



ASSURING THE SAFETY, QUALITY AND EFFICACY  
OF VETERINARY MEDICINES

# SALES OF ANTIMICROBIAL PRODUCTS AUTHORISED FOR USE AS VETERINARY MEDICINES IN THE UK IN 2010

# 2011





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OF VETERINARY MEDICINES

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## SUMMARY

This is the thirteenth in a series of reports designed to provide information about the sales of veterinary antimicrobial products in the UK. The data for this report have been calculated using the same methods developed for the 2002 report.

### **Summary of the main points and changes to the report (all tonnages are expressed as active ingredient (a.i) unless otherwise stated)**

The main points and changes presented in this year's report are:

- Report for the first time sales of veterinary antimicrobial products in the UK from 2010.
- There is a net 45 tonne increase in sales of veterinary antibiotics, most of which is accounted for by a small increase in sales of most classes of antibiotics.
- There is an increase in sales of products for food-producing animals of 41 tonnes.
- In 2010 383 Kg more fluoroquinolones were sold than in 2009. For cephalosporins, there was a decrease of 57 Kg.
- During 2006, 2007 and 2008, approximately 0.06 kg of antibiotics were used for every tonne of animals slaughtered for food. There were small increases in 2009 of 0.006 kg and in 2010 of 0.004 kg, giving an average of 0.07 kg antibiotic per tonne of animals slaughtered for these two years.
- No data on antimicrobial products imported under the SIC/STC systems have been included in this report as routine validation of the database of applications identified duplicate applications and other errors, which would lead to over-reporting of data. The VMD is continuing to address this issue.
- No sales of antimicrobial growth promoters are reported as their use and sale were banned from 1 January 2006.

## Trends

### Total Sales

During 2006 total sales of antibiotics decreased by 41 tonnes to 405 tonnes, fell by 18 tonnes in 2007 to 387 tonnes and again fell in 2008 to 384 tonnes. In 2009 total sales increased by 18 tonnes to 402 tonnes. In 2010 total sales increased by 45 tonnes to 447.

The sales of veterinary antiprotozoals in 2010 were 15 tonnes, an increase of 12 tonnes since 2009. Sales of these products are exclusively for food-producing animals. The sales of veterinary antifungals were 11 tonnes in 2010; an increase of 3 tonnes on the previous year.



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Sales of coccidiostats in 2010 were 240 tonnes, an increase of 6 tonnes from 2009. Sales of coccidiostats have not been at this level since 2003. Coccidiostats are used in food-producing animals only, particularly poultry reared on deep litter systems.

There were no sales of veterinary antimicrobial growth promoters in 2010 following the EU ban from 1 January 2006.

### Food-Producing Animals

In 2010 sales of antibiotic products for use in food-producing animals accounted for approximately 87% (390 tonnes) of the total annual sales of 447 tonnes which was comparable with previous years. However it is not possible to identify the proportion of the 390 tonnes which was administered to animals that did not enter the food chain.

Overall the sales of veterinary antibiotic products for use in food-producing animals showed an increase in 2010, from the 2009 sales. There was an increase in sales of veterinary antibiotic in 2010 for some of the individual food-producing species e.g. pig and poultry only products increased by 47 tonnes and poultry only products increased by 13 tonnes in 2010 compared to 2009. Sales of cattle only products remained similar at 11 tonnes, whilst sales of pig only products fell by 15 tonnes. Sales of multi-species products (excluding pig and poultry only) also decreased by 2 tonnes.

Between 44% and 54% of the total sales of veterinary antibiotics were accounted for by tetracyclines in each year from 2005 to 2010. In each of the reporting years between 1 and 2 tonnes of fluoroquinolones were sold (less than 1% of the total). Between 61% and 71% of veterinary antibiotic products for food-producing animals only were sold for use as medicated feedingstuffs, over the reporting period (2005–2011), most of which are sold for use in pig and poultry farming.

### Non-Food-Producing Animals

Sales of antibiotics for veterinary medicinal products authorised only for use in non-food-producing animals in 2010 accounted for 8% (35 tonnes) of the total annual sales (447 tonnes). It is currently not possible to determine what proportion of the 22 tonnes (5%) of antibiotics sold for use in either food-producing or non-food-producing animals was used in companion animals.

In 2010 there was a decrease in the amount of antibiotics sold for use in dogs only (1.5 tonnes) and an increase (2.8 tonnes) in sales for horses only.



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## Context

### Animal health background

In addition to the normal animal health challenges facing farming the following would have had an impact on the requirement to use antimicrobials:

- In 2010 there was another wet summer in the UK which facilitates some diseases and treatment needs.
- Swine dysentery increased in pigs.

### Regulatory Background

All veterinary antibiotic products in the UK may be dispensed only under veterinary prescription.

### Numbers of Livestock in the National Herd

The following table shows the number of food-producing animals recorded each year in Defra's June Census for each of the last six reporting years. All figures are quoted in thousands of individual animals and are not adjusted for seasonality.

	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Cattle	10,392	10,270	10,304	10,107	10,025	*10,112
Pigs	4,862	4,933	4,834	4,714	4,540	*4,460
Sheep	35,416	34,722	33,946	33,131	31,445	*31,084
Poultry	173,909	173,081	167,667	166,200	152,753	*163,867

Data for 2009 have been updated since the previous report as they have now been validated.

\*Data are provisional as not all were fully validated at the time of collection.

### Interpreting the figures

The figures in this report should only be regarded as indicative of overall trends in sales. There is no central record kept of the use of antimicrobials in animals in the UK. However it is reasonable to assume that there is a direct relationship between the quantities of antimicrobials sold and used in the UK. Our assessment does not include any measure of the quality or the degree of uncertainty for the figures reported.



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## INTRODUCTION

Antibiotic resistance is a serious problem in human medicine resulting in increasing concerns about their use in human medicine, veterinary medicine, animal production, agriculture and horticulture. The UK Government has made clear that it takes this problem seriously and has developed a comprehensive strategy to address it so that their effectiveness in both humans and animals can be maintained. A key element of this strategy is the collection and publication of information on the quantities of antimicrobial products, in particular antibiotics, sold each year for veterinary use in the UK.

The Veterinary Medicines Directorate (VMD), an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra), is responsible for the authorisation of veterinary medicines in the UK. For the past 13 years, in response to recommendations made by the Advisory Committee on the Microbiological Safety of Food (ACMSF), we have collected, collated and published figures on UK sales volumes of active antimicrobial ingredients in products authorised for use in animals.

These reports are based on sales data provided voluntarily by the veterinary pharmaceutical companies marketing these products in the UK from 1998-2004. Data for 2005 and later were collected as a statutory requirement in accordance with the provisions of EC Directive 2001/82 (as amended), following entry into force of the Veterinary Medicine Regulations 2005 (at the time of collecting the data in this report the Veterinary Medicines Regulations 2009 were in force). It is reasonable to assume that there is a close correlation between the reported quantities of products sold and those used in the UK in the species indicated, though error in this assumption would overestimate use.

A glossary of terms used in this report can be found at Annex 1.

### **Methods Used**

The following paragraphs provide a brief overview of the methods used to analyse the data provided by pharmaceutical companies and to calculate the sales figures in this report.

#### Collection of data

We collect data from veterinary pharmaceutical companies in the first half of each calendar year for the previous full calendar year. These data are collated and verified before they are imported into a bespoke spreadsheet for analysis.



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### Categorisation of data

Additional information, drawn from regulatory data on each of these products, is included in a spreadsheet. These data include the authorised administration methods, target species and an appropriate conversion factor to calculate the proportion of active antimicrobial ingredient in each product. All of these data are rechecked before any further calculations are undertaken. Data are then analysed by chemical grouping, administration methods, target species and against livestock slaughter figures.

This report distinguishes sales of products indicated for use in food-producing animals only, non-food animals only and for both food-producing and non-food animals. It is hoped that this will provide a valid picture of the apportionment of sales for use of veterinary antimicrobials in the UK.

### Collation and publication

The resulting figures are collated into a report format and patterns and trends of sales are identified. It is not within the remit of this report to interpret these patterns. However, where appropriate, we do include information on factors that we are aware of and might have affected sales or use of antimicrobial products during the reporting period.

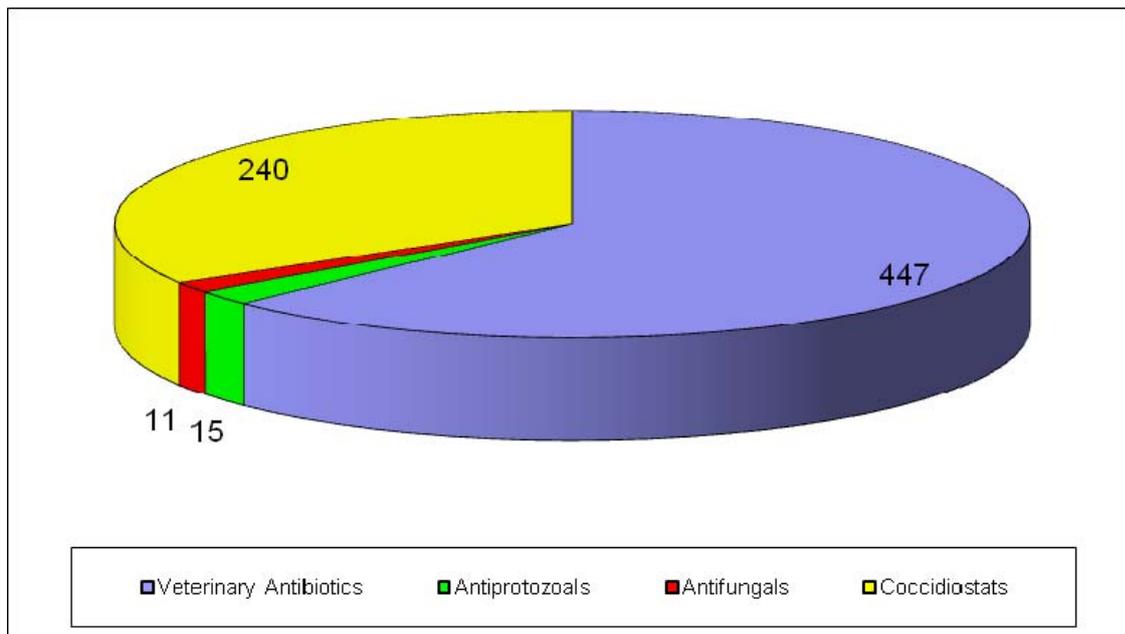
Finally, we seek comments on the draft report from the Veterinary Products Committee (VPC), the Government's independent expert advisory committee on veterinary medicines and from the Defra Antimicrobial Resistance Coordination (DARC) Group.

## RESULTS

### TOTAL SALES

The quantities of sales in 2010 for each of the four categories of veterinary products reported are illustrated in Figure 1. Veterinary antibiotics were the largest selling group (447 tonnes), followed by coccidiostats (240 tonnes). Antiprotozoals and antifungals were the smallest selling categories (15 tonnes and 11 tonnes respectively). There was no sale of antibiotic growth promoters.

**Figure 1: Quantities of veterinary antibiotics, antiprotozoals, antifungals and coccidiostats in tonnes sold in the UK in 2010<sup>1</sup>**



The numbers of products sold within each category of antimicrobials reported are summarised in Table 1. This is a summary of the numbers of products sold to help clarify the reported data. It is not a list of products that had marketing authorisations in 2010.

<sup>1</sup> Not all of the veterinary antibiotics are used to treat clinical disease manifested in animals. Some may be used prophylactically in whole groups of animals to prevent the establishment of disease in otherwise healthy animals, or metaphylactically to prevent spread of disease within a herd or flock. It is not possible within this report to estimate the proportion of therapeutic antimicrobials that were used to prevent or to treat diseases in animals.



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**Table 1: Numbers of individual products sold in 2005-2010 by reporting group of products**

<b>Group of Veterinary Product Sold</b>	<b>Number of Products Sold by Group 2005</b>	<b>Number of Products Sold by Group 2006</b>	<b>Number of Products Sold by Group 2007</b>	<b>Number of Products Sold by Group 2008</b>	<b>Number of Products Sold by Group 2009</b>	<b>Number of Products Sold by Group 2010</b>
Antibiotics comprising:	<b>325</b>	<b>317</b>	<b>312</b>	<b>334</b>	<b>340</b>	<b>371</b>
<i>Tetracyclines</i>	48	45	46	46	48	55
<i>Trimethoprim/Sulphonamides</i>	46	40	40	41	36	37
<i>β-lactams</i>	113	120	110	131	122	125
<i>Aminoglycosides</i>	29	26	28	28	29	29
<i>Macrolides</i>	23	21	22	22	28	29
<i>Fluoroquinolones</i>	26	27	27	25	31	43
<i>Other antibiotics</i>	40	38	39	41	46	53
Antiprotozoals	<b>12</b>	<b>11</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>14</b>
Antifungals	<b>13</b>	<b>13</b>	<b>13</b>	<b>15</b>	<b>13</b>	<b>17</b>
Coccidiostats	<b>9</b>	<b>9</b>	<b>9</b>	<b>11</b>	<b>11</b>	<b>11</b>

#### Total Sales: Veterinary Antibiotics

The gross quantities of antibiotic active ingredients in products sold between 2005 and 2010 are shown in Table 2. These sales are divided into those sold for use in food-producing animals only, non-food-producing animals only and those sold for use in a combination of both food and non-food animals. They are expressed as tonnes of base active ingredient. Table 2 also illustrates the trend in sales of these groups of products over the period 2005-2010. These figures are expressed graphically in Figure 2.

The overall sales of veterinary antibiotic products remained broadly the same during the reporting period of 2005-2010, varying between 384 and 447 tonnes. Since 2005 sales have been declining annually until 2009, when sales increased for 2 years in a row, see Table 2 and Figure 2. The fluctuations year-on-year are most likely to reflect natural changes in the incidence of disease in animals over that period. Sales in 2010 have shown an increase of 45 tonnes to 447 tonnes. In 2010, sales of products for use only in food-producing animals have also increased from 349 to 390 tonnes of active ingredient, sales



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of veterinary antibiotics for use in non-food-producing animals have fluctuated over the period 2005 to 2010 between 27 and 38 tonnes. Sales of products for use in either food-producing or non-food-producing species varied between 18 and 29 tonnes showing no specific trend.

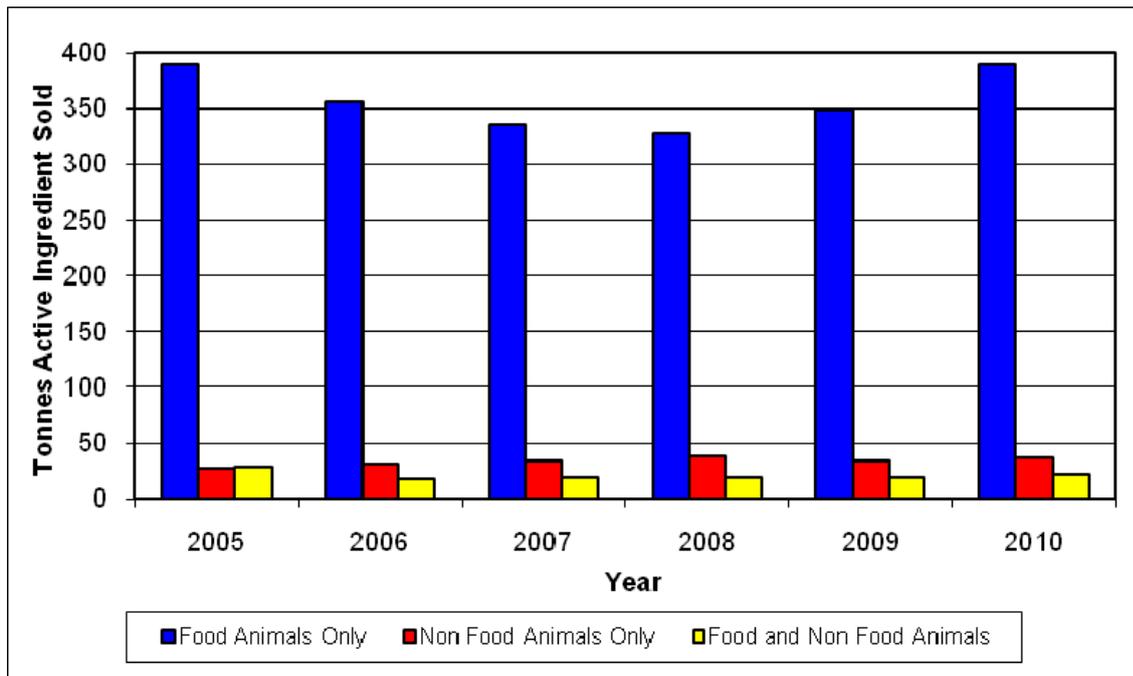
**Table 2: Sales of antibiotics 2005–2010, in the categories of food animals only, non-food animals only and combined food and non-food animals**

	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Indicated for food animals only	390	356	335	327	349	390
<i>Annual change</i>	-3	-34	-21	-8	+22	+41
Indicated for non-food animals only	27	31	34	38	34	35
<i>Annual change</i>	-2	+4	+3	+4	-4	+2
Indicated for a combination of both food and non-food animals	29	18	19	19	19	22
<i>Annual change</i>	-3	-11	+1	0	0	+3
<b>Total sales of antimicrobials</b>	<b>446</b>	<b>405</b>	<b>387</b>	<b>384</b>	<b>402</b>	<b>447</b>



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**Figure 2: Sales of antibiotic products (tonnes active ingredient) 2005–2010 in food animals only, non-food animals only and in a combination of food and non-food animals**



Total Sales: Antiprotozoals

The sales of antiprotozoal products reported to the VMD are summarised in Table 3. Antiprotozoals are products primarily used in the treatment and/or prevention of parasitic protozoal infections, (e.g. *Eimeria* spp.) Sales of antiprotozoals showed a marked decrease in 2009 relative to 2008 and a marked increase again in 2010. Sales had remained relatively stable between 2005-2008 at 12-15 tonnes. All antiprotozoal products authorised in the UK are for use in food-producing animal species.

**Table 3: Sales of antiprotozoals (tonnes active ingredient) in the UK 2005–2010**

	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Antiprotozoals	12	14	14	15	3	15
<i>Annual change</i>	-1	+2	0	+1	-12	+12



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### Total Sales: Antifungals

The sales of antifungal products reported to the VMD under the drug classifications imidazoles, triazoles, griseofulvin, aliphatic halogenitros and polyene macrolides are given in Table 4. Of the 17 sold products authorised to treat veterinary antifungal infections, 12 are indicated for use only in non-food animals. Sales have gradually increased from 2007 – 2010 from 3.1 tonnes to 10.6 tonnes.

**Table 4: Sales of antifungals (tonnes active ingredient) in the UK 2005–2010**

	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Antifungals	7.1	5.2	3.1	4.1	7.6	10.6
<i>Annual change</i>	+2	-1.9	-2.1	+1	+3.5	+3

### Total Sales: Antibiotic Growth Promoters

The last sales of antibiotic growth promoting products were in 2005 (14 tonnes). No sales have been reported since 1 January 2006 following the EU-wide ban of the sale or use of antimicrobial growth promoters.



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### Total Sales: Coccidiostats

The sales of coccidiostats from 2005 to 2010 are shown in Table 5. Sales from 2005 have shown a generally decreasing trend until 2008 and then increased in 2009 and 2010. Coccidiostats are not related to any antimicrobial product currently used in human therapy. They are used exclusively in animals, particularly poultry, to prevent coccidiosis.

**Table 5: Sales of coccidiostats (tonnes active ingredient) in the UK 2005-2010**

	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Total Coccidiostats	231	207	196	207	234	240
<i>Annual change</i>	+7	-24	-11	+11	+27	+6
<i>Ionophores</i>	173	151	144	150	169	175
<i>Non-ionophores</i>	59	56	52	57	65	65

The sub-divided ionophore and non-ionophore compounds shows is a decreasing trend in use of ionophore coccidiostats from 2005-2007, but an increase annually from 2008-2010. Sales of non-ionophore coccidiostats have been relatively stable.



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## IMPORTED SALES

In previous reports the VMD has presented data showing the amounts of active ingredients imported into the UK via the Special Import Certificate (SIC) and Special Treatment Certificate (STC) schemes. When the report of 2009 data published last year was being prepared, the VMD undertook routine validation of the SIC/STC data. The VMD found that applicants were frequently duplicating applications and that some other errors had occurred when applications were made. These factors meant that the calculated SIC/STC summary data over-reported imports.

We have been addressing how to accurately report amounts of imported antimicrobials. This year the VMD has been working with veterinary practices to try to establish more accurate data by requesting actual usage of the product, rather than the imported amounts. This task itself highlighted many other issues with the data received and further investigation and communication is required prior to this information being issued.

If we accumulate reliable data prior to next year's annual report, an addendum to this report will be issued.

## CRITICALLY IMPORTANT ANTIMICROBIALS

In November 2007, the Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials developed 11 recommendations to address the risk analysis process of hazards related to antimicrobial resistance resulting from the use of antimicrobials in food animals. Recommendation 7 stated:

"Foodborne pathogens and commensals (in particular *Salmonella* spp., *Campylobacter* spp. and *Escherichia coli* linked to the potential antimicrobial resistance to 3<sup>rd</sup> and 4<sup>th</sup> generation cephalosporins, quinolones and macrolides should be given special consideration for risk analysis".

Of these three groups of antimicrobials, the data from 2010 show that there were 1.4 tonnes of 3<sup>rd</sup> and 4<sup>th</sup> generation cephalosporins sold (0.3% of the total 447 tonnes), 2.2 tonnes of fluoroquinolones sold (0.5% of the 447 total) and 35 tonnes of macrolides sold (7.8% of the total 447 tonnes).



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## SALES BY CHEMICAL ANTIBIOTIC GROUP

The sales of various chemical groups of antibiotics between 2005 and 2010 are shown in Table 6 and Figure 2. These represent the main chemical groups of veterinary antibiotics sold in the UK. Definitions of these groups can be found in the glossary at Annex 1. In all years, tetracyclines,  $\beta$ -lactams (including penicillin) and trimethoprim/sulphonamides accounted for the majority sold. For example, in 2010, they accounted for 82% of sales, with tetracyclines accounting for 45%,  $\beta$ -lactams 21% and trimethoprim/sulphonamides 17%. The majority tetracycline products sold were authorised for use in pigs and poultry as medicated feedingstuffs.

Table 6 and Figure 2 indicate a stable trend in sales of sulphonamides/trimethoprim, tetracyclines and aminoglycosides over the past 5 years with an increase in sales of  $\beta$ -lactams. Fluoroquinolones have shown a general increase in sales from 2005-2007, small decreases in 2008-2009 and an increase in 2010. The others group has shown a gradual increase from 2005-2010.

The numbers of different products sold within each of these chemical classes of products are given in Table 1.

**Table 6: Sales of total antibiotic products by chemical grouping (tonnes active ingredient) 2005–2010**

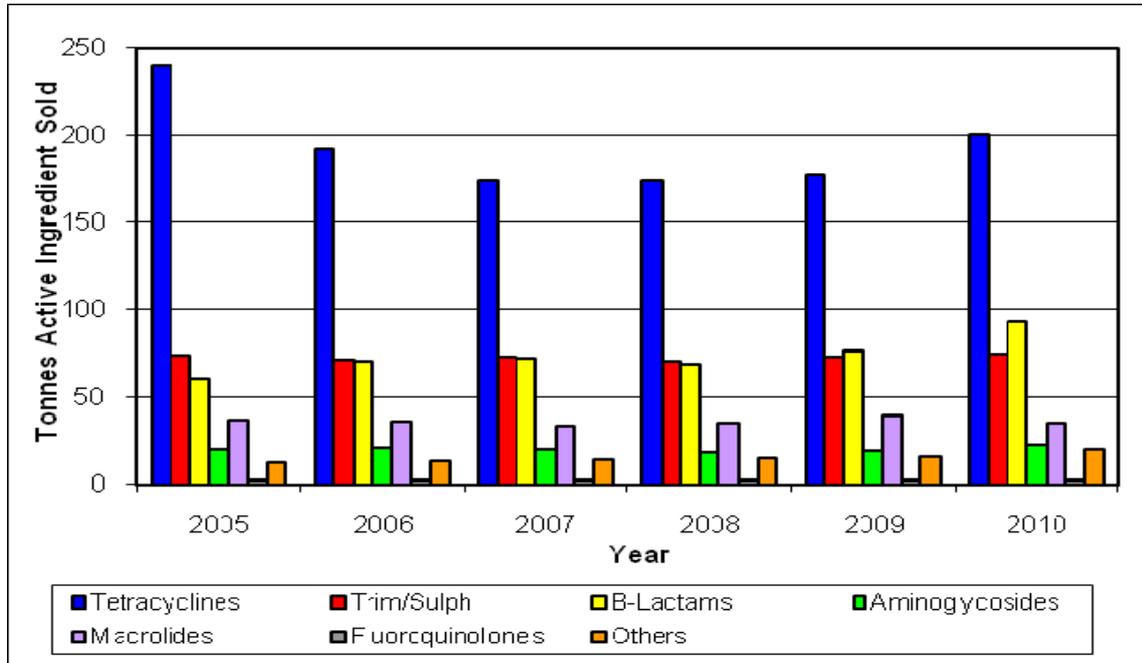
	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Tetracyclines	240	192	174	174	177	200
Trimethoprim/ Sulphonamides	74	71	73	70	73	75
$\beta$ -Lactams	60	70	72	69	76	93
Aminoglycosides	20	21	20	18	19	22
Macrolides	37	36	33	35	39	35
Fluoroquinolones *	2	2	2	2	2	2
Other	12	13	14	15	16	20
<b>Total</b>	<b>446</b>	<b>405</b>	<b>387</b>	<b>384</b>	<b>402</b>	<b>447</b>

\*fluoroquinolones (kg)                      1,451                      1,616                      1,951                      1,928                      1,849                      2,232



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**Figure 3: Sales of total antibiotic products (tonnes active ingredient) 2005–2010**



Where it is possible within the bounds of company confidentiality, the larger classes of antibiotic have been sub-divided, as suggested by a stakeholder, to give a more detailed picture of antimicrobial use in the UK, see Table 7.



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**Table 7: Sales of antibiotic products by sub-chemical grouping (tonnes active ingredient) 2005–2010**

	2005	2006	2007	2008	2009	2010
<b>Trimethoprim/ Sulphonamides</b>	<b>74</b>	<b>71</b>	<b>73</b>	<b>70</b>	<b>73</b>	<b>75</b>
Trimethoprim	12	12	12	12	12	12
Sulphonamides	62	59	61	58	61	63
<b>β-Lactams</b>	<b>60</b>	<b>70</b>	<b>72</b>	<b>69</b>	<b>76</b>	<b>93</b>
Cephalosporins* <sup>#</sup>	4	6	6	6	7	7
Penicillins**	12	13	15	13	14	17
Other Penicillins***	44	51	51	50	55	69
<b>Aminoglycosides</b>	<b>20</b>	<b>21</b>	<b>20</b>	<b>18</b>	<b>19</b>	<b>22</b>
Streptomycins	6	6	7	6	6	8
Neomycin and Framycetin	5	5	2	1	1	<1
Others****	9	10	11	11	12	14

# cephalosporins (kg)                      3,969      5,639      6,215      6,242      6,596      6,539

\* = all generations of cephalosporins are included in this group.

\*\* = includes potassium penicillin, benzyl penicillin, procain penicillin.

\*\*\* = includes cloxacillin, amoxycillin, ampicillin, penicillamine hydrochloride.

\*\*\*\* = includes gentamicin, apramycin, kanamycin, spectinomycin.

<sup>#</sup>Because of particular interest in cephalosporins the actual figures in addition to the rounded figures are shown.



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## SALES BY ROUTE OF ADMINISTRATION

### General

The major routes of administration of antibiotics sold in 2005–2010 are listed in Table 8 and Figure 3. In 2010 medicated feedingstuffs made up 62% of the total antibiotics sold, whilst oral/water and injectable products accounted for 27% and 10% respectively. Intramammary products and other antibiotic products (creams, aerosols, drops, etc) contributed 0.9% and 0.4% respectively.

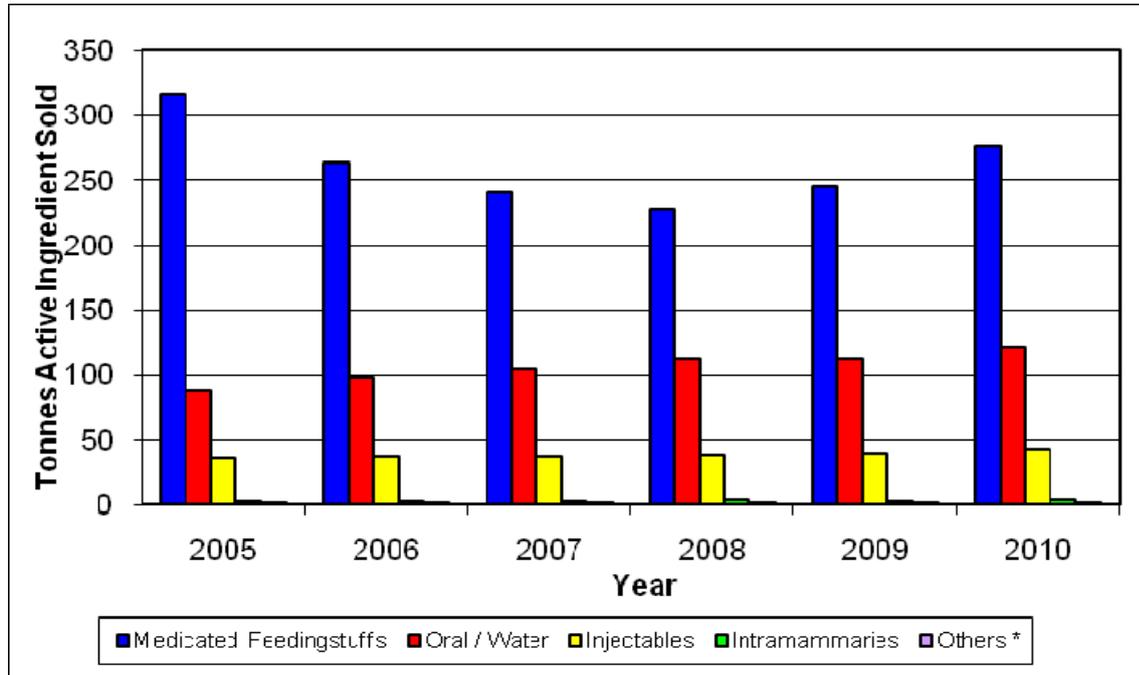
**Table 8: Sales of total antibiotics (tonnes active ingredient) by route of administration 2005–2010**

	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Medicated Feedingstuffs	317	264	241	228	245	276
Oral/Water	88	99	104	112	112	122
Injectables	36	37	37	38	40	43
Intramammaries	3	3	3	4	3	4
Others	2	2	2	2	2	2
<b>Total</b>	<b>446</b>	<b>405</b>	<b>387</b>	<b>384</b>	<b>402</b>	<b>447</b>



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**Figure 4: Sales of veterinary antibiotics (total tonnes active ingredient) by route of administration 2005–2010**



\* others includes aerosols, creams, ear and eye medications.

### Intramammary Products

Sales of intramammary products vary between 3,125 and 4,092 kilograms active ingredient across the period 2005-2010 (see Table 9). Sales of lactating cow products increased to 1,649 kilograms in 2010 and sales of dry cow therapy products increased to 1,882 kilograms.

**Table 9: Sales of antibiotic intramammary products (kilograms active ingredient) 2005–2010<sup>2</sup>**

	2005	2006	2007	2008	2009	2010
	<b>Kilograms Active Ingredient</b>					
Dry Cow Products	1,750	2,002	1,880	2,317	1,873	1,882
Lactating Cow Products	1,375	1,266	1,383	1,775	1,298	1,649
<b>Total</b>	<b>3,125</b>	<b>3,268</b>	<b>3,263</b>	<b>4,092</b>	<b>3,171</b>	<b>3,531</b>

<sup>2</sup> Sales of intramammary products are reported in kilograms.



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## SALES BY ANIMAL SPECIES

### Food Animal Species

The breakdown of the sales of antibiotics in products authorised only for food animals is shown in Table 10 and Figure 5. In 2010 65% of antibiotic products authorised only for food animals were for use in a combination of pigs and poultry only. Multi-species products are authorised for use in more than one food-producing animal only and not including 'pig and poultry only' products. These accounted for 7% of sales in 2010.

**Table 10: Sales of total antibiotics for food-producing animals only (tonnes active ingredient) by food animal species 2005–2010**

	2005	2006	2007	2008	2009	2010
	<b>Tonnes Active Ingredient</b>					
Cattle Only Products	7	10	9	11	11	11
Pig Only Products	56	71	66	62	62	47
Poultry Only Products	15	17	18	31	37	50
Sheep Only Products	<1	<1	<1	<1	<1	<1
Fish Only Products	3	4	4	1	3	1
Pig and Poultry Combined Only	286	234	216	195	205	252
Multi Species Products In Food Animals Only	23	21	22	28	31	29
<b>Total</b>	<b>390</b>	<b>356*</b>	<b>335</b>	<b>327</b>	<b>349</b>	<b>390</b>

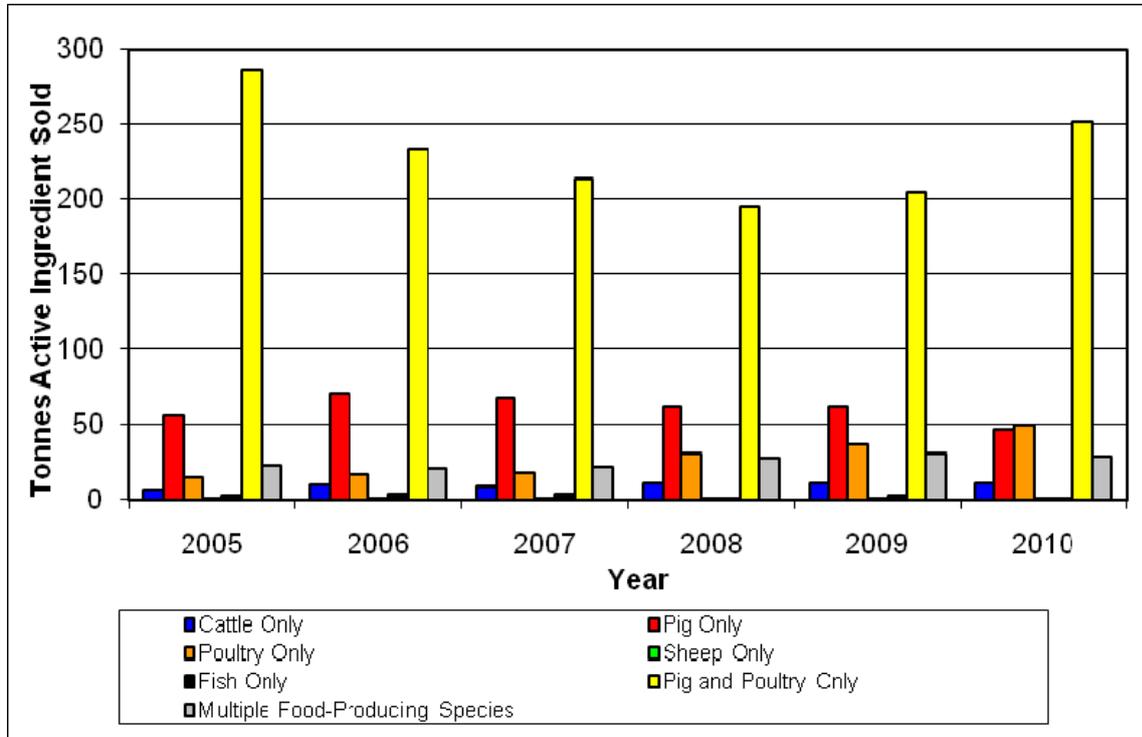
\*A difference in rounding from Table 2 gives a total of 358 tonnes.

This year for the fourth time we have analysed sales of the 252 tonnes of active ingredient in the products authorised for only for pig and poultry based on estimates of sector size provided by the pharmaceutical companies with the marketing authorisations for the products. The pharmaceutical companies advised that in 2010 that 65% of the 252 tonnes sold to pig companies and 33% were sold to poultry companies. Less than 2% were sold for off-label use in bird species other than those for which the products are authorised for e.g. duck, turkey, game. These approximations are similar to those of earlier years. Nevertheless, we do not have information which shows the final species in which these products were used and so are unable to validate the proportions.



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**Figure 5: Total sales of veterinary antibiotics (tonnes active ingredient) for food-producing animals only 2005–2010**



### Non-Food Animal Species

Table 11 shows the sales of antibiotics indicated for use in different species of non-food animals only. In 2010, 61% of all antibiotics authorised for use in non-food-producing animals were sold only for use in non-food-producing horses only and 31% in dogs only.

**Table 11: Sales of total antibiotics for non-food-producing animals only (kilograms active ingredient) by animal species 2005-2010<sup>3</sup>**

	2005	2006	2007	2008	2009	2010
	<b>Kilograms Active Ingredient</b>					
Dog Only Products	5,715	7,764	7,249	11,533	12,454	10,951
Horse Only Products	15,629	17,010	19,975	24,139	19,435	22,294
Other Products For Use In Non-food Animals Only	5,122	5,660	6,397	2,243	2,236	2,292
<b>Total</b>	<b>26,466</b>	<b>30,435</b>	<b>33,621</b>	<b>37,915</b>	<b>34,125</b>	<b>35,537</b>

<sup>3</sup> Sales of antibiotics for non-food-producing animals only are reported in kilograms.



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## ANTIBIOTIC SALES AND LIVESTOCK REARED

The live weights of animals slaughtered for food in the UK from 2005-2010 are shown in Table 12 and Figure 6. The Defra Statistics Division provided the data for livestock. The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) provided the UK fish production data and the Scottish Government and the Department of Agriculture and Rural Development (DARD) provided the fish production data, for Scotland and Northern Ireland respectively.

The total live weight of animals slaughtered for food generally increased between 2005 and 2007, but slightly fell again in 2008-2010 whilst total sales of antibiotics for food animals increased in 2010 (Table 13). Cattle, pig and sheep production decreased in 2010 compared with 2008, while poultry and fish production remained stable.

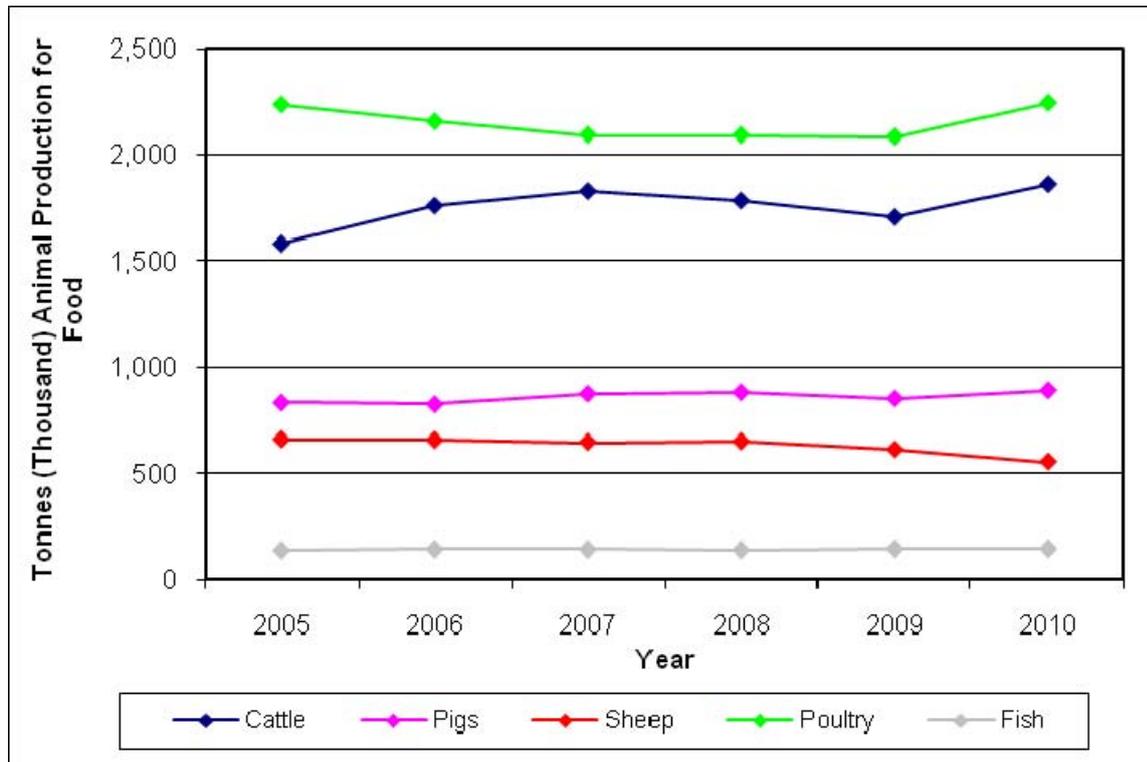
**Table 12: Live weight ('000 tonnes) of animals slaughtered for food use 2005–2010**

	2005	2006	2007	2008	2009	2010
	<b>'000 Tonnes live weight animals slaughtered for food</b>					
Cattle	1,581	*1,760	*1,829	*1,784	1,706	1862
Pigs	833	825	875	882	853	891
Sheep	658	655	646	649	611	554
Poultry	2,234	2,153	2,091	2,090	2,082	**2,242
Fish	140	145	144	142	**147	**147
<b>Total</b>	<b>5,446</b>	<b>5,538</b>	<b>5,585</b>	<b>5,547</b>	<b>5,399</b>	<b>5,696</b>

\* The OTMS rule ceased on 22 January 2006 when the OCDS scheme replaced it. The OCDS scheme closed on 31 December 2008, so there was no further throughput after that date.

\*\* Data are estimated as not all data were fully validated at the time of collection.

**Figure 6: Live weight ('000 tonnes) of animals slaughtered for food use 2005–2010**



Many farm animals are reared to slaughter without the use of antibiotics. Other animals such as dairy cows may be treated with antimicrobials but may not be slaughtered for food use until a number of years later. However, if it was assumed that total antibiotics sold for food-producing animals only were used solely in animals slaughtered for food, 1 tonne of antibiotic would have been used in the production of 13,480, 15,556, 16,672, 16,963, 15,470 and 14,605 tonnes of live weight of animals slaughtered in the years 2005-2010 (see Table 13). Using the same assumptions, between 60g and 80g of antimicrobial was sold for each tonne of live weight animal slaughtered.

The figures for live weight of animals slaughtered are only those animals fed and slaughtered within the UK and no account has been taken of those live animals exported. Furthermore, the live weight slaughter figures do not include animals slaughtered in previous years via the OCDS and OTMS or selective culls (e.g. FMD, avian influenza, etc.), i.e. animals slaughtered but not used in food production. The numbers of cattle slaughtered annually under OTMS in 2005 are 706,787. In 2006 50,400 cattle were culled via the OTMS and 150,411 by the OCDS (total culled 200,811). In 2007 127,559 and in 2008 128,345 cattle were culled respectively via the OCDS. The OCDS scheme closed on 31 December 2008, so there was no further throughput after that date.



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Some animals that receive antibiotics may not enter the food chain for a number of other reasons. Therefore, a proportion of the food-producing animals that have been treated with antibiotics do not ultimately end up as human food. It is not possible to take these factors into account in preparing this report so our figures are likely to be an over-estimate. If they were taken into account, the quantity of antibiotics used to produce each tonne of animal slaughtered for human food would be considerably less.

**Table 13: Total live weight ('000 tonnes) of animals slaughtered for food use (data sources see above) against total antibiotic product sales for food-producing animals only (tonnes active ingredient) 2005-2010**

	2005	2006	2007	2008	2009	2010
Total live weight animals slaughtered for food use ('000 tonnes)	5,446 <sup>1</sup>	5,538	5,585	5,547	5,399	**5,696
Total antibiotics (tonnes) sold for food animals (tonnes a.i.)	404 <sup>1</sup>	356	335	327	349	**390
Live weight of animals slaughtered (tonnes) for food per tonne of antimicrobial a.i. sold	13,480 <sup>1</sup>	15,556	16,672	16,963	15,470	**14,605
Kg of antimicrobial a.i. sold per tonne of live weight of animals slaughtered for food	0.07 <sup>1</sup>	0.06	0.06	0.06	0.07	**0.07

<sup>1</sup> Includes 15 tonnes of growth promoters.

\*\* Data are estimated as not all data were fully validated at the time of data collection.



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## ANTIBIOTIC SALES AND OTHER FOOD ANIMAL COMMODITIES

Cows' milk production in the UK annually, expressed in millions of litres, is detailed in Table 14. The Defra Statistics (Commodities and Food) Division provided the data for milk production. These data have been compared to the quantities of intramammary products sold over the same period for use in lactating cows. Over the reporting period the quantity of milk produced for each tonne of intramammary product sold for use in lactating cows has fluctuated. Using the same data we can estimate that around 0.1mg of antibiotic was sold per litre of milk produced.

**Table 14: Litres of milk produced per kilogram of antibiotic lactating cow intramammary product (kilograms active ingredient) sold 2005-2010**

	2005	2006	2007	2008	2009	2010
Million litres milk produced	14,052	13,902	13,619	13,319	*13,197	**13,533
Kilograms a.i. lactating intramammary sold	1,375	1,266	1,383	1,775	*1,298	**1,649
Million litres milk produced per tonne a.i. lactating intramammary sold	10,220	10,981	9,847	7,504	*10,167	**8,207
Kilograms a.i. lactating intramammary sold per million litre of milk produced	0.10	0.09	0.10	0.13	*0.10	**0.12

\*2009 data has been updated to reflect the validation results.

\*\*Data are provisional as not all data were fully validated at the time of collection.

In addition not all of the approximately 13 billion litres of milk produced annually in the UK (excluding suckled milk) are sold for human consumption. It is estimated that approximately 183 million litres of milk produced are fed back to calves and other animals (e.g. pigs) or are treated on farm as waste in 2010. If milk is produced over the allowed EU quotas it may also be destroyed.



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## EUROPEAN SURVEILLANCE OF VETERINARY ANTIMICROBIAL CONSUMPTION

The European Commission (EC) has requested the European Medicines Agency (EMA) to take the lead in collecting data on the use of antimicrobial agents in animals from all Member States (MS). The EMA has developing a harmonised approach for the collection and reporting of data based on national sales figures. This was designed to be comparable with usage data of human antimicrobials.

The collection protocol and template were developed via a Technical Consultative Group (TCG) in which the VMD participated. The protocol was also harmonised with that method used by the European Surveillance of Antimicrobial Consumption (ESAC) in human medicine.

The VMD worked as part of the pilot project to report 2008 sales data in the ESVAC format. Members of the TCG subsequently trained other MS in the use of the agreed protocol and template. Subsequently the European Countries which had antimicrobial consumption data project already in existence gave their data for 2005 to 2009 to the ESVAC project. At the time of writing this report, the first ESVAC report was due to be published and a call for 2010 data from 22 countries had also been made.

The ESVAC format reports sales figures in a slightly different way to the approach used in the UK. Currently the ESVAC project requires data on consumption of antimicrobial products with particular Anatomical Therapeutic Codes (ATCs) and these do not at the current time encompass the same breadth of products as the UK report. We intend to continue to use the current reporting format for the UK sales data report, but periodically review the UK report as the ESVAC project develops.



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## HOW CAN WE IMPROVE THIS REPORT?

**We would welcome any comments that readers have on this report.**

We will continue to strive to improve this report within the limitations of the data supplied.

We are looking to improve our understanding of the effects of changes in the patterns of sales of antimicrobial products through comparing our figures with other validated information held by Defra and other Government Departments, and in other countries. In March 2010, a number of Government Agencies including the VMD, Defra, FSA, HPA and DH published the second Overview of Antimicrobial Usage and Bacterial Resistance in Selected Human and Animal Pathogens in the UK covering data from 2007. This Overview report is available on the VMD website under 'general public', 'antimicrobial related information', and 'publications' tabs along side the original report covering data for 2004.

**We are keen to maximise the value of the published figures to stakeholders. We would welcome any comments that you might have about the contents of this report, including the categories under which information is reported, and on our proposals for improvements.**

We would also welcome any information or interpretations that you may have on the patterns and trends of sales of antimicrobials noted in this report. These should be sent to:

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**[postmaster@vmd.defra.gsi.gov.uk](mailto:postmaster@vmd.defra.gsi.gov.uk)**

**VETERINARY MEDICINES DIRECTORATE  
NOVEMBER 2011**



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## **ANNEX 1: GLOSSARY OF TERMS**

<b>a.i.</b>	Active Ingredient; the part of an antimicrobial medicine that acts against the bacterial infection.
<b>Aminoglycosides</b>	A closely related group of bactericidal antibiotics derived from bacteria of the order Actinomycetales. Polycationic compounds that contain an aminocyclitol with cyclic amino-sugars attached by glycoside linkages. Sulphate salts are generally used. They have broadly similar toxicological features.
<b>Antibiotic</b>	A substance produced by or derived from a micro-organism, which selectively destroys or inhibits the growth of other micro-organisms. In this report antibiotic is used to mean antibacterial.
<b>Antifungal</b>	Products that are destructive to or suppress the reproduction or growth of fungi.
<b>Antimicrobial</b>	A compound which, at low concentrations, exerts an action against micro-organisms and exhibits selective toxicity towards them. The term includes any substance of natural, synthetic or semi-synthetic origin that is used to kill, or inhibit the growth of, micro-organisms (bacteria, fungi, protozoa and viruses). Antimicrobials include antibiotics, disinfectants, preservatives and other substances.
<b>Antimicrobial Resistance</b>	The ability of a micro-organism to grow or survive in the presence of an antimicrobial that is usually sufficient to inhibit or kill micro-organisms of the same species.
<b>Antiprotozoal</b>	A drug primarily used in the treatment and/or prevention of parasitic protozoal infections.
<b>β-Lactam</b>	Semi-synthetic antibiotics derived from penicillin G or cephalosporin C, natural antibiotics produced by the mould <i>Cephalosporium acremonium</i> . Bactericidal products that act by inhibiting synthesis of the bacterial cell wall.
<b>Coccidiostat</b>	Product used for the prevention of coccidiosis, a protozoal infection causing diarrhoea and dysentery.
<b>Defra</b>	Department for Environment, Food and Rural Affairs.



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<b>FAO</b>	Food and Agriculture Organisation of the United Nations
<b>Fluoroquinolone</b>	A sub-group of the quinolone compounds, having the addition of a fluorine atom and the 7-piperazinyl group. Broad-spectrum antibacterials with properties more suited to the treatment of systemic infections.
<b>Food Animals</b>	Animals produced for food including: cattle, sheep, pigs, poultry, salmon, trout and bees.
<b>Growth Promoter</b>	Substances, which, when given in animal feed, increase feed conversion efficiency or result in better daily live weight gain, or both.
<b>Injectable Product</b>	A product which is administered to animals via injection.
<b>Intramammary Product</b>	A product which is administered into the udder.
<b>Ionophore</b>	A small hydrophobic molecule that dissolves in lipid bilayer membranes and increases permeability to inorganic ions.
<b>Macrolide</b>	A large group of antibiotics mainly derived from <i>Streptomyces</i> spp. Weak bases that are only slightly soluble in water. They have low toxicity and similar antimicrobial activity with cross-resistance between individual members of the group. Thought to act by interfering with bacterial protein synthesis.
<b>Medicated Feedingstuff</b>	Feedingstuffs that contain a veterinary medicine and that are intended for feeding to animals without further processing.
<b>Non-Food Animals</b>	Animals not reared for food. These are mainly companion animals including, dogs, cats, horses, small mammals, rabbits and birds.
<b>Non-Ionophore Coccidiostat</b>	All coccidiostats with alternative modes of action to those shown by ionophores.
<b>OIE</b>	World Organisation for Animal Health
<b>Special Import Certificate</b>	A certificate issued by the VMD on behalf of the Secretary of State to permit veterinary surgeons to legally import veterinary medicinal products with current EU authorisations into the UK to treat animals under the 'cascade'.



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<b>Special Treatment Certificate</b>	A certificate issued by the VMD on behalf of the Secretary of State to permit veterinary surgeons to legally import other products/substances, where the health situation demands and where there is no EU authorised treatment available.
<b>Sulphonamide</b>	A group of bacteriostatic compounds that interfere with folic acid synthesis of susceptible organisms. They all have similar antimicrobial activity but different pharmacokinetic properties.
<b>Tetracycline</b>	A group of antibiotics derived from <i>Streptomyces</i> spp. They are usually bacteriostatic at concentrations achieved in the body and act by interfering with protein synthesis in susceptible organisms. All have a broad spectrum of activity.
<b>Therapeutic Product</b>	A product which treats or prevents disease.
<b>Trimethoprim</b>	Compounds with a similar action to sulphonamides, acting by interfering with folic acid synthesis, but at a different stage in the metabolic pathway. Display a similar spectrum of activity to, and are often used in combination with, sulphonamides.
<b>VMD</b>	Veterinary Medicines Directorate, an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra).
<b>Water/Oral Product</b>	A product that is administered to animals orally. Includes tablets, boluses, capsules, dissolvable powders and sachets, solutions, etc.
<b>WHO</b>	World Health Organisation.



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## **ANNEX 2: CONTRIBUTORS AND PARTICIPANTS**

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aniMedica GmbH  
Bayer Plc  
Boehringer Ingelheim Vetmedica  
CEVA Animal Health Ltd  
Chanelle Animal Health Ltd  
Continental Farmaceutica S.L.  
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