food-producing animal species

	Total coverage %*	2020 Total tonnage**	2020 Total per unit***	Longer term change****	1 year change
Pigs	>95	83.1	105 mg/kg	↓ 172.7 mg/kg (62%)	↓ 5.5 mg/kg
Turkeys	90	21.0	25.7 mg/kg	↓ 194 mg/kg (88%)	↓ 16.3 mg/kg
Broilers			16.3 mg/kg	↓ 32.5 mg/kg (67%)	↓ 1.2 mg/kg
Ducks			2.6 mg/kg	↓ 12.5 mg/kg (83%)	↑ 0.9 mg/kg
Laying hens	90	3.1	0.47 % bird days	↓ 0.19 %bird days (29%)	↓ 0.21 %bird days
Gamebirds	91	6.0	—	↓ 14.2 tonnes† (71%)	↓ 4.4 tonnes†
Salmon	100	5.6	29.3 mg/kg	↑ 13.2 mg/kg (82%)	↑ 15.8 mg/kg
Trout	90	0.16	13.9 mg/kg	↓ 5.4 mg/kg (28%)	↑ 4.2 mg/kg

Highest Priority Critically Important Antibiotics by food-producing animal species

	Total coverage %*	2020 Total kg**	2020 Total per unit***	Longer term change****	1 year change
Pigs	>95	41	0.05 mg/kg	↓ 0.93 mg/kg (95%)	↑ 0.01 mg/kg
Meat Poultry	90	12	0.008 mg/kg	↓ 1.2 mg/kg (99%)	↓ 0.001 mg/kg
Gamebirds	91	22	—	↓ 42.5 kg† (66%)	↓ 36.2 kg†
Trout	90	48	4.3 mg/kg	↓ 2.3 mg/kg (35%)	↑ 1.8 mg/kg
Salmon	100	2.5	0.01 mg/kg	↓ 0.11 mg/kg (89%)	↓ 0.01 mg/kg

* Represents the % animals covered by the data, except gamebirds which represents an estimate of the total % antibiotics sales

** Relates to the weight of antibiotic active ingredient, using ESVAC methodology

*** mg/kg relates to the amount of active ingredient standardised by kg biomass and calculated using ESVAC methodology, % doses refers to 'actual daily bird-doses/100 bird-days at risk'

**** This represents the change from when antibiotic usage was first published, which was 2015 for pigs, 2014 for meat poultry, 2016 for laying hens, 2016 for gamebirds and 2017 for salmon and trout

† Note that industry estimates suggest that, due to Covid restrictions, gamebird rearing reduced by 30% during 2020

Antibiotic resistance in zoonotic and commensal bacteria from healthy animals at slaughter

Resistance in *Escherichia coli* from broilers and turkeys

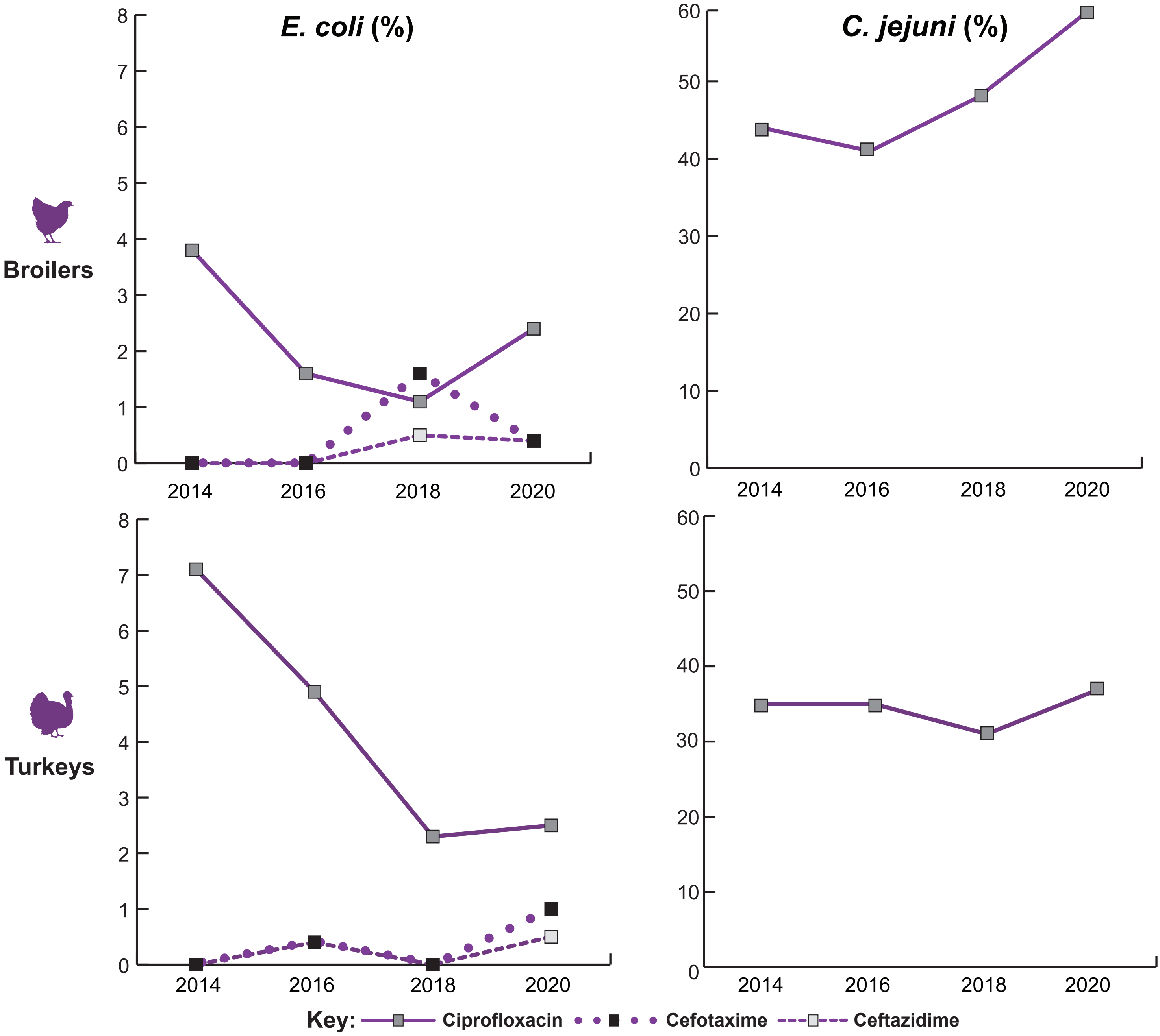
Overall, the UK can report trends of decreasing AMR in *E. coli* from healthy broilers at slaughter since 2014. Resistance to HP-CIAs remains undetected or at low or very low levels* in both broilers and turkeys. There has also been a decrease in ESBL/AmpC-producing *E. coli* detected in broilers and turkeys since 2016, with less than 5% of caecal samples testing positive at slaughter in 2020.

Resistance in *Salmonella* spp. from broilers, laying hens and turkeys

In *Salmonella* collected from broilers and layers as part of the National Control Programmes (NCPs), susceptibility to the full panel of antibiotics tested has decreased since 2018; however, in broilers, it is still higher than in 2014. All *Salmonella* isolated from poultry through the NCPs were fully susceptible to the HP-CIAs tested, with the exception of nine isolates from layer flocks, which belong to a serovar that is naturally resistant to colistin.

Resistance in *Campylobacter jejuni* from broilers and turkeys

This year, *C. jejuni* isolates from broilers showed increasing and very high resistance to ciprofloxacin*. This situation is not unique to the UK and is occurring despite very low fluoroquinolone use in meat poultry. In turkeys, resistance levels are more stable, but remain high. Resistance to erythromycin, a first-line treatment for *Campylobacter* infection in people, remained very low in broilers and turkeys (<1%).

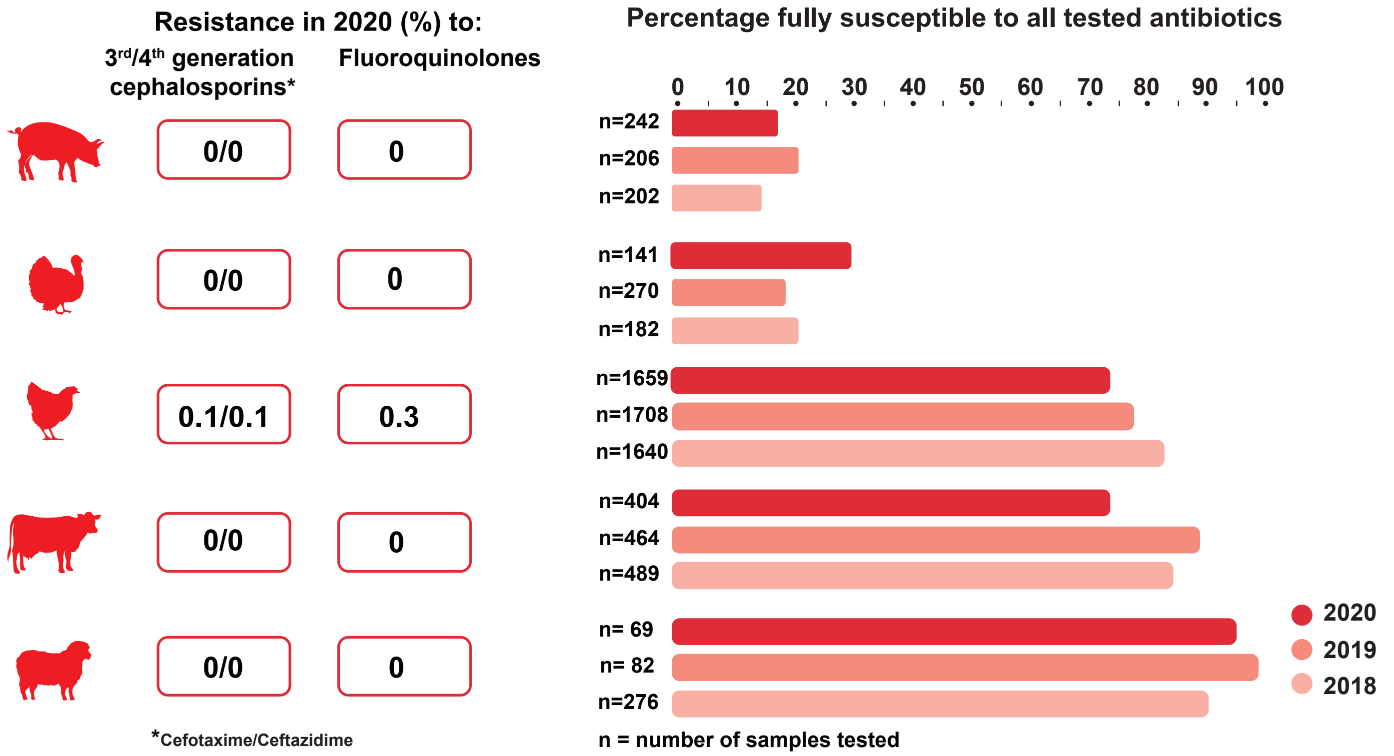


* Description of percentage resistance referenced: rare (<0.1%), very low (0.1% to 1%), low (>1% to 10%), moderate (>10% to 20%), high (>20% to 50%), very high (>50% to 70%), extremely high (>70%)

Antibiotic resistance - clinical surveillance

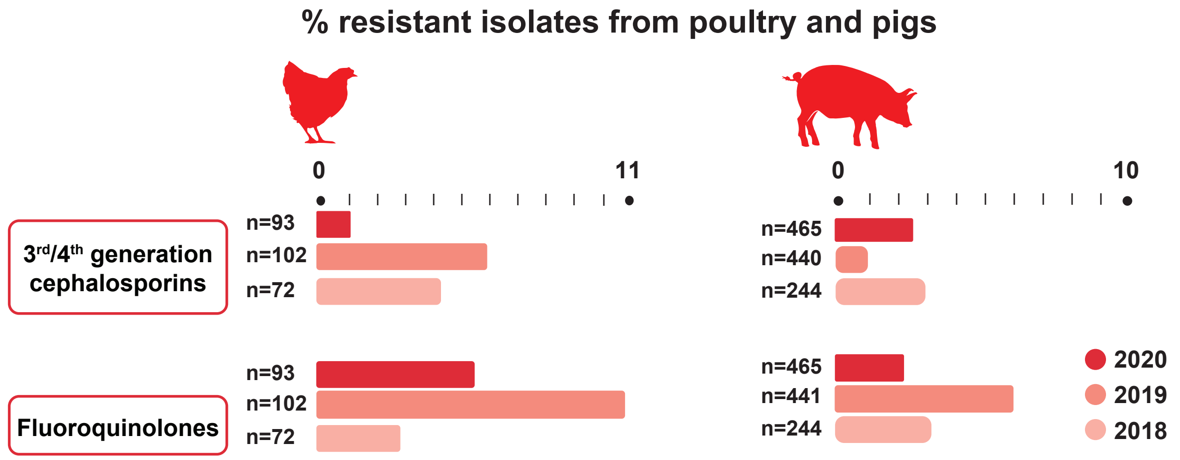
Resistance in *Salmonella* spp.

Of the 4,205 *Salmonella* isolates tested, 68% were susceptible to all of the antibiotics tested. No resistance to third/fourth generation cephalosporins and fluoroquinolones was detected in cattle, pigs, sheep and turkeys. In chickens, resistance to third/fourth generation cephalosporins (0.1%) and fluoroquinolones (0.3%) was very low. Resistance to ciprofloxacin was detected in a small number of isolates which were detected from chickens, feed and related samples, a pheasant and other non-avian species. Two isolates detected in an equine environment were multi-drug resistant.



Resistance in *Escherichia coli*

Resistance to fluoroquinolones and third generation cephalosporins remains low (≤10%) compared to 2018 for all animal species, the exception being for chickens where in 2019, fluoroquinolone resistance was 11%.



MIC testing of veterinary pathogens

This year's clinical surveillance programme has been enhanced to include MIC testing for a core range of key veterinary bacterial pathogens against commonly used clinical antibiotics. This improves the usefulness of our AMR surveillance and will also help vets make better prescribing choices.

Many isolates were susceptible to the panel of antimicrobials tested and when resistance was detected, alternative therapeutic options were likely to be available amongst antimicrobials authorised for veterinary use. Resistance was uncommon or not detected amongst antimicrobials which are often used as second or third line treatment options.

Background

How are sales data collected?
In the UK, from 2005 it has been a statutory requirement for pharmaceutical companies to report to the VMD the amount of antibiotic products sold for use in animals. The quantity of active ingredient is calculated from the amounts sold and the product characteristics. These sales data do not take into account wastage of veterinary antibiotics. However, this is the best currently available approximation of the quantity of antibiotics administered to animals in the UK.

How are usage data collected?
Data have been voluntarily provided by producers (pig, poultry and laying hen sectors), feed companies (gamebirds) and veterinary practices (gamebirds and fish). Usage data collection systems have been put in place to collect data from the British Poultry Council (meat poultry), the British Egg Industry Council (laying hen sector), the Game Farmers Association (gamebirds), the electronic Medicines Book (pigs), British Trout Association (trout) and Scottish Salmon Producers' Association (salmon).

Usage data, i.e. the amount of antibiotics purchased, prescribed and/or administered, have the potential to provide much more precise estimates of use. The VMD has been working with the animal production sectors to develop sector-led data collection systems to monitor their antibiotic usage.

What is the Population Correction Unit (PCU)?
Trends in sales of antibiotics between years and different countries cannot be determined without taking into consideration variations in the number and size of animals that may require treatment. Therefore, sales data are analysed using the population correction unit (PCU). This is a standard technical unit of measurement developed by the European Medicines Agency and adopted by EU countries. This allows data to be presented as mg of antibiotic per kg of livestock biomass. For more details see:
https://www.gov.uk/government/publications/understanding-the-mgpcu-calculation-used-for-antibiotic-monitoring-in-food-producing-animals

What are Critically Important Antibiotics (CIAs)?
Certain antibiotic classes are categorised by the World Health Organization (WHO) as critically important antibiotics for human use, of which several are designated as 'highest priority critically important antibiotics' (HP-CIA). In January 2020, the European Medicines Agency published new scientific advice on the risk to humans from antibiotic resistance caused by the use of highest priority critically important antibiotics (HP-CIAs) in animals. The report was prepared by Antimicrobial Advice Ad Hoc Expert Group (AMEG). Fluoroquinolones, third and fourth generation cephalosporins and polymyxins were classified as category B, where the use of these antibiotics should be restricted, as a result of their critical importance in human medicine. For more details see:
https://www.ema.europa.eu/en/documents/report/categorisation-antibiotics-european-union-answer-request-european-commission-updating-scientific_en.pdf

How is antibiotic resistance interpreted?
Antibiotic resistance in bacteria isolated from animals is monitored through two distinct surveillance programmes: harmonised monitoring and clinical surveillance. The harmonised monitoring scheme is a UK-wide programme in which we test bacteria from the gut of healthy pigs and poultry at slaughter, giving us a representative picture of resistance in key livestock species entering the food chain. Clinical surveillance involves the testing of bacteria that have been isolated from clinical samples submitted by farmers and private veterinarians to government laboratories in England and Wales.

Susceptibility testing for harmonised monitoring is performed using broth microdilution to determine minimum inhibitory concentrations (MICs). Resistance is assessed using EUCAST (European Committee on Antimicrobial Susceptibility Testing) human clinical break points (CBPs) and EUCAST epidemiological cut-off values (ECOFFs). Susceptibility results included in the Highlights as well as in the main body of the report were interpreted using CBPs, or ECOFFs where CBPs were unavailable. Results interpreted using both human CBPs and ECOFFs are reported in full in S3.3 of the supplementary material.

In the 2020 clinical surveillance programme, MIC testing was performed for important respiratory pathogens of cattle, sheep, and pigs, and the results were interpreted using veterinary CBPs when possible. Otherwise, resistance was assessed by disc diffusion techniques, and interpreted using BSAC (British Society for Antimicrobial Chemotherapy) human CBPs, where available. Full details of the methods used are available in S4.1 of the supplementary material.