



HM Government

Executive summary

Third UK One Health Report

Joint report on antibiotic use,
antibiotic sales, and antibiotic
resistance

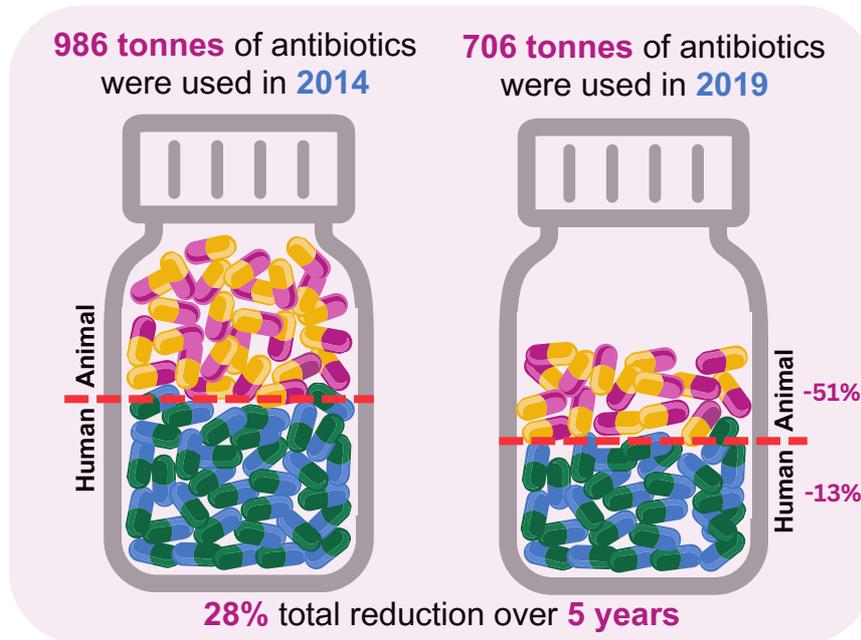
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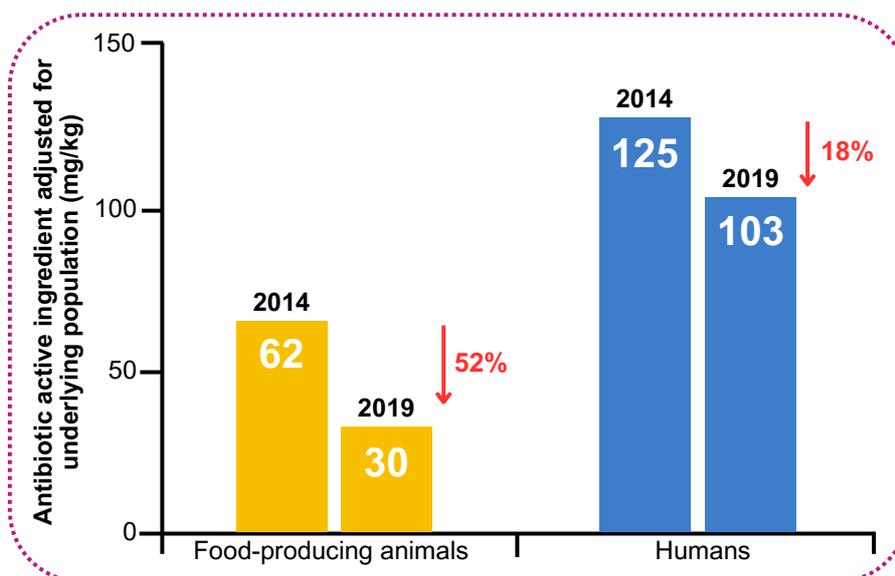
Antibiotic consumption

Antibiotic use (AMU) is the major driver of antimicrobial resistance (AMR).

In 2019, a total of 706 tonnes of antibiotics were consumed in the UK, of which people consumed 68% (478 tonnes) and animals consumed 32% (228 tonnes). Between 2014 and 2019, the total quantity of antibiotics consumed in humans and animal in the UK has decreased by 28%.



Between 2014 and 2019, consumption when adjusted for underlying population, decreased in food-producing animals by 52% (from 62 mg/kg to 30 mg/kg) and in humans by 18% (from 125 mg/kg to 103 mg/kg).



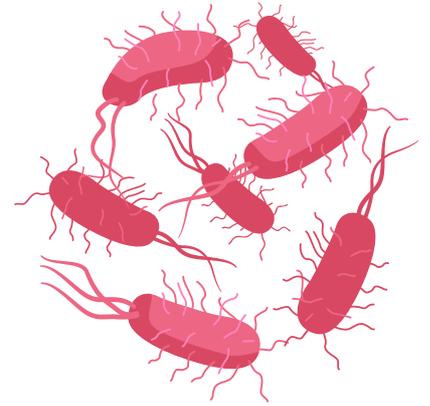
Certain antibiotics used in human and veterinary medicine are classed as highest-priority, critically important antibiotics for use in people (HP-CIAs). A key focus of the animal sector's stewardship initiatives has been to minimise use of HP-CIAs, to help ensure they continue to be effective in people for as long as possible. Between 2014 and 2019, consumption of HP-CIAs in animals decreased by 75% to a very low level (0.17 mg/kg).

Antibiotic resistance

Antimicrobial resistance (AMR) refers to the ability of any microbes (bacteria, as well as viruses, fungi, and protozoa) to resist treatment to drugs designed to kill them or stop their growth. This report focuses on resistance in key bacteria.

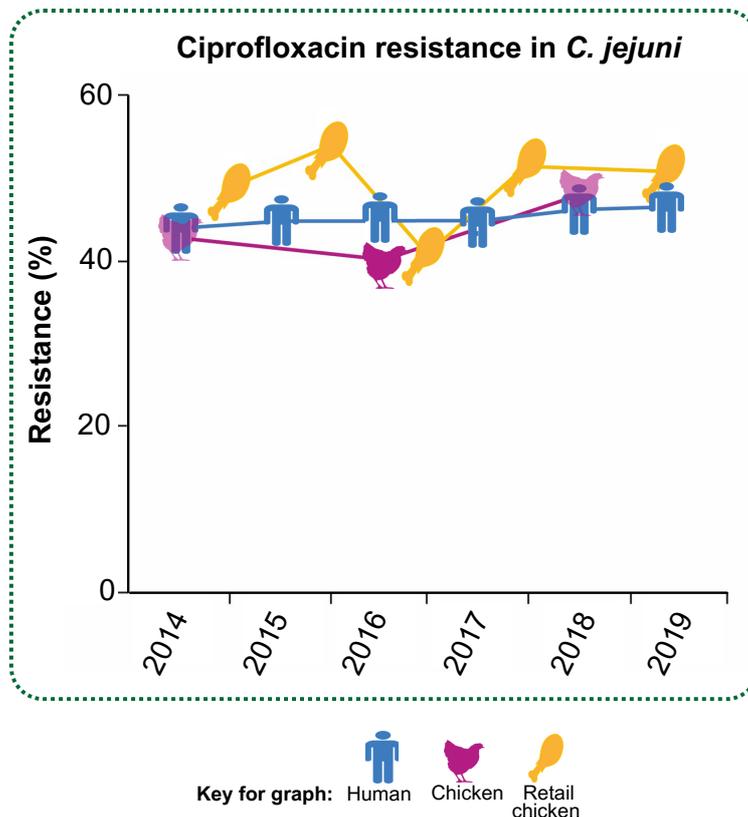
Salmonella spp.

AMR in *Salmonella* spp. varies widely across the animal and human sectors. This is due to the differing patterns of AMR between individual *Salmonella* serovars circulating in humans and animals. For the majority of antibiotics tested, resistance is higher in human patients than in chickens, although is mostly declining in both species. One exception to this is resistance to the HP-CIAs third- and fourth-generation cephalosporins and quinolones, which is higher in people and appears stable.



Campylobacter spp.

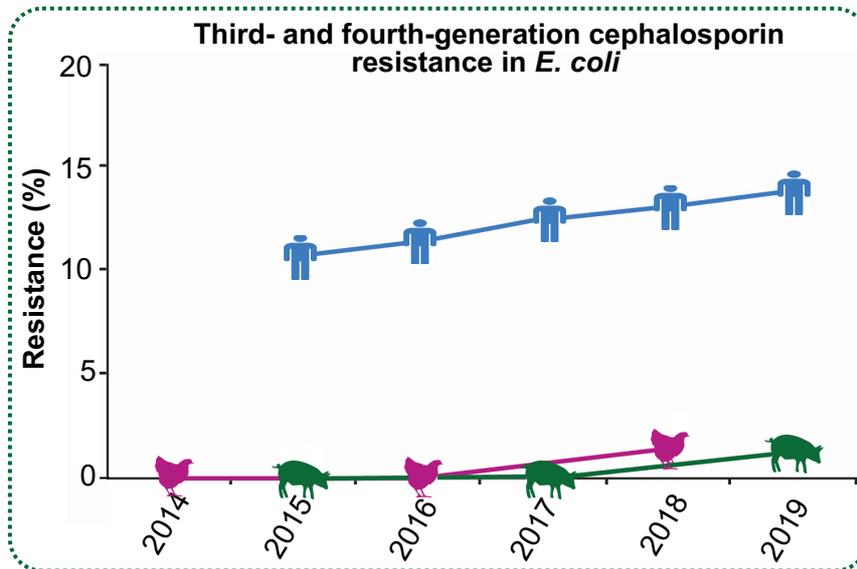
Similar patterns of AMR in *Campylobacter* spp. are reported across chickens, chicken meat, and human patients, suggesting strong linkages through the food chain. High levels of fluoroquinolone resistance (>40%) have persisted across the sectors despite very low usage of these antibiotics in chickens.



Antibiotic resistance

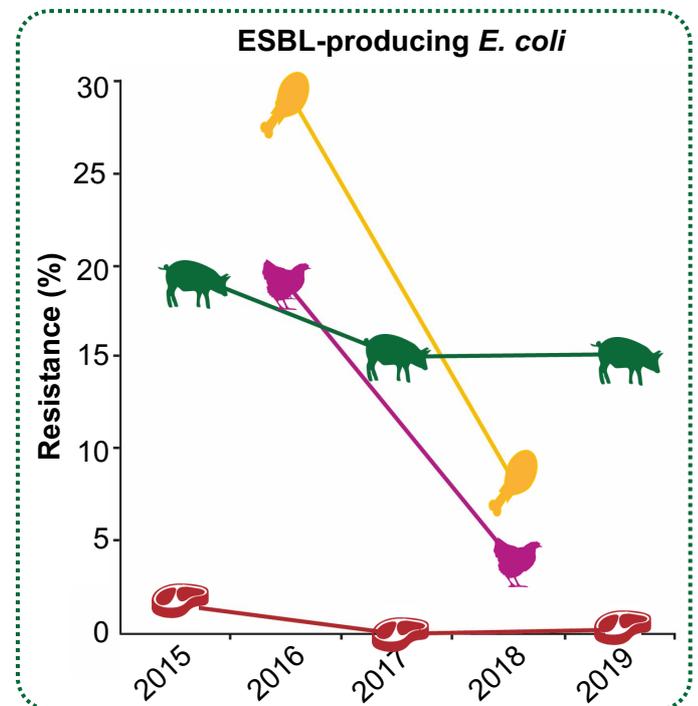
Escherichia coli

Large declines in resistance to most antibiotics have been observed in *E. coli* from chickens, and to a lesser extent, pigs, whereas resistance in human patients has remained stable or declined slightly over time. Resistance to the HP-CIAs, third- and fourth-generation cephalosporins, is considerably higher in human patients than in animals, and appears to be increasing.



Extended spectrum beta-lactamases (ESBL) and AmpC- producing *E. coli*

We also perform more sensitive type of testing in animals and food using selective media. This test inhibits the growth of susceptible bacteria but allows ESBL/AmpC-producing *E. coli* to multiply, making them easier to detect. There have been substantial reductions in the proportion of chickens carrying ESBL- and AmpC-producing *E. coli*, and a similar reduction in the presence of these bacteria in chicken meat. These organisms are resistant to the HP-CIAs, third- and fourth-generation cephalosporins, and the decline in carriage is most likely due to reduced use of antibiotics in the meat poultry sector. By contrast, the presence of ESBL- and AmpC- producing *E. coli* in pigs has reduced slightly over time. Levels in pork meat are much lower than in pigs, which reflects the effectiveness of slaughterhouse processes in clearing bacteria for these animals.



The trend of AMR in *Salmonella* and *E. coli* carried by pigs and chickens differ from those in human patients. By contrast, resistance in *Campylobacter* from chickens, chicken meat, and human patients is much more similar, due to foodborne transmission of these bacteria.

The natural environment: an emerging area

AMR exists in natural environments (e.g., air, water, soil). The spread and impact of AMR in the environment between and among humans and animals is poorly understood. There is no established ongoing surveillance programme for AMR in the environment in the UK, however, this is an area under active development, including in the [PATH-SAFE](#) programme.

Companion animals: an emerging area

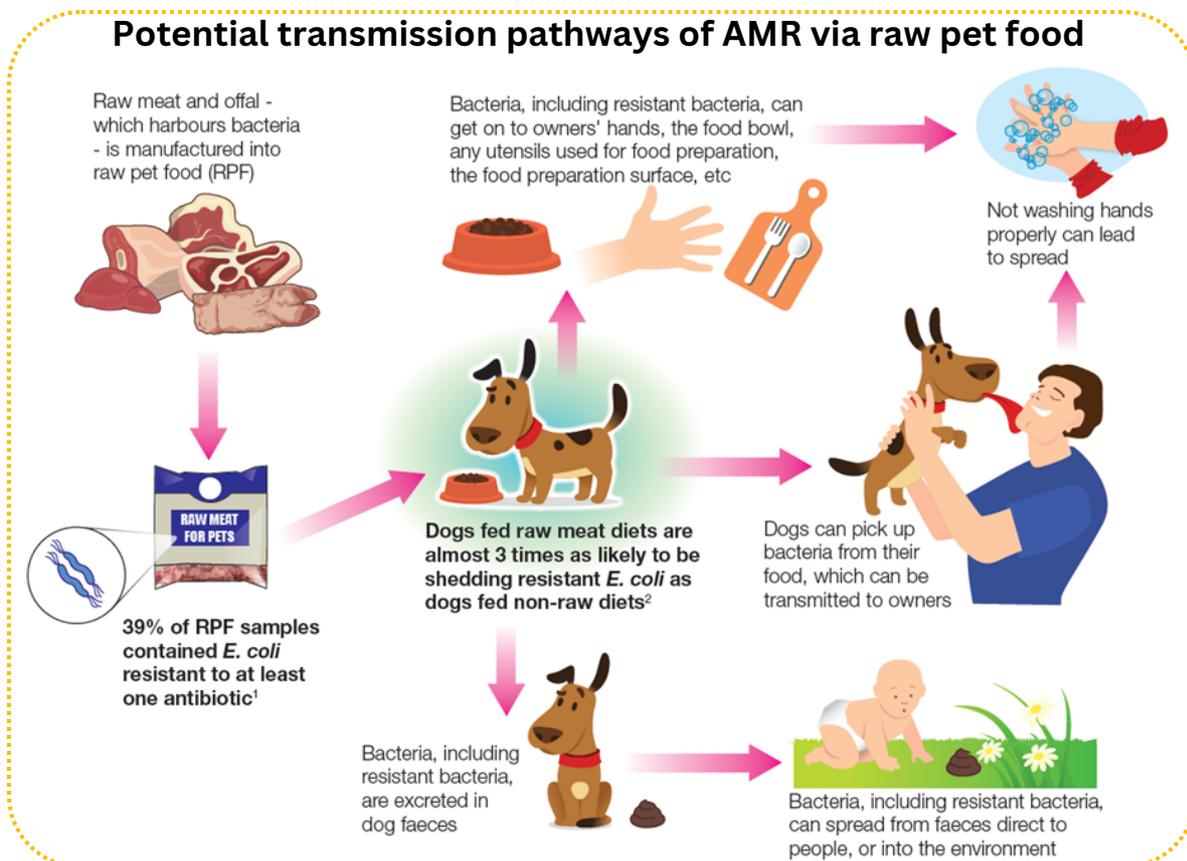
Companion animals refers to animal species kept as pets. Sales data on veterinary antibiotics licensed for use in companion animals are routinely collected, however, there is no system to monitor the prevalence of AMR in UK pets. Due to the close contact between companion animals and humans there is considerable potential for transfer of AMR.

Antibiotic consumption in dogs and cats in the UK

In dogs and cats, antibiotic sales data indicates that between 2014 and 2019, both overall use and the use of HP-CIAs decreased. However, the use of HP-CIAs is still high, particularly in cats.

Antibiotic resistance in companion animals

New research on AMR in companion animals showed that dogs fed raw diets were significantly more likely to excrete ESBL-producing and multi-drug resistant (MDR) *E. coli* in their faeces than dogs fed non-raw diets.



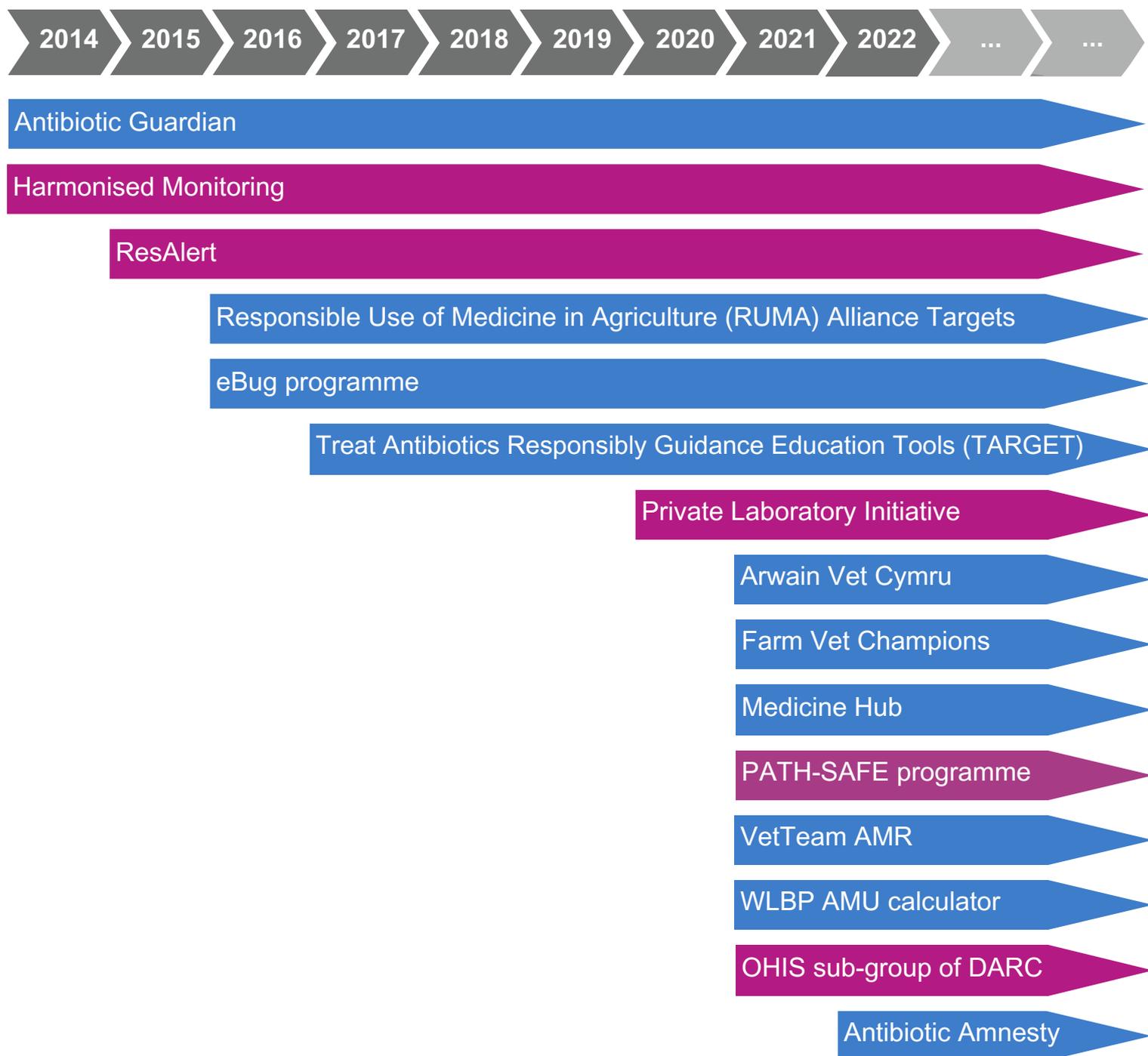
¹ Morgan, G., Williams, N., Schmidt, V., Pinchbeck, G. Antimicrobial resistance and the presence of *E. coli*, *Salmonella* spp. and *Enterobacter* spp. in raw meat diets fed to dogs in the UK [abstract]. In: BSAVA Congress Proceedings; 2022 Mar 24-26; Manchester, UK. Abstract nr 50.

² Morgan, G., Pinchbeck, G., Schmidt, V., Williams, N. A cross-sectional study of the prevalence of antimicrobial-resistant *E. coli* carriage in dogs fed raw and non-raw diets in the UK [abstract]. In: Proceedings of the 16th International Symposium of Veterinary Epidemiology and Economics; 2022 Aug 7-12; Halifax, Nova Scotia, Canada. Abstract nr 339.

Control measures and new initiatives

Ongoing UK initiatives in antibiotic stewardship and AMR surveillance described in the report and the year they were initiated.

Antibiotic stewardship and surveillance initiatives



Abbreviations:

WLBP = Welsh Lamb and Beef Producers
 OHIS = One Health Integrated Surveillance
 DARC = Defra Antimicrobial Resistance Coordination
 PATH-SAFE = Pathogen Surveillance in Agriculture, Food and Environment

Key:

— = Antibiotic stewardship programme
 — = Surveillance initiatives