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Sales Survey of Veterinary Medicinal Products Containing Antimicrobials in France in 2019

Annual Report

November 2020 - Scientific Edition

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Sales Survey of Veterinary Medicinal Products Containing Antimicrobials in France in 2019

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I. Abstract

The French Agency for Veterinary Medicinal Products (ANSES-ANMV) has been monitoring sales of veterinary antimicrobials in France since 1999. This monitoring is carried out according to the standards defined in Chapter 6.9 of the OIE's Terrestrial Animal Health Code: "Monitoring of the quantities and usage patterns of antimicrobial agents used in food-producing animals".

This monitoring of antimicrobial sales is based on reporting by holders of marketing authorisations (MAs) in accordance with the provisions of Article L. 5141-14-1 of the French Public Health Code, in conjunction with the French Union for the Veterinary Medicinal Product and Reagent Industry (SIMV).

The companies also provide an estimated breakdown of the drugs sold by target species.

The information collected from the pharmaceutical companies covers 100% of authorised drugs in France[1].

The information gathered in the context of this national monitoring scheme is one of the essential elements, together with monitoring of bacterial resistance, needed for assessing the risks associated with antimicrobial resistance.

Background

The first EcoAntibio 2012-2016 plan was published in November 2011. This aimed to reduce the use of antimicrobials by 25% in five years, with particular attention being paid to the use of antimicrobials of critical importance in veterinary and human medicine. The main objective of the first plan was met, with a 36.5% decrease in animal exposure to antibiotics during this five-year period.

The Act on the future of agriculture, food and forestry (LAAAF[2], Act No. 2014-1170 of 13 October 2014) added specific objectives for antimicrobials of critical importance in human medicine. It thus set a target of a 25% reduction in three years in the use of antimicrobials belonging to the classes of fluoroquinolones and third- and fourth-generation cephalosporins, with 2013 being the reference year. This objective was achieved and even greatly exceeded in 2016.

The second EcoAntibio 2017-2021 plan aims to ensure that the decline in animal exposure to antibiotics is sustained. It provides for communication and training measures, access to alternatives to antimicrobials, and improved prevention of animal diseases. A specific objective for colistin is a 50% reduction in exposure to this antibiotic in five years, in the cattle, pig and poultry sectors.

Tonnage of active ingredient sold

In 2019, the total sales volume for antimicrobials amounted to 422 tonnes, a fall of 10.5% compared to 2018 (472 tonnes).

This was the lowest tonnage recorded since monitoring began in 1999 (1311 tonnes). A 53.3% reduction can also be observed compared to 2011, the reference year for the first EcoAntibio plan. This trend is largely attributable to lower sales of orally administered antimicrobials.

[1] The off-label use of veterinary medicinal products is partly taken into consideration in the manufacturers' reports. Exceptional prescription and off-label use of human drugs or extemporaneous preparations containing antimicrobials under the provisions of the cascade approach (Article L. 5143-4 of the French Public Health Code) is not taken into account.

[2] http://www.legifrance.gouv.fr/affichLoiPubliee.do;jsessionid=5691BBA0E2987B8FCBB6195E53853F64.tpdjo07v_2?type=general&idDocument=JORFDOLE000028196878

Exposure to antimicrobials

Given the differences in potency and dose between different drugs, the sales in weight of antimicrobials do not accurately reflect their use. Recent antimicrobials are generally more potent and require the administration of a smaller dose of active ingredient.

To assess animal exposure to antimicrobials, it is necessary to consider the dosage and duration of administration, but also changes in the animal population over time.

By comparing the estimates of body weight treated with the mass of the animal population potentially treated with antimicrobials, we obtain an estimate of the level of exposure (ALEA: Animal Level of Exposure to Antimicrobials). This indicator is correlated with the percentage of animals treated relative to the total population and is an objective indicator of exposure to antimicrobials.

Compared to 2011, overall exposure of animals has decreased by 45.3%: by 74.4% for medicated premixes, 51.4% for oral powders and solutions, and 15.2% for injections. Exposure to antimicrobials has declined for all species compared to 2011: -25.5% for cattle, -54.0% for pigs, -60.5% for poultry, -41.4% for rabbits and -13.9% for domestic carnivores. The number of intramammary treatments per dairy cow has decreased by 31.4% since 2011.

The sharp drop observed since 2011 has continued and overall animal exposure fell by 10.9% between 2018 and 2019. Over the last year, the change in exposure has varied according to the species: -9.9% for cattle, -16.4% for pigs, -12.8% for poultry, +1.5% for rabbits and +2.1% for domestic carnivores. Between 2018 and 2019, exposure fell by 16.7% for oral powders and solutions, 6.6% for medicated premixes and 6.0% for injections. The ALEA declined mainly for tetracyclines and polymyxins (oral and parenteral routes combined). The number of intramammary treatments per dairy cow has decreased by 15.4% since 2018.

In 2019, animal exposure to antimicrobials reached its lowest level since 1999. After a sharp decline in the ALEA between 2011 and 2016, there has been a relative stabilisation of animal exposure over the last three years for most classes of antimicrobials, with the exception of tetracyclines and polymyxins.

Exposure to fluoroquinolones and newer-generation cephalosporins

Third- and fourth-generation cephalosporins and fluoroquinolones are considered as particularly important in human medicine because they are among the only alternatives for the treatment of certain infectious diseases in humans.

The Act on the future of agriculture, food and forestry had set a target of a 25% reduction in three years in the use of antimicrobials belonging to each of these classes, taking 2013 as the reference year. A reduction in exposure to antimicrobials of critical importance was observed for all species compared to 2013. These encouraging results followed publication of a Decree and an Interministerial Order in 2016 seeking to regulate the prescription and dispensing of drugs used in veterinary medicine and containing antibiotics of critical importance.

In 2018, animal exposure to newer-generation cephalosporins had fallen by 93.8% compared to 2013. In 2019, the decline in exposure continued, and was estimated to be 94.1% compared to 2013, all species combined. Between 2018 and 2019, a decrease in exposure was observed for all species, except for domestic carnivores (+1.5%). The number of intramammary treatments per dairy cow based on newer-generation cephalosporins decreased by 99.4% between 2013 and 2018. In 2019, this number was higher than in 2018, but there has still been a 98.9% fall since 2013. The increase observed between 2018 and 2019 is explained by a lag in the reported sales figures for 2018 for some drugs, and does not reflect a change in the use of these intramammary treatments.

Regarding fluoroquinolones, in 2018, exposure had declined by 86.1% compared to 2013. In 2019, exposure fell by 86.0% compared to 2013. Indeed, over the last year, a slight increase of 0.7% has been observed: this can be explained by an increase in the use of injections (+2.8% for all species combined).

Between 2018 and 2019, exposure to fluoroquinolones increased for cattle, domestic carnivores and horses, while it decreased for pigs and poultry.

Since 2017, the frequency of treatment with critically important antimicrobials has fallen to a very low level. However, despite the significant decrease in the use of these antimicrobials compared to 2013, continued vigilance is needed, and this trend should be monitored over the coming years.

Exposure to colistin

An article published in November 2015 describing the first plasmid-mediated mechanism of resistance to colistin led to the establishment of reinforced surveillance for this antibiotic.

At European level, in July 2016, the Antimicrobial Advice Ad Hoc Expert Group (AMEG)[3] recommended reducing the use of colistin within three to four years to no more than 5 mg/PCU (Population Correction Unit) for European countries that are high or moderate consumers, and no more than 1 mg/PCU for European countries with the lowest use of colistin.

In France, in its report[4] on colistin published in October 2016, ANSES recommended a 50% reduction in the use of this antimicrobial. Following this opinion, the EcoAntibio2 plan (Action 12) set a five-year goal of a 50% reduction in exposure to colistin in the cattle, pig and poultry sectors, taking the average ALEA for 2014-2015 as a reference.

By 2019, exposure to colistin had fallen by 64.2% compared to the average exposure calculated for 2014 and 2015. Exposure had decreased for pigs (-73.7%), poultry (-58.1%) and cattle (-52.3%) compared to the average exposure for 2014-2015. **The objective set by the EcoAntibio 2017-2021 plan to reduce colistin exposure by 50% has therefore been achieved for the pig, poultry and cattle sectors.**

Calculating the results in mg/PCU according to the standards defined by the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) scheme, the value obtained for colistin in 2019 was 1.40 mg/PCU, which is far lower than the 5 mg/PCU threshold advocated by the AMEG.

Conclusion

Following the success of the EcoAntibio 2017 plan, which achieved all of its objectives, the new EcoAntibio 2017-2021 plan aims to ensure that the decline in animal exposure to antibiotics is sustained. The decline observed since 2011 has continued, and overall animal exposure has fallen in the last year. Between 2018 and 2019, the ALEA by species decreased for pigs, poultry and cattle, and increased slightly for domestic carnivores and rabbits.

Exposure to antimicrobials regarded as critical has fallen by 86.0% for fluoroquinolones and 94.1% for newer-generation cephalosporins, compared to 2013. After a sharp decline observed between 2013 and 2016, exposure to critical antimicrobials appears to have stabilised over the last three years.

The objective set by the EcoAntibio 2017-2021 plan to reduce colistin exposure by 50% has been achieved for the cattle, pig and poultry sectors.

Results for 2019 indicate that overall exposure of animals to antimicrobials has fallen compared to 2018. For some classes of antimicrobials, it seems that the reduction in use has reached a limit. It is important

[3] http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2016/07/WC500211080.pdf

[4] https://www.anses.fr/fr/system/files/MV2016SA0160.pdf

to monitor antimicrobial uses and assess their consequences on the development of bacterial resistance. The momentum for the prudent and responsible use of antimicrobials in veterinary medicine must be maintained. The EcoAntibio 2 plan aims in particular to consolidate the achievements and pursue the actions previously undertaken in the first national plan.

II. Introduction

Antimicrobial resistance is a major public health issue concerning both human and veterinary medicine. Monitoring of sales of antimicrobials is one of the key sources of information used to assess and manage the risks associated with antimicrobial resistance.

ANSES-ANMV has been monitoring sales of veterinary antimicrobials in France since 1999. This monitoring is carried out according to the standards defined in Chapter 6.9 of the OIE's Terrestrial Animal Health Code: "Monitoring of the quantities and usage patterns of antimicrobial agents used in food-producing animals".

France also participates in the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) scheme, which was launched by the European Medicines Agency (EMA) at the request of the European Commission, with the aim of collecting harmonised data on antimicrobial sales for all countries in the European Union.

In France, the monitoring of antimicrobial sales is based on reporting by holders of marketing authorisations (MAs) in accordance with the provisions of Article L. 5141-14-1 of the French Public Health Code, in conjunction with the French Union for the Veterinary Medicinal Product and Reagent Industry (SIMV). All veterinary antimicrobials sold in France are recorded through this annual monitoring.

This report describes the veterinary antimicrobial sales for 2019 and includes a comparison with results from previous years.

III. Materials and methods

1. Data used in this report

a) *Data on sales of medicinal products containing antimicrobials*

Monitoring of sales is based on an annual declaration by each marketing authorisation (MA) holder marketing veterinary medicinal products containing antimicrobials authorised in France. Information on the number of units sold for each presentation of each medicinal product is thus sent to ANSES-ANMV. Since 2009, MA holders have also been required to provide information, for each presentation, on the breakdown of sales by target animal species.

The figures collected cover the period from 1 January to 31 December and constitute an exhaustive compilation of the veterinary antimicrobials marketed in France during the calendar year.

To avoid the risk of any reporting errors, sales volumes are compared with annual turnover reported independently by the MA holders. Any discrepancies are investigated. Significant differences compared to previous years are also subject to a specific audit.

b) *Data on French animal populations*

To take account of fluctuations in the animal population when interpreting the data, the information published by Agreste[5] is used for food-producing animals.

For domestic pets, data are provided by statistics from FACCO[6], the French trade federation of food manufacturers for dogs, cats, birds and other pets, which are published every two years.

The data published by the French Horse and Riding Institute[7] (IFCE) are used to determine the numbers of Equidae.

For fish, the national production data come from a report published by the Federation of European Aquaculture Producers[8] (FEAP).

In order to evaluate the biomasses of animals potentially treated with antimicrobials, different weights have been selected: the weights of adult animals for those with a life cycle of more than one year, and the weights at slaughter for the others.

The data on animal populations used for this report are available in the Annex (Table 1 and Table 2).

c) *Data on veterinary medicinal products containing antimicrobials*

A variety of information on medicinal products containing antimicrobials is available in the index of veterinary medicinal products authorised in France[9]. Some data from the Summary of Product Characteristics (SPC) have been used for each veterinary drug:

- qualitative and quantitative composition in antimicrobials,

- pharmaceutical form,

- dosage and route of administration.

[5] http://agreste.agriculture.gouv.fr/

[6] http://www.facco.fr/

[7] https://www.ifce.fr/

[8] http://feap.info/

[9] http://www.ircp.anmv.anses.fr/

For each drug and each species, the dosage selected is the one defined in the MA:

- the **daily** dose, expressed in mg of antimicrobials per kg of body weight treated,

- the **duration** of treatment, expressed in days.

In the framework of this national monitoring programme, when multiple doses and durations are described in the SPC for the same species, dosing data have been used, according to the following rules:

- When multiple doses are possible, the highest dose was chosen, for the drug's main indication.

- When multiple treatment durations are possible, the longest treatment duration was chosen.

2. Calculations and interpretation of indicators

To correctly interpret the data in this report, it is necessary to understand what information is used as a basis for the calculations of the proposed indicators. Several indicators are proposed because the results of this study may be used for different purposes.

Some indicators may be preferred for assessing the correlation between sales of antimicrobials and antimicrobial resistance. Others will be more appropriate for monitoring global changes over time in prescription of veterinary medicinal products and for attempting to measure the impact of actions implemented at national level.

In this report, two types of indicators are presented:

- sales indicators, used to monitor the change in the weights of antimicrobials sold over time,

- exposure indicators, used to better represent the use of antimicrobials to treat animals.

a) *Tonnages of antimicrobials sold*

The weight of antimicrobials sold by drug presentation is an exact measurement obtained by multiplying the quantitative composition of active ingredient for each presentation by the number of units sold.

For some active ingredients expressed in IU (International Units) or prodrugs, a conversion coefficient (WHO standard value) has been used to calculate the quantity of antimicrobials by drug presentation. The coefficients used for the national monitoring scheme are those recommended by the European Medicines Agency (EMA) in the framework of the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) scheme[10].

In this report, the quantities of antimicrobials sold (expressed in tonnes) are presented by pharmaceutical form of the drugs and/or by class of antimicrobials.

The weight of antimicrobials sold by species is calculated using the estimates provided by the MA holders on the shares of sales for each animal species. This estimated amount is therefore calculated by multiplying the weight of antimicrobials sold by presentation by the percentage of reported sales for a given species.

[10] http://www.ema.europa.eu/docs/en_GB/document_library/Other/2015/06/WC500188365.pdf

b) *Weight of antimicrobials sold compared to the animal biomass*

In order to take account of fluctuations in medicinal product sales and animal populations over time, the ratio between the weights of antimicrobials sold and the biomass of the population potentially using antimicrobials can be calculated.

This indicator is expressed in mg of active ingredient per kg of body weight.

c) *Indicators of exposure of the animal population*

For drugs administered by the oral and parenteral routes, three exposure indicators can be calculated: the body weight treated-day, the body weight treated, and the ALEA.

The **body weight treated-day** for a given drug, also called the "Number of ADDkg", is calculated by dividing the weight of antimicrobials sold by the daily dose chosen for this drug.

This daily dose, or ADDkg (Animal Daily Dose) is the dose necessary to treat one kg of body weight for one day.

The body weight treated-day for a given species is calculated by adding together the numbers of ADDkg calculated for all the drug presentations sold for this species.

The **body weight treated** for a given drug, also called the "Number of ACDkg", is calculated by dividing the weight of antimicrobials sold by the dose required to treat a kg of typical animal over the entire duration of treatment.

This dose, known as the ACDkg (Animal Course Dose), is the daily dose multiplied by the duration of treatment.

The body weight treated for a given species is calculated by adding together the numbers of ACDkg calculated for all the drug presentations sold for this species.

The **indicator of exposure** of animals to antimicrobials or **ALEA** (Animal Level of Exposure to Antimicrobials) is calculated by dividing the body weight treated by the biomass of the animal population potentially using antimicrobials.

The ALEA indicator has no unit and is based on the assumption that all the antimicrobials sold during the year were administered to animals in France during this year.

The total per year in body weight treated is lower than the sum of body weight treated per class of antimicrobials, due to combinations of antimicrobials in some veterinary drugs. The same is true for the total body weight treated-day and the total ALEA, when the results are presented by class of antimicrobials.

3. Important points concerning the 2019 annual report

Changes to the SPC were introduced in 2019 for certain veterinary medicinal products authorised in France. These changes have been incorporated in the analysis of sales for 2019 but do not affect the results of previous years.

The biomass data for the different animal populations have been updated according to the Agreste website, especially for veal calves, for the years 2017 and 2018.

Previously, penethamate was regarded as an antimicrobial substance on its own. However, since this substance is a prodrug of benzylpenicillin, a conversion factor of 0.60 was applied to the quantitative composition of penethamate hydroiodide.

IV. Tonnages of antimicrobials sold and exposure indicators in 2019

1. Tonnages by antimicrobial class and route of administration

In 2019, the total volume of sales amounted to 422.08 tonnes of antimicrobials. Five antimicrobial classes (tetracyclines, sulfonamides, penicillins, aminoglycosides and macrolides) accounted for more than 89% of total antimicrobial sales (Table 1). Tetracyclines alone represented around 34% of tonnage sold. Critical antimicrobials (newer-generation cephalosporins and fluoroquinolones) accounted for nearly 0.3% of the tonnage of active ingredient sold.

Table 1: Breakdown of sales for 2019 in tonnage of active ingredient for each antimicrobial class by route of administration

	MEDICATED PREMIXES	ORAL FORMS EXCLUDING PREMIXES	INJECTIONS	INTRAMAMMARY & INTRAUTERINE	TOTAL	SHARE OF THE CLASS (%)
AMINOGLYCOSIDES	10.75	11.27	26.70	1.42	50.14	11.88%
OTHER CLASSES[11]	-	1.61	-	0.04	1.65	0.39%
CEPHALOSPORINS 1&2G	-	3.97	0.04	1.10	5.11	1.21%
CEPHALOSPORINS 3&4G	-	-	0.11	0.00	0.11	0.03%
FLUOROQUINOLONES	-	0.69	0.28	-	0.97	0.23%
LINCOSAMIDES	0.31	2.18	0.65	0.02	3.16	0.75%
MACROLIDES	5.74	17.42	7.35	-	30.52	7.23%
PENICILLINS	8.77	31.24	27.77	2.18	69.95	16.57%
PHENICOLS	-	0.23	5.20	-	5.43	1.29%
PLEUROMUTILINS	1.67	1.79	0.01	-	3.47	0.82%
POLYMYXINS	0.61	9.26	0.44	0.12	10.42	2.47%
QUINOLONES	-	2.33	-	-	2.33	0.55%
SULFONAMIDES	37.34	38.62	5.39	-	81.34	19.27%
TETRACYCLINES	62.57	71.83	8.32	1.42	144.15	34.15%
TRIMETHOPRIM	5.69	6.58	1.04	-	13.31	3.15%
TOTAL	133.45	199.03	83.31	6.29	422.08	100.00%
PERCENTAGE	31.62%	47.15%	19.74%	1.49%	100.00%	

Sales of antimicrobials administered in local forms (sprays, creams, ear or eye solutions) are not presented in this report. They account for around 0.7% of the tonnage of active ingredient sold.

[11] Other classes: dimetridazole, metronidazole, pyrimethamine, rifaximin

2. Tonnages by species

In 2019, according to the information on the breakdown by species transmitted to ANSES-ANMV by the pharmaceutical companies, 33% of the tonnage of antimicrobials sold is intended for pigs, 28% is intended for cattle and 17% is destined for poultry (Table 2).

In 2019, 27.51 mg of antimicrobials were sold per kilogram of body weight, with differences depending on the species.

When expressed in weight of active ingredient, the results are not representative of the animal species' "exposure" to antimicrobials.

Table 2: Breakdown of sales for 2019 between the different species in tonnage of active ingredient and quantity of active ingredient per kilogram of body weight

	Cattle	Pigs	Poultry	Rabbits	Cats & Dogs	Sheep & Goats	Horses	Fish	Other	Total
Tonnage sold	117.46	140.62	73.67	31.07	16.41	30.42	8.59	3.40	0.45	422.08
Percentage	27.83%	33.32%	17.45%	7.36%	3.89%	7.21%	2.03%	0.81%	0.11%	100.00%
Sales in mg/kg	13.11	49.80	34.24	382.21	96.06	54.47	16.67	73.94	12.81	27.51

3. Indicators by antimicrobial class and route of administration

Sales expressed in body weight treated show that animals are treated primarily with tetracyclines, penicillins, aminoglycosides, macrolides and polymyxins, followed by sulfonamides (Table 3). Less than 1% of body weight treated in veterinary medicine is treated with fluoroquinolones or newer-generation cephalosporins.

Medicated premixes are generally medicinal products containing older compounds and are administered over a long period. Although they account for nearly 32% of the tonnage of active ingredient sold, they represent around 10% of body weight treated. Oral powders & solutions and injections each represented 44% of total body weight treated with antimicrobials.

For medicated premixes, the tetracycline class accounted for around 37% of body weight treated, and the sulfonamides class for more than 29% of body weight treated. Around 39% of the body weight treated with oral powders or solutions was treated with tetracyclines, and 22% with polymyxins. For parenteral administration, in terms of body weight treated, penicillins were the class most commonly used (41%), followed by aminoglycosides (29%), macrolides (23%) and tetracyclines (20%).

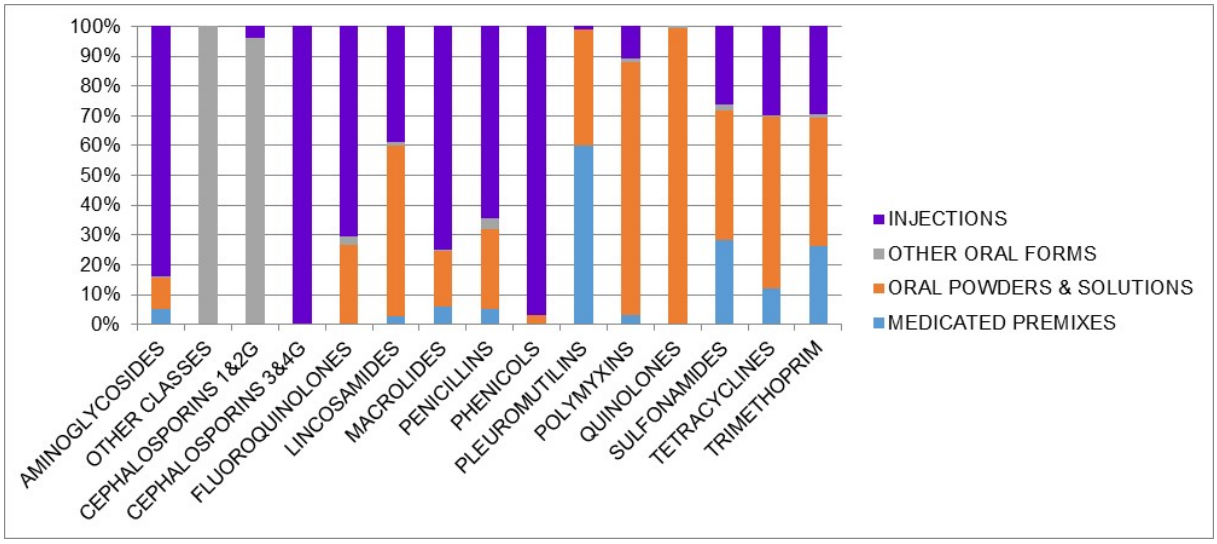
Fluoroquinolones and third- and fourth-generation cephalosporins were used to treat respectively 1.5% and 0.8% of the total body weight treated by the parenteral route.

Table 3: Body weight treated in 2019 according to the classes of antimicrobials and routes of administration (in tonnes)

	MEDICATED PREMIXES	ORAL POWDERS & SOLUTIONS	OTHER ORAL FORMS*	INJECTIONS	TOTAL	PERCENTAGE
AMINOGLYCOSIDES	39,810	79,139	5,037	641,983	765,969	15.18%
OTHER CLASSES	0	0	6,555	0	6,555	0.13%
CEPHALOSPORINS 1&2G	0	0	11,680	479	12,159	0.24%
CEPHALOSPORINS 3&4G	0	0	0	17,252	17,252	0.34%
FLUOROQUINOLONES	0	12,408	1,267	32,746	46,421	0.92%
LINCOSAMIDES	1,564	34,491	765	23,388	60,208	1.19%
MACROLIDES	39,501	126,099	3,019	505,007	673,626	13.35%
PENICILLINS	71,431	385,309	52,583	921,315	1,430,638	28.35%
PHENICOLS	0	4,608	0	138,386	142,994	2.83%
PLEUROMUTILINS	21,097	13,609	0	411	35,117	0.70%
POLYMYXINS	17,751	490,808	6,080	62,372	577,011	11.43%
QUINOLONES	0	31,400	181	0	31,581	0.63%
SULFONAMIDES	143,690	220,840	10,322	133,633	508,485	10.07%
TETRACYCLINES	181,166	859,860	9,104	442,996	1,493,126	29.58%
TRIMETHOPRIM	116,631	192,856	5,134	132,052	446,673	8.85%
TOTAL (in tonnes)	491,783	2,227,530	98,659	2,229,030	5,047,002	100.00%
PERCENTAGE	9.74%	44.14%	1.95%	44.17%	100.00%	

* Tablets, oral pastes, boluses, etc.

Figure 1: Relative average proportions of pharmaceutical forms in the body weight treated by different classes of antimicrobials in 2019



Polymyxins, tetracyclines, sulfonamides and trimethoprim are mainly administered orally (Figure 1). Aminoglycosides, penicillins and macrolides are mainly used by the parenteral route.

4. Indicators by species

More than 43% of the body weight of animals treated relates to cattle, more than 28% to pigs and 17% to poultry (Table 4). These percentages should be considered in the context of the biomass of each animal species in France (Table 2 in the Annex).

Table 4: Breakdown of sales for 2019 between the different species in tonnage of body weight treated and ALEA exposure indicator

	Cattle	Pigs	Poultry	Rabbits	Cats & Dogs	Sheep & Goats	Horses	Fish	Other	Total
Body weight treated (tonnes)	2,193,014	1,433,492	852,912	151,150	109,642	190,520	99,420	11,666	5,186	5,047,002
Percentage	43.45%	28.40%	16.90%	2.99%	2.17%	3.77%	1.97%	0.23%	0.10%	100.00%
ALEA	0.245	0.508	0.396	1.860	0.642	0.341	0.193	0.254	0.147	0.329

The ALEA indicator best reflects exposure to antimicrobials as it takes into account information on the treatments (dose and duration) and also on potential users (weight of the animal population potentially treated with antimicrobials).

If the ALEA is equal to 1, it means that, for a given species, the estimated body weight treated is exactly the same as the total body weight (produced) of the animal population. An ALEA of 0.245 for cattle means that sales of antimicrobials intended for this animal sector were used to treat 24.5% of the total body weight of cattle.

According to the ALEA calculated for 2019, rabbits, cats and dogs, pigs and poultry are the species most exposed to antimicrobials (Table 4).

However, the ALEA does not take into account the potential differences between the treatment of young and adult animals. To better assess the use of antimicrobials, the weight of the animals during treatment should be taken into account and not the adult weight or weight at slaughter.

V. Change in sales and exposure to antimicrobials between 1999 and 2019

1. Milestone years in the national monitoring scheme

The monitoring of sales of antimicrobials in veterinary medicine began in 1999.

After several months of discussions with stakeholders, the first EcoAntibio plan was published in November 2011. One of this plan's objectives was to reduce the use of antimicrobials by 25% in five years, taking 2011 as the reference year.

The Act on the future of agriculture, food and forestry of 13 October 2014[12] set a target of a 25% reduction in three years in the use of antimicrobials belonging to the classes of fluoroquinolones and third- and fourth-generation cephalosporins, taking 2013 as the reference year. This Act also introduced several measures, such as an end to discounts, rebates and reductions as of 1 January 2015. This led to stockpiling of medicines containing antimicrobials among the parties involved in the distribution and/or prescription of veterinary medicinal products during 2014, which resulted in sales falling in 2015.

Following on from the 2012-2016 EcoAntibio plan, the second EcoAntibio plan was published in April 2017, in order to ensure that the decline in animal exposure to antimicrobials is sustained. One of its goals is a 50% reduction in five years in exposure to colistin in the beef, pork and poultry sectors (using the average ALEA for 2014-2015 as a reference).

Throughout this report, therefore, the results for 2019 have been compared to those of the three reference years 1999, 2011 and 2013.

2. Change in sales and exposure to antimicrobials by pharmaceutical form

a) *Change in weights of active ingredients*

Over the 21 years of monitoring, the tonnage of antimicrobials sold has fluctuated between 1383 tonnes in 2000 and 422 tonnes in 2019 (Table 3 in the Annex). The tonnage of antimicrobials sold in 2019 fell by 10.5% compared to the tonnage in 2018. This change was mainly due to a decrease in the tonnage sold for oral powders and solutions (-16.8% in one year).

The weight of antimicrobials sold in 2019 was compared to the tonnage in 2011, the reference year for the first national EcoAntibio plan: a decrease of 53.3% can be observed over these last eight years. This decrease is largely attributable to lower sales of orally administered antimicrobials (-67.2% for medicated premixes and -50.6% for oral powders and solutions).

b) *Change in the body weight treated by antimicrobials*

The body weight treated was calculated for each drug for the different oral forms and injections.

Since 1999, the body weight treated has halved (-50.5%). The body weight treated varied between 5 million tonnes (in 2019) and 11 million tonnes (in 2007).

The body weight treated in 2019 was down by 48.5% compared to 2011, the reference year for the first national EcoAntibio plan (Table 5 in the Annex): -75.8% for medicated premixes, -54.2% for oral powders and solutions, and -20.1% for injections.

The change in sales by pharmaceutical form is presented in the Annex: Table 4 for the change in the body weight treated-day and Table 5 for the change in the body weight treated.

12 http://www.legifrance.gouv.fr/affichLoiPubliee.do;jsessionid=5691BBA0E2987B8FCBB6195E53853F64.tpdjo07v_2?type=general&idDocument=JORFDOLE000028196878

c) *Change in animal exposure to antimicrobials (ALEA)*

Since monitoring of sales began, the level of exposure of animals to antimicrobials, all routes and species combined, has decreased by 41.3% (variation between 1999 and 2019). In 2019, overall exposure fell by 10.9% compared to the previous year and by 45.3% compared to 2011 (Table 5).

Table 5: Change in the indicator of exposure by pharmaceutical form (ALEA)

	MEDICATED PREMIXES	ORAL POWDERS & SOLUTIONS	OTHER ORAL FORMS	INJECTIONS	TOTAL
1999	0.210	0.180	0.007	0.164	**0.561**
2000	0.217	0.214	0.007	0.160	**0.598**
2001	0.203	0.245	0.006	0.157	**0.610**
2002	0.191	0.282	0.006	0.158	**0.638**
2003	0.184	0.308	0.007	0.164	**0.663**
2004	0.171	0.317	0.007	0.154	**0.649**
2005	0.176	0.359	0.007	0.171	**0.713**
2006	0.176	0.342	0.007	0.180	**0.705**
2007	0.193	0.342	0.007	0.165	**0.708**
2008	0.168	0.305	0.007	0.169	**0.649**
2009	0.154	0.306	0.007	0.158	**0.625**
2010	0.146	0.310	0.007	0.166	**0.629**
2011	0.125	0.299	0.007	0.171	**0.602**
2012	0.098	0.284	0.006	0.178	**0.566**
2013	0.084	0.262	0.006	0.172	**0.524**
2014	0.084	0.316	0.007	0.187	**0.593**
2015	0.069	0.155	0.005	0.139	**0.369**
2016	0.050	0.172	0.006	0.154	**0.382**
2017	0.039	0.178	0.006	0.145	**0.368**
2018	0.034	0.174	0.006	0.155	**0.369**
2019	0.032	0.145	0.006	0.145	**0.329**
Variation 2019 / 2018	-0.002 -6.6%	-0.029 -16.7%	0.000 1.2%	-0.009 -6.0%	**-0.040** **-10.9%**
Variation 2019 / 2011	-0.093 -74.4%	-0.153 -51.4%	-0.000 -4.1%	-0.026 -15.2%	**-0.273** **-45.3%**

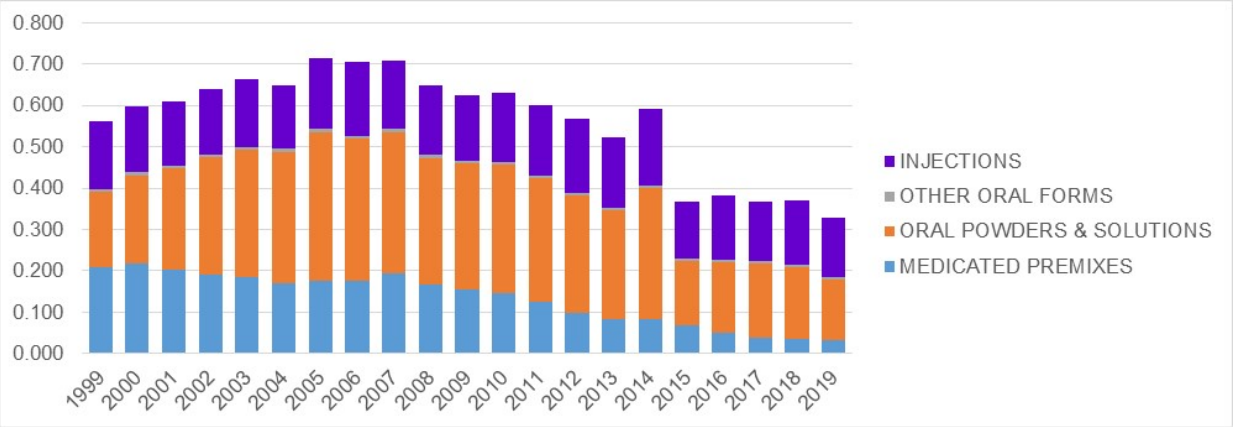
Exposure to antimicrobials via medicated premixes has fallen by 74.4% since 2011 (Figure 2). Over the last year, there has been a 6.6% decrease in exposure to this pharmaceutical form.

Over the last year, there has been a 6.0% decrease in exposure to injections. Since 2011, exposure to antimicrobials in this pharmaceutical form has fallen by 15.2%.

Exposure to antimicrobials via oral powders and solutions has decreased by 16.7% in the last year and by 51.4% since 2011.

Exposure to antimicrobials via other orally administered forms (pastes, tablets, boluses, etc.) is low and has been relatively stable since 1999.

Figure 2: Change in ALEA by pharmaceutical form since 1999



3. Change in sales and exposure to antimicrobials by class

a) *Change in the tonnage compared to the mass of the animal population*

Since 1999, sales expressed in mg of antimicrobials per kg of body weight produced have fluctuated between 27.51 and 78.82 mg/kg (Table 6).

Table 6: Change in sales by antimicrobial class since 1999 in mg of active ingredient per kilogram of body weight (mg/kg)

	AMINOGLYCOSIDES	OTHER CLASSES*	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	4.49	0.05	0.29	0.05	0.18	0.32	4.37	4.97	0.24	1.71	3.69	1.09	14.25	34.29	2.06	72.06
2000	4.89	0.05	0.29	0.06	0.20	0.44	4.82	5.28	0.25	1.80	3.85	0.90	14.78	35.79	2.11	75.50
2001	4.95	0.05	0.28	0.05	0.22	0.50	5.45	5.04	0.24	1.38	3.85	0.79	13.13	35.62	1.94	73.48
2002	4.95	0.05	0.34	0.06	0.23	0.60	5.95	5.36	0.31	1.39	3.73	0.87	12.56	34.63	1.86	72.91
2003	4.63	0.02	0.39	0.07	0.25	0.58	5.78	5.21	0.24	1.24	3.82	0.79	11.85	36.61	1.84	73.32
2004	4.53	0.05	0.39	0.08	0.25	0.55	5.56	4.86	0.28	0.93	3.63	0.72	12.09	36.75	1.95	72.62
2005	4.61	0.04	0.43	0.10	0.26	0.60	6.01	5.33	0.28	0.50	3.99	0.80	12.94	39.86	2.14	77.89
2006	4.67	0.06	0.39	0.11	0.29	0.54	6.18	5.58	0.37	0.60	4.02	0.78	12.72	36.11	1.99	74.42
2007	4.41	0.04	0.43	0.12	0.28	0.54	5.80	5.56	0.35	0.59	4.39	0.65	13.34	40.32	2.01	78.82
2008	4.39	0.04	0.43	0.13	0.29	0.47	5.71	5.12	0.30	0.48	3.95	0.48	11.72	35.17	1.78	70.45
2009	3.89	0.04	0.42	0.11	0.29	0.43	5.00	5.20	0.29	0.49	3.98	0.45	10.92	30.28	1.70	63.49
2010	3.79	0.04	0.36	0.14	0.32	0.41	4.94	5.50	0.31	0.46	3.95	0.49	10.61	28.66	1.60	61.57
2011	3.91	0.04	0.43	0.14	0.32	0.33	4.33	5.55	0.28	0.42	3.73	0.38	10.53	23.95	1.54	55.89
2012	3.58	0.04	0.41	0.15	0.31	0.29	3.81	5.38	0.29	0.35	3.20	0.33	9.07	20.49	1.33	49.03
2013	3.40	0.04	0.40	0.13	0.30	0.29	3.25	5.42	0.29	0.35	2.68	0.29	8.52	17.62	1.26	44.23
2014	3.60	0.04	0.46	0.13	0.31	0.29	3.65	6.14	0.37	0.40	3.22	0.35	9.18	19.74	1.42	49.29
2015	3.01	0.03	0.28	0.09	0.17	0.20	2.27	4.01	0.24	0.34	1.90	0.17	6.65	11.69	0.97	32.01
2016	3.49	0.08	0.40	0.02	0.11	0.19	2.31	4.86	0.35	0.28	1.27	0.20	6.96	11.61	1.08	33.21
2017	3.49	0.08	0.35	0.01	0.08	0.19	2.16	4.62	0.34	0.26	1.04	0.21	5.84	12.01	1.02	31.70
2018	3.34	0.09	0.36	0.01	0.06	0.20	2.06	4.55	0.37	0.23	0.88	0.18	5.40	11.57	0.97	30.26
2019	3.27	0.11	0.33	0.01	0.06	0.21	1.99	4.56	0.35	0.23	0.68	0.15	5.30	9.40	0.87	27.51
Variation 2019 / 2018	-0.07	0.02	-0.03	0.00	0.00	0.01	-0.07	0.01	-0.02	0.00	-0.20	-0.02	-0.10	-2.17	-0.10	-2.75
	-2.1%	20.4%	-7.4%	-4.6%	-1.1%	5.6%	-3.3%	0.2%	-4.2%	-0.3%	-22.8%	-13.8%	-1.8%	-18.8%	-10.7%	-9.1%
Variation 2019 / 2011	-0.64	0.07	-0.10	-0.13	-0.26	-0.13	-2.34	-0.99	0.07	-0.19	-3.05	-0.23	-5.22	-14.56	-0.67	-28.37
	-16.4%	166.7%	-23.0%	-94.9%	-80.4%	-38.3%	-54.0%	-17.8%	25.9%	-45.6%	-81.8%	-60.3%	-49.6%	-60.8%	-43.6%	-50.8%

* Other classes: dimetridazole, metronidazole, pyrimethamine and rifaximin

A 61.8% decrease in the quantity of active ingredient in mg per kilogram of body weight can be observed between 1999 and 2019. This decrease was largely attributable to lower sales of antimicrobials from the classes of tetracyclines (-72.6%) and sulfonamides (-62.8%).

Since 2011, there has been a 50.8% decrease in the quantity of antimicrobials sold in mg per kilogram of body weight. This trend is largely attributable to lower sales of antimicrobials from the classes of tetracyclines (-60.8%) and sulfonamides (-49.6%), but also from the classes of polymyxins (-81.8%) and macrolides (-54.0%).

In the last year, a 9.1% decrease in the quantity of active ingredient in mg per kilogram of body weight has been observed. This trend is largely due to a decrease in sales of tetracyclines, polymyxins, sulfonamides and trimethoprim, aminoglycosides and macrolides between 2018 and 2019. During the same period, sales of fluoroquinolones fell by 1.1% and sales of newer-generation cephalosporins fell by 4.6%.

The change in the tonnage sold by class is shown in Table 6 in the Annex.

b) *Change in animal exposure to antimicrobials (ALEA)*

Since 1999, the level of animal exposure to antimicrobials, all classes and animal species combined, has fallen by 41.3%. The trend in exposure varies according to the class considered (Figure 4).

Between 2011 and 2019, overall exposure decreased by 45.3%. This was largely due to lower exposure to polymyxins (-73.1%), tetracyclines (-44.0%), macrolides (-31.4%), sulfonamides (37.7%), third- and fourth-generation cephalosporins (-94.6%) and fluoroquinolones (-86.4%) (Figure 3).

The ALEA was 0.329 in 2019, a decrease of 10.9% in one year (Table 7). Exposure to tetracyclines has fallen by 20.5% in one year. Exposure to polymyxins decreased by 20.1% between 2018 and 2019. Over this period, antimicrobial exposure decreased for all classes except for first- and second-generation cephalosporins, fluoroquinolones, lincosamides and penicillins; exposure for these classes was stable between 2018 and 2019.

Figure 3: Comparison of the ALEA by antimicrobial class in 2011 and 2019

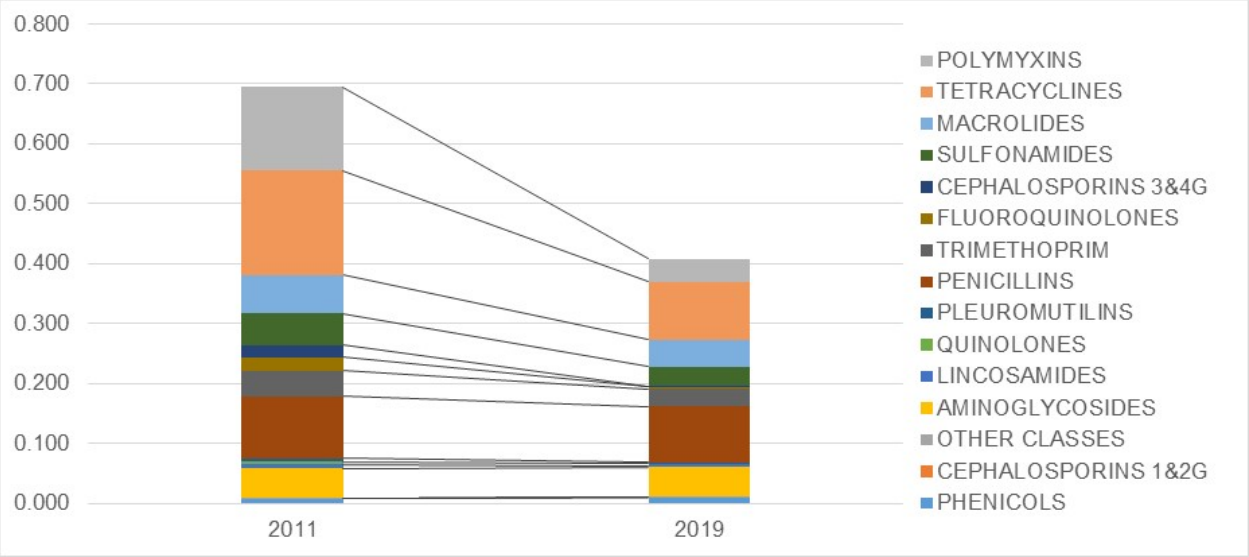


Figure 4: Change in animal exposure in France by antimicrobial class since 2011 (ALEA)

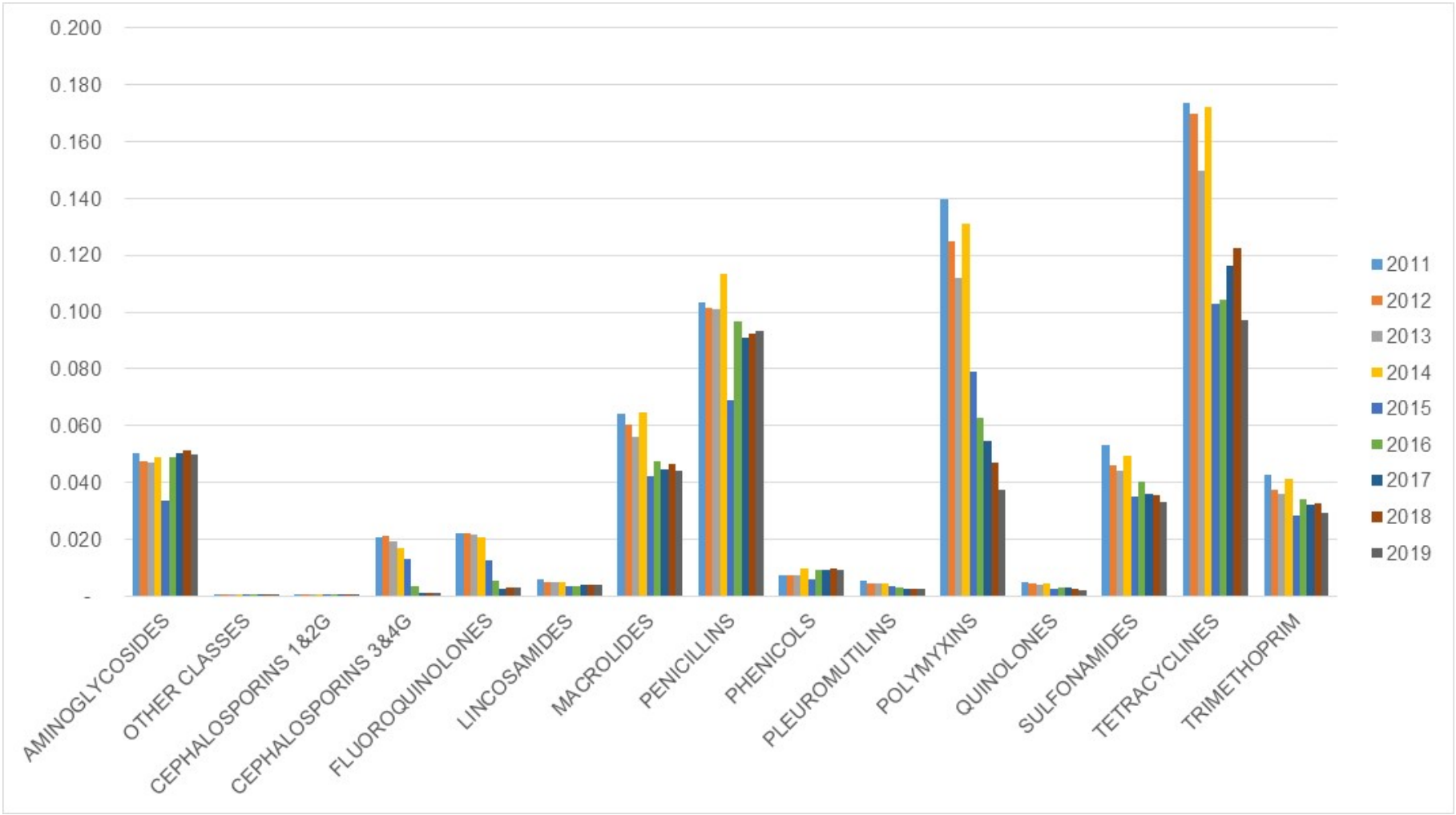


Table 7: Change in ALEA by antimicrobial class since 1999 (for the oral and parenteral routes only)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	0.058	0.000	0.000	0.008	0.011	0.006	0.051	0.094	0.006	0.023	0.111	0.013	0.069	0.176	0.052	0.561
2000	0.060	0.000	0.000	0.009	0.012	0.009	0.059	0.101	0.006	0.025	0.118	0.011	0.071	0.184	0.054	0.598
2001	0.060	0.000	0.000	0.009	0.014	0.010	0.064	0.097	0.006	0.019	0.121	0.010	0.066	0.196	0.051	0.610
2002	0.060	0.000	0.001	0.011	0.017	0.013	0.071	0.094	0.008	0.019	0.123	0.010	0.064	0.209	0.048	0.638
2003	0.059	0.000	0.001	0.012	0.019	0.012	0.070	0.097	0.006	0.017	0.130	0.010	0.060	0.231	0.047	0.663
2004	0.062	0.000	0.001	0.013	0.018	0.011	0.066	0.090	0.007	0.013	0.126	0.009	0.061	0.234	0.048	0.649
2005	0.064	0.000	0.001	0.015	0.021	0.011	0.075	0.101	0.007	0.008	0.142	0.009	0.064	0.260	0.052	0.713
2006	0.063	0.001	0.001	0.018	0.023	0.010	0.076	0.104	0.009	0.008	0.146	0.009	0.063	0.239	0.050	0.705
2007	0.060	0.000	0.001	0.019	0.020	0.009	0.068	0.103	0.009	0.008	0.150	0.008	0.065	0.247	0.052	0.708
2008	0.058	0.000	0.001	0.020	0.022	0.009	0.070	0.095	0.008	0.006	0.143	0.006	0.059	0.210	0.047	0.649
2009	0.052	0.000	0.001	0.017	0.022	0.008	0.066	0.094	0.007	0.006	0.144	0.006	0.054	0.199	0.045	0.625
2010	0.049	0.000	0.001	0.021	0.022	0.007	0.067	0.101	0.008	0.006	0.146	0.006	0.053	0.191	0.044	0.629
2011	0.050	0.000	0.001	0.021	0.022	0.006	0.064	0.103	0.007	0.005	0.140	0.005	0.053	0.174	0.042	0.602
2012	0.048	0.000	0.001	0.021	0.022	0.005	0.060	0.101	0.008	0.005	0.125	0.004	0.046	0.170	0.037	0.566
2013	0.047	0.000	0.001	0.019	0.022	0.005	0.056	0.101	0.007	0.005	0.112	0.004	0.044	0.150	0.036	0.524
2014	0.049	0.000	0.001	0.017	0.021	0.005	0.065	0.114	0.009	0.004	0.131	0.005	0.049	0.172	0.041	0.593
2015	0.033	0.000	0.000	0.013	0.013	0.004	0.042	0.069	0.006	0.004	0.079	0.002	0.035	0.103	0.028	0.369
2016	0.049	0.000	0.001	0.004	0.005	0.004	0.047	0.097	0.009	0.003	0.063	0.003	0.040	0.104	0.034	0.382
2017	0.050	0.000	0.001	0.001	0.003	0.004	0.045	0.091	0.009	0.003	0.055	0.003	0.036	0.116	0.032	0.368
2018	0.051	0.000	0.001	0.001	0.003	0.004	0.046	0.093	0.010	0.002	0.047	0.002	0.036	0.122	0.032	0.369
2019	0.050	0.000	0.001	0.001	0.003	0.004	0.044	0.093	0.009	0.002	0.038	0.002	0.033	0.097	0.029	0.329
Variation 2019 / 2018	-0.001	0.000	0.000	0.000	0.000	0.000	-0.002	0.001	0.000	0.000	-0.009	0.000	-0.002	-0.025	-0.003	-0.040
	-2.4%	16.4%	5.7%	-5.4%	0.7%	0.4%	-5.2%	0.8%	-4.0%	-1.4%	-20.1%	-14.2%	-6.7%	-20.5%	-10.3%	-10.9%
Variation 2019 / 2011	-0.001	0.000	0.000	-0.020	-0.019	-0.002	-0.020	-0.010	0.002	-0.003	-0.102	-0.003	-0.020	-0.077	-0.013	-0.273
	-1.1%	26.5%	20.6%	-94.6%	-86.4%	-34.7%	-31.4%	-9.9%	27.8%	-56.3%	-73.1%	-58.4%	-37.7%	-44.0%	-31.4%	-45.3%

The change in sales by class of antimicrobials is presented in the Annex: Table 7 for the change in the body weight treated-day and Table 8 for the change in the body weight treated.

VI. Change in exposure to antimicrobials by species

1. Cattle

a) *Change in sales and exposure to antimicrobials by class*

The tonnage intended for cattle increased considerably between 1999 and 2005 and then declined until 2015 (Table 9 in the Annex). In 2019, it was around 117 tonnes, i.e. 13.9% lower than the tonnage in 2018 and 35.9% lower than in 2011.

The level of exposure of cattle to antimicrobials has fallen by 8.0% since 1999. According to the ALEA per class in 2019, cattle are treated mostly with penicillins, tetracyclines, aminoglycosides and then macrolides (Figure 6).

Between 2011 and 2019, exposure of cattle fell by 25.5%. This was largely due to lower exposure to third- and fourth-generation cephalosporins (-95.2%), fluoroquinolones (-89.8%), polymyxins (-50.6%), macrolides (-21.8%) and penicillins (9.7%) (Figure 5).

The exposure of cattle to antimicrobials seems to have been relatively stable since 2015.

The ALEA was 0.245 in 2019, a variation of -9.9% in one year (Table 8). Between 2018 and 2019, a decrease in exposure was observed for all classes of antimicrobials, except for fluoroquinolones (+1.4%) and penicillins (+1.1%).

Figure 5: Comparison of the ALEA for cattle by antimicrobial class in 2011 and 2019

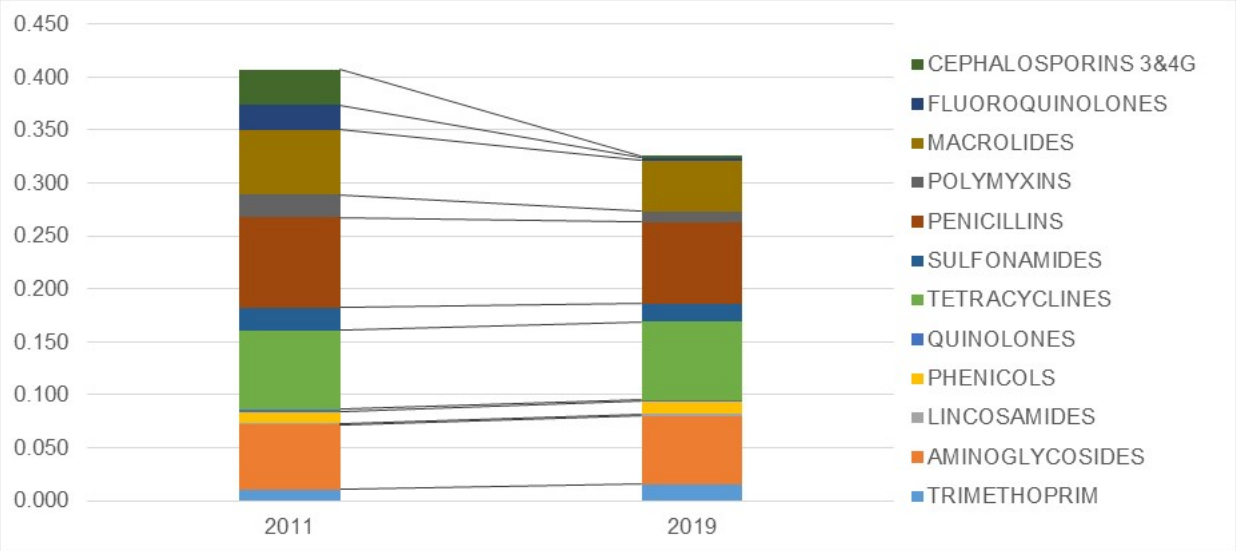


Figure 6: Change in exposure of cattle by antimicrobial class since 2011 (ALEA)

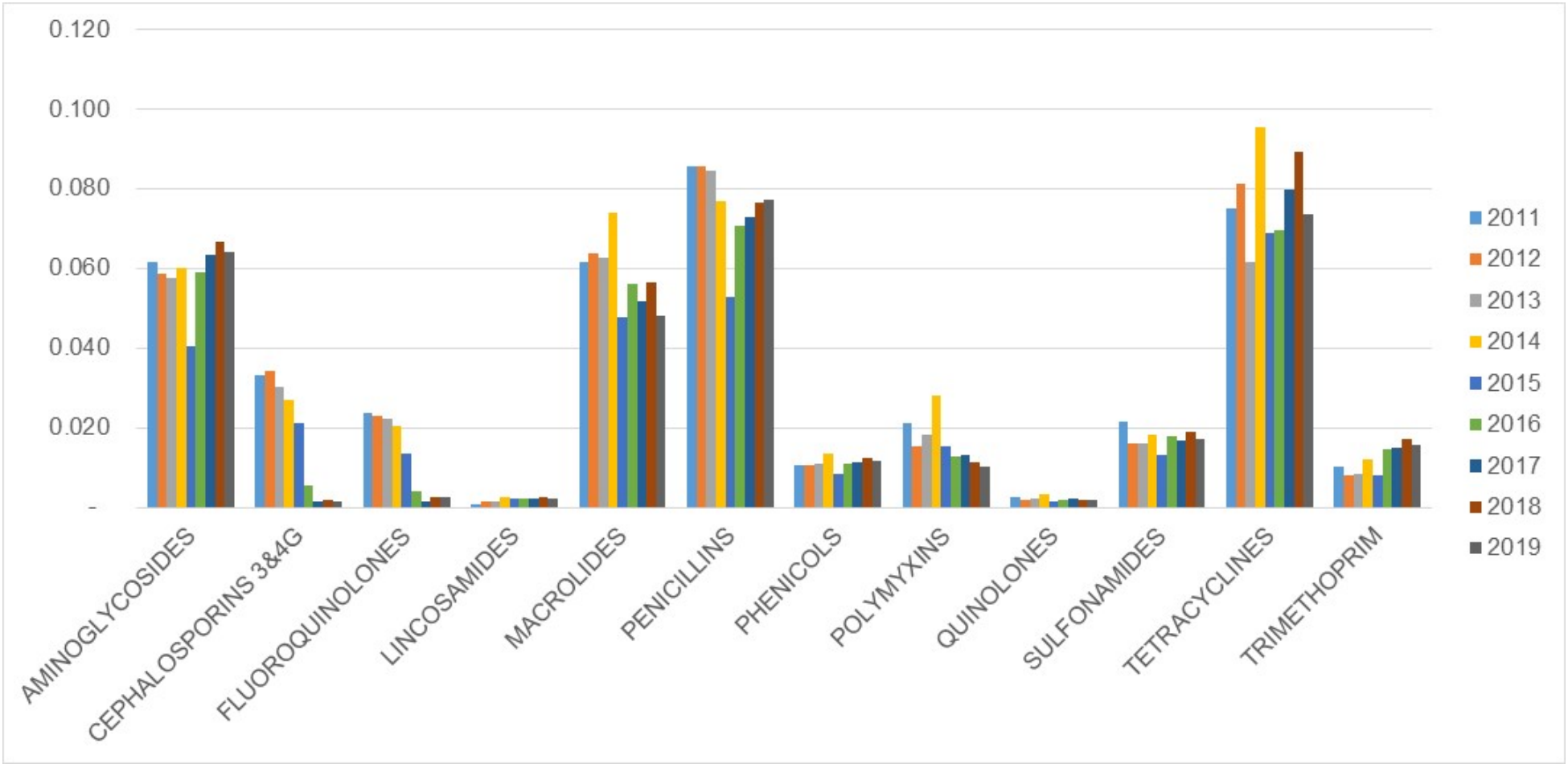


Table 8: Change in exposure of cattle by antimicrobial class since 1999 (for the oral and parenteral routes only)

	AMINOGLYCOSIDES	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	0.065	0.012	0.009	0.002	0.045	0.080	0.010	0.029	0.004	0.013	0.072	0.007	0.266
2000	0.064	0.015	0.009	0.002	0.046	0.079	0.011	0.030	0.004	0.015	0.070	0.007	0.271
2001	0.062	0.014	0.013	0.002	0.046	0.077	0.010	0.031	0.004	0.014	0.062	0.007	0.263
2002	0.060	0.017	0.016	0.002	0.050	0.075	0.013	0.033	0.005	0.014	0.067	0.007	0.284
2003	0.062	0.020	0.019	0.002	0.051	0.076	0.011	0.033	0.005	0.013	0.076	0.007	0.299
2004	0.066	0.021	0.017	0.002	0.049	0.079	0.012	0.031	0.004	0.014	0.098	0.007	0.321
2005	0.070	0.025	0.020	0.003	0.056	0.087	0.013	0.035	0.005	0.014	0.117	0.007	0.368
2006	0.068	0.026	0.022	0.003	0.053	0.085	0.016	0.034	0.005	0.014	0.106	0.007	0.357
2007	0.065	0.027	0.020	0.002	0.044	0.079	0.015	0.031	0.004	0.016	0.104	0.007	0.335
2008	0.062	0.029	0.020	0.002	0.053	0.074	0.013	0.031	0.003	0.016	0.081	0.008	0.317
2009	0.053	0.024	0.019	0.002	0.053	0.069	0.011	0.031	0.003	0.013	0.086	0.007	0.305
2010	0.053	0.030	0.023	0.002	0.057	0.079	0.012	0.027	0.004	0.014	0.098	0.007	0.340
2011	0.062	0.033	0.024	0.001	0.062	0.085	0.011	0.021	0.002	0.021	0.075	0.010	0.328
2012	0.059	0.034	0.023	0.002	0.064	0.085	0.011	0.015	0.002	0.016	0.081	0.008	0.327
2013	0.057	0.030	0.022	0.002	0.063	0.084	0.011	0.018	0.002	0.016	0.062	0.008	0.304
2014	0.060	0.027	0.020	0.002	0.074	0.077	0.013	0.028	0.003	0.018	0.095	0.012	0.354
2015	0.040	0.021	0.013	0.002	0.048	0.053	0.009	0.015	0.001	0.013	0.069	0.008	0.240
2016	0.059	0.006	0.004	0.002	0.056	0.071	0.011	0.013	0.002	0.018	0.070	0.015	0.249
2017	0.063	0.002	0.002	0.002	0.052	0.073	0.011	0.013	0.002	0.017	0.080	0.015	0.252
2018	0.067	0.002	0.002	0.002	0.056	0.076	0.012	0.011	0.002	0.019	0.089	0.017	0.272
2019	0.064	0.002	0.002	0.002	0.048	0.077	0.012	0.010	0.002	0.017	0.073	0.016	0.245
Variation 2019 / 2018	-0.002	0.000	0.000	0.000	-0.008	0.001	-0.001	-0.001	0.000	-0.002	-0.016	-0.002	-0.027
	-3.4%	-5.2%	1.4%	-7.8%	-14.8%	1.1%	-4.9%	-8.2%	-0.6%	-9.5%	-17.8%	-9.8%	-9.9%
Variation 2019 / 2011	0.003	-0.031	-0.021	0.001	-0.013	-0.008	0.001	-0.011	-0.001	-0.004	-0.001	0.005	-0.084
	4.1%	-95.2%	-89.8%	146.8%	-21.8%	-9.7%	8.9%	-50.6%	-31.3%	-20.1%	-1.9%	50.2%	-25.5%

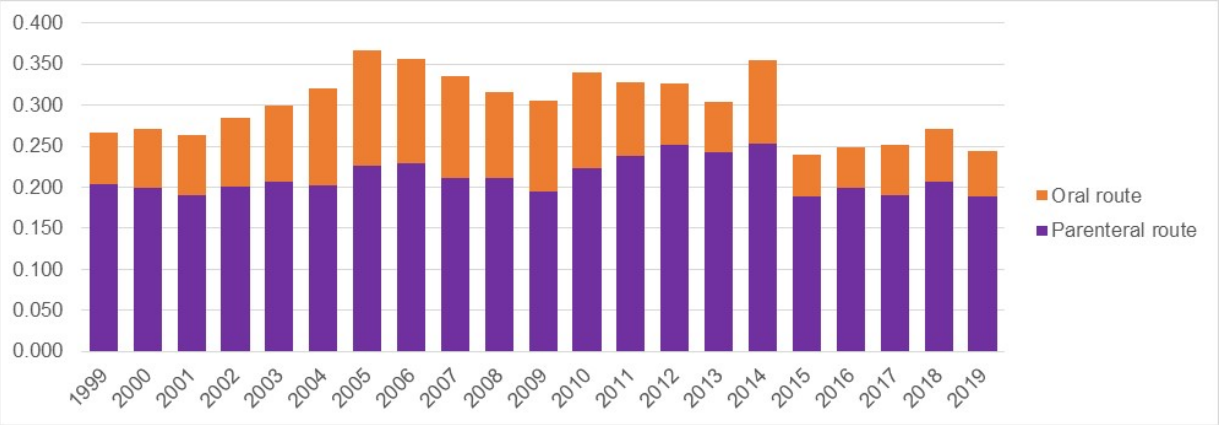
b) *Change in exposure by pharmaceutical form*

Cattle are treated primarily by the parenteral route and then by the oral route (Figure 7), mainly with the use of oral powders and solutions.

Exposure to antimicrobials via injections has fallen by 20.6% compared to 2011, with an 8.5% decline between 2018 and 2019.

Exposure to antimicrobials via the oral route has fallen by 34.1% compared to 2011, with a 14.4% decline between 2018 and 2019.

Figure 7: Change in exposure of cattle by administration route since 1999 (ALEA)



Various indicators calculated for cattle are available in the Annex: antimicrobial sales expressed in mg/kg in Table 9, body weight treated-day in Table 10 and body weight treated in Table 11.

c) *Intramammary treatments*

The number of intramammary treatments per dairy cow was estimated by attributing all the sales of intramammary drugs in the cattle sector to the population of dairy cows.

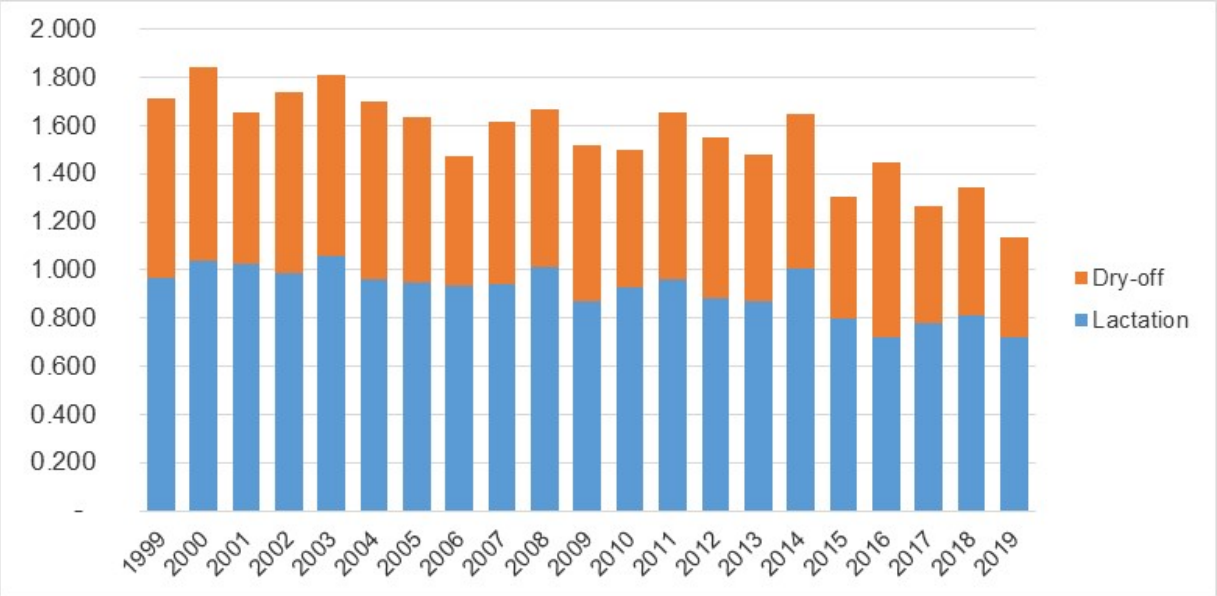
The equivalent of 1.71 intramammary treatments per dairy cow were sold in 1999, and the equivalent of 1.13 treatments per dairy cow in 2019 (Figure 8): a 33.7% fall has therefore been observed since national monitoring began. In 2019, the number of intramammary treatments per dairy cow fell by 31.4% compared to 2011, and by 15.4% compared to 2018.

In 2019 and according to the population data, the number of intramammary treatments was estimated to be 71.9 per 100 dairy cows in the lactation period, and 41.6 per 100 dairy cows at dry-off. Medicinal products administered at dry-off accounted for 43.4% of intramammary treatments in 1999 versus 36.6% for 2019.

Aminoglycosides, penicillins, polymyxins, tetracyclines and first- and second-generation cephalosporins are the classes most used by the intramammary route.

The number of intramammary treatments per dairy cow based on newer-generation cephalosporins decreased by 98.9% between 2013 and 2019. Note that the estimated number of treatments has doubled since 2018. The increase was mainly observed for treatments administered during the lactation period. According to the reported data, the number of dairy cows treated by the intramammary route with newer-generation cephalosporins represented 0.26% of animals in 2019 (versus 0.13% in 2018). The change is explained by a lag in the reported sales figures for 2018 for some drugs, and does not necessarily reflect a change in the use of these intramammary treatments.

Figure 8: Change in the number of intramammary treatments per dairy cow during the lactation period and at dry-off since 1999



2. Pigs

a) *Change in sales and exposure to antimicrobials by class*

The tonnage intended for pigs has declined considerably since 1999 (Table 12 in the Annex). In 2019, it was around 141 tonnes, i.e. 15.6% lower than the tonnage in 2018 and 60.3% lower than in 2011.

The level of exposure of pigs to antimicrobials has decreased by 60.0% since 1999. According to the ALEA per class in 2019, pigs are treated mostly with tetracyclines and penicillins, then with polymyxins, macrolides, sulfonamides and trimethoprim (Figure 10).

Between 2011 and 2019, exposure of pigs fell by 54.0%. This change was largely due to a decrease in exposure to polymyxins (-82.5%), but also to sulfonamides and trimethoprim (-60.6%), macrolides (-57.1%), tetracyclines (-43.8%) and fluoroquinolones (-90.0%) (Figure 9). Exposure to penicillins increased over this period (+12.7%).

The ALEA was 0.508 in 2019, a variation of -16.4% in one year (Table 9). Between 2018 and 2019, exposure to antimicrobials decreased mainly for tetracyclines and polymyxins. Over the same period, exposure to macrolides increased by 8.7%.

Figure 9: Comparison of the ALEA for pigs by antimicrobial class in 2011 and 2019

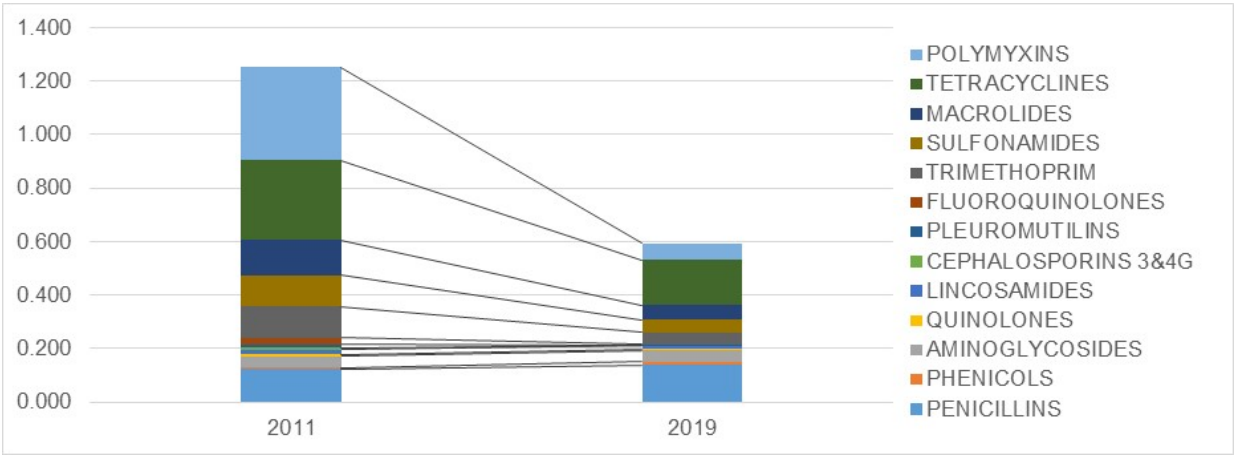


Figure 10: Change in exposure of pigs by antimicrobial class since 2011 (ALEA)

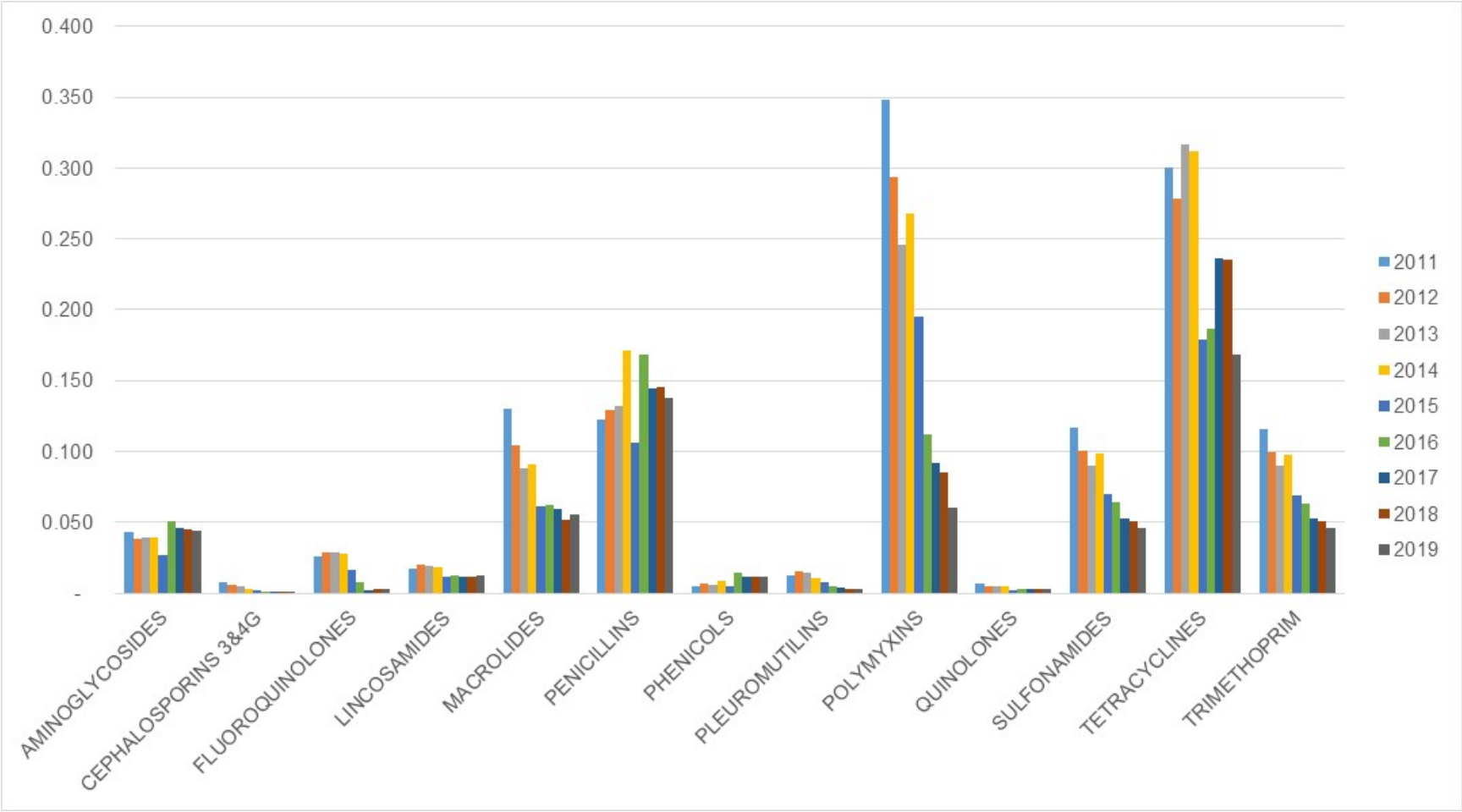


Table 9: Change in exposure of pigs by antimicrobial class since 1999 (ALEA calculated for the oral and parenteral routes only)

	AMINOGLYCOSIDES	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	0.072	0.004	0.021	0.020	0.118	0.114	0.000	0.090	0.323	0.029	0.160	0.385	0.146	1.268
2000	0.080	0.005	0.024	0.027	0.153	0.126	0.000	0.087	0.332	0.021	0.161	0.422	0.148	1.363
2001	0.091	0.004	0.026	0.032	0.191	0.130	0.000	0.073	0.342	0.015	0.163	0.485	0.149	1.479
2002	0.090	0.005	0.029	0.037	0.207	0.126	0.000	0.066	0.323	0.012	0.159	0.492	0.147	1.481
2003	0.083	0.005	0.031	0.034	0.192	0.123	0.000	0.042	0.338	0.009	0.144	0.502	0.134	1.443
2004	0.087	0.005	0.030	0.032	0.179	0.118	0.000	0.032	0.320	0.010	0.152	0.475	0.141	1.378
2005	0.088	0.007	0.037	0.033	0.193	0.131	0.000	0.022	0.343	0.011	0.155	0.509	0.145	1.469
2006	0.086	0.014	0.039	0.030	0.204	0.140	0.000	0.018	0.355	0.009	0.157	0.477	0.148	1.474
2007	0.078	0.015	0.033	0.028	0.196	0.148	0.000	0.015	0.410	0.010	0.166	0.518	0.155	1.568
2008	0.073	0.014	0.038	0.027	0.167	0.127	0.000	0.011	0.361	0.009	0.148	0.421	0.137	1.345
2009	0.073	0.013	0.040	0.026	0.162	0.141	0.006	0.012	0.345	0.007	0.141	0.401	0.131	1.315
2010	0.058	0.016	0.024	0.022	0.152	0.135	0.004	0.013	0.324	0.007	0.141	0.366	0.134	1.217
2011	0.043	0.008	0.026	0.018	0.130	0.122	0.005	0.013	0.348	0.007	0.117	0.300	0.116	1.103
2012	0.038	0.006	0.029	0.020	0.105	0.129	0.007	0.015	0.294	0.005	0.101	0.278	0.100	0.994
2013	0.039	0.005	0.029	0.019	0.088	0.132	0.005	0.014	0.246	0.005	0.090	0.317	0.090	0.957
2014	0.040	0.003	0.028	0.019	0.091	0.171	0.009	0.010	0.268	0.005	0.098	0.311	0.098	1.017
2015	0.027	0.002	0.016	0.012	0.061	0.107	0.005	0.008	0.195	0.002	0.070	0.179	0.069	0.657
2016	0.050	0.001	0.008	0.012	0.063	0.169	0.014	0.005	0.112	0.003	0.064	0.187	0.064	0.645
2017	0.046	0.000	0.002	0.012	0.059	0.144	0.012	0.004	0.092	0.003	0.053	0.236	0.053	0.624
2018	0.045	0.000	0.003	0.012	0.051	0.145	0.012	0.003	0.085	0.003	0.051	0.236	0.051	0.607
2019	0.044	0.000	0.003	0.012	0.056	0.138	0.012	0.003	0.061	0.003	0.046	0.169	0.046	0.508
Variation 2019 / 2018	-0.001	0.000	0.000	0.000	0.004	-0.007	0.000	0.000	-0.024	0.000	-0.005	-0.067	-0.005	-0.099
	-2.6%	-22.0%	-3.0%	2.3%	8.7%	-5.0%	-1.4%	-4.6%	-28.5%	4.6%	-9.0%	-28.4%	-9.4%	-16.4%
Variation 2019 / 2011	0.001	-0.007	-0.023	-0.005	-0.074	0.016	0.006	-0.010	-0.287	-0.003	-0.071	-0.131	-0.070	-0.595
	2.7%	-96.5%	-90.0%	-29.9%	-57.1%	12.7%	123.0%	-76.4%	-82.5%	-50.8%	-60.6%	-43.8%	-60.6%	-54.0%

b) *Change in exposure by pharmaceutical form*

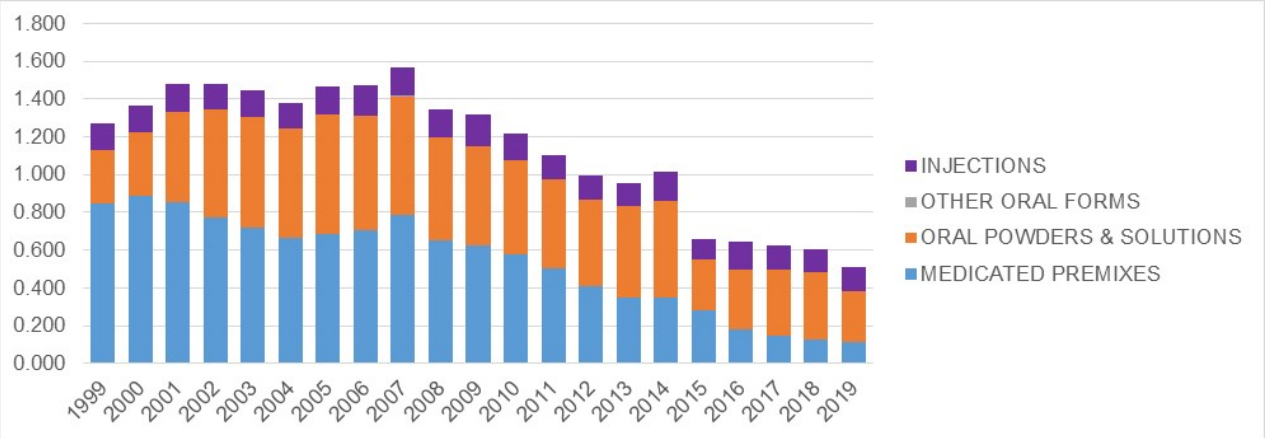
Pigs are treated essentially by the oral route, and then by the parenteral route (Figure 11).

Medicated premixes are used less and less: the ALEA for this pharmaceutical form has decreased by 77.6% since 2011 and by 12.5% over the last year.

Exposure to antimicrobials via oral powders and solutions has decreased by 41.9% since 2011 and has fallen by 22.8% over the last year.

Exposure to antimicrobials via injections has decreased by 5.6% since 2011 and has fallen by 2.2% over the last year.

Figure 11: Change in exposure of pigs by pharmaceutical form since 1999 (ALEA)



Various indicators calculated for pigs are available in the Annex: antimicrobial sales expressed in mg/kg in Table 12, body weight treated-day in Table 13 and body weight treated in Table 14.

3. Poultry

a) *Change in sales and exposure to antimicrobials by class*

The tonnage intended for poultry has declined considerably since 1999 (Table 15 in the Annex). In 2019, it was around 74 tonnes, i.e. 14.6% lower than the tonnage in 2018 and 63.6% lower than in 2011.

Since 1999, the level of exposure of poultry to antimicrobials has decreased by 39.5%. According to the ALEA per class in 2019, poultry are treated mostly with polymyxins, penicillins and tetracyclines, and then with sulfonamides and trimethoprim (Figure 13).

Between 2011 and 2019, exposure of poultry fell by 60.5%. This change was largely due to a decrease in exposure to polymyxins (-65.4%), tetracyclines (-72.2%), penicillins (-36.0%) and sulfonamides and trimethoprim (-33.5%), but also to fluoroquinolones (71.9%) and lincosamides (-85.8%) (Figure 12). Note that the use of cephalosporins is not authorised in poultry.

The ALEA was 0.396 in 2019, a variation of -12.8% in one year (Table 10). Between 2018 and 2019, exposure to antimicrobials fell for most classes of antimicrobials, but especially for polymyxins (-17.8%) and tetracyclines (-25.3%). An increase in exposure to penicillins was observed (+11.5%).

Figure 12: Comparison of the ALEA for poultry by antimicrobial class in 2011 and 2019

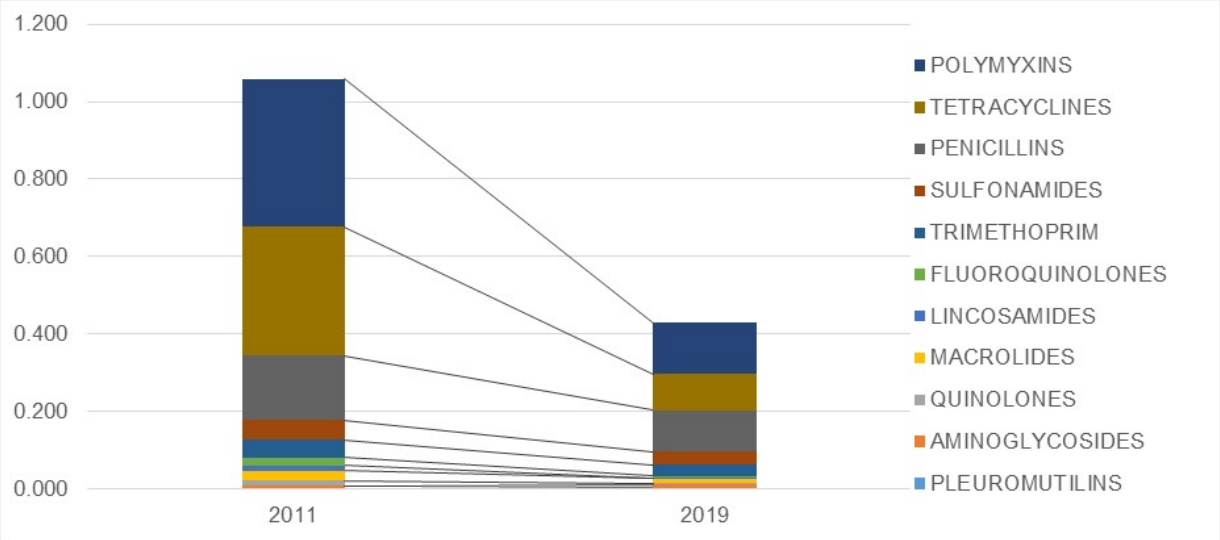


Figure 13: Change in exposure of poultry by antimicrobial class since 2011 (ALEA)

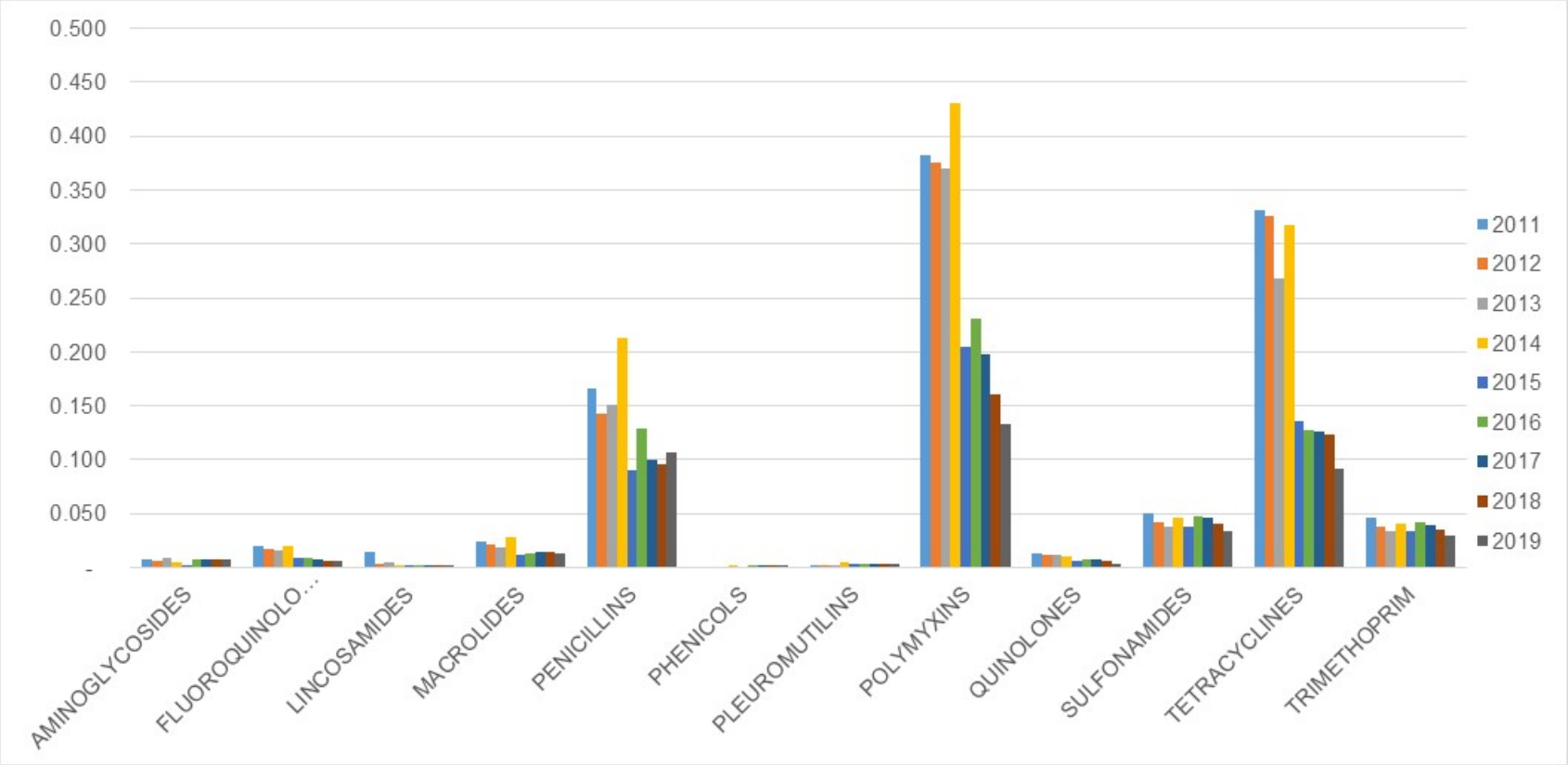


Table 10: Change in exposure of poultry by antimicrobial class since 1999 (ALEA calculated for the oral and parenteral routes only)

	AMINOGLYCOSIDES	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	0.010	0.012	0.009	0.025	0.078	0.000	0.001	0.185	0.029	0.037	0.283	0.037	0.655
2000	0.013	0.013	0.016	0.027	0.113	0.000	0.001	0.218	0.028	0.040	0.302	0.038	0.757
2001	0.014	0.012	0.023	0.027	0.098	0.000	0.001	0.227	0.027	0.037	0.339	0.038	0.790
2002	0.012	0.011	0.032	0.030	0.108	0.000	0.001	0.256	0.023	0.041	0.382	0.036	0.882
2003	0.010	0.012	0.027	0.032	0.107	0.000	0.000	0.283	0.023	0.042	0.437	0.038	0.961
2004	0.011	0.013	0.022	0.035	0.102	0.000	0.000	0.292	0.024	0.042	0.394	0.038	0.922
2005	0.010	0.012	0.020	0.042	0.120	0.000	0.000	0.340	0.023	0.044	0.412	0.043	1.013
2006	0.011	0.015	0.020	0.045	0.143	0.000	0.003	0.390	0.028	0.044	0.398	0.040	1.086
2007	0.011	0.016	0.016	0.042	0.149	0.000	0.004	0.351	0.021	0.046	0.407	0.043	1.050
2008	0.008	0.016	0.015	0.047	0.132	0.000	0.003	0.360	0.014	0.041	0.378	0.039	1.006
2009	0.009	0.017	0.011	0.036	0.144	0.000	0.004	0.409	0.016	0.045	0.347	0.043	1.029
2010	0.011	0.019	0.015	0.033	0.156	0.000	0.002	0.462	0.015	0.033	0.306	0.029	1.043
2011	0.008	0.020	0.015	0.024	0.167	0.000	0.003	0.383	0.012	0.051	0.332	0.046	1.005
2012	0.007	0.018	0.003	0.021	0.143	0.000	0.003	0.376	0.012	0.042	0.325	0.038	0.942
2013	0.009	0.016	0.004	0.019	0.151	0.000	0.002	0.370	0.011	0.038	0.268	0.033	0.882
2014	0.005	0.020	0.001	0.028	0.213	0.000	0.005	0.431	0.011	0.046	0.317	0.041	1.073
2015	0.003	0.008	0.001	0.011	0.090	0.000	0.004	0.204	0.006	0.038	0.136	0.034	0.500
2016	0.007	0.009	0.001	0.013	0.129	0.000	0.004	0.230	0.007	0.048	0.127	0.042	0.573
2017	0.008	0.008	0.002	0.015	0.100	0.000	0.004	0.198	0.008	0.046	0.126	0.039	0.512
2018	0.007	0.006	0.002	0.014	0.096	0.000	0.003	0.161	0.005	0.041	0.123	0.035	0.454
2019	0.008	0.006	0.002	0.012	0.107	0.000	0.003	0.132	0.003	0.034	0.092	0.029	0.396
Variation 2019 / 2018	0.001	0.000	0.000	-0.002	0.011	0.000	0.000	-0.029	-0.002	-0.007	-0.031	-0.006	-0.058
	14.2%	-1.7%	19.4%	-12.0%	11.5%	-9.9%	10.7%	-17.8%	-38.9%	-16.5%	-25.3%	-17.2%	-12.8%
Variation 2019 / 2011	0.000	-0.014	-0.013	-0.012	-0.060	0.000	0.001	-0.250	-0.009	-0.017	-0.240	-0.017	-0.608
	1.6%	-71.9%	-85.8%	-49.1%	-36.0%		38.8%	-65.4%	-73.2%	-33.5%	-72.2%	-36.5%	-60.5%

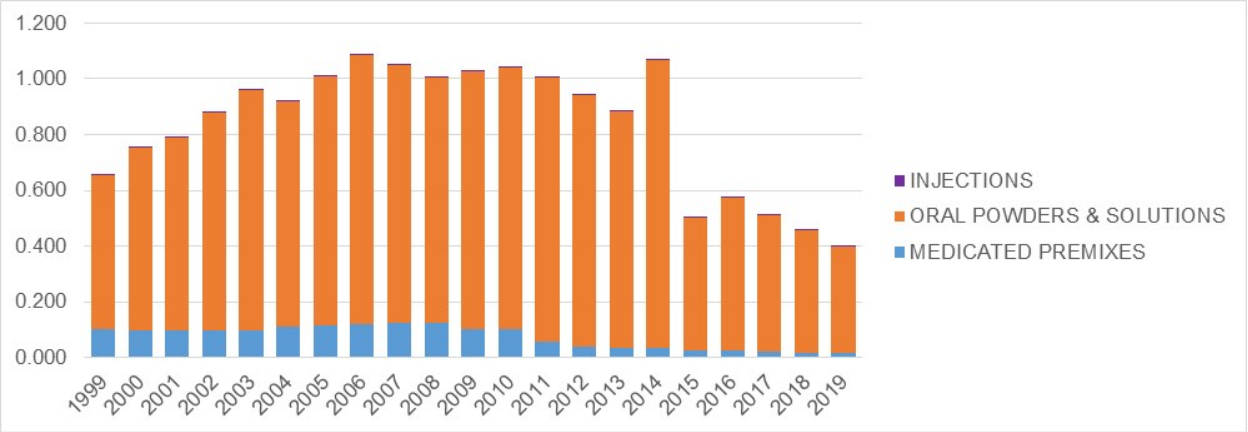
b) *Change in exposure by pharmaceutical form*

Poultry are treated primarily with oral powders and solutions (Figure 14).

Medicated premixes are used less and less: the ALEA for this pharmaceutical form has decreased by 71.1% since 2011 and by 8.1% over the last year.

Exposure to antimicrobials via oral powders and solutions has decreased by 59.9% since 2011 and by 12.9% in the last year.

Figure 14: Change in exposure of poultry by pharmaceutical form since 1999 (ALEA)



Various indicators calculated for poultry are available in the Annex: antimicrobial sales expressed in mg/kg in Table 15, body weight treated-day in Table 16 and body weight treated in Table 17.

4. Rabbits

a) *Change in sales and exposure to antimicrobials by class*

The tonnage intended for rabbits increased between 1999 and 2004, flattened out between 2004 and 2007, then declined until 2017 and has been stable in the past few years (Table 18 in the Annex). In 2019, it was around 31 tonnes, i.e. 10.0% higher than the tonnage in 2018 and 56.3% lower than in 2011.

Since 1999, the level of exposure of rabbits to antimicrobials has decreased by 33.5%. According to the ALEA per class in 2019, rabbits are treated mainly with tetracyclines, sulfonamides and trimethoprim, aminoglycosides, pleuromutilins and polymyxins (colistin and bacitracin) (Figure 16).

Between 2011 and 2019, exposure of rabbits fell by 41.4%. A decrease in exposure was observed for all classes of antimicrobials, except for macrolides (+3.4%). Exposure fell by 54.1% for tetracyclines, 48.9% for polymyxins, 46.0% for aminoglycosides and 38.4% for pleuromutilins.

The ALEA was 1.860 in 2019, a variation of +1.5% in one year (Table 11). Between 2018 and 2019, exposure to antimicrobials decreased for tetracyclines (-17.2%) and polymyxins (-11.3%). In contrast, increases in exposure were estimated for macrolides (+98.0%), sulfonamides (+37.4%) and trimethoprim (+37.6%). These are probably due to the updating of the percentages of the sales breakdowns by species in 2019 for a few drugs. This will be specifically verified in the coming years. Discussions with veterinarians specialising in this sector revealed no particular health episodes that year, nor any changes in their treatment practices. These increases should therefore be interpreted with caution.

Figure 15: Comparison of the ALEA for rabbits by antimicrobial class in 2011 and 2019

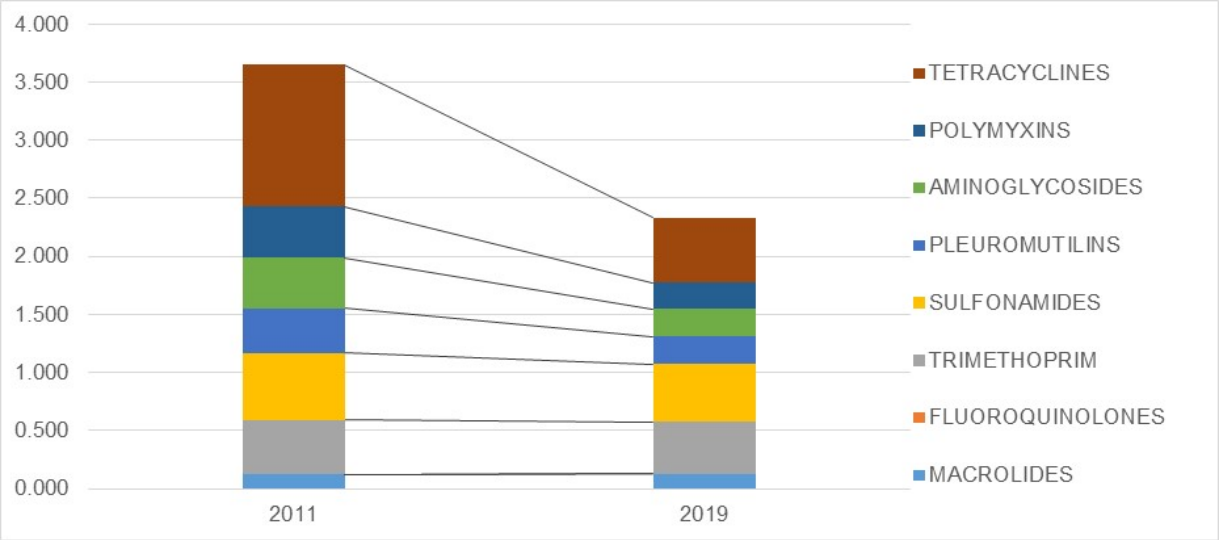


Figure 16: Change in exposure of rabbits by antimicrobial class since 2011 (ALEA)

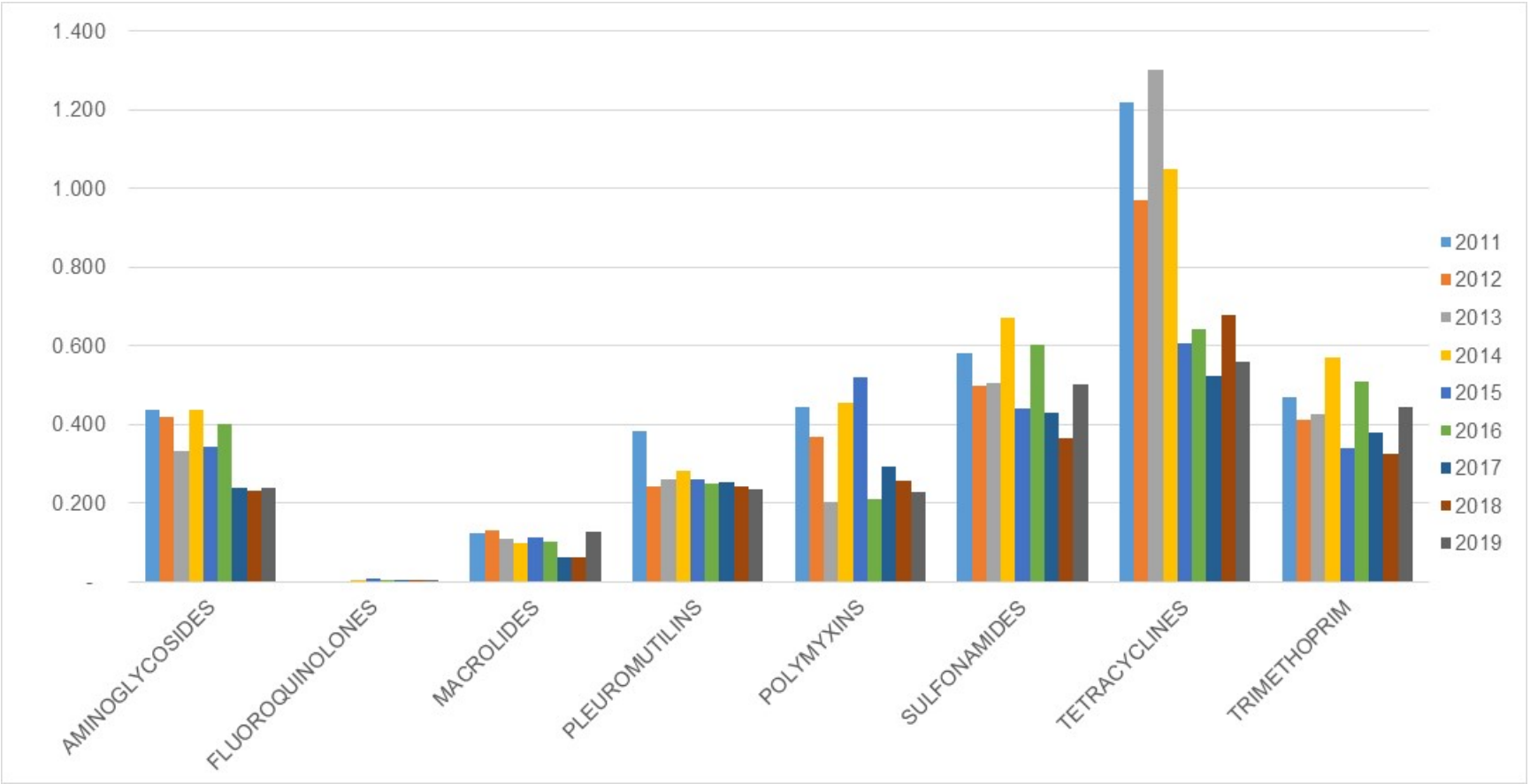


Table 11: Change in exposure of rabbits by antimicrobial class since 1999 (ALEA calculated for the oral and parenteral routes only)

	AMINOGLYCOSIDES	FLUOROQUINOLONES	MACROLIDES	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	0.305	0.000	0.081	0.970	0.617	0.001	0.379	0.457	0.189	2.797
2000	0.325	0.000	0.066	1.236	0.681	0.001	0.492	0.425	0.278	3.214
2001	0.320	0.000	0.077	0.904	0.677	0.004	0.473	0.497	0.277	2.935
2002	0.340	0.000	0.080	0.984	0.526	0.005	0.508	0.957	0.320	3.389
2003	0.296	0.000	0.059	1.330	0.420	0.005	0.614	1.424	0.443	4.137
2004	0.262	0.000	0.053	0.988	0.315	0.005	0.685	2.147	0.545	4.450
2005	0.231	0.000	0.040	0.465	0.351	0.006	0.844	2.196	0.722	4.125
2006	0.264	0.000	0.037	0.532	0.346	0.007	0.797	1.871	0.646	3.848
2007	0.286	0.000	0.030	0.584	0.387	0.007	0.882	1.892	0.725	4.063
2008	0.329	0.000	0.020	0.539	0.386	0.007	0.738	1.841	0.609	3.857
2009	0.346	0.000	0.015	0.578	0.465	0.007	0.748	1.739	0.612	3.894
2010	0.459	0.000	0.147	0.546	0.350	0.007	0.666	1.553	0.516	3.723
2011	0.438	0.000	0.121	0.382	0.442	0.000	0.579	1.220	0.468	3.176
2012	0.418	0.000	0.130	0.240	0.367	0.000	0.498	0.969	0.410	2.607
2013	0.331	0.000	0.109	0.261	0.201	0.000	0.506	1.300	0.426	2.701
2014	0.435	0.000	0.098	0.282	0.455	0.000	0.672	1.049	0.570	2.983
2015	0.342	0.006	0.111	0.260	0.518	0.000	0.439	0.606	0.341	2.269
2016	0.399	0.005	0.103	0.248	0.209	0.000	0.602	0.641	0.507	2.192
2017	0.238	0.004	0.061	0.254	0.293	0.000	0.430	0.524	0.380	1.796
2018	0.233	0.003	0.063	0.241	0.255	0.000	0.365	0.677	0.323	1.832
2019	0.236	0.002	0.125	0.235	0.226	0.000	0.502	0.560	0.444	1.860
Variation 2019 / 2018	0.004	0.000	0.062	-0.006	-0.029	0.000	0.137	-0.117	0.121	0.028
	1.6%	-15.9%	98.0%	-2.5%	-11.3%		37.4%	-17.2%	37.6%	1.5%
Variation 2019 / 2011	-0.201	0.002	0.000	-0.147	-0.216	0.000	-0.077	-0.660	-0.024	-1.316
	-46.0%		3.4%	-38.4%	-48.9%		-13.3%	-54.1%	-5.1%	-41.4%

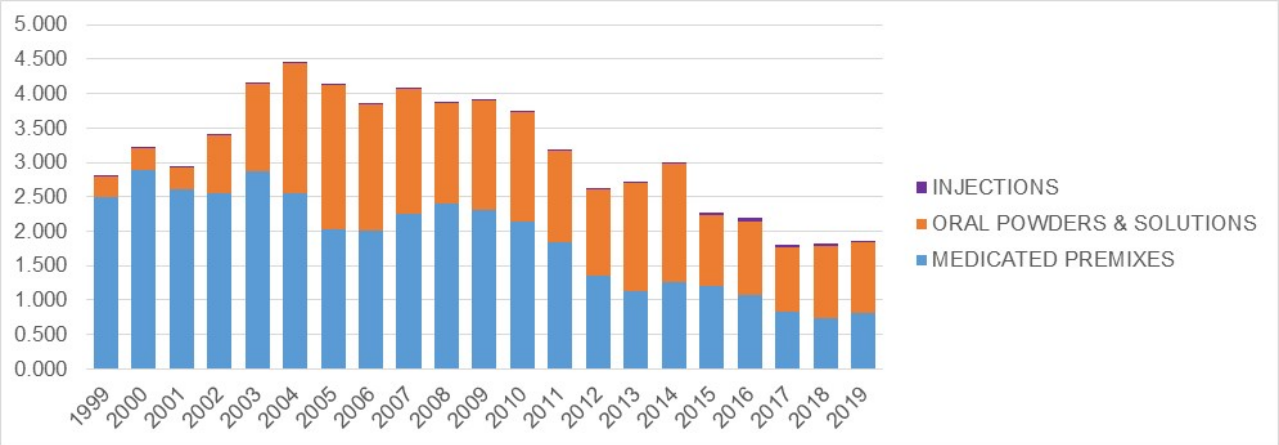
b) *Change in exposure by pharmaceutical form*

Rabbits are treated essentially by the oral route (Figure 17).

Medicated premixes are used less and less: the ALEA for this pharmaceutical form has decreased by 55.7% since 2011, although there was an 11.8% increase over the last year.

Exposure to antimicrobials via oral powders and solutions has decreased by 22.8% since 2011, and has fallen by 2.9% over the last year.

Figure 17: Change in exposure of rabbits by pharmaceutical form since 1999 (ALEA)



Various indicators calculated for rabbits are available in the annexes: antimicrobial sales expressed in mg/kg in Table 18, body weight treated-day in Table 19 and body weight treated in Table 20.

5. Domestic carnivores

a) *Change in sales and exposure to antimicrobials by class*

The tonnage intended for cats and dogs increased between 1999 and 2006 (Table 21 in the Annex). It then decreased until 2013 and has been rising again since. In 2019, it was 16.4 tonnes, i.e. 1.3% higher than the tonnage in 2018, but 2.1% lower than in 2011.

Since 1999, the level of exposure of domestic carnivores to antimicrobials has decreased by 12.7% According to the ALEA per class in 2019, cats and dogs were treated mainly with penicillins, followed by aminoglycosides, first-generation cephalosporins, sulfonamides and tetracyclines (Figure 19).

Between 2011 and 2019, exposure of domestic carnivores fell by 13.9%. This change was largely due to a decrease in exposure to aminoglycosides (-32.2%), fluoroquinolones (-69.0%), newer-generation cephalosporins (-71.7%) and penicillins (-7.3%) (Figure 18).

The ALEA was 0.642 in 2019, a variation of +2.1% in one year (Table 12). Exposure of domestic carnivores has been fairly stable over the last three years. Between 2018 and 2019, exposure to sulfonamides and trimethoprim decreased slightly. Over the same period, an increase in exposure was observed mainly for aminoglycosides (+17.6%) and penicillins (+2.7%).

Figure 18: Comparison of the ALEA for cats & dogs by antimicrobial class in 2011 and 2019

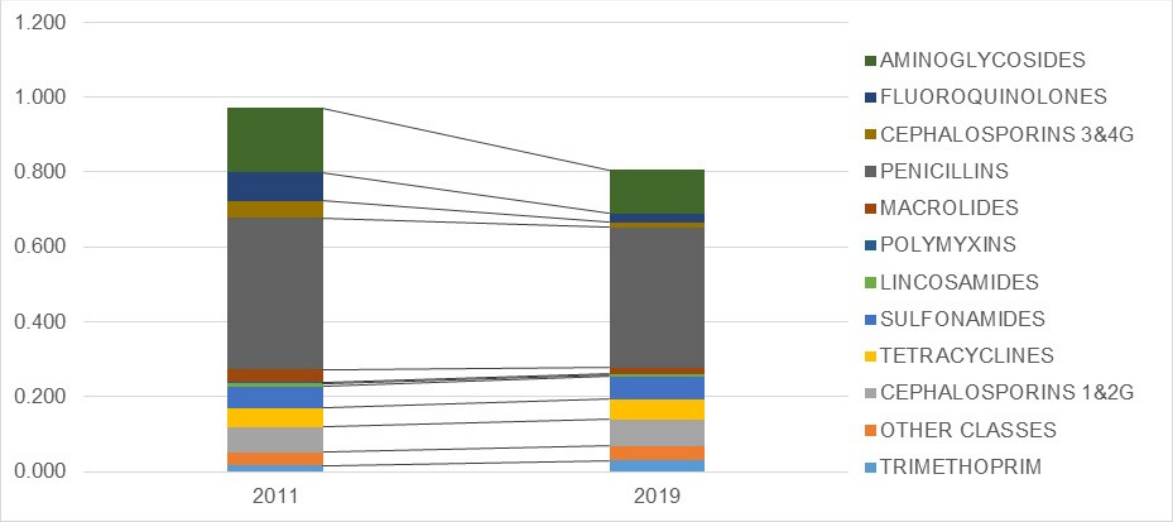


Figure 19: Change in exposure of domestic carnivores by antimicrobial class since 2011 (ALEA)

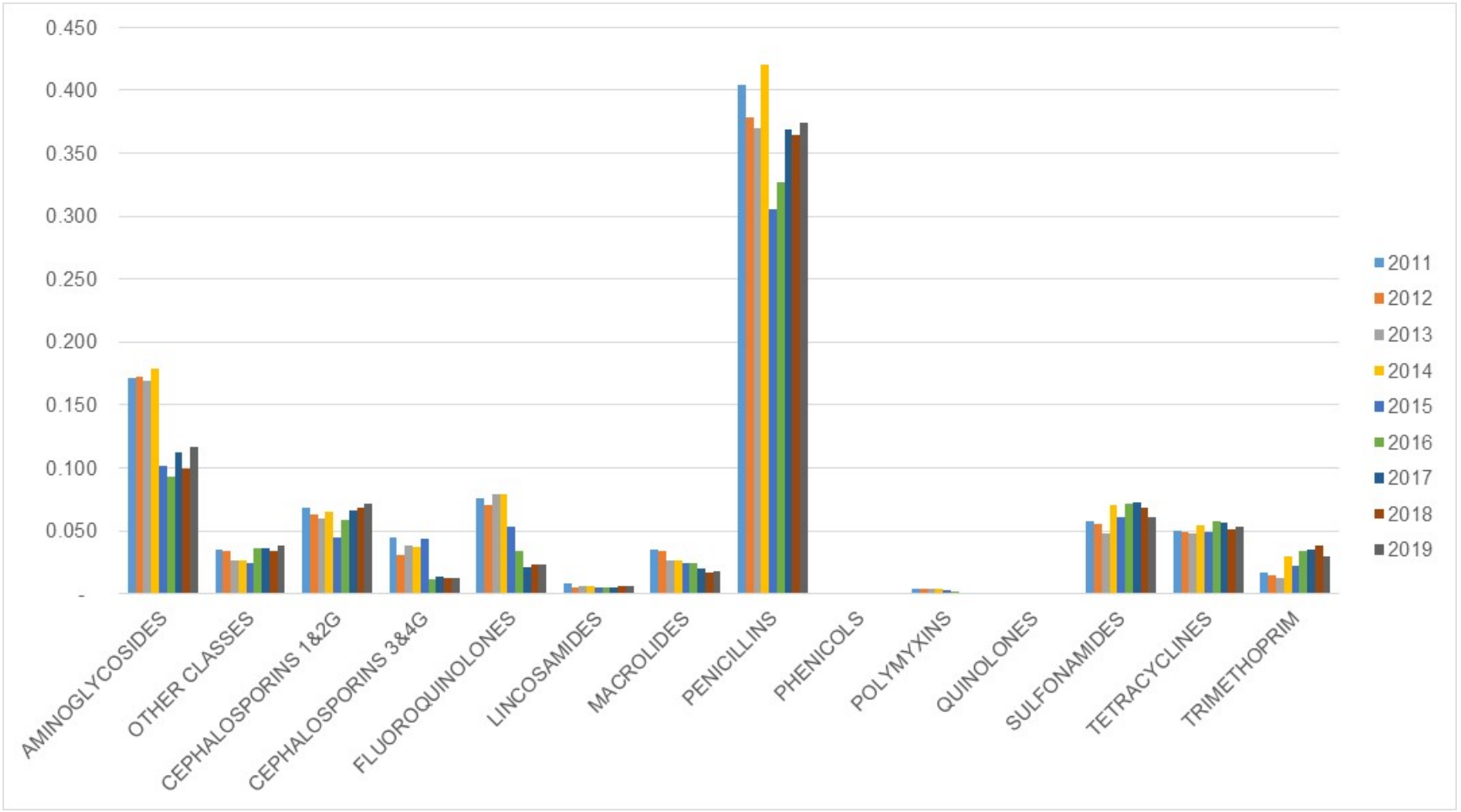


Table 12: Change in exposure of domestic carnivores by antimicrobial class since 1999 (ALEA calculated for the oral and parenteral routes only)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	0.201	0.047	0.048	0.000	0.047	0.013	0.041	0.408	0.001	0.010	0.001	0.093	0.047	0.034	0.735
2000	0.190	0.051	0.049	0.000	0.064	0.008	0.046	0.392	0.001	0.010	0.004	0.091	0.045	0.030	0.731
2001	0.173	0.047	0.052	0.000	0.070	0.007	0.043	0.358	0.001	0.008	0.003	0.074	0.040	0.024	0.674
2002	0.174	0.045	0.056	0.000	0.078	0.008	0.047	0.318	0.001	0.008	0.005	0.073	0.042	0.020	0.658
2003	0.183	0.018	0.064	0.000	0.078	0.008	0.041	0.301	0.001	0.008	0.004	0.069	0.041	0.017	0.631
2004	0.203	0.045	0.065	0.000	0.080	0.008	0.044	0.330	0.001	0.007	0.003	0.073	0.043	0.018	0.666
2005	0.202	0.032	0.069	0.000	0.075	0.007	0.041	0.364	0.001	0.007	0.003	0.063	0.050	0.015	0.697
2006	0.201	0.056	0.071	0.004	0.077	0.007	0.055	0.403	0.001	0.008	0.000	0.066	0.046	0.015	0.750
2007	0.194	0.040	0.071	0.023	0.081	0.007	0.039	0.429	0.001	0.005	0.002	0.067	0.052	0.014	0.782
2008	0.186	0.039	0.070	0.028	0.082	0.006	0.038	0.409	0.001	0.006	0.000	0.069	0.048	0.014	0.760
2009	0.171	0.036	0.067	0.031	0.084	0.006	0.036	0.404	0.001	0.005	0.001	0.060	0.047	0.012	0.744
2010	0.177	0.035	0.064	0.034	0.084	0.008	0.036	0.409	0.001	0.003	0.000	0.054	0.048	0.012	0.740
2011	0.172	0.035	0.068	0.045	0.076	0.008	0.035	0.404	0.000	0.004	0.000	0.058	0.051	0.016	0.745
2012	0.172	0.034	0.063	0.031	0.071	0.005	0.034	0.378	0.000	0.004	0.000	0.056	0.049	0.014	0.687
2013	0.170	0.027	0.059	0.038	0.079	0.006	0.027	0.370	0.000	0.004	0.000	0.048	0.048	0.013	0.675
2014	0.179	0.027	0.065	0.037	0.079	0.006	0.027	0.421	0.000	0.004	0.000	0.071	0.054	0.029	0.761
2015	0.101	0.024	0.045	0.043	0.054	0.005	0.024	0.305	0.000	0.003	0.000	0.060	0.049	0.023	0.587
2016	0.093	0.037	0.059	0.012	0.034	0.005	0.024	0.326	0.000	0.001	0.000	0.071	0.057	0.034	0.602
2017	0.112	0.036	0.066	0.014	0.021	0.005	0.020	0.369	0.000	0.001	0.000	0.072	0.056	0.035	0.642
2018	0.099	0.034	0.068	0.013	0.023	0.006	0.017	0.365	0.000	0.001	0.000	0.068	0.051	0.038	0.629
2019	0.116	0.038	0.071	0.013	0.024	0.006	0.018	0.375	0.000	0.001	0.000	0.061	0.054	0.030	0.642
Variation 2019 / 2018	0.017 17.6%	0.005 14.6%	0.003 4.0%	0.000 1.5%	0.001 2.3%	0.000 0.6%	0.001 5.0%	0.010 2.7%	0.000	0.000 -8.5%	0.000	-0.008 -11.2%	0.003 4.9%	-0.008 -21.6%	0.013 2.1%
Variation 2019 / 2011	-0.055 -32.2%	0.004 10.4%	0.003 5.0%	-0.032 -71.7%	-0.053 -69.0%	-0.002 -29.3%	-0.017 -49.1%	-0.030 -7.3%	0.000	-0.003 -79.1%	0.000	0.003 5.2%	0.003 6.5%	0.014 85.5%	-0.103 -13.9%

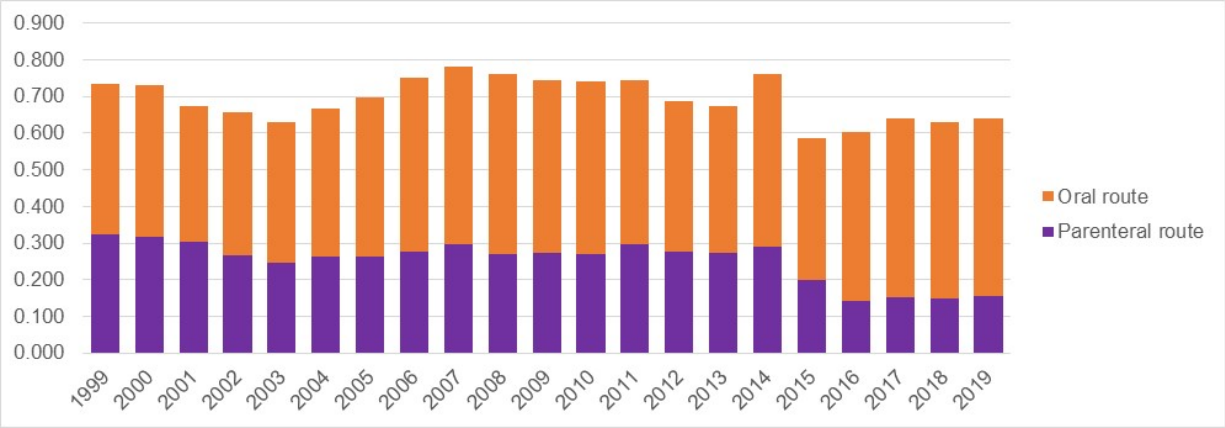
b) *Change in exposure by pharmaceutical form*

Cats and dogs are treated primarily by the oral route (mostly with the use of tablets), and then by the parenteral route (Figure 20).

Exposure to antimicrobials via the oral route has increased by 8.1% since 2011 and by 1.2% over the last year.

Exposure to antimicrobials via injections has decreased by 47.1% since 2011, but has increased by 4.8% in the last year.

Figure 20: Change in exposure of domestic carnivores by routes of administration since 1999 (ALEA)



Various indicators calculated for domestic carnivores are available in the Annex: antimicrobial sales expressed in mg/kg in Table 21, body weight treated-day in Table 22 and body weight treated in Table 23.

VII. Update on exposure to fluoroquinolones, third- and fourth-generation cephalosporins and colistin

1. Background

a) *Fluoroquinolones and third- and fourth-generation cephalosporins*

Third- and fourth-generation cephalosporins and fluoroquinolones are considered as particularly important in human medicine because they are among the only alternatives for the treatment of certain infectious diseases in humans.

The Act on the future of agriculture, food and forestry (LAAAF[13], Act No. 2014-1170 of 13 October 2014) set a target of a 25% reduction in three years in the use of antimicrobials belonging to each of these classes. The year 2013 was taken as a reference for this objective, which was to be achieved by the end of December 2016 at the latest.

On 16 March 2016, a decree was published to regulate the prescription and dispensing of drugs used in veterinary medicine and containing one or more antibiotic substance of critical importance. The two most important provisions for French veterinary medicine are:

- a ban on the prescription of critical antimicrobials for preventive purposes;
- the requirement to conduct a clinical examination followed by an antibiogram before prescribing a critical antibiotic for curative or metaphylactic purposes. Some exceptions apply.

The Interministerial order of 18 March 2016 establishes the list of critical antibiotic substances (4 substances belonging to the third- and fourth-generation cephalosporins and 5 substances belonging to the fluoroquinolones), as well as the list of methods for carrying out the bacterial strain susceptibility test (antibiogram).

b) *Colistin*

The scientific article published in November 2015 describing the first plasmid-mediated mechanism of resistance to colistin led to the establishment of reinforced surveillance for this antimicrobial.

At European level, in July 2016, the Antimicrobial Advice Ad Hoc Expert Group (AMEG)[14] recommended reducing the use of colistin within three to four years to no more than 5 mg/PCU (Population Correction Unit) for European countries that are high or moderate consumers, and no more than 1 mg/PCU for European countries with the lowest use of colistin.

In France, in its report[15] on colistin published in October 2016, ANSES recommended a 50% reduction in the use of this antimicrobial. Following this opinion, the EcoAntibio2 plan (Action 12) set a five-year goal of a 50% reduction in exposure to colistin in the cattle, pig and poultry sectors, taking the average ALEA for 2014-2015 as a reference (see Chapter V.1 of this report). This reference is calculated as follows:

$ALEA_{2014\text{-}15}$ = (body weight $treated_{2014}$ + body weight $treated_{2015}$) / ($Biomass_{2014}$ + $Biomass_{2015}$)

2. Change in exposure to fluoroquinolones

13 http://www.legifrance.gouv.fr/affichLoiPubliee.do;jsessionid=5691BBA0E2987B8FCBB6195E53853F64.tpdjo07v_2?type=general&idDocument=JORFDOLE000028196878

14 http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2016/07/WC500211080.pdf

15 https://www.anses.fr/fr/system/files/MV2016SA0160.pdf

a) *Change in exposure of animals in France*

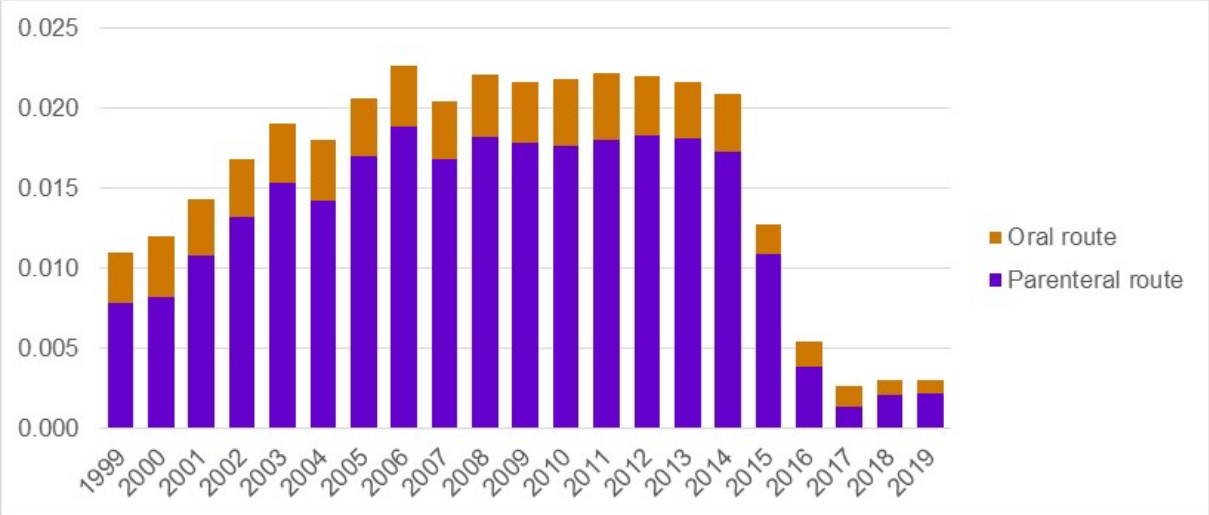
In 2019, 44 veterinary drugs containing a fluoroquinolone were marketed, containing one of the following five active ingredients: danofloxacin, enrofloxacin, marbofloxacin, orbifloxacin and pradofloxacin.

Fluoroquinolones are only authorised for use in cattle (oral and parenteral route), pigs (parenteral), poultry (oral), rabbits (oral and parenteral), cats and dogs (oral, parenteral and local), other pets (oral and parenteral) and sheep and goats (parenteral). According to the reports submitted by the pharmaceutical companies, fluoroquinolones are also used to treat horses. Off-label uses not quantified by the pharmaceutical companies as part of this monitoring have not been considered.

The tonnages of fluoroquinolones used in veterinary medicine by the oral and parenteral routes are relatively low: 0.25% of the tonnage of antimicrobials sold in 1999 (3.30 tonnes), 0.68% of the tonnage sold in 2013 (4.80 tonnes) and 0.23% of the tonnage sold in 2019 (0.97 tonnes). Nevertheless, expressing sales in body weight treated reveals a non-negligible use of this class: 1.95% of the body weight treated in 1999, 4.12% of the body weight treated in 2013 and 0.92% of the body weight treated in 2019.

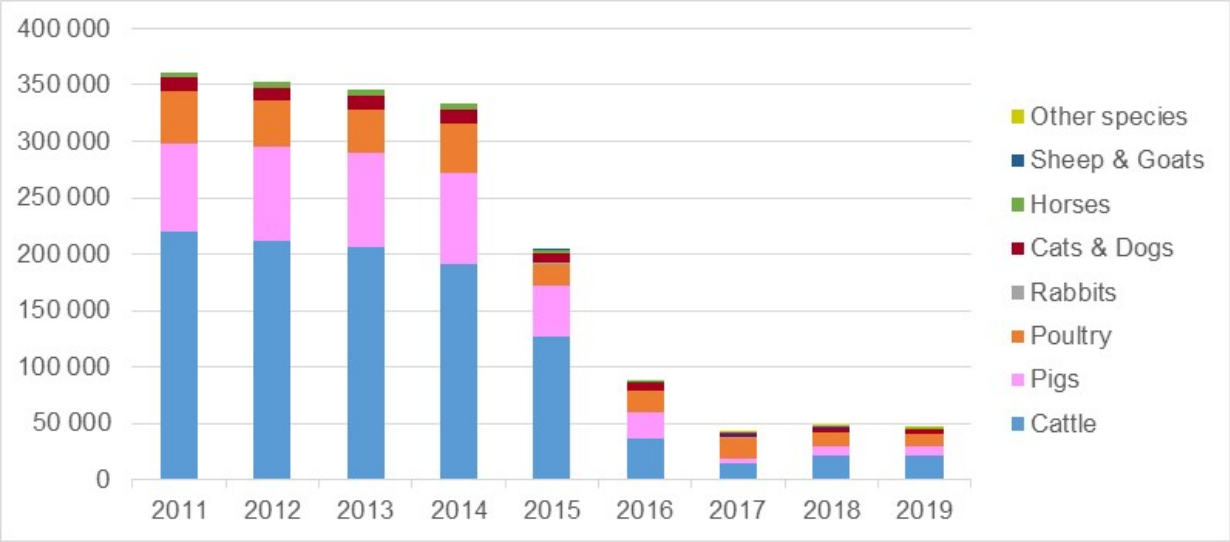
After an increase in exposure to fluoroquinolones until 2006, exposure was relatively stable between 2007 and 2013 (Figure 21). Then a decrease in exposure was observed. Between 2013 and 2019, exposure fell by 86.0% for all species and routes of administration combined. This decrease in exposure was greater for the parenteral route (-88.2% compared to 2013) than for the oral route (-75.0% compared to 2013). Nevertheless, parenteral exposure increased by 56.5% between 2017 and 2019.

Figure 21: Change in exposure to fluoroquinolones (ALEA)



For 2019, the body weight treated with fluoroquinolones corresponded mainly to four animal species (Figure 22): cattle (46.7%), poultry (25.7%), pigs (15.6%) and cats & dogs (8.7%). Horses account for 1.0% of the body weight treated, sheep/goats 1.9% and rabbits 0.4%.

Figure 22: Change in body weight treated with fluoroquinolones according to the species (in tonnes)



b) *Change in exposure by species*

Compared to 2013, a decrease in exposure to fluoroquinolones was observed in 2019 for all species (Table 13).

This decrease was around 90% for cattle, pigs and horses and was 70.3% for cats and dogs. The exposure of poultry to fluoroquinolones has declined by 66.1% since 2013.

Table 13: Change in exposure to fluoroquinolones between 2013 and 2019 according to the species

	Cattle	Pigs	Poultry	Cats & Dogs	Horses	All species
Change in ALEA	**-89.0%**	**-91.2%**	**-66.1%**	**-70.3%**	**-91.3%**	**-86.0%**
- Oral route	-97.6%		-66.1%	-78.3%		-75.0%
- Parenteral route	-88.4%	-91.2%		-64.8%	-91.3%	-88.2%

Between 2018 and 2019, exposure to fluoroquinolones remained stable (+0.7%): exposure fell by 3.9% for the oral route and increased by 2.8% for the parenteral route (Table 14).

Table 14: Change in exposure to fluoroquinolones between 2018 and 2019 according to the species

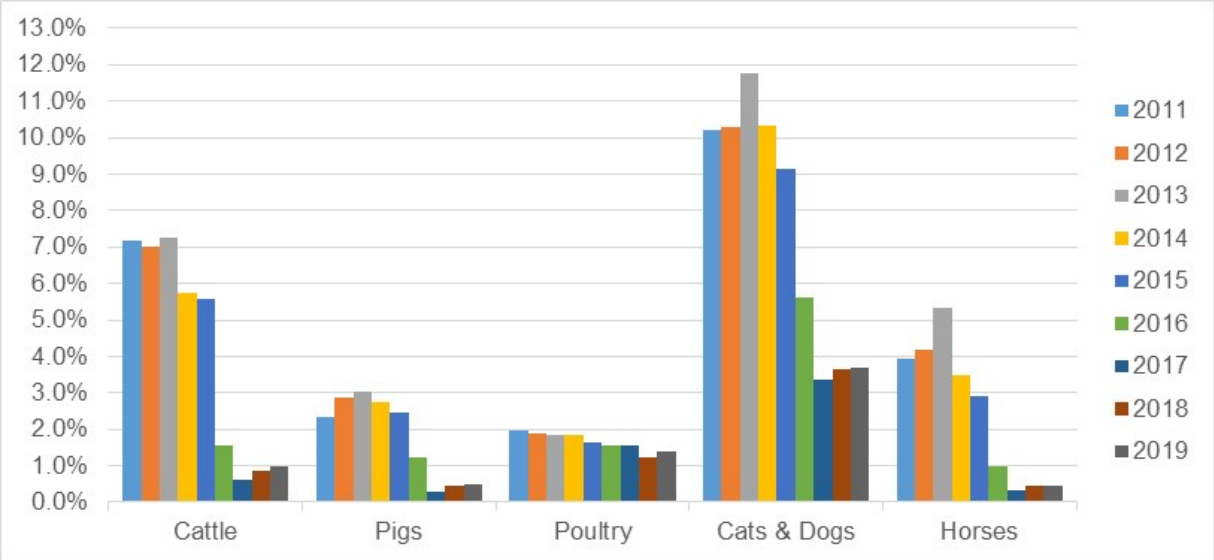
	Cattle	Pigs	Poultry	Cats & Dogs	Horses	All species
Change in ALEA	**1.4%**	**-3.0%**	**-1.7%**	**2.3%**	**3.9%**	**0.7%**
- Oral route	-36.5%		-1.7%	2.5%		-3.9%
- Parenteral route	2.3%	-3.0%		2.2%	3.9%	2.8%

The share of the fluoroquinolones class in total exposure to antimicrobials varies according to the species (Figure 23). The Decree of March 2016 regulating the prescription of critical antimicrobials[16] led to a further decrease in the use of fluoroquinolones for all animal species.

In 2013, the ALEA for fluoroquinolones as a percentage of total ALEA per species was between 5% and 12% for horses, cattle, cats and dogs. This share was close to 3% for pigs and 2% for poultry in 2013.

In 2019, the ALEA for fluoroquinolones as a percentage of total ALEA was less than 1% for all species, except poultry (1.4%) and cats & dogs (3.7%).

Figure 23: Change in the ALEA for fluoroquinolones as a percentage of total ALEA per species



[16] https://www.legifrance.gouv.fr/eli/decret/2016/3/16/AGRG1515288D/jo/texte

3. Change in exposure to newer-generation cephalosporins

a) *Change in exposure of animals in France*

In 2019, 15 veterinary drugs containing a newer-generation cephalosporin were marketed, containing one of the following four active ingredients: cefoperazone, cefovecin, cefquinome and ceftiofur.

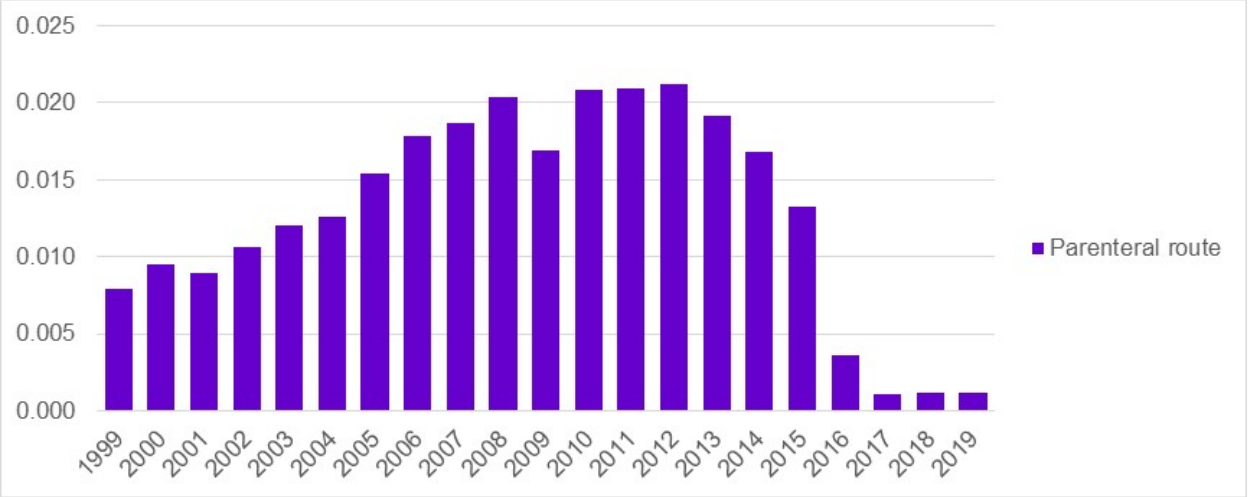
Newer-generation cephalosporins are authorised only for the intramammary route in cattle, and the parenteral route in pigs, cattle, horses, cats and dogs. They are not authorised in poultry. Off-label uses not quantified by the pharmaceutical companies as part of this monitoring have not been considered.

The tonnages of third- and fourth-generation cephalosporins used in veterinary medicine are low: 0.07% of the tonnage of antimicrobials sold in 1999 (0.92 tonnes), 0.30% of the tonnage sold in 2013 (2.13 tonnes) and 0.03% of the tonnage sold in 2019 (0.11 tonnes). Nevertheless, expressing sales in body weight treated reveals a non-negligible use of this class: 1.40% of the body weight treated in 1999, 3.65% of the body weight treated in 2013 and 0.34% of the average body weight treated in 2019.

The number of intramammary treatments based on newer-generation cephalosporins per dairy cow decreased by 98.9% between 2013 and 2019, but increased by 105.3% between 2018 and 2019. The change is explained by a lag in the reported sales figures for 2018 for some drugs, and does not reflect a change in the use of these intramammary treatments.

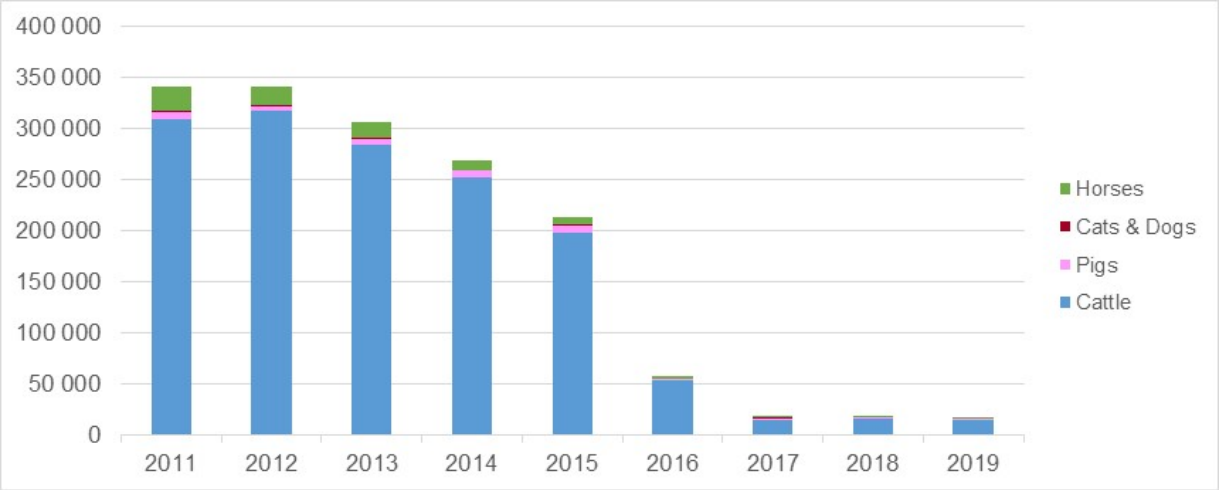
Exposure of animals to third- and fourth-generation cephalosporins via the parenteral route increased until 2012 then decreased until 2017 and has been stable since (Figure 24). A 94.1% decrease in ALEA has thus been observed between 2013 and 2019.

Figure 24: Change in exposure to newer-generation cephalosporins (ALEA)



In 2019, the body weight treated with third- and fourth-generation cephalosporins mainly corresponded to cattle (80.7%), followed by domestic carnivores (12.4%) and pigs (4.3%). Horses accounted for 0.6% of the body weight treated (Figure 25).

Figure 25: Change in body weight treated with newer-generation cephalosporins (in tonnes)



b) *Change in exposure by species*

Compared to 2013, a decrease in exposure to third- and fourth-generation cephalosporins was observed in 2019 for all species (Table 15).

This decrease was more than 90% for cattle, pigs and horses and was equal to 66.7% for cats and dogs.

Table 15: Change in exposure to third- and fourth-generation cephalosporins between 2013 and 2019 according to the species

	Cattle	Pigs	Cats & Dogs	Horses	All species
Change in ALEA	**-94.8%**	**-95.0%**	**-66.7%**	**-90.8%**	**-94.1%**

Over the last year, a 5.4% decrease in exposure has been observed (Table 16).

Table 16: Change in exposure to third- and fourth-generation cephalosporins between 2018 and 2019 according to the species

	Cattle	Pigs	Cats & Dogs	Horses	All species
Change in ALEA	**-5.2%**	**-22.0%**	**1.5%**	**-17.8%**	**-5.4%**

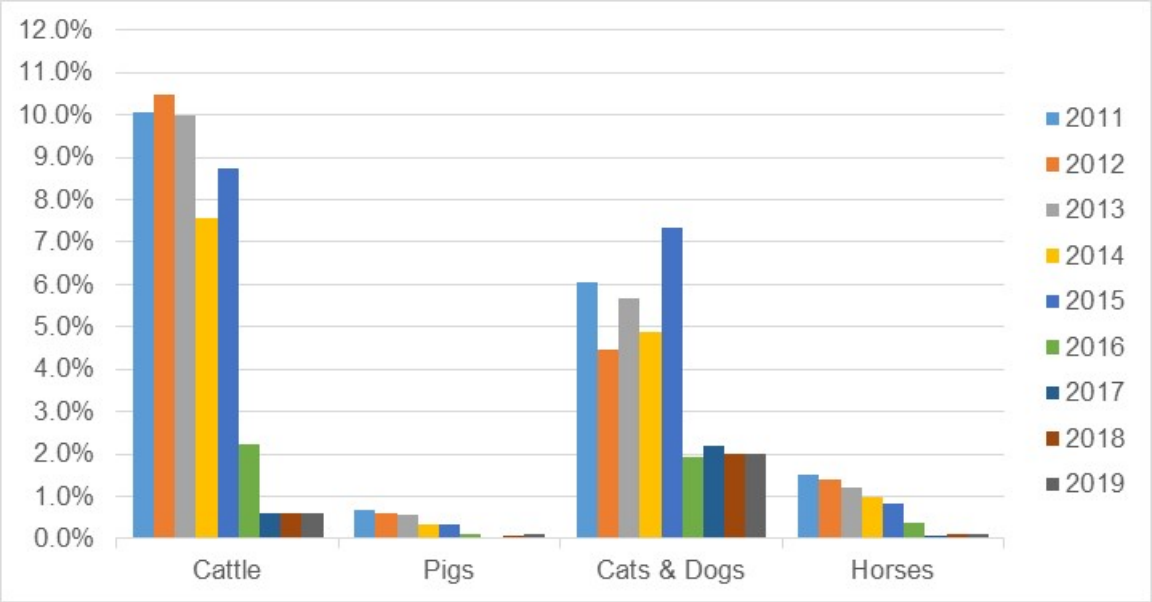
The share of third- and fourth-generation cephalosporins in total exposure to antimicrobials varies by species (Figure 26). The Decree of March 2016 regulating the prescription of critical antimicrobials[17] reinforced the decline in the use of third- and fourth- generation cephalosporins:

In 2013, the ALEA for third- and fourth-generation cephalosporins as a percentage of total ALEA per species was between 5% and 10% for cattle, cats and dogs. This share was close to 1% for horses and equal to 0.6% for pigs in 2013.

[17] https://www.legifrance.gouv.fr/eli/decret/2016/3/16/AGRG1515288D/jo/texte

In 2019, the ALEA for third- and fourth-generation cephalosporins as a percentage of total ALEA was less than 1% for all species except cats and dogs (2.0%).

Figure 26: Change in the ALEA for third- and fourth-generation cephalosporins as a percentage of total ALEA per species



4. Change in exposure to colistin

a) *Change in exposure of animals in France*

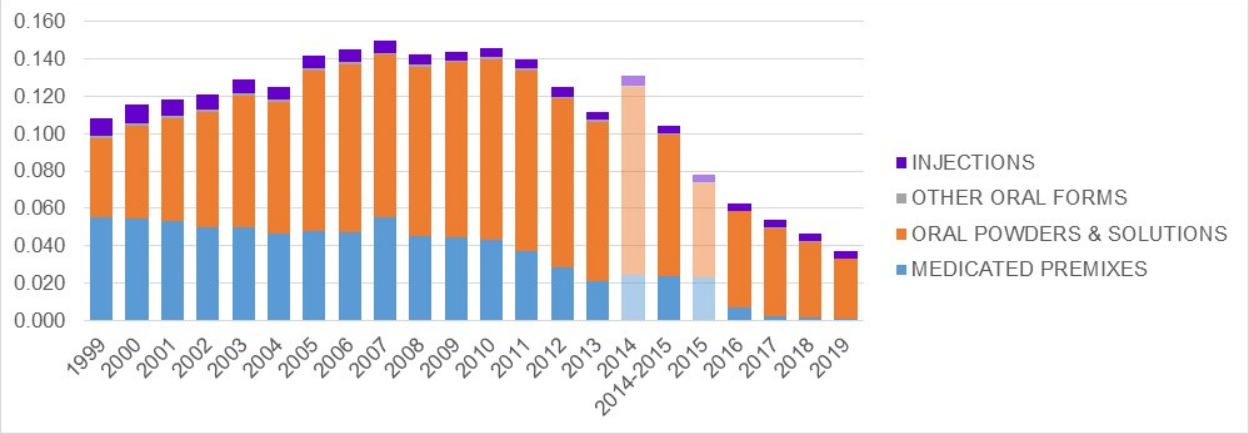
In 2019, 24 veterinary medicinal products containing colistin were marketed. These drugs are authorised for different species and administered by different routes (parenteral, oral or intramammary). Off-label uses not quantified by the pharmaceutical companies as part of this monitoring have not been considered.

Tonnages of colistin used in veterinary medicine have been decreasing since national monitoring began: 63 tonnes in 1999 (4.8% of the tonnage of antimicrobials sold), 40 tonnes on average for the years 2014-2015 (6.1% of the tonnage sold) and 10 tonnes in 2019 (2.4% of the tonnage sold).

In 1999, the body weight treated by colistin accounted for 19.3% of the body weight treated, all species combined. This percentage changed little until 2015 and has been declining since. In 2019, the body weight treated by colistin accounted for 11.3% of the body weight treated.

After increasing until 2007, exposure to colistin changed little between 2008 and 2011, and has been decreasing over the last few years (Figure 27). With an ALEA of 0.037 in 2019, a 73.3% decrease in exposure was observed compared to 2011 (all species and routes of administration combined).

Figure 27: Change in exposure to colistin according to the pharmaceutical form (ALEA)

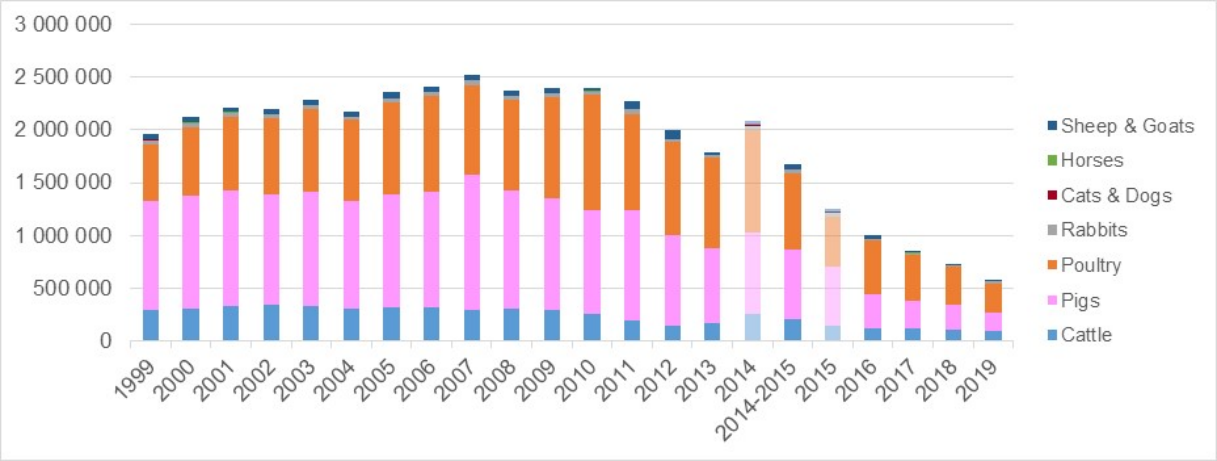


Exposure to colistin via medicated premixes has decreased by 97.9% since 1999, and by 96.9% since 2011 (Figure 27). Exposure to colistin by the other oral forms (powders, solutions, oral pastes and tablets) has decreased by 26.7% since 1999, and by 67.2% since 2011. Exposure by the parenteral route is relatively low compared to oral exposure; it has decreased by 56.8% since 1999 and by 15.0% since 2011.

In 2019, exposure to colistin decreased by 64.2% compared to the average exposure calculated for 2014 and 2015 (all species and routes of administration combined). This was due to a 66.7% decrease in oral exposure (including a 95.1% decrease for medicated premixes).

For 2019, the body weight treated with colistin corresponded mainly to three animal species (Figure 28): poultry (49.8%), pigs (30.0%), and then cattle (16.2%). Other species are also treated with this antimicrobial, but the percentages of body weight treated attributable to these species are relatively low: 2.4% for rabbits, 1.5% for sheep and goats, 0.1% for horses and 0.02% for domestic carnivores.

Figure 28: Change in body weight treated with colistin according to the species (in tonnes)



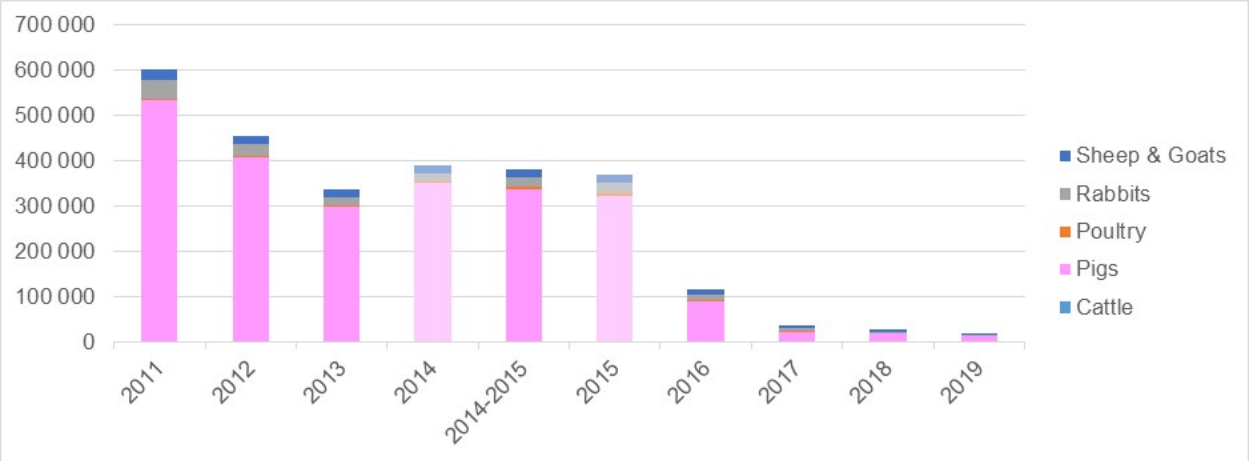
b) *Change in body weight treated by medicated premixes according to the species*

There has been a large decrease in the use of colistin-based premixes in the pig sector (Figure 29): 97.5% since 2011 and 96.1% compared to the average calculated for 2014 and 2015.

In the other animal production sectors, the use of colistin-based premixes has also been falling. Compared to the average for 2014 and 2015, the decrease in body weight treated was 87.7% for sheep and goats, 90.4% for rabbits and 91.4% for poultry.

In 2019, the body weight treated with colistin via premixes mainly concerned pigs (73.7%), then sheep and goats (12.5%), rabbits (11.1%) and poultry (2.8%). According to the sales data from 2016 to 2019, cattle are not treated with colistin-based medicated premixes.

Figure 29: Change in body weight treated by colistin-based premixes (tonnes)



c) *Change in body weight treated by oral forms (excluding premixes) according to the species*

Since 2011, the use of colistin-based oral forms (powders, solutions, oral pastes and tablets) has decreased considerably (Figure 30).

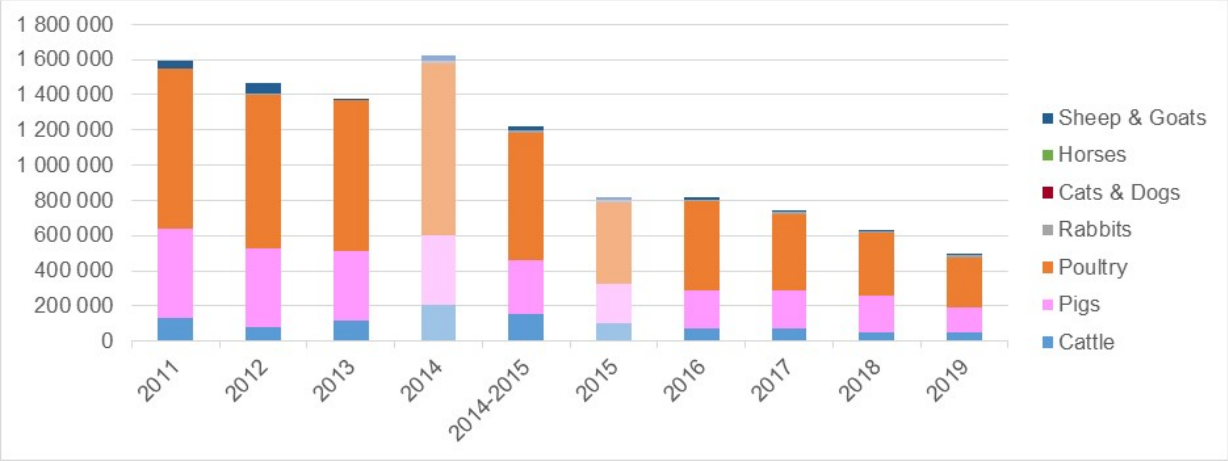
Use of these oral forms in the poultry sector has fallen by 68.7% since 2011 and by 60.5% compared to the average calculated for 2014 and 2015.

The body weight treated with oral forms of colistin (excluding premixes) in the pig sector has fallen by 71.3% since 2011 and by 53.7% compared to the average calculated for 2014 and 2015.

The use of these oral forms in the cattle sector has fallen by 65.3% since 2011 and by 69.0% compared to the average calculated for 2014 and 2015.

In 2019, the body weight treated with oral forms of colistin (excluding premixes) corresponded mainly to poultry (57.7%), followed by pigs (29.2%) and cattle (9.6%). The share of other animal species in this body weight treated was relatively low: 2.4% for rabbits, 1.1% for sheep and goats, less than 0.1% for horses and domestic carnivores.

Figure 30: Change in body weight treated by oral forms (excluding premixes) based on colistin (tonnes)



d) *Change in body weight treated parenterally according to the species*

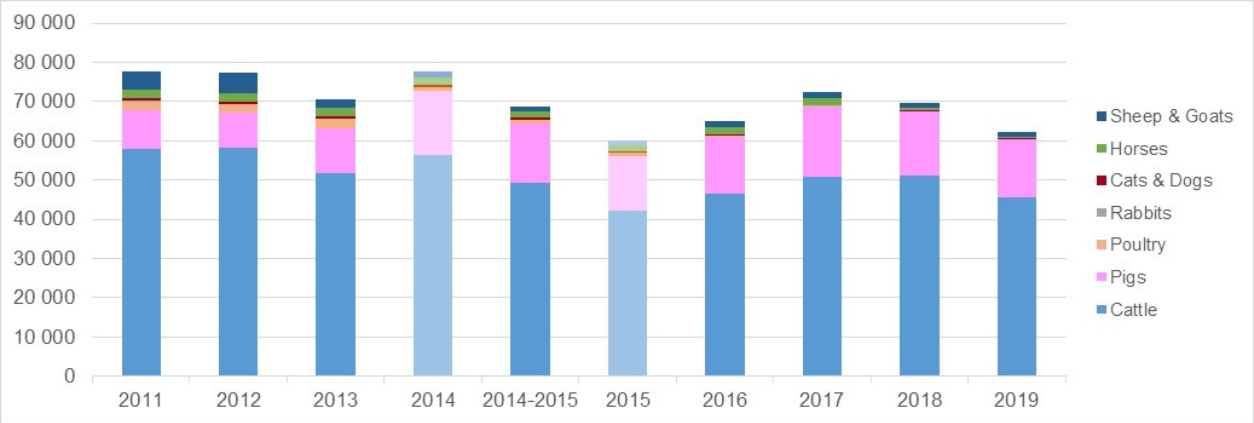
Since 2011, the use of colistin-based injections has been relatively stable (Figure 31).

In the cattle sector, the body weight treated by injections has fallen by 21.6% since 2011 and by 7.8% compared to the average calculated for 2014 and 2015.

In the pig sector, the body weight treated by injections has increased by 52.8% compared to 2011 but has fallen by 1.8% compared to the average calculated for 2014-2015.

In 2019, the body weight treated with colistin by the parenteral route corresponded mainly to cattle (73.0%) and pigs (23.8%). The percentages of body weight treated attributable to other species were relatively low: 1.9% for sheep and goats, 0.9% for horses, 0.2% for poultry and 0.2% for domestic carnivores.

Figure 31: Change in body weight treated parenterally with colistin (in tonnes)



e) *Colistin reduction objectives*

At European level, in July 2016, the Antimicrobial Advice Ad Hoc Expert Group (AMEG)[18] recommended reducing the use of colistin to no more than 5 mg/PCU (Population Correction Unit) in three to four years for European countries that are high or moderate consumers, and to no more than 1 mg/PCU for European countries with the lowest use. These objectives, to be achieved in three to four years, were designed to contribute to a 65% reduction in the use of colistin in Europe.

Since 2015, the quantities of colistin sold in France have been below the 5 mg/PCU threshold advocated by the AMEG (Table 17).

Table 17: Change in the quantities of colistin sold according to the European indicator (mg/PCU)

	Tonnage of colistin	PCU (x 1000 tonnes)	Quantity of colistin in mg/PCU
2013	42.70	7247	5.89
2014	50.57	7197	7.03
2015	29.10	7222	4.03
2016	19.94	7217	2.76
2017	15.62	7097	2.20
2018	13.02	7107	1.83
2019	9.96	7124	1.40

One of the objectives of the EcoAntibio2 plan (Action 12) is a 50% reduction in five years in exposure to colistin in the cattle, pig and poultry sectors, taking as a reference the average ALEA for 2014-15.

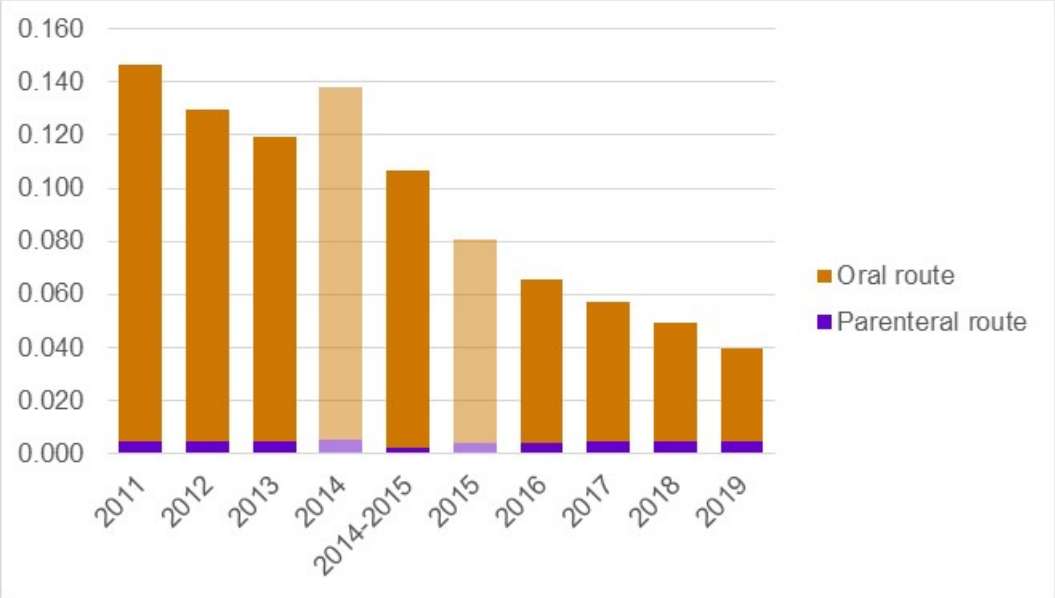
Between 2014-15 and 2019, exposure to colistin declined for cattle (-52.3%), pigs (73.7%) and poultry (-58.1%). Cumulative exposure for cattle, pigs and poultry decreased by 63.9% compared to the average ALEA for 2014-2015 (Figure 32). This fall was due to a 66.5% decrease in oral exposure and a 3.1% fall in parenteral exposure (Table 18).

[18] http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2016/07/WC500211080.pdf

Table 18: Change in colistin exposure according to species, comparing the 2019 ALEA with the average ALEA for 2014-2015

	Cattle	Pigs	Poultry	Cattle + Pigs + Poultry	All species
Change in ALEA	**-52.3%**	**-73.7%**	**-58.1%**	**-63.9%**	**-64.2%**
- Oral route	-68.0%	-75.4%	-58.1%	-66.5%	-66.7%
- Parenteral route	-3.0%	-0.8%	-83.5%	-3.1%	-5.3%

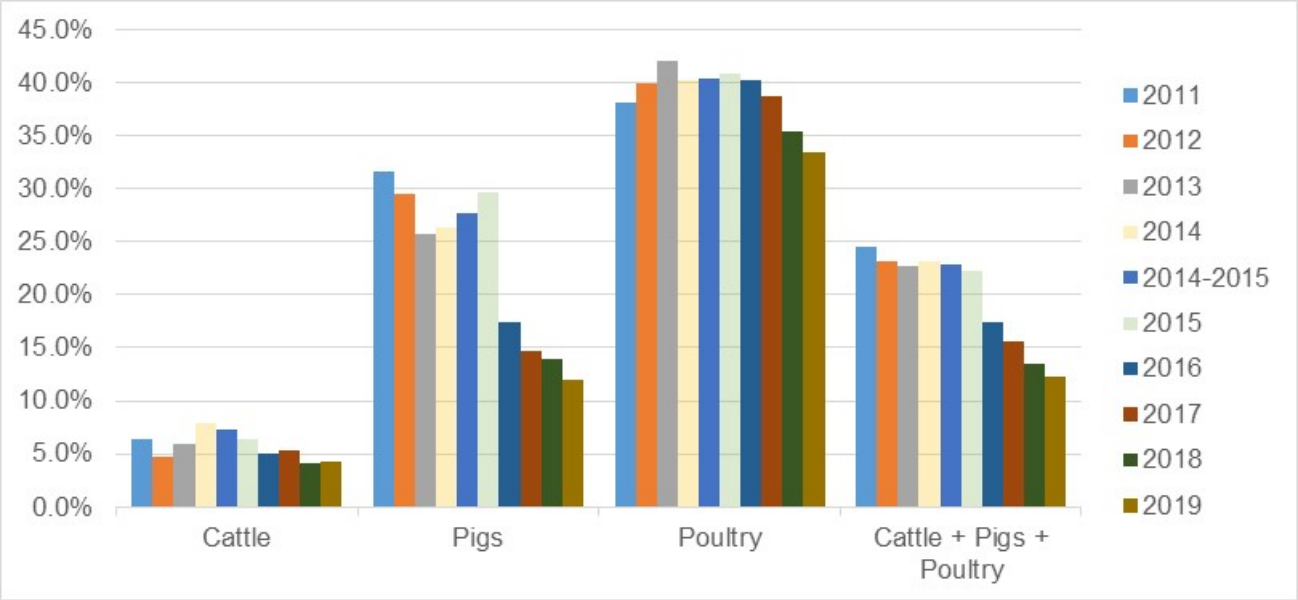
Figure 32: Change in cumulative exposure to colistin for cattle, pigs and poultry



The share of colistin in total exposure to antimicrobials varies according to the species (Figure 33).

In 2014-2015, the ALEA for colistin as a percentage of total ALEA per species was close to 7% for cattle, 28% for pigs and 40% for poultry. These percentages all decreased in 2019 to 4% for cattle, 12% for pigs, and 33% for poultry.

Figure 33: Change in the ALEA for colistin as a percentage of total ALEA per species



VIII. Comparison of exposure calculations and indicators between the French and European approaches

1. Publication of the DDDvet and DCDvet values by the ESVAC

In April 2016, the ESVAC scheme published reference values (DDDvet and DCDvet) for three animal species[19]: cattle, pigs and broilers (poultry).

These values were established on the basis of marketing authorisation data from nine European countries, including France.

An average dose and an average treatment duration were therefore established for each active ingredient, route of administration and, in some cases, pharmaceutical form (medicated premixes).

The value of the DDDvet (defined daily dose for animals) corresponds to the dose in mg/kg, and the value of the DCDvet (defined course dose for animals) corresponds to the dose in mg/kg multiplied by the average duration of treatment.

The purpose of the ESVAC scheme is to better estimate animal exposure in Europe and enable a more effective analysis of the changes in exposure to antimicrobials for the different animal species.

2. Differences in the calculations between the French and European approaches

Since 2008, the annual report on sales of antimicrobials in France has presented results by species in number of ACDkg (body weight treated), in ALEA (equal to the number of ACDkg divided by the animal biomass) and in number of ADDkg (body weight treated-day).

The ADD and ACD values are defined according to the doses and treatment durations specified in the SPC for each veterinary medicinal product authorised in France. The maximum doses and treatment durations are generally used.

The European DDDvet and DCDvet reference values are not specific to a drug but depend on the active ingredient and the route of administration. These values are averages established by the ESVAC scheme according to the doses and durations authorised in different European countries.

In the framework of this report, a comparative analysis was performed for the years 2011 to 2019, using the European reference values on the one hand and the French reference values on the other.

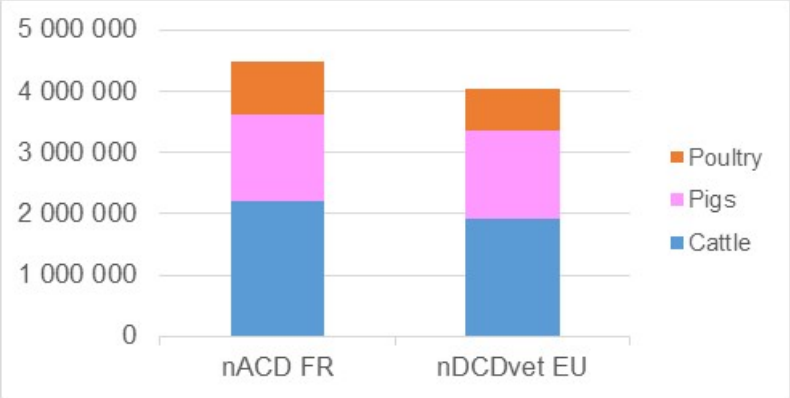
3. Comparison by species for 2019

a) *Body weight treated in 2019*

When comparing the number of ACDkg (shown as nACD FR) and the number of DCDvet (shown as nDCDvet EU) for all three animal species, there is a difference of 10.0% for the body weight treated in 2019 (Figure 34). For the body weight treated calculated by species, the differences between the French and European approaches are 12.3% for cattle, 0.6% for pigs and 21.9% for poultry.

[19] http://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/general/general_content_001493.jsp&mid

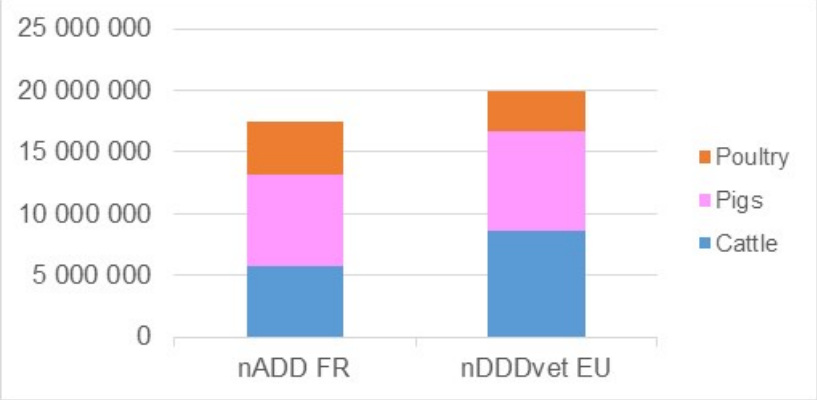
Figure 34: Comparison of body weight treated in 2019 according to the French and European approaches (tonnes)



b) *Body weight treated-day in 2019*

When comparing the number of ADDkg (shown as nADD FR) and the number of DDDvet (shown as nDDDvet EU) for all three animal species, there is a difference of 14.2% for the body weight treated-day in 2019 (Figure 35). For the body weight treated-day calculated by species, the differences between the French and European approaches are 50.1% for cattle, 8.6% for pigs and 24.3% for poultry.

Figure 35: Comparison of body weight treated-day in 2019 according to the French and European approaches (tonnes)



The observed differences in body weight treated-day between the French or European reference values are therefore relatively large, except for pigs.

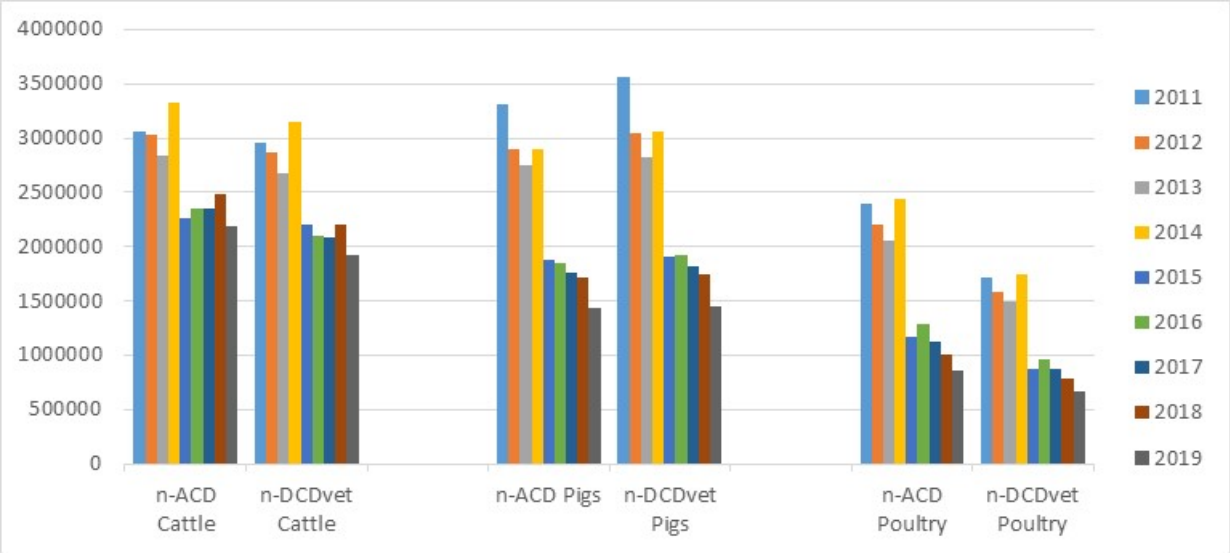
This can be explained by the different choices made to establish the reference values in Europe and in France: European values by active ingredient and route of administration versus French values specific to a drug; average doses and durations according to the drugs authorised in Europe versus maximum doses and durations for a drug authorised in France.

4. Change in exposure indicators since 2011

a) *Change in body weight treated since 2011*

The changes in the numbers of ACDkg (FR) and numbers of DCDvet (EU) are very similar between 2011 and 2019 (Figure 36).

Figure 36: Change in body weight treated since 2011 according to the French and European approaches (tonnes)



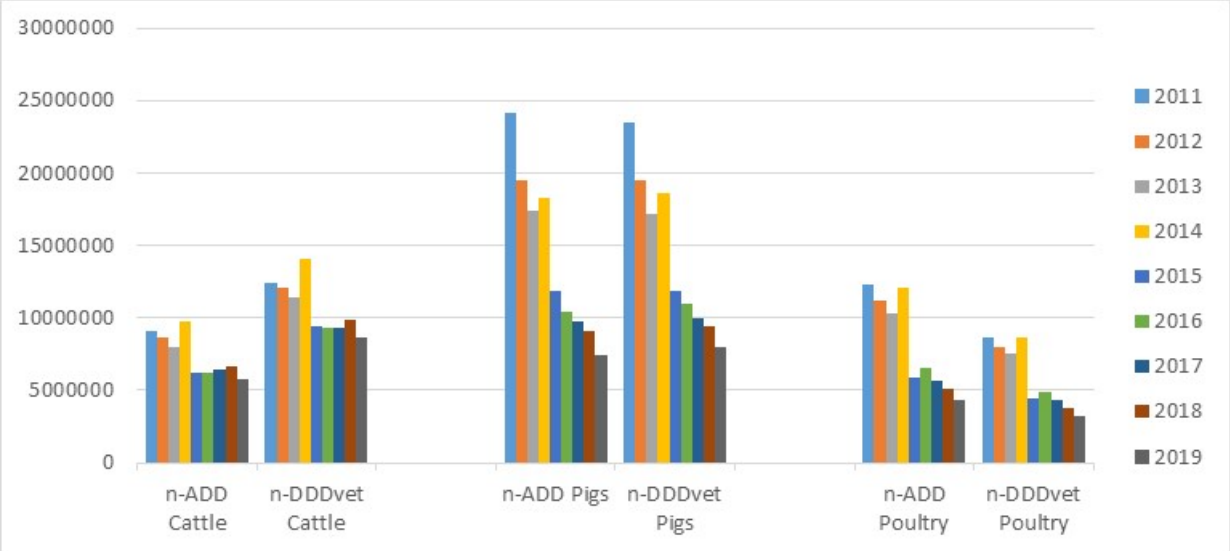
Since 2011, the decrease in body weight treated for the three species is 48.9% according to the French reference values and 51.0% with the European reference values.

b) *Change in body weight treated-day since 2011*

The changes in the numbers of ADDkg (FR) and numbers of DDDvet (EU) are very similar between 2011 and 2019 (Figure 37).

Since 2011, the decrease in body weight treated-day for the three species is 61.8% according to the French reference values and 55.4% with the European reference values.

Figure 37: Change in body weight treated-day since 2011 according to the French and European approaches (tonnes)



c) *Change in animal exposure to antimicrobials*

The number of DCDvet was compared to the French animal biomass in order to calculate an ALEA comparable to the ALEA used in the framework of the national monitoring.

Considering the three species (cattle, pigs and poultry), the indicator of exposure to antimicrobials (ALEA) has decreased by 48.2% since 2011 if the French reference values are used. The decrease in this indicator is 46.1% if using the European reference values.

Over the same period, considering the three species, the indicator of exposure to fluoroquinolones has decreased by 87.5% with the French values versus 86.9% with the European values.

For newer-generation cephalosporins, since 2011 the ALEA has decreased by 95.2% with the French values and by 94.9% with the European values.

Despite the differences in the French and European approaches for defining the reference values required for the ALEA calculations, the percentages of the decrease in animal exposure are very similar.

IX. Discussion

1. Indicators of sales and indicators of exposure

The results of this sales survey of veterinary medicinal products containing antimicrobials should be interpreted with caution. In this report, the different indicators used describe different phenomena. It is very important to choose the most appropriate indicator to describe a specific change.

Antimicrobial sales expressed in weight of active ingredient do not reflect exposure to the different classes because the antimicrobials' therapeutic activity is not taken into account. This may however be of interest for environmental studies.

It is therefore necessary to distinguish between indicators of "sales" (in mg of active ingredient and mg/kg, i.e. mass of active ingredient relative to the weight of the animal population) and indicators of exposure (body weight treated-day, body weight treated, ALEA).

The volume of sales in terms of the amount of active ingredient is an accurate measurement when applied to all species combined. When it is defined by species, it is based on an estimate of the breakdown of sales between different species potentially using antimicrobials and becomes an estimated measurement. All expressions of sales in terms of exposure indicators are estimated measurements. They result from the pharmaceutical companies' estimates of the breakdown of sales by species, and dosages and durations of treatment specified by the MA that are sometimes unrelated to the dosages and durations actually applied in the field.

Since 2009, the breakdown between different species has been based on information provided by the MA holders. This information has been provided for all drugs intended for more than one target species.

The weight of the animal population used in this report corresponds to the weight of the animal population potentially treated with antimicrobials. The weights used for veal calves, rabbits, pigs and poultry are the weights at slaughter. These weights do not generally correspond to the weight at the time of treatment. This leads to an underestimation of actual exposure, although it has no influence on the overall trends observed.

The methodology used in this survey of sales of antimicrobials cannot accurately describe off-label use, even though the new approach introduced in 2009 (estimation by MA holders of the breakdown by species) partly takes this type of use into account.

2. Systems for collecting data on antimicrobials used in animals

The need for more precise data on the use of antimicrobials by species and animal category has been regularly reiterated at European level in recent years. From 2022, the new European Regulation (EU) 2019/6 on veterinary medicinal products will introduce the requirement for Member States to communicate data on antimicrobial sales. As stated in Article 57 of the Regulation published on 7 January 2019, the mandatory communication of data on antimicrobial use by species will have to be introduced progressively. The systems for transmitting data on cattle (distinguishing calves under one year old), pigs and poultry (chickens and turkeys) have to be operational before 28 January 2024. Those concerning all other food-producing animal species have to be operational three years later (by 2027), and six years later (by 2030) for other animals which are bred or kept (mainly pets).

In France, projects were initiated during the first EcoAntibio plan to better estimate antimicrobial exposure by species, animal category or physiological stage. This EcoAntibio plan (2012-2016) recommended the creation of self-assessment tools for breeders and veterinarians on antimicrobial usage in animal husbandry.

In this context, the French Pork and Pig Institute (IFIP) and ANSES-ANMV put in place the GVET[20] approach on management of veterinary treatments. This approach has two complementary objectives: to modernise the register of treatments and measure antimicrobial usage in animal husbandry. The IFIP and ANSES-ANMV have given specific requirements to software developers to ensure that data on the use of antimicrobials in animal husbandry can be collected and monitored. This computerised livestock register enables breeders to monitor their antimicrobial usage through indicators such as the number of treatments and the number of days of treatment per pig for each holding.

A permanent observatory on the use of antimicrobials in veal calf farms[21] was set up by ANSES-ANMV and the French Livestock Institute (IDELE) at the request of the INTERBEV Veaux association. Launched in 2016 and deployed with a panel of volunteer breeders, this approach yielded initial results calculated according to various simple and comparable standardised indicators. The data from this observatory supplement those from the annual sales survey. The data are analysed with a software tool specifically developed at ANSES-ANMV to enable farmers, together with livestock technicians and veterinarians, to assess their antimicrobial use practices. The observatory's first results[22] were published in 2018.
A professional network was set up to produce references on the use of antimicrobials in poultry farming. This national network, called RefA²vi, aims to produce regular references on antimicrobial exposure indicators for each poultry species. The results from the network's first year of operation[23], which consisted of a pilot phase of data collection from volunteer production organisations, were published in 2019. These data were analysed by a working group made up of representatives of ITAVI, ANSES and the ANVOL inter-professional association. The method used to calculate the indicators is broadly based on that of the ALEA and provides references by poultry species, in particular turkeys and broilers.

The Act on the future of agriculture, food and forestry (LAAAF[24], Act No. 2014-1170 of 13 October 2014) introduced mandatory reporting of antimicrobial sales throughout France. This law (amended by Act No. 2019-774 of 24 July 2019 on the organisation and transformation of the healthcare system) concerns marketing authorisation (MA) holders, companies manufacturing and distributing medicated feedingstuffs, veterinarians and pharmacists.

A report[25] published in July 2019 provides an initial analysis of the data submitted by manufacturers and distributors of medicated feedingstuffs for the first two quarters of 2018. These data have enabled an initial comparison to be made with data obtained from the national monitoring of antimicrobial sales based on reports from MA holders; it showed that these two reporting systems were highly concordant. The sales reports from MA holders and operators appear to slightly overestimate the reports for pigs and poultry and, conversely, to underestimate the reports for sheep/goats, other species (especially game) and rabbits. One possible interpretation is that the reports of sales of medicated premixes by MA operators do not sufficiently take into account the use of antimicrobials for minor species, which occur as part of the therapeutic "cascade" outside the recommendations of the MA. Analysis of all the 2018 data confirmed these results.

The reports of antimicrobial sales by other beneficiaries, veterinary practitioners and pharmacists will provide more precise information for other pharmaceutical forms. The Calypso project, led by the Directorate General for Food, is seeking to set up a specific computer system for managing, reporting

[20] https://ifip.asso.fr/fr/content/gestion-informatique-des-traitements-v%C3%A9t%C3%A9rinaires-gr%C3%A2ce-%C3%A0-gvet

[21] http://idele.fr/reseaux-et-partenariats/inosys-reseaux-delevage/publication/idelesolr/recommends/observatoire-antibiotique-lexposition-des-veaux-de-boucherie-aux-antibiotiques-a-diminue-de-40-e.html

[22] http://www.journees3r.fr/IMG/pdf/texte_3_reduction_intrants_m-chanteperdrix-2.pdf

[23] https://www.itavi.asso.fr/content/reseau-professionnel-de-references-sur-les-usages-dantibiotiques-en-elevage-avicole

[24] http://www.legifrance.gouv.fr/affichLoiPubliee.do;jsessionid=5691BBA0E2987B8FCBB6195E53853F64.tpdjo07v_2?type=general&idDocument=JORFDOLE000028196878

[25] https://www.anses.fr/fr/system/files/Rapport_Am-AB-T1_T2.pdf

and consulting data. The analysis of these exhaustive data will in time complement that of the sales data currently reported by MA holders, as it is much finer and more detailed.

3. Change in exposure of animals to antimicrobials

Exposure to antimicrobials

Since monitoring of sales began in 1999, the Animal Level of Exposure to Antimicrobials (ALEA) has declined by 41.3% in France, all routes and species combined. Since 2011, overall exposure has decreased by 45.3%: by 74.4% for medicated premixes, 51.4% for oral powders and solutions, and 15.2% for injections. Exposure to antimicrobials has declined for all species compared to 2011: -25.5% for cattle, -54.0% for pigs, -60.5% for poultry, -41.4% for rabbits and -13.9% for domestic carnivores.

The sharp drop observed since 2011 has continued, and overall animal exposure fell by 10.9% between 2018 and 2019. Over the last year, exposure has fallen by 16.7% for oral powders and solutions, 6.6% for medicated premixes and 6.0% for injections. Between 2018 and 2019, the change in exposure varied according to the species: -9.9% for cattle, -16.4% for pigs, -12.8% for poultry, +1.5% for rabbits and +2.1% for domestic carnivores. The number of intramammary treatments per dairy cow has decreased by 15.4% since 2018.

Exposure to fluoroquinolones and newer-generation cephalosporins

Third- and fourth-generation cephalosporins and fluoroquinolones are considered as particularly important in human medicine because they are among the only alternatives for the treatment of certain infectious diseases in humans.

In 2018, animal exposure to newer-generation cephalosporins had fallen by 93.8% compared to 2013. In 2019, the decline in exposure continued, and was estimated to be 94.1% compared to 2013, all species combined. Between 2018 and 2019, a decrease in exposure was observed for all species, except for domestic carnivores (+1.5%).

The number of intramammary treatments per dairy cow based on newer-generation cephalosporins decreased by 98.9% between 2013 and 2019. Note that the number of treatments has doubled since 2018. The increase was mainly observed for treatments administered during the lactation period. According to the reported data, the number of dairy cows treated by the intermammary route with newer-generation cephalosporins represented 0.26% of animals in 2019 (versus 0.13% in 2018). The change is explained by a lag in the reported sales figures for 2018 for some drugs, and does not necessarily reflect a change in the use of these intramammary treatments.

Regarding fluoroquinolones, in 2018, exposure had declined by 86.1% compared to 2013. In 2019, exposure fell by 86.0% compared to 2013. Over the last year, a slight increase of +0.7% has been observed, especially with injections (+2.8% for all species combined). Between 2018 and 2019, exposure to fluoroquinolones increased for cattle, domestic carnivores and horses, while it decreased for pigs and poultry.

Since 2017, the frequency of treatment with critically important antimicrobials has become very low. All species combined, the ALEA in 2019 for fluoroquinolones was equal to 0.003; this means that this class of antimicrobials was used to treat 0.3% of the animal biomass in France. The ALEA in 2019 for newer-generation cephalosporins was 0.001.

Since 2016, the decrease in the use of third- and fourth-generation cephalosporins and fluoroquinolones has mainly resulted in a limited shift to sulfonamides, trimethoprim and aminoglycosides for the parenteral treatment of cattle. For pigs, the shift seems to concern injections containing penicillins, aminoglycosides, phenicols and macrolides. For domestic carnivores, an increase in exposure to penicillins associated with clavulanic acid and first- and second-generation cephalosporins was observed for the oral route.

The changes in exposure to critical antimicrobials, along with the shifts in uses to other classes of antimicrobials, need to be monitored in the coming years.

Exposure to colistin

An article published in November 2015 describing the first plasmid-mediated mechanism of resistance to colistin led to the establishment of reinforced surveillance for this antimicrobial.

At European level, in July 2016, the Antimicrobial Advice Ad Hoc Expert Group (AMEG)[26] recommended reducing the use of colistin within three to four years to no more than 5 mg/PCU (Population Correction Unit) for European countries that are high or moderate consumers, and no more than 1 mg/PCU for European countries with the lowest use of colistin.

In France, in its report[27] on colistin (October 2016), ANSES recommended a 50% reduction in the use of colistin. Following this opinion, the EcoAntibio2 plan (Action 12) set a five-year goal of a 50% reduction in exposure to colistin in the cattle, pig and poultry sectors, taking the average ALEA for 2014-2015 as a reference.

In 2019, exposure to colistin decreased by 64.2% compared to the average exposure calculated for 2014 and 2015, and by 73.1% compared to 2011 (all species and routes of administration combined). Colistin exposure has continued to decrease over the last year for the main user species: -8.2% for cattle, -28.5% for pigs and -17.8% for poultry.

Between 2014-15 and 2019, exposure to colistin fell for pigs (-73.7%), poultry (-58.1%) and cattle (-52.3%). The objective set by the EcoAntibio 2017-2021 plan to reduce exposure by 50% has been achieved for the three sectors.

Calculating the results in mg/PCU according to the standards defined by the ESVAC scheme, the value obtained for colistin in 2019 was 1.40 mg/PCU while it was 5.89 mg/PCU in 2013. In 2019, the quantities of colistin sold in France were therefore below the 5 mg/PCU threshold advocated by the AMEG.

[26] http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2016/07/WC500211080.pdf

[27] https://www.anses.fr/fr/system/files/MV2016SA0160.pdf

X. Conclusion

The information gathered through this national monitoring scheme is one of the essential elements, together with monitoring of bacterial resistance, needed for assessing the risks associated with antimicrobial resistance.

The new EcoAntibio 2017-2021 plan aims to ensure that the decline in animal exposure to antibiotics is sustained. The sharp drop observed since 2011 has continued and overall animal exposure fell by 10.9% between 2018 and 2019. Over the last year, the change in exposure has varied according to the species: a decrease in exposure can be observed for pigs, poultry and cattle, while exposure has increased slightly for domestic carnivores and rabbits.

Exposure to antimicrobials regarded as critical has fallen by 86.0% for fluoroquinolones and 94.1% for newer-generation cephalosporins, compared to 2013. This decrease in exposure concerned all species. These encouraging results followed publication of a Decree and an Interministerial Order in 2016 seeking to regulate the prescription and dispensing of drugs used in veterinary medicine and containing antibiotics of critical importance. After a sharp decline observed between 2013 and 2016, exposure to critical antimicrobials appears to have stabilised over the last three years.

By 2019, exposure to colistin had fallen by 64.2% compared to the average exposure calculated for 2014 and 2015. The objective set by the EcoAntibio 2017-2021 plan to reduce exposure by 50% has been achieved for the pig, cattle and poultry sectors.

Results for 2019 indicate that overall exposure of animals to antimicrobials has fallen compared to 2018. For some classes of antimicrobials, it seems that the reduction in use has reached a limit. The momentum for the prudent and responsible use of antimicrobials in veterinary medicine must be maintained by all stakeholders. The EcoAntibio 2 plan aims in particular to consolidate the achievements and pursue the actions previously undertaken in the first national plan.

XI. Annexes

1. Animal population data

Table 1: Numbers of animals potentially using antimicrobials between 1999 and 2019

Table 1. A: Cattle (number of animals)

Type/ Species	Dairy cows	Suckler cows	1 to 2 yr old dairy heifers	> 2 yr old dairy heifers	1 to 2 yr old beef heifers	> 2 yr old beef heifers	1 to 2 yr old other females	> 2 yr old other females	1 to 2 yr old bullocks	> 2 yr old bullocks	Non-castrated males	0 to 1 yr old cattle	1 to 2 yr old males	> 2 yr old males	Veal calves (slaugh-tered)
BW in kg	650	750	350	500	450	550	400	500	450	700	650	200	400	700	150
1999	4,424,000	4,071,000	1,350,846	951,154	980,827	906,000	393,000	294,000	303,938	273,062	971,562	5,169,611			1,887,941
2000	4,153,000	4,214,000	1,418,000	974,000	1,044,000	943,000	303,000	318,000	315,000	283,000	918,000	5,706,000			1,843,013
2001	4,195,000	4,293,000	1,433,000	1,009,000	1,085,000	946,000	404,000	320,000	315,000	283,000	1,105,438	5,612,562			1,882,763
2002	4,128,000	4,095,000	1,396,000	1,009,000	1,009,000	957,000	383,000	402,000	372,000	314,000	906,509	5,494,491			1,862,961
2003	4,012,000	4,040,000	1,380,000	1,002,000	970,000	918,000	334,000	362,000	302,000	304,000	754,000	4,961,000			1,822,579
2004	3,803,000	4,166,000	1,346,000	982,000	971,000	891000	315,000	327,000	290,000	260,000	774,000	4,994,000			1,751,708
2005	3,957,858	4,068,096	2,035,440		1,899,069		535,667		481,770		633,675	4,611,368			1,750,492
2006	3,882,195	4,156,628	1,147,598	815,049	1,068,008	869,811	270,742	228,202				4,947,374	922,177	447,909	1,700,867
2007	3,869,936	4,247,432	1,120,796	800,649	1,086,069	891,863	295,220	240,939				5,002,669	951,291	453,517	1,564,549
2008	3,863,435	4,313,976	1,109,701	778,266	1,175,059	980,352	304,547	248,282				4,989,176	990,268	499,047	1,506,004
2009	3,747,886	4,271,801	1,188,085	804,095	1,095,383	1,080,162	294,743	258,280				4,816,839	981,930	512,824	1,449,910
2010	3,732,707	4,299,792	1,161,313	834,652	1,026,254	1,026,119	281,584	253,951				4,838,766	709,607	502,191	1,430,931
2011	3,664,153	4,145,382	1,150,334	805,082	942,066	879,626	363,906	330,863				4,887,805	846860	415745	1,396,702
2012	3,643,200	4,109,861	1,171,956	763,931	949,755	852,355	369,777	318,016				4,899,743	880355	396153	1,355,721
2013	3,697,232	4,101,296	1,180,161	779,828	972,396	886,555	376,364	329,521				4,812,509	908,799	409,968	1,311,016
2014	3,698,450	4,138,148	1,204,838	782,487	944,565	910,828	373,930	334,758				4,921,261	892402	422,434	1,286,756
2015	3,661,183	4,207,412	1,242,113	790,870	970,862	893,365	385,612	332,622				4,989,541	860,654	424,203	1,266,898
2016	3,637,015	4,243,082	1,253,823	783,033	984,884	907,090	388,184	335,260				4,943,925	847,632	418,828	1,267,899
2017	3,596,837	4,154,472	1,211,655	826,872	960,221	959,458	376,103	356,093				4,677,493	833,380	407,635	1,243,073
2018	3,554,232	4,094,903	1,081,963	695,731	934,343	911,080	390,975	473,173				4,685,327	775,097	401,463	1,258,622
2019	3,488,006	4,012,080	1,072,731	654,167	1,028,905	880,180	307,745	450,132				4,571,712	776,657	392,088	1,244,237

Table 1. B: Pigs, poultry and rabbits (number of slaughtered animals, except for female rabbits - number of live animals)

	Pigs			Poultry								Rabbits	
Type/Species	Cull animals	Sows (number)	Fattening pigs	Broilers	Turkeys	Ducks	Guinea fowl	Laying hens	Pigeons	Quails	Geese	Female rabbits	Rabbits
BW in kg	350	300	105	1.8	10	4	1.4	2	0.65	0.5	8	4	2.5
1999	608,698	1,029,000	25,490,863	777,896,300	105,470,400	69,566,800	32,725,000	49,054,000	4,303,000	52,907,000	480,000	1,446,000	53,273,000
2000	580,334	1,210,208	25,291,317	734,563,400	113,860,700	73,494,900	34,760,000	48,145,000	4,484,000	52,907,000	612,000	1,376,000	52,279,000
2001	581,548	1,369,000	24,815,811	782,180,300	112,554,300	79,505,400	36,988,000	49,052,000	4,122,000	60,100,000	616,000	1,335,000	52,157,000
2002	582,418	1,360,000	25,102,459	729,489,300	98,661,300	79,243,900	31,071,000	48,664,000	4,303,000	60,400,000	692,000	1,293,000	52,179,000
2003	541,406	1,328,000	25,000,385	739,219,300	95,575,100	73,878,900	29,208,000	49,050,000	3,875,000	54,206,000	645,000	1,196,000	49,647,000
2004	521,412	1,302,000	24,757,765	694,837,500	93,668,900	73,384,800	29,020,000	47,224,000	3,875,000	47,364,000	560,000	1,181,000	50,129,000
2005	491,911	1,266,951	24,359,049	715,915,700	81,146,300	76,148,200	29,902,000	46,753,000	4,300,000	49,400,000	458,000	1,127,000	49,364,000
2006	484,950	1,256,179	24,184,591	636,178,400	72,834,400	74,863,200	27,284,000	45,703,000	3,600,000	46,952,000	469,000	1,053,000	47,994,000
2007	471,395	1,224,100	24,457,730	699,511,600	70,220,900	79,114,700	28,092,000	45,213,000	3,400,000	50,786,000	474,000	1,061,000	48,529,000
2008	445,213	1,225,574	24,539,585	711,875,400	62,857,200	79,134,200	27,936,000	45,990,000	3,400,000	55,137,000	462,000	1,012,000	39,941,000
2009	423,514	1,207,500	24,192,857	718,368,200	58,024,100	75,137,100	27,168,000	45,306,000	3,400,000	47,540,000	448,000	893,000	36,757,000
2010	396,998	1,162,135	24,189,737	740,246,900	56,187,900	77,105,400	26,457,000	46,564,000	11,108,971	52,890,000	324,000	878,000	35,752,000
2011	396,397	1,105,817	24,073,359	781,104,600	53,824,600	79,177,800	26,714,000	42,906,000	11,108,971	53,563,000	296,000	871,000	38,943,000
2012	384,557	1,074,340	23,464,399	767,394,000	50,217,000	77,918,000	24,954,000	43,050,000	11,108,971	53,542,000	295,000	835,000	37,242,000
2013	356,481	1,046,738	23,161,982	790,002,000	44,267,000	74,888,000	24,761,000	48,826,000	11,108,971	54,849,000	249,000	825,000	36,586,000
2014	357,042	1,040,948	23,021,543	745,949,000	45,996,000	76,127,000	25,092,000	49,146,000	11,108,971	52,679,000	241,000	837,000	37,439,000
2015	368,068	1,023,343	22,991,646	777,069,000	45,482,000	76,657,000	25,229,000	50,452,000	11,108,971	51,164,000	226,000	871,000	36,700,000
2016	366,176	993,896	23,161,017	754,772,000	44,995,000	66,232,000	25,539,000	48,485,000	11,108,971	51,130,000	167,000	768,000	33,247,000
2017	348,304	1,005,348	22,765,955	757,124,000	42,097,000	63,454,000	24,920,000	50,504,000	11,108,971	49,467,000	153,000	732,000	31,493,000
2018	351,875	1,026,525	22,836,279	754,039,000	41,249,000	73,183,000	26,130,000	47,971,000	11,108,971	48,143,000	147,000	713,000	30,215,000
2019	336,313	991,711	22,935,989	734,777,000	39,333,000	71,428,000	24,929,000	45,950,000	11,108,971	43,242,000	150,000	670,000	29,296,000

Table 1. C: Companion and sports animals (number of animals)

	Domestic carnivores		Horses				Other	
Type/ Species	**Dogs**	**Cats**	**Sport horses**	**Draught horses**	**Donkeys**	**Ponies**	**Birds**	**Small mammals**
Body weight (kg)	15	4	550	850	350	300	0.1	0.5
1999	8,100,000	8,700,000	634,110	93,170	92,622	257,943	7,100,000	1,800,000
2000	8,100,000	9,000,000	634,110	93,170	92,622	257,943	7,000,000	2,000,000
2001	8,800,000	9,400,000	635,586	92,237	99,178	258,543	8,100,000	4,900,000
2002	8,780,000	9,670,000	665,203	91,566	100,612	270,591	8,000,000	2,320,000
2003	8,600,000	9,700,000	667,176	90,920	104,390	271,394	6,700,000	4,100,000
2004	8,510,000	9,940,000	671,459	91,368	105,039	273,136	6,590,000	3,770,000
2005	8,510,000	9,940,000	673,177	89,613	106,544	273,835	6,590,000	3,770,000
2006	8,080,000	10,040,000	666,785	88,217	106,639	271,234	3,680,000	2,940,000
2007	8,080,000	10,040,000	671,715	87,371	104,864	273,240	3,680,000	2,940,000
2008	7,800,000	10,700,000	673,371	91,304	102,718	273,913	3,500,000	3,200,000
2009	7,800,000	10,700,000	681,036	92,344	103,887	277,032	3,500,000	3,200,000
2010	7,590,000	10,960,000	685,364	92,931	104,547	278,792	6,040,000	3,010,000
2011	7,590,000	10,960,000	686,428	93,075	104,709	279,225	6,040,000	3,010,000
2012	7,420,000	11,410,000	683,148	92,630	104,209	277,891	6,430,000	2,660,000
2013	7,420,000	11,410,000	674,990	91,524	102,965	274,572	6,430,000	2,660,000
2014	7,255,940	12,680,251	662,687	89,856	101,088	269,568	5,750,000	2,840,000
2015	7,255,940	12,680,251	647,637	87,815	98,792	263,446	5,750,000	2,840,000
2016	7,333,995	13,478,046	627,556	85,092	95,729	255,277	5,790,000	3,370,000
2017	7,333,995	13,478,046	628,192	79,226	92,051	255,536	5,790,000	3,370,000
2018	7,600,000	14,200,000	621,675	78,852	90,625	252,885	5,790,000	3,370,000
2019	7,600,000	14,200,000	624,123	77,031	86,417	253,881	4,700,000	3,700,000

Table 1. D: Sheep and goats (number of animals)

Type/Species	Goats	Kids	Dairy ewes	Meat ewes	Covered ewe lambs	Maiden ewes	Lambs	Other sheep
BW in kg	50	9.76	60	80	45	20	15	45
1999	1,362,341	741,132	1,297,000	5,157,000	937,000	348,000	5,336,584	1,771,000
2000	1,362,341	704,766	1,366,038	5,160,188	1,205,963		5,422,589	1,782,514
2001	1,373,565	697,977	1,332,571	4,985,757	1,247,369		5,400,786	1,823,812
2002	1,380,109	725,605	1,329,870	4,884,497	1,265,207		5,120,916	1,819,113
2003	1,370,811	746,987	1,327,743	4,841,187	1,270,733		5,045,598	1,815,842
2004	1,358,242	761,582	1,309,756	4,787,806	1,268,457		4,826,975	1,785,370
2005	1,360,945	913,258	1,299,846	4,749,568	1,262,518		4,724,274	1,760,340
2006	1,367,788	762,212	1,276,350	4,613,460	1,201,634		4,623,501	1,733,031
2007	1,358,729	751,800	1,252,817	4,523,942	1,165,785		4,581,528	1,668,163
2008	1,361,983	707,965	1,272,811	4,168,244	1,118,348		4,233,962	1,562,301
2009	1,410,567	658,507	1,280,508	4,054,899	1,133,234		3,868,100	1,552,740
2010	1,437,620	686,549	1,324,055	3,980,852	1,151,674		3,860,200	1,465,573
2011	1,381,209	707,988	1,297,651	3,851,261	1,103,628		3,958,707	1,406,231
2012	1,307,753	678,094	1,290,933	3,713,872		1,067,159	3,796,118	1,389,970
2013	1,290,623	625,791	1,238,433	3,617,338		1,040,389	3,662,175	1,342,897
2014	1,284,667	589,959	1,230,484	3,562,465		1,057,836	3,688,342	1,330,345
2015	1,261,684	570,425	1,231,793	3,460,147		1,069,763	3,646,166	1,302,838
2016	1,258,204	593,939	1,234,120	3,416,186		1,062,975	3,747,993	1,332,689
2017	1,270,737	549,781	1,247,035	3,333,294		1,054,243	3,622,569	1,266,884
2018	1,302,107	556,555	1,255,072	3,408,470		1,080,978	3,643,552	1,304,200
2019	1,311,688	546,732	1,321,792	3,397,937		1,088,830	3,626,936	1,337,572

Table 1. E: Fish (production in kg)

Type/Species	Trout	Carp	Salmon	Bass	Bream	Turbot	Sturgeon	Other
1999	46,160,000	6,000,000		3,150,000	1,000,000	900,000	110,000	
2000	47,500,000	6,000,000		3,600,000	1,400,000	1,000,000	130,000	
2001	47,500,000	6,000,000		3,000,000	1,700,000	700,000	150,000	
2002	42,900,000	6,000,000	5,000,000	3,500,000	1,500,000	750,000	150,000	
2003	37,000,000	6,000,000	800,000	3,700,000	1,100,000	909,000	170,000	1,100,000
2004	37,500,000	6,000,000	70,000	4,000,000	1,600,000	949,000	200,000	1,047,000
2005	34,000,000	6,000,000	1,200,000	4,300,000	1,900,000	791,000	250,000	1,167,000
2006	34,000,000	6,000,000	1,600,000	5,585,000	2,200,000	870,000	250,000	1,182,000
2007	34,000,000	6,000,000	1,800,000	4,764,000	1,392,000	850,000	250,000	1,135,000
2008	34,000,000	6,000,000	0	3,968,000	1,636,000	850,000	250,000	1,106,000
2009	34,000,000	6,000,000	0	3,204,000	1,648,000	531,000	250,000	1,021,000
2010	34,000,000	4,000,000	802,000	2,779,000	1,377,000	394,000	380,000	1,310,000
2011	36,000,000	3,500,000	700,000	3,000,000	1,500,000	300,000	280,000	1,600,000
2012	36,000,000	3,500,000	300,000	2,300,000	1,300,000	250,000	250,000	1,140,000
2013	32,000,000	3,500,000	300,000	1,970,000	1,477,000	255,000	280,000	923,000
2014	34,000,000	3,000,000	300,000	2,021,000	1,105,000	279,000	298,000	1,138,000
2015	36,713,000	3,000,000	300,000	1,980,000	1,502,000	303,000	241,000	982,000
2016	37,200,000	3,000,000	450,000	1,928,000	1,671,000	288,000	450,000	984,000
2017	37,200,000	3,000,000	450,000	1,928,000	1,671,000	288,000	450,000	984,000
2018	37,200,000	3,000,000	450,000	1,928,000	1,671,000	288,000	450,000	984,000
2019	37,200,000	3,000,000	450,000	1,928,000	1,671,000	288,000	450,000	984,000

Table 2: Biomasses of animal populations potentially using antimicrobials from 1999 to 2019 (in tonnes)

	Cattle	Pigs	Poultry	Rabbits	Cats & Dogs	Sheep & Goats	Horses	Fish	Other	Total
1999	10,397,639	3,198,285	2,907,401	138,967	156,300	767,366	537,755	57,320	30,652	18,191,685
2000	10,466,102	3,221,768	2,931,104	136,202	157,500	778,715	537,755	59,630	30,860	18,319,635
2001	10,746,012	3,219,902	3,036,354	135,733	169,600	766,708	540,249	59,050	32,184	18,705,792
2002	10,436,923	3,247,604	2,793,233	135,620	170,380	755,166	560,084	59,800	31,002	18,189,811
2003	9,982,187	3,212,933	2,753,116	128,902	167,800	750,080	562,184	50,779	31,484	17,639,463
2004	9,852,206	3,172,660	2,644,174	130,047	167,410	739,349	565,670	51,366	31,308	17,354,188
2005	9,278,685	3,109,954	2,566,981	127,918	167,410	732,896	565,860	49,608	31,308	16,630,620
2006	9,558,491	3,085,968	2,329,518	124,197	161,360	715,460	560,410	51,687	30,602	16,617,692
2007	9,665,091	3,100,280	2,436,728	125,567	161,360	701,271	562,383	50,191	30,293	16,833,164
2008	9,807,349	3,100,153	2,388,839	111,997	159,800	668,976	566,088	47,810	30,405	16,623,560
2009	9,724,506	3,050,730	2,329,853	102,609	159,800	657,068	572,532	46,654	30,405	16,674,156
2010	9,558,447	3,027,512	2,361,950	99,916	157,690	652,172	576,170	45,042	34,972	16,478,900
2011	9,331,444	2,998,187	2,386,525	107,810	157,690	634,255	577,065	46,880	34,972	16,274,827
2012	9,258,486	2,920,659	2,345,318	103,125	156,940	587,405	574,307	45,040	34,836	16,026,116
2013	9,332,284	2,870,798	2,325,960	101,365	156,940	570,503	567,449	40,705	34,836	16,000,840
2014	9,393,431	2,854,511	2,268,865	103,642	159,560	565,165	557,106	42,141	34,858	15,979,279
2015	9,443,444	2,849,950	2,323,787	102,202	159,560	554,086	544,454	45,021	34,858	16,057,362
2016	9,452,929	2,858,237	2,233,093	92,334	163,922	553,500	527,572	45,971	35,127	15,962,685
2017	9,320,258	2,813,936	2,199,463	87,517	163,922	542,822	521,726	45,971	35,127	15,730,742
2018	9,139,427	2,828,923	2,220,264	84,094	170,800	553,481	516,530	45,971	35,127	15,594,616
2019	8,960,176	2,823,502	2,151,262	81,280	170,800	558,434	515,154	45,971	35,183	15,341,763

2. Change in sales and exposure to antimicrobials between 1999 and 2019

Table 3: Change in the weight of active ingredient by pharmaceutical form (in tonnes)

	MEDICATED PREMIXES	ORAL POWDERS & SOLUTIONS	OTHER ORAL FORMS	INJECTIONS	INTRAMAMMARY & INTRAUTERINE	TOTAL
1999	853	285	19	139	15	**1311**
2000	878	332	19	139	15	**1383**
2001	821	384	18	137	14	**1374**
2002	732	431	18	131	14	**1326**
2003	687	451	18	124	14	**1293**
2004	651	465	18	114	12	**1260**
2005	653	495	19	116	12	**1295**
2006	626	459	20	120	11	**1237**
2007	712	474	19	110	11	**1327**
2008	627	405	20	109	11	**1171**
2009	536	393	18	102	10	**1059**
2010	496	388	19	102	10	**1015**
2011	407	369	19	104	10	**910**
2012	308	346	18	105	9	**786**
2013	267	315	17	101	8	**708**
2014	276	378	19	107	8	**788**
2015	210	194	15	87	8	**514**
2016	199	213	17	93	8	**530**
2017	162	223	16	91	7	**499**
2018	137	219	17	91	8	**472**
2019	133	182	17	83	6	**422**
Variation 2019 / 2018	-4 -2.8%	-37 -16.8%	0 0.4%	-8 -8.6%	-1 -16.7%	**-50** **-10.5%**
Variation 2019 / 2011	-274 -67.2%	-187 -50.6%	-2 -11.0%	-21 -20.0%	-4 -37.4%	**-485** **-53.3%**

Table 4: Change in body weight treated-day by pharmaceutical form (Number of ADDkg in tonnes)

	MEDICATED PREMIXES	ORAL POWDERS & SOLUTIONS	OTHER ORAL FORMS	INJECTIONS	TOTAL
1999	41,937,523	15,687,276	681,490	7,282,096	**65,588,385**
2000	45,487,889	18,997,926	698,755	7,338,997	**72,523,567**
2001	43,996,214	22,165,044	687,477	7,254,173	**74,102,908**
2002	41,895,291	24,911,326	718,661	7,152,465	**74,677,743**
2003	40,038,192	26,299,946	726,073	7,014,127	**74,078,338**
2004	35,921,980	26,804,473	725,666	6,513,929	**69,966,048**
2005	33,923,490	28,952,099	772,720	6,853,123	**70,501,432**
2006	34,275,063	27,420,511	794,301	7,066,749	**69,556,624**
2007	37,243,221	27,819,999	796,317	6,599,644	**72,459,181**
2008	31,973,271	24,447,844	814,218	6,791,781	**64,027,114**
2009	29,339,104	24,624,010	782,951	6,293,935	**61,040,000**
2010	26,929,498	24,727,098	789,914	6,498,653	**58,945,163**
2011	22,268,222	23,654,185	755,115	6,486,296	**53,163,818**
2012	16,145,372	22,412,893	692,001	6,624,614	**45,874,880**
2013	13,496,041	20,353,596	697,294	6,506,209	**41,053,140**
2014	13,972,326	24,616,281	763,763	6,600,794	**45,953,164**
2015	10,659,440	12,301,933	591,914	5,007,091	**28,560,378**
2016	8,038,695	13,518,872	669,995	5,118,317	**27,345,879**
2017	6,497,851	13,844,517	675,657	4,643,820	**25,661,845**
2018	5,452,429	13,431,974	700,437	4,784,568	**24,369,408**
2019	4,819,232	10,943,305	698,840	4,387,752	**20,849,129**
Variation 2019 / 2018	-633,197	-2,488,669	-1,597	-396,816	**-3,520,279**
	-11.6%	-18.5%	-0.2%	-8.3%	**-14.4%**
Variation 2019 / 2011	-17,448,990	-12,710,880	-56,275	-2,098,544	**-32,314,689**
	-78.4%	-53.7%	-7.5%	-32.4%	**-60.8%**

Table 5: Change in body weight treated by pharmaceutical form (Number of ACDkg in tonnes)

	MEDICATED PREMIXES	ORAL POWDERS & SOLUTIONS	OTHER ORAL FORMS	INJECTIONS	TOTAL
1999	3,820,859	3,281,363	122,867	2,975,938	**10,201,027**
2000	3,974,651	3,925,451	128,356	2,933,734	**10,962,192**
2001	3,788,900	4,582,475	117,759	2,927,877	**11,417,011**
2002	3,480,322	5,135,194	117,363	2,872,109	**11,604,988**
2003	3,247,260	5,435,508	119,417	2,893,534	**11,695,719**
2004	2,969,194	5,498,622	117,164	2,678,732	**11,263,712**
2005	2,926,740	5,975,773	122,421	2,837,270	**11,862,204**
2006	2,927,972	5,689,829	120,798	2,983,577	**11,722,176**
2007	3,256,585	5,764,845	116,362	2,777,477	**11,915,269**
2008	2,789,002	5,074,768	121,082	2,803,621	**10,788,473**
2009	2,563,942	5,101,107	111,425	2,640,435	**10,416,909**
2010	2,398,407	5,110,385	116,605	2,741,597	**10,366,994**
2011	2,035,767	4,859,987	109,164	2,788,404	**9,793,322**
2012	1,572,826	4,551,739	101,161	2,850,537	**9,076,263**
2013	1,336,389	4,190,107	100,277	2,758,424	**8,385,197**
2014	1,334,647	5,042,333	104,372	2,986,441	**9,467,793**
2015	1,106,967	2,496,473	86,162	2,229,608	**5,919,210**
2016	794,288	2,749,711	91,579	2,465,365	**6,100,943**
2017	613,961	2,797,403	94,481	2,280,525	**5,786,370**
2018	535,150	2,716,752	99,098	2,409,949	**5,760,949**
2019	491,783	2,227,530	98,659	2,229,030	**5,047,002**
Variation 2019 / 2018	-43,367	-489,222	-439	-180,919	**-713,947**
	-8.1%	-18.0%	-0.4%	-7.5%	**-12.4%**
Variation 2019 / 2011	-1,543,984	-2,632,457	-10,505	-559,374	**-4,746,320**
	-75.8%	-54.2%	-9.6%	-20.1%	**-48.5%**

Table 6: Change in sales by antimicrobial class since 1999 in tonnes of active ingredient

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	81.73	0.93	5.25	0.92	3.30	5.88	79.42	90.46	4.31	31.14	67.19	19.75	259.27	623.82	37.46	1310.82
2000	89.56	0.98	5.30	1.05	3.69	8.02	88.27	96.77	4.65	32.96	70.44	16.50	270.70	655.70	38.63	1383.22
2001	92.51	0.96	5.24	1.02	4.06	9.27	101.88	94.36	4.44	25.80	72.03	14.86	245.63	666.22	36.22	1374.50
2002	90.12	0.94	6.19	1.17	4.18	10.85	108.23	97.54	5.61	25.26	67.89	15.82	228.53	629.91	33.90	1326.14
2003	81.66	0.32	6.84	1.27	4.43	10.21	101.93	91.94	4.30	21.94	67.30	13.99	209.00	645.70	32.53	1293.35
2004	78.59	0.85	6.71	1.37	4.28	9.50	96.53	84.37	4.90	16.15	63.07	12.50	209.75	637.81	33.79	1260.19
2005	76.70	0.66	7.13	1.60	4.36	10.06	99.88	88.70	4.69	8.27	66.35	13.29	215.23	662.93	35.54	1295.38
2006	77.64	1.04	6.41	1.87	4.81	8.98	102.69	92.69	6.08	10.02	66.80	13.04	211.38	600.14	33.14	1236.72
2007	74.29	0.72	7.16	2.00	4.68	9.07	97.60	93.59	5.88	9.95	73.83	10.91	224.56	678.70	33.84	1326.79
2008	72.94	0.70	7.20	2.12	4.89	7.79	94.89	85.04	5.01	7.90	65.73	7.93	194.88	584.57	29.56	1171.15
2009	64.88	0.64	7.01	1.82	4.89	7.11	83.39	86.67	4.79	8.19	66.40	7.48	182.02	504.97	28.32	1058.58
2010	62.49	0.64	5.94	2.28	5.27	6.72	81.36	90.64	5.12	7.62	65.04	8.03	174.79	472.23	26.45	1014.62
2011	63.64	0.66	7.04	2.31	5.27	5.43	70.44	90.26	4.57	6.77	60.72	6.24	171.31	389.84	25.04	909.54
2012	57.37	0.65	6.64	2.33	4.94	4.69	61.00	86.21	4.65	5.64	51.31	5.35	145.28	328.42	21.27	785.76
2013	54.40	0.57	6.40	2.13	4.80	4.58	51.94	86.65	4.69	5.64	42.82	4.70	136.26	281.86	20.21	707.64
2014	57.60	0.61	7.31	2.00	4.90	4.60	58.39	98.16	5.88	6.44	51.43	5.57	146.68	315.36	22.75	787.69
2015	48.34	0.54	4.43	1.49	2.66	3.13	36.47	64.33	3.81	5.42	30.57	2.80	106.75	187.74	15.53	514.02
2016	55.76	1.26	6.40	0.39	1.70	3.01	36.84	77.57	5.59	4.53	20.25	3.21	111.04	185.40	17.23	530.16
2017	54.83	1.32	5.44	0.11	1.18	3.01	33.99	72.68	5.41	4.16	16.40	3.33	91.80	188.99	16.09	498.74
2018	52.05	1.39	5.61	0.12	1.00	3.04	32.09	70.96	5.76	3.54	13.72	2.75	84.23	180.44	15.15	471.85
2019	50.14	1.65	5.11	0.11	0.97	3.16	30.52	69.95	5.43	3.47	10.42	2.33	81.34	144.15	13.31	422.08
Variation 2019 / 2018	-1.91	0.26	-0.50	-0.01	-0.03	0.12	-1.57	-1.01	-0.33	-0.07	-3.29	-0.42	-2.89	-36.29	-1.84	-49.77
	-3.7%	18.5%	-8.9%	-6.2%	-2.7%	3.8%	-4.9%	-1.4%	-5.8%	-1.9%	-24.0%	-15.2%	-3.4%	-20.1%	-12.1%	-10.5%
Variation 2019 / 2011	-13.50	0.99	-1.93	-2.20	-4.30	-2.27	-39.92	-20.30	0.85	-3.30	-50.30	-3.91	-89.97	-245.69	-11.73	-487.46
	-21.2%	151.4%	-27.4%	-95.2%	-81.5%	-41.8%	-56.7%	-22.5%	18.7%	-48.7%	-82.8%	-62.6%	-52.5%	-63.0%	-46.8%	-53.6%

Table 7: Change in sales by antimicrobial class since 1999 in body weight treated-day (number of ADDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	5,314,542	61,559	114,400	613,705	829,639	1,349,919	7,803,382	5,961,946	109,518	6,675,463	14,437,030	1,249,525	7,852,979	18,560,113	5,778,494	65,588,385
2000	5,790,509	66,635	117,557	760,098	910,333	1,827,150	10,182,164	6,500,314	117,177	7,621,741	15,235,272	1,015,743	8,058,445	19,832,367	5,992,872	72,523,567
2001	6,244,677	66,649	136,206	732,296	998,468	2,112,908	11,843,772	6,319,054	112,757	5,769,456	15,541,707	933,434	7,425,390	21,239,150	5,569,444	74,102,908
2002	6,212,152	66,081	151,228	844,120	1,060,534	2,505,567	12,161,797	6,575,953	142,383	5,942,278	14,728,773	1,018,958	6,730,022	21,421,846	5,090,641	74,677,743
2003	5,697,048	20,094	170,144	928,161	1,109,326	2,313,283	11,270,966	6,192,824	109,075	6,366,511	14,687,842	905,360	6,182,552	22,497,858	4,828,311	74,078,338
2004	5,578,208	63,355	171,336	956,306	1,059,975	2,044,525	10,235,902	5,703,962	124,094	4,734,507	13,815,183	776,027	6,096,472	22,651,201	4,922,071	69,966,048
2005	5,561,951	49,954	187,279	1,108,247	1,151,521	2,135,486	10,726,611	6,005,841	118,931	2,284,051	14,573,360	814,949	6,145,501	23,670,632	5,072,329	70,501,432
2006	5,527,036	79,771	185,150	1,179,871	1,221,951	1,867,426	11,466,991	6,227,379	153,634	2,549,288	14,776,261	801,330	5,915,289	21,346,028	4,792,901	69,556,624
2007	5,191,221	54,139	189,566	1,252,310	1,121,520	1,792,187	11,017,235	6,258,505	148,549	2,671,140	16,242,651	674,745	6,143,350	23,252,206	4,928,272	72,459,181
2008	4,849,730	51,933	188,960	1,381,556	1,221,774	1,675,598	10,006,118	5,749,083	127,998	2,147,339	14,594,055	496,030	5,342,185	19,681,136	4,353,707	64,027,114
2009	4,432,394	47,873	182,802	1,130,704	1,230,660	1,569,691	9,210,601	5,807,554	159,834	2,083,986	14,774,326	482,974	5,097,213	18,081,341	4,180,016	61,040,000
2010	3,897,394	46,634	165,331	1,155,511	1,287,784	1,456,974	8,496,503	6,131,167	176,394	1,846,633	14,689,549	514,581	4,908,991	17,180,935	3,958,591	58,945,163
2011	3,654,028	46,985	183,603	1,136,265	1,195,462	1,206,384	7,122,720	6,164,475	168,934	1,426,662	13,670,947	409,713	4,769,510	14,999,077	3,744,852	53,163,818
2012	3,204,704	46,118	171,364	1,132,043	1,131,367	993,472	5,332,637	5,922,552	183,028	956,083	11,683,542	355,498	4,032,944	13,540,269	3,199,166	45,874,880
2013	3,070,545	39,617	159,934	1,059,444	1,164,270	940,810	4,483,224	5,885,842	198,502	975,148	9,899,925	310,410	3,836,174	11,694,340	3,101,504	41,053,140
2014	3,106,743	42,623	184,568	885,300	1,059,271	844,865	4,302,549	6,673,130	238,659	1,036,269	11,804,079	367,309	4,726,287	13,297,098	3,959,069	45,953,164
2015	2,373,930	38,953	111,221	666,725	576,541	557,216	3,175,101	4,168,534	151,309	960,734	6,857,935	194,040	3,473,229	7,386,913	2,799,112	28,560,378
2016	2,744,630	53,770	142,021	229,201	301,301	510,600	2,951,786	5,293,507	245,700	792,199	4,978,331	224,474	3,730,804	7,326,946	3,108,162	27,345,879
2017	2,588,778	50,936	135,580	53,729	174,030	454,343	2,654,092	4,900,231	231,367	733,420	4,132,924	231,703	3,308,263	8,046,216	2,992,456	25,661,845
2018	2,446,134	48,682	136,507	55,028	169,473	454,735	2,415,123	4,734,239	241,543	666,253	3,507,572	188,330	3,088,256	8,170,749	2,810,684	24,369,408
2019	2,249,402	54,938	133,706	49,031	165,129	461,272	2,094,498	4,706,512	229,810	635,946	2,691,359	157,683	2,838,536	6,361,964	2,442,957	20,849,129
Variation 2019 / 2018	-196,732	6,256	-2,801	-5,997	-4,344	6,537	-320,625	-27,727	-11,733	-30,307	-816,213	-30,647	-249,720	-1,808,785	-367,727	-3,520,279
	-8.0%	12.9%	-2.1%	-10.9%	-2.6%	1.4%	-13.3%	-0.6%	-4.9%	-4.5%	-23.3%	-16.3%	-8.1%	-22.1%	-13.1%	-14.4%
Variation 2019 / 2011	-1,404,626	7,953	-49,897	-1,087,234	-1,030,333	-745,112	-5,028,222	-1,457,963	60,876	-790,716	-10,979,588	-252,030	-1,930,974	-8,637,113	-1,301,895	-32,314,689
	-38.4%	16.9%	-27.2%	-95.7%	-86.2%	-61.8%	-70.6%	-23.7%	36.0%	-55.4%	-80.3%	-61.5%	-40.5%	-57.6%	-34.8%	-60.8%

Table 8: Change in sales by antimicrobial class since 1999 in body weight treated (number of ACDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	1,060,632	7,358	7,453	143,160	199,415	114,768	935,311	1,717,621	107,144	424,983	2,015,945	227,976	1,262,505	3,199,139	952,470	10,201,027
2000	1,096,686	8,082	7,666	173,693	219,348	159,385	1,073,405	1,847,755	116,123	450,470	2,170,515	203,194	1,301,343	3,364,520	982,166	10,962,192
2001	1,123,740	8,055	8,816	168,131	267,555	195,279	1,205,024	1,814,370	110,816	360,112	2,260,666	186,051	1,241,046	3,670,787	951,770	11,417,011
2002	1,084,767	7,759	9,612	193,433	305,734	233,426	1,297,976	1,712,853	139,419	350,896	2,236,069	190,262	1,161,266	3,796,702	881,916	11,604,988
2003	1,039,253	3,148	10,689	212,162	334,924	208,835	1,228,220	1,707,865	106,992	307,067	2,296,785	170,170	1,056,504	4,072,594	824,615	11,695,719
2004	1,067,372	7,489	10,896	218,523	312,948	184,307	1,153,792	1,569,252	121,861	230,899	2,182,588	149,779	1,050,189	4,064,879	840,298	11,263,712
2005	1,058,202	5,309	11,628	255,451	342,811	180,234	1,239,789	1,672,908	116,663	127,628	2,365,591	157,703	1,071,517	4,317,924	871,721	11,862,204
2006	1,048,722	8,985	11,496	296,009	376,593	164,527	1,257,883	1,731,032	151,399	127,409	2,421,637	155,718	1,042,325	3,964,054	835,189	11,722,176
2007	1,012,240	6,422	11,379	314,383	344,097	152,145	1,148,960	1,733,067	146,577	128,427	2,531,260	130,832	1,098,619	4,165,335	869,156	11,915,269
2008	968,735	6,200	11,150	338,909	367,442	144,125	1,157,417	1,572,483	124,850	102,892	2,379,086	96,420	973,812	3,495,339	779,411	10,788,473
2009	860,137	5,705	10,761	281,667	360,582	126,955	1,095,828	1,569,510	123,760	105,461	2,401,853	93,928	905,745	3,313,222	745,272	10,416,909
2010	814,488	5,573	10,054	343,656	358,790	118,128	1,100,719	1,664,584	130,965	100,523	2,408,038	100,095	876,094	3,144,169	717,989	10,366,994
2011	821,642	5,499	10,692	340,257	360,937	97,872	1,041,634	1,684,123	118,668	85,261	2,277,429	80,587	865,545	2,829,732	691,141	9,793,322
2012	763,087	5,368	10,290	340,522	352,116	81,143	964,367	1,623,236	120,378	74,402	2,004,615	70,471	736,271	2,719,525	597,435	9,076,263
2013	752,769	4,211	9,290	306,104	345,740	80,026	896,653	1,619,472	119,729	72,993	1,788,447	61,695	704,402	2,392,974	576,469	8,385,197
2014	783,277	4,311	10,410	269,171	332,885	78,789	1,033,443	1,814,348	151,584	69,690	2,098,679	73,240	785,985	2,748,798	660,231	9,467,793
2015	537,161	3,909	7,130	212,424	203,997	56,727	675,590	1,107,705	97,565	58,293	1,268,372	38,624	562,214	1,649,132	455,263	5,919,210
2016	784,122	5,995	9,632	57,406	86,547	57,366	756,587	1,547,375	146,684	46,840	1,002,724	44,698	639,298	1,667,867	545,606	6,100,943
2017	791,893	5,838	10,810	17,619	41,439	59,372	700,305	1,430,701	142,802	41,976	861,223	45,852	567,301	1,830,365	509,088	5,786,370
2018	798,042	5,722	11,692	18,530	46,842	60,941	722,272	1,443,185	151,367	36,210	734,174	37,395	554,197	1,908,496	506,075	5,760,949
2019	765,969	6,555	12,159	17,252	46,421	60,208	673,626	1,430,638	142,994	35,117	577,011	31,581	508,485	1,493,126	446,673	5,047,002
Variation 2019 / 2018	-32,073	833	467	-1,278	-421	-733	-48,646	-12,547	-8,373	-1,093	-157,163	-5,814	-45,712	-415,370	-59,402	-713,947
	-4.0%	14.6%	4.0%	-6.9%	-0.9%	-1.2%	-6.7%	-0.9%	-5.5%	-3.0%	-21.4%	-15.5%	-8.2%	-21.8%	-11.7%	-12.4%
Variation 2019 / 2011	-55,673	1,056	1,467	-323,005	-314,516	-37,664	-368,008	-253,485	24,326	-50,144	-1,700,418	-49,006	-357,060	-1,336,606	-244,468	-4,746,320
	-6.8%	19.2%	13.7%	-94.9%	-87.1%	-38.5%	-35.3%	-15.1%	20.5%	-58.8%	-74.7%	-60.8%	-41.3%	-47.2%	-35.4%	-48.5%

3. Change in exposure to antimicrobials by species

Cattle

Table 9: Change in sales for cattle and in their exposure to antimicrobials

	Tonnage sold (tonnes)	Percentage of total tonnage*	Sales in mg/kg	Body weight treated (tonnes)	Percentage of total body weight treated*	ALEA
1999	168.88	12.9%	**16.24**	2,767,006	27.1%	**0.266**
2000	178.67	12.9%	**17.07**	2,839,540	25.9%	**0.271**
2001	174.78	12.7%	**16.26**	2,831,180	24.8%	**0.263**
2002	175.61	13.2%	**16.83**	2,968,454	25.6%	**0.284**
2003	172.29	13.3%	**17.26**	2,986,137	25.5%	**0.299**
2004	193.94	15.4%	**19.68**	3,164,445	28.1%	**0.321**
2005	206.98	16.0%	**22.31**	3,410,079	28.7%	**0.368**
2006	200.58	16.2%	**20.98**	3,411,037	29.1%	**0.357**
2007	198.70	15.0%	**20.56**	3,238,130	27.2%	**0.335**
2008	183.53	15.7%	**18.71**	3,105,792	28.8%	**0.317**
2009	172.78	16.3%	**17.77**	2,963,954	28.5%	**0.305**
2010	182.56	18.0%	**19.10**	3,247,701	31.3%	**0.340**
2011	183.26	20.1%	**19.64**	3,064,806	31.3%	**0.328**
2012	165.83	21.1%	**17.91**	3,024,280	33.3%	**0.327**
2013	146.94	20.8%	**15.75**	2,838,932	33.9%	**0.304**
2014	179.25	22.8%	**19.08**	3,328,807	35.2%	**0.354**
2015	124.13	24.1%	**13.14**	2,263,594	38.2%	**0.240**
2016	124.23	23.4%	**13.14**	2,354,621	38.6%	**0.249**
2017	131.01	26.3%	**14.06**	2,347,798	40.6%	**0.252**
2018	136.46	28.9%	**14.93**	2,481,999	43.1%	**0.272**
2019	117.46	27.8%	**13.11**	2,193,014	43.5%	**0.245**
Variation 2019 / 2018	-19.00		**-1.82**	-288,985		**-0.027**
	-13.9%		**-12.2%**	-11.6%		**-9.9%**
Variation 2019 / 2011	-65.79		**-6.53**	-871,792		**-0.084**
	-35.9%		**-33.2%**	-28.4%		**-25.5%**

* "total" means for all animal species

Table 10: Change in body weight treated-day by antimicrobial class for cattle (number of ADDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL	Body weight treated-day / biomass
1999	2,051,114	0	0	552,250	363,336	109,246	1,060,944	2,671,680	106,775	0	924,376	190,161	543,702	1,864,871	274,735	**8,007,921**	**0.77**
2000	2,081,634	0	0	698,186	385,935	110,986	1,111,140	2,725,880	115,972	0	982,092	192,575	608,013	1,965,475	270,884	**8,512,471**	**0.81**
2001	2,048,311	0	0	680,314	444,423	103,770	1,136,247	2,699,828	110,448	0	1,042,451	209,029	578,878	1,841,468	270,829	**8,509,324**	**0.79**
2002	1,948,318	0	0	784,539	490,831	111,524	1,189,766	2,542,420	138,904	0	1,134,493	251,764	559,933	2,074,359	281,437	**8,989,229**	**0.86**
2003	1,834,252	0	0	867,026	518,049	114,113	1,182,909	2,393,302	106,672	0	1,096,276	239,193	497,565	2,364,507	253,607	**9,119,792**	**0.91**
2004	1,790,151	0	0	896,593	476,587	121,361	1,153,258	2,297,490	121,515	0	1,040,481	203,648	541,167	3,584,877	275,365	**10,188,074**	**1.03**
2005	1,800,135	0	0	1,037,117	532,505	125,507	1,204,988	2,380,816	116,312	0	1,087,936	243,147	517,911	4,108,318	266,810	**11,119,608**	**1.20**
2006	1,815,065	0	0	1,078,489	582,448	123,853	1,173,252	2,425,657	151,054	0	1,067,341	246,990	509,685	3,711,989	259,556	**10,833,169**	**1.13**
2007	1,712,040	0	0	1,134,965	501,761	120,554	996,529	2,250,958	146,273	0	1,035,073	188,627	572,907	3,715,178	261,869	**10,430,334**	**1.08**
2008	1,694,612	0	0	1,263,421	552,306	114,412	1,249,241	2,169,153	123,627	0	1,040,634	136,860	586,506	2,793,841	290,835	**9,833,258**	**1.00**
2009	1,430,700	0	0	1,024,180	533,375	102,767	1,136,026	1,979,353	121,464	0	1,067,431	141,672	553,449	3,142,452	278,214	**9,567,689**	**0.98**
2010	1,331,289	0	0	1,029,375	683,992	75,496	1,187,433	2,155,593	147,893	0	889,301	172,925	535,451	3,590,307	248,104	**10,226,948**	**1.07**
2011	1,640,395	0	0	1,053,442	594,700	41,793	1,189,808	2,357,580	130,998	0	643,979	114,178	967,078	2,310,134	535,679	**9,142,586**	**0.98**
2012	1,540,014	0	1432	1,064,093	558,221	72,409	1,313,439	2,324,174	133,378	0	482,855	92,384	625,796	2,256,595	301,159	**8,681,343**	**0.94**
2013	1,512,270	0	0	993,813	589,359	73,014	1,281,128	2,283,850	157,427	0	605,123	96,560	622,219	1,489,584	319,250	**7,975,452**	**0.85**
2014	1,569,920	0	0	840,298	510,672	113,018	1,531,565	2,060,061	176,751	0	1,074,489	160,252	677,013	2,829,341	420,901	**9,801,195**	**1.04**
2015	1,257,963	0	0	634,460	287,427	105,061	974,866	1,592,095	108,196	0	576,095	65,253	485,491	1,594,158	263,188	**6,259,157**	**0.66**
2016	1,367,551	0	0	216,021	102,871	96,064	1,135,214	1,767,052	140,830	0	477,589	89,836	623,605	1,601,722	480,179	**6,165,796**	**0.65**
2017	1,489,041	0	0	48,458	40,057	106,826	989,915	1,864,586	143,817	0	497,392	95,420	567,286	2,058,180	485,962	**6,385,530**	**0.69**
2018	1,483,254	0	0	48,667	54,325	109,558	1,098,113	1,802,819	149,200	0	408,796	77,292	607,844	2,337,225	545,638	**6,680,243**	**0.73**
2019	1,368,940	0	0	43,318	51,303	99,060	845,199	1,764,472	139,566	0	366,822	75,326	534,245	1,839,355	474,597	**5,744,095**	**0.64**
Variation 2019 / 2018	-114,314	0	0	-5349	-3,022	-10498	-252,914	-38,347	-9,634	0	-41,974	-1,966	-73,599	-497,870	-71,041	**-936,148**	**-0.09**
	-7.71%			-10.99%	-5.56%	-9.58%	-23.03%	-2.13%	-6.46%		-10.27%	-2.54%	-12.11%	-21.30%	-13.02%	**-14.01%**	**-12.29%**
Variation 2019 / 2011	-271,455	0	0	-1,010,124	-543,397	57,267	-344,609	-593,108	8,568	0	-277,157	-38,852	-432,833	-470,779	-61,082	**-3,398,491**	**-0.34**
	-16.55%			-95.89%	-91.37%	137.03%	-28.96%	-25.16%	6.54%		-43.04%	-34.03%	-44.76%	-20.38%	-11.40%	**-37.17%**	**-34.57%**

Table 11: Change in body weight treated by antimicrobial class for cattle (number of ACDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	672,296	0	0	127,314	89,974	21,849	465,815	828,336	106,775	0	296,921	38,033	140,098	751,371	72,478	**2,767,006**
2000	672,494	0	0	157,321	93,665	22,197	485,154	831,158	115,972	0	312,159	38,514	155,832	730,747	69,422	**2,839,540**
2001	661,536	0	0	154,198	134,552	20,754	489,962	829,054	110,448	0	328,709	41,805	150,080	663,289	70,540	**2,831,180**
2002	627,068	0	0	177,480	166,670	22,305	523,605	778,096	138,904	0	347,008	50,353	145,433	696,226	74,629	**2,968,454**
2003	621,338	0	0	195,641	188,856	22,823	509,713	763,490	106,672	0	329,087	47,839	131,304	761,692	67,355	**2,986,137**
2004	648,428	0	0	202,291	169,904	24,272	478,620	781,082	121,515	0	305,894	40,729	137,977	969,377	70,423	**3,164,445**
2005	651,062	0	0	232,823	184,729	25,101	517,638	807,173	116,312	0	322,856	48,630	133,373	1,085,831	69,427	**3,410,079**
2006	648,113	0	0	249,975	210,588	24,771	510,220	812,055	151,054	0	322,025	49,397	131,655	1,016,969	67,476	**3,411,037**
2007	632,066	0	0	261,170	190,385	24,111	427,012	765,075	146,273	0	299,727	37,725	152,848	1,002,908	67,108	**3,238,130**
2008	612,162	0	0	289,016	197,942	22,882	518,047	727,694	123,627	0	303,898	27,372	157,871	795,622	74,495	**3,105,792**
2009	518,706	0	0	233,537	186,472	20,553	510,816	670,371	105,249	0	300,469	28,334	127,334	832,883	68,907	**2,963,954**
2010	504,733	0	0	289,427	222,391	15,099	541,240	753,250	117,261	0	262,789	34,585	129,856	938,915	64,376	**3,247,701**
2011	575,529	0	0	308,533	220,333	8,359	574,329	797,457	99,980	0	195,504	22,836	199,112	698,957	96,895	**3,064,806**
2012	541,878	0	477	316,976	211,464	14,482	588,579	791,196	98,910	0	142,928	18,477	148,016	750,997	74,835	**3,024,280**
2013	536,315	0	0	283,418	205,889	14,603	583,324	787,419	103,554	0	169,048	19,312	149,794	575,405	78,862	**2,838,932**
2014	564,380	0	0	252,366	191,073	22,604	694,078	722,809	125,988	0	262,555	32,051	170,775	895,139	111,824	**3,328,807**
2015	380,885	0	0	198,232	126,224	21,012	448,679	497,297	80,819	0	145,628	13,051	123,599	649,419	74,413	**2,263,594**
2016	556,013	0	0	52,873	36,305	19,213	529,194	668,511	103,612	0	119,036	17,967	169,024	658,220	138,273	**2,354,621**
2017	590,987	0	0	14,294	14,153	21,365	481,984	679,323	104,551	0	123,658	19,084	157,216	743,618	137,990	**2,347,798**
2018	607,832	0	0	15,284	21,809	21,912	516,249	697,346	112,170	0	102,983	15,458	172,044	816,733	157,994	**2,481,999**
2019	575,431	0	0	14,212	21,674	19,812	431,310	691,291	104,527	0	92,679	15,065	152,674	658,209	139,723	**2,193,014**
Variation 2019 / 2018	-32,401	0	0	-1072	-135	-2100	-84,939	-6,055	-7,643	0	-10,304	-393	-19,370	-158,524	-18,271	**-288,985**
	-5.33%			-7.01%	-0.62%	-9.58%	-16.45%	-0.87%	-6.81%		-10.01%	-2.54%	-11.26%	-19.41%	-11.56%	**-11.64%**
Variation 2019 / 2011	-98	0	0	-294,321	-198,659	11,453	-143,019	-106,166	4,547	0	-102,825	-7,771	-46,438	-40,748	42,828	**-871,792**
	-0.02%			-95.39%	-90.16%	137.01%	-24.90%	-13.31%	4.55%		-52.59%	-34.03%	-23.32%	-5.83%	44.20%	**-28.45%**

Pigs

Table 12: Change in sales for pigs and in their exposure to antimicrobials

	Tonnage sold (tonnes)	Percentage of total tonnage*	Sales in mg/kg	Body weight treated (tonnes)	Percentage of total body weight treated*	ALEA
1999	652.36	49.8%	**203.97**	4,054,918	39.8%	**1.268**
2000	694.04	50.2%	**215.42**	4,392,299	40.1%	**1.363**
2001	696.42	50.7%	**216.29**	4,762,837	41.7%	**1.479**
2002	654.75	49.4%	**201.61**	4,808,885	41.4%	**1.481**
2003	621.60	48.1%	**193.47**	4,637,863	39.7%	**1.443**
2004	575.40	45.7%	**181.36**	4,372,872	38.8%	**1.378**
2005	595.52	46.0%	**191.49**	4,567,621	38.5%	**1.469**
2006	575.93	46.6%	**186.63**	4,547,478	38.8%	**1.474**
2007	635.80	47.9%	**205.08**	4,861,904	40.8%	**1.568**
2008	537.10	45.9%	**173.25**	4,169,442	38.6%	**1.345**
2009	484.15	45.7%	**158.70**	4,011,249	38.5%	**1.315**
2010	446.86	44.0%	**147.60**	3,683,343	35.5%	**1.217**
2011	354.38	39.0%	**118.20**	3,305,508	33.8%	**1.103**
2012	291.81	37.1%	**99.91**	2,903,956	32.0%	**0.994**
2013	270.97	38.3%	**94.39**	2,748,267	32.8%	**0.957**
2014	284.77	36.2%	**99.76**	2,901,647	30.6%	**1.017**
2015	185.45	36.1%	**65.07**	1,871,096	31.6%	**0.657**
2016	189.40	35.7%	**66.26**	1,843,021	30.2%	**0.645**
2017	181.27	36.3%	**64.42**	1,755,851	30.3%	**0.624**
2018	166.69	35.3%	**58.92**	1,717,114	29.8%	**0.607**
2019	140.62	33.3%	**49.80**	1,433,492	28.4%	**0.508**
Variation 2019 / 2018	-26.07		**-9.12**	-283,622		**-0.099**
	-15.6%		**-15.5%**	-16.5%		**-16.4%**
Variation 2019 / 2011	-213.76		**-68.40**	-1,872,016		**-0.595**
	-60.3%		**-57.9%**	-56.6%		**-54.0%**

* "total" means for all animal species

Table 13: Change in body weight treated-day by antimicrobial class for pigs (number of ADDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL	Body weight treated-day / biomass
1999	2,291,933	0	0	45,380	210,054	1,049,513	6,125,907	1,642,529	0	2,471,098	9,416,970	538,283	3,173,009	9,143,660	2,615,815	34,209,612	10.70
2000	2,663,876	0	0	47,623	239,199	1,367,730	8,496,477	1,679,057	0	2,376,589	9,629,601	331,960	3,085,774	10,067,534	2,628,024	37,973,460	11.79
2001	3,157,463	0	0	41,525	263,760	1,509,011	10,100,005	1,686,119	1,048	1,943,350	9,760,224	233,442	3,015,817	10,824,599	2,571,084	40,547,095	12.59
2002	3,234,449	0	0	47,474	291,718	1,753,317	10,349,586	2,112,324	709	1,784,871	9,065,876	215,884	2,762,520	10,458,948	2,512,155	40,357,940	12.43
2003	2,979,399	0	0	49,621	308,817	1,657,307	9,548,987	1,907,393	0	1,045,174	9,143,208	162,223	2,469,918	10,402,255	2,262,700	38,154,596	11.88
2004	2,990,867	0	0	49,156	293,612	1,502,272	8,534,591	1,783,549	0	745,779	8,427,154	177,951	2,516,680	9,572,260	2,312,444	35,268,371	11.12
2005	3,040,918	0	0	59,745	352,557	1,640,894	8,934,122	1,807,141	0	437,141	8,610,420	186,353	2,420,581	10,016,206	2,239,518	36,175,213	11.63
2006	2,968,103	0	0	80,702	367,648	1,393,500	9,687,246	1,879,475	0	463,794	8,690,813	152,077	2,360,925	9,284,544	2,216,889	36,287,510	11.76
2007	2,744,839	0	0	85,773	314,133	1,379,388	9,445,982	1,963,578	0	353,065	10,283,262	164,640	2,497,049	10,417,193	2,299,603	38,646,399	12.47
2008	2,412,791	0	0	84,719	361,858	1,286,102	8,173,367	1,756,966	2,127	235,347	8,727,720	137,424	2,221,857	8,540,099	2,042,477	32,867,792	10.60
2009	2,284,068	0	0	74,947	370,961	1,273,124	7,682,694	1,943,040	36,527	252,130	8,310,807	114,949	2,116,391	7,675,053	1,963,207	31,004,975	10.16
2010	1,583,945	0	0	96,608	235,854	1,083,449	6,864,480	1,983,725	27,004	251,499	7,817,966	113,403	2,222,722	6,852,999	2,101,195	28,215,325	9.32
2011	1,141,682	0	0	54,160	245,300	868,818	5,564,533	1,701,565	30,948	253,080	7,550,506	99,895	1,764,218	5,502,986	1,751,966	24,146,712	8.05
2012	905,334	0	0	42,420	252,297	826,715	3,678,768	1,722,109	48,428	278,240	6,035,677	73,886	1,465,634	4,776,944	1,452,262	19,563,214	6.70
2013	853,437	0	0	41,862	245,849	754,568	2,901,541	1,674,548	38,906	261,364	4,643,856	66,294	1,283,114	5,108,942	1,273,334	17,364,177	6.05
2014	836,266	0	0	22,300	209,187	695,790	2,410,657	2,048,115	57,096	217,338	5,243,607	69,534	1,884,345	5,104,040	1,873,843	18,283,703	6.41
2015	559,988	0	0	16,965	108,331	421,383	1,952,929	1,289,384	38,376	185,092	3,292,519	30,573	1,405,418	2,955,046	1,396,912	11,855,983	4.16
2016	767,591	0	0	6,753	49,877	375,572	1,581,085	1,843,102	99,056	125,040	1,660,301	36,237	1,243,263	3,077,716	1,236,500	10,431,195	3.65
2017	588,637	0	0	2,354	14,431	302,513	1,442,729	1,551,612	75,332	86,199	1,211,293	37,319	1,049,173	3,712,165	1,047,039	9,785,124	3.48
2018	538,015	0	0	2,645	20,596	293,501	1,094,843	1,507,214	79,408	68,105	1,123,835	43,078	1,008,999	3,619,870	1,006,273	9,115,244	3.22
2019	498,575	0	0	2,290	18,703	304,614	929,466	1,440,386	77,780	63,347	770,744	45,090	883,871	2,611,380	877,929	7,376,223	2.61
Variation 2019 / 2018	-39,440	0	0	-355	-1,893	11,113	-165,377	-66,828	-1,628	-4,758	-353,091	2,012	-125,128	-1,008,490	-128,344	-1,739,021	-0.61
	-7.3%			-13.4%	-9.2%	3.8%	-15.1%	-4.4%	-2.1%	-7.0%	-31.4%	4.7%	-12.4%	-27.9%	-12.8%	-19.08%	-18.92%
Variation 2019 / 2011	-643,107	0	0	-51,870	-226,597	-564,204	-4,635,067	-261,179	46,832	-189,733	-6,779,762	-54,805	-880,347	-2,891,606	-874,037	-16,770,489	-5.44
	-56.3%			-95.8%	-92.4%	-64.9%	-83.3%	-15.3%	151.3%	-75.0%	-89.8%	-54.9%	-49.9%	-52.5%	-49.9%	-69.45%	-67.56%

Table 14: Change in body weight treated by antimicrobial class for pigs (number of ACDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	230,989	0	0	14,239	67,875	65,479	377,507	364,211	0	287,041	1,032,593	92,905	511,084	1,231,271	466,800	4,054,918
2000	256,647	0	0	14,943	77,199	87,602	491,457	404,491	0	279,007	1,068,529	66,632	518,129	1,358,297	477,216	4,392,299
2001	293,081	0	0	12,887	85,153	103,370	613,679	419,062	210	234,775	1,100,635	46,820	526,023	1,560,855	480,916	4,762,837
2002	290,934	0	0	14,742	94,428	120,288	670,883	410,777	142	215,128	1,048,149	39,788	516,400	1,597,073	478,088	4,808,885
2003	267,749	0	0	15,370	100,082	109,588	615,937	396,607	0	134,504	1,085,791	29,511	463,489	1,613,641	431,691	4,637,863
2004	276,460	0	0	15,176	94,758	100,860	566,895	373,477	0	101,526	1,015,274	33,043	481,144	1,506,007	447,342	4,372,872
2005	273,117	0	0	21,489	113,933	103,587	600,690	408,334	0	67,516	1,067,625	34,997	483,103	1,581,645	450,933	4,567,621
2006	264,474	0	0	43,687	119,235	91,145	628,113	432,794	0	54,361	1,096,362	28,473	484,839	1,470,614	456,706	4,547,478
2007	242,226	0	0	47,195	102,148	87,659	609,008	459,022	0	46,416	1,271,635	30,942	514,993	1,605,512	481,377	4,861,904
2008	226,448	0	0	43,107	117,802	83,388	519,170	393,247	920	34,465	1,119,960	26,565	457,451	1,304,286	425,975	4,169,442
2009	221,579	0	0	41,155	120,566	80,148	494,291	430,076	18,263	37,823	1,053,497	21,956	429,029	1,222,299	400,082	4,011,249
2010	176,413	0	0	47,064	73,599	66,463	461,338	409,202	13,502	40,592	981,045	21,490	428,285	1,106,873	407,015	3,683,343
2011	129,151	0	0	22,976	77,079	52,793	390,083	366,887	15,474	38,084	1,042,911	19,551	351,086	900,363	348,439	3,305,508
2012	112,035	0	0	17,231	83,597	57,987	305,917	378,060	21,133	43,681	857,499	14,731	294,976	811,971	291,887	2,903,956
2013	113,374	0	0	15,365	83,485	54,925	252,768	379,163	15,486	40,890	706,438	13,361	259,458	910,183	257,303	2,748,267
2014	113,499	0	0	9,648	80,243	53,096	259,872	489,256	24,270	29,356	763,937	14,021	280,877	889,149	278,546	2,901,647
2015	77,695	0	0	6,679	46,133	33,110	174,345	303,701	14,669	22,667	555,507	6,158	199,112	509,600	197,266	1,871,096
2016	144,100	0	0	2,283	22,745	34,608	178,833	482,412	41,201	15,194	320,196	7,279	183,351	533,980	181,996	1,843,021
2017	128,376	0	0	956	5,001	33,794	166,182	406,073	32,410	11,183	259,013	7,529	149,611	664,735	149,186	1,755,851
2018	128,507	0	0	966	7,493	34,155	145,297	410,601	33,025	8,897	240,634	8,681	143,399	667,095	142,883	1,717,114
2019	124,875	0	0	752	7,257	34,874	157,569	389,417	32,493	8,468	171,775	9,062	130,300	476,769	129,168	1,433,492
Variation 2019/2018	-3,632	0	0	-214	-236	719	12,272	-21,184	-532	-429	-68,859	381	-13,099	-190,326	-13,715	-283,622
	-2.8%			-22.2%	-3.1%	2.1%	8.4%	-5.2%	-1.6%	-4.8%	-28.6%	4.4%	-9.1%	-28.5%	-9.6%	-16.5%
Variation 2019/2011	-4,276	0	0	-22,224	-69,822	-17,919	-232,514	22,530	17,019	-29,616	-871,136	-10,489	-220,786	-423,594	-219,271	-1,872,016
	-3.3%			-96.7%	-90.6%	-33.9%	-59.6%	6.1%	110.0%	-77.8%	-83.5%	-53.6%	-62.9%	-47.0%	-62.9%	-56.6%

Poultry

Table 15: Change in sales for poultry and in their exposure to antimicrobials

	Tonnage sold (tonnes)	Percentage of total tonnage*	Sales in mg/kg	Body weight treated (tonnes)	Percentage of total body weight treated*	ALEA
1999	221.36	16.9%	**76.14**	1,905,620	18.7%	**0.655**
2000	237.18	17.1%	**80.92**	2,219,218	20.2%	**0.757**
2001	249.28	18.1%	**82.10**	2,398,575	21.0%	**0.790**
2002	250.98	18.9%	**89.85**	2,464,931	21.2%	**0.882**
2003	261.95	20.3%	**95.15**	2,646,125	22.6%	**0.961**
2004	251.27	19.9%	**95.03**	2,437,520	21.6%	**0.922**
2005	254.57	19.7%	**99.17**	2,599,957	21.9%	**1.013**
2006	237.66	19.2%	**102.02**	2,530,206	21.6%	**1.086**
2007	254.37	19.2%	**104.39**	2,558,716	21.5%	**1.050**
2008	242.17	20.7%	**101.38**	2,404,093	22.3%	**1.006**
2009	216.43	20.4%	**92.89**	2,397,571	23.0%	**1.029**
2010	203.73	20.1%	**86.26**	2,462,472	23.8%	**1.043**
2011	202.29	22.2%	**84.77**	2,398,377	24.5%	**1.005**
2012	177.24	22.6%	**75.57**	2,208,711	24.3%	**0.942**
2013	157.37	22.2%	**67.66**	2,051,564	24.5%	**0.882**
2014	178.41	22.7%	**78.64**	2,434,618	25.7%	**1.073**
2015	98.94	19.2%	**42.58**	1,161,503	19.6%	**0.500**
2016	105.49	19.9%	**47.24**	1,280,621	21.0%	**0.573**
2017	94.62	19.0%	**43.02**	1,126,018	19.5%	**0.512**
2018	86.29	18.3%	**38.87**	1,009,035	17.5%	**0.454**
2019	73.67	17.5%	**34.24**	852,912	16.9%	**0.396**
Variation 2019 / 2018	-12.63		**-4.62**	-156,123		**-0.058**
	-14.6%		**-11.9%**	-15.5%		**-12.8%**
Variation 2019 / 2011	-128.63		**-50.52**	-1,545,465		**-0.608**
	-63.6%		**-59.6%**	-64.4%		**-60.5%**

* "total" means for all animal species

Table 16: Change in body weight treated-day by antimicrobial class for poultry (number of ADDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL	Body weight treated-day / biomass
1999	149,763	0	0	0	171,228	178,220	351,930	947,342	0	27,543	2,598,982	428,235	623,244	5,136,192	502,050	10,422,240	3.58
2000	200,499	0	0	0	192,263	338,080	348,275	1,415,277	0	26,541	3,098,379	413,193	710,480	5,460,224	539,524	11,983,009	4.09
2001	227,802	0	0	0	179,820	489,500	350,990	1,278,277	0	21,533	3,301,263	404,224	700,095	6,195,693	578,699	12,904,377	4.25
2002	191,343	0	0	0	156,671	626,430	341,352	1,322,725	0	18,381	3,296,892	331,777	738,003	6,351,976	574,947	13,170,636	4.72
2003	160,922	0	0	0	164,270	525,150	335,388	1,288,964	0	8,375	3,500,196	318,067	760,359	6,997,536	613,407	13,884,626	5.04
2004	157,032	0	0	0	174,366	405,230	348,909	1,152,607	0	5,929	3,512,047	324,450	720,316	6,319,148	596,156	12,945,531	4.90
2005	143,423	0	0	0	158,259	352,080	437,560	1,309,916	0	3,933	3,917,861	301,897	746,458	6,343,124	651,779	13,548,164	5.28
2006	134,363	0	0	0	171,914	331,840	444,888	1,373,963	0	36,378	4,128,588	331,625	696,690	5,572,673	580,968	13,095,819	5.62
2007	126,606	0	0	0	192,569	275,070	457,668	1,493,356	0	44,251	3,973,276	256,068	746,037	6,011,677	650,845	13,452,994	5.52
2008	113,827	0	0	0	192,589	258,010	499,115	1,292,522	0	40,982	3,964,395	170,673	650,855	5,623,860	569,947	12,708,317	5.32
2009	116,335	0	0	0	200,930	176,800	315,099	1,375,370	0	42,092	4,514,814	188,671	676,524	4,907,219	612,577	12,419,498	5.33
2010	197,486	0	0	0	220,997	279,249	288,851	1,463,482	0	27,666	5,338,647	184,259	495,167	4,388,268	388,632	12,716,425	5.38
2011	136,423	0	0	0	236,062	276,976	228,390	1,639,173	0	31,348	4,477,953	149,819	766,438	4,508,289	649,937	12,308,690	5.16
2012	115,917	0	0	0	207,589	78,505	199,025	1,448,987	0	31,053	4,307,656	141,169	608,794	4,216,967	506,047	11,230,872	4.79
2013	167,311	0	0	0	190,535	96,329	180,858	1,508,469	0	29,173	4,238,210	127,780	525,097	3,411,934	430,258	10,353,833	4.45
2014	49,832	0	0	0	223,391	14,878	246,495	2,106,306	1,776	56,904	4,810,375	119,304	616,370	3,864,384	505,903	12,072,243	5.32
2015	30,149	0	0	0	95,717	13,058	106,837	886,978	0	46,928	2,321,896	75,427	547,656	1,819,578	466,368	5,915,651	2.55
2016	125,538	0	0	0	100,330	19,435	111,101	1,227,093	665	44,456	2,544,305	80,483	668,852	1,615,991	573,888	6,508,707	2.91
2017	135,861	0	0	0	88,802	23,427	124,111	960,276	892	43,250	2,140,508	87,458	635,038	1,501,744	531,828	5,706,081	2.59
2018	117,545	0	0	0	62,705	27,369	118,743	926,254	984	35,415	1,760,294	60,731	549,118	1,462,875	470,152	5,082,210	2.29
2019	132,685	0	0	0	59,749	31,690	110,464	1,025,934	861	37,941	1,395,351	35,959	447,367	1,053,471	380,705	4,289,564	1.99
Variation 2019 / 2018	15,140				-2,956	4,321	-8,279	99,680	-123	2,526	-364,943	-24,772	-101,751	-409,404	-89,447	-792,646	-0.30
	12.9%				-4.7%	15.8%	-7.0%	10.8%	-12.5%	7.1%	-20.7%	-40.8%	-18.5%	-28.0%	-19.0%	-15.60%	-12.89%
Variation 2019 / 2011	-3,738				-176,313	-245,286	-117,926	-613,239	861	6,593	-3,082,602	-113,860	-319,071	-3,454,818	-269,232	-8,019,126	-3.16
	-2.7%				-74.7%	-88.6%	-51.6%	-37.4%		21.0%	-68.8%	-76.0%	-41.6%	-76.6%	-41.4%	-65.15%	-61.34%

Table 17: Change in body weight treated by antimicrobial class for poultry (number of ACDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	28,199	0	0	0	34,246	25,460	72,280	227,201	0	3206	537,962	83,634	106,825	822,576	106,552	**1,905,620**
2000	36,824	0	0	0	38,453	48,297	79,041	330,106	0	3121	638,597	82,639	115,988	885,419	110,311	**2,219,218**
2001	41,731	0	0	0	35,964	69,929	82,529	297,386	0	2609	690,617	80,731	111,626	1,030,167	115,125	**2,398,575**
2002	33,394	0	0	0	31,334	89,490	83,887	301,969	0	2251	714,931	65,358	115,400	1,065,807	101,212	**2,464,931**
2003	28,442	0	0	0	32,854	75,021	87,360	294,592	0	1177	778,378	63,222	116,771	1,202,130	105,901	**2,646,125**
2004	27,795	0	0	0	34,873	57,890	93,338	269,125	0	896	771,245	64,257	110,243	1,040,685	100,416	**2,437,520**
2005	25,240	0	0	0	31,652	50,297	108,775	308,778	0	661	873,760	59,955	114,005	1,058,825	109,156	**2,599,957**
2006	24,699	0	0	0	34,383	47,406	105,136	331,984	0	6947	908,239	65,915	103,369	927,645	93,544	**2,530,206**
2007	26,680	0	0	0	38,514	39,296	102,212	363,841	0	8662	856,303	50,844	112,050	991,210	104,679	**2,558,716**
2008	19,524	0	0	0	38,518	36,859	111,299	314,301	0	8072	860,386	33,800	98,846	902,634	92,040	**2,404,093**
2009	20,522	0	0	0	40,186	25,257	82,733	336,510	0	8290	952,731	37,171	104,957	809,201	100,329	**2,397,571**
2010	26,349	0	0	0	44,199	35,268	77,567	368,538	0	5423	1,091,842	36,501	77,378	723,604	69,254	**2,462,472**
2011	18,513	0	0	0	47,212	35,467	57,932	397,384	0	6018	912,966	29,784	121,440	791,760	108,911	**2,398,377**
2012	15,898	0	0	0	41,518	7,850	50,207	335,192	0	5967	881,147	28,120	98,256	762,878	88,684	**2,208,711**
2013	21,771	0	0	0	38,107	9,633	44,439	350,164	0	5613	861,632	25,547	87,673	623,105	77,827	**2,051,564**
2014	10,251	0	0	0	44,678	2,125	64,271	482,700	355	11092	977,909	23,861	105,258	719,571	92,290	**2,434,618**
2015	5,975	0	0	0	19,143	1,865	26,386	209,891	0	9086	474,455	15,086	88,749	316,803	79,587	**1,161,503**
2016	15,489	0	0	0	20,066	2,776	28,527	288,987	133	8732	514,196	16,097	106,094	284,702	93,242	**1,280,621**
2017	17,192	0	0	0	17,760	3,358	32,419	220,542	178	8549	435,472	17,492	101,864	277,615	85,795	**1,126,018**
2018	15,321	0	0	0	12,541	3,921	31,146	212,239	197	7016	357,682	12,147	89,962	273,933	77,740	**1,009,035**
2019	16,956	0	0	0	11,950	4,535	26,560	229,309	172	7528	284,910	7,192	72,779	198,312	62,337	**852,912**
Variation 2019 / 2018	1,635	0	0	0	-591	614	-4,586	17,070	-25	512	-72,772	-4,955	-17,183	-75,621	-15,403	**-156,123**
	10.7%				-4.7%	15.7%	-14.7%	8.0%	-12.7%	7.3%	-20.3%	-40.8%	-19.1%	-27.6%	-19.8%	**-15.5%**
Variation 2019 / 2011	-1,557	0	0	0	-35,262	-30,932	-31,372	-168,075	172	1510	-628,056	-22,592	-48,661	-593,448	-46,574	**-1,545,465**
	-8.4%				-74.7%	-87.2%	-54.2%	-42.3%		25.1%	-68.8%	-75.9%	-40.1%	-75.0%	-42.8%	**-64.4%**

Rabbits

Table 18: Change in sales for rabbits and in their exposure to antimicrobials

	Tonnage sold (tonnes)	Percentage of total tonnage*	Sales in mg/kg	Body weight treated (tonnes)	Percentage of total body weight treated*	ALEA
1999	75.42	5.8%	**542.69**	388,697	3.8%	**2.797**
2000	82.46	6.0%	**605.43**	437,686	4.0%	**3.214**
2001	80.80	5.9%	**595.30**	398,372	3.5%	**2.935**
2002	89.83	6.8%	**662.34**	459,635	4.0%	**3.389**
2003	100.52	7.8%	**779.80**	533,210	4.6%	**4.137**
2004	116.77	9.3%	**897.94**	578,705	5.1%	**4.450**
2005	114.80	8.9%	**897.44**	527,722	4.4%	**4.125**
2006	103.25	8.3%	**831.33**	477,901	4.1%	**3.848**
2007	113.66	8.6%	**905.19**	510,172	4.3%	**4.063**
2008	103.02	8.8%	**919.88**	431,942	4.0%	**3.857**
2009	88.61	8.4%	**863.58**	399,515	3.8%	**3.894**
2010	79.90	7.9%	**799.71**	371,967	3.6%	**3.723**
2011	71.09	7.8%	**659.44**	342,378	3.5%	**3.176**
2012	55.26	7.0%	**535.81**	268,863	3.0%	**2.607**
2013	52.46	7.4%	**517.57**	273,825	3.3%	**2.701**
2014	61.66	7.8%	**594.95**	309,151	3.3%	**2.983**
2015	45.25	8.8%	**442.74**	231,895	3.9%	**2.269**
2016	44.22	8.3%	**478.93**	202,397	3.3%	**2.192**
2017	31.68	6.4%	**362.02**	157,143	2.7%	**1.796**
2018	28.24	6.0%	**335.87**	154,053	2.7%	**1.832**
2019	31.07	7.4%	**382.21**	151,150	3.0%	**1.860**
Variation 2019 / 2018	2.82		**46.34**	-2,903		**0.028**
	10.0%		**13.8%**	-1.9%		**1.5%**
Variation 2019 / 2011	-40.03		**-277.23**	-191,228		**-1.316**
	-56.3%		**-42.0%**	-55.9%		**-41.4%**

* "total" means for all animal species

Table 19: Change in body weight treated-day by antimicrobial class for rabbits (number of ADDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL	Body weight treated-day / biomass
1999	435,842	0	0	0	0	0	198,522	0	0	4,176,822	1,020,245	690	369,180	629,259	139,720	6,820,589	49.08
2000	455,506	0	0	0	0	0	158,203	0	0	5,218,611	1,103,266	635	508,684	572,579	254,607	8,009,347	58.81
2001	439,336	0	0	0	0	0	189,523	0	0	3,804,573	1,101,718	2,415	474,000	665,353	247,465	6,666,321	49.11
2002	445,188	0	0	0	0	0	206,122	0	0	4,139,026	844,874	3,127	539,775	943,762	319,050	7,115,074	52.46
2003	361,322	0	0	0	0	0	140,417	0	0	5,312,962	608,582	3,074	646,328	1,241,358	459,999	8,308,213	64.45
2004	314,180	0	0	0	0	0	132,567	0	0	3,982,799	501,837	3,210	754,560	1,817,533	605,779	7,502,825	57.69
2005	266,428	0	0	0	0	0	88,044	0	0	1,842,977	555,982	4,076	921,562	1,751,995	796,200	5,426,835	42.42
2006	295,350	0	0	0	0	0	77,824	0	0	2,049,116	531,688	4,327	861,404	1,428,065	708,858	5,244,430	42.23
2007	309,171	0	0	0	0	0	59,892	0	0	2,273,824	577,110	4,252	955,902	1,520,688	795,873	5,698,173	45.38
2008	329,121	0	0	0	0	0	30,229	0	0	1,871,010	516,820	4,167	697,730	1,486,118	585,049	4,933,109	44.05
2009	343,113	0	0	0	0	0	24,771	0	0	1,789,764	555,605	3,485	616,216	1,234,738	503,675	4,565,869	44.50
2010	541,691	0	0	0	0	0	106,100	0	0	1,567,468	409,766	3,384	507,178	1,071,977	388,281	4,205,492	42.09
2011	537,013	0	0	0	0	0	90,401	0	0	1,142,234	520,890	2	438,716	942,285	337,423	3,667,867	34.02
2012	455,320	0	0	0	0	0	92,095	0	0	646,790	421,864	1	348,463	694,554	276,243	2,650,256	25.70
2013	368,510	0	0	0	0	0	77,674	0	0	684,611	184,793	0	342,637	821,307	279,400	2,474,604	24.41
2014	470,499	0	0	0	14	0	68,957	0	0	762,027	366,329	0	474,106	714,165	389,897	2,849,471	27.49
2015	369,999	0	0	0	2,949	0	69,768	0	0	728,714	436,009	0	335,229	434,164	252,219	2,367,222	23.16
2016	354,925	0	0	0	2,181	0	65,157	0	0	622,703	130,219	0	393,378	394,435	325,133	1,951,622	21.14
2017	242,859	0	0	0	1,696	0	36,587	0	0	603,971	191,186	0	259,079	308,579	231,086	1,638,778	18.73
2018	213,639	0	0	0	1,182	0	36,500	0	0	562,733	153,659	0	206,165	348,178	181,329	1,518,946	18.06
2019	152,012	0	0	0	957	0	70,718	0	0	534,658	111,167	0	292,080	290,460	258,181	1,434,321	17.65
Variation 2019 / 2018	-61,627				-225	0	34,218	0	0	-28,075	-42,492	0	85,915	-57,718	76,852	-84,625	-0.42
	-28.8%				-19.0%		93.7%			-5.0%	-27.7%		41.7%	-16.6%	42.4%	-5.57%	-2.30%
Variation 2019 / 2011	-385,001				957	0	-19,683	0	0	-607,576	-409,723	-2	-146,636	-651,825	-79,242	-2,233,546	-16.38
	-71.7%						-21.8%			-53.2%	-78.7%	-100.0%	-33.4%	-69.2%	-23.5%	-60.89%	-48.13%

Table 20: Change in body weight treated by antimicrobial class for rabbits (number of ACDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	42,389	0	0	0	0	0	11,305	0	0	134736	85,792	138	52,630	63,474	26,325	**388,697**
2000	44,198	0	0	0	0	0	9,029	0	0	168342	92,760	127	67,000	57,879	37,899	**437,686**
2001	43,385	0	0	0	0	0	10,489	0	0	122728	91,893	483	64,197	67,465	37,655	**398,372**
2002	46,128	0	0	0	0	0	10,802	0	0	133517	71,277	625	68,842	129,833	43,432	**459,635**
2003	38,190	0	0	0	0	0	7,565	0	0	171386	54,090	615	79,100	183,501	57,056	**533,210**
2004	34,120	0	0	0	0	0	6,946	0	0	128477	40,942	642	89,143	279,252	70,891	**578,705**
2005	29,531	0	0	0	0	0	5,120	0	0	59451	44,846	815	107,923	280,961	92,333	**527,722**
2006	32,806	0	0	0	0	0	4,558	0	0	66101	42,924	865	98,960	232,411	80,199	**477,901**
2007	35,873	0	0	0	0	0	3,758	0	0	73349	48,582	850	110,777	237,626	91,076	**510,172**
2008	36,874	0	0	0	0	0	2,227	0	0	60355	43,262	833	82,695	206,187	68,250	**431,942**
2009	35,456	0	0	0	0	0	1,588	0	0	59348	47,751	697	76,726	178,386	62,828	**399,515**
2010	45,859	0	0	0	0	0	14,688	0	0	54508	35,000	677	66,564	155,156	51,571	**371,967**
2011	47,194	0	0	0	0	0	13,052	0	0	41159	47,675	0	62,432	131,564	50,489	**342,378**
2012	43,075	0	0	0	0	0	13,366	0	0	24754	37,839	0	51,364	99,932	42,275	**268,863**
2013	33,544	0	0	0	0	0	11,097	0	0	26490	20,339	0	51,256	131,775	43,222	**273,825**
2014	45,091	0	0	0	1	0	10,200	0	0	29242	47,119	0	69,643	108,760	59,088	**309,151**
2015	34,923	0	0	0	588	0	11,307	0	0	26540	52,939	0	44,888	61,943	34,801	**231,895**
2016	36,867	0	0	0	436	0	9,477	0	0	22914	19,342	0	55,615	59,218	46,800	**202,397**
2017	20,847	0	0	0	338	0	5,340	0	0	22244	25,619	0	37,596	45,864	33,254	**157,143**
2018	19,570	0	0	0	235	0	5,317	0	0	20297	21,436	0	30,714	56,924	27,155	**154,053**
2019	19,219	0	0	0	191	0	10,177	0	0	19121	18,378	0	40,786	45,531	36,115	**151,150**
Variation 2019 / 2018	-351				-44	0	4,860	0	0	-1176	-3,058	0	10,072	-11,393	8,960	**-2,903**
	-1.8%				-18.7%		91.4%			-5.8%	-14.3%		32.8%	-20.0%	33.0%	**-1.9%**
Variation 2019 / 2011	-27,975				191	0	-2,875	0	0	-22038	-29,297	0	-21,646	-86,033	-14,374	**-191,228**
	-59.3%						-22.0%			-53.5%	-61.5%		-34.7%	-65.4%	-28.5%	**-55.9%**

Domestic carnivores

Table 21: Change in sales for cats and dogs and in their exposure to antimicrobials

	Tonnage sold (tonnes)	Percentage of total tonnage*	Sales in mg/kg	Body weight treated (tonnes)	Percentage of total body weight treated*	ALEA
1999	16.00	1.2%	**102.38**	114,904	1.1%	**0.735**
2000	15.89	1.1%	**100.91**	115,055	1.0%	**0.731**
2001	15.70	1.1%	**92.55**	114,392	1.0%	**0.674**
2002	16.45	1.2%	**96.57**	112,040	1.0%	**0.658**
2003	15.46	1.2%	**92.14**	105,961	0.9%	**0.631**
2004	16.50	1.3%	**98.58**	111,431	1.0%	**0.666**
2005	17.23	1.3%	**102.94**	116,726	1.0%	**0.697**
2006	18.42	1.5%	**114.17**	120,969	1.0%	**0.750**
2007	18.29	1.4%	**113.36**	126,125	1.1%	**0.782**
2008	18.19	1.6%	**113.80**	121,448	1.1%	**0.760**
2009	17.38	1.6%	**108.75**	118,934	1.1%	**0.744**
2010	16.88	1.7%	**107.04**	116,706	1.1%	**0.740**
2011	16.75	1.8%	**106.25**	117,524	1.2%	**0.745**
2012	15.66	2.0%	**99.80**	107,800	1.2%	**0.687**
2013	14.29	2.0%	**91.03**	105,939	1.3%	**0.675**
2014	17.03	2.2%	**106.76**	121,478	1.3%	**0.761**
2015	12.73	2.5%	**79.78**	93,609	1.6%	**0.587**
2016	15.63	2.9%	**95.36**	98,642	1.6%	**0.602**
2017	16.08	3.2%	**98.10**	105,164	1.8%	**0.642**
2018	16.20	3.4%	**94.86**	107,424	1.9%	**0.629**
2019	16.41	3.9%	**96.06**	109,642	2.2%	**0.642**
Variation 2019 / 2018	0.21 1.3%		**1.20** **1.3%**	2,218 2.1%		**0.013** **2.1%**
Variation 2019 / 2011	-0.35 -2.1%		**-10.19** **-9.6%**	-7,882 -6.7%		**-0.103** **-13.9%**

* "total" means for all animal species

Table 22: Change in body weight treated-day by antimicrobial class for cats and dogs (number of ADDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL	Body weight treated-day / biomass
1999	83,648	61,307	114,400	0	85,021	12,940	56,093	187,477	1,285	0	6,278	996	75,759	36,287	35,257	598,430	3.83
2000	78,470	66,454	117,557	0	92,936	10,354	61,523	180,250	1,205	0	5,907	3,217	73,714	34,935	31,416	600,448	3.81
2001	73,425	66,410	136,206	0	110,465	10,627	62,165	173,398	1,261	0	5,445	2,727	63,935	33,805	27,108	616,480	3.63
2002	78,783	65,850	151,228	0	121,314	14,296	72,004	167,868	1,279	0	5,160	4,014	62,255	35,916	22,561	654,031	3.84
2003	75,159	19,864	170,144	0	118,190	16,713	60,379	165,174	1,275	0	5,243	3,126	55,378	34,407	17,897	645,353	3.85
2004	75,467	63,254	171,336	0	115,410	15,662	63,871	177,033	1,242	0	4,586	2,318	58,313	35,760	17,887	658,047	3.93
2005	73,997	49,780	187,279	0	108,200	17,005	59,590	218,166	1,318	0	4,429	2,550	50,407	41,610	14,518	705,264	4.21
2006	69,460	79,644	185,150	631	99,941	18,233	80,411	254,480	1,326	0	4,718	330	50,239	37,267	13,595	743,202	4.61
2007	65,256	54,009	189,566	3,743	113,057	17,175	55,139	282,701	1,207	0	3,593	1,316	51,738	41,688	13,207	766,055	4.75
2008	63,476	51,855	188,960	4,448	115,021	17,074	52,245	285,018	1,006	0	3,651	241	51,905	38,555	12,125	761,922	4.77
2009	60,204	47,873	182,802	4,877	125,394	17,000	50,087	282,710	843	0	3,250	715	45,378	37,791	10,659	754,087	4.72
2010	61,304	46,411	165,331	5,310	120,390	18,780	48,894	298,510	649	0	2,511	87	42,505	37,684	10,426	741,133	4.70
2011	57,305	46,890	183,603	7,111	98,426	18,797	46,888	287,645	0	0	2,648	13	45,346	39,820	13,326	728,932	4.62
2012	58,129	46,007	169,932	4,807	91,821	15,843	46,007	249,433	0	0	2,682		44,320	38,107	12,388	661,708	4.22
2013	54,914	39,533	159,934	6,009	112,477	16,899	39,533	252,949	0	0	2,816		37,619	37,507	10,547	663,001	4.22
2014	58,914	42,580	184,568	5,919	94,285	21,179	42,580	313,936	0	0	3,336		51,197	43,258	19,119	758,530	4.75
2015	39,410	38,925	111,221	7,180	66,507	17,714	38,925	250,791	74	0	2,347		44,409	38,252	15,132	576,331	3.61
2016	39,185	53,750	142,021	1,897	40,055	19,529	39,371	303,585	0	0	975		52,763	47,028	23,405	661,641	4.04
2017	43,584	50,936	135,580	2,308	26,428	21,577	33,577	337,475	0	0	682		54,074	46,187	24,300	675,945	4.12
2018	37,891	48,682	136,507	2,147	27,296	24,307	28,750	353,675	0	0	709		51,481	44,455	26,528	689,716	4.04
2019	41,863	54,938	133,706	2,179	29,495	25,323	30,187	349,307	0	0	652		48,674	47,668	22,965	692,531	4.05
Variation 2019 / 2018	3,972	6,256	-2,801	32	2,199	1,016	1,437	-4,368	0	0	-57	0	-2,807	3,213	-3,563	2,815	0.02
	10.5%	12.9%	-2.1%	1.5%	8.1%	4.2%	5.0%	-1.2%			-8.0%		-5.5%	7.2%	-13.4%	0.41%	0.41%
Variation 2019 / 2011	-15,442	8,048	-49,897	-4,932	-68,931	6,526	-16,701	61,662	0	0	-1,996	-13	3,328	7,848	9,639	-36,401	-0.57
	-26.9%	17.2%	-27.2%	-69.4%	-70.0%	34.7%	-35.6%	21.4%			-75.4%	-100.0%	7.3%	19.7%	72.3%	-4.99%	-12.29%

Table 23: Change in body weight treated by antimicrobial class for cats and dogs (number of ACDkg in tonnes)

	AMINOGLYCOSIDES	OTHER CLASSES	CEPHALOSPORINS 1&2G	CEPHALOSPORINS 3&4G	FLUOROQUINOLONES	LINCOSAMIDES	MACROLIDES	PENICILLINS	PHENICOLS	PLEUROMUTILINS	POLYMYXINS	QUINOLONES	SULFONAMIDES	TETRACYCLINES	TRIMETHOPRIM	TOTAL
1999	31,474	7,308	7,453	0	7,320	1,980	6,453	63,788	161	0	1,634	199	14,553	7,342	5,334	114,904
2000	29,868	8,046	7,666	0	10,031	1,289	7,237	61,675	151	0	1,558	643	14,388	7,015	4,712	115,055
2001	29,380	8,007	8,816	0	11,886	1,226	7,319	60,708	158	0	1,389	545	12,607	6,784	4,150	114,392
2002	29,721	7,713	9,612	0	13,302	1,343	8,074	54,230	160	0	1,336	803	12,518	7,205	3,439	112,040
2003	30,695	3,102	10,689	0	13,132	1,403	6,901	50,517	159	0	1,356	625	11,508	6,899	2,929	105,961
2004	33,948	7,469	10,896	0	13,413	1,285	7,287	55,208	155	0	1,181	464	12,139	7,169	3,022	111,431
2005	33,816	5,274	11,628	0	12,497	1,249	6,906	61,011	165	0	1,118	510	10,628	8,339	2,500	116,726
2006	32,426	8,959	11,496	631	12,387	1,205	8,846	65,006	166	0	1,230	66	10,648	7,468	2,425	120,969
2007	31,297	6,396	11,379	3,743	13,050	1,079	6,305	69,256	151	0	882	263	10,850	8,351	2,308	126,125
2008	29,746	6,184	11,150	4,448	13,180	996	6,036	65,367	126	0	891	48	11,030	7,718	2,226	121,448
2009	27,355	5,705	10,761	4,877	13,358	997	5,760	64,588	105	0	781	143	9,598	7,558	1,923	118,934
2010	27,913	5,529	10,054	5,310	13,291	1,298	5,638	64,426	81	0	528	17	8,515	7,537	1,943	116,706
2011	27,075	5,480	10,692	7,111	11,995	1,253	5,480	63,745	0	0	573	3	9,089	7,964	2,563	117,524
2012	26,981	5,345	9,813	4,807	11,101	824	5,345	59,326	0	0	570	0	8,739	7,622	2,212	107,800
2013	26,618	4,194	9,290	6,009	12,457	865	4,194	58,106	0	0	603	0	7,492	7,501	1,981	105,939
2014	28,564	4,302	10,410	5,919	12,546	964	4,302	67,096	0	0	697	0	11,284	8,651	4,668	121,478
2015	16,147	3,903	7,130	6,886	8,551	740	3,903	48,688	74	0	499	0	9,613	7,792	3,603	93,609
2016	15,187	5,991	9,632	1,897	5,542	769	3,937	53,509	0	0	226	0	11,655	9,405	5,649	98,642
2017	18,402	5,838	10,810	2,308	3,519	855	3,358	60,469	0	0	136	0	11,811	9,238	5,747	105,164
2018	16,918	5,722	11,692	2,147	3,933	953	2,875	62,318	0	0	142	0	11,654	8,760	6,569	107,424
2019	19,894	6,555	12,159	2,179	4,022	959	3,019	63,977	0	0	130	0	10,352	9,189	5,150	109,642
Variation 2019 / 2018	2,976	833	467	32	89	6	144	1,659	0	0	-12	0	-1,302	429	-1,419	2,218
	17.6%	14.6%	4.0%	1.5%	2.3%	0.6%	5.0%	2.7%			-8.5%		-11.2%	4.9%	-21.6%	2.1%
Variation 2019 / 2011	-7,181	1,075	1,467	-4,932	-7,973	-294	-2,461	232	0	0	-443	-3	1,263	1,225	2,587	-7,882
	-26.5%	19.6%	13.7%	-69.4%	-66.5%	-23.5%	-44.9%	0.4%			-77.3%	-100.0%	13.9%	15.4%	100.9%	-6.7%

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