Veterinary Medicines Directorate

Highlights

UK-VARSS 2017

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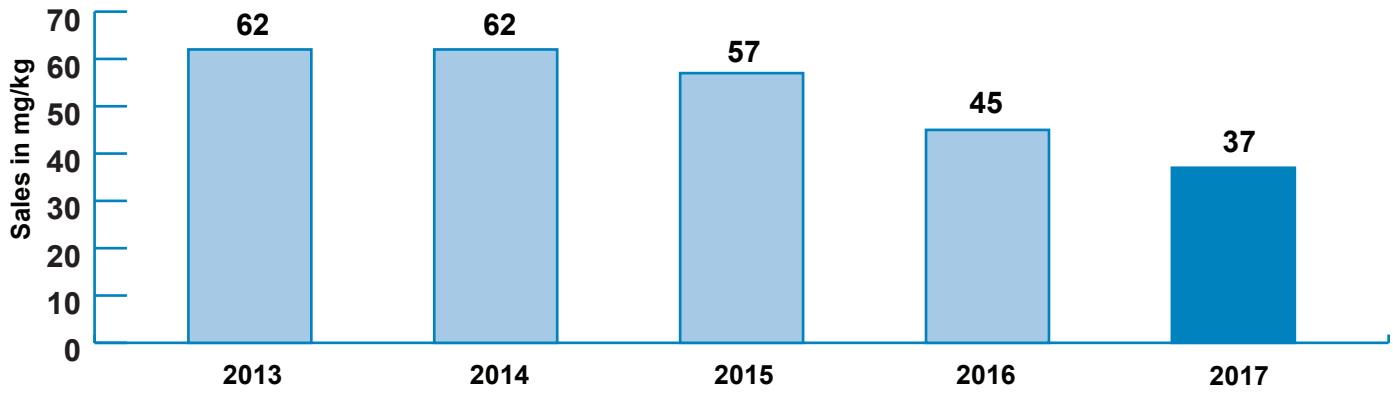
Antibiotic Sales

Overall trends in mg/kg

In 2017, sales of veterinary antibiotics for use in food-producing animals, adjusted for animal population, were 37 mg/kg; an 8 mg/kg (18%) drop from 2016, and 25 mg/kg (40%) decrease from 2013.

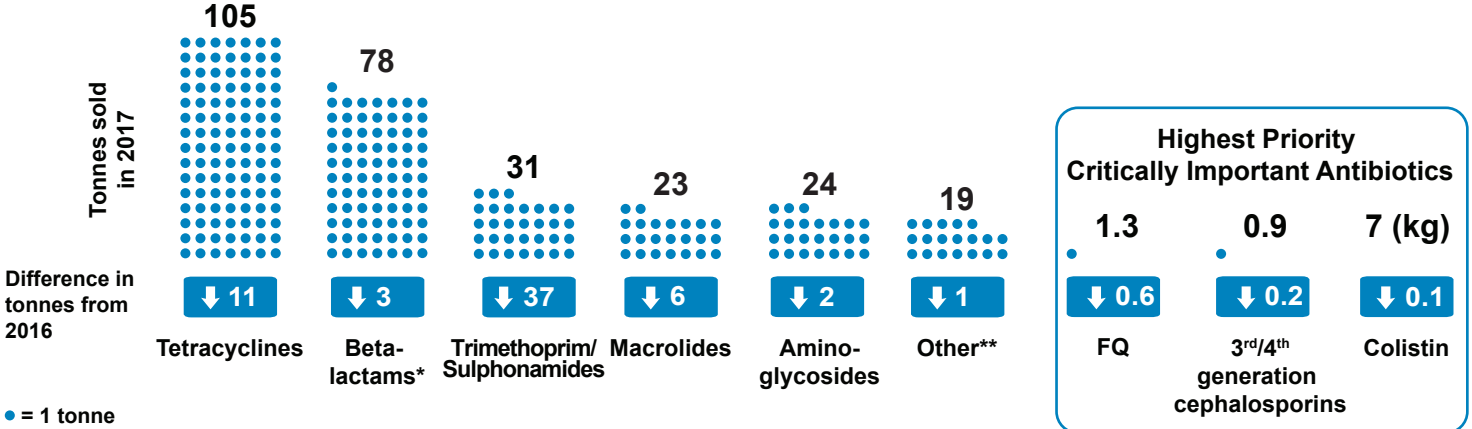


Sales of highest priority critically important antibiotics (HP-CIAs) in food-producing animals dropped by a further 0.86 tonnes (29%) from an already low level in 2016; an overall drop of 2.35 tonnes (52%) between 2013 and 2017.

	2013	2014	2015	2016	2017	Compared with 2016	Compared with 2013
Sales (all antibiotics, mg/kg)	62	62	57	45	37	⬇ 18%	⬇ 40%
Fluoroquinolones (mg/kg)	0.36	0.35	0.34	0.23	0.16	⬇ 30%	⬇ 55%
3rd/4th generation cephalosporins (mg/kg)	0.18	0.19	0.17	0.15	0.12	⬇ 21%	⬇ 32%
Colistin (mg/kg)	0.11	0.12	0.12	0.02	0.001	⬇ 94%	⬇ 99%
Total sales (all animals, tonnes)	436	448	408	338	282	⬇ 17%	⬇ 35%

Total sales in tonnes of active ingredient by antibiotic class (all animal species)

Overall, tetracyclines remain the most sold antibiotic class (37%), followed by beta-lactams (28%) and trimethoprim/sulphonamides (11%). Sales of HP-CIAs in all animal species represent a small proportion (0.8%) of the overall antibiotic sales.



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

Antibiotic Usage

Antibiotic usage by food-producing animal species

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

	Total coverage %*	2017 Total tonnage	2017 Total per unit**	Compared with 2016 %	HP-CIA usage	Compared with 2016 %
Pigs	87	90	131 mg/kg	↓ 28	0.1 mg/kg	↓ 63
Turkeys	90	14	45 mg/kg	↓ 48	0.03 mg/kg	↓ 75
Broilers			10 mg/kg	↓ 42		
Ducks			3 mg/kg	0		
Laying hens	90	2.2	0.57 % doses	↓ 22	0	↓ 100
Gamebirds	90*	13	—	↓ 36	49.6 kg	↓ 22
Salmon	100	3.0	17 mg/kg	—	0	—
Trout	70	0.2	19 mg/kg	—	0	—
Dairy	31†	4.2	17 mg/kg	↓ 35†	0.6 mg/kg	↓ 28†
Beef	5†	0.9	19 mg/kg	—	0.3 mg/kg	—

*** Represents the % animals covered by the data, except gamebirds which represents an estimate of the % total antibiotic sales.**
**** mg/kg relates to the amount of active ingredient normalised by kg biomass and calculated using ESVAC methodology, % doses refers to the 'actual daily bird-doses/100 bird-days at risk', tonnes and kg relates to the amount of antibiotic active ingredient. More details are provided in the methods sections.**
† Due to the small sample size, and the fact that these data are from a convenience sample, results may not be represenative of the situation across the UK. In addition, because of the differences in the sample population of farms between years, caution should be taken when interpreting trends.

The usage data from the meat poultry and pig sectors highlight how the reductions achieved in 2017 have built on the reductions reported in previous years:

	2014 (mg/kg)	2015 (mg/kg)	2016 (mg/kg)	2017 (mg/kg)	Compared with 2015 (pigs) or 2014 (meat poultry)
Pigs	—	278	183	131	↓ 53%
Turkeys	220	200	86	45	↓ 79%
Broilers	49	27	17	10	↓ 80%
Ducks	15	8	3	3	↓ 78%

Antibiotic Resistance in Zoonotic and Commensal Bacteria from Healthy Animals at Slaughter

Resistance in *Salmonella* from pigs

No resistance to HP-CIAs was detected in *Salmonella* isolates from pigs.

Resistance in *Escherichia coli* from pigs

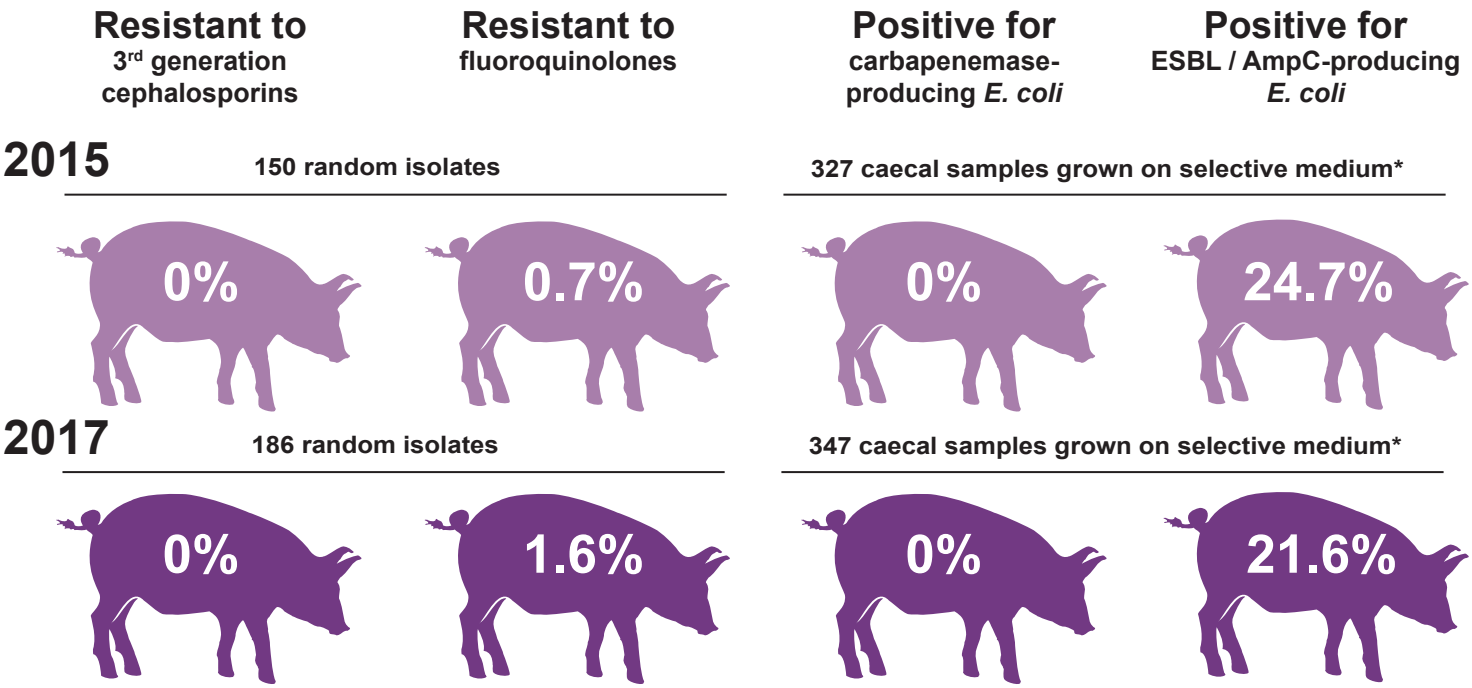
Similar to 2015, resistance to ciprofloxacin (fluoroquinolone) in indicator *E. coli* from healthy pigs at slaughter was low in 2017 (1.6%, up from 0.7% in 2015); and no resistance was detected to the other HP-CIAs. Resistance to nalidixic acid was up from 1.3% in 2015 to 2.2% in 2017.

Resistance levels to the other eight antibiotics tested were lower compared to 2015.

ESBL-, AmpC- or carbapenemase-producing *Escherichia coli* from pigs

In 2017, 22% (75/347) of caecal samples from the UK yielded presumptive ESBL-/AmpC-producing *E. coli* following selective culture, which was down from 25% in 2015. Of the 347 samples, 15% were ESBL-positive, 5% were AmpC-positive and 1% were positive for both. No presumptive carbapenemase-producing *E. coli* were detected.

Testing carried out on *E. coli* collected as part of the EU Harmonised Monitoring Scheme



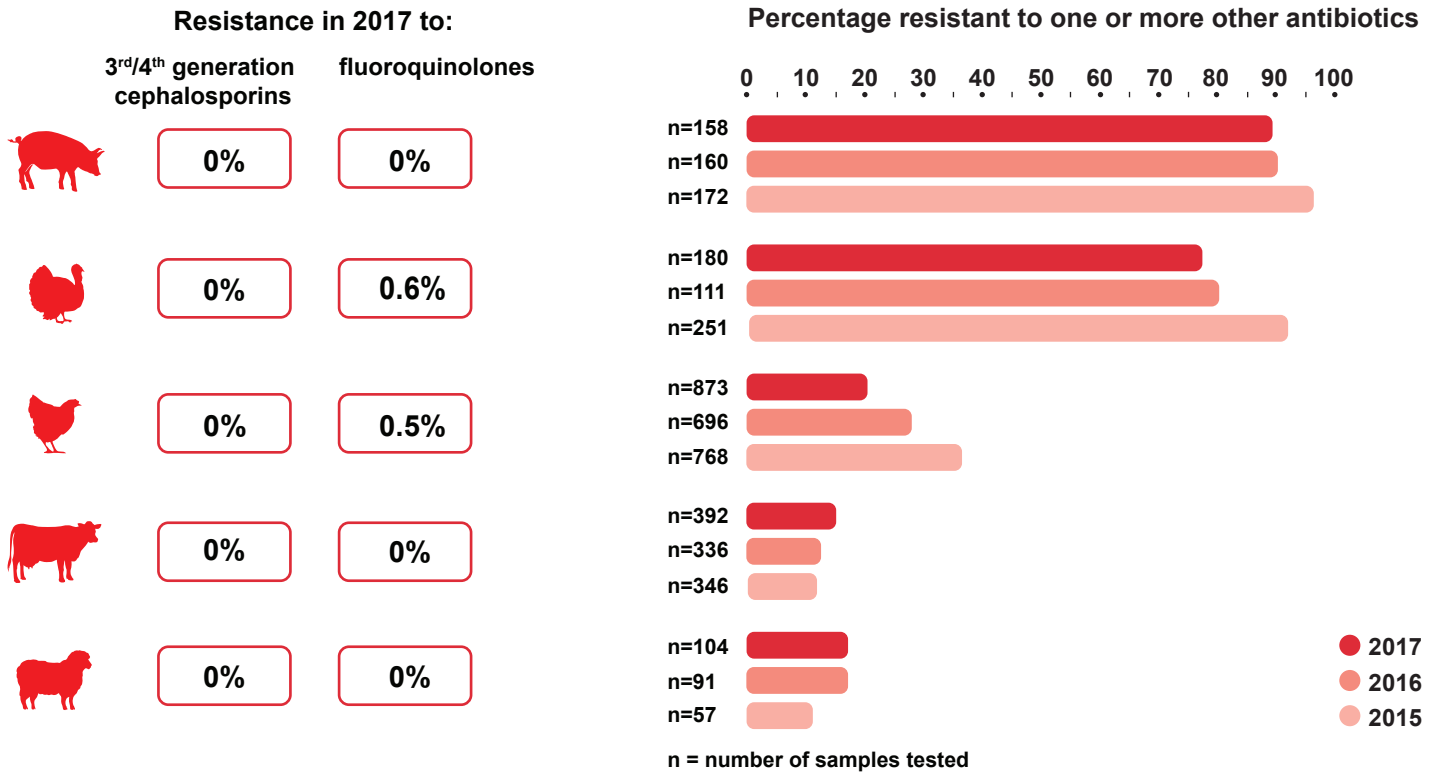
*** To note this testing does not identify the type or number of ESBLs present.**

Antibiotic Resistance - Clinical Surveillance

Resistance in *Salmonella* spp.

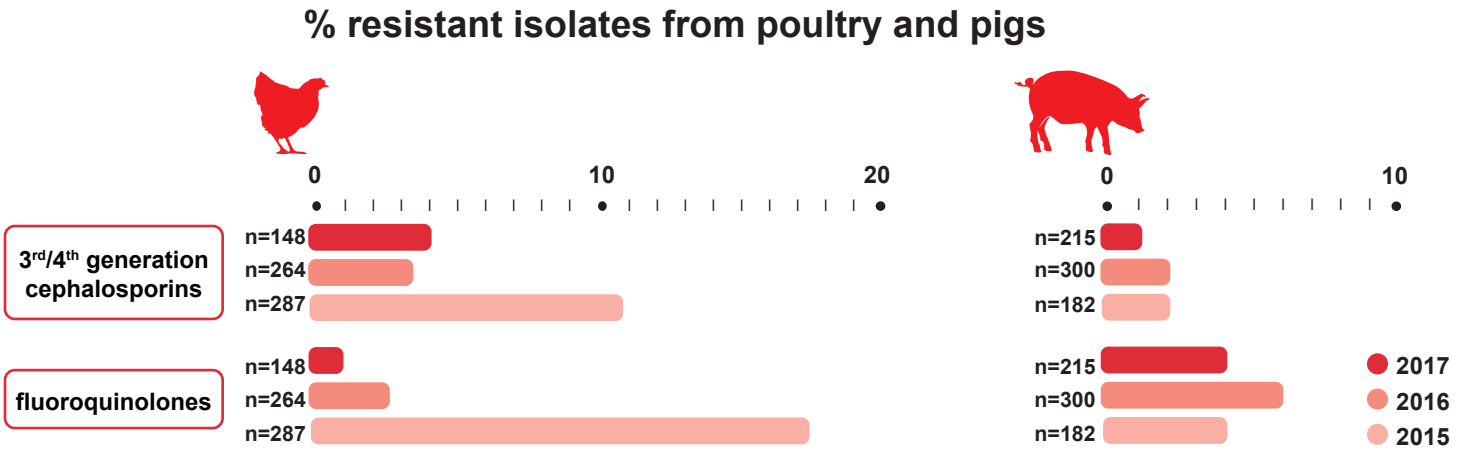
A high percentage of all *Salmonella* isolates tested (72% of 3,111 isolates obtained in total) was susceptible to all 16 antibiotics tested. The results indicate an increasing trend in the proportion of isolates that are susceptible to all antibiotics tested.

No resistance to cefotaxime or ceftazidime (3rd generation cephalosporins) was detected in 1,707 *Salmonella* isolates from pigs, turkeys, chickens, cattle and sheep tested in 2017. Five isolates obtained from these animal species (0.3%) showed resistance to ciprofloxacin (fluoroquinolone).



Resistance in *Escherichia coli*

Resistance to fluoroquinolones and 3rd generation cephalosporins was low (<4%), except in cattle (11% of isolates resistant to fluoroquinolones, 8% resistant to ceftazidime and 14% resistant to cefotaxime; the vast majority of these isolates were obtained from calves) and turkeys (17% of isolates resistant to fluoroquinolones).
No resistance to colistin was detected in any species.



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. From the amounts and the product characteristics, the quantity of active ingredient is calculated which is reported here. These sales data do not take into account wastage, imports or exports of veterinary antibiotics. However, they do serve as the best currently available approximation of the quantity of antibiotics administered to animals in the UK. 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. Usage data are now being reported.

How are usage data collected?
Data have been voluntarily provided by producers (pig, poultry and egg sectors), feed companies (gamebirds) and veterinary practices (gamebirds, cattle 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), FarmVet Systems (cattle), British Trout Association (trout) and Scottish Salmon Producers' Association (salmon).

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 December 2014, the European Medicines Agency published scientific advice on the risk to humans from antibiotic resistance caused by the use of HP-CIAs in animals. This advice classed macrolides as category 1, where the risk of use in animals to public health is low or limited, whereas fluoroquinolones and 3rd and 4th generation cephalosporins were classified as category 2, where the risk to public health is considered higher. Following discovery of a novel gene conferring resistance to colistin and capable of horizontal transmission (*mcr-1*) in November 2015, this advice was updated, and it was recommended that colistin was moved to category 2, alongside fluoroquinolones and 3rd and 4th generation cephalosporins.

How is antibiotic resistance interpreted?
Antibiotic resistance in bacteria isolated from animals is monitored through two distinct antibiotic resistance surveillance programmes: the compulsory EU Harmonised Monitoring Scheme (from healthy animals) and the voluntary Clinical Surveillance programme (from sick animals).

For the EU Harmonised Monitoring scheme, both EUCAST human clinical break points (CBPs) and EUCAST epidemiological cut-off values (ECOFFs) were used to determine the susceptibility of the different bacterial populations. Susceptibility results included in the highlights section as well as in the main body of the report were interpreted using CBPs. Results interpreted using both human CBPs and ECOFFs are provided in full in Table S3.1.1, S3.2.1 and S3.3.1 of the supplementary material.

For the clinical surveillance programme, resistance in bacteria was interpreted using BSAC human CBPs. Where BSAC CBPs were not available, a historical APHA veterinary breakpoint (13 mm zone size diameter) has been used to indicate resistance (see Table S4.1.1 of the supplementary material for further details).