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# REPORT ON THE SALES OF VETERINARY ANTIMICROBIALS: 2004/2005

## Introduction

Registrants of prescription veterinary medicines containing antibiotics are required to provide an annual summary of sales to the New Zealand Food Safety Authority (NZFSA) as a condition on the registration. This report summarises the sales for the year April 2004 to the end of March 2005 and provides a comparison with the information supplied for the previous two years.

Data is collected to provide an overview that can be used to indicate possible changes in the way antibiotics are used or levels of use for particular conditions. It is not intended that more definite conclusions on changes in use will be made without further information on actual use. The 2003/2004 annual report did provide an overview of antibiotic use in pigs and poultry. The intention is to provide similar commentaries providing more detail on actual use of antibiotics in animals as the information becomes available.

The summary tables do not include data on antimicrobials that are not managed as prescription veterinary medicines, e.g. ionophores, flavomycin, avilamycin or quinoxalines. These products are not likely to be used in human medicine and there is no evidence to suggest that they could contribute to antibiotic resistance in humans.

## Data interpretation

The following issues should be considered when interpreting the information in this report:

1. Sales data is not the same as data on use. An unknown amount of antibiotic sold within the nominated period will be used in the following year or years depending on the product's shelf life. Some product will be disposed of as damaged or expired.
2. A change in the overall quantity used is often due to increases in animal populations. The usage on a per animal basis may actually fall despite increased sales.
3. Environmental conditions and major disease outbreaks may cause a temporary increase in the use of specific antibiotics, which should not be interpreted as a long-term trend.
4. Comparing quantities of different antibiotics can give a false impression of the actual numbers of doses used and the number of treated animals. Dose rates and treatment lengths vary between antibiotics. This report makes no attempt to convert sales data into the number of potential animal treatments.
5. Significant quantities of antibiotics may be used legally off label in other species or for conditions that are not indicated on labels. Species such as sheep and deer, which are significant in New Zealand, are 'minor uses' elsewhere and unlikely to have registered uses on many products.
6. This report only deals with antibiotics registered as veterinary medicines. Veterinarians can legally use human medicines and compound products for animals under their care subject to an approved code of practice.

## Data presentation

The data is formatted in the same way as for the 2003/2004 report. Sales information is provided by registrants in kilograms or volumes of product sold on a monthly basis. The conversion to kilograms of actives is calculated assuming the product when used contains the active concentration as expressed on the label. Overages used in manufacturing and non active salts are not included in the final quantity. For example, oxytetracycline hydrochloride 113 grams per litre in the formulation will be treated as oxytetracycline 100 grams per litre when calculating the quantity of antibiotic. The conversion of sales information to the amount of active is standardised for each product to ensure consistency.

The presentation of the data assumes products are used as indicated on the label and makes no judgement on known off label uses. The *species* categories are defined as:

1. Companion – cats and/or dogs
2. Cattle – dairy and/or beef cattle
3. Pigs/Poultry – pigs and/or chicken, turkeys and game birds
4. Multi species – all products with multiple groups approved on labels including many injectable penicillins, tetracyclines and sulphonamides . This category includes all products with claims for sheep or deer as there are few examples of antibiotics registered for these species alone.
5. Other – currently includes horses, sheep, cage birds and ornamental fish.

*Use* categories are defined as:

1. Oral – Tablets, capsules, pastes, powders and suspensions for individual dosing.
2. Injectable – Intravenous, subcutaneous and intramuscular.
3. Feed – In animal feed for mass medication.
4. Water – In dedicated animal water supply for mass medication.
5. Intramammary – ‘Milking cow’ and ‘dry cow’ products administered via the teat canal.
6. Other – Topical, ophthalmic, ear preparations, intrauterine.

**Table 1: Summary of antibiotic sales in kilograms of active ingredients in family groups\***

Family of active ingredient	Total kilograms (2002/2003)	Total kilograms (2003/2004)	Total kilograms (2004/2005)
Macrolides/lincosamides	6279	5011	5667.5
Penicillins	11065	13708	13819
Clavulanic acid	73	141	120.5
Cephalosporins	1176	1076	1201.5
Tetracyclines	1509	3458	3361
Sulphonamides/Trimethoprim	2998	4429	5339
Aminoglycosides	2325	2134	1920
Fluoroquinolones	23	28	27
Novobiocin	5	6	4.5
Nitro-imidazoles	60	105	61
Nitrofurans	168	111	42
Bacitracins	26579	27264	18057
Virginiamycin	4	28	16
Fusidic acid	1	2	2.5
**other	57	56	82.8
<b>TOTAL</b>	<b>52702</b>	<b>57557</b>	<b>49719</b>

\*Does not include sales of ionophores

\*\* includes oleandomycin, florfenicol and polymixin

**Table 2: Sales by active ingredient family and approved route of administration**

Family	Oral	Injectable	Feed	Water	Intramammary	Other	Total
Aminoglycosides	354.10	864.32	11.77	128.70	550.63	10.46	1919.99
Bacitracin	0.00	0.00	18056.25	0.00	0.00	0.80	18057.05
Cephalosporins	268.25	127.97	0.00	0.00	755.12	50.30	1201.63
Clavulanic Acid	85.16	4.57	0.00	0.00	28.89	0.00	118.61
Fluoroquinolones	14.62	12.17	0.00	0.00	0.00	0.00	26.79
Fusidic Acid	0.00	0.00	0.00	0.00	0.00	2.36	2.36
Macrolides / Lincosamides	10.23	1020.52	4483.57	80.72	72.46	0.00	5667.49
Nitrofurans	0.00	0.00	41.00	0.00	0.00	0.86	41.86
Nitro-imidazoles	11.91	0.00	42.77	6.00	0.00	0.00	60.69
Novobiocin	0.00	0.00	0.00	0.00	4.47	0.00	4.47
Other	0.00	8.70	0.00	0.00	73.86	0.25	82.80
Penicillins	542.40	7774.59	0.00	17.70	5454.80	29.11	13818.60
Sulphonamides / Trimethoprim	4979.26	183.89	119.50	0.27	0.00	56.36	5339.28
Tetracyclines	23.22	1446.37	1391.00	218.66	115.39	166.59	3361.22
Virginiamycin	0.00	0.00	16.08	0.00	0.00	0.00	16.08
<b>Total</b>	<b>6289.15</b>	<b>11443.09</b>	<b>24161.94</b>	<b>452.05</b>	<b>7055.61</b>	<b>317.08</b>	<b>49718.93</b>

**Table 3: Sales in kilograms by active ingredient by approved species**

Family	Companion	Cattle	Pigs/Poultry	Multi-species	Other	Total
Aminoglycosides	45.55	467.73	77.30	1324.76	4.66	1919.99
Bacitracin	0.49	0.00	18056.25	0.31	0.00	18057.05
Cephalosporins	268.25	805.42	0.00	127.97	0.00	1201.63
Clavulanic Acid	85.16	29.10	0.00	4.36	0.00	118.61
Fluoroquinolones	16.44	3.26	0.00	7.09	0.00	26.79
Fusidic Acid	2.36	0.00	0.00	0.00	0.00	2.36
Macrolides / Lincosamides	10.23	74.38	440.08	5142.80	0.00	5667.49
Nitrofurans	0.00	0.00	41.00	0.50	0.37	41.86
Nitro-imidazoles	11.91	0.00	48.77	0.00	0.00	60.69
Novobiocin	0.00	4.47	0.00	0.00	0.00	4.47
Other	0.20	3.63	0.00	78.98	0.00	82.80
Penicillins	449.64	5793.30	17.70	7557.96	0.00	13818.60
Sulphonamides / Trimethoprim	0.00	84.12	119.50	3654.03	1481.64	5339.28
Tetracyclines	23.22	7.76	0.00	3330.12	0.12	3361.22
Virginiamycin	16.08	0.00	0.00	0.00	0.00	16.08
<b>Total</b>	<b>929.52</b>	<b>7273.16</b>	<b>18800.61</b>	<b>21228.86</b>	<b>1486.78</b>	<b>49718.93</b>

### Specific comment on sales trends

There is an apparent decrease in sales of approximately 7,800 kilograms or 13.6%. All of the change from the 2003/2004 year can be accounted for by a 33% drop in sales of zinc bacitracin. This antibiotic still represents 36% of all antibiotic by weight, 96% of antibiotic usage in the pig and poultry industry, and 73% of in-feed and water usage.

### Sulphonamides

Quantities sold have shown a steady increase over the three years. This is due to increased sales of a variety of products used for individual animal treatment rather than mass medication. Over 25% are used in veterinary medicines that are likely to be used only in horses.

### Tetracyclines

Sales are relatively static after a large increase the previous year. The in-feed sales decreased slightly with a small increase in quantities of injectable products.

### **Macrolides/Linosamides**

A small increase occurred following a large drop the previous year. The increase can be attributed to an increase of sales in tylosin (12.7%) and lincomycin (78%). Both injectable and in-feed product sales of tylosin rose. Tylosin makes up 94% of the total quantity of the macrolide/lincosamide group with approximately 20% of this in injectable formulations, which have significant use patterns in dairy cattle for treatment of conditions such as mastitis.

While the amount of lincomycin used is not large, there were increases of approximately 75% for all uses (feed, water and intramammary).

Eighty per cent of the sales of the macrolide/lincosamide group are products intended for in-feed and in-water medication.

### **Penicillins**

This remains the most significant class of antibiotics used for individual animal treatment across a wide range of species. The following comments can be made:

1. The use in cats and dogs is primarily restricted to amoxicillin/clavulonic acid combinations.
2. The sales categorised as sold for cattle primarily consist of intramammary products.
3. Most of the injectable amoxicillin, ampicillin and penicillin products have multispecies claims.
4. Significant quantities are likely to be used for the treatment of cattle, sheep, pigs and horses.
5. Total amoxicillin sales increased by 20% due to a trebling of injectable amoxicillin sales.
6. Ampicillin, cloxacillin and cephalonium sales in intramammary products show a significant increase. Approximately 70% of the total antibiotic actives used in intramammary products are for dry cow therapy.

### **Aminoglycosides**

Sales show no clear trend in recent years. The largest component is streptomycin/dihydrostreptomycin, which increased substantially from 2003 to 2004 only to show a moderate decrease in the latest figures. The sales of dihydrostreptomycin/streptomycin are divided between intramammary 26.2%, oral scour treatments 17.3%, and injectable 56.5%

### **Virginiamycin**

Reported sales are for product intended for the management of laminitis in horses. One product remains registered for therapeutic use in poultry with no sales reported.

### **Cephalosporins**

Sales have shown little overall change when compared with the previous two years. An apparent trend for increased use of cephalosporins in intramammary preparations was offset by

a small decrease in sales of the injectable products. Sales of the antibiotic ceftiofur, registered for use in cattle, horse and pigs, made up 74% of the injectable product. A fourth generation cephalosporin, cefquinome, is approved for use in food-producing species; however, no sales were reported.

### Fluoroquinolones

The products available are individual animal treatments with sales split between oral and injectable products. Approximately ten kilograms of active are in injectable product of a type which is likely to be used in food-producing animals.

### Nitrofurans

Furazolidone sales have shown a steady decrease in use over the three years, coinciding with increased constraints on use due to issues unrelated to antibiotic resistance. The product is used in relatively small quantities for the treatment of bacterial infections in pigs and poultry. Very small amounts of nitrofurazone are used for topical treatment in non food-producing animals.

### Niro-imidazoles

Sales are consistent with the 2002/3 year after an increase in 2003/4 dropped following a peak the previous year. Of the 60.7 kilograms sold, 80% is sold as in-feed or water medication intended for pigs and poultry. Off label use in other food-producing species is not permitted to manage trade risks. The remaining 20% consists of metronidazole used in tablet form for treatment of cats and dogs.

**Table 4: Sales in kilograms by route of administration and species**

Route	Companion	Cattle	Pigs/Poultry	Multi-species	Other	Total
Oral	885.90	32.00	0.82	3884.40	1486.02	6289.15
Injectable	18.60	343.89	3.80	11076.81	0.00	11443.09
Feed	16.08	0.00	18626.86	5519.00	0.00	24161.94
Water	0.00	0.47	169.13	282.05	0.40	452.05
Intramammary	0.00	6794.38	0.00	261.23	0.00	7055.61
Other	8.94	102.41	0.00	205.36	0.37	317.08
<b>Total</b>	<b>929.52</b>	<b>7273.16</b>	<b>18800.61</b>	<b>21228.86</b>	<b>1486.78</b>	<b>49718.93</b>

The data in Table 4 tabulates use pattern by route of administration. This illustrates that the routine method of administration varies significantly between companion animals, pigs/poultry and cattle.

The 'other' species category almost entirely consists of sulphonamides and trimethoprim intended for oral use in horses. Small amounts are also used in cage birds and one oral product for lambs.

The large amount of antibiotic potentially used in a range of species makes interpretation of this information difficult. If the data is analysed for each product recorded as 'multi-species', the following assumptions can be made:

- The oral product consists largely of anti-diarrhoeal preparations, most of which are likely to be used in large animals, particularly cattle. A small amount (6%) consists of 500mg amoxicillin/clavulonic acid tablets, which could be used in dogs or calves.
- The injectable product mainly consists of the older, established antibiotic groups of tetracyclines, penicillins and sulphonamides. A significant amount is likely to be used in cattle and sheep and, to a lesser extent, pigs, deer and horses. The actual quantity used in companion animals will be small simply due to the comparative animal sizes and the type of antibiotics involved.
- The in-feed medication consists of oxytetracycline and tylosin. These products are likely to be used primarily in the intensive pig and poultry industries but will have uses in dairy and feed lot cattle where in-feed medication is practical.
- The in-water medication consists mostly of oxytetracycline with some neomycin. The majority of this product is likely to be used in the pig and poultry industry where in-water medication is practical. Oxytetracycline could be used in milk to medicate calves.
- The intramammary use is due to one product with indications for treating topical conditions in cats and dogs. Most of this product will be used in cattle. Intramammary products are normally registered only for treatment of mastitis in cattle. However, small amounts could be used to treat sheep and goats.
- The other category consists of topical products, which are frequently approved with multiple species claims.

## Antibiotic use in horticulture

One product containing streptomycin is registered for the following uses:

Pipfruit - Fireblight

Stonefruit - Blast and Bacterial Spot

Seedling Tomatoes - bacterial diseases.

**Table 5: Reported streptomycin sales for use in horticulture**

1999	2001-2002	2002 -2003	2003 - 2004	2004 - 2005
1200 kg	391 kg	359 kg	495.9 kg	281.35 kg

While there has been an apparent significant drop in the 2004 -2005 year this may just represent varying disease incidences and climatic factors as more targeted usage.



## **Summary**

The sales information provides a snapshot of registered veterinary antibiotics. The data presented over a three year period shows no trends that would indicate antibiotics are not being used as intended. Increased sales or use cannot be interpreted as increased prescribing frequency without considering changes to the animal populations. Large variations in sales are most likely to occur with products that are used in small quantities to manage disease outbreaks. Any changes that might represent a significant alteration have been highlighted in the report.