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 2007

2008

ASSURING THE SAFETY, QUALITY AND EFFICACY OF VETERINARY MEDICINES

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SUMMARY

This is the tenth 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.

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 2007.
- There is an overall 18 tonne decrease in sales of veterinary antimicrobials, most of which is accounted for by the combination of a decrease in sales of tetracyclines of 18 tonnes and macrolides of 3 tonnes and an increase in sales of β-lactams of 2 tonnes.
- There is a decrease in sales of products for food-producing animals of 21 tonnes and an increase of 3 tonnes and 1 tonne respectively for the groups non-food animals only and combination of both food and non-food animals.
- No sales of antimicrobial growth promoters are reported as their use and sale were banned from 1 January 2006.
- There is a 37 tonne decrease in sales of coccidiostats in 2007, compared with 2006.
- In 2007 335 Kg more fluoroquinolones were sold than in 2006. For cephalosporins, there was an increase of 576 Kg.
- In 2007 there was an increase in sales of products imported under the SIC/STC systems, increasing from 189 kg in 2006 to 1,043 kg in 2007.

Trends

Total Sales

The total sales of veterinary therapeutic antimicrobials in the UK 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, decreased by a further 41 tonnes in 2006 to 405 tonnes, and again fell by 18 tonnes in 2007 to 387 tonnes.

The sales of veterinary therapeutic antiprotozoals in 2007 were 14 tonnes, the same as in 2006. Sales of these products are exclusively for food-producing animals. The sales of veterinary antifungals were 3.1 tonnes in 2007 less than in previous years.

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

Sales of coccidiostats in 2007 were 166 tonnes, a decrease of 37 tonnes from 2006. Coccidiostats are used in food-producing animals only, particularly poultry reared on deep litter systems.

Food-Producing Animals

In 2007 sales of antimicrobial products for therapeutic use in food-producing animals accounted for approximately 87% (335 tonnes) of the total annual sales of 387 tonnes which was comparable with previous years. However it is not possible to identify the proportion of the 335 tonnes which was administered to animals that did not enter the food chain (for example, cattle barred from use in food via the Older Cattle Disposal Scheme).

Approximately half of the total sales of therapeutic antimicrobials were accounted for by tetracyclines in each year from 2002 to 2007. In each of the ten reporting years between 1 and 2 tonnes of fluoroquinolones were sold (less than 1% of the total). Between 53% and 82% of therapeutic antimicrobial products for food-producing animals only were sold for use as medicated feedingstuffs, over the reporting period (2002– 2007), 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 2007, from the 2006 sales. There was a decrease in sales of therapeutic antimicrobials in 2007 for some of the individual food-producing species e.g. for pigs and poultry only (decreased by 20 tonnes a.i.). A decrease in sales was seen for cattle only (1 tonne a.i.) and pigs only (3 tonnes a.i.). Sales of multi-species products (excluding pig and poultry only) remained constant from 2002 to 2007.

Context

Animal health background

In addition to the normal animal health challenges facing farming:

- In 2007 there was an outbreak of Foot and Mouth disease (FMD) in the UK which placed animal movement restrictions on farmers;
- In 2007 the first outbreaks of bluetongue virus were reported in the UK.
- 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.

	2002	**2003**	**2004**	**2005**	**2006**	**2007**
Cattle	10,345	10,508	10,588	10,392	10,270	10,304
Pigs	5,588	5,046	5,159	4,862	4,933	4,834
Sheep	35,834	35,812	35,817	35,416	34,722	33,946
Poultry	168,996	178,800	181,759	173,909	173,081	167,667

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 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.

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 ten 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 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. Since 2006 this report 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.

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 VMD's 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. For the first time this year we have been able to use the data provided by the pharmaceutical companies to estimate how pig and poultry only products are used in these 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.

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.

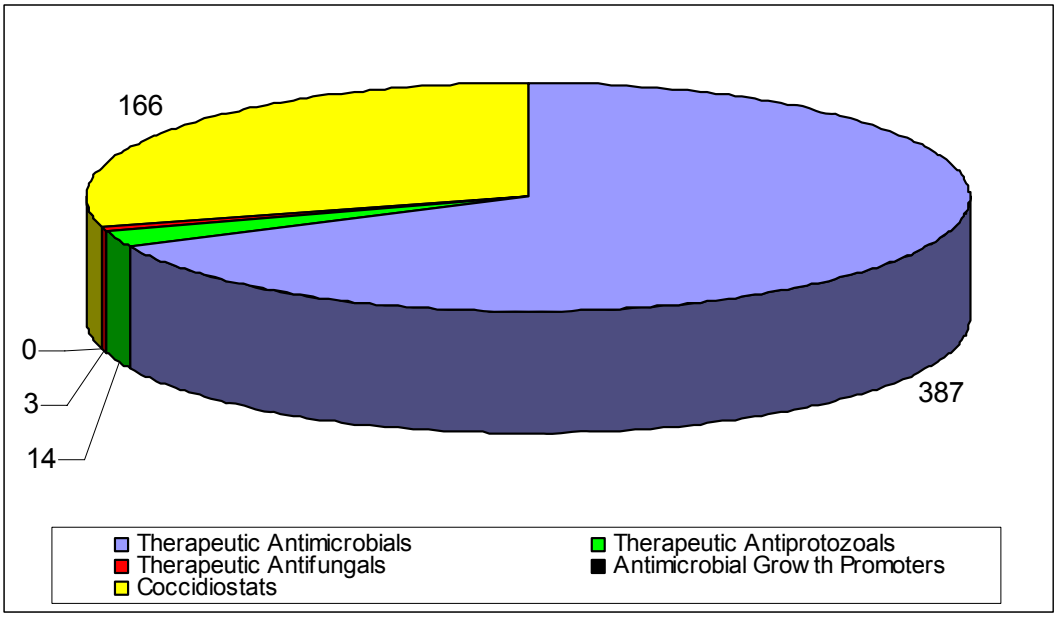
Finally, we seek comments on the draft report from the Veterinary Products Committee (VPC), the Government's independent expert advisory committee on veterinary medicines and from the Defra Antimicrobial Resistance Coordination (DARC) Group.

RESULTS

TOTAL SALES

The quantities of sales in 2007 for each of the five categories of veterinary products reported are illustrated in Figure 1. Therapeutic antimicrobials were the largest selling group (387 tonnes), followed by coccidiostats (166 tonnes), with no sales of antimicrobial growth promoters. Therapeutic antiprotozoals and antifungals were the smallest selling categories (14 tonnes and 3 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 2007[1]



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 2007, but a summary of the numbers of products sold to help clarify the reported data.

[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. 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.

Table 1: Numbers of products sold in 2002-2007 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	Number of Products Sold by Group 2006	Number of Products Sold by Group 2007
Therapeutic Antimicrobials comprising:	**370**	**358**	**339**	**325**	**317**	**311**
Tetracyclines	*56*	*49*	*50*	*48*	*45*	*46*
Trimethoprim/Sulphonamides	*56*	*50*	*45*	*46*	*40*	*40*
β-lactams	*129*	*124*	*120*	*113*	*120*	*110*
Aminoglycosides	*42*	*45*	*40*	*29*	*26*	*28*
Macrolides	*20*	*20*	*19*	*23*	*21*	*22*
Fluoroquinolones	*31*	*34*	*25*	*26*	*27*	*27*
Others	*36*	*36*	*40*	*40*	*38*	*39*
Therapeutic Antiprotozoals	**18**	**14**	**13**	**12**	**11**	**12**
Therapeutic Antifungals	**14**	**16**	**15**	**13**	**13**	**13**
Coccidiostats	**17**	**11**	**10**	**9**	**9**	**9**

Total Sales: Therapeutic Antimicrobials

The gross quantities of antimicrobial active ingredients in therapeutic products sold between 2002 and 2007 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 2002-2007. These figures are expressed graphically in Figure 2.

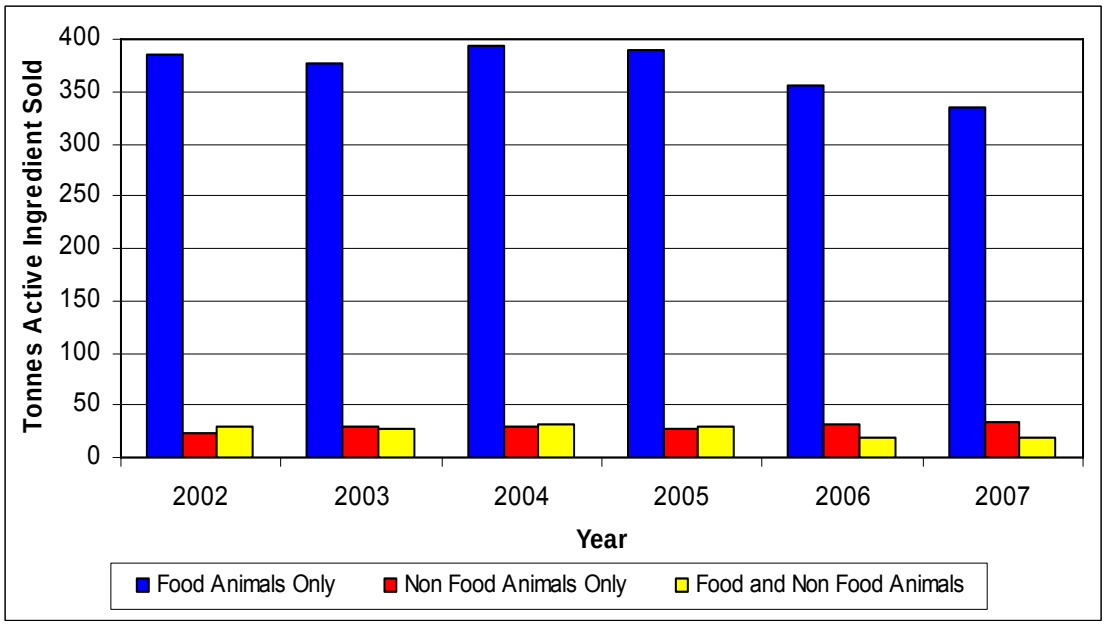
The overall sales of therapeutic antimicrobial products remained broadly the same over the period 2002-2005, varying between 435 and 454 tonnes, since which time sales have been declining annually, see Table 2 and Figure 2. The fluctuations year-on-year are most likely to reflect natural changes in the incidence of disease in animals over that period. Sales in 2007 have shown a decrease of 18 tonnes to 387 tonnes. In 2007, sales of therapeutic products for use in food-producing animals only have also decreased from 356 to 335 tonnes of active ingredient, sales of therapeutic antimicrobials for use in non

food-producing animals only varied between 24 and 34 tonnes and sales of products for use in either food-producing or non food-producing species varied between 18 and 32 tonnes showing no specific trend.

Table 2: Sales of therapeutic antimicrobials 2002 – 2007, in the categories of food animals only, non food animals only and combined food and non food animals

	2002	**2003**	**2004**	**2005**	**2006**	**2007**
	Tonnes Active Ingredient					
Indicated for food animals only	386	377	393	390	356	335
Annual Actual increase/decrease	*15*	*(9)*	*16*	*(3)*	*(34)*	*(21)*
Indicated for non food animals only	24	30	29	27	31	34
Annual Actual increase/decrease	*0*	*6*	*(1)*	*(2)*	*4*	*3*
Indicated for a combination of both food and non food animals	30	28	32	29	18	19
Annual Actual increase/decrease	*1*	*(2)*	*4*	*(3)*	*(11)*	*1*
Total sales of therapeutic antimicrobials	**440**	**435**	**454**	**446**	**405**	**387**

Figure 2: Sales of antimicrobial therapeutic products (tonnes active ingredient) 2002 – 2007 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 a marked decrease in sales in 2003 relative to 2002. Sales increased in 2004 and have remained relatively stable since then, at between 12 and 14 tonnes. 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 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Antiprotozoals	65	2	13	12	14	14
Annual Actual Increase / Decrease	*32*	*(63)*	*11*	*(1)*	*2*	*(-)*

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 are given in Table 4. Therapeutic antifungals are products primarily used to destroy or suppress the reproduction or growth of pathogenic fungi. Of the 13 sold 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 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Antifungals	10.5	13.8	5.1	7.1	5.2	3.1
Annual Actual Increase / Decrease	*8.8*	*3.3*	*(8.7)*	*2*	*(1.9)*	*(2.1)*

Total Sales: Antimicrobial Growth Promoters

The sales of antimicrobial growth promoting products from 2002-2007, are summarised in Table 5. Sales volumes have decreased from 2002 (42 tonnes) to 2006 when no sales were reported. Similarly, no sales were reported in 2007. 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 2002 - 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Growth Promoting Products	42	36	32	14	0	0
Annual Actual Increase / Decrease	*(1)*	*(6)*	*(4)*	*(18)*	*(14)*	*(0)*

Total Sales: Coccidiostats

The sales of coccidiostats from 2002 to 2007 are shown in Table 6. Sales from 2002 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 2002 - 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Coccidiostats	260	240	224	231	203	166
Annual Actual Increase / Decrease	*(6)*	*(20)*	*(16)*	*7*	*(28)*	*(37)*

The sales of coccidiostats have been sub-divided into ionophore and non-ionophore compounds and are summarised in Table 7. They show that there is a decreasing trend in use of ionophore coccidiostats from 2002-2007 (79% - 69%) while sales of non-ionophore coccidiostats have been relatively stable.

Table 7: Sales of ionophore and non-ionophore coccidiostats (tonnes active ingredient) in the UK 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Ionophores	206	190	173	173	147	114
Non-ionophores	54	50	51	59	56	52
Total	**260**	**240**	**224**	**231**	**203**	**166**

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 relatively 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 2004-2007 were variable amongst the years with a marked increase in 2007. It is likely that any changes reflect the different disease issues addressed by veterinary surgeons. In each of the years 2004, 2005, 2006 and 2007 56%, 73%, 31% and 88% of those imports were for use in food-producing animals.

Table 8: Sales of imported antimicrobials (kilograms active ingredient) into the UK 2004-2007 for all animals 2004-2007

	2004	2005	2006	2007
	Kilograms Active Ingredient			
Antimicrobial active ingredient	159	252	189	1,043

SALES BY CHEMICAL ANTIMICROBIAL GROUP

The sales of various chemical groups of antimicrobials between 2002 and 2007 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 ß-lactams (including penicillin) accounted for the vast majority of the therapeutic antimicrobials sold. For example, in 2007, they accounted for 83% of sales, with tetracyclines accounting for 45%, Trimethoprim/sulphonamides 19% and ß-lactams 19%. Most tetracyclines were sold for the treatment of pigs and poultry as medicated feedingstuffs (MFS), under veterinary prescription.

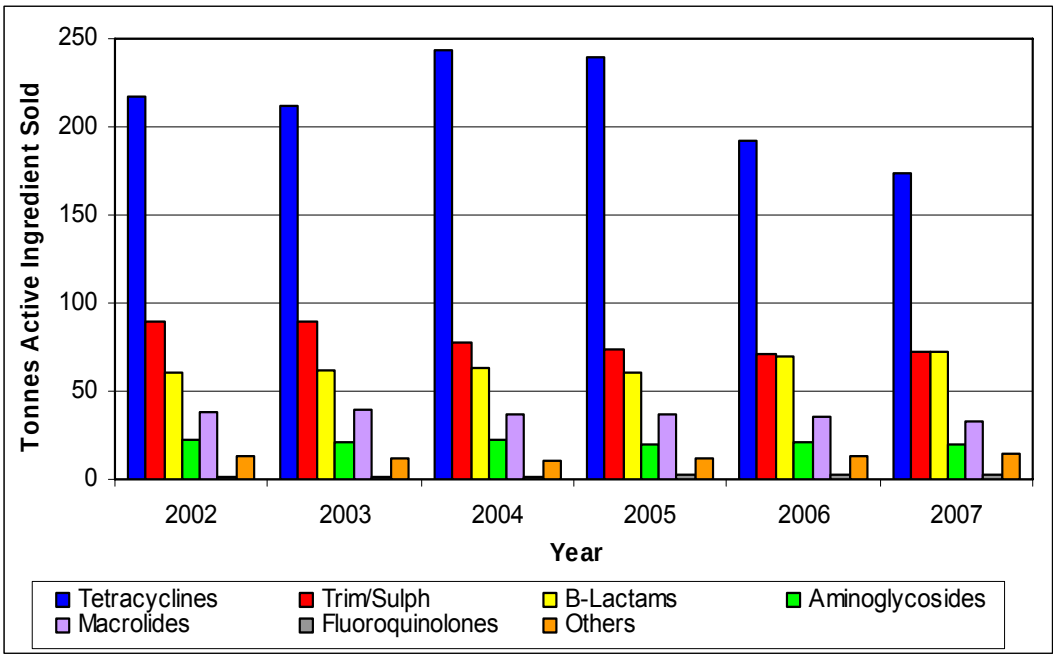
Table 9 and Figure 3 indicate a decreasing trend for sales of sulphonamides/trimethoprims and macrolides, whereas sales remained relatively stable for the classes of aminoglycosides and others. Fluoroquinolones have shown an increase in sales from 2002-2007. Tetracyclines have shown a 9% decrease from 2006 to 2007.

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) 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Tetracyclines	217	212	243	240	192	174
Trimethoprims/ Sulphonamides	89	89	77	74	71	73
β-Lactams	60	62	63	60	70	72
Aminoglycosides	22	21	22	20	21	20
Macrolides	38	39	37	37	36	33
Fluoroquinolones *	1	1	1	2	2	2
Other	13	12	11	12	13	14
Total	**440**	**435**	**454**	**446**	**405**	**387**
*fluoroquinolones (kg)	1,365	1,364	1,412	1,451	1,616	1,951

Figure 3: Sales of total antimicrobial therapeutic products (tonnes active ingredient) 2002 – 2007



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.

Table 10: Sales of antimicrobial therapeutic products by sub-chemical grouping (tonnes active ingredient) 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Trimethoprims/ Sulphonamides	**89**	**89**	**77**	**74**	**71**	**73**
Trimethoprims	14	15	13	12	12	12
Sulphonamides	75	74	64	62	59	61
β-Lactams	**60**	**62**	**63**	**60**	**70**	**72**
Cephalosporins*#	3	3	3	4	6	6
Penicillins**	18	16	14	12	13	15
Others Penicillins***	39	43	46	44	51	51
Aminoglycosides	**22**	**21**	**22**	**20**	**21**	**20**
Streptomycins	7	7	6	6	6	7
Neomycin and Framycetin	5	5	6	5	5	2
Others****	10	9	11	9	10	11
# cephalosporins (kg)	2,520	3,037	3,240	3,969	5,639	6,215

* = 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.

SALES BY ROUTE OF ADMINISTRATION

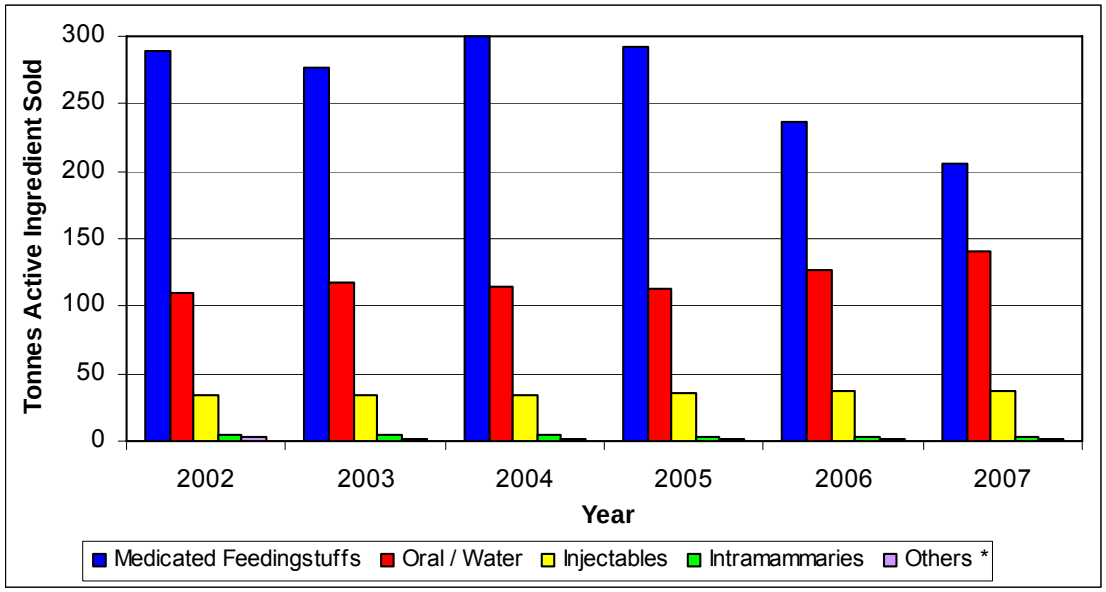
General

The major routes of administration of antimicrobials sold in 2002 – 2007 are listed in Table 11 and Figure 4. In 2007 medicated feedingstuffs made up 53% of the total therapeutic antimicrobials sold, whilst oral/water and injectable products accounted for 36% and 10% respectively. Intramammary products and other therapeutic antimicrobial products (creams, aerosols, drops, etc) contributed 0.8% and 0.5% respectively.

Table 11: Sales of total therapeutic antimicrobials (tonnes active ingredient) by route of administration 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Medicated Feedingstuffs	289	277	300	292	236	205
Oral / Water	110	117	115	113	127	140
Injectables	34	34	34	36	37	37
Intramammaries	4	5	4	3	3	3
Others	3	2	2	2	2	2
Total	**440**	**435**	**454**	**446**	**405**	**387**

Figure 4: Sales of total therapeutic antimicrobials (tonnes active ingredient) by route of administration 2002 – 2007



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

Intramammary Products

Sales of intramammary products vary between 3,125 and 4,735 kilograms active ingredient across the period 2002-2007 (see Table 12). Sales of lactating cow products increased to 1,383 kilograms in 2007 but sales of dry cow therapy products showed a decrease of 122 kilograms.

Table 12: Sales of antimicrobial intramammary products (kilograms active ingredient) 2002 – 2007[2]

	2002	2003	2004	2005	2006	2007
	Kilograms Active Ingredient					
Dry Cow Products	2,466	2,590	1,979	1,750	2,002	1,880
Lactating Cow Products	1,947	2,145	1,886	1,375	1,266	1,383
Total	**4,413**	**4,735**	**3,865**	**3,125**	**3,268**	**3,263**

[2] Sales of intramammary products are reported in kilograms.

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 2007 64% of antimicrobial products sold for food animals only were authorised for use in a combination of pigs and poultry only. Between 5 and 7% of total antimicrobials sold for use in food-producing animals were for use in more than one food producing species (excluding those for pig and poultry only) in any year between 2002 and 2007. The largest percentage of single species products is sold for use in pigs, and these sales contributed 21% in 2007 of the total sales of products for food-producing animals only. Multi-species products are authorised for use in more that one food-producing animal only, but does not include the group of 'pig and poultry only'.

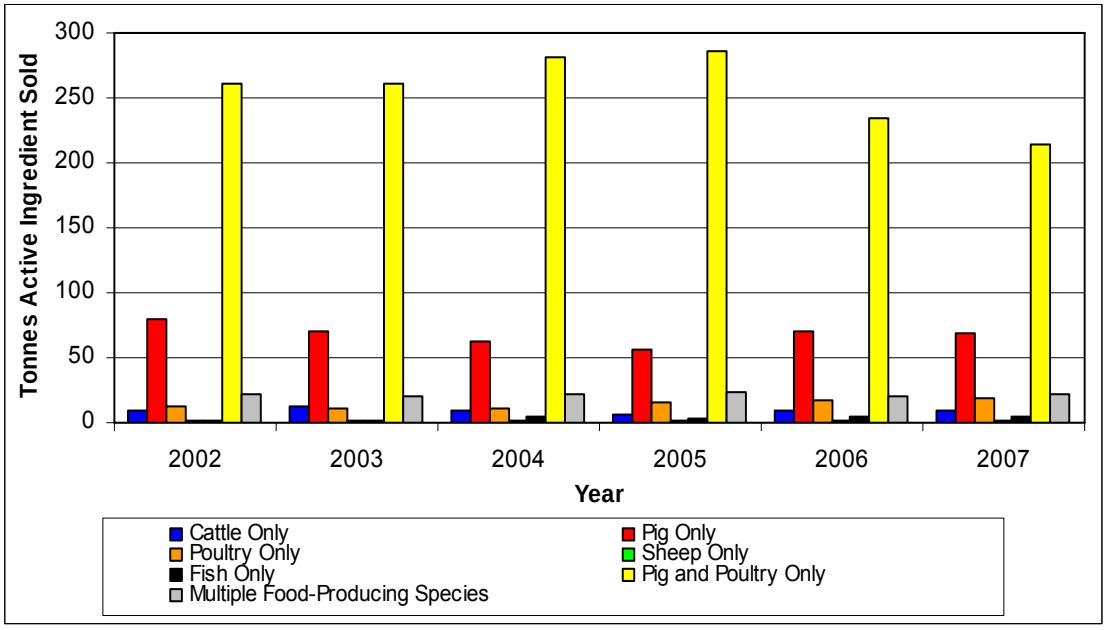
Table 13: Sales of total therapeutic antimicrobials for food-producing animals only (tonnes active ingredient) by food animal species 2002 – 2007

	2002	2003	2004	2005	2006	2007
	Tonnes Active Ingredient					
Cattle Only Products	9	12	10	7	10	9
Pig Only Products	80	70	63	56	71	68
Poultry Only Products	13	11	11	15	17	18
Sheep Only Products	<1	<1	<1	<1	<1	<1
Fish Only Products	1	2	4	3	4	4
Pig and Poultry Combined Only	261	261	282	286	234	214
Multi Species Products In Food Animals Only	22	21	22	23	21	22
Total	**386**	**377**	**393**	**390**	**358**	**335**

This year for the first time we have analysed sales for the category of pig and poultry only products based on estimates of use provided by the pharmaceutical companies with the marketing authorisations for the products. It is estimated in 2007 that 61% of the 214 tonnes sold for use were used in pigs, and 39% were

used in poultry. Less than 0.3% were sold for off-label use in bird species other than those for which the products are authorised for e.g. duck, turkey, game.

Figure 5: Total sales of therapeutic antimicrobials (tonnes active ingredient) for food-producing animals only 2002 – 2007



Non-Food Animal Species

Table 14 shows the sales of antimicrobials indicated for use in different species of non food animals only. In 2007 59% of all antimicrobials authorised for use in non food-producing animals 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.

Table 14: Sales of total therapeutic antimicrobials for non food-producing animals only (kilograms active ingredient) by animal species 2002 - 2007[3]

	2002	2003	2004	2005	2006	2007
	Kilograms Active Ingredient					
Dog Only Products	4,465	4,649	4,976	5,715	7,764	7,249
Horse Only Products	14,304	14,414	14,041	15,629	17,010	19,975
Other Products For Use In Non Food Animals Only	5,727	10,661	10,397	5,122	5,660	6,397
Total	**24,496**	**29,725**	**29,417**	**26,466**	**30,435**	**33,621**

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

ANTIMICROBIAL SALES AND LIVESTOCK REARED

The live weights of animals slaughtered for food in the UK from 2002-2007 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 Government 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 remained constant between 2006 and 2007 whilst total sales of therapeutic antimicrobials and antimicrobial growth promoters for food animals decreased (Table 16). Cattle slaughtered for food-production increased in 2007 relative to 2006 due to the cessation of OTMS is January 2006. Sheep and poultry production decreased in 2007 compared with 2006, while pig production increased slightly.

Table 15: Live weight ('000 tonnes) of animals slaughtered for food use 2002 – 2007

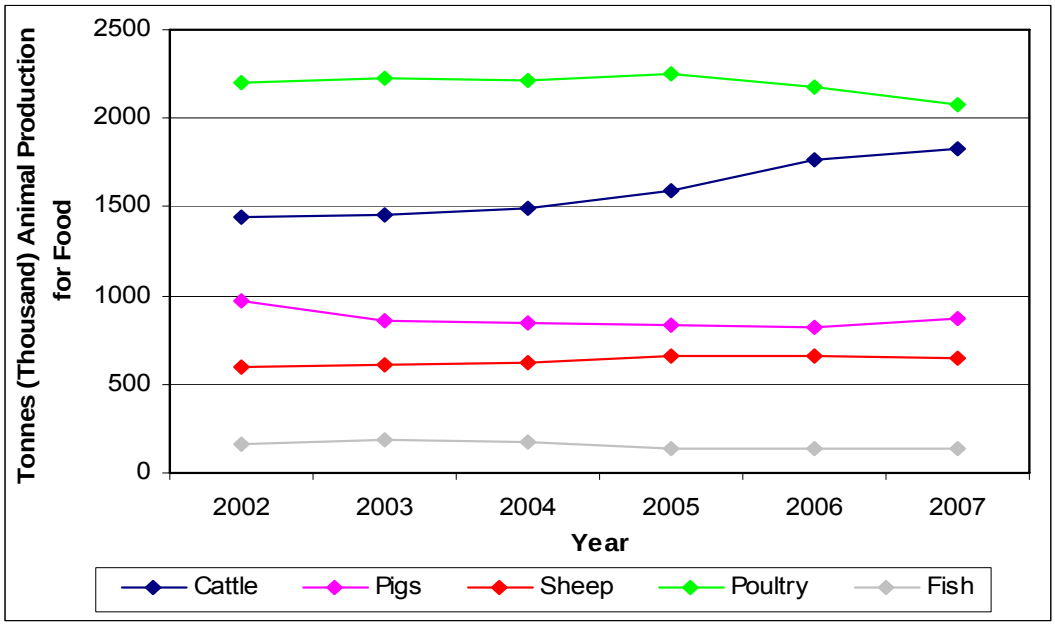
	2002	2003	2004*	2005	2006	2007
	'000 Tonnes live weight animals slaughtered for food					
Cattle	1,439	1,457	1,498	1,586	1,762**	1,831**
Pigs	969	861	845	833	825	875
Sheep	600	605	622	658	655	646
Poultry	2,207	2,225	2,215	2,248	2,175	2,078
Fish	158	183	170	142	140	140***
Total	**5,402**	**5,313**	**5,322**	**5,473**	**5,557**	**5,570**

* 2004 was a 53 week reporting year. 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.

*** Estimate based on 2006 figures, as 2007 data were not available at the time of report preparation.

Figure 6: Live weight ('000 tonnes) of animals slaughtered for food use 2002 – 2007



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 the 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 12,554, 12,908, 12,588, 13,547, 15,610 and 16,777 tonnes of live weight of animals slaughtered in the years 2002-2007 (see Table 16). Using the same assumptions, around 60-80g 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 (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 2002 – 2005 are 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). In 2007 127,559 cattle were culled via the OCDS.

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) 2002 - 2007

	2002	2003	2004	2005	2006*	2007
Total live weight animals slaughtered for food use ('000 tonnes)	5,373	5,331	5,350	5,473	5,557	5,570
Total antimicrobials (therapeutic and growth promoters) (tonnes) sold for food animals (tonnes a.i.)	428	413	425	404	356*	335*
Live weight of animals slaughtered (tonnes) for food per tonne of antimicrobial a.i. sold	12,554	12,908	12,588	13,547	15,610	16,627
Kg of antimicrobial a.i. sold per tonne of live weight of animals slaughtered for food	0.08	0.08	0.08	0.07	0.06	0.06

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

ANTIMICROBIAL SALES AND OTHER FOOD ANIMAL COMMODITIES

Cows' milk production in the UK annually, expressed in millions of litres is 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 2002 - 2007

	2002	2003	2004	2005	2006	2007
Million litres milk produced	14,448	14,587	14,139	14,062	13,933	13,660
Kilograms a.i. lactating intramammary sold	1,947	2,145	1,886	1,375	1,266	1,383
Million litres milk produced per tonne a.i. lactating intramammary sold	7,421	6,799	7,537	10,227	11,006	9,877
Kilograms a.i. lactating intramammary sold per million litre of milk produced	0.13	0.15	0.13	0.10	0.09	0.10

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.

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. Additionally this year we have spoken with some companies to determine how they believe their pig and poultry only products are used between the species.

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. To this end in 2007, VMD published the first Overview of Antimicrobial Usage and Bacterial Resistance in Selected Human and Animal Pathogens in the UK which pulled together for the first time information on human and animal population data, human and animal antimicrobial use/sales data and bacterial resistance data from the medical and veterinary fields. This report is available on the VMD website under the 'publications' and 'antibiotic related' tabs.

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
July 2008

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 micro-organisms 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 *Cephalosporium acremonium*. 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.

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 *Streptomyces* 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.
Special Import Certificate	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'.

Special Treatment Certificate	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.
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.
Tetracycline	A group of antibiotics derived from *Streptomyces* 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.
Zootechnical 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.

ANNEX 2: CONTRIBUTORS AND PARTICIPANTS

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Contributing Pharmaceutical Companies and Other Marketing Authorisation Holders

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Bayer Plc
Boehinger Ingelheim Ltd
CEVA Animal Health Ltd
Chanelle Animal Health Ltd
Cross Vetpharm Group Ltd
Cyton Biosciences Ltd
Dechra
Dopharma Research B.V.
ECO Animal Health Ltd
ECUPHAR
Eli Lilly
European Veterinary Supplies Ltd
Eurovet Animal Health
Fort Dodge Animal Health Ltd
Forum Products Ltd
Globalmed Ltd
Gosmore Ltd
Petlife
Intervet (UK) Ltd
Janssen Cilag Ltd
Krka Dd
Laboratories Hipra SA
Merial Animal Health Ltd
Minster Veterinary Practice
Munro Wholesale Medical Supplies Ltd
Norbrook Laboratories Ltd

Novartis Animal Health Ltd
Novartis Animal Health Vaccines Ltd
Oropharma
Pfizer Ltd
Pharmacia Animal Health Ltd
PHARMAQ Ltd
Quvera Ltd
Schering Plough Animal Health
Sogeval
Vétoquinol UK Ltd
Virbac S.A

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