



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 2005

2006





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SUMMARY

This is the eighth 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 2005.
- Re-state downwards the figures for sales of therapeutic antimicrobial products from 1999-2004. This was necessary following clarification by one company that data from earlier years had been incorrectly over-reported to VMD. As a result we asked all companies to check all previously reported data and advise us of any discrepancies. The revised data are published here.
- As a result of this re-stating of data, sales of reported antimicrobials for each year have decreased by approximately 20 tonnes. This decrease is mainly in the 'food-producing animals only' and 'macrolide' reporting categories.
- Re-state the sales of therapeutic antiprotozoal products for 2004 and report for the first time sales for 2005. This showed an increase of 11 tonnes in 2004 relative to 2003, and no change in 2005.
- Re-state the figures for the sales of antifungal products from 2002-2004. This followed comment from the Veterinary Products Committee (VPC) that not all groups of therapeutic antifungals were previously included. This showed an overall increase in sales of therapeutic antifungals from 2002-2004.
- Sales of antimicrobial growth promoters continued to decrease and fell by 18 tonnes in 2005, compared with 2004.
- Report the sales of cephalosporins in kg of active ingredients, following a request from a stakeholder.

Trends

Total Sales (All tonnages are expressed as active ingredient)

The total sales of veterinary therapeutic antimicrobials in the UK have remained relatively steady between 1998 and 2003 at around 434 tonnes per annum.



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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.

The sales of veterinary therapeutic antiprotozoals in 2005 were 12 tonnes an increase of 7 tonnes over 2004. Sales of these products are exclusively for food-producing animals. The sales of veterinary antifungals were relatively constant in 2005 compared to previous years at about 2 tonnes.

The total sales of veterinary antimicrobial growth promoters in 2005 were 14 tonnes, a decrease of 18 tonnes over 2004 levels. Sales of these products are exclusively for food-producing animals.

Sales of coccidiostats in 2005 were 231 tonnes an increase of 7 tonnes over 2004. It is known that in 1998 and 1999 there were missing data and direct comparisons of sales between these years and 2005 therefore cannot be made. Coccidiostats are used in food-producing animals only, particularly poultry reared on deep litter systems.

Food-Producing Animals

In 2005 sales of antimicrobial products for therapeutic use in food-producing animals accounted for approximately 87% (390 tonnes) of the total annual sales of 446 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 (for example, cattle barred from use in food as they were over thirty months old).

Approximately half of the total sales of therapeutic antimicrobials were accounted for by tetracyclines in each year from 1998 to 2005. In each of the seven reporting years approximately 1-2 tonnes of fluoroquinolones were sold (less than 1% of the total). Between 64% and 72% of therapeutic antimicrobial products for food-producing animals were sold for use in medicated feedingstuffs, over the reporting period (1998 – 2005), most of which are sold for use in pig and poultry farming.

Of all antimicrobials sold in 2005 for use in food-producing animals only, 97% were for therapeutic purposes, and 3% were for growth promotion. There was a decrease in sales of antimicrobial growth promoters from 32 tonnes in 2004 to 14 tonnes in 2005.

Overall the sales of therapeutic antimicrobial products for use in food-producing animals showed a decrease in 2005, relative to 2004. There was a decrease in sales of therapeutic antimicrobials in 2005 for some of the individual food-producing species e.g. for pigs only (decreased by 7 tonnes a.i.) and cattle only (decreased by 3 tonnes a.i.). Sales of multi-species products (excluding pig and poultry only) remained constant from 2002 to 2005.



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Context

Animal health background

In addition to the normal animal health challenges facing farming:

- 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 faced preparations for the EU ban of the four remaining antimicrobial growth promoting ingredients from 1 January 2006. These active ingredients are monensin, avilamycin, salinomycin and flavophospholipol. Monensin and salinomycin can still be used as coccidiostats in poultry.

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 five reporting years. All figures are quoted in thousands and are not adjusted for seasonality.

	1998	1999	2000	2001	2002	2003	2004	2005
Cattle	11,519	11,423	11,133	10,600	10,343	10,517	10,551	10,378
Pigs	8,146	7,284	6,482	5,845	5,588	5,047	5,161	4,851
Sheep	44,471	44,656	42,261	36,716	35,834	35,846	35,848	35,253
Poultry	152,886	153,499	157,138	166,881	156,290	167,110	168,152	159,323

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 eight 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, were for the first time 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. The report does not include products imported by veterinary surgeons under Special Import Certificate (SIC) or Special Treatment Certificate 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.

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.

Using the spreadsheet, 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. At this time we are not able to determine the quantities sold which are used in each of the species for which they are authorised. We are working with the National Animal Disease Information Service (NADIS) to provide information on on-farm use to enable us to split 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 validated picture of the apportionment of sales for use of veterinary therapeutic 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 the remit of this report to interpret these patterns. However where appropriate, we do include information on factors that might have affected sales or use of antimicrobial products during the reporting period.)

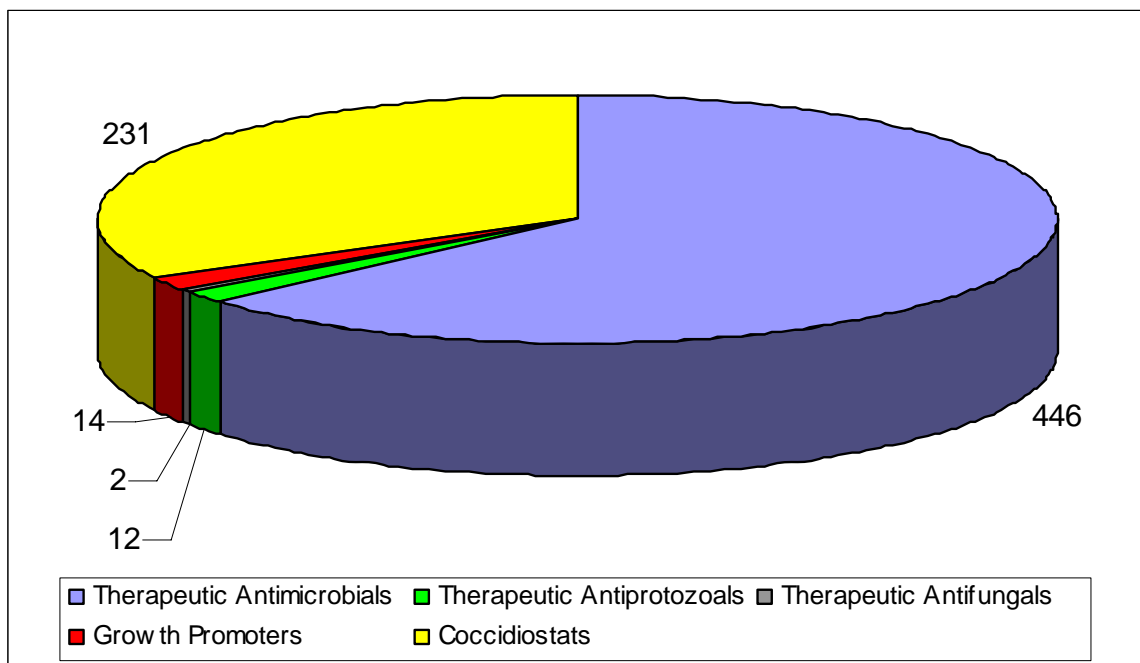
Finally, we seek comments on the draft report from the Veterinary Products Committee (VPC), the Government's independent expert advisory committee on veterinary medicines, and from the Defra Antimicrobial Resistance Coordination (DARC) Group.

RESULTS

TOTAL SALES

Figure 1 illustrates the quantities of sales in 2005 for each of the five categories of veterinary products reported. Therapeutic antimicrobials were the largest selling group (446 tonnes), followed by coccidiostats (231 tonnes), and antimicrobial growth promoters (14 tonnes). Therapeutic antiprotozoals and antifungals were the smallest selling categories (12 tonnes and 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 2005¹



¹ 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 with a percentage of infected animals being present. It is not possible within this report to estimate the proportion of therapeutic antimicrobials that were used to prevent or treat diseases in animals.



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The numbers of products sold within each category of antimicrobials reported on are summarised in Table 1. This is not a list of products that had marketing authorisations in 2005, but a summary of the numbers of products sold to help clarify the reported data.

Table 1: Numbers of products sold in 2002-2005 by reporting group of products

Group of Veterinary Product Sold	Number of Products Sold by Group 2002	Number of Products Sold by Group 2003	Number of Products Sold by Group 2004	Number of Products Sold by Group 2005
Therapeutic Antimicrobials comprising:	370	358	339	325
<i>Tetracyclines</i>	56	49	50	48
<i>Trimethoprim/Sulphonamides</i>	56	50	45	46
<i>β-lactams</i>	129	124	120	113
<i>Aminoglycosides</i>	42	45	40	29
<i>Macrolides</i>	20	20	19	23
<i>Fluoroquinolones</i>	31	34	25	26
<i>Others</i>	36	36	40	40
Therapeutic Antiprotozoals	18	14	13	12
Therapeutic Antifungals	14	16	15	13
Antimicrobial Growth Promoters	5	3	4	4
Coccidiostats	17	11	10	9

Total Sales: Therapeutic Antimicrobials

Table 2 shows the gross quantities of antimicrobial active ingredients in therapeutic products sold between 1998 and 2005. 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 1998-2005. These figures are also expressed graphically in Figure 2.



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Table 2 and Figure 2 illustrate that overall sales of therapeutic antimicrobial products have remained broadly the same over the eight-year reporting period, varying between 424 and 454 tonnes. The minor fluctuations year-on-year are most likely to reflect natural changes in the incidence of disease in animals over that period. Over the same timeframe, sales of therapeutic products for use in food-producing animals only have varied between 371 and 402 tonnes of active ingredient, sales of therapeutic antimicrobials for use in non food-producing animals only varied between 19 and 34 tonnes active ingredient and sales of products for use in either food-producing or non food-producing species varied between 22 and 32 tonnes of active ingredient showing no specific trend.

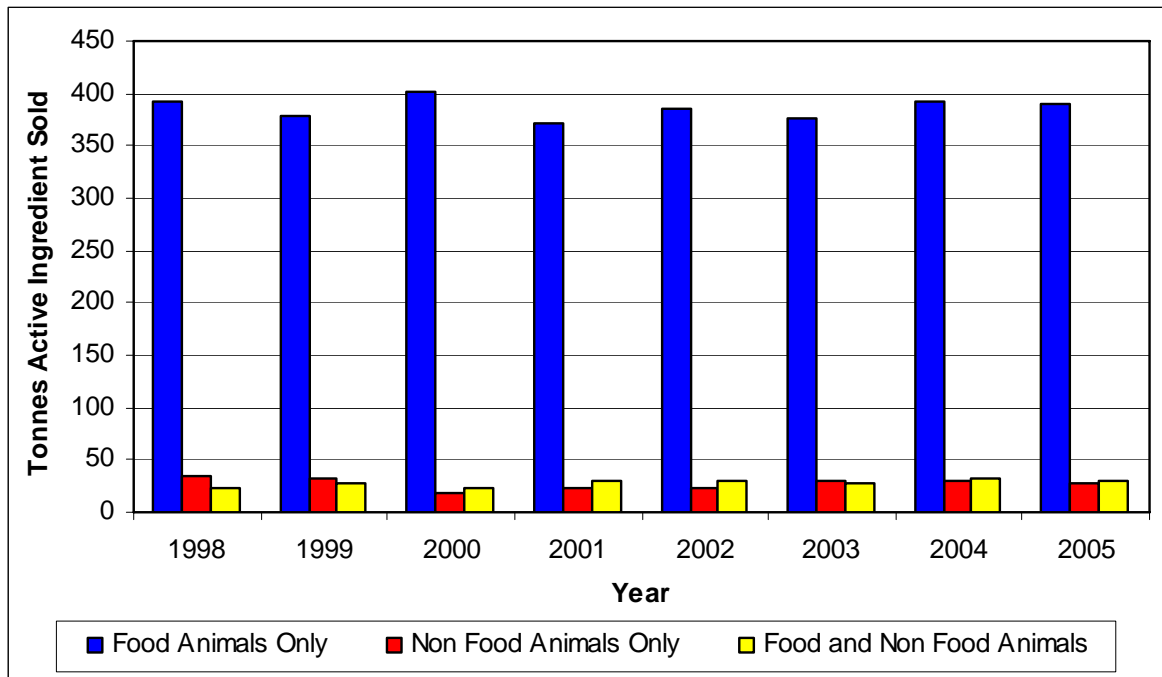
Table 2: Sales of therapeutic antimicrobials 1998 – 2005, in the categories of food animals only, non food animals only and combined food and non food animals

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes of Active Ingredient							
Indicated for food animals only	393	378	402	371	386	377	393	390
<i>Annual Actual increase/decrease</i>	<i>N/A</i>	<i>(15)</i>	<i>24</i>	<i>(31)</i>	<i>15</i>	<i>(9)</i>	<i>16</i>	<i>(3)</i>
Indicated for non food animals only	34	32	19	24	24	30	29	27
<i>Annual Actual increase/decrease</i>	<i>N/A</i>	<i>(2)</i>	<i>(13)</i>	<i>5</i>	<i>0</i>	<i>6</i>	<i>(1)</i>	<i>(2)</i>
Indicated for a combination of both food and non food animals	22	27	23	29	30	28	32	29
<i>Annual Actual increase/decrease</i>	<i>N/A</i>	<i>5</i>	<i>(4)</i>	<i>6</i>	<i>1</i>	<i>(2)</i>	<i>4</i>	<i>(3)</i>
Total sales of therapeutic antimicrobials	449	437	444	424	440	435	454	446



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Figure 2: Sales of antimicrobial therapeutic products (tonnes active ingredient) 1998 – 2005 in food animals only, non food animals only and in a combination of food and non food animals



Total Sales: Therapeutic Antiprotozoals

Table 3 summarises the sales of therapeutic antiprotozoal products reported to the VMD. 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 in 2004 and 2005. All antiprotozoal products authorised in the UK are for use in food-producing animal species only.

Table 3: Sales of therapeutic antiprotozoals (tonnes active ingredient) in the UK 1998 – 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Antiprotozoals	65	27	26	33	65	2	13	12
<i>Annual Actual Increase / Decrease</i>	<i>N/A</i>	<i>(38)</i>	<i>(1)</i>	<i>7</i>	<i>32</i>	<i>(63)</i>	<i>11</i>	<i>(1)</i>



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Total Sales: Therapeutic Antifungals

Table 4 summarises the sales of therapeutic antifungal products reported to the VMD under the drug classifications: imidazoles, triazoles, griseofulvin, aliphatic halogenitros and polyene macrolides. 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, ten are indicated for use only in non food animals.

Table 4: Sales of therapeutic antifungals (tonnes active ingredient) in the UK 1998 – 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes of Active Ingredient							
Antifungals	1.7	1.7	1.9	1.7	10.5	13.8	5.1	7.1
<i>Annual Actual Increase / Decrease</i>	N/A	-	0.2	(0.2)	8.8	3.3	(8.7)	(2)

Total Sales: Antimicrobial Growth Promoters

Table 5 summarises the sales of antimicrobial growth promoting products from 1998-2005. Sales volumes have decreased from 1998 (141 tonnes) to 2005 (14 tonnes).

On 1 July 1999 an EU-wide ban of the use of four growth promoting antimicrobial ingredients came into effect. This meant that spiramycin, bacitracin zinc, tylosin and virginiamycin could no longer be used for growth promotion in livestock production. A similar EU-wide ban came into effect from 1 January 2006 for the remaining antimicrobial growth promoting ingredients (monensin, avilamycin, salinomycin and flavophosphilipol).

Table 5: Sales of antimicrobial growth promoting products (tonnes active ingredient) in the UK 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Growth Promoting Products	141	65	44	43	42	36	32	14
<i>Annual Actual Increase / Decrease</i>	N/A	(76)	(21)	(1)	(1)	(6)	(4)	(18)



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Total Sales: Coccidiostats

Table 6 summarises the sales of coccidiostats. 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 between 2001 and 2004 have a generally decreasing trend followed by a relatively small increase in 2005. 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 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Coccidiostats	227*	190*	250	266	260	240	224	231
<i>Annual Actual Increase / Decrease</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	16	(6)	(20)	(16)	7

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 (70-79%) of ionophore coccidiostats in each year 2001-2005.

Table 7: Sales of ionophore and non-ionophore coccidiostats (tonnes active ingredient) in the UK 2001 – 2005

	2001	2002	2003	2004	2005
	Tonnes Active Ingredient				
Ionophores	190	206	190	173	173
Non-ionophores	76	54	50	51	59
Total	266	260	240	224	231



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SALES BY CHEMICAL ANTIMICROBIAL GROUP

Table 8 and Figure 3 show the sales of various chemical groups of antimicrobials between 1998 and 2005. 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 β -lactams (including penicillin) accounted for the vast majority of the therapeutic antimicrobials sold. For example, in 2005, they accounted for 84% of sales, with tetracyclines accounting for 54%, Trimethoprim/sulphonamides 17% and β -lactams 13%. Most tetracyclines were sold for the treatment of pigs and poultry as medicated feedingstuffs (MFS), under veterinary prescription.

Table 8 and Figure 3 indicate a decreasing trend for sales of sulphonamides/trimethoprim, whereas sales remained relatively stable for the classes of β -lactam, aminoglycoside, others and fluoroquinolones. Tetracyclines have shown a 13% increase from 2003 to 2005.

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

Table 8: Sales of total antimicrobial therapeutic products by chemical grouping (tonnes active ingredient) 1998 – 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Tetracyclines	228	212	226	190	217	212	243	240
Trimethoprim/ Sulphonamides	99	108	99	103	89	89	77	74
β -Lactams	63	61	61	61	60	62	63	60
Aminoglycosides	21	22	18	22	22	21	22	20
Macrolides	23	21	29	35	38	39	37	37
Fluoroquinolones *	2	2	1	1	1	1	1	2
Other	14	11	11	11	13	12	11	12
Total	449	437	444	424	440	435	454	446

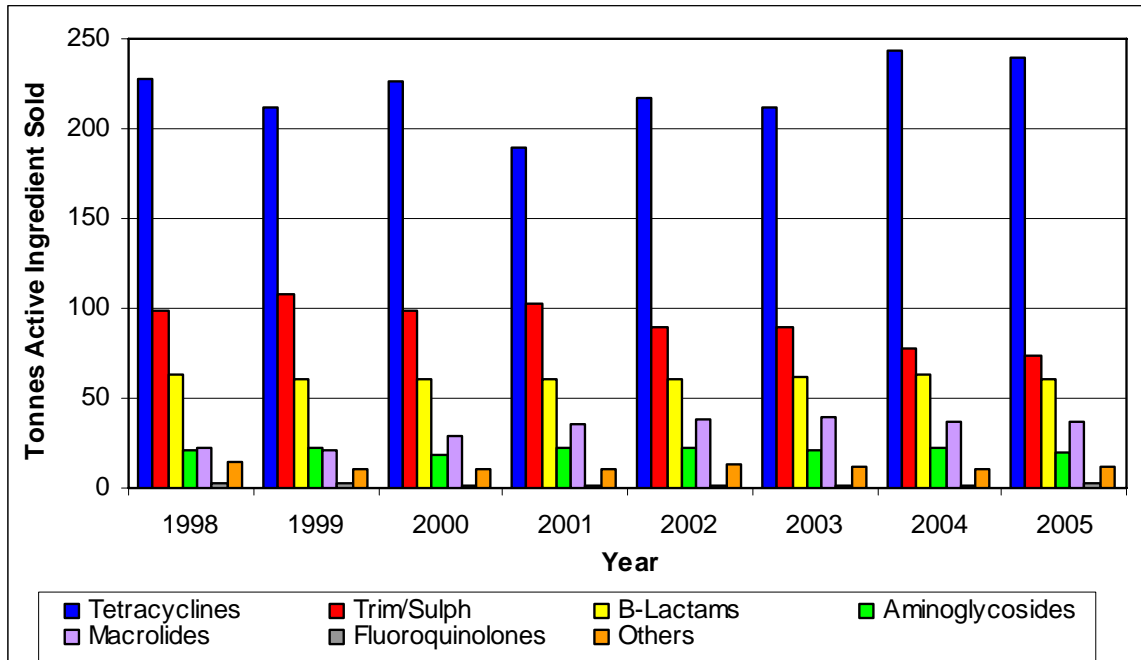
*fluoroquinolones (kg) 1,876 2,287 1,228 1,318 1,365 1,364 1,044 1,451



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The earlier slightly rising trend for sales of macrolides from 1998 to 2001 appears to have stabilised between 2002 and 2005. The majority of macrolide sales were under veterinary prescription for medicated feedingstuffs for the treatment of pigs. A smaller number of macrolides sold were authorised for use in other food-producing animals (cattle, sheep and poultry). These were administered by a range of methods, including orally and by injection.

Figure 3: Sales of total antimicrobial therapeutic products (tonnes active ingredient) 1998 – 2005



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 9.



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Table 9: Sales of antimicrobial therapeutic products by sub-chemical grouping (tonnes active ingredient) 1998 – 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Trimethoprim/ Sulphonamides	99	108	99	103	89	89	77	74
Trimethoprim	14	16	15	16	14	15	13	12
Sulphonamides	85	92	84	87	75	74	64	62
β-Lactams	63	61	61	61	60	62	63	60
Cephalosporins [#]	2	3	3	3	3	3	3	4
Penicillins ^{**}	25	28	25	24	18	16	14	12
Others ^{***}	36	30	33	34	39	43	46	44
Aminoglycosides	21	22	18	22	22	21	22	20
Streptomycins	8	7	7	8	7	7	6	6
Neomycin and Framycetin	10	9	6	5	5	5	6	5
Others ^{****}	3	6	5	9	10	9	11	9

[#] cephalosporins (kg) 2,027 3,220 2,473 2,607 2,520 3,037 3,240 3,969

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

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

*** = includes cloxacillin, amoxicillin, ampicillin, nafcillin, penthamate hydroide.

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



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SALES BY ROUTE OF ADMINISTRATION

General

Table 10 and Figure 4 list the major routes of administration of antimicrobials sold in 1998 - 2005. In 2005 medicated feedingstuffs made up 65% of the total therapeutic antimicrobials sold, whilst oral/water and injectable products accounted for 25% and 8% respectively. Intramammary products and other therapeutic antimicrobial products (creams, aerosols, drops, etc) contributed 0.7% and 0.6% respectively. Overall the sales of products for all routes of administration appear to be relatively stable with only minor yearly fluctuations.

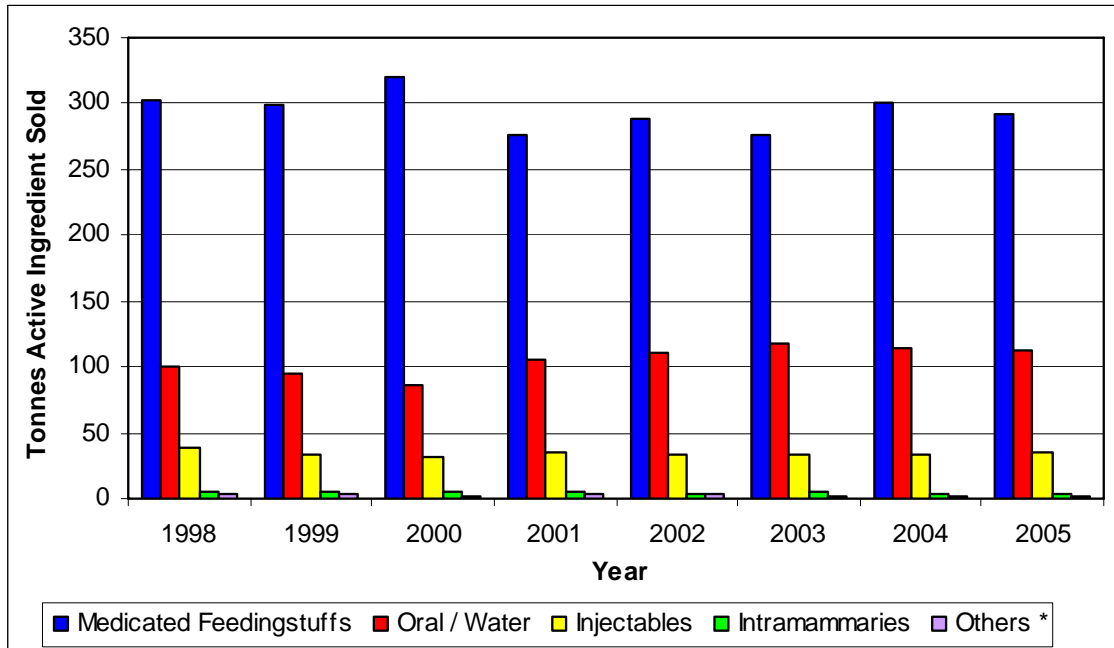
Table 10: Sales of total therapeutic antimicrobials (tonnes active ingredient) by route of administration 1998 – 2005

	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Medicated Feedingstuffs	303	299	320	276	289	277	300	292
Oral / Water	100	95	86	105	110	117	115	113
Injectables	38	34	32	36	34	34	34	36
Intramammaries	5	6	5	5	4	5	4	3
Others	3	3	1	3	3	2	2	2
Total	449	437	444	424	440	435	454	446



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Figure 4: Sales of total therapeutic antimicrobials (tonnes active ingredient) by route of administration 1998 – 2005



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

Intramammary Products

Sales of intramammary products vary between 6,222 and 3,125 kilograms active ingredient across the eight-year period (see Table 11). Sales of lactating cow products decreased to 1,375 kilograms in 2005 and sales of dry cow therapy products also showed a small decrease.

Table 11: Sales of antimicrobial intramammary products (kilograms active ingredient) 1998 – 2005²

	1998	1999	2000	2001	2002	2003	2004	2005
	Kilograms Active Ingredient							
Dry Cow Products	3,295	4,283	3,910	2,590	2,466	2,590	1,979	1,750
Lactating Cow Products	2,168	1,939	1,790	2,145	1,947	2,145	1,886	1,375
Total	5,464	6,222	5,700	4,735	4,413	4,735	3,865	3,125

² Sales of intramammary products are reported in kilograms.



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SALES BY ANIMAL SPECIES

Food Animal Species

Table 12 and Figure 5 show the breakdown of the sales of antimicrobials indicated for use in food animal species only. Table 12 shows that in 2005 73% 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 2005. The largest percentage of single species products is sold for use in pigs, and these sales contributed 14% in 2005 of the total sales of products for food-producing animals only which was much lower than in previous years. 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 12: Sales of total therapeutic antimicrobials for food-producing animals only (tonnes active ingredient) by food animal species 1998 – 2005

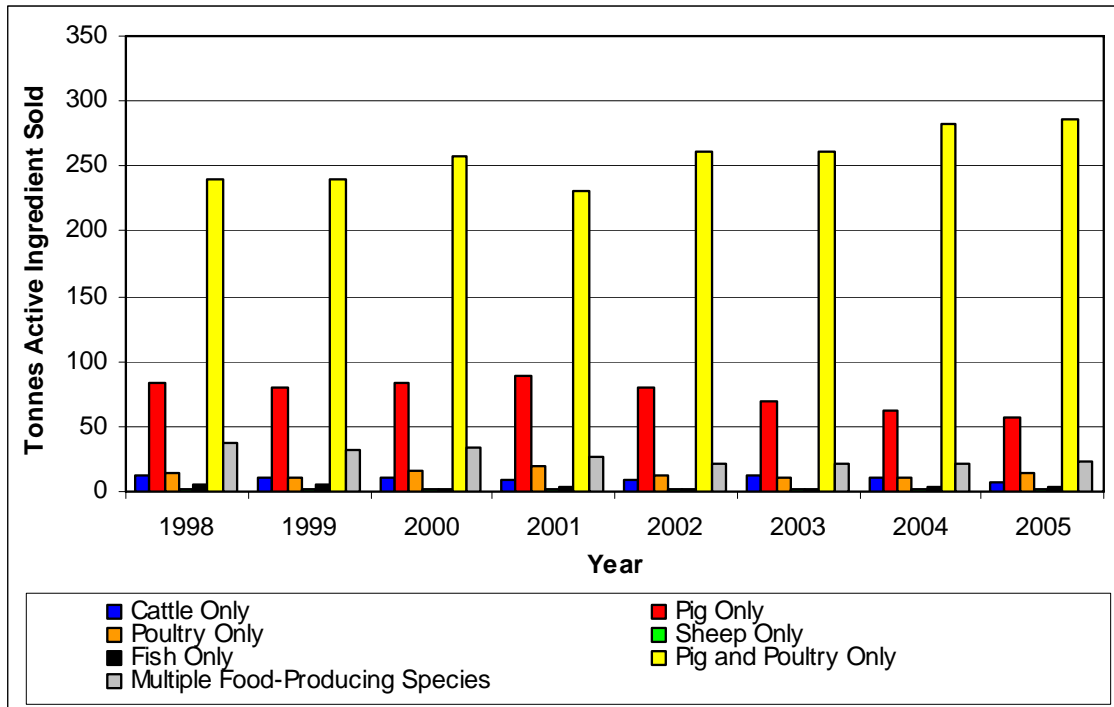
	1998	1999	2000	2001	2002	2003	2004	2005
	Tonnes Active Ingredient							
Cattle Only Products	12	10	10	8	9	12	10	7
Pig Only Products	83	80	83	88	80	70	63	56
Poultry Only Products	15	11	16	20	13	11	11	15
Sheep Only Products	<1	<1	<1	<1	<1	<1	<1	<1
Fish Only Products	6	5	2	3	1	2	4	3
Pig and Poultry Combined Only	239	240	258	231	261	261	282	286
Multi Species Products In Food Animals Only	38	32	33	26	22	21	22	23
Total	393	378	402	371	386	377	393	390

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 currently seeking to develop a methodology that will provide statistically valid data in this area, with a view to publishing figures in the future.



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Figure 5: Total sales of therapeutic antimicrobials (tonnes active ingredient) for food-producing animals only 1998 – 2005



The figures indicate that the total quantity of antimicrobials sold each year since 2000 for use in aquaculture has remained at 4 tonnes or less, despite a significant increase in farmed fish (salmon and trout) production (see Table 14). These levels of sales are substantially lower than sales in 1998, when only 123,000 tonnes of salmon and trout were produced in the UK and 6 tonnes of fish-only antimicrobials were sold.

Non-Food Animal Species

Table 13 shows the sales of antimicrobials indicated for use in different species of non food animals only. In 2005 59% were sold only for use in non food-producing horses only and 22% in dogs only. These figures are similar for all other reporting years.



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Table 13: Sales of total therapeutic antimicrobials for non food-producing animals only (kilograms active ingredient) by animal species 1998 - 2005³

	1998	1999	2000	2001	2002	2003	2004	2005
	Kilograms Active Ingredient							
Dog Only Products	4,482	3,781	5,202	4,606	4,465	4,649	4,976	5,715
Horse Only Products	16,177	22,272	8,428	12,956	14,304	14,414	14,041	15,629
Other Products For Use In Non Food Animals Only	13,509	6,078	5,648	5,897	5,727	10,661	10,397	5,122
Total	34,168	32,131	19,278	23,459	24,496	29,725	29,417	26,466

³ Sales of therapeutic antimicrobials for non food-producing animals only are reported in kilograms.



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ANTIMICROBIAL SALES AND LIVESTOCK REARED

Table 14 and Figure 6 show the live weights of animals slaughtered for food in the UK from 1998-2005. The Defra Statistics (Commodities and Food) 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 3% between 2004 and 2005 whilst total sales of therapeutic antimicrobials and antimicrobial growth promoters for food animals decreased by 5% (Table 15). Cattle, sheep and poultry production increased in 2005 relative to 2004, while pig and fish production decreased.

Table 14: Live weight ('000 tonnes) of animals slaughtered for food use 1998 – 2005

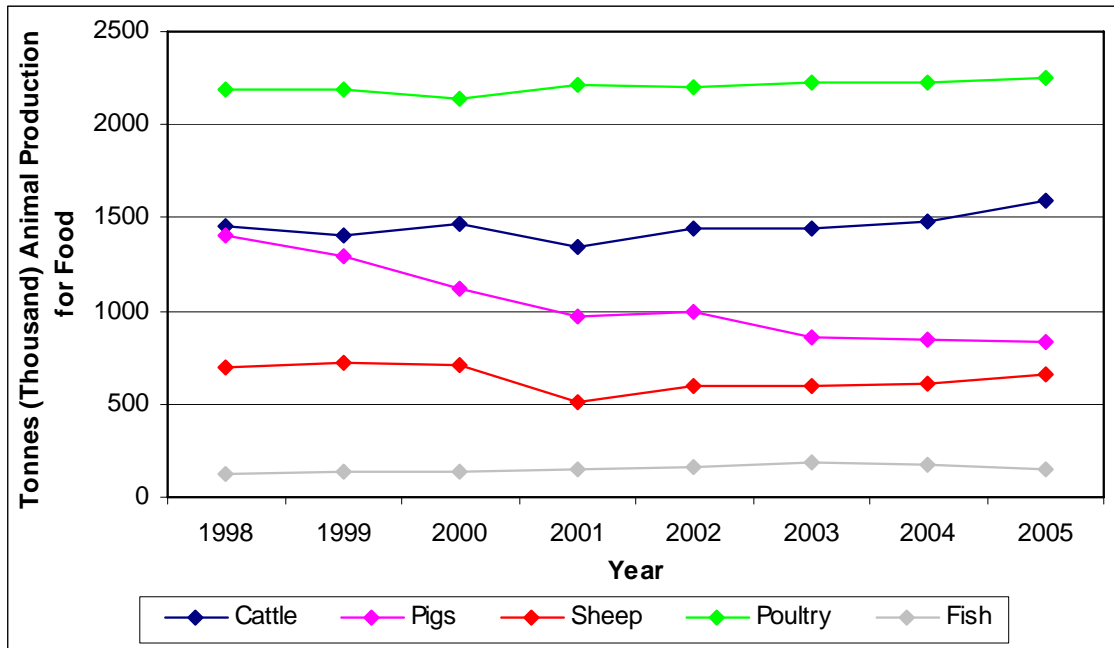
	1998*	1999	2000	2001	2002	2003	2004*	2005
	'000 Tonnes live weight animals slaughtered for food							
Cattle	1,452	1,407	1,465	1,341	1,441	1,449	1,477	1,586
Pigs	1,402	1,298	1,121	972	998	859	843	839
Sheep	699	717	711	514	600	598	609	658
Poultry	2,183	2,194	2,145	2,220	2,205	2,224	2,223	2,247
Fish	123	140	140	151	158	183	170	150
Total	5,861	5,756	5,582	5,198	5,402	5,313	5,322	5,480

* 1998 and 2004 were 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 later years.



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Figure 6: Live weight ('000 tonnes) of animals slaughtered for food use 1998 – 2005



Many farm animals are reared to slaughter without the use of therapeutic antimicrobials or antimicrobial growth promoters. Other animals such as dairy cows may be treated with antimicrobials but are not slaughtered for food use, because of the over 30 months scheme (OTMS). However, if it were assumed that total antimicrobials sold for food-producing animals only (therapeutic and growth promoting products) were used only in animals slaughtered for food, 1 tonne of antimicrobial would have been used in the production of 10,976, 12,933, 12,516, 12,556, 12,621, 12,864, 12,522 and 13,564 tonnes of live weight of animals slaughtered in the years 1998-2005 (see Table 15). 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 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 1998 – 2005 are 901,519, 968,092, 960,819, 621,010, 823,434, 752,914, 801,748 and 706,787 respectively. 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



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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 15: 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) 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005
Total live weight animals slaughtered for food use ('000 tonnes)	5,861	5,756	5,582	5,198	5,402	5,313	5,322	5,480
Total antimicrobials (therapeutic and growth promoters) (tonnes) sold for food animals (tonnes a.i.)	534	443	446	414	428	413	425	404
Live weight of animals slaughtered (tonnes) for food per tonne of antimicrobial a.i. sold	10,976	12,933	12,516	12,556	12,621	12,864	12,522	13,564
Kg of antimicrobial a.i. sold per tonne of live weight of animals slaughtered for food	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.07



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ANTIMICROBIAL SALES AND OTHER FOOD ANIMAL COMMODITIES

Table 16 details the litres of cows' milk produced in the UK annually, expressed in millions of litres. 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 16: Litres of milk produced per kilogram of antimicrobial lactating cow intramammary product (kilograms active ingredient) sold 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005
Million litres milk produced	14,218	14,587	14,078	14,290	14,448	14,584	14,215	14,154
Kilograms a.i. lactating intramammary sold	2,168	1,939	1,790	2,145	1,947	2,145	1,886	1,375
Million litres milk produced per tonne a.i. lactating intramammary sold	6,558	7,523	7,865	6,662	7,421	6,799	7,537	10,294
Kilograms a.i. lactating intramammary sold per million litre of milk produced	0.15	0.13	0.13	0.15	0.13	0.15	0.13	0.10

In addition not all of the approximately 14.1 billion litres of milk produced annually in the UK (excluding suckled milk) are sold for human consumption. It is estimated that approximately 230 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 2006**



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ANNEX 1: GLOSSARY OF TERMS

AI	Active Ingredient; the part of an antimicrobial medicine that acts against the bacterial infection.
Aminoglycosides	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.
Antibiotic	A substance produced by or derived from a microorganism, which selectively destroys or inhibits the growth of other microorganisms.
Antifungal	Products that are destructive to or suppress the reproduction or growth of fungi.
Antimicrobial	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.
Antimicrobial Resistance	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.
Antiprotozoal	A drug primarily used in the treatment and/or prevention of parasitic protozoal infections.
β-Lactam	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.
Coccidiostat	Product used for the control of coccidiosis, a protozoa and infection causing diarrhoea and dysentery.
Defra	Department for Environment, Food and Rural Affairs.



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Fluoroquinolone	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.
Food Animals	Animals produced for food including: cattle, sheep, pigs, poultry, salmon, trout and bees.
Growth Promoter	Substances, which, when given in animal feed, increase feed conversion efficiency or result in better daily live weight gain, or both.
Injectable Product	A therapeutic product which is administered to animals via injection.
Intramammary Product	A product which is administered into the udder.
Ionophore	A small hydrophobic molecule that dissolves in lipid bilayer membranes and increases permeability to inorganic ions.
Macrolide	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.
Medicated Feedingstuff	Feedingstuffs that contain a veterinary medicine, and that are intended for feeding to animals without further processing.
Non Food Animals	Animals not reared for food. These are mainly companion animals including, dogs, cats, horses, small mammals, rabbits and birds.
Non Ionophore Coccidiostat	All coccidiostats with alternative modes of action to those shown by ionophores.
PDNS	Porcine Dermatitis and Nephropathy Syndrome, a disease affecting pigs.
PMWS	Post-weaning Multi-systemic Wasting Syndrome, a disease affecting pigs.
Sulphonamide	A group of bacteriostatic compounds that interfere with folic acid synthesis of susceptible organisms. They all have similar antimicrobial activity but different pharmacokinetic properties.



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Tetracycline	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.
Therapeutic Product	A product which treats or prevents disease.
Trimethoprim	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.
VMD	Veterinary Medicines Directorate, an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra).
Water / Oral Product	A therapeutic product that is administered to animals orally. Includes tablets, boluses, capsules, dissolvable powders and sachets, solutions, etc.
Zotechnical Feed Additive	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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Contributing Pharmaceutical Companies And Other Marketing Authorisation Holders

Alpharma Inc
Animal Care Ltd
Arnolds Veterinary Products
Bayer Plc
Boehinger Ingelheim Ltd
Ceva Animal Health Ltd
Chanelle Pharmaceutical Manufacturers
Cross Vetpharm Group Ltd
Cyton Biosciences Ltd
Denfleet Pharma Ltd
ECO Animal Health Ltd
Elanco Animal Health
European Veterinary Supplies Ltd
Eurotec Nutrition Ltd
Eurovet Animal Health Bv
Fort Dodge Animal Health Ltd
Forum Products Ltd
Harkers Ltd
Intervet (UK) Ltd
Janssen Animal Health
Leo Laboratories Ltd
Merial Animal Health Ltd
Minster Veterinary Practice
Norbrook Laboratories Ltd
Novartis Animal Health UK Ltd
Novartis Animal Vaccines Ltd
Oropharma



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Pfizer Ltd
PharmAQ
Schering Plough Ltd
Sogeval SA
Trouw (UK) Ltd
Tulivin Laboratories Ltd
Vetoquinol UK Ltd
Vet XX
Virbac UK Ltd

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