



ASSURING THE SAFETY, QUALITY AND EFFICACY  
OF VETERINARY MEDICINES

SALES OF ANTIMICROBIAL PRODUCTS  
AUTHORISED FOR USE AS  
VETERINARY MEDICINES,  
ANTIPROTOZOALS,  
ANTIFUNGALS,  
GROWTH PROMOTERS  
AND  
COCCIDIOSTATS,  
IN THE UK IN 2006

**2007**





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## SUMMARY

This is the ninth 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 methodology developed in 2002. It includes additional reporting categories designed to enhance the previous data and provide a more comprehensive picture of sales of veterinary antimicrobials in the UK.

### Summary of the main points and changes to the report

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 2006.
- Report for the first time the amounts of veterinary antimicrobials imported into the UK, 2004-2006, by Veterinary Surgeons using the Special Import Certificate (SIC) and Special Treatment Certificate (STC) systems.
- There is an overall 41 tonne decrease in sales of veterinary antimicrobials, most of which is accounted for by the combination of a decrease in sales of tetracyclines of 48 tonnes and an increase in sales of  $\beta$ -lactams of 10 tonnes.
- There is a decrease in sales of products for food-producing animals and a combination of food-producing and non food producing animals of 34 tonnes and 11 tonnes respectively.
- No sales of antimicrobial growth promoters are reported as their use and sales were banned from 1 January 2006.
- There is a 28 tonne decrease in sales of coccidiostats in 2006, compared with 2005.
- In 2006 165 Kg<sup>1</sup> more fluoroquinolones were sold than in 2005. For cephalosporins, there was an increase of 1.6 tonnes<sup>1</sup>.

### Trends

#### Total Sales (All tonnages are expressed as active ingredient (a.i))

The total sales of veterinary therapeutic antimicrobials in the UK have remained relatively steady between 1998 and 2003 at around 434 tonnes per annum. During 2004 total sales of antimicrobials for therapeutic use in all animals increased by 20 tonnes to 454 tonnes, but decreased by 8 tonnes in 2005 to 446 tonnes and by a further 41 tonnes in 2006 to 405 tonnes.

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<sup>1</sup> The proportions published on 20 December 2007 may be open to interpretation and so these have been removed to clarify the change. There are no changes to the tonnages reported.



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The sales of veterinary therapeutic antiprotozoals in 2006 were 14 tonnes, an increase of 2 tonnes over 2005. Sales of these products are exclusively for food-producing animals. The sales of veterinary antifungals were relatively constant in 2006 compared to previous years.

There were no sales of veterinary antimicrobial growth promoters in 2006 following the EU ban on their use or sales from 1 January 2006.

Sales of coccidiostats in 2006 were 203 tonnes, a decrease of 28 tonnes from 2005. It is known that in 1998 and 1999 there were missing data and direct comparisons of sales between these years and 2006 therefore cannot be made. Coccidiostats are used in food-producing animals only, particularly poultry reared on deep litter systems.

### Food-Producing Animals

In 2006 sales of antimicrobial products for therapeutic use in food-producing animals accounted for approximately 88% (356 tonnes) of the total annual sales of 405 tonnes which was comparable with previous years. However it is not possible to identify the proportion of the 356 tonnes which was administered to animals that did not enter the food chain (for example, cattle barred from use in food via the Over Thirty Months Scheme).

Approximately half of the total sales of therapeutic antimicrobials were accounted for by tetracyclines in each year from 1998 to 2006. In each of the nine reporting years between 1 and 2 tonnes of fluoroquinolones were sold (less than 1% of the total). Between 66% and 76% of therapeutic antimicrobial products for food-producing animals only were sold for use as medicated feedingstuffs, over the reporting period (2001– 2006), most of which are sold for use in pig and poultry farming.

Overall the sales of therapeutic antimicrobial products for use in food-producing animals showed a decrease in 2006, from the 2005 sales. There was a decrease in sales of therapeutic antimicrobials in 2006 for some of the individual food-producing species e.g. for pigs and poultry only (decreased by 52 tonnes a.i.). An increase in sales was seen for cattle only (3 tonnes a.i.) and poultry only (2 tonnes a.i.). Sales of multi-species products (excluding pig and poultry only) remained constant from 2002 to 2006.

## **Context**

### Animal health background

In addition to the normal animal health challenges facing farming:

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- UK pig farming continued to suffer from the presence of diseases such as Porcine Dermatitis and Nephropathy Syndrome and Post-weaning Multi-systemic Wasting Syndrome (PDNS/PMWS), which often lead to secondary infections requiring antimicrobial treatment; and
- Farmers followed the EU ban of the four remaining antimicrobial growth promoting ingredients from 1 January 2006.

### Regulatory Background

All therapeutic antimicrobial 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>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
Cattle	10,602	10,345	10,508	10,588	10,392	10,270
Pigs	5,845	5,588	5,046	5,159	4,862	4,933
Sheep	36,716	35,834	35,812	35,817	35,416	34,722
Poultry	179,800	168,996	178,800	181,759	173,909	173,081

### 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 the UK. However it is reasonable to assume that there is a direct relationship between the quantity 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

Antimicrobial resistance is a serious problem in human medicine resulting in increasing concerns about the use of antimicrobial products 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 the effectiveness of antimicrobial products 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 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 nine 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 used in products authorised as veterinary medicines, growth promoters or coccidiostats. The report has been extended over time to include antiprotozoal and antifungal products.

These reports are based on sales data previously 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. 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. This report for the first time includes products imported by Veterinary Surgeons under Special Import Certificate (SIC) or Special Treatment Certificate (STC) arrangements.

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.



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### 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.

Data from the SIC and STC imports are gathered from the in-house databases and transferred into a purpose built spreadsheet for analysis.

### 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.

A number of antimicrobial products are authorised for use in more than one species. It is proving difficult to determine for which species the products were sold. Data have been collected by the National Animal Disease Information Service (NADIS) about on-farm use to provide evidence upon which to base a pro-rata split of the sales figures for pig and poultry only products between the species.

In this year's report we have reported 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 therapeutic antimicrobials in the UK.

SIC and STC data were analysed and relevant data on target species etc included in the spreadsheets. Data were checked and calculations validated in-house. Data were split into those for food-producing animals only and those for non-food producing animals only.

### 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.



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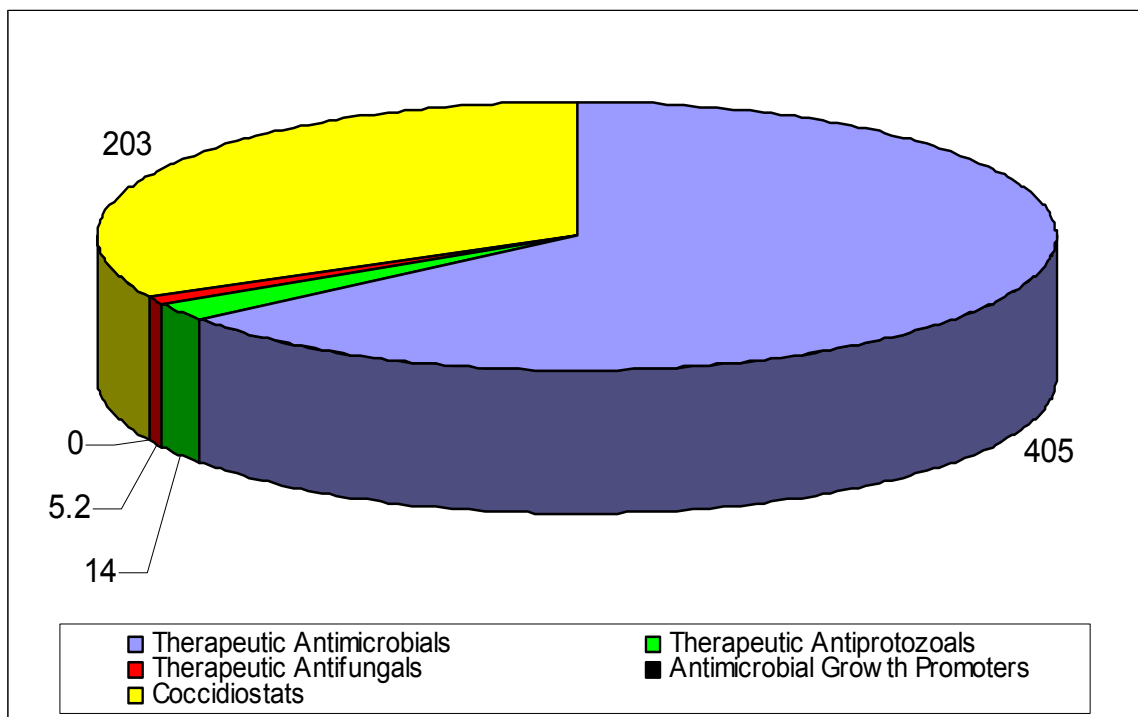
Finally, we seek comments on the draft report from the Veterinary Products Committee (VPC), the Government's independent expert advisory committee on veterinary medicines and from the Defra Antimicrobial Resistance Coordination (DARC) Group.

## RESULTS

### TOTAL SALES

The quantities of sales in 2006 for each of the five categories of veterinary products reported are illustrated in Figure 1. Therapeutic antimicrobials were the largest selling group (405 tonnes), followed by coccidiostats (203 tonnes), with no sales of antimicrobial growth promoters. Therapeutic antiprotozoals and antifungals were the smallest selling categories (14 tonnes and 5.2 tonnes respectively).

**Figure 1: Quantities of therapeutic antimicrobials, antiprotozoals, antifungals and coccidiostats and antimicrobial growth promoters in tonnes a.i. sold in the UK in 2006<sup>2</sup>**



The numbers of products sold within each category of antimicrobials reported are summarised in Table 1. This is not a list of products that had marketing authorisations in 2006, but a summary of the numbers of products sold to help clarify the reported data.

<sup>2</sup> Not all of the therapeutic antimicrobials are used to treat clinical disease manifested in animals. Some may be used prophylactically in whole groups of animals, to prevent the 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 products sold in 2002-2006 by reporting group of products**

<b>Group of Veterinary Product Sold</b>	<b>Number of Products Sold by Group 2002</b>	<b>Number of Products Sold by Group 2003</b>	<b>Number of Products Sold by Group 2004</b>	<b>Number of Products Sold by Group 2005</b>	<b>Number of Products Sold by Group 2006</b>
Therapeutic Antimicrobials comprising:	<b>370</b>	<b>358</b>	<b>339</b>	<b>325</b>	<b>317</b>
<i>Tetracyclines</i>	56	49	50	48	45
<i>Trimethoprim/Sulphonamides</i>	56	50	45	46	40
<i>β-lactams</i>	129	124	120	113	120
<i>Aminoglycosides</i>	42	45	40	29	26
<i>Macrolides</i>	20	20	19	23	21
<i>Fluoroquinolones</i>	31	34	25	26	27
<i>Others</i>	36	36	40	40	38
Therapeutic Antiprotozoals	<b>18</b>	<b>14</b>	<b>13</b>	<b>12</b>	<b>11</b>
Therapeutic Antifungals	<b>14</b>	<b>16</b>	<b>15</b>	<b>13</b>	<b>13</b>
Coccidiostats	<b>17</b>	<b>11</b>	<b>10</b>	<b>9</b>	<b>9</b>

#### Total Sales: Therapeutic Antimicrobials

The gross quantities of antimicrobial active ingredients in therapeutic products sold between 2001 and 2006 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 and are expressed as tonnes of base active ingredient. Table 2 also illustrates the trend in sales of these groups of products over the period 2001-2006. These figures are expressed graphically in Figure 2.

The overall sales of therapeutic antimicrobial products have remained broadly the same over the period 2001-2005, varying between 424 and 454 tonnes, see Table 2 and Figure 2. The minor fluctuations year-on-year are most likely to reflect natural changes in the incidence of disease in animals over that period. Sales in 2006 have shown a decrease of 41 tonnes to 405 tonnes. In 2006, sales of therapeutic products for use in food-producing animals only have also decreased from 390 to 356 tonnes of active ingredient, sales of therapeutic antimicrobials for use in non food-producing animals only varied between 24



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and 31 tonnes active ingredient and sales of products for use in either food-producing or non food-producing species varied between 18 and 32 tonnes of active ingredient showing no specific trend.

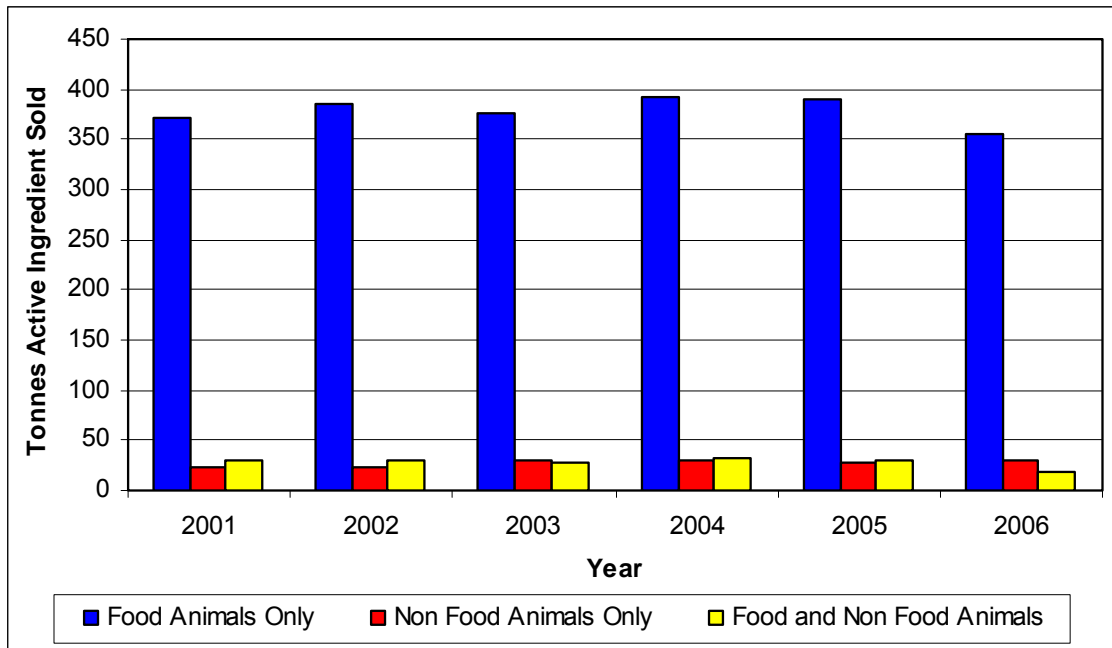
**Table 2: Sales of therapeutic antimicrobials 2001 – 2006, in the categories of food animals only, non food animals only and combined food and non food animals**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Indicated for food animals only	371	386	377	393	390	356
<i>Annual Actual increase/decrease</i>	(31)	15	(9)	16	(3)	(34)
Indicated for non food animals only	24	24	30	29	27	31
<i>Annual Actual increase/decrease</i>	5	0	6	(1)	(2)	4
Indicated for a combination of both food and non food animals	29	30	28	32	29	18
<i>Annual Actual increase/decrease</i>	6	1	(2)	4	(3)	(11)
<b>Total sales of therapeutic antimicrobials</b>	<b>424</b>	<b>440</b>	<b>435</b>	<b>454</b>	<b>446</b>	<b>405</b>



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**Figure 2: Sales of antimicrobial therapeutic products (tonnes active ingredient) 2001 – 2006 in food animals only, non food animals only and in a combination of food and non food animals**



Total Sales: Therapeutic Antiprotozoals

The sales of therapeutic antiprotozoal products reported to the VMD are summarised in Table 3. Therapeutic antiprotozoals are products primarily used in the treatment and/or prevention of parasitic protozoal infections, e.g. *Eimeria* spp. Sales of therapeutic antiprotozoals showed an overall downward trend over the years 1998-2003 then an increase between 2004 and 2006. All antiprotozoal products authorised in the UK are for use in food-producing animal species.

**Table 3: Sales of therapeutic antiprotozoals (tonnes active ingredient) in the UK 2001 – 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Antiprotozoals	33	65	2	13	12	14
<i>Annual Actual Increase / Decrease</i>	7	32	(63)	11	(1)	2



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### Total Sales: Therapeutic Antifungals

The sales of therapeutic antifungal products reported to the VMD under the drug classifications: imidazoles, triazoles, griseofulvin, aliphatic halogenitros and polyene macrolides, see Table 4. Therapeutic antifungals are products primarily used to destroy or suppress the reproduction or growth of pathogenic fungi. Of the 13 products authorised to treat veterinary antifungal infections, 10 are indicated for use only in non food animals.

**Table 4: Sales of therapeutic antifungals (tonnes active ingredient) in the UK 2001 – 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Antifungals	1.7	10.5	13.8	5.1	7.1	5.2
<i>Annual Actual Increase / Decrease</i>	(0.2)	8.8	3.3	(8.7)	2	(1.9)

### Total Sales: Antimicrobial Growth Promoters

The sales of antimicrobial growth promoting products from 2001-2006, are summarised in Table 5. Sales volumes have decreased from 1998 (141 tonnes) to 2006 when no sales were reported. This follows the EU-wide ban on 1 January 2006 of the sale or use of antimicrobial growth promoters.

**Table 5: Sales of antimicrobial growth promoting products (tonnes active ingredient) in the UK 2001 - 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Growth Promoting Products	43	42	36	32	14	0
<i>Annual Actual Increase / Decrease</i>	(1)	(1)	(6)	(4)	(18)	(14)



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Total Sales: Coccidiostats

The sales of coccidiostats from 2001 to 2006 are shown in Table 6. Because of incomplete returns of sales data for coccidiostats for 1998 and 1999 it is assumed that the tonnes reported for these years were below actual sales. With this in mind, the apparent increase in coccidiostat sales between 1999 and 2000 probably reflects missing data in 1998 and 1999 rather than higher sales in subsequent years. Sales from 2001 have shown a generally decreasing trend. Coccidiostats are not related to any antimicrobial product currently used in human therapy. They are used exclusively in animals to prevent coccidiosis, particularly in poultry.

**Table 6: Sales of coccidiostats (tonnes active ingredient) in the UK 2001 - 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Coccidiostats	266	260	240	224	231	203
<i>Annual Actual Increase / Decrease</i>	16	(6)	(20)	(16)	7	(28)

The sales of coccidiostats have been sub-divided into ionophore and non-ionophore compounds for the years where data are believed to be complete. These data are summarised in Table 7. They show that there is a relatively constant proportion (71-79%) of ionophore coccidiostats in each year 2001-2006.

**Table 7: Sales of ionophore and non-ionophore coccidiostats (tonnes active ingredient) in the UK 2001 – 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Ionophores	190	206	190	173	173	147
Non-ionophores	76	54	50	51	59	56
<b>Total</b>	<b>266</b>	<b>260</b>	<b>240</b>	<b>224</b>	<b>231</b>	<b>203</b>



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## IMPORTED SALES

The amounts of antimicrobial active ingredients imported into the UK via the SIC and STC systems, where no authorised products are available in the UK, are shown in Table 8. The amounts imported are small and are reported in kilograms of active ingredient. Definitions of these routes of import are given in the Glossary at Annex 1.

The imports of antimicrobial active ingredients for all animals for 2004-2006 were variable amongst the years with no clear trend of use. This would be expected as different disease issues were addressed by veterinary surgeons. In each of the years 2004, 2005 and 2006, 56%, 73% and 31% of those imports were for use in food-producing animals.

**Table 8: Sales of imported antimicrobials (kilograms active ingredient) into the UK 2004-2006 for all animals 2004-2006**

	2004	2005	2006
	<b>Kilograms Active Ingredient</b>		
Antimicrobial active ingredient	159	252	189



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## SALES BY CHEMICAL ANTIMICROBIAL GROUP

The sales of various chemical groups of antimicrobials between 2001 and 2006 are shown in Table 9 and Figure 3. These represent the main chemical groups of veterinary antimicrobials sold in the UK. Definitions of these groups can be found in the glossary at Annex 1. In all years, tetracyclines, trimethoprim/sulphonamides and  $\beta$ -lactams (including penicillin) accounted for the vast majority of the therapeutic antimicrobials sold. For example, in 2006, they accounted for 82% of sales, with tetracyclines accounting for 48%, Trimethoprim/sulphonamides 18% and  $\beta$ -lactams 17%. Most tetracyclines were sold for the treatment of pigs and poultry as medicated feedingstuffs (MFS), under veterinary prescription.

Table 9 and Figure 3 indicate a decreasing trend for sales of sulphonamides/trimethoprim, whereas sales remained relatively stable for the classes of aminoglycoside, macrolides and others. Fluoroquinolones have shown an increase in sales from 2004-2006. Tetracyclines have shown a 20% decrease from 2005 to 2006.

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

**Table 9: Sales of total antimicrobial therapeutic products by chemical grouping (tonnes active ingredient) 2001 – 2006**

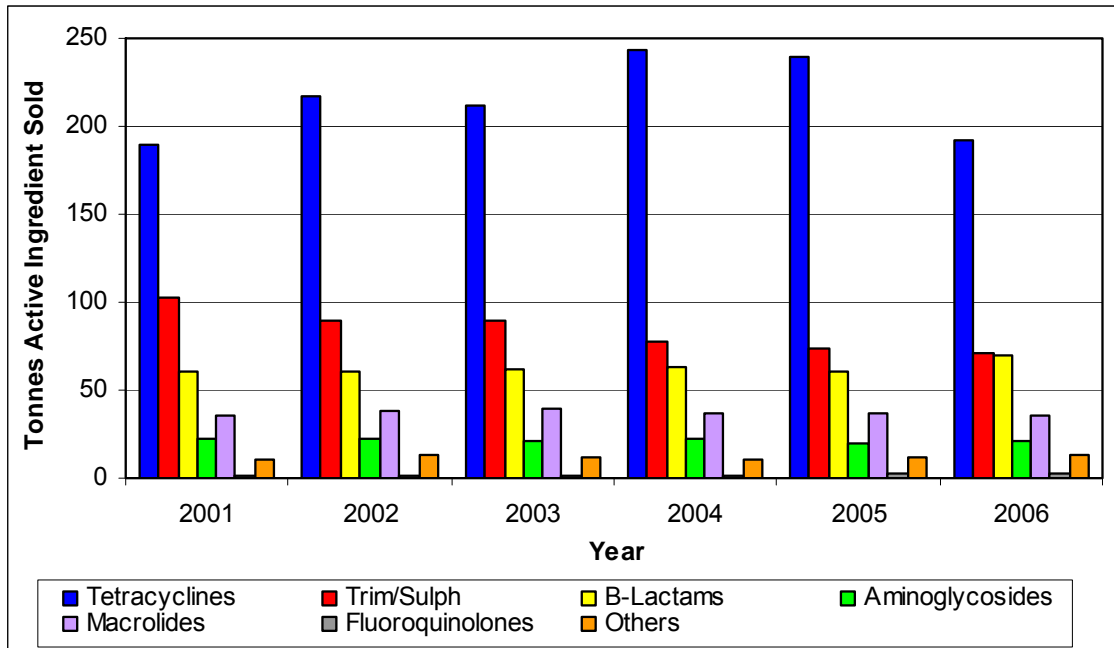
	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Tetracyclines	190	217	212	243	240	192
Trimethoprim/ Sulphonamides	103	89	89	77	74	71
$\beta$ -Lactams	61	60	62	63	60	70
Aminoglycosides	22	22	21	22	20	21
Macrolides	35	38	39	37	37	36
Fluoroquinolones *	1	1	1	1	2	2
Other	11	13	12	11	12	13
<b>Total</b>	<b>424</b>	<b>440</b>	<b>435</b>	<b>454</b>	<b>446</b>	<b>405</b>

\*fluoroquinolones (kg)      1,318      1,365      1,364      1,412      1,451      1,616



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**Figure 3: Sales of total antimicrobial therapeutic products (tonnes active ingredient) 2001 – 2006**



Where it is possible within the bounds of company confidentiality, the larger classes of antimicrobials have been sub-divided, as suggested by a stakeholder, to give a more detailed picture of antimicrobial use in the UK, see Table 10.



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**Table 10: Sales of antimicrobial therapeutic products by sub-chemical grouping (tonnes active ingredient) 2001 – 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
<b>Trimethoprim/ Sulphonamides</b>	<b>103</b>	<b>89</b>	<b>89</b>	<b>77</b>	<b>74</b>	<b>71</b>
Trimethoprim	16	14	15	13	12	12
Sulphonamides	87	75	74	64	62	59
<b>β-Lactams</b>	<b>61</b>	<b>60</b>	<b>62</b>	<b>63</b>	<b>60</b>	<b>70</b>
Cephalosporins <sup>#</sup>	3	3	3	3	4	6
Penicillins <sup>**</sup>	24	18	16	14	12	13
Others Penicillins <sup>***</sup>	34	39	43	46	44	51
<b>Aminoglycosides</b>	<b>22</b>	<b>22</b>	<b>21</b>	<b>22</b>	<b>20</b>	<b>21</b>
Streptomycins	8	7	7	6	6	6
Neomycin and Framycetin	5	5	5	6	5	5
Others <sup>****</sup>	9	10	9	11	9	10

<sup>#</sup> cephalosporins (kg)                      2,607      2,520      3,037      3,240      3,969      5,639

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

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

\*\*\* = includes cloxacillin, amoxycillin, ampicillin, nafcillin, penthamate hydroide.

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



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## SALES BY ROUTE OF ADMINISTRATION

### General

The major routes of administration of antimicrobials sold in 2001 – 2006 are listed in Table 11 and Figure 4. In 2006 medicated feedingstuffs made up 58% of the total therapeutic antimicrobials sold, whilst oral/water and injectable products accounted for 31% and 9% respectively. Intramammary products and other therapeutic antimicrobial products (creams, aerosols, drops, etc) contributed 0.7% and 0.5% respectively. Overall the sales of products for all routes of administration appear to be relatively stable with only minor yearly fluctuations.

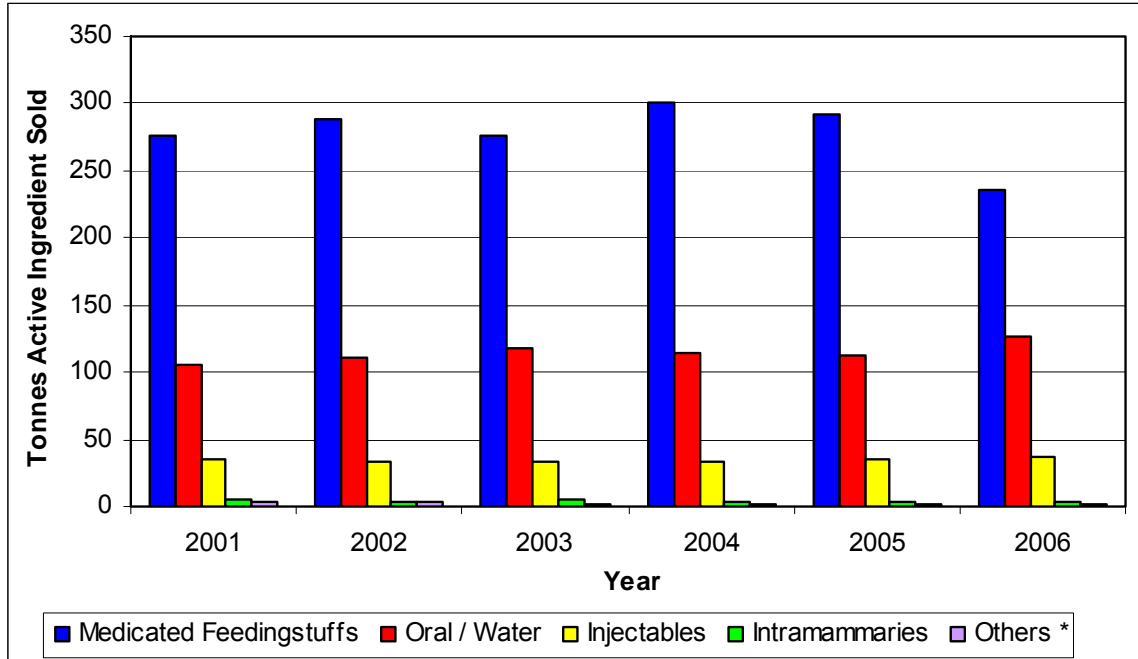
**Table 11: Sales of total therapeutic antimicrobials (tonnes active ingredient) by route of administration 2001 – 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Medicated Feedingstuffs	276	289	277	300	292	236
Oral / Water	105	110	117	115	113	127
Injectables	36	34	34	34	36	37
Intramammaries	5	4	5	4	3	3
Others	3	3	2	2	2	2
<b>Total</b>	<b>424</b>	<b>440</b>	<b>435</b>	<b>454</b>	<b>446</b>	<b>405</b>



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**Figure 4: Sales of total therapeutic antimicrobials (tonnes active ingredient) by route of administration 2001 – 2006**



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

### Intramammary Products

Sales of intramammary products vary between 4,735 and 3,125 kilograms active ingredient across the six-year period (see Table 12). Sales of lactating cow products decreased to 1,266 kilograms in 2006 but sales of dry cow therapy products showed a small increase.

**Table 12: Sales of antimicrobial intramammary products (kilograms active ingredient) 2001 – 2006<sup>3</sup>**

	2001	2002	2003	2004	2005	2006
	<b>Kilograms Active Ingredient</b>					
Dry Cow Products	2,590	2,466	2,590	1,979	1,750	2,002
Lactating Cow Products	2,145	1,947	2,145	1,886	1,375	1,266
<b>Total</b>	<b>4,735</b>	<b>4,413</b>	<b>4,735</b>	<b>3,865</b>	<b>3,125</b>	<b>3,268</b>

<sup>3</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 antimicrobials indicated for use in food animal species only is shown in Table 13 and Figure 5. Table 11 shows that in 2006 66% of antimicrobial products sold for food animals only were authorised for use in a combination of pigs and poultry only. Between 5 and 10% of total antimicrobials sold for use in animals were for use in more than one food producing species (excluding those for pig and poultry only) in any year between 1998 and 2006. The largest percentage of single species products is sold for use in pigs, and these sales contributed 20% in 2006 of the total sales of products for food-producing animals only. Multi-species products are authorised for use in more than one food-producing animal only, but does not include the group of 'pig and poultry only'.

**Table 13: Sales of total therapeutic antimicrobials for food-producing animals only (tonnes active ingredient) by food animal species 2001 – 2006**

	2001	2002	2003	2004	2005	2006
	<b>Tonnes Active Ingredient</b>					
Cattle Only Products	8	9	12	10	7	10
Pig Only Products	88	80	70	63	56	71
Poultry Only Products	20	13	11	11	15	17
Sheep Only Products	<1	<1	<1	<1	<1	<1
Fish Only Products	3	1	2	4	3	4
Pig and Poultry Combined Only	231	261	261	282	286	234
Multi Species Products In Food Animals Only	26	22	21	22	23	21
<b>Total</b>	<b>371</b>	<b>386</b>	<b>377</b>	<b>393</b>	<b>390</b>	<b>358</b>

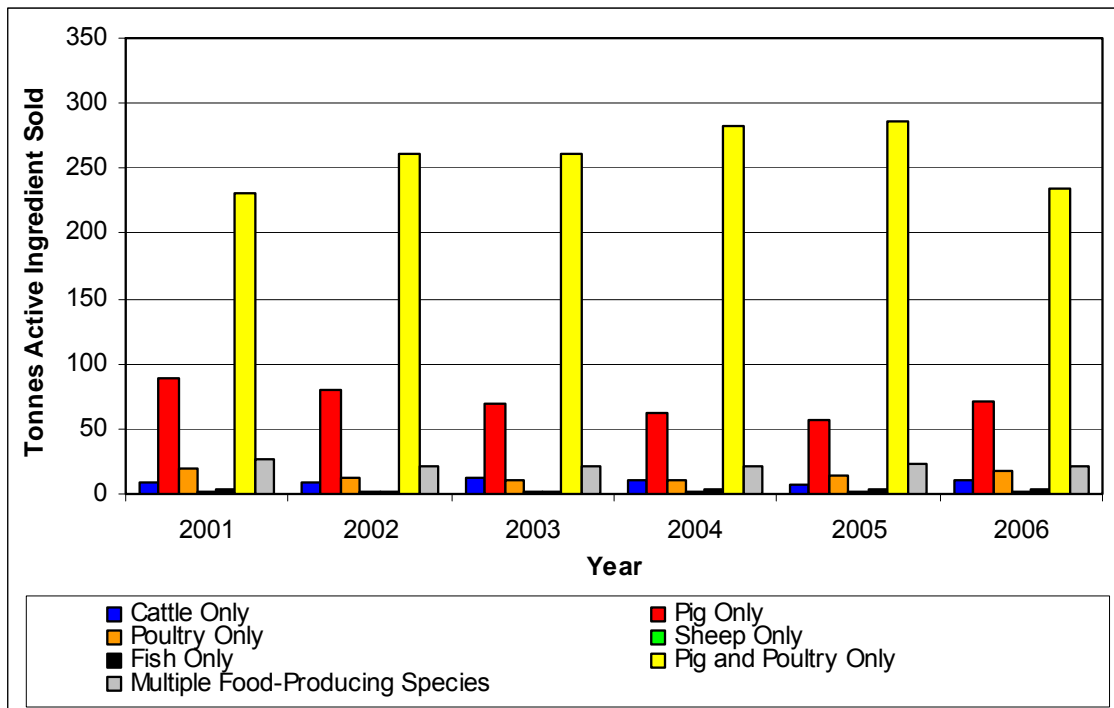
This year for the first time we have analysed sales for the category of pig and poultry only products. For 2006, 80 tonnes of the 234 tonnes total sales for this category were sold for use in pigs and poultry meat only, with the remaining 154 tonnes sold for use in pigs, poultry meat or layers.



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It is currently impossible to determine how much of a product authorised for use in more than one species has been sold for use in each species. However, we are seeking to develop a methodology that will provide statistically valid data in this area, with a view to publishing figures in the future.

**Figure 5: Total sales of therapeutic antimicrobials (tonnes active ingredient) for food-producing animals only 2001 – 2006**



Non-Food Animal Species

Table 14 shows the sales of antimicrobials indicated for use in different species of non food animals only. In 2006 56% were sold only for use in non food-producing horses only and 25% in dogs only. These figures are similar for all other reporting years.



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**Table 14: Sales of total therapeutic antimicrobials for non food-producing animals only (kilograms active ingredient) by animal species 2001 - 2006<sup>4</sup>**

	2001	2002	2003	2004	2005	2006
	<b>Kilograms Active Ingredient</b>					
Dog Only Products	4,606	4,465	4,649	4,976	5,715	7,764
Horse Only Products	12,956	14,304	14,414	14,041	15,629	17,010
Other Products For Use In Non Food Animals Only	5,897	5,727	10,661	10,397	5,122	5,660
<b>Total</b>	<b>23,459</b>	<b>24,496</b>	<b>29,725</b>	<b>29,417</b>	<b>26,466</b>	<b>30,435</b>

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<sup>4</sup> Sales of therapeutic antimicrobials for non food-producing animals only are reported in kilograms.



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## ANTIMICROBIAL SALES AND LIVESTOCK REARED

The live weights of animals slaughtered for food in the UK from 2001-2006 are shown in Table 15 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 Executive (SEERAD) and the Department of Agriculture and Rural Development in (DARD) provided the fish production data, for Scotland and Northern Ireland respectively.

The total live weight of animals slaughtered for food increased by around 1.5% between 2005 and 2006 whilst total sales of therapeutic antimicrobials and antimicrobial growth promoters for food animals decreased slightly (Table 16). Cattle slaughtered for food-production increased in 2006 relative to 2005 partially due to the cessation of OTMS in January 2006, while pig, sheep and poultry production decreased.

**Table 15: Live weight ('000 tonnes) of animals slaughtered for food use 2001 – 2006**

	2001	2002	2003	2004*	2005	2006
	<b>'000 Tonnes live weight animals slaughtered for food</b>					
Cattle	1,339	1,439	1,457	1,498	1,586	1,762**
Pigs	972	969	861	845	833	825
Sheep	518	600	605	622	658	655
Poultry	2,220	2,207	2,225	2,215	2,248	2,175
Fish	151	158	183	170	142	140
<b>Total</b>	<b>5,198</b>	<b>5,402</b>	<b>5,313</b>	<b>5,322</b>	<b>5,473</b>	<b>5,557</b>

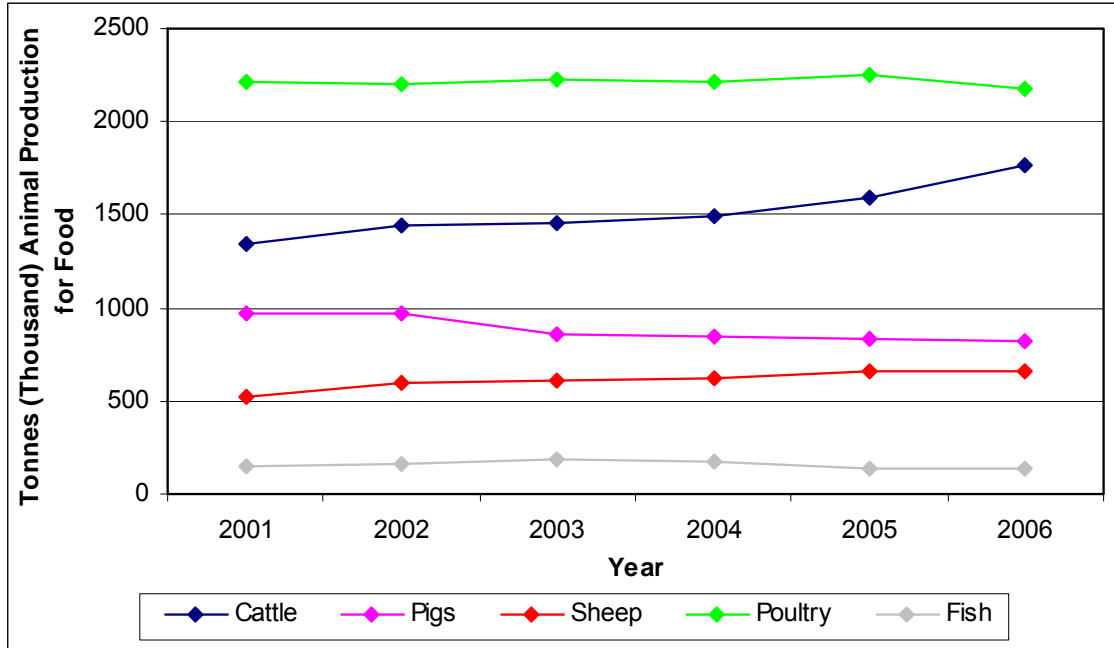
\* 2004 was 53 week reporting years. The data for cattle, pigs, and sheep have been normalised by Defra Statistics Branch to a 52 week reporting year to allow direct comparison with data from other years.

\*\* The OTMS rule ceased on 22 January 2006.



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**Figure 6: Live weight ('000 tonnes) of animals slaughtered for food use 2001 – 2006**



Many farm animals are reared to slaughter without the use of therapeutic antimicrobials. Other animals such as dairy cows may be treated with antimicrobials but are not slaughtered for food use, because of older cattle disposal scheme (OCDS) and before 22 January 2006, the over 30 months scheme (OTMS). However, if it were assumed that total antimicrobials sold for food-producing animals only were used solely in animals slaughtered for food, 1 tonne of antimicrobial would have been used in the production of 12,560, 12,554, 12,908, 12,588, 13,547 and 15,610 tonnes of live weight of animals slaughtered in the years 2001-2006 (see Table 16). Using the same assumptions, around 70-80g of antimicrobial were sold for use per tonne of live weight animal slaughtered.

The figures for live weight of animals slaughtered are only those animals fed and slaughtered within the UK, i.e. no account has been taken of those live animals exported. Furthermore, the live weight slaughter figures do not include animals slaughtered via the OCDS and OTMS or selective culls throughput (e.g. FMD, swine fever-infected animals), i.e. animals not slaughtered for food production. The numbers of cattle slaughtered annually under OTMS over the reporting period 2001 – 2005 are 621,010, 823,434, 752,914, 801,748 and 706,787 respectively. In 2006 50,400 cattle were culled via the OTMS and 150,411 by the OCDS (total culled 200,811).



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Some animals that receive therapeutic antimicrobials 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 antimicrobials 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 antimicrobials used to produce each tonne of animal slaughtered for human food would be considerably less.

**Table 16: Total live weight ('000 tonnes) of animals slaughtered for food use (data sources see above) against total antimicrobial product sales for food-producing animals only (tonnes active ingredient) 2001 - 2006**

	2001	2002	2003	2004	2005	2006*
Total live weight animals slaughtered for food use ('000 tonnes)	5,200	5,373	5,331	5,350	5,473	5,557
Total antimicrobials (therapeutic and growth promoters) (tonnes) sold for food animals (tonnes a.i.)	414	428	413	425	404	356*
Live weight of animals slaughtered (tonnes) for food per tonne of antimicrobial a.i. sold	12,560	12,554	12,908	12,588	13,547	15,610
Kg of antimicrobial a.i. sold per tonne of live weight of animals slaughtered for food	0.08	0.08	0.08	0.08	0.07	0.06

\* Data for 2006 are ratioed only against total therapeutic antimicrobials as no antimicrobial growth promoters were sold for use, see Table 5.



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## ANTIMICROBIAL SALES AND OTHER FOOD ANIMAL COMMODITIES

The litres of cows' milk produced in the UK annually, expressed in millions of litres are detailed in Table 17. 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 antimicrobial was sold for use per litre of milk produced.

**Table 17: Litres of milk produced per kilogram of antimicrobial lactating cow intramammary product (kilograms active ingredient) sold 2001 - 2006**

	2001	2002	2003	2004	2005	2006
Million litres milk produced	14,290	14,448	14,587	14,139	14,065	13,945
Kilograms a.i. lactating intramammary sold	2,145	1,947	2,145	1,886	1,375	1,266
Million litres milk produced per tonne a.i. lactating intramammary sold	6,662	7,421	6,799	7,537	10,294	11,015
Kilograms a.i. lactating intramammary sold per million litre of milk produced	0.15	0.13	0.15	0.13	0.10	0.09

In addition not all of the approximately 14 billion litres of milk produced annually in the UK (excluding suckled milk) are sold for human consumption. It is estimated that approximately 220 million litres of milk produced are fed back to calves and other animals (e.g. pigs) or are treated on farm as waste. If milk is produced over the allowed EU quotas it may also be destroyed.



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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 still reviewing our methods for apportioning the sales of products authorised for use in more than one species, with the aim of introducing a more accurate methodology in the future. We have therefore commissioned a further piece of data collection through NADIS to assist us with this task.

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. This is likely to include information held on residues surveillance databases, other national antimicrobial sales/use databases and microbial sensitivity databases.

**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 Dr Kay Goodyear at:

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**VETERINARY MEDICINES DIRECTORATE  
December 2007**



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

<b>AI</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 microorganism, which selectively destroys or inhibits the growth of other microorganisms.
<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 microorganisms 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, microorganisms (bacteria, fungi, protozoa and viruses). Antimicrobials include antibiotics, disinfectants, preservatives and other substances.
<b>Antimicrobial Resistance</b>	The ability of a microorganism to grow or survive in the presence of an antimicrobial that is usually sufficient to inhibit or kill microorganisms 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 control of coccidiosis, a protozoa and infection causing diarrhoea and dysentery.
<b>Defra</b>	Department for Environment, Food and Rural Affairs.



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<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 therapeutic 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>PDNS</b>	Porcine Dermatitis and Nephropathy Syndrome, a disease affecting pigs.
<b>PMWS</b>	Post-weaning Multi-systemic Wasting Syndrome, a disease affecting pigs.
<b>Special Import Certificate</b>	A certificate issued by the VMD on behalf of the Secretary of State, in order 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, in order to permit veterinary surgeons to legally import other products/substances, where the health situation demands and where there is no alternative 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 therapeutic product that is administered to animals orally. Includes tablets, boluses, capsules, dissolvable powders and sachets, solutions, etc.
<b>Zotechnical Feed Additive</b>	A high technology feed additive, used routinely in low doses to affect favourably the performance of animals in good health. Includes growth promoters, coccidiostats and histomonostats.



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

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Alpharma Inc  
Animal Care Ltd  
Arnolds Veterinary Products Ltd  
Bayer Plc  
Boehringer Ingelheim Ltd  
CEVA Animal Health Ltd  
Chanelle Animal Health Ltd  
Cross Vetpharm Group Ltd  
Cyton Biosciences Ltd  
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Vétoquinol UK Ltd  
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Virbac S.A

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