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Press kit
November 2022

Antimicrobial resistance in animal health

2022 review

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Introduction

Antimicrobial resistance is a **major issue for both human and animal health**. Some resistant bacteria can be transmitted from animals to humans, and vice versa. Bacteria carrying antimicrobial resistance genes are also found in the environment. **Combating antimicrobial resistance therefore requires an overall approach.**

ANSES is responsible for monitoring antimicrobial resistance **in veterinary medicine and in food of animal origin.**

To mark World Antibiotic Awareness Week, the Agency is presenting its annual reports on sales of veterinary medicinal products and on the level of resistance of pathogenic bacteria in animals. It is also providing an update on its monitoring of resistance in bacteria that can contaminate humans via food of animal origin, conducted as part of monitoring plans that have been harmonised at European level.

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Monitoring veterinary medicinal product sales and antimicrobial resistance: parallel trends

L'ANSES is responsible for both the monitoring of sales of veterinary antimicrobials, carried out by the French Agency for Veterinary Medicinal Products (ANMV), and for the French Surveillance Network for Antimicrobial Resistance in Pathogenic Bacteria of Animal Origin (RESAPATH), run by the Lyon and Ploufragan-Plouzané-Niort laboratories. These two complementary monitoring schemes show parallel trends, demonstrating that the level of antimicrobial use has an effect on the frequency of resistant bacteria.

Volume of sales of veterinary antimicrobials:

- 10,7 %

from 2020 to 2021

Animal exposure to antimicrobials:

- 3,2 %

from 2020 to 2021

Continuing downward trend in livestock exposure to antibiotics

Between 2020 and 2021, antimicrobial exposure of livestock animals continued to fall:

Cattle: -0.9%
Swine: -7.2%
Poultry: -8.6%
Rabbits: -12.7%

Lower resistance overall but with an upturn observed for two antibiotics

While **the overall rate of resistant bacteria has continued to decline** for most antimicrobials, **the exceptions are amoxicillin and amoxicillin-clavulanic acid.**

Over the past five years, **the rate of *Escherichia coli* resistant to these antibiotics has increased** in all species monitored by RESAPATH, except for turkeys.

An upsurge in antimicrobial exposure of pets that needs to be monitored

Cats and dogs were **exposed to 9.9% more antibiotics in 2021** than in 2020.

This trend could be explained by greater medicalisation in these animals, but this assumption remains to be verified with more precise data on antimicrobial prescription.

The decrease in resistance seems to have levelled off in cattle

In cattle, **rates of resistant bacteria are stable or increasing** depending on the antibiotic. Resistant bacteria are very common: up to 70% for some antibiotics.

Stabilisation of exposure and resistance for critical antibiotics

The use of critically important antibiotics, i.e. those whose efficacy is crucial for treating serious diseases in humans, **has fallen dramatically in veterinary medicine in recent years, as has resistance** to these antibiotics.

- **Exposure to fluoroquinolones:** -87.7% since 2013
- **Exposure to newer-generation cephalosporins:** -93.8% since 2013
- **Less than 6-8% of bacteria sampled in 2021 were resistant** to these antibiotics

Colistin:

Colistin is only monitored in cattle, swine and poultry.

This monitoring found:

- **Exposure 66.6% lower** than the average for 2014-2015
- **A steady decline in the rate of resistant bacteria** since 2007

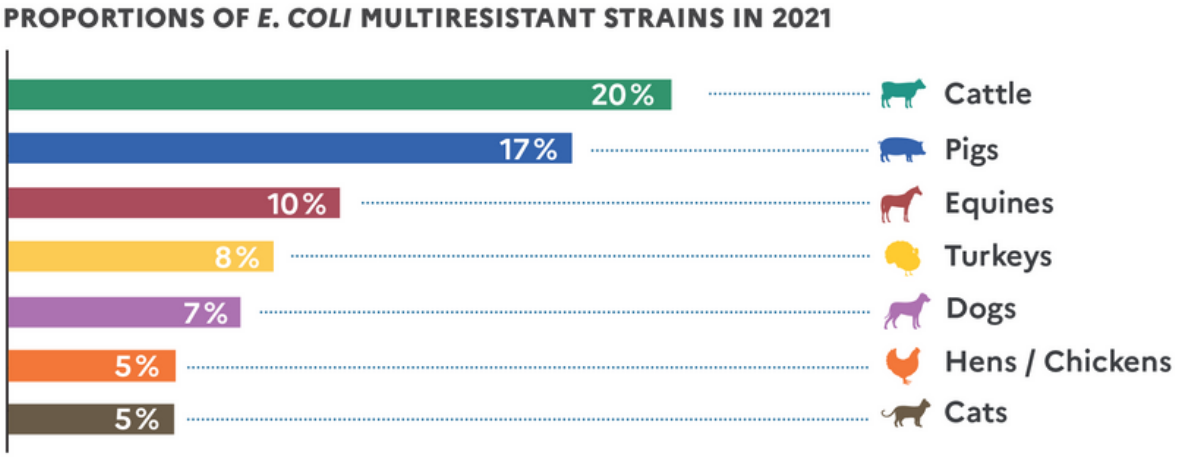
Multidrug resistance: different frequencies for different animal species

Bacteria are said to be multidrug resistant when **they lack susceptibility to at least three of the five classes of antibiotics tested**. The development of multidrug resistance can lead to therapeutic dead-ends, when there are no longer any medicines effective against a bacterial strain.

In 2022, **the multidrug resistance indicator used by RESAPATH was revised**. It no longer takes account of critically important antibiotics, which are considered less relevant because of the sharp decline in resistance to these antibiotics in recent years. They have been replaced by other antibiotics.

Multidrug-resistant strains are **more common in cattle and swine (18-20%) than in poultry, dogs, cats and horses (5-10%).**

However, in dogs, cats and equines, the number of **multi-susceptible strains**, i.e. strains that are not resistant to any of the antibiotics tested, fell sharply between 2017 and 2020.



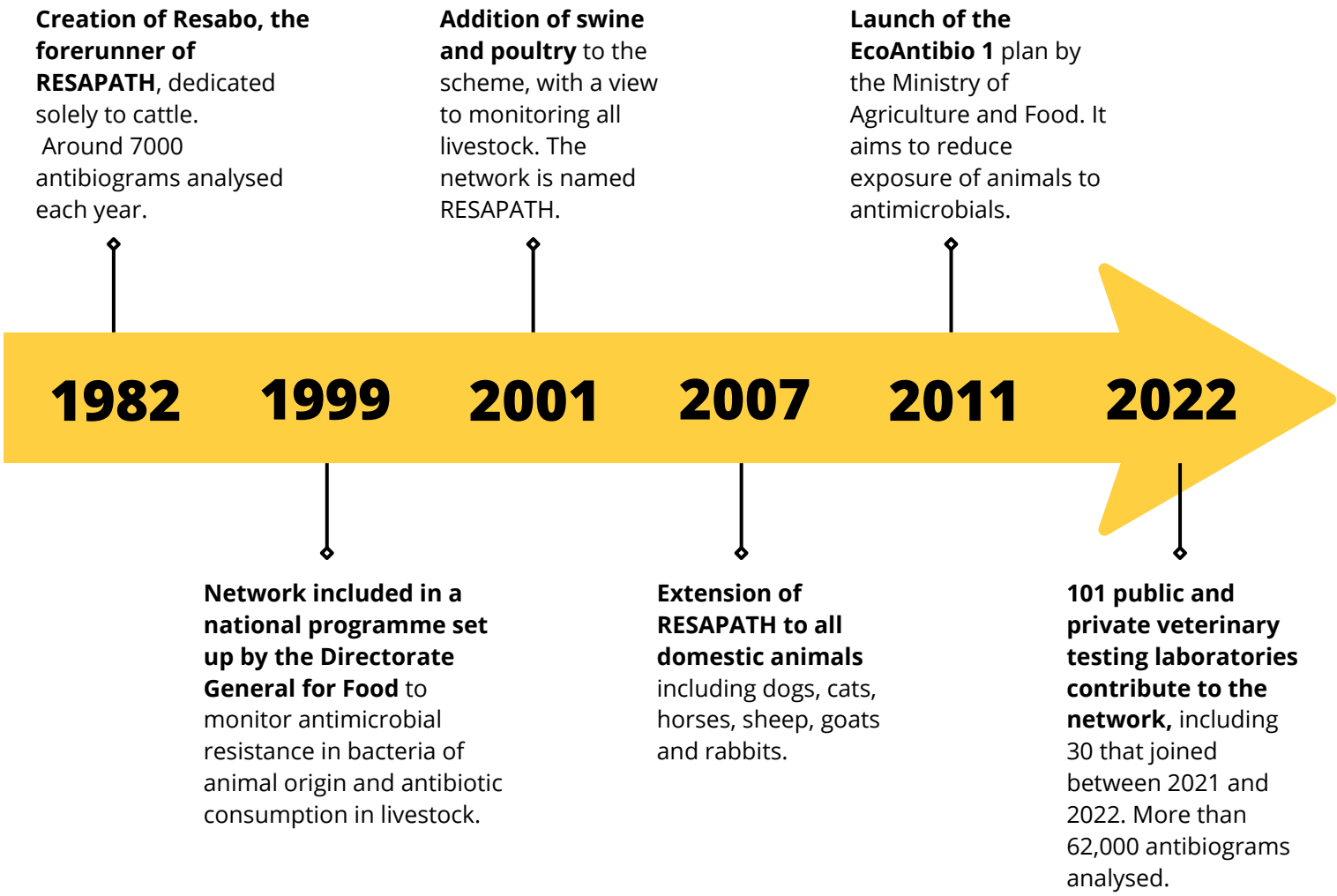
To find out more

Read the **RESAPATH annual report** for 2021

Read the **report on the sales survey of veterinary medicinal products containing antimicrobials** in France – 2021

Four decades of monitoring antimicrobial resistance in animal health

Created to monitor antibiotic-resistant bacteria, RESAPATH is celebrating its 40th anniversary this year. This epidemiological surveillance network for antimicrobial resistance in pathogenic bacteria of animal origin is the only one of its kind in Europe. It is based on the voluntary participation of veterinary testing laboratories, which share with the network the results of antimicrobial resistance tests carried out at the request of veterinary practitioners when treating animals.



Find out more about RESAPATH

New EU regulations to strengthen action against antimicrobial resistance

The new European Regulation on veterinary medicines, which came into force on 28 January 2022, provides for several measures to limit and monitor the use of veterinary antimicrobials:

- **Shortening the interval between prescription and dispensing of a medicinal product**

Dispensing of antimicrobials is only permitted with a prescription that is less than five days old.

- **Strengthening the rules on the use of antimicrobials**

Use of antimicrobials before the onset of clinical signs is only possible in exceptional cases, in individual treatment or on a limited number of animals when the risk of infection is very high and has major consequences. Similarly, administering a medicinal product to a group of animals when a disease has been diagnosed in only part of the group is only possible if there are no other alternatives to prevent the spread of infection. These restrictions reduce the use of antibiotics and therefore limit the exposure of animals that do not require antibiotic treatment.

- **Adopting a European list of critical antimicrobials reserved for human use**

Use of these antimicrobials is totally prohibited in animals. Livestock animals that have received antimicrobials on this list, or their products, are banned from being imported into Europe.

- **Consideration of the risk of emergence of antimicrobial resistance for marketing authorisations**

The risk of emergence of antimicrobial resistance is now grounds for refusing marketing authorisation for a medicinal product if this risk outweighs the benefits for animal health.

- **Monitoring of antimicrobial dispensing by veterinarians and pharmacists, as well as sales of medicated feed**

In addition to the monitoring of veterinary medicinal product sales, already reported by MA holders, this will provide more accurate data on antimicrobial exposure by species and age group. This will enable a more detailed understanding of the small fluctuations observed from one year to the next.

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Monitoring antimicrobial resistance in food-producing animals

The European antimicrobial resistance monitoring scheme measures antimicrobial resistance in bacteria **collected from healthy food-producing animals and their meat**. It focuses on "indicator" bacteria, such as *Escherichia coli*, as well as bacteria such as *Salmonella* and *Campylobacter* that cause human infections.

At the French level, 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 vary every other year. **In 2021, surveillance concerned swine and cattle**. Samples were taken from caecal contents, i.e. the intestines of animals at the slaughterhouse, and from meat at distribution.

Antimicrobial resistance in E. coli: reversal of trends

While the proportion of susceptible strains in swine had been declining since 2015, there was a large increase in the rate of susceptible bacteria between 2019 and 2021. Conversely, after a very significant increase in the number of E. coli susceptible to all antibiotics in calves, this number fell slightly between 2019 and 2021.

Furthermore, the prevalence of *E. coli* producing extended-spectrum ß-lactamases and AmpC cephalosporinases, which are enzymes responsible for cephalosporin resistance, continued to decrease in both animal species.

Comparison of rates of E. coli susceptible to all antibiotics

- Swine: 30% in 2019, 44% in 2021
- Calves: 40% in 2019, 36% in 2021

No carbapenem resistance detected

No strains of *E. coli* or *Salmonella* resistant to carbapenems, which are antibiotics critical to human health, were detected among the strains collected from animals or their meat.

Salmonella: a variable rate of resistance depending on the serovars and the animals

Swine: 67% of Salmonella Derby were susceptible to all antibiotics tested.

More than 50% of Salmonella Typhimurium and its variants were resistant to at least three classes of antibiotics and are therefore classified as multidrug resistant.

However, **no resistance to antibiotics of critical importance to human health** has been identified.

Calves: the prevalence of Salmonella in cattle caeca in France is low. The only Salmonella strain isolated from calves in 2021 was found **to be susceptible to all antibiotics tested.**

Campylobacter: high resistance to some antibiotics

There was high to very high resistance to fluoroquinolones and tetracyclines, regardless of Campylobacter species and animal species.

Combined resistance to erythromycin and ciprofloxacin, two critical antibiotics for the treatment of campylobacteriosis in humans, remains broadly stable compared to the previous monitoring campaigns.

Combined resistance to erythromycin and ciprofloxacin:

- 0.8% of C. jejuni were resistant in calves,
- 8% of C. coli were resistant in swine,
- 25% of C. coli isolated from calves were resistant.

All the monitoring results will be published in France in the DGAL's report on its monitoring and control plans. At European level, they will be addressed in a report by the European Food Safety Authority (EFSA) and the European Centre for Disease Prevention and Control (ECDC).

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Research to improve the fight of antimicrobial resistance

Veterinary clinics, places where antibiotic-resistant bacteria circulate

Dogs carry **more antibiotic-resistant bacteria when they leave veterinary clinics** than when they enter them. These are the findings of a study carried out on 125 dogs hospitalised in a single veterinary hospital over a four-month period. Conducted by scientists from ANSES and the Alfort National Veterinary School, this study was published in the October 2022 issue of the *Journal of Antimicrobial Chemotherapy*.

The scientists focused on resistance to two antibiotics of critical importance to humans: cephalosporins and carbapenems. On admission, 4.8% of the dogs carried bacteria resistant to one of these antibiotics. **When they were discharged from the hospital, this number was 24.8%.** Identical bacteria or genes were found in dogs having had no direct contact, and in the hospital premises. **This confirmed that they were transmitted here, either via the environment or by the medical staff.**

"*The role of hospitals in the transmission of bacteria and resistance genes is well known in humans, but has been less studied in animals*" says Jean-Yves Madec, head of the Antimicrobial resistance and bacterial virulence unit at the Lyon Laboratory and co-author of the study.

As carbapenems are not authorised for use in dogs, it is likely that the bacteria resistant to this antibiotic were initially transmitted to them by a human. Similarly, dogs carrying these resistant bacteria could in turn transmit them to their owners. These results are a reminder that **the fight against antimicrobial resistance also requires the application of measures to prevent bacterial transmission** between animals, and from animals to humans (and vice versa). One of these measures is the systematic washing of hands after touching an animal, especially when the animal has been hospitalised or is under antibiotic treatment.

Find out more

An ANSES doctoral student wins the EcoAntibio 2022 prize

The French Union for the Veterinary Medicinal Product and Reagent Industry (SIMV) has awarded the EcoAntibio 2022 prize to Jingjing Liu, a doctoral student at ANSES's Lyon Laboratory, in collaboration with the INRAE laboratory and the Toulouse National Veterinary School. This prize recognises work on alternatives to antibiotics for combating infectious animal diseases.

Jingjing Liu has been working on combining an existing antibiotic with non-antibiotic compounds to combat a Staphylococcus aureus that causes chronic mastitis in dairy cows. Staphylococci are virtually non-susceptible to antibiotics used alone. However, the addition of subtilisin A or calcium gluconate destroys the biofilm protecting the bacteria, thus getting around their resistance to the antibiotic. The award will be officially presented on 25 November 2022.

Find out more

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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, thereby 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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