Veterinary Medicines Directorate

UK-VARSS 2015

Highlights report

Antibiotic Sales

All figures calculated using the European agreed ESVAC method unless specified.

Overall trends in mg/kg (using population correction unit)

This year the methodology used to calculate national sales data trends for this report has been changed so it is harmonised and consistent with methodology used across European countries.

Between 2014 and 2015, antibiotics for use in food producing animals (in mg/PCU) decreased by 10% from 62 to 56 mg/PCU.

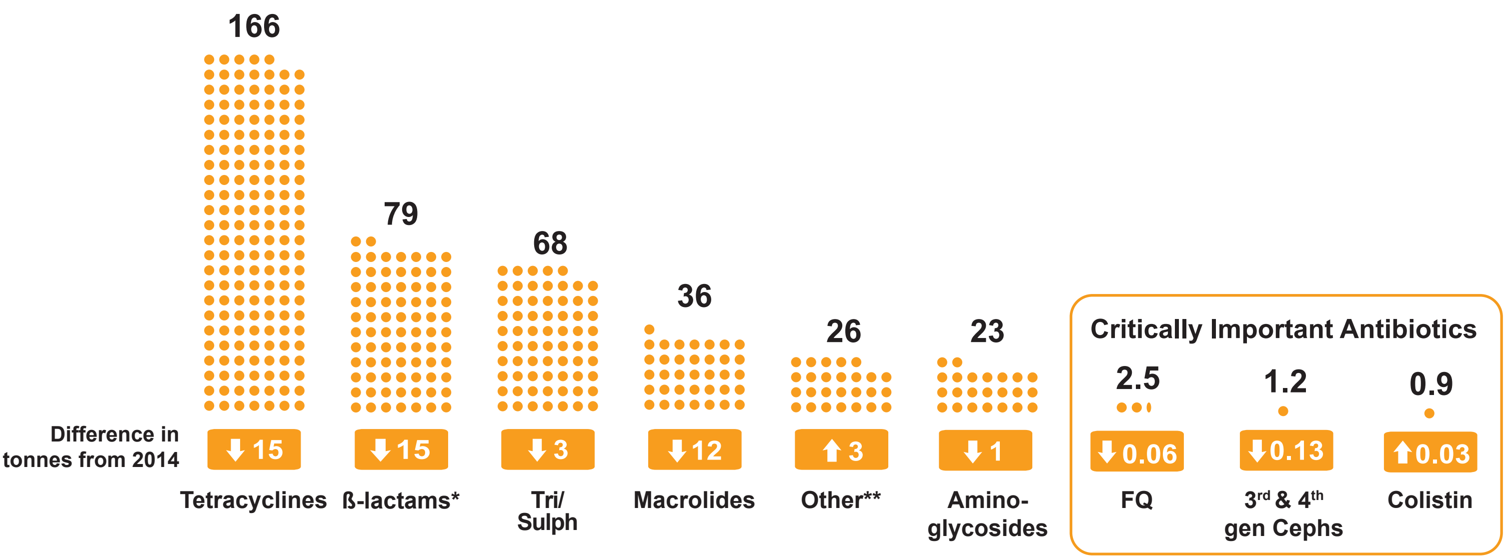
Sales of highest priority critically important antibiotics remain low and were little changed compared to 2014: sales of 3rd and 4th generation cephalosporins were 0.17mg/PCU in 2015 (compared to 0.19mg/PCU in 2014) and sales of fluoroquinolones were 0.34mg/PCU in 2015 (compared to 0.35 mg/PCU in 2014).

Colistin was included as a critically important antibiotic for the first time in this year's UK-VARSS report, following the discovery of the plasmid mediated gene mcr-1 in China in November 2015. Sales of colistin in the UK were 0.12mg/PCU, which is below the European Medicines Agency's Antimicrobial Expert Group's recommended target of 1mg/PCU.

	2012	2013	2014	2015	Compared with 2014
Total in mg/PCU	66	62	62	56	↓ 10%
Fluoroquinolones (FQ) in mg/PCU	0.33	0.36	0.35	0.34	↓ 3%
3rd & 4th gen Cephalosporins in mg/PCU	0.20	0.18	0.19	0.17	↓ 11%
Colistin in mg/PCU	0.09	0.11	0.12	0.12	—
Total sales in tonnes	464	436	445	404	↓ 9%

Total sales in tonnes of active ingredient by class

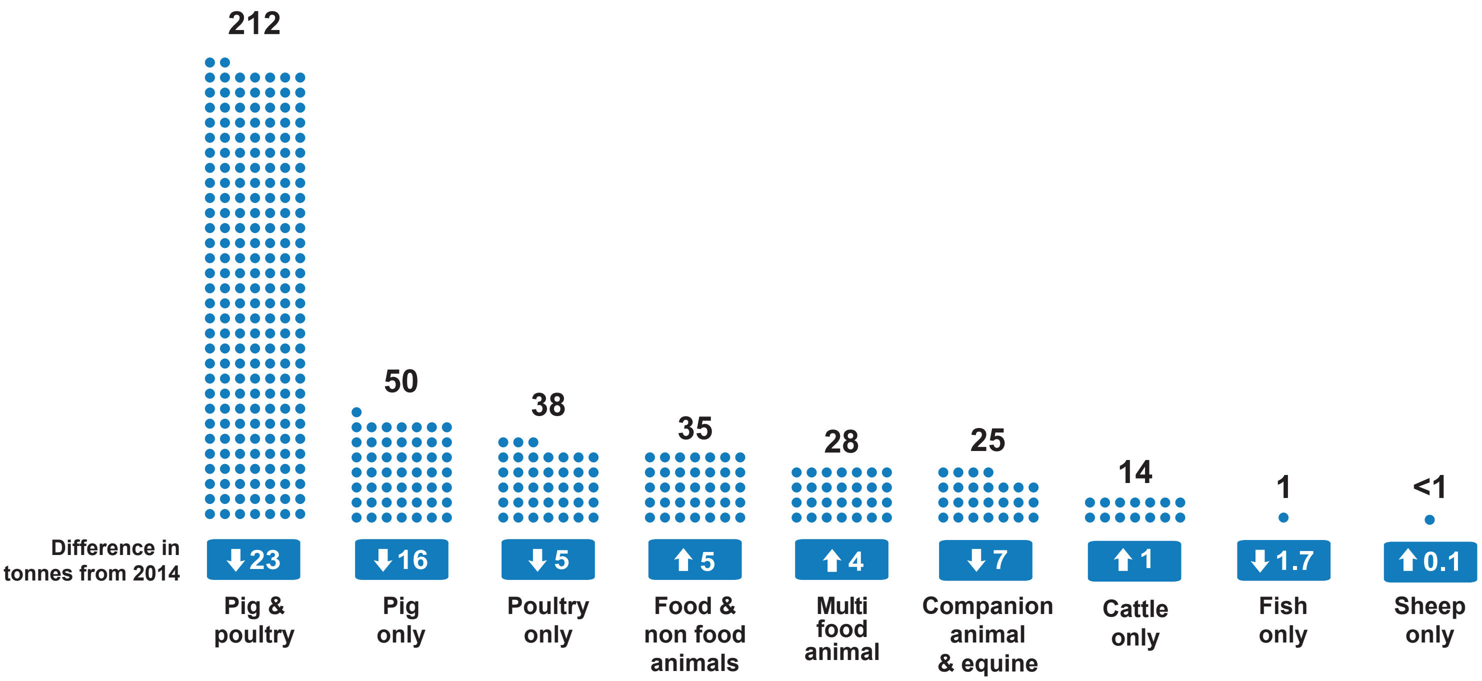
● = 1 tonne



*excludes 3rd & 4th generation cephalosporins (shown seperately)
**other includes: amphenicols, lincomycins, pleuromutilins, steroidal antibiotics and polymixins (excl. colistin - shown seperately)

Total sales in tonnes of active ingredient by species indicated

● = 1 tonne



The mg/PCU for products only authorised for use in pigs and/or poultry decreased by 16% between 2014 and 2015 from 192mg/PCU to 162mg/PCU.

Antibiotic Usage and Data Collection Activities by Livestock Species

In order to optimise usage of antibiotics in livestock it is important to monitor antibiotic use in each species. The VMD has been working with the poultry, pig and cattle sectors to develop systems to monitor their antibiotic usage. Highlights include:

- The British Poultry Council reported that use of antibiotics by members of its Antibiotic Stewardship Scheme in 2015 reduced by 27% compared to 2014, including a 52% reduction in the use of fluoroquinolones.

- Agriculture and Horticulture Development Board pork reported that, by the end of October 2016, 534 sites had signed up to their online reporting system eMB-Pigs, covering 17% of national pig production (2,544,186 finishers, 2,988,379 weaners and 371,580 sows and boars).

- The Cattle Health and Welfare Group completed a scoping study to investigate current data recording systems and has developed a proposal for a data capture system, that should be operational by 2017.

Antibiotic Resistance

Percentage resistance in *E. coli* from randomly selected healthy pigs

In 2015, isolates of *E. coli* from the caeca of healthy pigs randomly selected at slaughter were tested for resistance.

Of the 150 isolates of *E. coli* tested, 1% were resistant to ciprofloxacin; none were resistant to cefotaxime, ceftazidime or colistin. However, following enrichment, presumptive extended spectrum ß-lactamase (ESBL) producing *E. coli* were detected in 24.7% of 327 caecal samples. No carbapenemase or OXA-48 producing *E. coli* were detected in 294 caecal samples cultured on selective agar.

Testing carried out as part of the EU Harmonised Monitoring Scheme

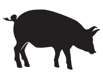
150 random isolates		~300 caecal samples grown on selective media*	
0%	**1%**	**0%**	**24.7%**
Resistant to 3rd gen Cephalosporins	**Resistant to** Fluoroquinolones	**Positive for** Carbapenemase producing *E. coli*	**Positive for** ESBL producing *E. coli*

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

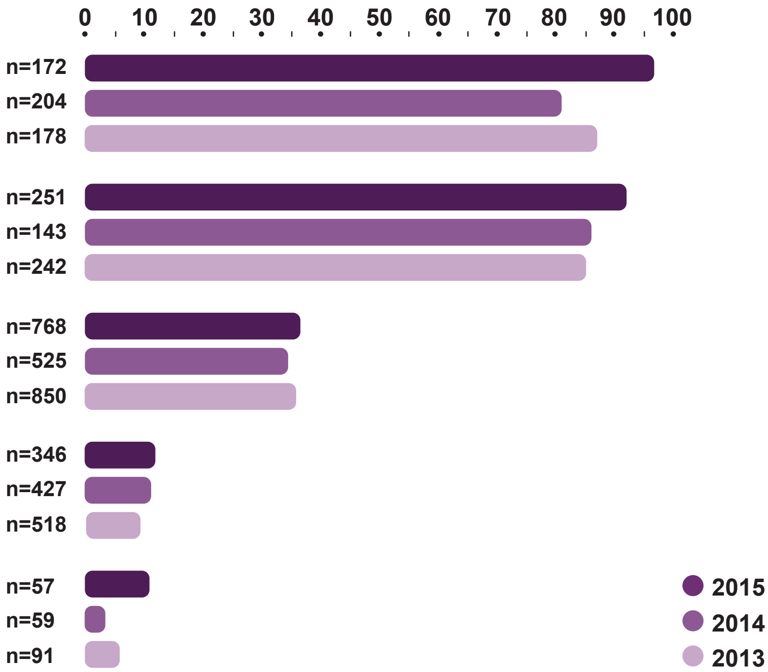
Salmonella isolates resistant to one or more antibiotic (%) from clinical surveillance

In total, 1594 *Salmonella* isolates from cattle, sheep, pigs, chickens and turkeys were tested. Resistance to the highest priority critically important antibiotics was very low with 1.3% (20/1594) of all *Salmonella* from all species resistant to ciprofloxacin (FQ) and 0.1% were resistant to cefotaxime and ceftazidime.

Resistance in 2015 to:

	3rd gen Cephs	FQ
	0.6%	0%
	0%	5.6%
	0%	0.7%
	0%	0.3%
	0%	0%

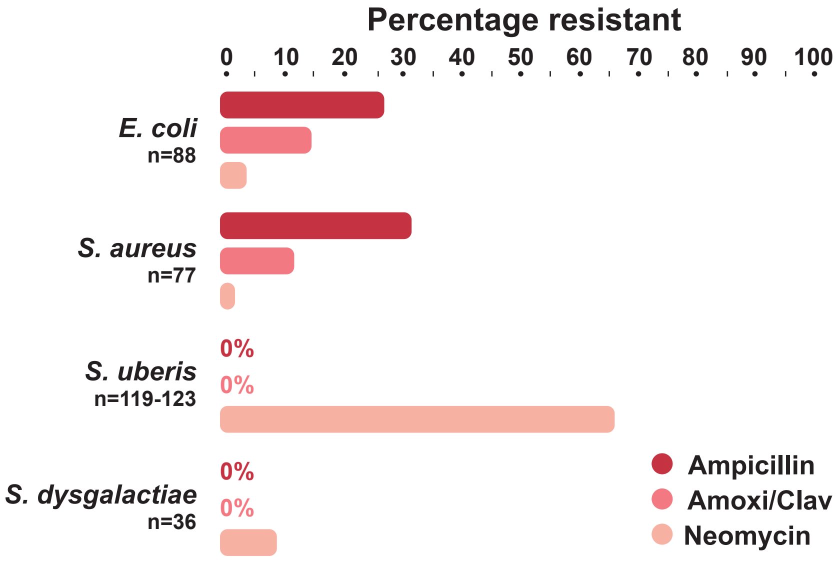
Percentage resistant to one or more antibiotic



n = number of samples tested
FQ = fluoroquinolone

Resistance level in mastitis pathogens (%) from clinical surveillance

Resistance demonstrated by bovine mastitis pathogens was broadly similar to previous years. Resistance to antibiotics commonly used in the treatment of mastitis did occur but varied between pathogens, highlighting the value of culture and sensitivity testing in the treatment of mastitis cases.



n = number of samples tested

Other observations of interest

- 0.6% of 313 samples from randomly sampled pigs, and 1.2% of 163 isolates from clinical surveillance, were positive for the *mcr-1* gene.
- Overall the level of resistance was low in bacteria associated with respiratory disease in sheep and cattle.
- Resistance to tiamulin in *Brachyspira hyodysenteriae* has been highlighted in previous reports due to the serious impact it could have on pig health and welfare. Of the five isolates tested in 2015, one was resistant.
- Livestock-associated meticillin-resistant *S. aureus* (LA-MRSA) ST398 was detected in a pooled caecal sample from pigs, collected at slaughter as part of a research project.
- None of the 63 isolates of *Streptococcus suis* that were tested were resistant to penicillin.
- *E. coli* isolates from a combination of all livestock species were most frequently resistant to streptomycin, tetracycline and ampicillin. Resistance to the highest priority critically important antibiotics tested was generally low, with 9.3% resistant to cefotaxime, 7.2% resistant to cefpodoxime, and 10.7% resistant to enrofloxacin.

Background

How are sales data collected and analysed?

In the UK, from 2005 it has been a statutory requirement for pharmaceutical companies to report the quantity of antibiotics sold for use in animals to the VMD. These 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. Consumption data, i.e. the amount of antibiotics purchased, prescribed and/or administered, have the potential to provide much more precise estimates of usage. The VMD has been working with the poultry, pig and cattle sectors to develop sector-led collection systems to monitor their antibiotic consumption.

In order to harmonise national and European reporting, for the first time in this year's UK-VARSS report, the European methodology developed by ESVAC has been adopted to calculate the amount of active ingredient in each antibiotic product and the mg/PCU for this national report.

What is the Population Correction Unit (PCU) and how is it calculated?

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 have been treated. 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 European countries.

The PCU is calculated by multiplying the standardised weight at time of treatment for each food-producing species by the estimated numbers of each species over a 12-month period. Companion animal (non-food) species are excluded from this; however horses are included in the calculation as they are considered a food-producing species by EU legislation. Using the PCU, the overall sales of products authorised for use in food producing species can be presented as mg/PCU. This is also equal to mg/kg as 1PCU=1kg of animal treated. This enables year-on-year, and country, comparisons to see whether antibiotic sales for livestock are changing relative to the animal population.

What are Critically Important Antibiotics (CIAs)?

Certain antibiotic classes are categorised by the World Health Organisation (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 for 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 the expert group 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). Resistance in bacteria collected under the EU Harmonised Monitoring Scheme is interpreted using EUCAST human clinical break points (CBPs). Resistance in bacteria collected under clinical surveillance is interpreted using BSAC human CBPs.