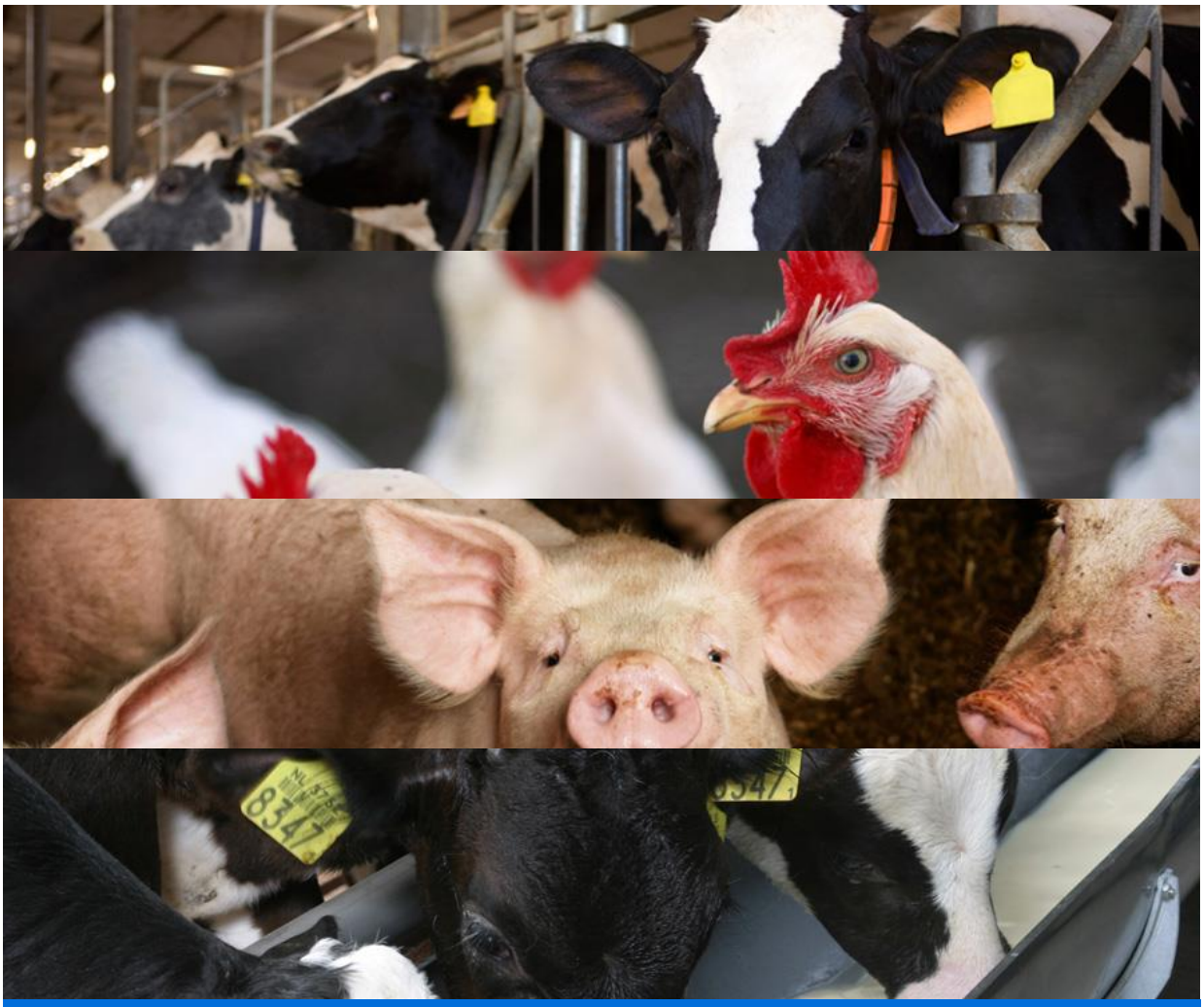
Autoriteit Diergeneesmiddelen



USAGE OF ANTIBIOTICS IN LIVESTOCK IN THE NETHERLANDS IN 2012

July 2013

FOR ANY QUESTIONS ABOUT THIS REPORT, PLEASE CALL THE SDa AT: +31-900-2211333

Autoriteit Diergeneesmiddelen

Contents

Preface

This is your copy of the SDa report ‘Usage of Antibiotics in Livestock in the Netherlands in 2012’. The purpose of this report is to provide insight into the usage of antibiotics in Dutch livestock farming. Thanks to the efforts of livestock farmers and veterinarians, the SDa is in a position to map out the usage of antibiotics on more than 40,000 farms, and to compare these data with those of 2011 for a large number of these farms. This is also the first time that the SDa is able to compare these data with the annual figures concerning the sales of antibiotics for usage in animals in the Netherlands.

The SDa bases its approach on the benchmarking of veterinarians and livestock farmers and on the improvement measures they have initiated. This is intended to result in reduced and prudent usage of antibiotics in livestock in the Netherlands.

The SDa Executive Board would like to express its appreciation for the way in which the expert panel, comprising Prof. D.J. Mevius (Chair), DVM, PhD, Prof. D.J.J. Heederik, PhD, Prof. J.W. Mouton, PhD, I.M. van Geijlswijk, PhD and the researchers M.E.H. Bos, PhD and F.J. Taverne, MSc, fulfilled the analyses of the data.

On behalf of the SDa Executive Board,
Utrecht, July 2013

F.J.M. Werner
Chair

1. Conclusions and Recommendations

Conclusions

1. In a relatively short period of time the usage of antibiotics on more than 40,000 farms was determined by animal type, farm type and class of antibiotics, and compared with benchmark indicators as established by the SDa. This is a major accomplishment of the private parties involved in the implementation of the policy designed to reduce the usage of antibiotics and promote prudent usage.

2. From the analysis of the data provided, it appears that the usage of antibiotics on Dutch veal calf, pig and broiler farms on average decreased by approximately 15% in 2012 compared to 2011.

3. Although the average usage declined, the data do not show any substantial shift in usage on livestock farms to lower levels. In other words, the distribution of farms across the three usage levels is virtually unchanged, while the aim of applying benchmark indicators was to realize a shift of the tail end of the distribution to systematic lower levels of usage. As a consequence, the action levels for veal calf, pig and broiler farms have not been adjusted for 2013.

4. The SDa now also has established benchmark indicators for target, signaling and action levels for 2013 for dairy cattle, suckler cows, beef bulls and rearing cattle. Because there are no figures available for previous years, comparison with 2011 is not possible for these farm types.

5. Usage of antibiotics that are of critical importance for public health in livestock has also significantly decreased. Usage of fluoroquinolones in veal calves, broilers, and to a lesser degree in cattle as well, still requires attention.

6. In 2012, the sales of antibiotics for therapeutic usage in animals have once again declined substantially. The objective of 50% reduction of antibiotic use on average in 2013, compared to 2009, as defined by the government for livestock farming, was already achieved in 2012.

This decline in sales is consistent with the decrease in usage observed on Dutch livestock farms by the SDa.

7. According to the available data, in 2012 five per cent more antibiotics were used on Dutch livestock farms than would appear to have been sold on the basis of the figures reported by the Dutch Organization for Producers and Importers of Veterinary Medicines (FIDIN). A sound explanation for this is lacking and this is the subject of further investigations.

Recommendations

The SDa makes the following recommendations on the basis of this report:

1. The SDa recommends a differentiated approach for livestock farms with different levels of usage. This means that livestock with already a relatively low level of usage require less further reduction. Measures must primarily be focused on the structurally high users. The animal production sectors have initiated improvement measures to improve health status and reduce antibiotic usage on farms in the action level. The SDa calls on the animal production sectors to make additional efforts and if necessary, to refine the improvement initiatives, should the desired effects of these initiatives not become visible over the course of 2013.

2. The SDa is currently working on a system for benchmarking veterinarians. Although the SDa at this point in time is not yet able to establish adequate benchmark indicators for veterinarians, the SDa is calling on veterinarians to critically review their own prescription behaviour and to focus attention on this in fraternal discussion forums.

3. Because the sales figures do not provide sufficient detail at the animal and farm type level, monitoring of the usage of antibiotics must continue to be linked to reports on the sale of antibiotics. This is the only way in which the policy, focused on a reduction in usage and the restrictive usage of second and third choice agents, can be adhered to at a sufficient level of detail. Further investigation into the discrepancy between the quantities of animal antibiotics sold and used is a priority.

4. Proper quality control of the data is essential in order to be able to guarantee the completeness, timeliness and accuracy of the data contained in the report. The SDa

recommends all parties involved to meticulously develop protocols for all control measures incorporated into the process steps, and to verify these measures.

2. Introduction

In June 2012, the SDa Expert Panel issued the first report concerning the usage of antibiotics on Dutch livestock farms on the basis of data supplied by the animal production sectors. That report also contained animal and farm type specific benchmark indicators. This was followed by a report in February 2013 concerning the usage of antibiotics that are of critical importance for public health: the fluoroquinolones and the 3rd and 4th generation cephalosporins.
The current report describes the trends in usage of antibiotics on livestock farms. The report for the first time also describes the relationship between the sales figures of animal antibiotics and their usage on farms.

The SDa in 2013 received the 2012 sales figures for all antibiotics used in animals from the Dutch Organization for Producers and Importers of Veterinary Medicines (FIDIN). In addition, in 2012, the veal calf, pig, poultry and cattle sectors collected antibiotics usage data for a total of 42,157 Dutch livestock farms. The data concerning the antibiotics supplied to these farms were entered by veterinarians into practice management systems, internet portals or VetCIS, and transmitted to sectoral databases. Data concerning the supply of antibiotics were linked to the average number of animals on farms in these databases. These data were supplied to the SDa in accordance with an agreed upon format. The SDa then calculated the Animal Defined Daily Dosages (ADDD/Y's) per farm per year, class of antibiotics and route of administration.

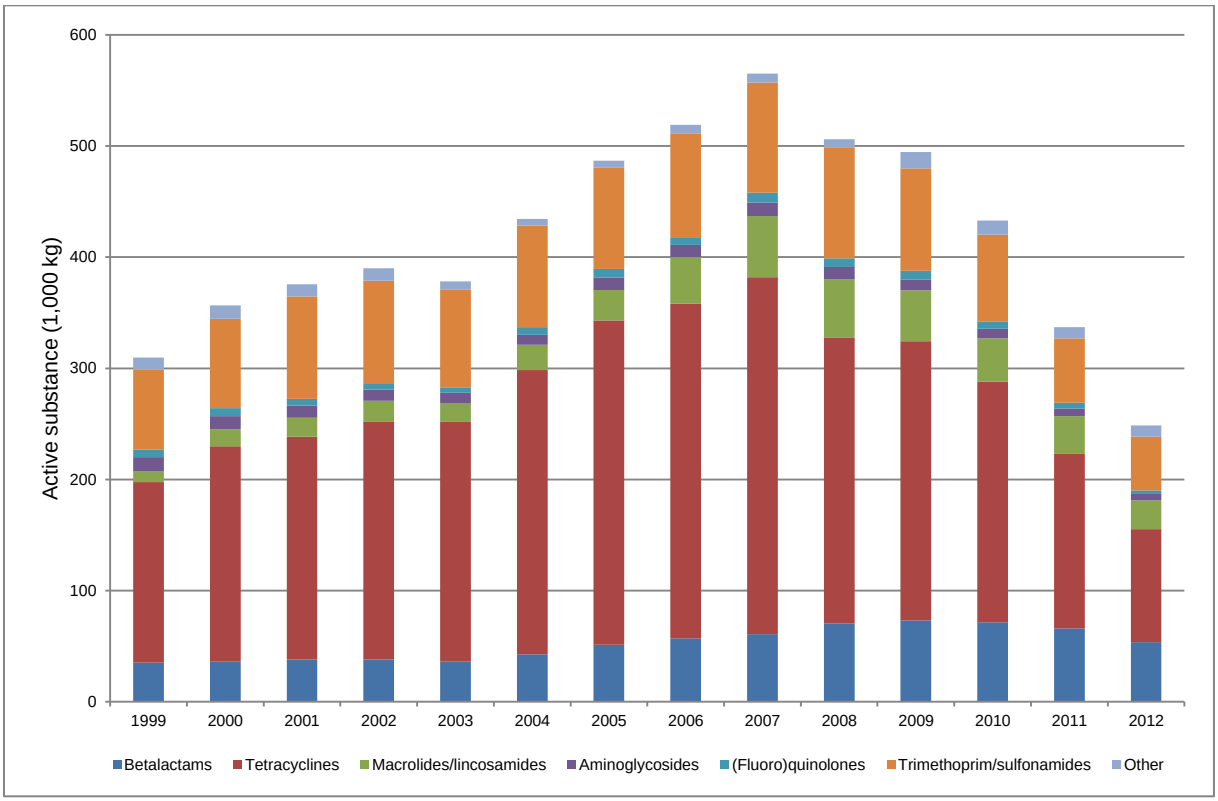
This report describes the sales data, as well as the daily dosage for the usage of antibiotics in 2012, and for the first time, show the usage trends in comparison to 2011. Furthermore, the report includes a comparison of the quantities of antibiotics sold to veterinarians and those that were used on farms. This report first describes the sales figures and then the defined daily dosage per animal by type of animal, farm and class of antibiotics. The usage of first, second and third choice agents is presented by animal and farm type. Furthermore, the report identifies the benchmark indicators for 2013. The appendices contain all of the technical details on which the conclusions of this report are based.

3. Sales of antibiotics for use in animals

General

In 2013, the SDa received the 2011 and 2012 sales figures for all antibiotics licenced for use in animals from the Dutch Organization for Producers and Importers of Veterinary Medicine (FIDIN). These data were supplied in accordance with the format developed by the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) working group of the European Medicines Agency (EMA) in London.

Figure 1. Sales figures for antibiotics licenced for therapeutic use in animals (kg x 1,000) in the Netherlands from 1999 up to and including 2012 (source: FIDIN).



Sales of antibiotics for use in animals declined sharply since 2007. The decrease amounts to 56% in five years; from 565 tonnes in 2007 to 249 tonnes in 2012 (Figure 1, Table 3). The percentage decrease in sales in 2012 compared to 2011 is 26% and the percentage decrease compared to 2009 (the index year set by the government) is almost 50%. The decrease in 2012 relative to 2011 is primarily caused by the drop in the usage of tetracyclines (55 tonnes; 61% of the total reduction). Sales of oxytetracycline as well as that of doxycycline decreased. However, the share of doxycycline has doubled from 20% of all tetracyclines in 2006 to 40% in 2012. An effective doxycycline dosage is lower in comparison

to a dosage for tetracyclines; approximately by a factor of 2-3. Thus, more animals can be treated with equal quantities of doxycycline. This means that a decrease in the sales of tetracyclines not automatically results in a similar reduction in the exposure of animals to which these antibiotics are administered.

The demographic data show that the number of animals per year, as determined by Statistics Netherlands (CBS), does vary somewhat, but that the number of kilogrammes of live weight produced each year is more or less stable (Tables 4, 5). This means that the decline in sales must be interpreted as an actual decrease in the exposure of animals to antibiotics.

Antimicrobial agents of critical importance for public health

Sales in 2012 of antibiotics that are critically important for public health, including fluoroquinolones (809 kg) and 3rd and 4th generation cephalosporins (56 kg), represented 0.35% of total sales. In 2012, the sales of these agents decreased by 45% and 94%, respectively, in comparison to 2011. The sales of macrolides decreased by 21% in relation to 2011.

4. Usage of antibiotics (ADDD/Y) in 2012 and benchmark indicators for 2013

Table 1 displays the antibiotics usage data for 2011 and 2012 as calculated by the SDa. The differences in the animal defined daily dosage/year (ADDD/Y) among animal and farm types in Table 1 are partly explained by differences in the degree of antibiotics usage. Also, the difference in age and weight of the average animal, which determines the denominator in the calculation of the ADDD/Ys affects these differences. This means that the ADDD/Y figure for each animal and farm type must be assessed separately. A quantitative comparison of animal and farm types is therefore difficult and must be interpreted with due care.
In 2012, the average usage of antibiotics (ADDD/Y) on livestock farms has decreased. However, the degree to which this has happened differs per animal species and farm type (Table 1). The variation among livestock farms above the action level has decreased somewhat. However, with the exception of the broiler production sector, the variation in total usage is still comparable to that of 2011. This means that the share of farms at the action level is more or less stable. On rosé veal fattening farms there was a limited increase in the number of daily dosages. The fact that the percentage decrease in the usage in ADDD/Y compared to 2011 (10 – 17%) does not correspond on a one-to-one basis with the

decreased sales in kilogrammes of antibiotics (26%) is in part due to the different calculation methods and units of measurement used, and to the skewed distribution of usage data across farms.

In the veal calf sector, the length of the fattening cycle has a high impact on the reported animal defined daily dosages of an individual farm. This in particular is a factor for white veal calves for which the number of fattening cycles from year to year varies from 1 to 2 (average of 1.5). Most of the infections occur during the starter phase, which means that usage of antibiotics during this period is highest. If there are two starter phases in a year, more antibiotics will then be used than on a farm with two fattening phases per year. To account for this, the SDa, in close collaboration with the veal calf sector, will investigate the possibility of developing a benchmark for each fattening cycle. Furthermore, this phenomenon averages out at the sector level and does not affect the reported sector trends.

Table 1. The average, median, 75th percentile (P75) and spread in usage of antibiotics in 2011 and 2012 for veal calves, pigs, broilers and cattle (only 2012) and the percentage decrease in average usage in 2012.

Animal Type	Farm Type	Number of Farms (N)		Average (ADDD/Y)		Median (ADDD/Y)		P75 (ADDD/Y)		% Decrease in Average Usage
		2011	2012	2011	2012	2011	2012	2011	2012	2012
Veal calves	White veal	934	904	35.6	29.6	28.6	27.2	38.9	34.8	-17%
	Rosé starter	207	189	105.4	90.7	83.2	78.9	110	99.7	-14%
	Rosé fattening	671	717	5.2	5.6	1.2	2.2	6.0	7.2	+8%
	Rosé combination	313	365	29.9	20.4	15.7	12.4	26.2	22.2	N/A
Pigs	Sows and piglets	2,528	2,338	17.6	14.6	9.8	9.5	21.6	20.0	-17%
	Fattening pigs	5,531	4,628	10.2	9.2	3.6	4.6	11.5	11.1	-10%
Poultry	Broilers	732	762	23.8*	19.9*	20.9*	17.1*	34.1*	29.8*	-16%
Cattle	Dairy cattle	#	18,053	#	2.9	#	2.7	#	3.7	N/A
	Suckler cows	#	11,927	#	0.8	#	0	#	0.6	N/A
	Rearing cattle/ beef bulls	#	2,274	#	1.1	#	0	#	0.02	N/A

The cattle sector began collecting antibiotics usage data in 2012.

* Presented as treatment days/year.

The cattle sector began to record its usage of antibiotics in 2012. During the start-up phase in the initial months of 2012, the registration of antibiotics usage data was not yet complete. This was much improved over the course of 2012, but did affect the completeness of the data for the full year in 2012. For comparison, the SDa has requested a number of veterinarian practices that had been recording usage on dairy cattle farms for several years,

to provide their data for 2012. In addition, the SDa has included the figures of the Agricultural Economics Research Institute (LEI) for the first half of 2012 in the analysis. In total, this represented more than 2,000 dairy cattle farms. Furthermore, the SDa separately calculated the usage on all cattle farms for the second half of 2012, assuming that the start-up problems had been largely resolved by then. The consistency among the various data sources (specific farm samples and LEI data) was so high, and the differences between the first and second half of 2012 so minor, that the reported data is considered representative. This implies that benchmark indicators could be determined on the basis of these data.

Based on its analyses, the SDa has set the target value for dairy cattle farms at 3 ADDD/Y (Table 2). The action value will be set at 6 ADDD/Y. This is a considerable reduction in comparison to the action value set in July 2011 (11.5 ADDD/Y). The action values for dairy cattle are based on the P90 value of the antibiotic usage data over 2012. The reason that the P75 value was not chosen for dairy cattle farms is that the average usage is low and that especially the spread in usage between farms is much smaller than for other animal and farm types. For non-milk supplying farms, the SDa was only able to differentiate farms with nurse cows on the basis of the data supplied. Benchmark indicators have been established for this farm type. For beef bulls and rearing cattle farms, it was not yet possible to make a distinction, and indicative benchmark indicators were included that, if necessary, will be adjusted on the basis of new information in 2013 or 2014.

For the other animal species, the SDa considers it too early to adjust the 2012 action values. To adjust the benchmark for calves and pigs is considered inopportune. The percentage of farms at the action level has not significantly changed. By contrast, this percentage for broiler farms has decreased considerably. The SDa will reassess these action values in 2014.

Currently, the approach of the SDa and the involved private parties is focused on farms that in terms of usage of antibiotics are above the target level, with farms in the action level having the highest priority. The fact that the SDa now has access to figures for 2011 and 2012, makes it possible to better identify high users. This especially concerns farms that were at the action level in 2011 as well as in 2012 (Tables 25 - 28). For veal calves, antibiotics usage is at the action level for 161 farms in 2011, as well as in 2012. This represents 10% of all veal calf farms. There are 331 such farms (15%) with sows and piglets, 524 fattening pig farms (12%) and 63 broiler farms (9%). These are farms that require

additional attention and where every effort must be made in the upcoming year to achieve a reduction in the usage of antibiotics.

Table 2. Quantitative benchmark indicators for antibiotics usage (ADDD/Y) in broilers, sows/piglets, fattening pigs, cattle and veal calves for 2013. Green means 'no immediate action required'; orange means 'high usage, requires additional attention'; and red means 'immediate action required'.

	Benchmark Indicators for Individual Farms (AADDD/Y)		
Animal Type	**Target Level 2012 - 2015**	**Signaling Level 2013**	**Action Level 2013**
Cattle			
- Dairy cattle	**0 - 3 (4#)**	**> 3 - 6 (> 4 - 7#)**	**> 6 (7#)**
- Suckler cows	**0 - 1**	**> 1 - 2**	**> 2**
- Beef bulls	**0 - 1$**	**> 1 - 2$**	**> 2$**
- Rearing cattle	**0 - 1$**	**> 1 - 2$**	**> 2$**
Veal calves			
- White veal calves	**0 - 23**	**> 23 - 39**	**> 39**
- Rosé starter	**0 - 67**	**> 67 - 110**	**> 110**
- Rosé fattening	**0 - 1**	**> 1 - 6**	**> 6**
- Rosé combination	**0 – 12**	**> 12 - 22**	**> 22**
Pigs			
- Sows and piglets	**0 - 10**	**> 10 - 22**	**> 22**
- Fattening pigs	**0 - 10**	**> 10 - 13**	**> 13**
Broilers			
- ADDD/Y	**0 - 15**	**> 15 - 30**	**> 30**
- Treatment days*	***0 - 17****	***> 17 - 34****	***> 34****

The figure between parentheses is the value determined on the basis of the 'LEI' methodology.[1]

* Expressed as the number of treatment days per year.

$ Indicative values; will be adjusted in the autumn of 2013 or 2014 as necessary.

Nevertheless, the data show that for the most part favourable shifts have occurred in 2012 in relation to 2011.

Most animal sectors started recording usage data at all farms in 2011. Because the registration of these data is very complex, and involves many individual parties, start-up problems were unavoidable. This can concern erroneous registrations in practice

[1]See Chapter 5 for the comparison of the SDa and LEI methodologies.

management systems and omissions in calculation tables and sectoral databases. To check the quality of the input of the data flows, the SDa as of 2010 has asked KPMG consultancy to carry out various projects. In addition, SDa has formulated agreements with the animal sectors concerning the quality assurance of data by the sectors themselves as part of the quality systems, such as the Integrated Lifecycle Management (IKB) system. The SDa is under the impression that the 2012 data is of better quality, provides a higher degree of coverage and contains fewer unexplained outliers than the 2011 data. This improvement naturally also affects the observed trends. At the same it is clear that feedback to the individual farms is a priority for the sectors and that monitoring of changes in the population of farms requires improvement. Changes in the sector, such as new affiliations and farm closures, and checks to ensure the consistency of data of farms with negative usage (potentially due to credit entries), extreme usage or zero usage, still leave something to be desired and warrants improvement. The influence of this category of farms on the sectoral trends is however limited and is not enough to explain the data patterns observed by the SDa. Far fewer start-up problems were observed in the broiler sector, because this sector has been collecting antibiotic usage data for a longer period of time in close collaboration with the involved veterinarians and the Animal Health Service.

The number of farms that were the subject of reporting between 2011 and 2012 differed per animal sector. In some instances there was an increase (broilers) and in others there was a substantial decrease (for example among pig farms). This can be expected to be the reflection of an increase in the number of farms per sector that are the subject of reporting on the one hand (the degree of coverage) and the termination of farming operations by livestock farmers in 2012 on the other hand (especially pig farms). In 2013, the SDa will ask all animal sectors to account for the number of farms for which data is being supplied, so that greater certainty can be obtained concerning the completeness of the databases and the trends in the farm-related files. During 2012 the SDa has asked the animal sectors to indicate whether for the farms for which a zero ADDD/Y was calculated this indeed meant that no antibiotics had been prescribed. This has been confirmed for the broiler, veal calf and part of the pig farms.

Comparison of the calculated usage data and the FIDIN sales figures

Based on the quantities of active ingredient in all of the antibiotics supplied to farms, the SDa has calculated that on the livestock farms covered by this reporting, 262 tonnes of antibiotics were used. This exceeds the figure reported by FIDIN by 13 tonnes. Because a number of animal types and sub-sectors is missing from this SDa report, it can be presumed that the

total usage in kilogrammes in all animals deviates to an even greater extent. To explain this difference, the SDa is not excluding the possibility of a limited degree of over-reporting of ADDDs due to errors in recording the deliveries of antibiotics. Another possible cause of this difference could be that the build-up of stocks by farms is affecting the quantities being sold each year. The FIDIN has indicated that the registration of antibiotic sales figures for animals has a virtually complete national coverage (estimated to be 98%). The missing 2% also contributes to explaining the difference with the antibiotics supplied to farms.
The current system for registering usage data on livestock farms, which is what this report is largely about, is still in its infancy. However, the fact that this system is registering more kilogrammes of antibiotics than the sales figures supplied by producers in the Netherlands, for the time being does not provide any indication that there is a substantial level of under-reporting.

Appendix 1 Detailed Description of Antibiotic Usage Data by Source

1. Sales Figures

The sales figures have been supplied by FIDIN in support of the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) working group, which monitors veterinary antibiotic usage at the European level. ESVAC asks member states to supply the sales figures for separate active ingredients and consequently separates combination preparations. The same classification based on the ATC-vet coding as that used for reporting the animal defined daily dosages has been used for this SDa report, and therefore includes a separate group with combinations of multiple antibiotics. Furthermore, the SDa has added medicines that can be locally applied (e.g. sprays) and represent slightly less than 2,000 kg (primarily tetracyclines). This last group has not been included in the ESVAC reporting.

The observed decrease in quantity is primarily attributable to a sharp reduction of 28.7% in sales of agents for oral medications (Fig. 3). This primarily concerns tetracyclines, trimethoprim/sulphonamides, macrolides and penicillins. Individual treatments by injection decreased by 9.1%. This reduction in sales has resulted in a decrease in the average usage of ADDD/Y from 10 - 17% in the pig, veal calf and broiler sectors.
The reduction in oral treatments of flocks/herds and the increased focus on individual and potentially on partial flock/herd treatments is one of the cornerstones of the current veterinary antibiotic usage policy. This policy leads to clear changes in usage in actual practice. However, antibiotics registered for oral medication still represent 86.4% of the total mass. In 2012 this was 88.8%. Thirty per cent (280 kg) of fluoroquinolones is prescribed as oral medication.

Based on the underlying antibiotic data supplied in support of the reported ADDD/Ys, it is possible to accurately calculate the number of kilogrammes of active ingredient used and compare it with the sales figures. For the time being, the SDa has limited the analysis to the total quantity of agents supplied to farms. In total, the antibiotics which have been supplied to livestock farms in 2012 and are the subject of reporting in this report, comprise 262 tonnes of active ingredient (105% of sales). A limited portion of this is not reported by FIDIN because the relevant suppliers are not members of FIDIN’s antibiotics working group and therefore do not contribute to the annual antibiotics reporting. Furthermore, the use up from previously built up stocks in 2012 by wholesalers and veterinarian practices could be a reason for the lower sales by the pharmaceutical industry than the actual usage on farms.

On the other hand, the sales figures also include antibiotics used for horses and pets, which do not form part of the usage data calculated by the SDa. In addition, the registration of antibiotic usage data for the first half of 2012 was not yet complete for the cattle sector and a number of animal types and sub-sectors is missing from the SDa reporting. This concerns turkeys, laying hens, rabbits and small ruminants that contribute to the total usage. To explain this difference, the SDa is not excluding the possibility of a limited degree of over-reporting of ADDDs due to errors in recording the deliveries of antibiotics. The observed difference between sales and usage necessitates further investigation to determine the explanation.

2. Usage of antibiotics by animal sector

2.1 Transfer of the sectoral databases

Most animal sectors started recording antibiotic usage data on all farms in 2011. At the time this was the SDa's first experience with data transfers and analysis. Based on this experience, the SDa developed Standard Operating Procedures (SOPs) for the transfer and analysis of data. These SOPs are under continued development on the basis of the most recent experience. They are adapted by the Expert Panel and communicated to the sectors.

2.2 Veal Calves

In 2013, the SDa, in consultation with the veal calf sector, agreed to make a distinction between four farm types as follows: white veal farms, rosé veal starter farms, rosé veal fattening farms and rosé combination farms.
Because this agreement includes a new farm type (rosé combination farms), a significant number of farms in 2012 falls within a different farm type than in 2011. The consequence is that the number of farms per farm type per year fluctuated and this has made comparisons with 2011 more difficult.
Of all 1,642 calf farms, 27% shifted to a lower usage level (for example, from red to orange or green) and 25% shifted to a higher usage level (for example, from green to red) (Table 25). Part of the possible explanation for this is that white veal farms each year comprise a one and a half fattening cycle. This means that years with two starter cycles have a higher probability of a higher ADDD/Y than years with two fattening cycles. Younger animals generally are exposed to the highest risk of infections, and are therefore administered the

highest levels of antibiotics during this time. The explanation in part can also be that on veal calf farms, where each animal's origin is different and the susceptibility to infectious diseases is high, it is very difficult to keep the animals healthy without preventive usage of antibiotics. The veal calf sector will have to focus a great deal of attention on opportunities for further reductions in usage and for improved health management on these farms.

2.3 White Veal Fattening farms

In 2012, on average 17% fewer antibiotics were used on white veal farms than in 2011. This decrease primarily involved tetracyclines and polymyxins (Fig. 5). Tetracyclines continued to be the most often used class of antibiotics in 2012. The average usage of polymyxins declined by 71% in 2012 in relation to 2011. A comparable decrease also applied to the fluoroquinolones and the 3rd and 4th generation cephalosporins. The 3rd and 4th generation cephalosporins were only still being applied on 30 of the 904 farms (3%) (Fig. 6, Table 7). Fluoroquinolones were used on 76% of the white veal farms. This represents a considerable decrease in relation to 2011 (92%) (Fig. 7, Table 7).
Figures 8 and 9 show that first choice agents were primarily used in 2012 and that in all three usage categories there was a decrease. No antibiotics were used on 24 (2.7%) of the 904 white veal farms in 2012. According to the data submitted by the sector, no antibiotics were supplied to these farms in 2012. Most likely these were farms with a herd of fattening animals that started in 2011, without the addition of new animals in 2012. In general, fewer or no antibiotics are commonly being used in the last phase of a fattening period.

2.4 Rosé Veal Starter Farms

In 2012, 14% fewer antibiotics were used on rosé starter farms than in 2011. This decrease primarily involved tetracyclines, trimethoprim/sulphonamides and polymyxins. The decrease for the last group was more than 50% (Fig. 10). The average (90.7 ADDD/Y), as well as the median usage (78.9 ADDD/Y), was well above the threshold value of the target level. Furthermore, the spread in usage among farms had not significantly decreased compared to 2011. This suggests that for this farm type it is not easy to prevent infectious diseases with sound health management and infection control.

The usage of third choice agents represented only a fraction of the total usage (Fig. 12) and primarily involved parenteral administration. Figure 12 also shows that the decrease in usage concerned first, as well as second and third choice agents. Third and fourth generation cephalosporins were used on only 3 of the 189 farms (1.6%), while fluoroquinolones were still used on 137 farms (74%). Usage on these farms varied from 0 – 5 ADDD/Y, which is significantly less than in 2011. For eight farms there were no records of delivery of antibiotics in 2012, according to the data submitted by the sector.

2.5 Rosé Veal Fattening Farms

An average increase in usage of 8% was registered for rosé fattening farms in 2012 (Table 1). In part, this could possibly be explained by the fact that new farms were added to this category in 2012. Furthermore, the level of the benchmark indicators established by the SDa in 2012 are significantly lower in comparison with other veal farm types (Table 2). This means that if there are new farms with a high usage of antibiotics this could affect the average usage and increase the number of farms at the action level. The health policy applied on these farms requires additional attention.

Although there was a decrease for many classes of antibiotics, this was not the case for macrolides administered by injection. Because often these are long-acting agents, this results in undesirable long-term exposure of animals and their bacterial flora to antibiotics. This may in part also explain the average increase in usage. The extended use of these agents, other than for individual use, is undesirable and is not in conformance with the recommendations contained in the formularies.

The usage of third choice agents is limited (Fig. 14). Only very incidental use was made of the 3rd and 4th generation cephalosporins on 8 of the 717 farms (1%). Fluoroquinolones were used somewhat more frequently on 132 of the 717 farms (18%). Usage on these farms varied from 0.01 – 1 ADDD/Y (Fig. 15, Table 11).

For 118 farms there were no records of delivery of antibiotics in 2012, according to the data submitted by the sector. Most likely these were farms with a herd of fattening animals that started in 2011, without the addition of new animals in 2012.

2.6 Rosé Combination Farms

The rosé combination farm type is a new category of veal farms created by the SDa in consultation with the veal calf sector. This category comprises rosé calves from the moment of start-up to the moment the calf is slaughtered. The average animal weight is relatively high, which affects the number of daily dosages. This involved 365 farms for which an average of 20.4 ADDD/Y was registered with 12.4 ADDD/Y as the median value. The spread in usage was very high, which was reflected in the size of the standard deviation (77.7 ADDD/Y) (Fig. 16, Table 12). The large spread can probably be explained by the variation in the proportion of starter and fattening calves on these farms. A higher proportion of starters results in a higher ADDD/Y as compared to when this proportion is relatively limited. The antibiotics were primarily administered orally (Fig. 17). The usage of third choice agents was relatively limited (Fig. 19, Table 13). Third and fourth generation cephalosporins were only administered by injection on 9 farms (2.5%). Fluoroquinolones were administered more frequently. Fluoroquinolones were administered by injection on 86 of the 365 farms (24%) and orally via the milk on 183 farms (50%).

Benchmark indicators will be established for 2013 for the first time for this farm type on the basis of the P50 and P75 values. The threshold values for the target level and the action level will be 12 ADDD/Y and 22 ADDD/Y, respectively. According to the data submitted by the sector, no antibiotics were supplied to 72 farms in 2012.

3. Pigs

The SDa in this report continues to make a distinction between two farm types for pigs, namely: farms with sows and piglets and farms with fattening pigs. Over the course of 2013, the SDa intends to calculate usage and establish benchmark indicators for farms that only wean piglets and for closed farms (sows and piglets, as well as fattening pigs on a single farm). This requires an adjustment to the establishment of the animal weights. This is planned for the autumn of 2013.

3.1 Sow and Piglet Farms

In 2012, on average 17% fewer antibiotics were used on farms with sows and piglets than in 2011 (Table 1). The total mass for this farm type decreased, but the spread in usage among farms largely stayed the same. This means that in 2012, antibiotic usage is above the threshold value for the action level for a similar number of farms as in 2011.
The observed decrease in usage concerns tetracyclines, as well as trimethoprim/sulphonamides, macrolides, penicillins and polymyxins (Fig. 21). These are first as well as second choice agents (Fig. 23).
Third choice agents were only incidentally administered (Fig. 23, Table 15).
Third and fourth generation cephalosporins were used on 17 of the 2,338 farms (0.7%).
Fluoroquinolones were administered orally on 14 of the 2,338 farms (0.5%) and via injection on 74 farms (3%). This is much less than in 2011.
The data submitted for 2012 indicated that 73 farms received no deliveries of antibiotics.

3.2 Pig Fattening Farms

In 2012, on average 8% fewer antibiotics were used on pig fattening farms than in 2011 (Table 1). The spread in usage for this farm type also largely remained the same as that in 2011 (Fig. 24). This means that for fattening pigs the number of farms at the action level also stayed approximately the same.
The decrease only concerned the oral administration of first choice tetracyclines. Usage stayed the same for the other classes of antibiotics (Fig. 25, Fig 27).
Third and fourth generation cephalosporins were used only incidentally by injection on 7 of the 4,628 farms (0.1%). Fluoroquinolones were administered incidentally be injection on 23 farms (0.5%).

No deliveries of antibiotics were registered for 443 farms in 2012.

4. Poultry

In this report, the SDa is limiting its reporting on poultry to broilers. Other farm types, such as turkeys and laying hens, are to follow in the autumn of 2013 or 2014.

4.1 Broiler Farms

In 2012, on average 16% fewer antibiotics were used on the 762 broiler farms than in 2011 (Table 1). In addition, the spread among farms decreased considerably, which is reflected in the considerably lower median and P75 usage values in 2012 (Fig. 28, Table 1). The number of farms at the action level in 2012 decreased substantially in comparison to 2011 (Fig. 29, Fig. 30). The view provided by these figures differs from the other animal sectors because the sector supplied the data in terms of treatment days per animal days per farm, which produces treatment days per average animal present per year. There is no differentiation in terms of groups of medicines. In addition, the broiler sector began registering the delivery of antibiotics for all farms from 1 January 2013 onwards, as a result of which these data for 2012 were not yet complete. The sector does collect the prescription lines per farm, however[2]. Nevertheless, to provide an impression of the different groups of medicines, the prescription lines for the entire sector were aggregated and grouped by medicine group and presented in terms of cumulative treatment days in the various tables and figures.
Between 2011 and 2012, a shift is observed from third choice (decrease from 10.1% to 7.6%) and second choice (decrease from 54.6% to 50.9%) antimicrobial agents to first choice agents (increase from 35.4% to 41.5%). The decrease therefore concerned the oral usage of second and third choice agents and all classes of antibiotics with the exception of polymyxins (second choice) and tetracyclines (first choice).
Third and fourth generation cephalosporins were not administered to broilers. The total number of treatment days of fluoroquinolones was high from a relative perspective and requires further attention. The frequent appearance of infections due to multi-resistant organisms is the reason why fluoroquinolones are more often administered to broilers than any other animal types.

[2] Prescription lines provide an indication of the number of days a certain antibiotic has been administered. Delivery lines are the numbers of packaging units of a certain antibiotic delivered on a certain date.

For 117 farms there were no records of antibiotic treatments in 2012, according to the data submitted by the sector.

5. Cattle

The registration of antibiotics usage in cattle started in 2012. Considering the large number of farms this is a very extensive operation. The registration of usage data was incomplete for the first six months of 2012, but this was largely corrected in the second half of 2012. The result is that the true usage over all of 2012 may have been under-reported. The SDa has estimated the degree to which usage in dairy cattle was under-reported by comparing the calculated data with that of the Farm Animal Practice (ULP), 11 core practices[3], which includes the data supplied over 2012 by a total of over 2,000 dairy cattle farms[4]. In addition, the SDa calculated the number of ADDD/Ys for dairy cattle for the second half of 2012, the period by which the start-up problems had been solved. For dairy cattle, the averages, as well as the median and P75 values, for these different populations were consistent. The SDa has based the establishment of the benchmark indicators on the median and P90 usage values over the second half of 2012.

The degree of coverage is not yet sufficient for beef cattle farms. Although this may not be desirable in itself, the highest priority for registering usage data for the SDa lies with the dairy cattle farms. The degree of coverage in this sector is very high. The SDa assumes that the number of beef cattle farms for which antibiotics usage is registered will further increase in 2013.

In the past, the antibiotics delivered to dairy cattle farms were attributed on the basis of the weight of the adult (dairy) cows present, at 600 kg/animal. At the end of 2012, the SDa, in consultation with the cattle sector, established weights by age category and gender that the SDa has used in its reporting for 2012. Since the application of these categories increases the total weight per farm, the result is that the ADDD/Ys automatically decrease. To provide transparency and also for comparison purposes, Table 2 also includes the ADDD/Ys calculated on the basis of the ‘old’ LEI methodology.

[3] The Kernpraktijken Rundvee is an association whose goal is to promote the knowledge and expertise of veterinary care in the area of cattle and organisation.
[4] With thanks to Dr. T. van Werven, ULP.

The strength of using all animal categories for establishing the total operating weight is that it enables the attribution of oral use to calves and the use of udder injectors and antibiotics for dry cow therapy to adult cows. These are separately reported (Table 19).

Because in 2012 it was still impossible to make a distinction in terms of the animals' gender in the database supplied by the cattle sector, the SDa reports on suckler cows and the combination of rearing cattle and beef bull farms within the non-milk supplying farms. The SDa has not yet established any definitive benchmark criteria for the above-referenced combination. In this report, and for establishing the benchmark indicators, no distinction is made for milk-supplying farms between farms with and without rearing cattle. The reason is that no systematic difference was detected in ADDD/Y, in spite of the fact that the average animal weight for farms without rearing cattle is lower.

5.1 Dairy Farms

The average antibiotic usage on 18,053 dairy farms was 2.9 ADDD/Y (3.8 ADDD/Y on the basis of the LEI methodology). The spread in the usage among farms was smaller than for other animal types (Fig. 31). This was reflected in a median usage (2.7 ADDD/Y) that was approximately the same as the average usage (2.9 ADDD/Y). The results indicate that usage in dairy cattle has declined in 2012 in comparison to 2011. LEI reported a usage of 6.1 ADDD/Y over 2011 (≈ 4.7 ADDD/Y using the SDa methodology).
On average the usage of antibiotics for dry cow therapy in 2012 was 1.8 ADDD/Y, as calculated for animals older than 2 years. This suggests a more selective use of antibiotics for dry cow therapy in 2012 than in 2011. Indeed, taking the herd-turnover and the time between calving into account, the number of daily dosages for antibiotics for dry cow therapy would approximately be 2.4 ADDD/Y if injectors were used to dry-off all animals. The average usage of mastitis injectors in adult cows was 0.8 ADDD/Y. The average usage of oral antibiotics for calves was 10.9 ADDD/Y. This means that on average on these farms 10.9 ADDD/Y of oral antibiotics are administered.[5] That is high and could be reduced given the closed operation of these farms.

[5] The composition of the group of calves kept on the farm changes over the year. Therefore not every single calf is exposed to this amount of antibiotics.

Dairy cattle distinguishes itself from other animal species in the sense that proportionately more second choice agents are used (Fig. 34). This is primarily due to the lack of first choice agents for treating mastitis and the limited availability of these agents as antibiotics for dry cow therapy.

Third and fourth generation cephalosporins were used on 1,920 farms as injectors for treating mastitis (10.6%). The usage of this class of antibiotics as a dry-off agent was limited to 46 farms (0.3%). Parenterally, these agents were incidentally used on 1,594 farms (8.8%) (Fig. 33, Table 20). The usage of fluoroquinolones concerned oral administration on 96 farms (0.5%) and especially administration by injection on 12,930 farms (72%). Although this concerned incidental usage for individual animals, the question remains whether such usage was always justified.
No deliveries of antibiotics were registered for 394 farms in 2012.

The SDa established the following benchmark indicators for 2012: 3 ADDD/Y (≈ 4 ADDD/Y using the LEI methodology) as the threshold value for the target level and 6 ADDD/Y (≈ 7 ADDD/Y using the LEI methodology) as the threshold value for the action level.

5.2 Suckler Cow Farms

The average antibiotic usage on 11,927 suckler cow farms was 1.0 ADDD/Y and the median usage was 0 ADDD/Y. The spread in usage among farms was determined by a few outliers with extremely high usage that were probably due to administrative errors (Fig. 35, Tables 1 and 21).
Figure 36 shows that in comparison with dairy farms far fewer udder injectors were used. Usage was primarily limited to incidental oral administration to calves and injections. This primarily involved first and second choice agents (Fig. 38).

Third and fourth generation cephalosporins were used on 74 farms as injectors for treating mastitis (0.6%). Only 3 farms made use of antibiotics for dry cow therapy. Parenterally, these agents were incidentally used on 67 farms (0.6%) (Fig. 37, Table 22). The usage of fluoroquinolones concerned oral administration on 29 farms (0.3%) and administration by injection on 337 farms (3%).
No deliveries of antibiotics were registered for 6,574 farms in 2012.

The SDa established 1 ADDD/Y as the threshold value for the target level and 2 ADDD/Y as the threshold value for the action level as the benchmark indicators for 2012.

5.3 Rearing Cattle and Beef Bull farms

As of yet, the SDa is unable to make a distinction between rearing cattle farms and beef bull farms in the supplied database. This is because, while it contains age categories, it does not include the animals' gender. Therefore, these farm types are still presented in combined form for 2012 in this report. The average antibiotic usage on 2,274 rearing cattle/bull farms was 2.4 ADDD/Y and the median usage was 0 ADDD/Y. The spread in usage among farms was high (Fig. 39, Tables 1 and 23).
Figure 40 shows that this usage is restricted to oral administration and injections. This primarily involved first and second choice agents (Fig. 42).

Third and fourth generation cephalosporins were used on a single farm as an injector. Parenterally, these agents were used on 16 farms (0.7%) (Fig. 41, Table 24). The usage of fluoroquinolones concerned oral administration on 65 farms (2.8%) and administration by injection on 210 farms (9%).
No deliveries of antibiotics were registered for 1,658 farms in 2012.

The SDa established 1 ADDD/Y as the threshold value for the target level and 2 ADDD/Y as the threshold value for the action level as the indicative benchmark indicators for 2012. These will be adjusted by farm type later in 2013 or in 2014 as necessary.

Appendix 2. Tables and Figures

1. FIDIN Sales Figures and Demographic Data for Numbers of Animals

Table 3. Sales figures for antibiotics for therapeutic usage in animals (kg x 1,000) from 1999 – 2012.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Penicillins/cephalosporins	35	36	38	38	36	43	51	57	61	70	73	71	66	54
Tetracyclines	162	194	200	214	216	256	292	301	321	257	251	217	157	102
Macrolides/lincosamides	10	15	17	19	17	23	28	42	55	52	46	39	34	26
Aminoglycosides	13	12	11	10	9	9	11	11	12	11	10	9	7	6
Fluoroquinolones	7	7	6	6	5	7	8	7	9	8	8	7	5	3
Trimethoprim/sulphonamides	72	80	92	92	88	91	91	93	99	100	92	78	58	48
Other	11	12	11	11	7	6	6	8	8	7	15	13	10	10
Total	310	356	376	390	378	434	487	519	565	506	495	433	338	249

Figure 2. Sales of antibiotics in 2011 and 2012 by class of antibiotics.

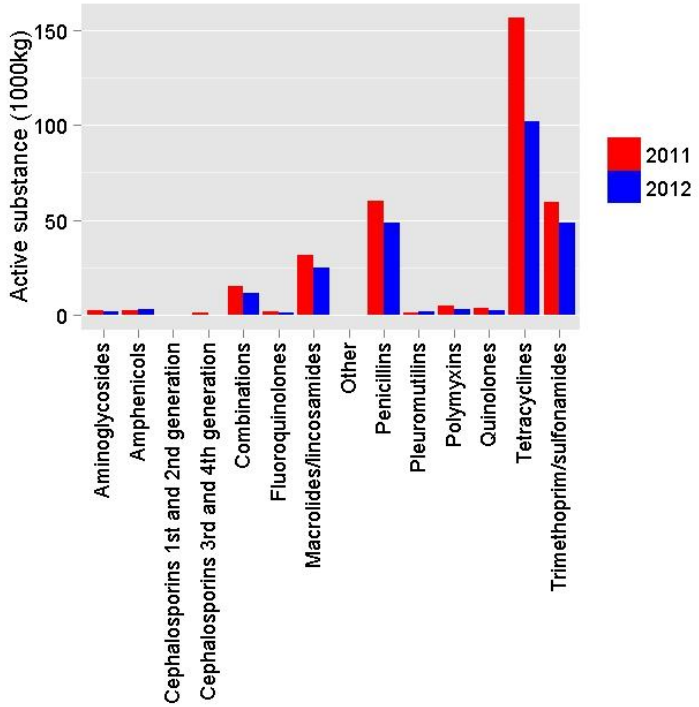


Figure 3. Sales of antibiotics in 2011 and 2012 by class of antibiotics, broken down by flock/herd and individual treatment.

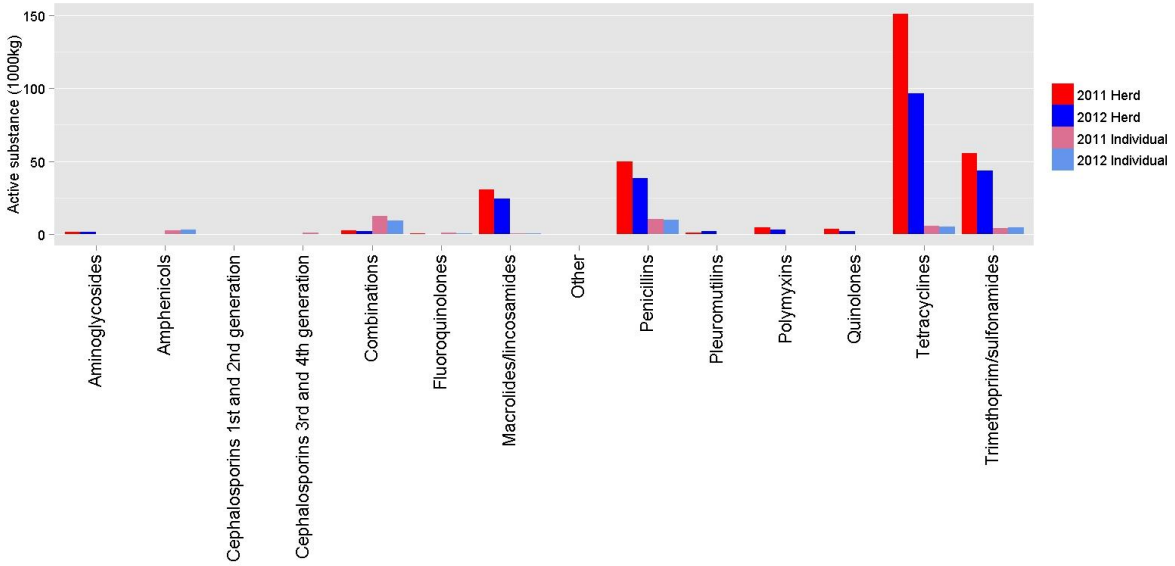


Table 4. Number of livestock (x 1,000) from 2002 – 2012 in the Netherlands on the basis of data supplied by Eurostat and Statistics Netherlands (CBS).[6]

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Piglets (< 20kg)	4,225	3,896	4,300	4,170	4,470	4,680	4,555	4,809	4,649	4,797	4,993
Pigs	1,140	1,052	1,125	1,100	1,050	1,060	1,025	1,100	1,098	1,106	1,081
Finishing pigs	3,913	3,934	3,850	3,830	4,040	4,010	4,105	4,099	4,419	4,179	4,189
Other pigs	1,876	1,883	1,865	1,900	1,660	1,960	2,050	2,100	2,040	2,021	1,841
Turkeys	1,451	1,112	1,238	1,245	1,140	1,232	1,044	1,060	1,036	990	827
Other poultry	102,200	80,120	86,776	94,220	93,195	94,479	98,184	98,706	102,585	98,253	96,268
Veal calves	692	748	775	813	824	860	913	886	921	919	940
Other cattle	3,088	2,986	2,984	2,933	2,849	2,960	3,083	3,112	3,039	2,993	3,045
Sheep	1,300	1,476	1,700	1,725	1,755	1,715	1,545	1,091	1,211	1,113	1,093
Total	119,885	97,208	104,614	111,936	110,983	112,956	116,505	116,963	120,998	116,371	114,227

[6] The data concerning the number of animals and the number of kilogrammes of live weight produced were supplied by Linda Puister of LEI Wageningen UR.

Table 5. Live weight (x 1,000 kg) of livestock in the Netherlands from 2002 – 2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Pigs	699,063	678,412	691,320	685,566	675,508	698,702	702,721	724,840	741,064	726,126	710,688
Poultry	110,904	86,792	94,207	101,692	100,034	101,873	104,450	105,064	108,803	104,195	101,229
Veal calves	119,301	129,024	133,610	140,161	142,058	148,264	157,401	152,746	158,780	158,436	162,056
Other cattle	1,544,000	1,493,150	1,492,000	1,466,500	1,424,500	1,480,000	1,541,500	1,556,000	1,519,500	1,496,500	1,522,500
Sheep	78,000	88,560	102,000	103,500	105,300	102,900	92,700	65,460	72,660	66,780	65,580
Total	2,551,267	2,475,938	2,513,137	2,497,419	2,447,400	2,531,739	2,598,772	2,604,111	2,600,807	2,552,036	2,562,053

2. Usage of antibiotics in ADDD/Y in veal calves

2.1 White Veal Calves

Number of farms: 904.

Number of farms with ADDD/Y = 0: 24.

Table 6. Usage of antibiotics on white veal calf farms.

N	Average	Median	P75	P90	Minimum	Maximum
904	29.6	27.2	34.8	43.6	-10.6	395.2

Figure 4. ADDD/Y frequency distribution for 904 white veal calf farms in 2012.

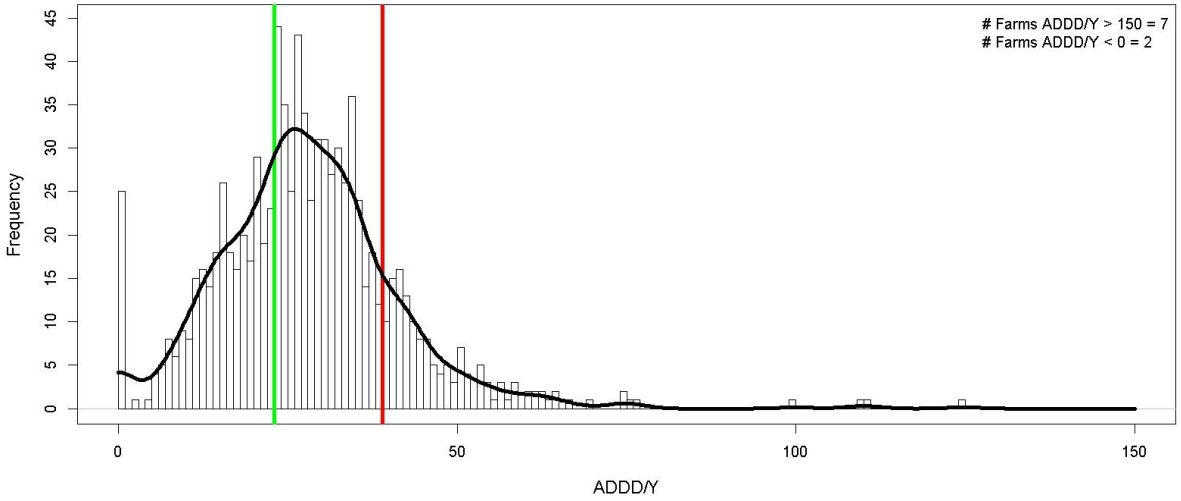


Figure 5. Average usage/white veal calf farm per ATC-vet group, broken down by route of administration (left) by class of antibiotics, and usage in 2011 and 2012 (right).

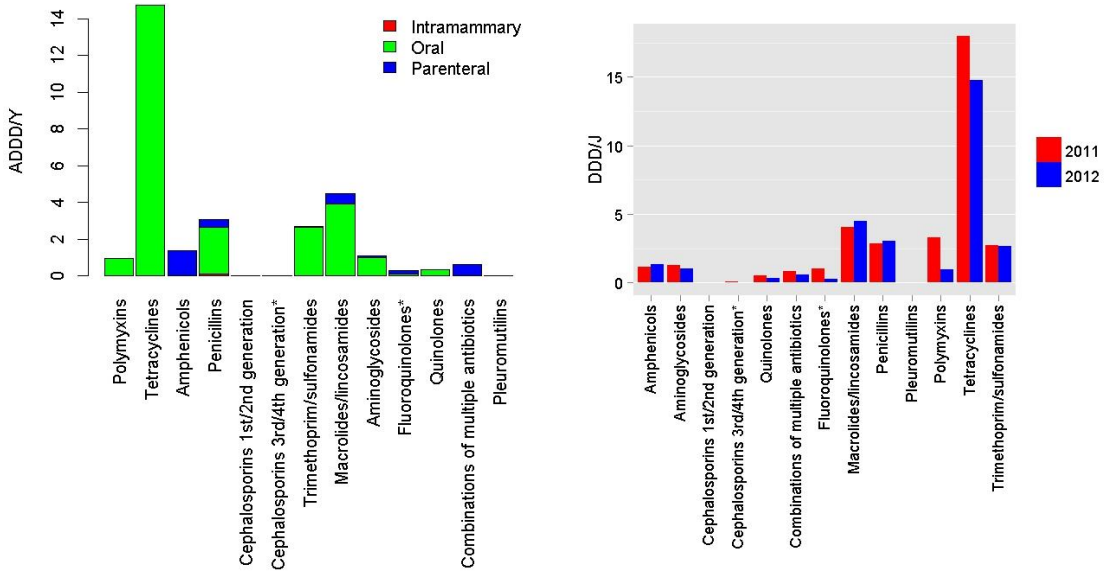


Figure 6. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on white veal calf farms in 2012.

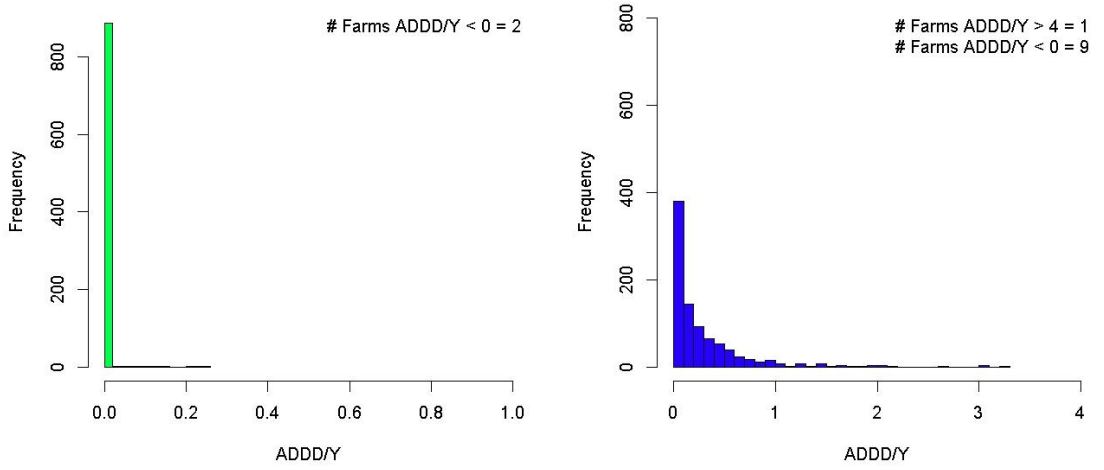


Figure 7. Usage by 1st, 2nd and 3rd choice agent by route of administration on white veal farms in 2012 (left) and for 2011 and 2012 (right).

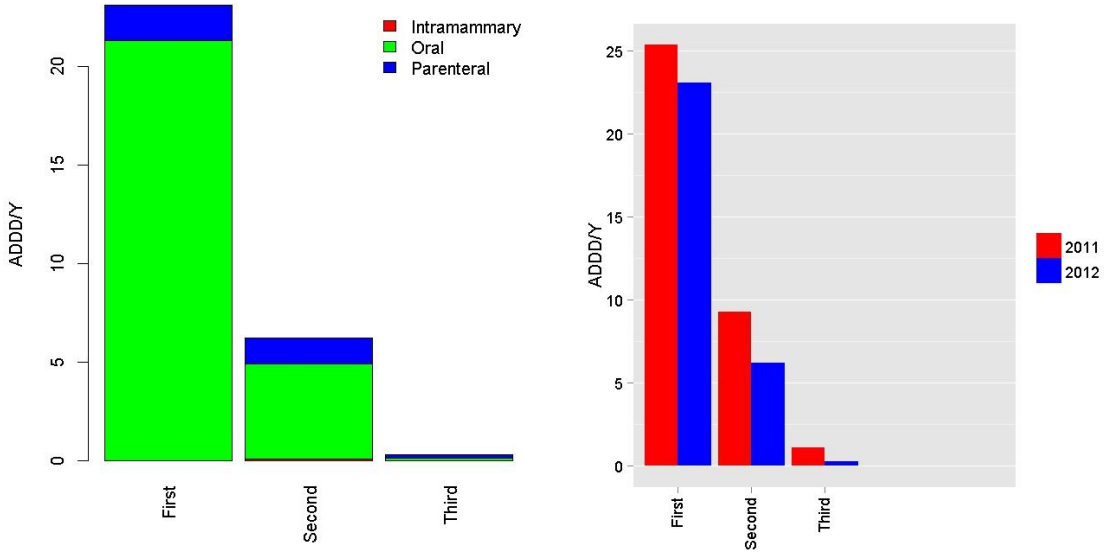


Table 7. Usage in ADDD/Y per ATC-vet group and by route of administration on 904 white veal farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y = 0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	904	0.00	0.00	0.00
Amphenicols	Oral	904	0.00	0.00	0.00
Amphenicols	Parenteral	47	1.05	1.62	1.35
Aminoglycosides	Intramammary	904	0.00	0.00	0.00
Aminoglycosides	Oral	632	0.00	1.22	1.00
Aminoglycosides	Parenteral	616	0.00	0.05	0.06
3rd and 4th generation cephalosporins	Intramammary	904	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	904	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	874	0.00	0.00	0.00
Quinolones	Intramammary	904	0.00	0.00	0.00
Quinolones	Oral	804	0.00	0.00	0.35
Quinolones	Parenteral	904	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	904	0.00	0.00	0.00
Combinations of multiple antibiotics	Oral	904	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	124	0.25	0.62	0.60
Fluoroquinolones	Intramammary	904	0.00	0.00	0.00
Fluoroquinolones	Oral	562	0.00	0.09	0.11
Fluoroquinolones	Parenteral	215	0.09	0.24	0.18
Macrolides/lincosamides	Intramammary	904	0.00	0.00	0.00
Macrolides/lincosamides	Oral	107	3.58	5.06	3.91
Macrolides/lincosamides	Parenteral	230	0.30	0.78	0.57
Penicillins	Intramammary	828	0.00	0.00	0.08
Penicillins	Oral	191	0.63	3.65	2.54
Penicillins	Parenteral	95	0.25	0.52	0.45
Polymyxins	Intramammary	904	0.00	0.00	0.00
Polymyxins	Oral	614	0.00	1.52	0.95
Polymyxins	Parenteral	904	0.00	0.00	0.00
Tetracyclines	Intramammary	904	0.00	0.00	0.00
Tetracyclines	Oral	36	12.79	18.56	14.75
Tetracyclines	Parenteral	845	0.00	0.00	0.01
Trimethoprim/sulphonamides	Intramammary	904	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	311	1.80	3.69	2.63
Trimethoprim/sulphonamides	Parenteral	400	0.02	0.08	0.07

2.2 Rosé Veal Starter Calves

Number of farms: 189

Number of farms with ADDD/Y = 0: 8

Table 8. Usage on rosé veal starter farms.

N	Average	Median	P75	P90	Minimum	Maximum
189	90.7	78.9	99.7	136.4	0	1,236.0

Figure 9. ADDD/Y frequency distribution for 189 rosé veal starter farms in 2012.

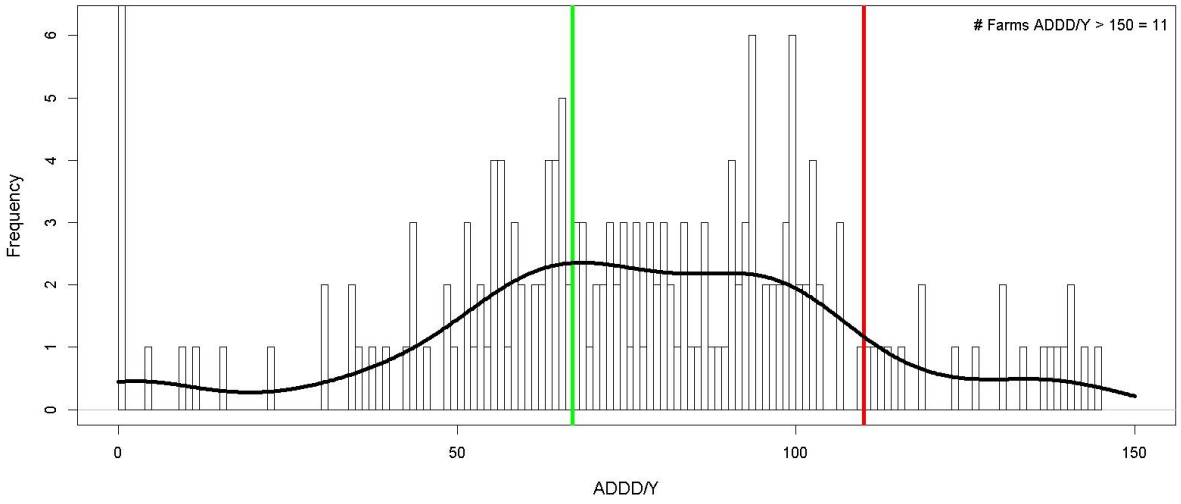


Figure 10. Average usage/rosé veal starter farm by ATC-vet group, broken down by route of administration (left) and by class of antibiotics in 2011 and 2012 (right).

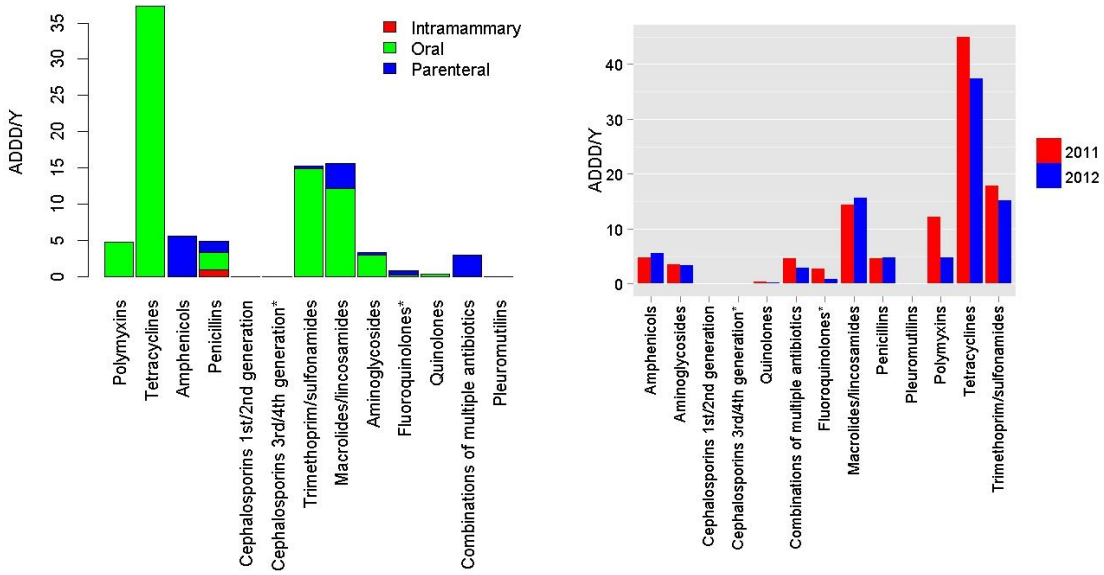


Figure 11. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on rosé veal starter farms in 2012.

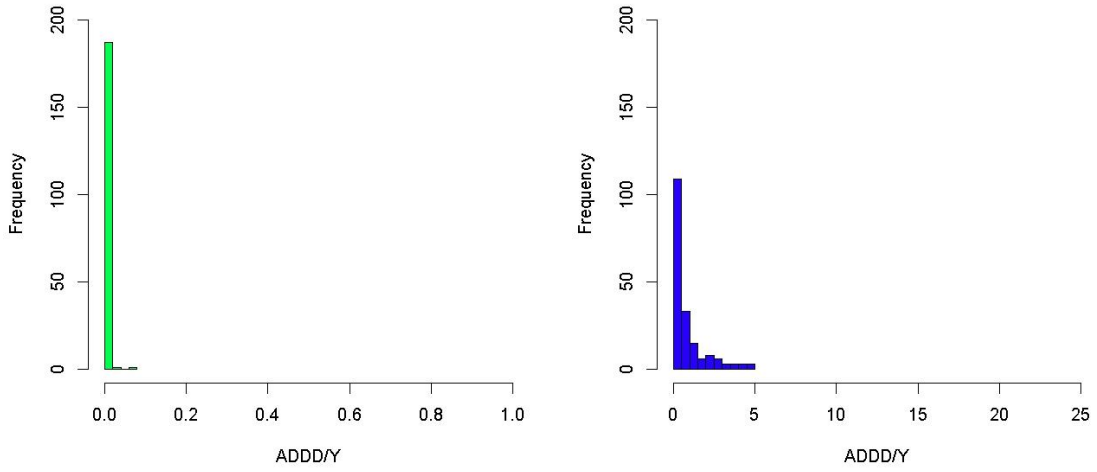


Figure 12. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 (left) and in 2011 and 2012 (right) on rosé veal starter farms.

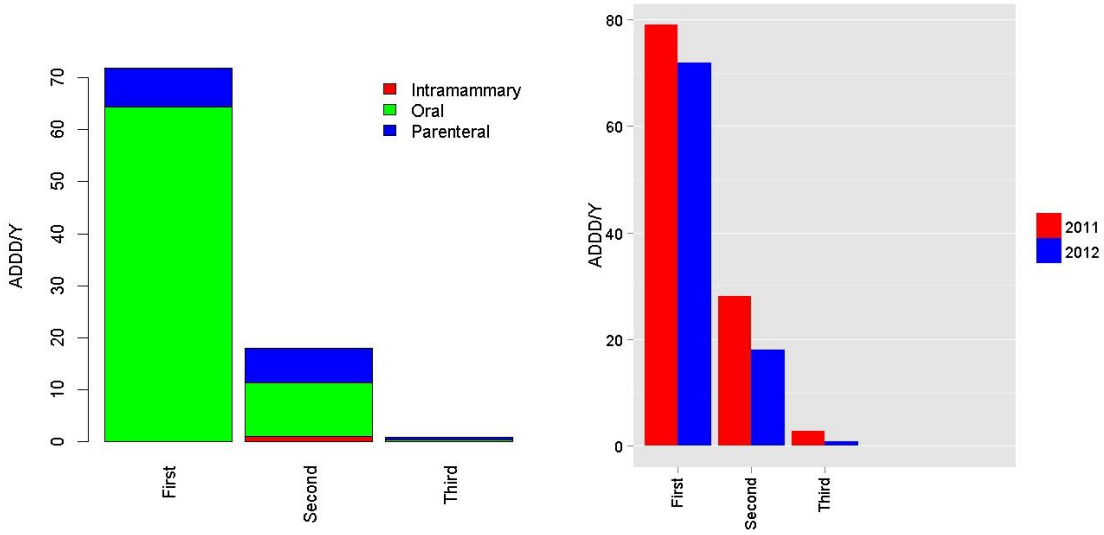


Table 9. Usage in ADDD/Y by ATC-vet group and by route of administration on rosé veal starter farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y = 0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	189	0.00	0.00	0.00
Amphenicols	Oral	189	0.00	0.00	0.00
Amphenicols	Parenteral	10	4.63	6.44	5.61
Aminoglycosides	Intramammary	189	0.00	0.00	0.00
Aminoglycosides	Oral	135	0.00	2.61	2.92
Aminoglycosides	Parenteral	112	0.00	0.40	0.40
3rd and 4th generation cephalosporins	Intramammary	189	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	189	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	186	0.00	0.00	0.00
Quinolones	Intramammary	189	0.00	0.00	0.00
Quinolones	Oral	175	0.00	0.00	0.30
Quinolones	Parenteral	189	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	189	0.00	0.00	0.00
Combinations of multiple antibiotics	Oral	189	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	26	1.33	3.26	2.98
Fluoroquinolones	Intramammary	189	0.00	0.00	0.00
Fluoroquinolones	Oral	130	0.00	0.19	0.25
Fluoroquinolones	Parenteral	52	0.20	0.62	0.55
Macrolides/lincosamides	Intramammary	189	0.00	0.00	0.00
Macrolides/lincosamides	Oral	32	11.60	17.37	12.20
Macrolides/lincosamides	Parenteral	51	1.12	3.49	3.39
Penicillins	Intramammary	158	0.00	0.00	0.99
Penicillins	Oral	85	0.43	2.91	2.40
Penicillins	Parenteral	29	0.80	1.85	1.46
Polymyxins	Intramammary	189	0.00	0.00	0.00
Polymyxins	Oral	105	0.00	4.80	4.73
Polymyxins	Parenteral	189	0.00	0.00	0.00
Tetracyclines	Intramammary	189	0.00	0.00	0.00
Tetracyclines	Oral	12	29.64	41.88	37.30
Tetracyclines	Parenteral	173	0.00	0.00	0.04
Trimethoprim/sulphonamides	Intramammary	189	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	32	10.75	17.95	14.92
Trimethoprim/sulphonamides	Parenteral	76	0.08	0.30	0.29

2.3 Rosé Veal Fattening Calves

Number of farms: 717

Number of farms with ADDD/Y = 0: 118

Table 10. Usage on rosé veal fattening farms.

N	Average	Median	P75	P90	Minimum	Maximum
717	5.6	2.2	7.2	14.7	-30.5	156.4

Figure 13. ADDD/Y frequency distribution for 717 rosé veal fattening farms in 2012.

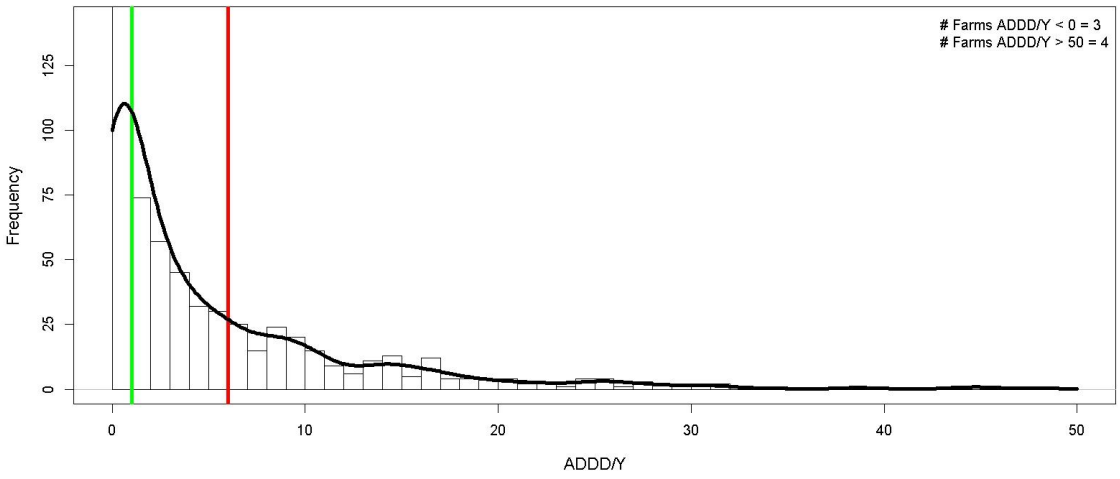


Figure 14. Average usage/rosé veal fattening farm by ATC-vet group, broken down by route of administration (left) by class of antibiotics, and usage in 2011 and 2012 (right).

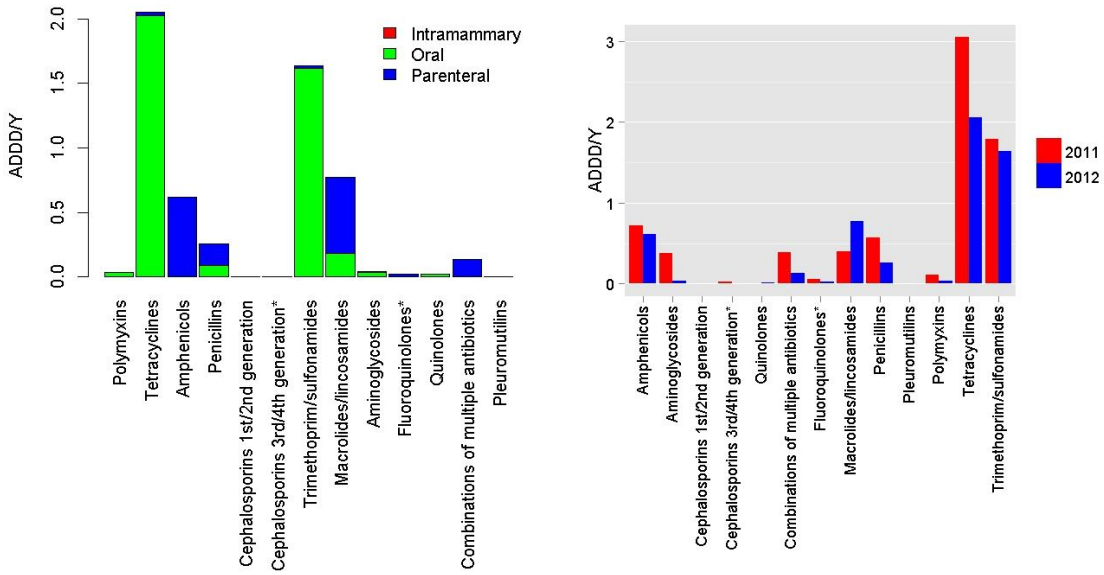


Figure 15. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on rosé veal fattening farms in 2012.

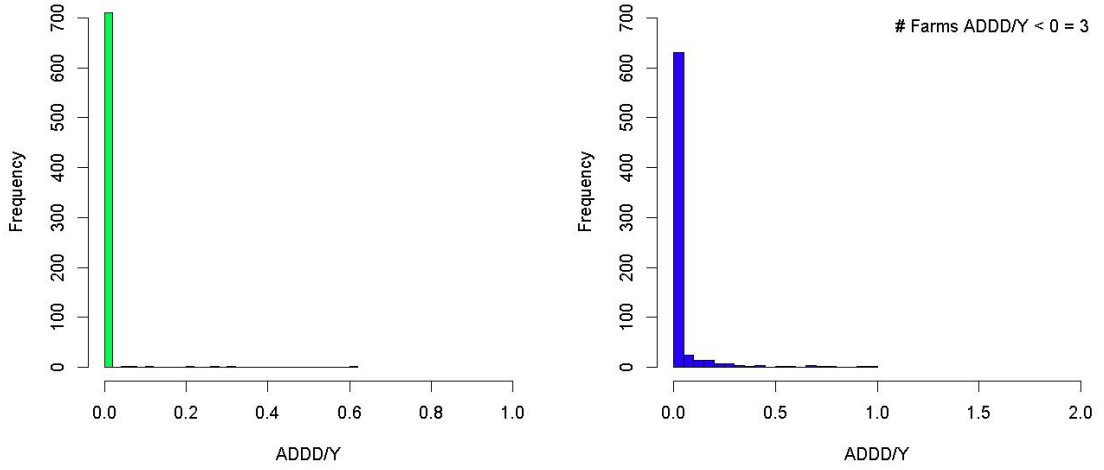


Figure 16. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 (left) and in 2011 and 2012 (right) on rosé veal fattening farms.

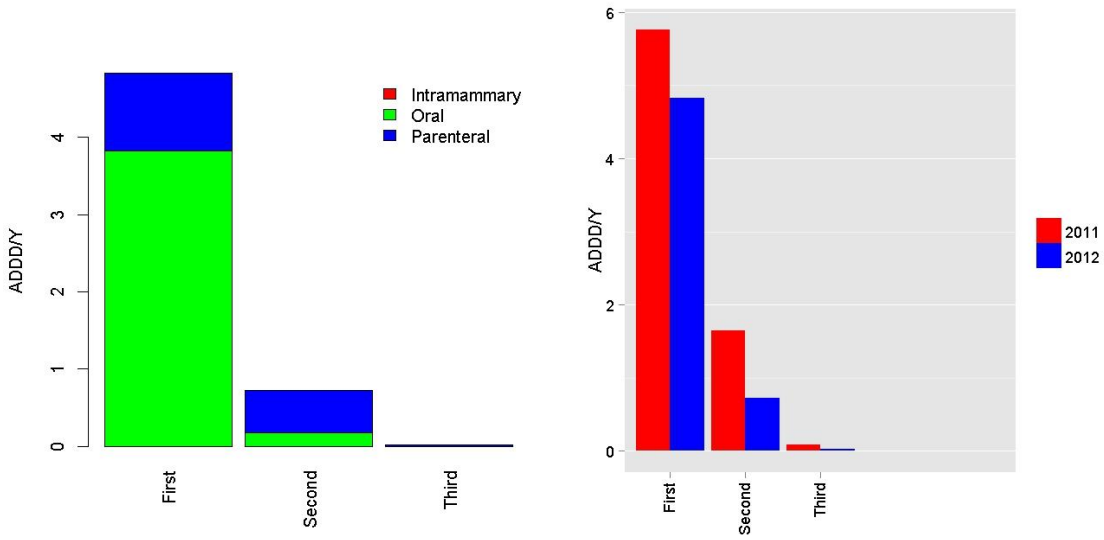


Table 11. Usage in ADDD/Y by ATC-vet group and by route of administration on rosé veal fattening farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y = 0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	717	0.00	0.00	0.00
Amphenicols	Oral	717	0.00	0.00	0.00
Amphenicols	Parenteral	188	0.33	0.72	0.61
Aminoglycosides	Intramammary	717	0.00	0.00	0.00
Aminoglycosides	Oral	707	0.00	0.00	0.04
Aminoglycosides	Parenteral	694	0.00	0.00	0.01
3rd and 4th generation cephalosporins	Intramammary	717	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	717	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	709	0.00	0.00	0.00
Quinolones	Intramammary	717	0.00	0.00	0.00
Quinolones	Oral	712	0.00	0.00	0.02
Quinolones	Parenteral	717	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	717	0.00	0.00	0.00
Combinations of multiple antibiotics	Oral	717	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	476	0.00	0.08	0.13
Fluoroquinolones	Intramammary	717	0.00	0.00	0.00
Fluoroquinolones	Oral	704	0.00	0.00	0.00
Fluoroquinolones	Parenteral	585	0.00	0.00	0.02
Macrolides/lincosamides	Intramammary	717	0.00	0.00	0.00
Macrolides/lincosamides	Oral	636	0.00	0.00	0.18
Macrolides/lincosamides	Parenteral	457	0.00	0.21	0.59
Penicillins	Intramammary	711	0.00	0.00	0.00
Penicillins	Oral	669	0.00	0.00	0.09
Penicillins	Parenteral	388	0.00	0.15	0.17
Polymyxins	Intramammary	717	0.00	0.00	0.00
Polymyxins	Oral	697	0.00	0.00	0.04
Polymyxins	Parenteral	717	0.00	0.00	0.00
Tetracyclines	Intramammary	717	0.00	0.00	0.00
Tetracyclines	Oral	474	0.00	2.17	2.03
Tetracyclines	Parenteral	669	0.00	0.00	0.03
Trimethoprim/sulphonamides	Intramammary	717	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	462	0.00	1.58	1.61
Trimethoprim/sulphonamides	Parenteral	634	0.00	0.00	0.02

2.4 Rosé Combination Farms

Number of farms: 365

Number of farms with ADDD/Y = 0: 72

Table 12. Usage by rosé combination farm.

N	Average	Median	P75	P90	Minimum	Maximum
365	20.4	12.4	22.2	35.2	0	1,298.1

Figure 16. ADDD/Y frequency distribution for 365 rosé combination farms in 2012.

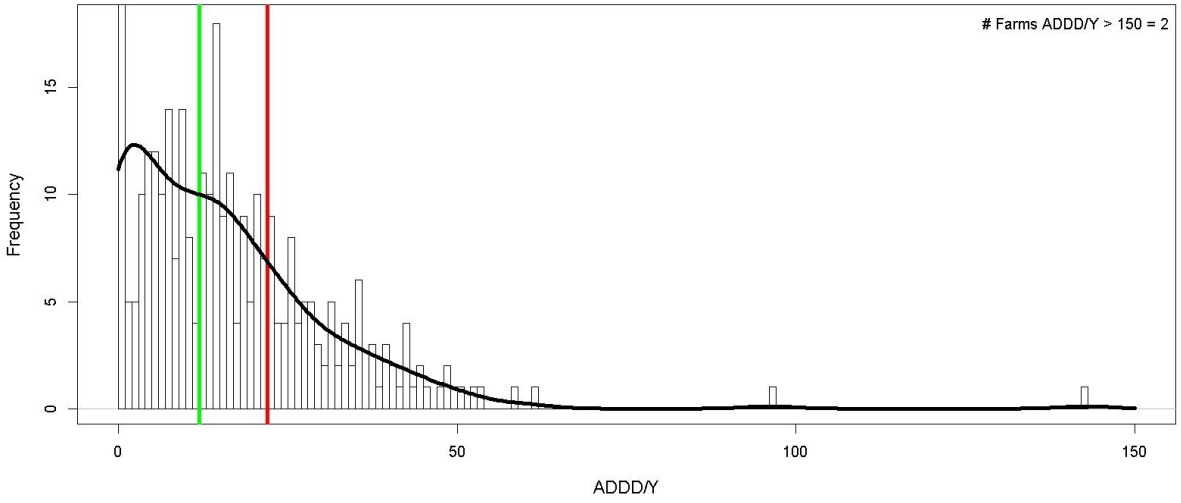


Figure 17. Average usage/rosé combination farm by ATC-vet group, broken down by route of administration and by class of antibiotic in 2012.

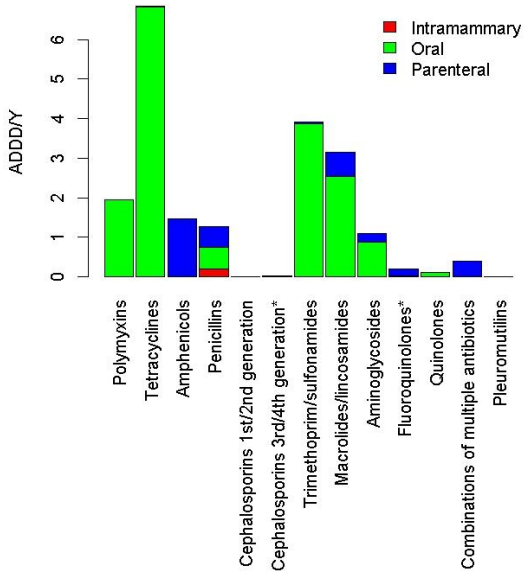


Figure 18. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on rosé combination farms in 2012.

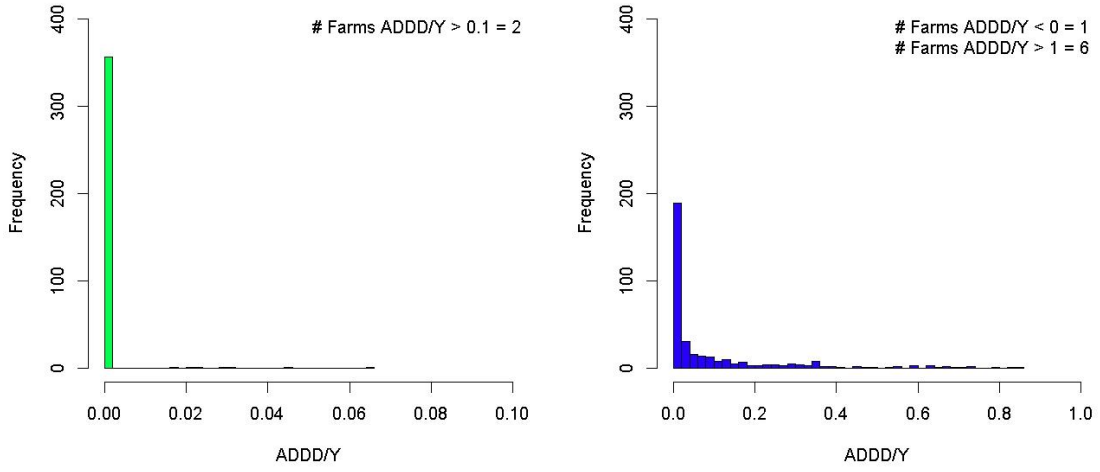


Figure 19. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 on rosé combination farms.

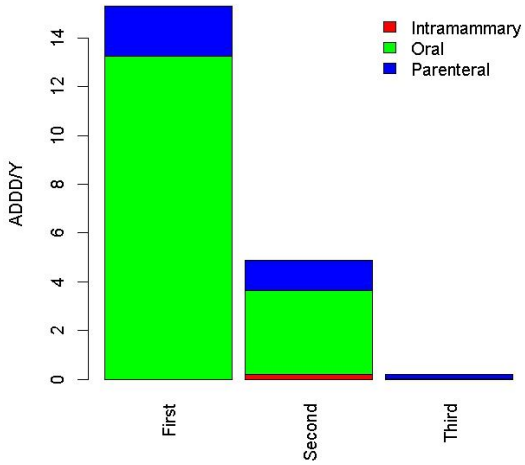


Table 13. Usage in ADDD/Y by ATC-vet group and by route of administration on rosé combination farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y = 0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	365	0.00	0.00	0.00
Amphenicols	Oral	365	0.00	0.00	0.00
Amphenicols	Parenteral	76	0.86	1.55	1.46
Aminoglycosides	Intramammary	365	0.00	0.00	0.00
Aminoglycosides	Oral	299	0.00	0.00	0.87
Aminoglycosides	Parenteral	261	0.00	0.03	0.22
3rd and 4th generation cephalosporins	Intramammary	365	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	365	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	356	0.00	0.00	0.01
Quinolones	Intramammary	365	0.00	0.00	0.00
Quinolones	Oral	343	0.00	0.00	0.10
Quinolones	Parenteral	365	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	365	0.00	0.00	0.00
Combinations of multiple antibiotics	Oral	365	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	134	0.11	0.42	0.39
Fluoroquinolones	Intramammary	365	0.00	0.00	0.00
Fluoroquinolones	Oral	297	0.00	0.00	0.03
Fluoroquinolones	Parenteral	182	0.00	0.09	0.16
Macrolides/lincosamides	Intramammary	365	0.00	0.00	0.00
Macrolides/lincosamides	Oral	162	0.72	2.55	2.55
Macrolides/lincosamides	Parenteral	153	0.13	0.64	0.61
Penicillins	Intramammary	326	0.00	0.00	0.19
Penicillins	Oral	215	0.00	0.30	0.54
Penicillins	Parenteral	119	0.16	0.46	0.53
Polymyxins	Intramammary	365	0.00	0.00	0.00
Polymyxins	Oral	246	0.00	0.68	1.95
Polymyxins	Parenteral	365	0.00	0.00	0.00
Tetracyclines	Intramammary	365	0.00	0.00	0.00
Tetracyclines	Oral	106	4.46	9.78	6.84
Tetracyclines	Parenteral	335	0.00	0.00	0.01
Trimethoprim/sulphonamides	Intramammary	365	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	142	1.00	3.31	3.87
Trimethoprim/sulphonamides	Parenteral	221	0.00	0.04	0.05

3. Usage of antibiotics in ADDD/Y on pig farms

3.1 Sows and Piglets

Number of farms: 2,338

Number of farms with ADDD/Y = 0: 73

Table 14. Usage on sow and piglet farms.

N	Average	Median	P75	P90	Minimum	Maximum
2,338	14.6	9.5	20.0	34.2	-44.4	251.7

Figure 20. ADDD/Y frequency distribution for 2,338 pig farms with sows and piglets in 2012.

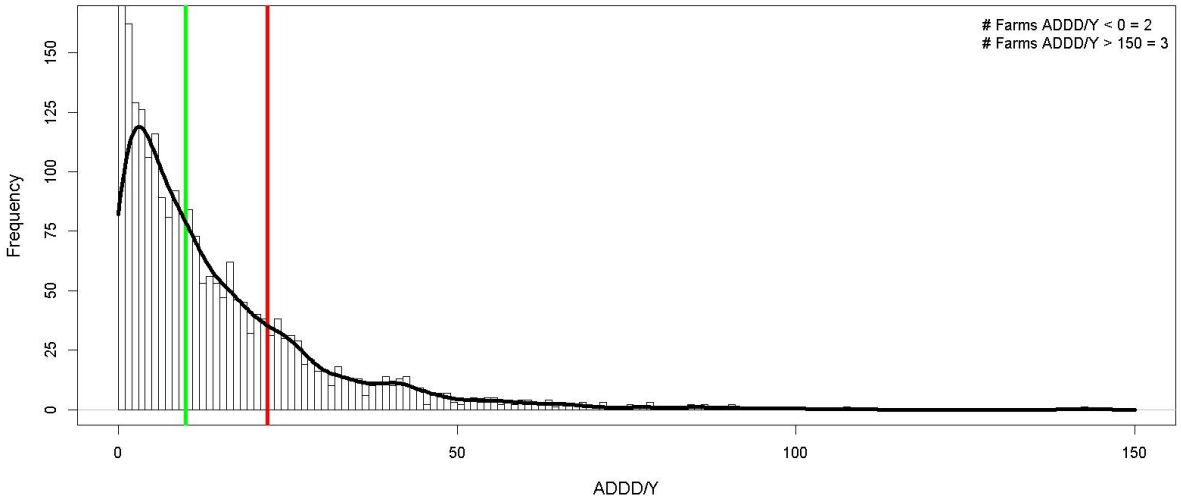


Figure 21. Average usage/sow and piglet farm by ATC-vet group, broken down by route of administration (left) by class of antibiotics and usage in 2011 and 2012 (right).

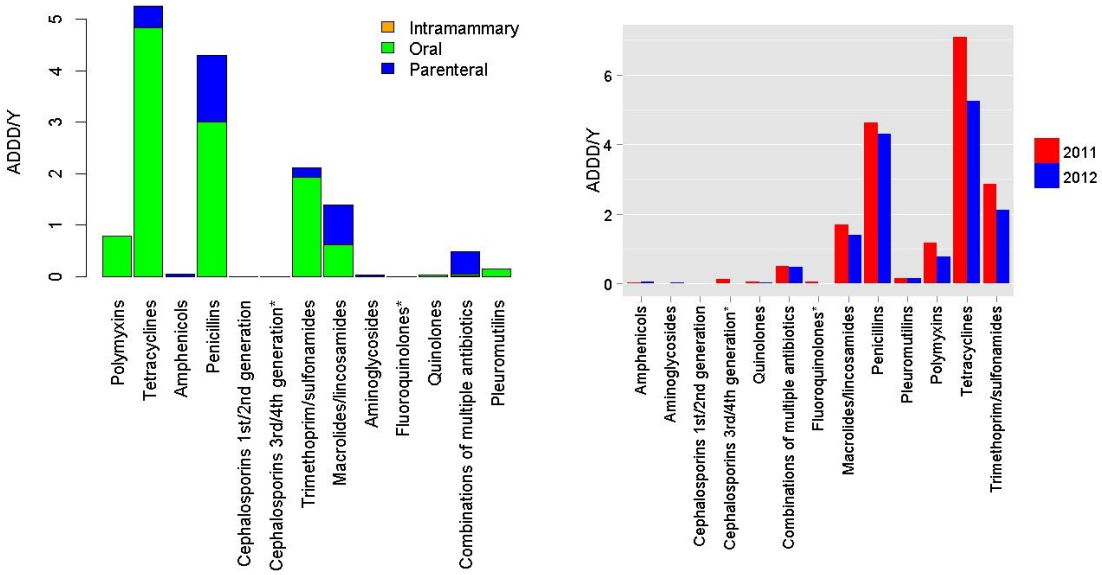


Figure 22. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on sow and piglet farms in 2012.

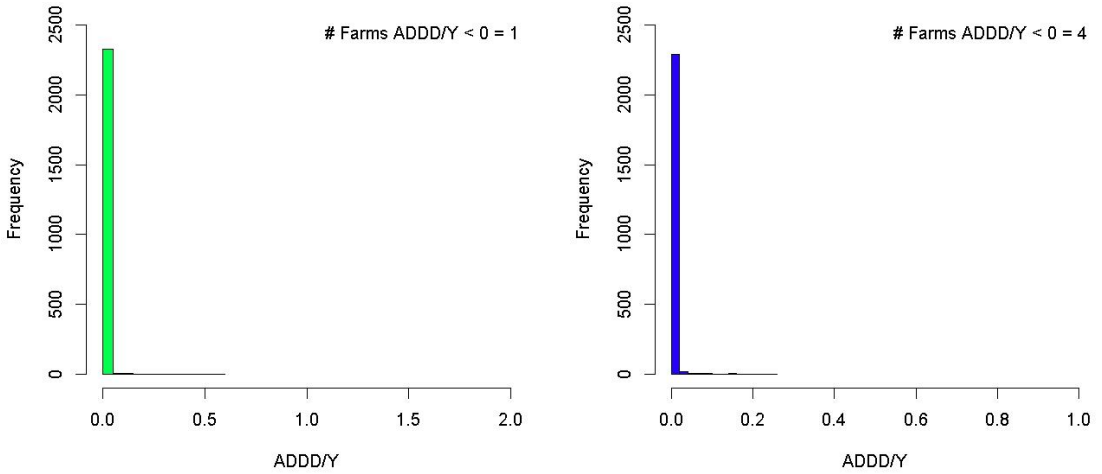


Figure 23. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 (left) and in 2011 and 2012 (right) on sow and piglet farms.

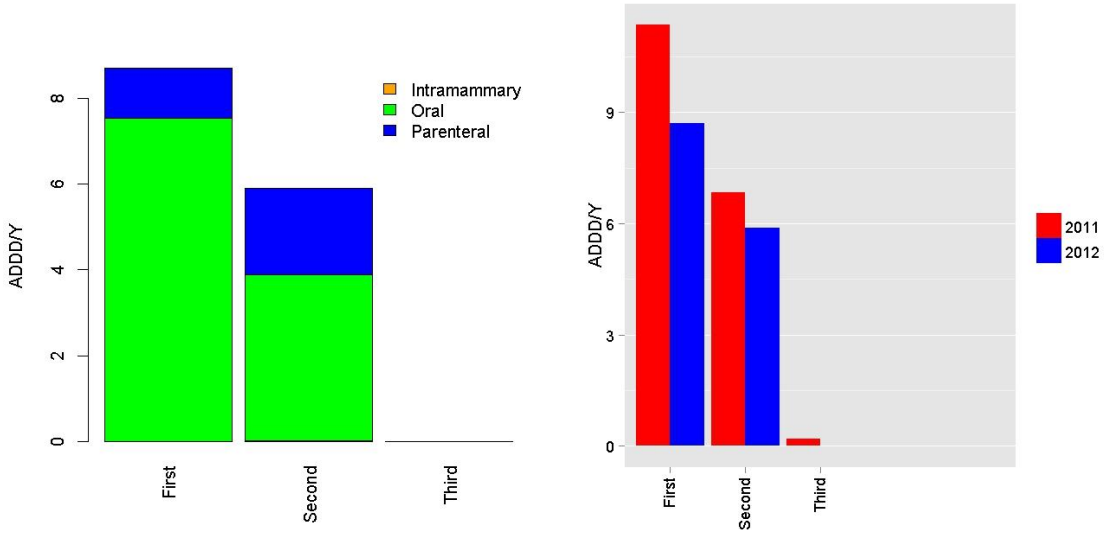


Table 15. Usage in ADDD/Y by ATC-vet group and by route of administration on sow and piglet farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y=0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	2,338	0.00	0.00	0.00
Amphenicols	Oral	2,336	0.00	0.00	0.00
Amphenicols	Parenteral	2,013	0.00	0.00	0.05
Aminoglycosides	Intramammary	2,338	0.00	0.00	0.00
Aminoglycosides	Oral	2,333	0.00	0.00	0.01
Aminoglycosides	Parenteral	2,327	0.00	0.00	0.02
3rd and 4th generation cephalosporins	Intramammary	2,338	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	2,338	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	2,321	0.00	0.00	0.00
Quinolones	Intramammary	2,338	0.00	0.00	0.00
Quinolones	Oral	2,290	0.00	0.00	0.03
Quinolones	Parenteral	2,338	0.00	0.00	0.00
Combination of multiple antibiotics	Intramammary	2,336	0.00	0.00	0.02
Combination of multiple antibiotics	Oral	2,239	0.00	0.00	0.04
Combination of multiple antibiotics	Parenteral	801	0.09	0.46	0.43
Fluoroquinolones	Intramammary	2,338	0.00	0.00	0.00
Fluoroquinolones	Oral	2,324	0.00	0.00	0.00
Fluoroquinolones	Parenteral	2,274	0.00	0.00	0.00
Macrolides/lincosamides	Intramammary	2,338	0.00	0.00	0.00
Macrolides/lincosamides	Oral	1,760	0.00	0.00	0.63
Macrolides/lincosamides	Parenteral	1,256	0.00	1.07	0.76
Penicillins	Intramammary	2,338	0.00	0.00	0.00
Penicillins	Oral	1,291	0.00	2.94	3.01
Penicillins	Parenteral	179	0.92	1.54	1.30
Pleuromutilins	Intramammary	2,338	0.00	0.00	0.00
Pleuromutilins	Oral	2,275	0.00	0.00	0.15
Pleuromutilins	Parenteral	2,263	0.00	0.00	0.00
Polymyxins	Intramammary	2,338	0.00	0.00	0.00
Polymyxins	Oral	1,147	0.00	0.49	0.79
Polymyxins	Parenteral	2,338	0.00	0.00	0.00
Tetracyclines	Intramammary	2,338	0.00	0.00	0.00
Tetracyclines	Oral	828	1.50	6.14	4.83
Tetracyclines	Parenteral	886	0.07	0.34	0.42
Trimethoprim/sulphonamides	Intramammary	2,338	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	1,144	0.11	1.76	1.92
Trimethoprim/sulphonamides	Parenteral	895	0.05	0.23	0.20

3.2 Fattening Pigs

Number of farms: 4,628

Number of farms with ADDD/Y = 0: 443

Table 16. Usage by fattening pig farm.

N	Average	Median	P75	P90	Minimum	Maximum
4,628	9.2	4.6	11.1	20.9	-25.7	1,223.1

Figure 24. ADDD/Y frequency distribution for 4,628 fattening pig farms in 2012.

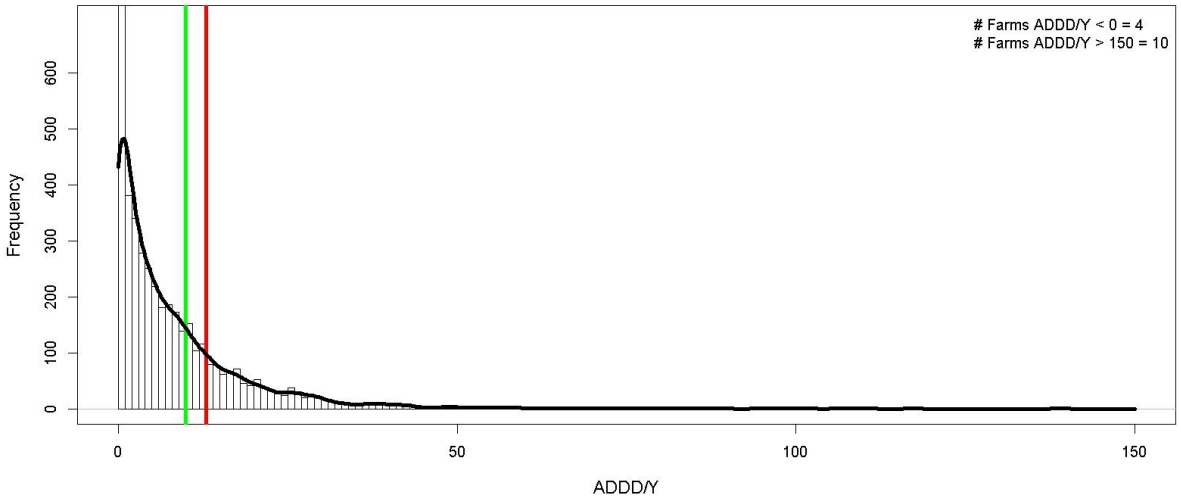


Figure 25. Average usage/fattening pig farm by ATC-vet group, broken down by route of administration (left) by class of antibiotics and usage in 2011 and 2012 (right).

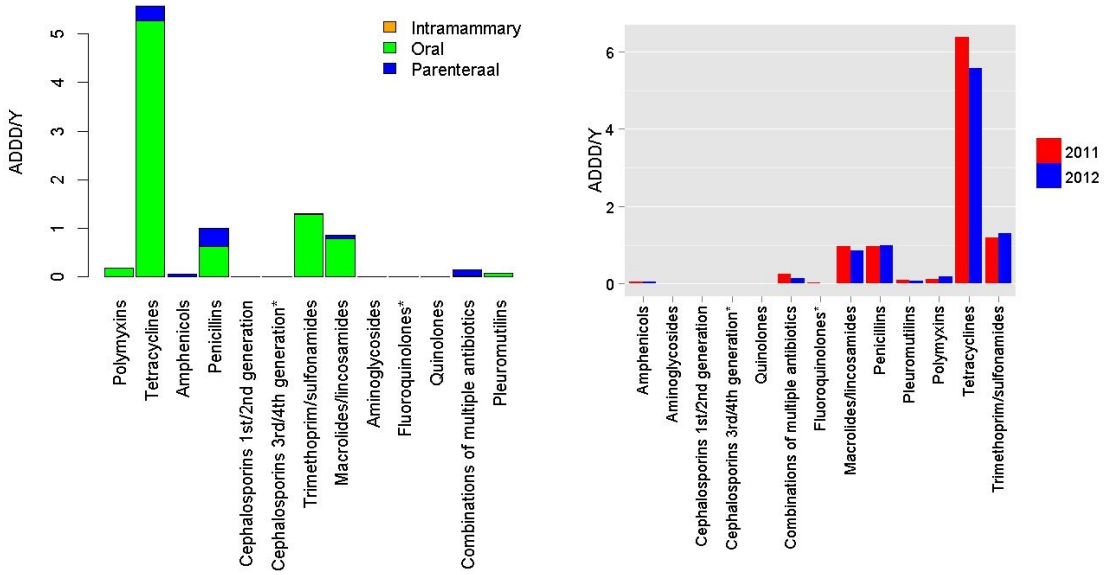


Figure 26. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on fattening pig farms in 2012.

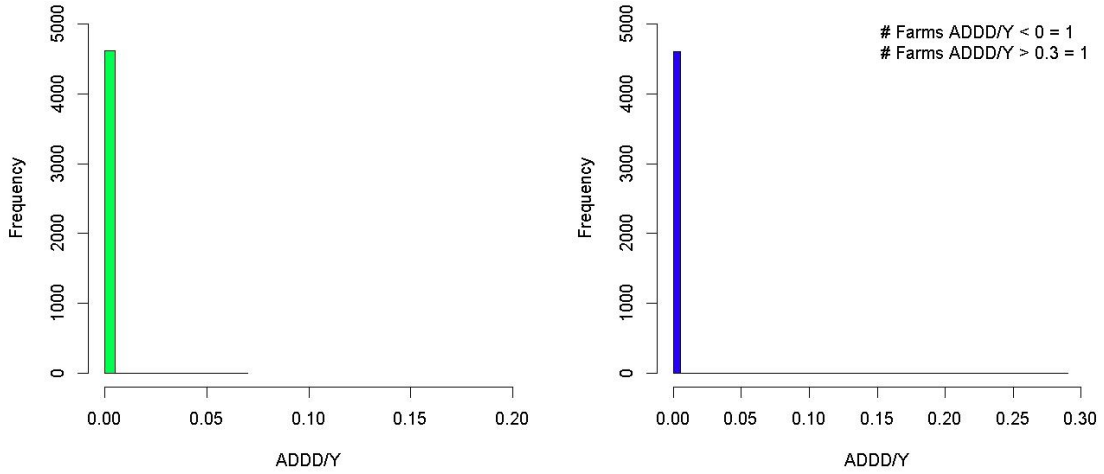


Figure 27. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 (left) and in 2011 and 2012 (right) on fattening pig farms.

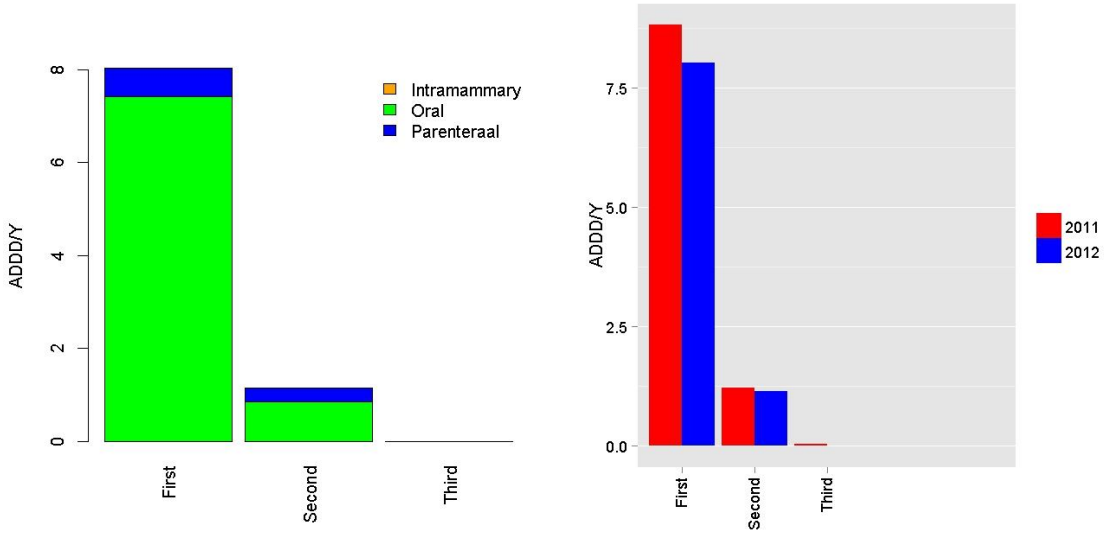


Table 17. Usage in ADDD/Y by ATC-vet group and by route of administration on pig fattening farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y=0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	4,628	0.00	0.00	0.00
Amphenicols	Oral	4,627	0.00	0.00	0.00
Amphenicols	Parenteral	3,987	0.00	0.00	0.06
Aminoglycosides	Intramammary	4,628	0.00	0.00	0.00
Aminoglycosides	Oral	4,628	0.00	0.00	0.00
Aminoglycosides	Parenteral	4,627	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Intramammary	4,628	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	4,628	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	4,621	0.00	0.00	0.00
Quinolones	Intramammary	4,628	0.00	0.00	0.00
Quinolones	Oral	4,611	0.00	0.00	0.01
Quinolones	Parenteral	4,628	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	4,627	0.00	0.00	0.00
Combination of multiple antibiotics	Oral	4,557	0.00	0.00	0.03
Combinations of multiple antibiotics	Parenteral	3,046	0.00	0.06	0.11
Fluoroquinolones	Intramammary	4,628	0.00	0.00	0.00
Fluoroquinolones	Oral	4,628	0.00	0.00	0.00
Fluoroquinolones	Parenteral	4,605	0.00	0.00	0.00
Macrolides/lincosamides	Intramammary	4,628	0.00	0.00	0.00
Macrolides/lincosamides	Oral	3,511	0.00	0.00	0.78
Macrolides/lincosamides	Parenteral	3,991	0.00	0.00	0.08
Penicillins	Intramammary	4,628	0.00	0.00	0.00
Penicillins	Oral	4,074	0.00	0.00	0.63
Penicillins	Parenteral	1,373	0.13	0.41	0.36
Pleuromutilins	Intramammary	4,628	0.00	0.00	0.00
Pleuromutilins	Oral	4,537	0.00	0.00	0.08
Pleuromutilins	Parenteral	4,480	0.00	0.00	0.00
Polymyxins	Intramammary	4,628	0.00	0.00	0.00
Polymyxins	Oral	4,169	0.00	0.00	0.18
Polymyxins	Parenteral	4,628	0.00	0.00	0.00
Tetracyclines	Intramammary	4,628	0.00	0.00	0.00
Tetracyclines	Oral	1,790	1.83	7.14	5.28
Tetracyclines	Parenteral	2,052	0.05	0.27	0.30
Trimethoprim/sulphonamides	Intramammary	4,628	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	3,121	0.00	0.70	1.29
Trimethoprim/sulphonamides	Parenteral	4,491	0.00	0.00	0.01

4. Usage of **antibiotics in Treatment Days/Y on Poultry Farms**

4.1 Broilers

Number of farms: 762

Number of farms with Treatment Days/Y = 0: 117

Table 18. Usage on broiler farms.

N	Average	Minimum	Maximum	Median	P75	P90
762	19.9	0	100.2	17.1	29.8	41.4

Figure 28. Treatment Days/Y frequency distribution for 762 broiler farms in 2012.

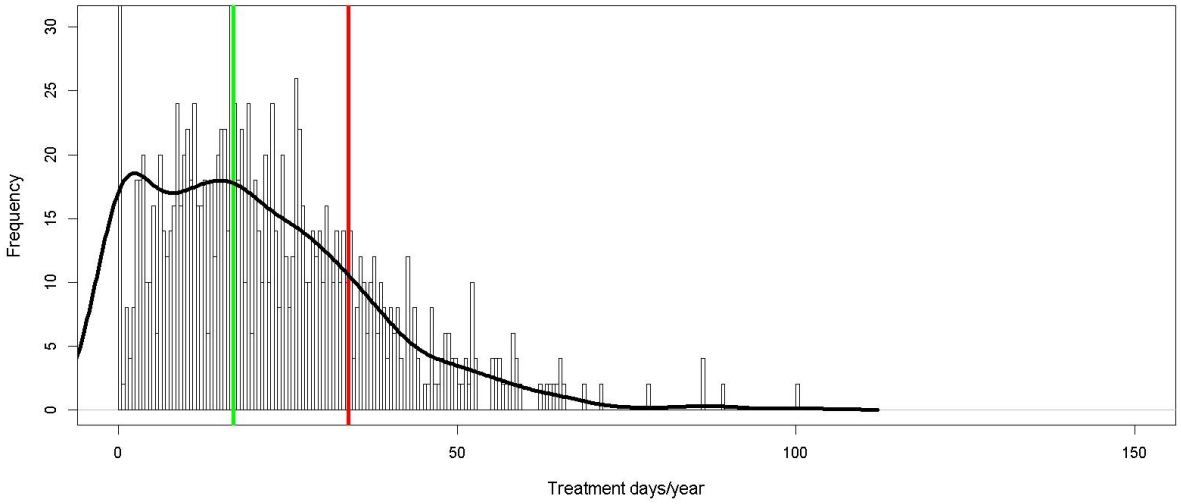


Figure 29. Aggregated usage for the broiler sector by ATC-vet group, broken down by class of antibiotics in 2011 and 2012, based on prescription lines.

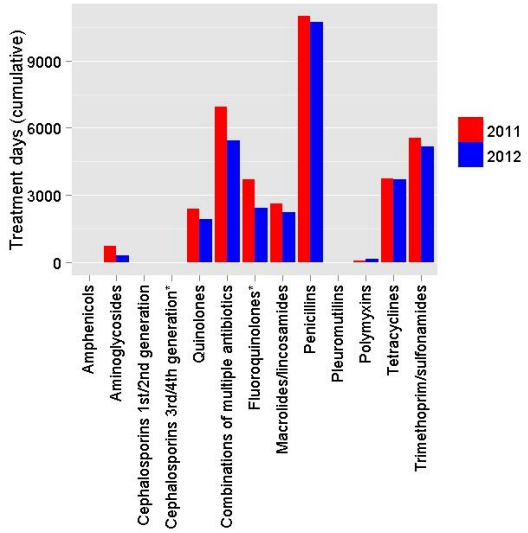
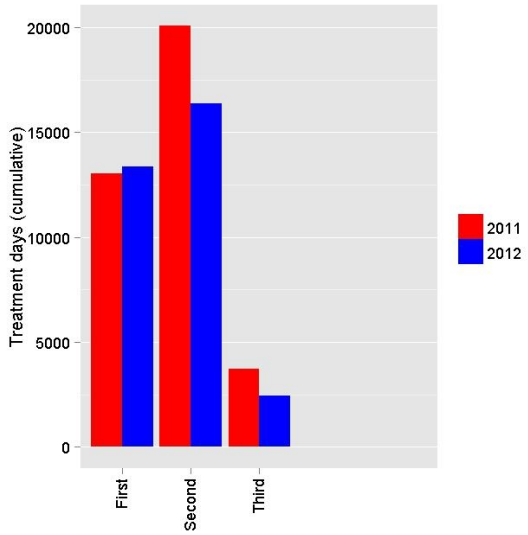


Figure 30. Aggregated usage per 1st, 2nd and 3rd choice agent by route of administration on broiler farms in 2011 and 2012, based on prescription lines.



5. Usage of Antibiotics in ADDD/Y on Cattle Farms

5.1 Dairy Cattle

Number of farms: 18,053

Number of farms with ADDD/Y = 0: 394

Table 19. Usage by dairy cattle farm presented as total usage (A), usage of antibiotics for dry cow therapy (B), usage of mastitis injectors (C), and the use of oral agents in calves (D).

A

Total Usage in ADDD/Y						
N	Average	Median	P75	P90	Minimum	Maximum
18,053	2.9	2.7	3.8	4.9	-8.2	344.6

B

Usage of Antibiotics for dry cow therapy in ADDD/Y (animals > 2 years)						
N	Average	Median	P75	P90	Minimum	Maximum
18,053	1.8	1.8	2.6	3.1	-8.6	212.3

C

Usage of Mastitis Injectors in ADDD/Y (animals > 2 years)						
N	Average	Median	P75	P90	Minimum	Maximum
18,053	0.8	0.6	1.1	1.7	-13.8	109.1

D

Usage of Oral Antibiotics in Calves in ADDD/Y (animals < 56 days)						
N	Average	Median	P75	P90	Minimum	Maximum
18,053	10.9	0	1.0	28.1	-809.1	3,123.4

Figure 31. ADDD/Y frequency distribution for 18,053 dairy farms in 2012.

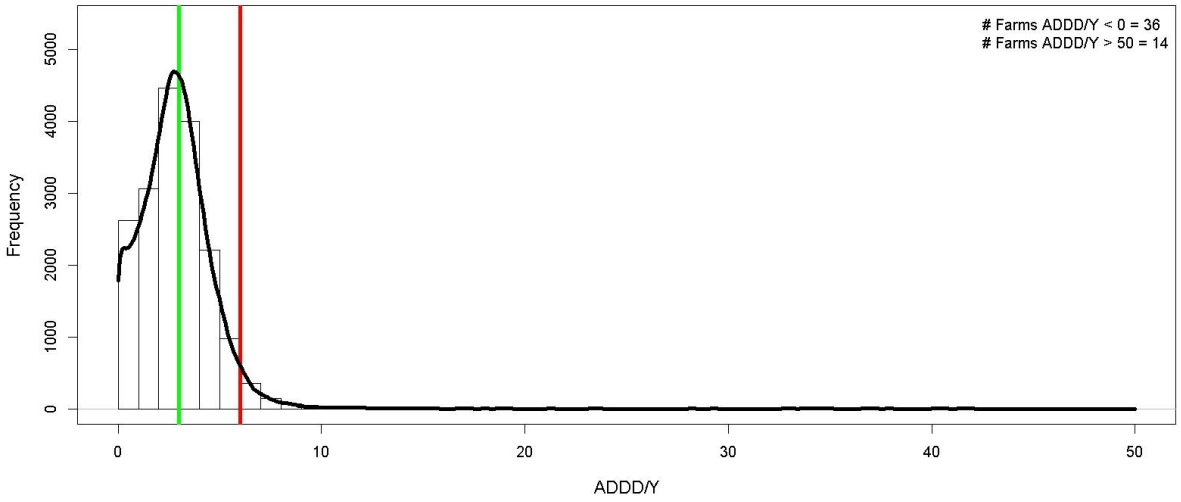


Figure 32. Average usage/dairy farm by ATC-vet group, broken down by route of administration and by class of antibiotics in 2012.

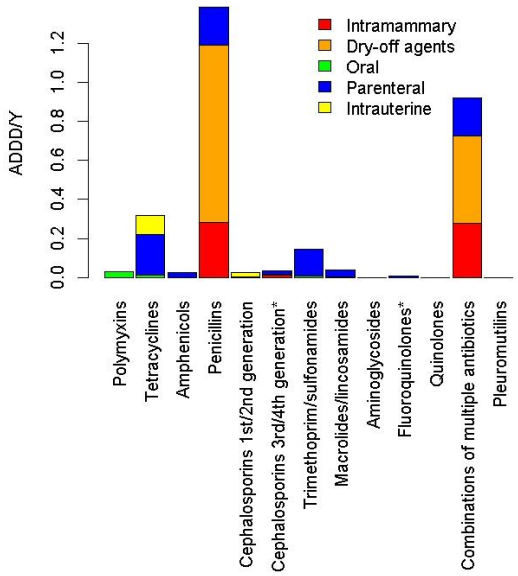


Figure 33. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on dairy farms in 2012.

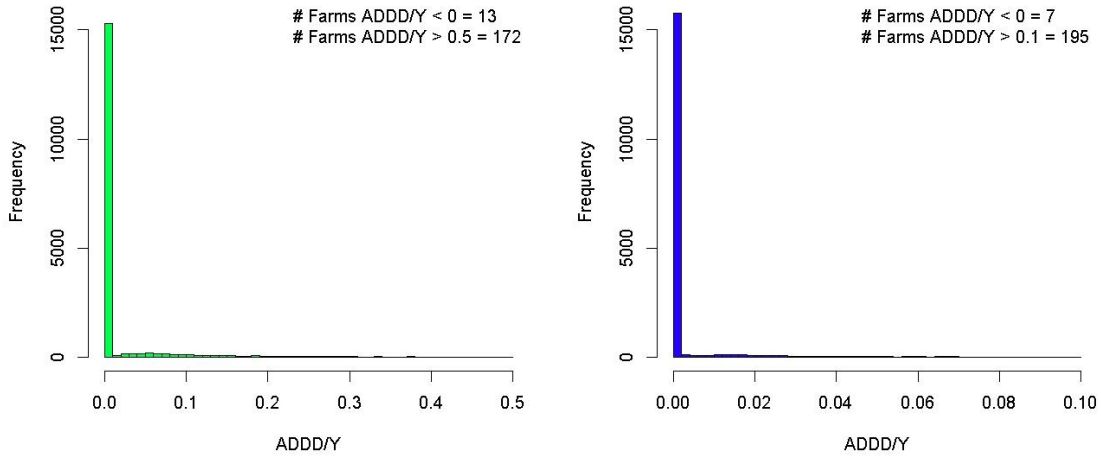


Figure 34. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 on dairy farms.

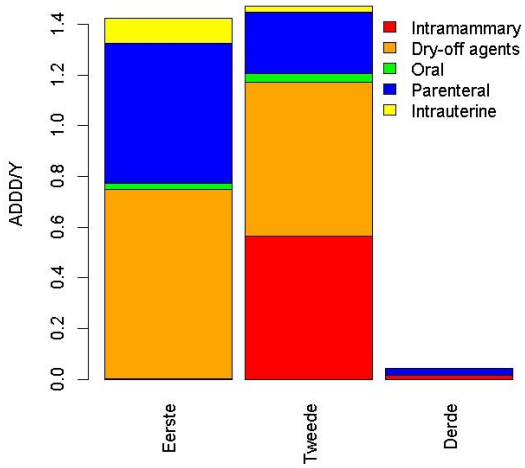


Table 20. Usage in ADDD/Y by ATC-vet group and by route of administration on dairy farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y=0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	18,053	0.00	0.00	0.00
Amphenicols	Dry-off agent[7]	18,053	0.00	0.00	0.00
Amphenicols	Oral	18,053	0.00	0.00	0.00
Amphenicols	Parenteral	12,316	0.00	0.03	0.03
Amphenicols	Intrauterine	18,053	0.00	0.00	0.00
Aminoglycosides	Intramammary	18,053	0.00	0.00	0.00
Aminoglycosides	Dry-off agent	18,053	0.00	0.00	0.00
Aminoglycosides	Oral	18,050	0.00	0.00	0.00
Aminoglycosides	Parenteral	17,556	0.00	0.00	0.00
Aminoglycosides	Intrauterine	18,053	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Intramammary	17,730	0.00	0.00	0.01
1st and 2nd generation cephalosporins	Dry-off agent	18,053	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Oral	18,053	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Parenteral	18,053	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Intrauterine	12,828	0.00	0.01	0.02
3rd and 4th generation cephalosporins	Intramammary	16,133	0.00	0.00	0.01
3rd and 4th generation cephalosporins	Dry-off agent	18,017	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	18,053	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	16,459	0.00	0.00	0.02
3rd and 4th generation cephalosporins	Intrauterine	18,053	0.00	0.00	0.00
Quinolones	Intramammary	18,053	0.00	0.00	0.00
Quinolones	Dry-off agent	18,053	0.00	0.00	0.00
Quinolones	Oral	18,050	0.00	0.00	0.00
Quinolones	Parenteral	18,053	0.00	0.00	0.00
Quinolones	Intrauterine	18,053	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	8,323	0.05	0.40	0.28
Combinations of multiple antibiotics	Dry-off agent	11,245	0.00	0.71	0.45
Combinations of multiple antibiotics	Oral	17,989	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	5,123	0.08	0.22	0.20
Combinations of multiple antibiotics	Intrauterine	18,053	0.00	0.00	0.00
Fluoroquinolones	Intramammary	18,053	0.00	0.00	0.00
Fluoroquinolones	Dry-off agent	18,053	0.00	0.00	0.00
Fluoroquinolones	Oral	17,967	0.00	0.00	0.00
Fluoroquinolones	Parenteral	15,552	0.00	0.00	0.01
Fluoroquinolones	Intrauterine	18,053	0.00	0.00	0.00
Macrolides/lincosamides	Intramammary	17,840	0.00	0.00	0.00
Macrolides/lincosamides	Dry-off agent	18,053	0.00	0.00	0.00
Macrolides/lincosamides	Oral	17,952	0.00	0.00	0.00
Macrolides/lincosamides	Parenteral	13,823	0.00	0.00	0.03
Macrolides/lincosamides	Intrauterine	18,053	0.00	0.00	0.00
Penicillins	Intramammary	5,324	0.17	0.42	0.28
Penicillins	Dry-off agent	6,510	0.63	1.62	0.90

[7] Dry-off agent means usage of antibiotics for dry cow therapy.

Penicillins	Oral	17,404	0.00	0.00	0.00
Penicillins	Parenteral	5,873	0.08	0.27	0.19
Penicillins	Intrauterine	18,053	0.00	0.00	0.00
Polymyxins	Intramammary	18,053	0.00	0.00	0.00
Polymyxins	Dry-off agent	18,053	0.00	0.00	0.00
Polymyxins	Oral	14,300	0.00	0.00	0.03
Polymyxins	Parenteral	18,053	0.00	0.00	0.00
Polymyxins	Intrauterine	18,053	0.00	0.00	0.00
Tetracyclines	Intramammary	18,053	0.00	0.00	0.00
Tetracyclines	Dry-off agent	18,053	0.00	0.00	0.00
Tetracyclines	Oral	17,025	0.00	0.00	0.01
Tetracyclines	Parenteral	5,896	0.09	0.26	0.21
Tetracyclines	Intrauterine	7,991	0.02	0.13	0.10
Trimethoprim/sulphonamides	Intramammary	18,053	0.00	0.00	0.00
Trimethoprim/sulphonamides	Dry-off agent	18,053	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	17,373	0.00	0.00	0.01
Trimethoprim/sulphonamides	Parenteral	4,627	0.06	0.16	0.14
Trimethoprim/sulphonamides	Intrauterine	18,053	0.00	0.00	0.00

5.2 Suckler Cows

Number of farms: 11,927

Number of farms with ADDD/Y = 0: 6,574

Table 21. Usage by suckler cow farms.

N	Average	Median	P75	P90	Minimum	Maximum
11,927	1.0	0	0.6	2.0	-27.0	1,455.3

Figure 35. ADDD/Y frequency distribution for 11,927 suckler cow farms in 2012.

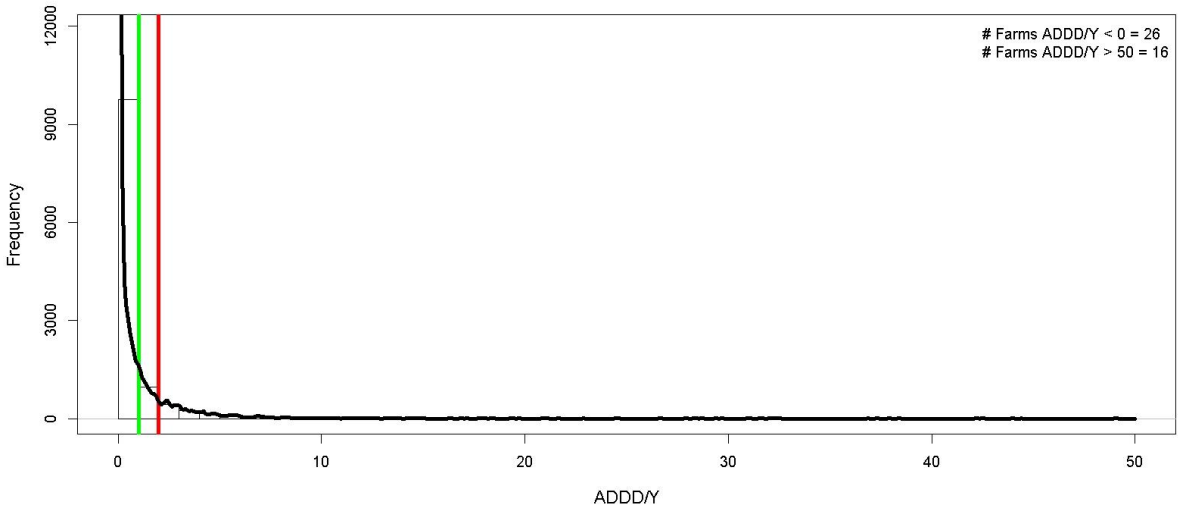


Figure 36. Average usage/suckler cow farm by ATC-vet group, broken down by route of administration and by class of antibiotics in 2012.

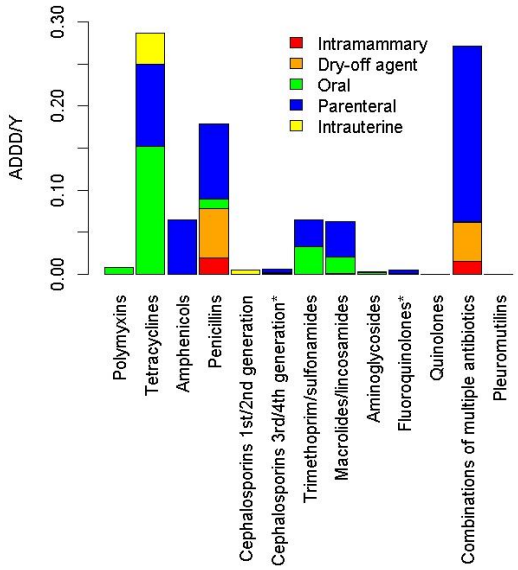


Figure 37. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on suckler cow farms in 2012. Dry-off agent means usage of antibiotics for dry cow therapy.

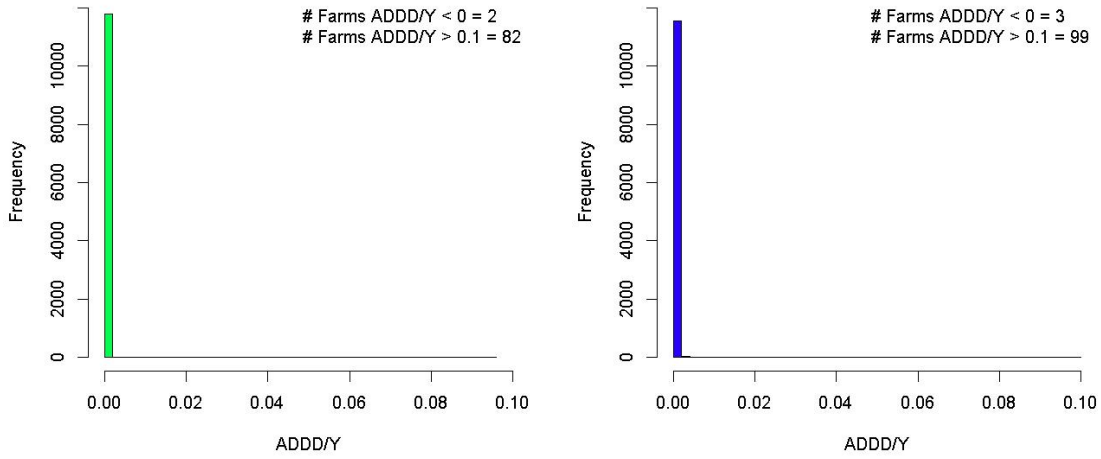


Figure 38. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 on suckler cow farms. Dry-off agent means usage of antibiotics for dry cow therapy.

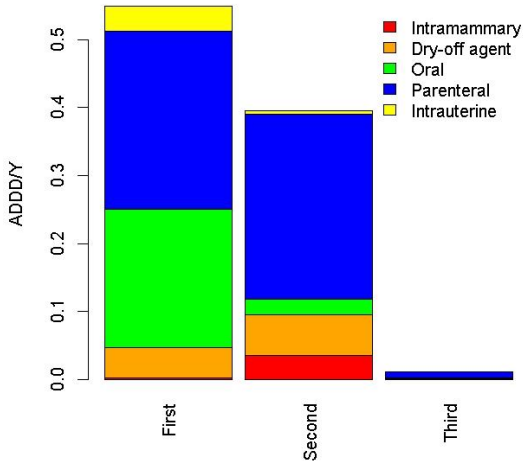


Table 22. Usage in ADDD/Y by ATC-vet group and by route of administration on suckler cow farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y=0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	11,927	0.00	0.00	0.00
Amphenicols	Dry-off agent[8]	11,927	0.00	0.00	0.00
Amphenicols	Oral	11,927	0.00	0.00	0.00
Amphenicols	Parenteral	10,396	0.00	0.00	0.06
Amphenicols	Intrauterine	11,927	0.00	0.00	0.00
Aminoglycosides	Intramammary	11,927	0.00	0.00	0.00
Aminoglycosides	Dry-off agent	11,927	0.00	0.00	0.00
Aminoglycosides	Oral	11,919	0.00	0.00	0.00
Aminoglycosides	Parenteral	11,826	0.00	0.00	0.00
Aminoglycosides	Intrauterine	11,927	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Intramammary	11,922	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Dry-off agent	11,927	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Oral	11,927	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Parenteral	11,927	0.00	0.00	0.00
1st and 2nd generation cephalosporins	Intrauterine	11,723	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Intramammary	11,853	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Dry-off agent	11,924	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	11,927	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	11,860	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Intrauterine	11,927	0.00	0.00	0.00
Quinolones	Intramammary	11,927	0.00	0.00	0.00
Quinolones	Dry-off agent	11,927	0.00	0.00	0.00
Quinolones	Oral	11,926	0.00	0.00	0.00
Quinolones	Parenteral	11,927	0.00	0.00	0.00
Quinolones	Intrauterine	11,927	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	11,575	0.00	0.00	0.02
Combinations of multiple antibiotics	Dry-off agent	11,595	0.00	0.00	0.05
Combinations of multiple antibiotics	Oral	11,924	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	8,763	0.00	0.03	0.21
Combinations of multiple antibiotics	Intrauterine	11,927	0.00	0.00	0.00
Fluoroquinolones	Intramammary	11,927	0.00	0.00	0.00
Fluoroquinolones	Dry-off agent	11,927	0.00	0.00	0.00
Fluoroquinolones	Oral	11,898	0.00	0.00	0.00
Fluoroquinolones	Parenteral	11,550	0.00	0.00	0.00
Fluoroquinolones	Intrauterine	11,927	0.00	0.00	0.00
Macrolides/lincosamides	Intramammary	11,923	0.00	0.00	0.00
Macrolides/lincosamides	Dry-off agent	11,927	0.00	0.00	0.00
Macrolides/lincosamides	Oral	11,873	0.00	0.00	0.02
Macrolides/lincosamides	Parenteral	11,153	0.00	0.00	0.04
Macrolides/lincosamides	Intrauterine	11,927	0.00	0.00	0.00

[8] Dry-off agent means usage of antibiotics for dry cow therapy.

Penicillins	Intramammary	11,340	0.00	0.00	0.02
Penicillins	Dry-off agent	11,468	0.00	0.00	0.06
Penicillins	Oral	11,795	0.00	0.00	0.01
Penicillins	Parenteral	9,883	0.00	0.00	0.09
Penicillins	Intrauterine	11,927	0.00	0.00	0.00
Polymyxins	Intramammary	11,927	0.00	0.00	0.00
Polymyxins	Dry-off agent	11,927	0.00	0.00	0.00
Polymyxins	Oral	11,570	0.00	0.00	0.01
Polymyxins	Parenteral	11,927	0.00	0.00	0.00
Polymyxins	Intrauterine	11,927	0.00	0.00	0.00
Tetracyclines	Intramammary	11,927	0.00	0.00	0.00
Tetracyclines	Dry-off agent	11,927	0.00	0.00	0.00
Tetracyclines	Oral	11,641	0.00	0.00	0.15
Tetracyclines	Parenteral	10,275	0.00	0.00	0.10
Tetracyclines	Intrauterine	10,465	0.00	0.00	0.04
Trimethoprim/sulphonamides	Intramammary	11,927	0.00	0.00	0.00
Trimethoprim/sulphonamides	Dry-off agent	11,927	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	11,743	0.00	0.00	0.03
Trimethoprim/sulphonamides	Parenteral	10,515	0.00	0.00	0.03
Trimethoprim/sulphonamides	Intrauterine	11,927	0.00	0.00	0.00

5.3 Rearing Cattle and Beef Bulls

Number of farms: 2,274

Number of farms with ADDD/Y = 0: 1,658

Table 23. Usage on rearing cattle/beef bull farms.

N	Average	Median	P75	P90	Maximum
2,274	2.4	0	0.1	5.6	305.2

Figure 39. ADDD/Y frequency distribution for 2,274 rearing cattle/beef bull farms in 2012.

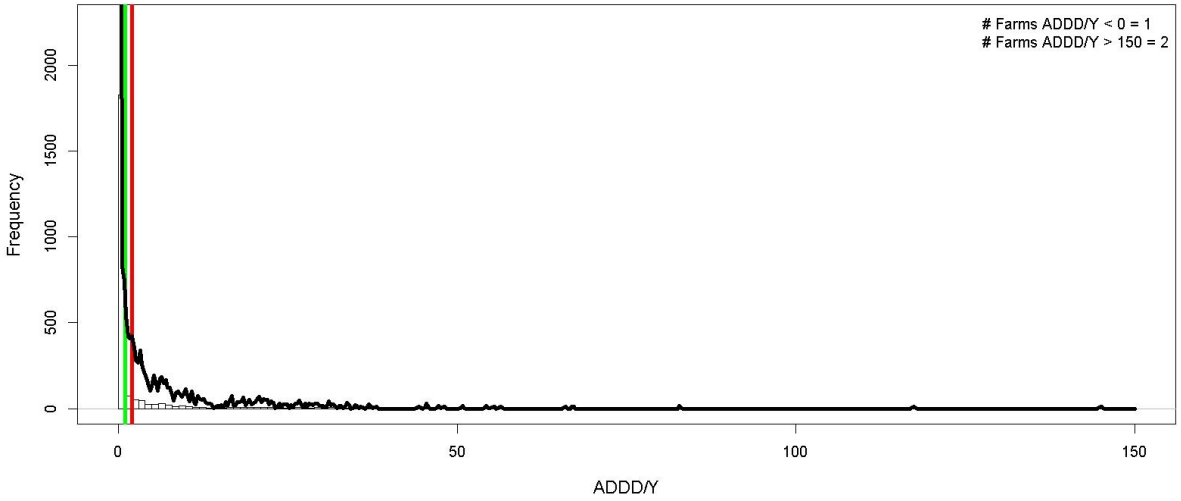


Figure 40. Average usage/rearing cattle/beef bull farm by ATC-vet group, broken down by route of administration and by class of antibiotics in 2012. Dry-off agent means usage of antibiotics for dry cow therapy.

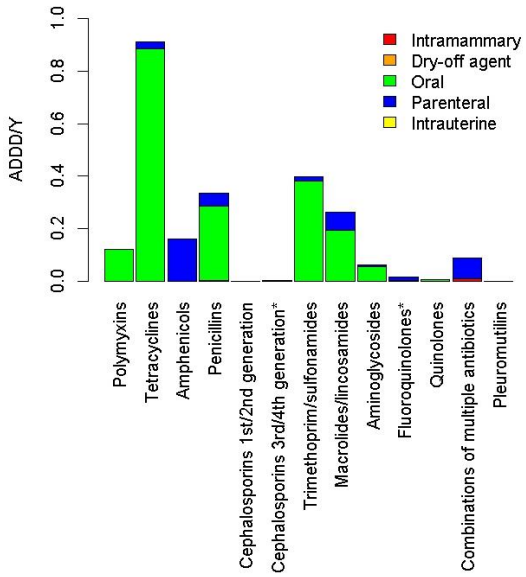


Figure 41. Usage of 3rd and 4th generation cephalosporins (left) and fluoroquinolones (right) on rearing cattle/beef bull farms in 2012.

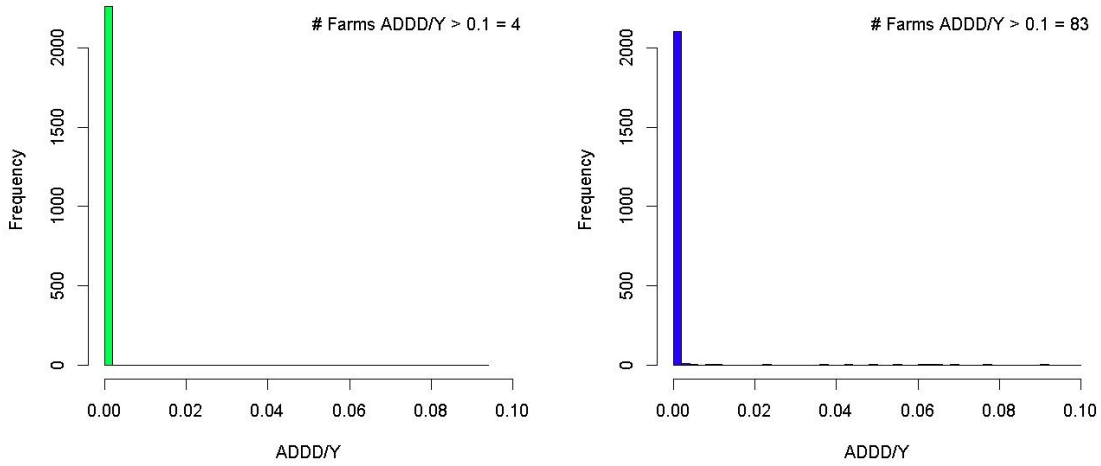


Figure 42. Usage per 1st, 2nd and 3rd choice agent by route of administration in 2012 on rearing cattle/beef bull farms. Dry-off agent means usage of antibiotics for dry cow therapy.

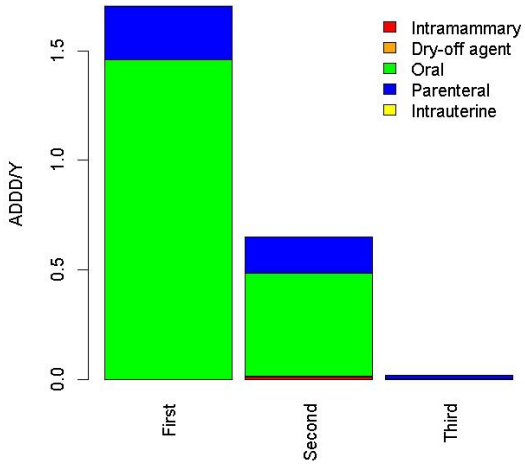


Table 24. Usage in ADDD/Y by ATC-vet group and by route of administration on rearing cattle/beef bull farms in 2012.

ATC-vet group	Route of Administration	# of Farms with ADDD/Y=0	ADDD/Y		
			Median	P75	Average
Amphenicols	Intramammary	2,274	0.00	0.00	0.00
Amphenicols	Dry-off agent[9]	2,274	0.00	0.00	0.00
Amphenicols	Oral	2,274	0.00	0.00	0.00
Amphenicols	Parenteral	1,777	0.00	0.00	0.16
Amphenicols	Intrauterine	2,274	0.00	0.00	0.00
Aminoglycosides	Intramammary	2,274	0.00	0.00	0.00
Aminoglycosides	Dry-off agent	2,274	0.00	0.00	0.00
Aminoglycosides	Oral	2,225	0.00	0.00	0.06
Aminoglycosides	Parenteral	2,205	0.00	0.00	0.01
Aminoglycosides	Intrauterine	2,274	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Intramammary	2,273	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Dry-off agent	2,274	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Oral	2,274	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Parenteral	2,258	0.00	0.00	0.00
3rd and 4th generation cephalosporins	Intrauterine	2,274	0.00	0.00	0.00
Quinolones	Intramammary	2,274	0.00	0.00	0.00
Quinolones	Dry-off agent	2,274	0.00	0.00	0.00
Quinolones	Oral	2,257	0.00	0.00	0.01
Quinolones	Parenteral	2,274	0.00	0.00	0.00
Quinolones	Intrauterine	2,274	0.00	0.00	0.00
Combinations of multiple antibiotics	Intramammary	2,270	0.00	0.00	0.01
Combinations of multiple antibiotics	Dry-off agent	2,270	0.00	0.00	0.00
Combinations of multiple antibiotics	Oral	2,274	0.00	0.00	0.00
Combinations of multiple antibiotics	Parenteral	1,873	0.00	0.00	0.08
Combinations of multiple antibiotics	Intrauterine	2,274	0.00	0.00	0.00
Fluoroquinolones	Intramammary	2,274	0.00	0.00	0.00
Fluoroquinolones	Dry-off agent	2,274	0.00	0.00	0.00
Fluoroquinolones	Oral	2,209	0.00	0.00	0.00
Fluoroquinolones	Parenteral	2,064	0.00	0.00	0.01
Fluoroquinolones	Intrauterine	2,274	0.00	0.00	0.00
Macrolides/lincosamides	Intramammary	2,274	0.00	0.00	0.00
Macrolides/lincosamides	Dry-off agent	2,274	0.00	0.00	0.00
Macrolides/lincosamides	Oral	2,021	0.00	0.00	0.19
Macrolides/lincosamides	Parenteral	1,966	0.00	0.00	0.07
Macrolides/lincosamides	Intrauterine	2,274	0.00	0.00	0.00
Penicillins	Intramammary	2,249	0.00	0.00	0.00
Penicillins	Dry-off agent	2,268	0.00	0.00	0.00
Penicillins	Oral	2,088	0.00	0.00	0.28
Penicillins	Parenteral	1,904	0.00	0.00	0.05
Penicillins	Intrauterine	2,274	0.00	0.00	0.00

[9] Dry-off agent means usage of antibiotics for dry cow therapy.

Polymyxins	Intramammary	2,274	0.00	0.00	0.00
Polymyxins	Dry-off agent	2,274	0.00	0.00	0.00
Polymyxins	Oral	2,156	0.00	0.00	0.12
Polymyxins	Parenteral	2,274	0.00	0.00	0.00
Polymyxins	Intrauterine	2,274	0.00	0.00	0.00
Tetracyclines	Intramammary	2,274	0.00	0.00	0.00
Tetracyclines	Dry-off agent	2,274	0.00	0.00	0.00
Tetracyclines	Oral	1,935	0.00	0.00	0.88
Tetracyclines	Parenteral	2,171	0.00	0.00	0.03
Tetracyclines	Intrauterine	2,270	0.00	0.00	0.00
Trimethoprim/sulphonamides	Intramammary	2,274	0.00	0.00	0.00
Trimethoprim/sulphonamides	Dry-off agent	2,274	0.00	0.00	0.00
Trimethoprim/sulphonamides	Oral	2,018	0.00	0.00	0.38
Trimethoprim/sulphonamides	Parenteral	2,051	0.00	0.00	0.01
Trimethoprim/sulphonamides	Intrauterine	2,274	0.00	0.00	0.00

Table 25. Cross table showing the number of veal fattening farms (white and rosé) that in 2011 and 2012 were classified in a specific usage category. Calculated on the basis of 1,642 farms that are present both in the 2011and the 2012 database.

		2012 Category			
		Green	Orange	Red	Total
2011 Category	Green	299	239	65	603
	Orange	203	325	105	633
	Red	72	173	161	406
	Total	574	737	331	1,642

Table 26. Cross table showing the number of sow and piglet farms that in 2011 and 2012 were classified in a specific usage category. Calculated on the basis of 2,196 farms that are present both in the 2011 and the 2012 database.

2011 Category	2012 Category: Green	Orange	Red	Total
Green	864	160	43	1,067
Orange	199	272	107	578
Red	48	172	331	551
Total	1,111	604	481	2,196

Table 27. Cross table showing the number of fattening pig farms that in 2011 and 2012 were classified in a specific usage category. Calculated on the basis of 4,262 farms that are present both in the 2011and the 2012 database.

2011 Category	2012 Category: Green	Orange	Red	Total
Green	2,486	180	288	2,954
Orange	178	44	76	298
Red	360	126	524	1,010
Total	3,024	350	888	4,262

Table 28. Cross table showing the number of broiler farms that in 2011 and 2012 were classified in a specific usage category. Calculated on the basis of 697 farms that are present both in the 2011and the 2012 database.

2011 Category	2012 Category: Green	Orange	Red	Total
Green	213	57	22	292
Orange	91	96	39	226
Red	39	77	63	179
Total	343	230	124	697