



**Results from the
monitoring of
antimicrobial resistance
in animal health and the
sale of antibiotics for
veterinary use**

Press liaison

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Introduction



Antimicrobial resistance is a major issue for both human and animal health. According to a British report cited by the WHO, it could lead to 10 million deaths worldwide each year by 2050, which is five times more than at present. There are two main strategies for limiting antimicrobial resistance. The first is obviously to use fewer antibiotics, while the second is to work on non-drug alternatives. Major progress has been made in zootechnics and biosecurity to prevent microbes from entering farms and to develop livestock farming methods that limit the impact of pathogens on animals.



**Jean-Yves Madec, Scientific Director
of the "Antimicrobial resistance"
cross-functional theme at ANSES**

ANSES's work contributes to the fight against antimicrobial resistance. To mark World Antibiotic Awareness Week, the Agency is publishing the data collected in 2022 from:

- the monitoring of sales of veterinary medicinal products containing antimicrobials
- the French surveillance network for antimicrobial resistance in pathogenic bacteria of animal origin (Resapath)
- the European scheme for monitoring antimicrobial resistance in the food chain

The Agency is also offering another look at its expert appraisal work on the transmission of antibiotic-resistant bacteria from animals to humans.

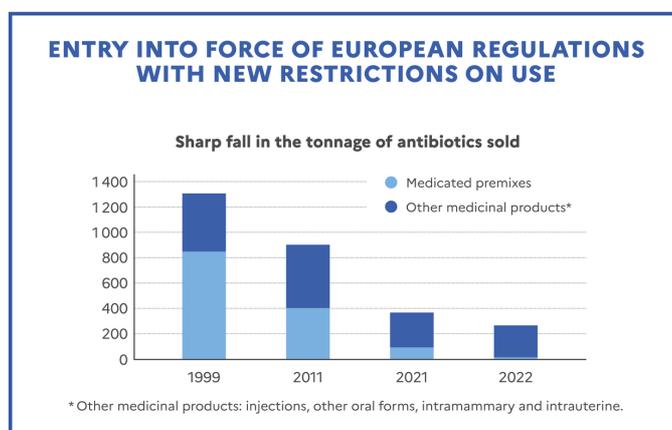
A noticeable reduction in sales of antibiotics in 2022

After sharp falls in sales of veterinary antibiotics between 2011 and 2021, last year marked a turning point with the new European regulation on veterinary medicinal products, which entered into force on 28 January 2022: the quantity of veterinary antibiotics sold has fallen by 26% in one year.

TA dramatic fall in sales of medicated feed and premixes

Medicated feed is obtained by mixing medicines known as **medicated premixes** with feed intended for animals. European Regulation (EU) 2019/4 now bans the preventive use of medicated feed containing antimicrobials and limits its use in metaphylaxis, i.e. on animals that are healthy but in contact with sick animals.

These restrictions have led to a **sharp reduction** in the quantities of medicated premixes sold.



An 82% fall in medicated premixes between 2021 and 2022.

This significant reduction was confirmed by data reported by manufacturers and distributors of medicated feed.

Overall, there has **not been any shift from the use** of premixes to other types of antibiotics, since sales of antibiotics have also fallen:

A 26% fall in antibiotics sold in one year

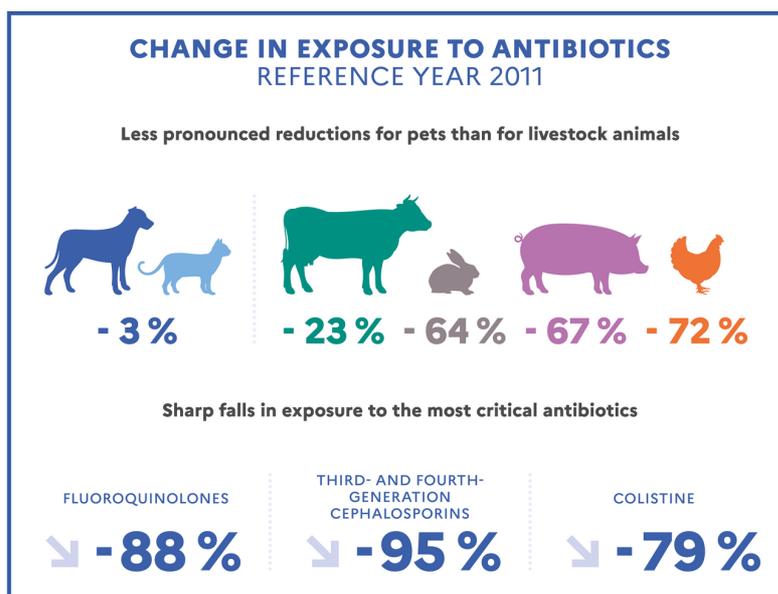
Animals less exposed overall, but differences between species

Based on the quantity of antibiotics sold, animal exposure to antibiotics is estimated by taking the recommended dosage for each medicinal product into account, as well as the population of each animal species in France.

Exposure has **fallen by 9% compared with 2021**, with most of this decline being due to reduced exposure to medicated premixes.

As these treatments are administered orally, this reduction in exposure is important for preventing the selection of resistance not only in the targeted pathogenic bacteria but also in other bacteria in the animal's digestive system.

However, there were differences between species. Between 2021 and 2022, the changes in animal exposure to antimicrobials were +1% for cattle, -21% for pigs, -12% for poultry, -35% for rabbits and -3% for cats and dogs.



After the increase in recent years in the exposure of cats, dogs and horses to antibiotics, levels now appear to be stabilising.

[Read the report entitled "Sales survey of veterinary medicinal products containing antimicrobials in France in 2022" \(in French\)](#)

[Read the report entitled "Sales of medicated feed containing antibiotics in France in 2022" \(in French\)](#)

Aiming for more comprehensive monitoring of antimicrobial use

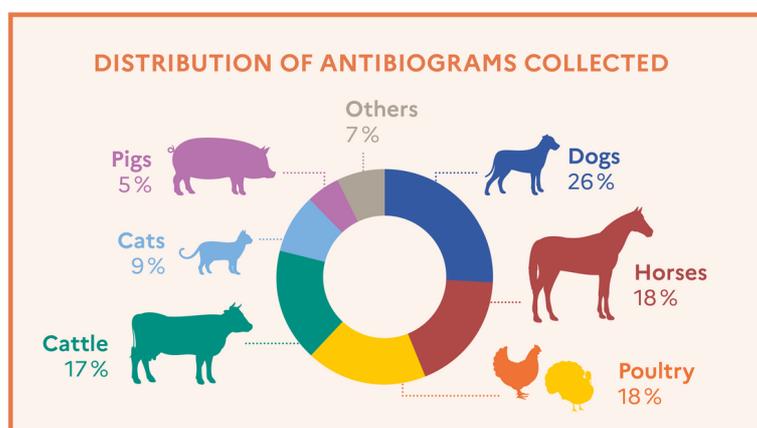
The European regulation has extended the collection of data on use to all antimicrobials. In addition to the antibiotics already monitored, antifungals, antiprotozoals and antivirals are now included. These data should ensure that the actions to be taken to combat antimicrobial resistance are better targeted. In France, the reporting of data on antimicrobial use for all animal species was launched via the Calypso online application in April 2023.

Resistant bacteria in animals: the main trends confirmed

The French surveillance network for antimicrobial resistance in pathogenic bacteria of animal origin (Resapath) monitors the development of resistance to antibiotics in bacteria responsible for infections in animals. This monitoring concerns both livestock animals and pets, and is led by ANSES's Lyon and Ploufragan-Plouzané-Niort laboratories.

Increase in the number of participating veterinary testing laboratories

Resapath is based on the participation of veterinary testing laboratories, which provide the results of **antimicrobial resistance tests** (antibiograms) carried out at the request of veterinary practitioners. This year, 108 laboratories took part in the monitoring, compared with 103 the previous year.



A general fall in antimicrobial resistance, with a few exceptions

The trends observed in recent years are continuing. Rates of resistant bacteria continue to fall overall, thanks to persistent efforts to reduce the use of antibiotics in veterinary medicine.

One exception: the increase in resistant bacteria in horses

Generally

Whereas the proportion of antibiotic-resistant bacteria in other animal species is stable or falling, **it has been rising in Equidae since 2018.**



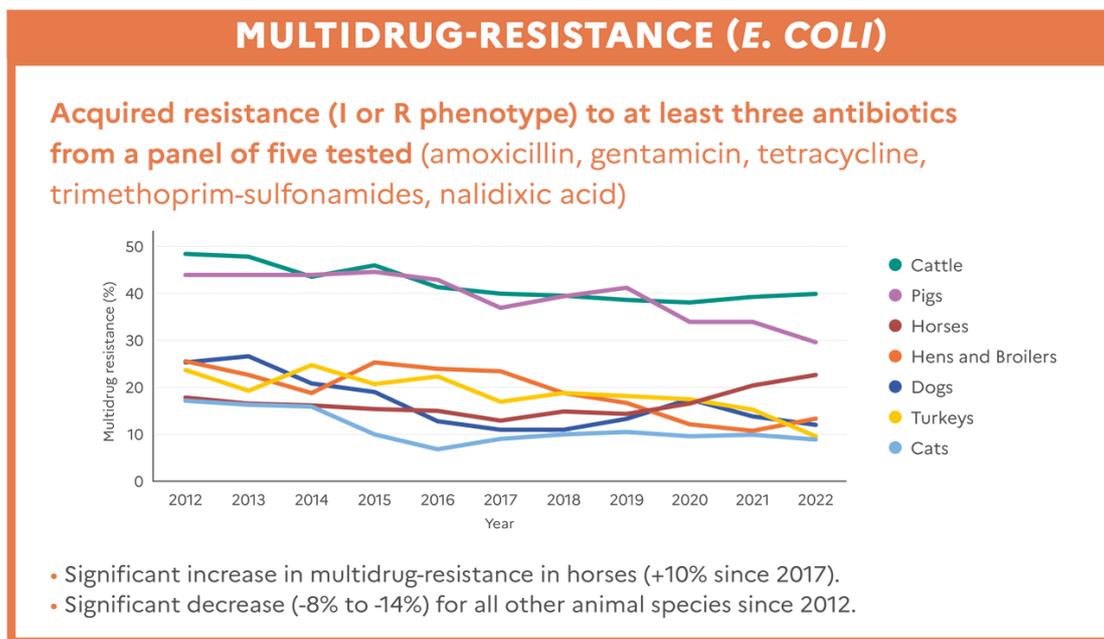
For multidrug-resistant bacteria

The proportion of multidrug-resistant bacteria, i.e. those resistant to at least three of the five antibiotic classes tested, has risen by 10% in Equidae since 2017.

For critical antibiotics

Newer-generation cephalosporins and fluoroquinolones are considered critical antibiotics, as their efficacy is crucial for treating serious diseases in humans. Their use in veterinary medicine is regulated.

The proportion of strains of *Escherichia coli* bacteria resistant to critical antibiotics has remained low (below 5-7% of strains) over the last five years in all animal species except horses. For the latter, an increase of 9% has been observed over the last four years.



A close watch needed on *K. pneumoniae* and *Enterobacter* spp.

Klebsiella pneumoniae and *Enterobacter* spp. are two bacteria that can develop resistance to newer-generation cephalosporins and fluoroquinolones. For both bacteria, the only data obtained in sufficient quantities for analysis concerned horses and dogs. These show:

- an **increase in resistance** in recent years
- a higher rate of resistance than that observed with *E. coli*

Staphylococci: varying levels of resistance to methicillin depending on the species

The proportion of methicillin-resistant *Staphylococcus aureus* **varies depending on the animal species:** 5-10% in dogs and cats, 15-20% in horses and 42% in pigs. Resistance of *Staphylococcus aureus* to methicillin is a concern for human health.

Resistance of *Staphylococcus pseudintermedius* to this antibiotic is **common, and stable** compared with other years: 15-20% of strains collected from dogs and cats. This bacterium is pathogenic for domestic carnivores, but has very little effect on humans.

[Read the Resapath 2022 report](#)

Carbapenem resistance

Carbapenem-resistant Enterobacterales, particularly *E. coli* and *K. pneumoniae*, are regularly isolated from pets. Carbapenems are considered to be "last-resort" antibiotics in humans and their use in animals is prohibited.

These resistant bacteria are most likely **transmitted to animals by humans**. They are often also resistant to other antibiotics used in animals. As such, they represent a major threat, because resistance to carbapenems can be amplified by co-selection of resistance in animals and then passed on to humans again.

A pilot study to extend Resapath throughout Europe

Since 2018, ANSES has been coordinating an initiative called EARS-Vet to develop a European network for monitoring resistance to antibiotics in pathogenic animal bacteria.

In 2022, a pilot phase of this network was launched. Eleven partners from nine European countries took part and provided their data for the period 2016-2020. For most countries, the available data covered only part of the scope targeted by **EARS-Vet**.

The study of these data highlighted the need to harmonise the antimicrobial resistance tests used across Europe and the criteria for their interpretation. Monitoring of antimicrobial resistance in bacteria responsible for animal infections needs to be stepped up in countries where it is currently insufficient or non-existent.

The network will continue to be developed as part of the European Joint Action EU-JAMRAI2, led by Inserm and funded by the European Commission for the period 2024-2027.

Food-producing animals: declining antimicrobial resistance in poultry

The European antimicrobial resistance monitoring scheme measures antimicrobial resistance in bacteria collected from healthy food-producing animals and their products. In France, the scheme is led by the Directorate General for Food (DGAL) and implemented by ANSES, as the National Reference Laboratory for antimicrobial resistance. The species monitored alternate every other year. In 2022, monitoring concerned poultry.

Most Salmonella not resistant to any antibiotics

Overall, the Salmonella collected from poultry farms were **rarely resistant to antibiotics**:

- On broiler farms, only 11 of the 168 strains sampled were resistant to at least one of the antibiotics tested
- In laying hens, only nine out of 125 strains were resistant to at least one antibiotic
- In turkeys, only 15 out of 66 strains were resistant to antibiotics

All poultry sectors combined, none of the Salmonella strains collected were resistant to antibiotics of critical importance to human health.

Decline in Campylobacter resistance rates

Rates of resistance in the bacteria *Campylobacter coli* and *Campylobacter jejuni* varied depending on the poultry species from which they were sampled and the antibiotic tested. Although these bacteria are still highly resistant to certain antibiotics, improvements have been observed:

- Resistance in *C. coli* isolated from chickens **decreased significantly** between 2011 and 2022 for tetracycline, erythromycin and ciprofloxacin
- *C. jejuni* resistance to tetracycline in chickens and turkeys has also declined in recent years.

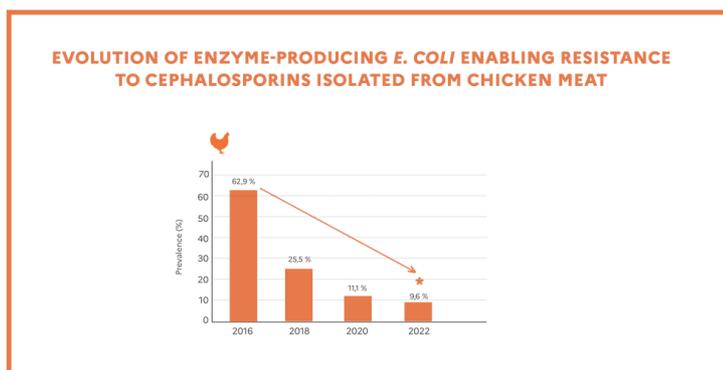
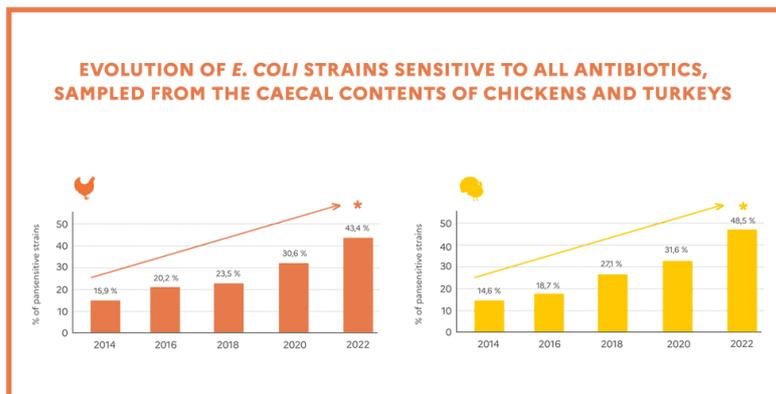


Increased sensitivity of *Escherichia coli* to all antibiotics

Since 2014, *Escherichia coli* sampled from chickens and turkeys at slaughter have become increasingly **susceptible to all antibiotics tested**.

No resistance to carbapenems

No carbapenem-resistant bacteria were detected in 2022. This applies to *E. coli* and *Salmonella* isolated from chickens and turkeys on farms, in the slaughterhouse and on meat.



Fall in cephalosporin resistance

E. coli producing enzymes responsible for cephalosporin resistance have **fallen steadily**, whether in the intestinal contents of chickens and turkeys sampled at slaughter between 2016 and 2022, or in chicken meat (monitoring of these bacteria in turkey meat only began in 2022).

New monitoring at the border

In 2022, France began monitoring **bacteria isolated from meat imported from countries outside the European Union**. This was introduced by Commission Implementing Decision (EU) 2020/1729. Some initial data have been collected on the level of resistant *E. coli* bacteria in chicken and turkey meat. However, as monitoring only began in autumn 2022, it is too early for any robust results.

Better assessing the role of animals in the transmission of antibiotic-resistant bacteria to humans

In an opinion published on 14 September 2023, ANSES provided a list of 11 bacterium/antibiotic class combinations requiring priority monitoring in pets and livestock animals because of the major risks to human health. The aim of this list is to better assess the role of animals in the transmission of resistant bacteria to humans.

Five bacterium/antibiotic class combinations categorised as high priority

The list drawn up was based on three health criteria: the transmissibility of antimicrobial resistance, the possibility of using alternative antibiotics, and the number of infections and deaths attributable to these resistant bacteria.

Of the 11 combinations on this list, **five are categorised as high priority:**

- Carbapenem-resistant Enterobacterales
- Enterobacterales resistant to third- and fourth-generation cephalosporins
- Methicillin-resistant *Staphylococcus aureus*
- Fluoroquinolone-resistant Enterobacterales
- Polymyxin-resistant Enterobacterales

In order to assess the degree to which the animal reservoir contributes to the transmission of these resistant bacteria to humans, the Agency recommends **sequencing the whole genome** whenever a resistant bacterium on this list is isolated from a pet or livestock animal.

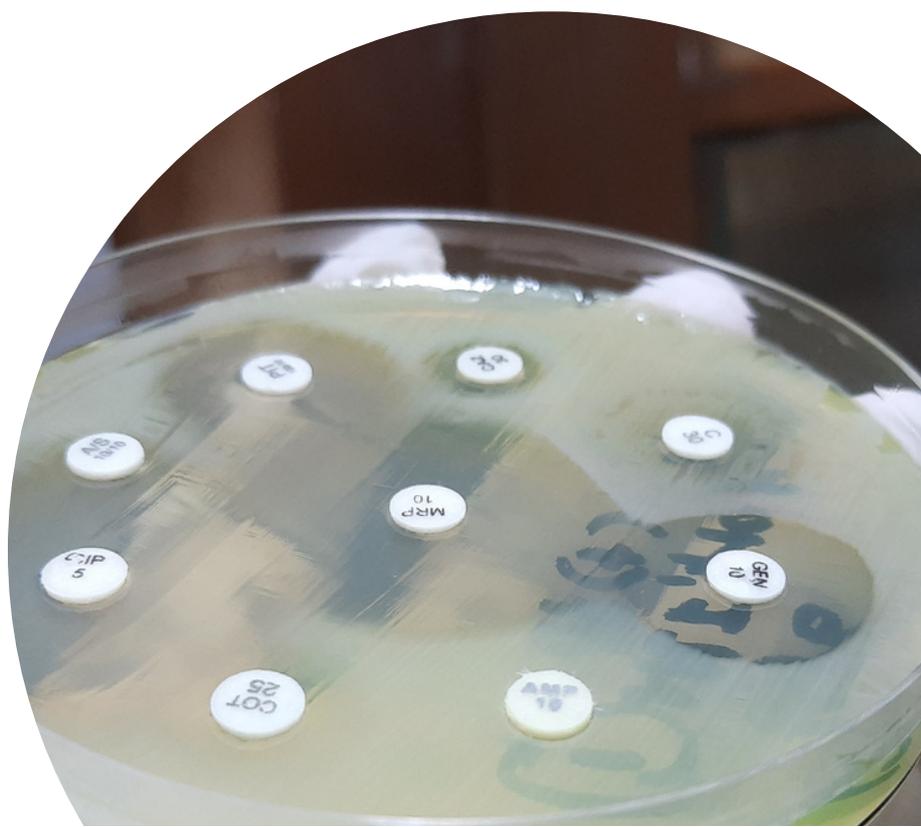
This would improve understanding of the bacterium's entire genome and make it possible to assess the presence of mobile genetic elements that could promote the transmission of genes responsible for antimicrobial resistance.

In the event of suspected transmission between animals and humans, this would also enable the identity of the bacteria found in both to be confirmed or ruled out.

Pay attention to imported food and animals

ANSES is also calling for **the monitoring of antibiotic-resistant bacteria in foodstuffs to be broadened** to include aquaculture products and live farm animals from countries outside the European Union. While the transmission of bacterial resistance between animals and humans is controlled in France by various measures (biosecurity on livestock farms, good hygiene practices in veterinary clinics, etc.), **imports could facilitate the introduction into the country of bacteria carrying new resistance genes, or even multidrug-resistant bacteria.** These bacteria pose a major threat to public health because they can lead to therapeutic dead-ends.

Read the ANSES report and opinion on the drafting of a list of bacterium/antibiotic class combinations of priority importance in controlling the spread of antimicrobial resistance from animals to humans and proposals for technical measures to support managers (in French)



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ANSES, French Agency for Food, Environmental and Occupational Health & Safety

The French Agency for Food, Environmental and Occupational Health & Safety (ANSES) provides public decision-makers with the scientific benchmarks needed to protect humans and the environment against health risks. It studies, assesses and monitors all the chemical, microbiological and physical risks to which humans, animals and plants are exposed,

hereby helping the public authorities take the necessary measures, including in the event of a health crisis. A national agency working in the public interest, ANSES comes under the responsibility of the French Ministries of Health, the Environment, Agriculture, Labour and Consumer Affairs.



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