



Veterinary
Medicines
Directorate

Veterinary Pharmacovigilance in the United Kingdom Annual Review 2015



© Crown copyright 2017

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.3. To view this licence visit www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ or email PSI@nationalarchives.gsi.gov.uk

This publication is available at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at

adverse.events@vmd.defra.gsi.gov.uk

www.gov.uk/vmd

Veterinary
Pharmacovigilance in the
United Kingdom
Annual Review 2015

Contents

Introduction	1
Important points to note.....	3
Who tells VMD about adverse events	4
Types of report	6
Medicines and other products reported	8
Authorised veterinary medicines.....	8
Therapeutic groups	10
Vaccines.....	10
Ectoparasiticides	10
Endectocides	10
Anthelmintics	10
Anti-inflammatories.....	10
Antimicrobials	11
Neurological agents.....	11
Hormones and hormone regulators	11
Incompletely identified veterinary medicines	11
Authorised human medicines (including extemporaneous ‘vet specials’)	12
Imported medicines	12
Exempt veterinary medicines.....	13
Non-medicinal veterinary products	13
Other non-medicinal products.....	14
Biocides and disinfectants	14
Products used in clinical/field trials	15
Animal species reported.....	16

Pet animal breeds.....	18
Dogs.....	18
Cats.....	18
Horse	18
Rabbit.....	18
Food-producing animal breeds	19
Cattle.....	19
Sheep.....	19
Pig.....	19
Poultry	19
Non-spontaneous adverse event reports	20
Reports from literature	20
Human reports	20
Animal reports.....	20
Environmental report.....	21
Reports from studies.....	21
Spontaneous adverse event reports	22
Human adverse reactions.....	25
People.....	25
Medicines and other products	26
Authorised veterinary medicines.....	26
Other products.....	27
Adverse reaction reports	28
Authorised veterinary medicines.....	28
Internal and external parasites.....	28
Vaccines	28

Infection control	31
Anaesthetics and sedatives	32
Prevention of vomiting	33
Inflammation control.....	33
Hormone control	33
Other products.....	33
Animal adverse event reports	35
Medicines and other products	35
Authorised veterinary medicines.....	36
Incompletely identified veterinary medicines	37
Authorised human medicines (including extemporaneous ‘vet specials’)	38
Imported medicines	38
Exempt veterinary medicines.....	38
Non-medicinal veterinary products	39
Other non-medicinal products.....	40
Biocides.....	40
Suspected lack of expected efficacy reports	40
Pet animals.....	41
Dogs	43
Cats	44
Rabbits	44
Horses	45
Ferret.....	46
Exotic animals	46
Pigeons.....	46
Food-producing animals	46
Cattle	48
Sheep	49
Pigs	51

Goats.....	51
Farmed fish.....	51
Chickens.....	52
Ducks.....	53
Turkey.....	53
Unidentified poultry	53
Safety reports.....	54
Pet animals.....	54
Dogs.....	55
Cats	70
Rabbits	78
Horses	79
Donkey	80
Budgerigar	80
Ferrets	80
Goat.....	81
Guinea pigs.....	81
Hamsters	82
African pygmy hedgehog	82
Rat.....	82
Tortoise.....	82
Food-producing animal reports.....	83
Cattle	83
Sheep.....	85
Pigs	86
Farmed fish.....	87
Bees	88
Goats.....	89
Chickens.....	89
Alpacas.....	90
Game birds	90
Exotic animal reports	91
Crocodile	91
Ornamental fish	91

Hedgehog	91
Reindeer	91
Laboratory mice	91
Withdrawal period issues.....	92
Environmental incidents.....	93
Conclusions.....	94
Annex.....	1
Trends	3
Reports received per year	3
Lack of efficacy of antimicrobials in animals	7
Number of suspected lack of efficacy reports received per year for different groups of antimicrobials	8
Cat injection site sarcomas	13
Additional information	14
Comparison of clinical signs recorded after dog vaccine use.....	14
Injectable products containing mineral oil	17
Glossary of clinical and other terms	18

Introduction

Many millions of doses of different types of veterinary medicine are manufactured, sold and used annually within the UK. In a relatively small number of cases, an adverse event (AE) occurs during, or a period of time after, the use of a medicine. Veterinary professionals, animal owners (including farmers) or anyone else who has reliable knowledge of the incident can report an AE either to the company marketing the medicine or to the VMD.

Veterinary pharmacovigilance is the monitoring of all AE reports for emerging patterns of undesirable effects, following the use of veterinary medicines.

An **adverse event** (AE) is any observation in animals or humans, whether or not considered to be product-related, that is unfavourable and unintended and that occurs after any use of a veterinary medicine.

A **suspected adverse reaction** (SAR) is an adverse event that involves the development of side effects in animals or humans after any use of a veterinary medicine. A **safety** report describes an event involving a suspected adverse reaction.

A **suspected lack of expected efficacy** (SLEE) is when a product is not thought to have worked as well as expected. Some safety reports also involve some element of lack of efficacy. In these cases, 'lack of efficacy' is recorded as a clinical sign.

A **serious adverse event** results in death, is life-threatening, ends in significant disability or incapacity, a congenital anomaly or birth defect, or results in permanent or prolonged signs in treated animals.

An **environmental incident** is an event in which wildlife or plants are affected by a veterinary medicine that has been released into the environment either accidentally or by deliberate intent.

During 2015, VMD's Pharmacovigilance team received and assessed a total of 5677 reports. Most of these reports describe events that occurred in animals during or after the use of authorised veterinary or human medicines. Fewer reports were associated with other types of products. Many reports involved the use of a combination of products.

Some reports describe reactions experienced by humans exposed to products used to treat animals or the household environment. Others involved the detection of the residues of veterinary medicines in a food product intended for human consumption, usually milk, before it enters the food chain.

Figure 1 shows the numbers of different types of report received during 2015 and the animal species associated with those reports.

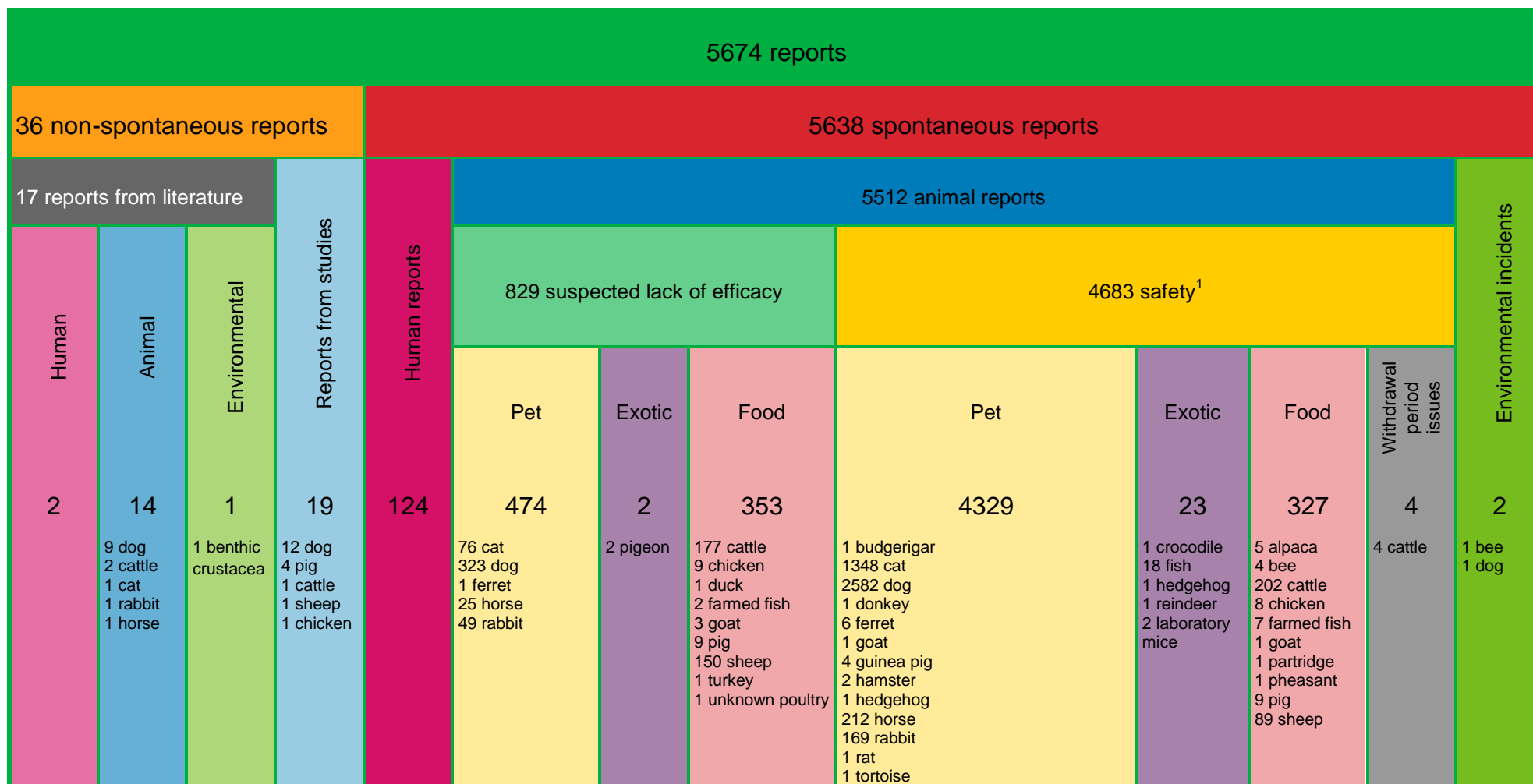


Figure 1 Number of reports of different types received during 2015 and the animal species associated with them

¹ Some safety reports may involve a lack of efficacy element; in these cases, 'lack of efficacy' is recorded together with any other clinical signs observed.

Important points to note

This review provides a summary of the reports received by the VMD's Pharmacovigilance team during 2015. It may provoke interest or discussion, but you should not use the information provided in isolation to make judgements on the safety of authorised veterinary products. Veterinary professionals should discuss and agree on the choice of product to use in a particular instance with animal owners.

Summaries of events associated with particular types of medicines in specific species of animal have only been presented if there was sufficient data to perform a basic analysis.

In the Annex of this review you will find a [glossary](#) explaining some of the more technical clinical terms used.

Remember:

- Companies that own or market authorised veterinary medicines (known as Marketing Authorisation Holders or MAHs) are obliged to send all serious animal and all human AE reports to us within 15 days of becoming aware of an incident. MAHs normally submit non-serious reports at intervals of between 6 months and 3 years, together with sales information for those intervals. Hence, the most recent figures we have for specific products may be up to 3 years old.
- All reports from MAHs, most of which are serious, are included in this annual review, together with those received directly from vets and other people.
- Certain signs observed may have been considered unconnected to the products used, but were still recorded.
- The reports that we receive are usually the most serious, therefore the information summarised in this review is a concentration of the most severe events that may occur following the use of different types of veterinary products.
- Most reports involve recognised clinical signs relating to the products used.
- Each report may involve one or a combination of different types of product.
- The use of multiple products, both medicinal and non-medicinal, will complicate the interpretation of the information summarised in this review, as they may contribute additional clinical signs.
- Administration of all products was as intended, unless specifically described.
- A death is not always directly associated with the use of any product involved. Death by euthanasia is frequently recorded simply as death and factors other than welfare, such as financial constraints, can affect the decision to euthanase an animal. Some animals are so sick that no treatment is capable of maintaining life, and death is inevitable.

Who tells VMD about adverse events

Most of the AE reports that we receive come from MAHs (61% in 2015). The majority of reporters contact the MAH of the product involved as this is the best way to get immediate advice and initiate rapid investigations into the AE.

The remaining 39% were received directly from those who witnessed an event, or were reporting for someone else. In 2015, 85% of those direct reporters were vets. Figure 2 shows the number of reports sent by different types of direct reporter.

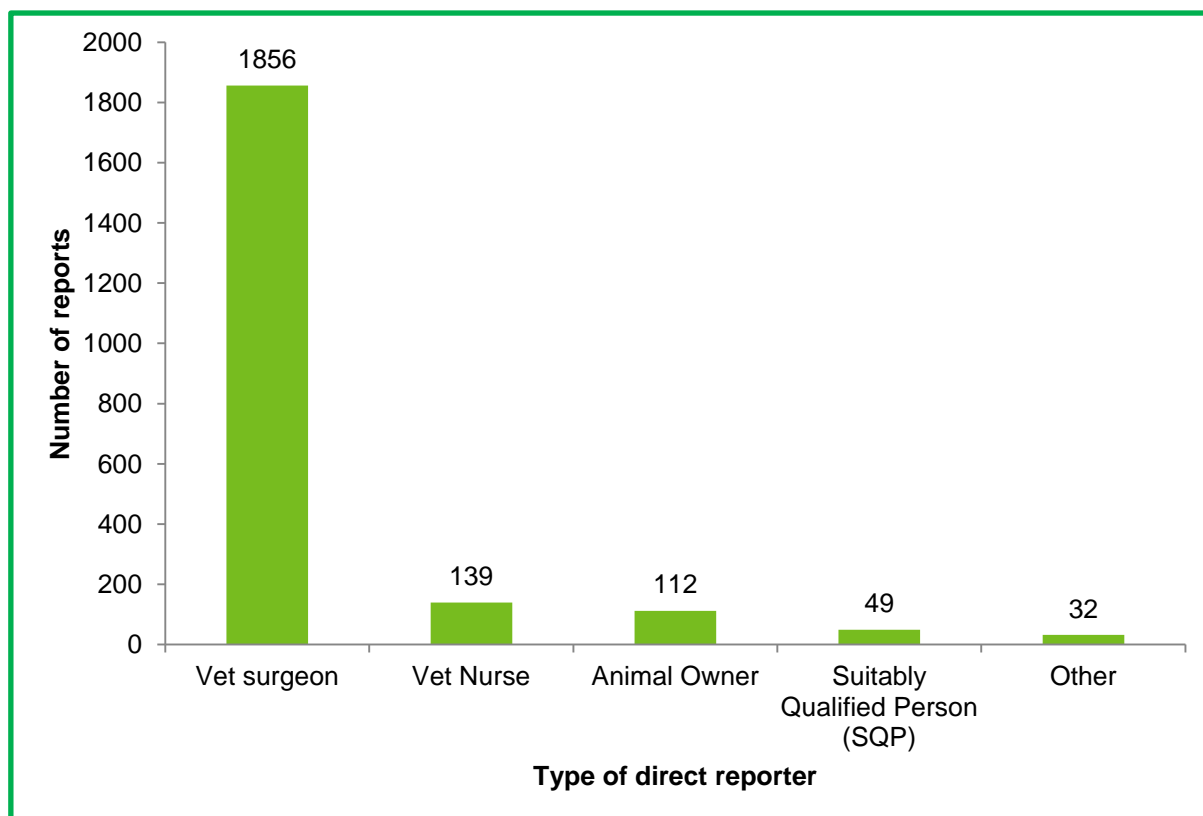


Figure 2 Numbers of reports from different types of direct reporters

Vet nurses may be more likely to report through vets. SQPs, if they are not associated with a veterinary practice, may be more likely to report directly to an MAH, especially if they are associated with an agricultural merchant or livery stable. Most 'Other' reporters had links with vet practices, but some had associations with livery stables. An agricultural merchant and a pharmacist also submitted 1 report each.

Only 12% of reporters, who reported directly to us, told us that they had also informed the MAH. But 34% of all reports received from direct reporters were later also received from the MAH.

There should be no need to report an event to both us and the MAH, but if you do, please tell us. Similarly when, as either a vet or an animal owner, you report an adverse event, we recommend that you let the other party know that you have done so. This will help reduce the number of duplicate reports we receive and have to identify.

If you are not an MAH we would like you to use the [online reporting form](#)² to submit information about AEs to us. This transfers information directly to our database and is quicker and easier to use than a paper form. You also get an automatic acknowledgement and a reference number for your records.

² Report a problem with an animal medicine or microchip, www.gov.uk/report-veterinary-medicine-problem

Types of report

Figure 3 shows that the vast majority of reports that we receive describe events following normal everyday use of veterinary medicines and other veterinary products. These are called ‘spontaneous’ events.

We also receive reports associated with clinical or field trials, which we call ‘reports from studies’. We similarly receive ‘reports from literature’, which MAHs find by searching scientific publications for events that may have been associated with their products. These reports either describe the results of research projects, or they may describe unusual or unexpected consequences of using a particular medicine. Reports from studies and literature are called ‘non-spontaneous’ reports.

Environmental reports are also classed as ‘spontaneous’ reports, unless they originate from scientific literature.

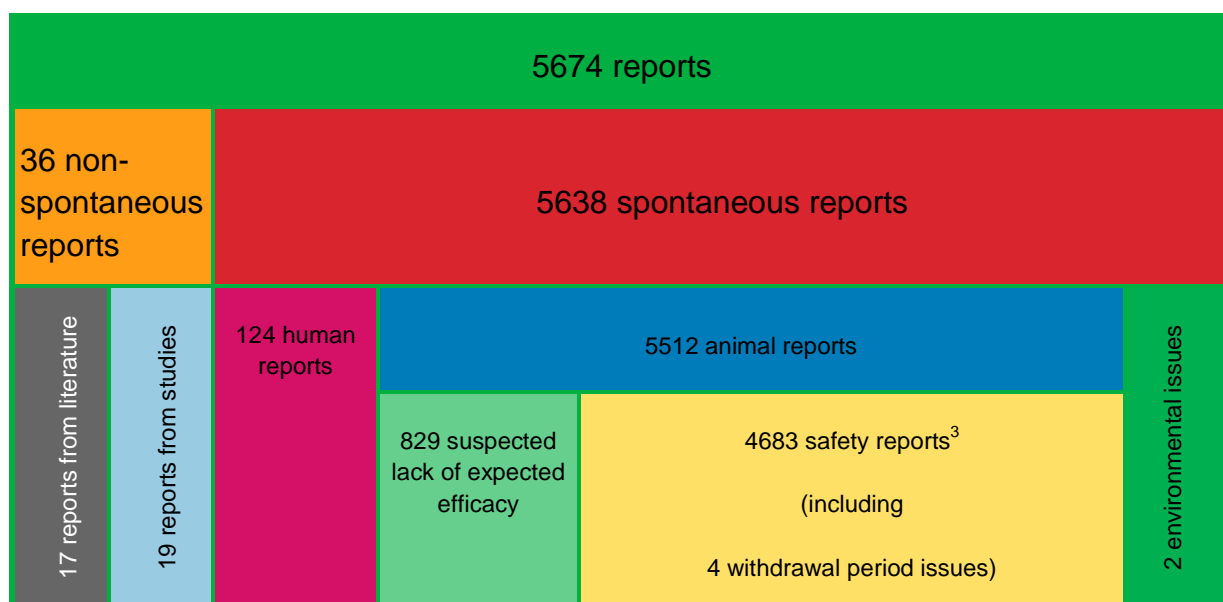


Figure 3 Different types of adverse event report received

Spontaneous reports are further subdivided by whether they relate to animals, people or the environment.

Animal reports are subdivided into 2 types:

- Suspected lack of expected efficacy (SLEE) reports
- Safety reports

³ Some safety reports may involve a lack of efficacy element; in these cases, ‘lack of efficacy’ is recorded together with any other clinical signs observed.

Withdrawal period issues are an important subset of safety reports. These reports involve food-producing animals; residues of veterinary medicine found in meat, milk or other products destined for the food chain must be reported. Usually these residues are still present because insufficient time has passed between administration of a medicine and residue testing prior to release of the food product into the food chain.

Medicines and other products reported

Most products mentioned in AE reports are fully identified by the reporter, but a significant number are not.

The complete identification of products ensures that a full assessment of the involvement of products used in each case can be made.

Without size/strength information it is not possible to determine whether under/over-dosing is a factor. In some cases, providing only a brand name will not even identify the dosage form, for example, tablet or oral solution. In these cases, we try to use whatever evidence is provided in the description of the AE to determine the identity of the product used.

The better the product identification is, the more effective the monitoring of all veterinary medicines will be.

Authorised veterinary medicines

There are currently over 2,700 [veterinary medicines](#)⁴ that are authorised for use in the United Kingdom.

Before authorisation, information about each product is scrutinised by appropriately qualified experts (vets, pharmacists, chemists, toxicologists etc) in the VMD and, where applicable, by equivalent experts in other Member States of the European Union. The use of any medicine carries a risk, but new medicines are only authorised for use when these experts are satisfied that the benefits gained by using them greatly outweigh the risks that may be incurred.

All aspects of medicines are checked, including

- the quality of the ingredients and the manufacturing process
- how well the medicine performs when used to treat a specific condition or disease
- any safety risks to the person(s) administering the medicines, the animals being treated or the environment

During the authorisation process, a document called the Summary of Product Characteristics (SPC) is agreed. This describes the approved conditions of use of the medicine to ensure its safety and effectiveness. It also includes technical information about the product's pharmacological or immunological properties which

⁴ Product information database, www.vmd.defra.gov.uk/ProductInformationDatabase/

veterinary professionals may find useful. A copy of the SPC for every authorised product can be accessed using the VMD's Product Information Database ([PID](#))⁵.

A [letter](#)⁶ was published in the Veterinary Record in 2015 reminding vets to check for changes to any product's SPC by accessing the VMD's PID. This is where to find the most up-to-date information about veterinary medicines.

A package leaflet, supplied with each medicine, lists important information from the SPC in non-technical terms, such as:

- the animal species it is intended to treat
- how much of the medicine should be administered and how often
- whether it is safe to use the medicine at the same time as another
- user safety precautions (eg whether protective gloves should be used whilst handling it).

If an authorised medicine is used following the instructions provided in the SPC, this is known as '**authorised use**'.

If an authorised medicine is used in a way that is not described in the SPC, for example:

- at a higher or lower dose than instructed
- more often than recommended
- to treat a species of animal not listed
- to treat a condition not listed

this is known as '**off-label use**'.

Vets can use their clinical judgement to decide whether the benefit of using a medicine off-label outweighs the risk of using it that way.

If no suitable authorised veterinary medicine is available in the UK to treat a specific condition in a particular species, in the interest of animal welfare, vets are allowed to treat an animal under their care with other products (human medicines or veterinary medicines authorised abroad) in accordance with the Cascade⁷.

⁵ Product information database, www.vmd.defra.gov.uk/ProductInformationDatabase/

⁶ Using the VMD's product information database, [Veterinary Record \(2015\) 177, 448](#)

⁷ The Cascade: Prescribing unauthorised medicines, www.gov.uk/guidance/the-cascade-prescribing-unauthorised-medicines

Therapeutic groups

A therapeutic group is a group of medicines that may be based on different active ingredients (drugs), but can all be used to treat a specific type of disease or condition.

Vaccines

Vaccines comprise a very wide range of products. Each vaccine is designed to protect against one or more specific infections in a particular species. Vaccines are available for use against bacteria, viruses, parasites and even one against a fungal infection in cattle.

Most vaccines are injected but some are given in different ways eg up the nose. They either contain a killed or weakened form of whole bacteria or viruses, or just a small part of them. They may prevent an animal catching a specific infection, or just reduce the severity of infection.

Ectoparasiticides

Ectoparasiticides are medicines that kill the parasites that live on the skin of animals, eg fleas, ticks, mites and lice; they treat external parasites.

Endectocides

Endectocides are medicines that kill both the parasites that live on the skin of your animals and those living in their guts or other parts of the body; they treat both internal and external parasites.

Anthelmintics

Anthelmintics are medicines that kill the parasitic worms that live in animals, eg roundworm, hookworm, whipworm, tapeworm, lungworm and heartworm; they treat internal parasites.

Anti-inflammatories

These products are used to treat inflammation. They are divided into sub-groups depending on the type of drug that makes them work. Different types used in animals include:

- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Corticosteroids
- Immunosuppressive drugs

Antimicrobials

These products are used to treat different types of infection caused by microscopic organisms.

- Antibiotics (used to treat bacterial infections)
- Antifungal agents (used to treat fungal/yeast infections)
- Antiprotozoals (used to treat protozoal infections)

There are some special antimicrobial preparations for use in specific situations, for example intramammary antimicrobials used to treat mastitis in dairy cows.

Neurological agents

These drugs act on the brain and nervous system. Different groups of product have different uses. There are:

- Sedatives
- Pain killers (analgesics)
- Injectable anaesthetics
- Inhaled anaesthetics
- Anti-epileptics
- Spasmolytics (to treat scour and equine colic).

Hormones and hormone regulators

These drugs may replace hormones that are no longer being produced, for example insulin to control the symptoms associated with diabetes mellitus. They may also stimulate or suppress the production of hormones that are being under or over produced respectively. Examples of these are thyroid suppressants for cats with overactive thyroids, and synthetic thyroid hormone replacements for dogs with underactive thyroids.

Incompletely identified veterinary medicines

These are products that have not been identified as a specific authorised veterinary medicine, but using the information provided it has been possible to determine that they are veterinary medicines. For instance, there are some active substances that are only used in veterinary medicines. Using all the available information, for example, active substance, pharmaceutical form, dose size, it is sometimes possible

to determine the exact veterinary medicine used. In these cases, the products are recorded as that veterinary medicine.

Authorised human medicines (including extemporaneous ‘vet specials’)

There are very many more medicines authorised for human use than there are for animal use. If there is no appropriate veterinary medicine available, a vet may decide that a human medicine is suitable for use in a particular animal. This may be a medicine that is not available in a veterinary product, or a medicine that is not available in a particular form, such as an injection.

In exceptional circumstances, a vet or pharmacist can prepare a suitable medicinal product for veterinary use. This may, for example, involve making a smaller size of tablet, a lower strength of a solution, or a specific combination of medicines. These products are known as extemporaneous products or vet specials.

Although the manufacturers of ‘vet specials’ may include safety information in product packaging, it is the responsibility of the vet prescribing the medicine to ensure that the user is fully aware of all necessary information so that the medicine is used safely.

Imported medicines

If you are a vet and wish to use a medicine (meant for animal or human use) that is not available in the UK, but is available elsewhere in Europe or the world, you can apply⁸ to the VMD to import it, with the appropriate certificate:

- a Special Import Certificate (SIC), for veterinary medicines authorised elsewhere in the EU
- a Special Treatment Certificate (STC), for veterinary medicines authorised outside the EU or any human medicine authorised outside the UK.

VMD includes product specific contraindications, precautions and user safety warnings as part of the appropriate import certificate as it is issued. This information must be made available to anyone using the imported product or caring for the animal(s) treated with it.

⁸ Apply for a certificate to import a veterinary medicine into the UK, www.gov.uk/guidance/apply-for-a-certificate-to-import-a-veterinary-medicine-into-the-uk

Exempt veterinary medicines

Some medicines, which are intended for use in minor pet species, are exempt⁹ from the need to be authorised like other more widely-used veterinary medicines. These products contain a restricted range of active substances. Although these medicines are not individually assessed in the same way as authorised veterinary medicines, they are manufactured to the same high standards. Many of their ingredients have been used to treat animals for a long time, and they have been found to be safe to use. Nevertheless, it is still important that the instructions that come with the medicine are carefully followed. These types of products are intended to be used to treat:

- small rodents (rats, guinea pigs, gerbils, hamsters etc)
- ferrets
- rabbits
- terrarium animals (terrestrial reptiles and amphibians)
- aquarium animals (aquatic reptiles, fish)
- cage birds (budgies, cockatiels, parrots etc)
- homing pigeons.

Non-medicinal veterinary products

There are other products available that are for use in animals, but as they are not medicines and do not make any medicinal claims, they do not have to comply with the rigorous requirements applied to medicines. These products include:

- supplements for joints
- support for liver function
- probiotics
- behaviour-modifying pheromones.

These products are not medicines and cannot claim to have medicinal properties.

⁹ Exemption from authorisation for medicines for small pet animals, www.gov.uk/guidance/exemption-from-authorisation-for-medicines-for-small-pet-animals

Other non-medicinal products

These are generally products that are made for human use, and although legally they may be authorised human medicines¹⁰ or medical devices, they are not in themselves medicinal as they do not treat or prevent disease. Examples include suture materials (stitches) and contrast agents, which are used to enhance the imaging of certain organs or tissues for diagnostic imaging (eg MRI scans).

We have also included microchips used for animal identification in this category.

Biocides and disinfectants

Biocides¹¹ control harmful or unwanted organisms through chemical or biological means. Some are used to control flea and other insect infestations. They are not authorised veterinary medicines. Some are meant to be applied to your animal and repel insects. Others are for treating where your animals live, including farm buildings, furniture, carpets and pet beds; these products will either repel or kill fleas and other insects.

The Health and Safety Executive¹² (HSE) have a database¹³ listing biocidal products containing substances approved or authorised under the Control of Pesticide Regulations and the EU Biocidal Products Directive. These products have a reference number with a prefix of 'HSE' or 'BPR' that shows that they are approved or authorised for use.

The HSE provides guidance¹⁴ on the steps to take if you think you, your family, your pets or wildlife have been affected by exposure to biocides.

If you have information about an adverse event in any animal(s) involving the use of a biocide, you should report this to the Wildlife Incident Investigation Scheme on 0800 321600. You can use this number for reporting events involving pets, farm animals or wildlife.

Chlorhexidine gluconate is a substance commonly found in disinfectants used in both clinical and veterinary environments. It is also found in some authorised veterinary medicines; mainly teat dips and sprays, but also a few shampoos used on cats and dogs. It is important that any product involved in an adverse event is readily

¹⁰ Find PILs and SPCs for different medicines, www.gov.uk/pil-spc

¹¹ Biocides: The basics, www.hse.gov.uk/biocides/basics.htm

¹² The Health and Safety Executive, www.hse.gov.uk

¹³ How can I find out if a product is already approved/authorised?, www.hse.gov.uk/biocides/faq.htm#productauthorised

¹⁴ Reporting incidents of exposure / possible adverse reactions to biocides, www.hse.gov.uk/biocides/reporting.htm

identifiable as the correct type of product. Disinfectants containing chlorhexidine were the only ones found in adverse event reports received during 2015.

Products used in clinical/field trials

In the latter stages of development of new veterinary medicines (once safety and efficacy have been demonstrated in laboratory conditions) MAHs are required to show that the same results can be achieved in the 'real world'. Vets in practice sometimes also wish to investigate other treatment options for particular diseases.

In order for such trials to be conducted in animals owned by the general public, MAHs and veterinary researchers must apply¹⁵ to the VMD for an Animal Test Certificate¹⁶ (ATC) which authorises the study. One of the conditions of an ATC is that all serious adverse events occurring following use of any product involved in the trial (even control products) must be reported to the VMD within 15 days.

Due to the confidential nature of these studies, we will not discuss the findings of any adverse events reported to us originating from trials carried out under ATCs in this review.

¹⁵ Apply for an animal test certificate, www.gov.uk/government/collections/apply-for-an-animal-test-certificate

¹⁶ Animal Test Certificates, www.gov.uk/guidance/animal-test-certificates

Animal species reported

For the purposes of this review:

- Pet animals are cats, dogs, horses, donkeys, small mammals and single caged birds kept as pets.
- Food-producing animals are cattle, sheep, pigs, poultry, farmed fish etc.
- Exotic animals are taken to be all other non-food-producing animals, including native wild animals, aquarium fish, zoo animals, aviary or racing/ornamental birds and laboratory animals.

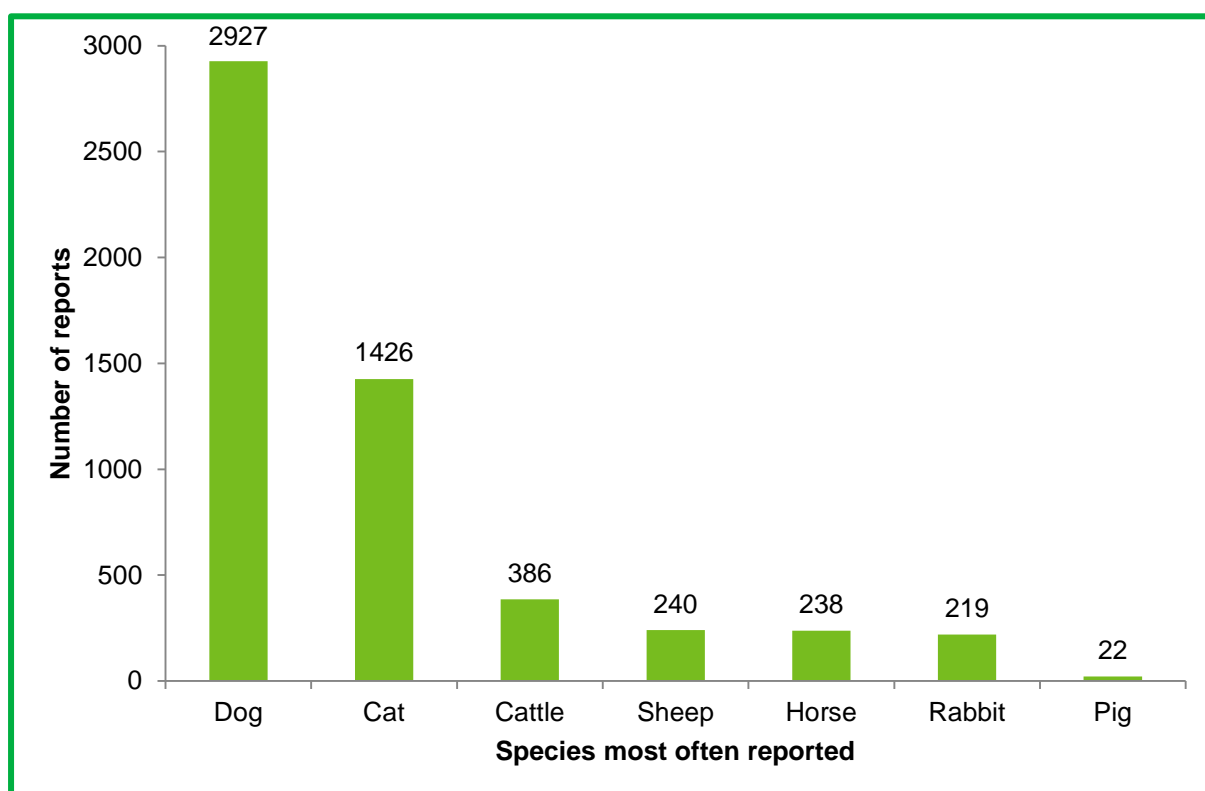


Figure 4 Number of reports received for the most commonly reported species

Table 1 shows the number of reports received for the less commonly reported species.

Species reported	Number of reports
Poultry	19
Ornamental fish	18
Salmon & Trout (fish farmed for food)	9
Ferret	7
Goat	5
Alpaca	5
Bee	5
Guinea pig	4
Laboratory animals	4
Wildlife	3
Hamster	2
Game birds	2
Pigeon	2
Reptile	2
Reindeer	1
Donkey	1
Rat	1
Budgerigar	1

Table 1 Number of reports for less commonly reported species

Pet animal breeds

For pet animals, the breed of the animal was not identified in approximately 20% of cases.

Dogs

The breed of a dog was not identified in 10% of dog cases, with a further 14% identified as 'crossbred'. The top 5 reported breeds were

- Labrador Retriever, 8.5%
- Jack Russell Terrier, 5.2%
- English Springer Spaniel, 3.5%
- English Cocker Spaniel, 3.4%
- Border Collie, 3.4%

Almost 150 different breeds were identified in reports.

Cats

The breed of a cat was not identified in 40% of cat cases, with a further 47% identified as 'crossbred'. Of the crossbred cats 82% were short-haired and 8% were long-haired.

Only 25 specific breeds were identified in reports, with Ragdoll, Bengal, Maine Coon and Siamese being the most commonly identified breeds.

Horse

The breed of a horse was not identified in 40% of horse cases, with a further 8% identified as 'crossbred'.

Only 28 specific breeds were identified in reports, with Thoroughbred, Welsh Cob, Irish Hunter and Dutch Warmblood being the most commonly identified breeds.

Rabbit

The breed of rabbit was not identified in 42% of rabbit cases, with a further 7% identified as 'crossbred'.

Ten specific breeds were identified, with Dwarf Lop (20%), English Lop (9%), Netherland Dwarf (7%) and Lion Head (6%) being the most commonly identified breeds.

Food-producing animal breeds

70% of food-producing animals were not identified by breed.

Cattle

The breed of cattle was not identified in 38% of the 383 cattle cases received, with a further 6% identified as 'crossbred'.

A total of 19 breeds were identified in reports, with Holstein-Friesian (12%), Limousin (2%) and Aberdeen Angus (2%) being the most commonly identified breeds.

Sheep

The breed of sheep was not identified in 74% of sheep cases, with a further 10% identified as 'crossbred'.

A total of 11 breeds were identified in reports, with Texel (7%), Suffolk (2.5%) and Swaledale (2%) being the most commonly identified breeds.

Pig

The breed of pig was not identified in 64% (14) of pig cases, with a further 23% (5) identified as 'crossbred'.

Only 2 specific breeds were identified in reports; Large White (2) and British Saddleback (1).

Poultry

Of the 21 cases involving poultry, the breed of the birds was identified in only 4. The breeds identified were all chickens; Ross 308 (2), Hubbard JA57 (1) and Bovan Brown (1).

Non-spontaneous adverse event reports

Figure 5 shows a breakdown of the 36 reports we received that were not associated with spontaneous adverse events. Nineteen of these described events that occurred during field or clinical trials, and the other 17 were reports originating from scientific literature; two of these involved people who work with animals.

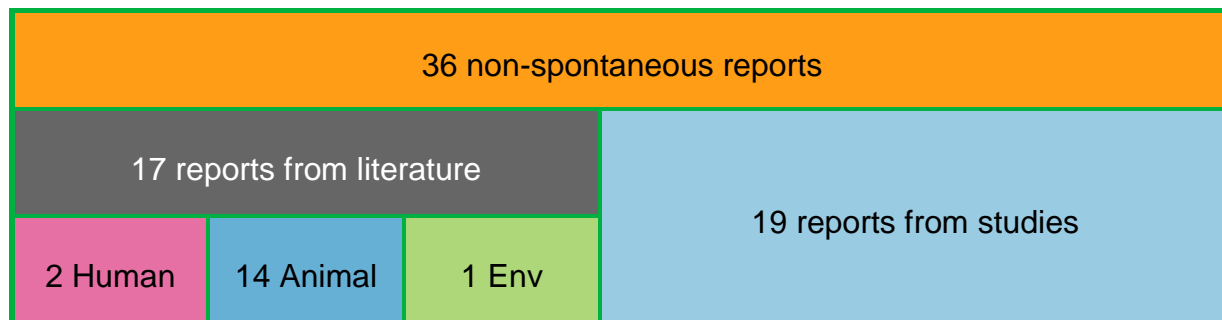


Figure 5 Sources of non-spontaneous reports received

Reports from literature

Human reports

One of the two articles associated with adverse reactions in animal workers highlighted the occurrence of occupational contact dermatitis in a stable lad¹⁷. The other described a case that we originally received in 2006, and was subsequently published in scientific literature in 2010. It involved a vet who acquired an infection after sustaining a needle stick injury whilst vaccinating a horse¹⁸.

Animal reports

In one article dexamethasone may have been involved in immunosuppression that enabled the development of latent oral papillomavirus in rabbits¹⁹.

Two articles discussed the use of isoflurane anaesthetic. The first involved complications in 169 of 1021 horses treated in an equine hospital²⁰. The second involved a single cat²¹.

¹⁷ Alwan, W., Banerjee, P. and White, I. R. (2014), Occupational contact dermatitis caused by omeprazole in a veterinary medicament. *Contact Dermatitis*, 71(6): 376.

¹⁸ Thompson R.N., McNicholl B.P. *BMJ Case Reports* (2010) Needlestick and infection with horse vaccine.

¹⁹ Immunosuppression facilitates the Reactivation of Latent Papillomavirus infections. *Journal of Virology*, January 2014, Volume 88 [1]. Pg 710-716

²⁰ This report arose from a published article: Peri-anaesthetic complications in an equine referral hospital: Risk factors for post anaesthetic colic. [Equine Vet J. 2015 Nov;47\(6\):635-40.](#)

²¹ Thomson, S. M., Burton, C. A. and Armitage-Chan, E. A. (2014), Intra-operative hyperthermia in a cat with a fatal outcome. *Vet Anaesth Analg*, 41: 290–296.

Another 2 articles investigated the efficacy of different combinations of products administered via different routes in cattle against immature and adult stages of liver fluke and nematodes^{22,23}.

Nine cases were extracted from one article that reviewed the treatment of mast cell tumours in dogs²⁴.

Environmental report

The final case was received from an MAH that had had a preview of a report on the effects of sea lice medicines on the environment. The report has since been published²⁵ and is publicly available.

This report describes the findings of studies undertaken between 1999 and 2004 and between 2013 and 2015 by the Scottish Association for Marine Science using data collated from the Scottish Environment Protection Agency's databases. The additional time period was undertaken to update the original study and allow the effect of the introduction of new products, increased use of products and changes in usage practices to be assessed. The products of interest contained either emamectin benzoate or teflubenzuron. The objective was to assess the effects on sensitive, non-target, benthic crustacea around fish-farms.

The main conclusion of the report was that there may be substantial, wide-scale reductions in both the richness and abundance of non-target crustacea associated with the use of emamectin. However, the causal relationship has not been established due to a lack of information on sedimentary emamectin residues. The dataset for teflubenzuron was too small to allow similar conclusions to be drawn regarding its use.

Reports from studies

We received 19 reports associated with studies. As previously stated, we do not discuss findings of clinical trials due to their commercially sensitive nature.

²² D.J. Bartley, C.L. McArthur, L.M. Devin, J.F. Sutra, A.A. Morrison, A. Lespine, J.B. Matthews (2012). Characterisation of macrocyclic lactone resistance in two field-derived isolates of *Cooperia oncophora*. *Veterinary Parasitology* Volume 190, Issues 3–4, 21 December 2012, Pages 454–460

²³ Thomas Geurden, David Bartram, Leen Van Brussel, Liu Bo, Emer Scott-Baird, Douglas Rugg (2012). Evaluation of the comparative efficacy of a moxidectin plus triclabendazole pour-on solution against adult and immature liver fluke, *Fasciola hepatica*, in cattle. *Veterinary Parasitology* Volume 189, Issues 2–4, 26 October 2012, Pages 227–232

²⁴ Miller RL, Van Lelyveld S, Warland J, Dobson JM, Foale RD (2015). A retrospective review of treatment and response of high-risk mast cell tumours in dogs. *Vet Comp Oncol*. 2014 Sep 15.

²⁵ [SARF098](http://www.sarf.org.uk/): Towards Understanding of the Environmental Impact of a Sea Lice Medicine – the PAMP Suite, 2016. A study commissioned by the Scottish Aquaculture Research Forum (SARF). <http://www.sarf.org.uk/>

Spontaneous adverse event reports

A total of 5638 spontaneous reports were received during 2015. Of these 5515 were associated with animals, 124 with people and 2 with the environment. Figure 6 shows a breakdown of the types of report and the groups of animal for which spontaneous reports have been received.

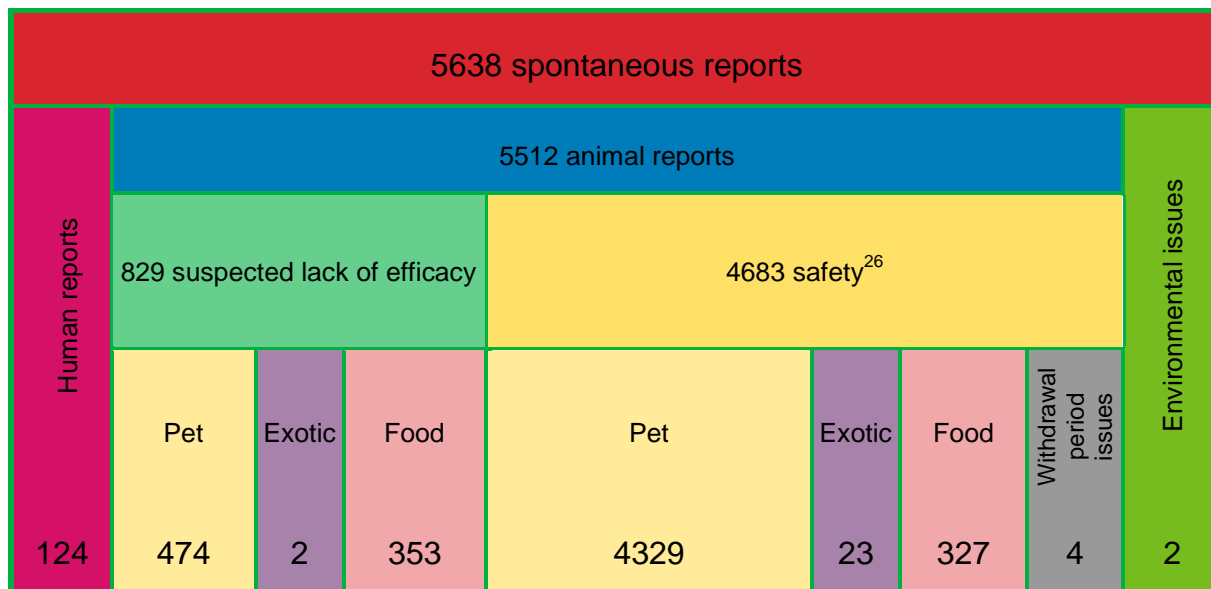


Figure 6 Number of spontaneous reports received, associated with different types of adverse event

Each human report relates to a single person. In some incidents, more than one person is affected. In these situations each person's symptoms are detailed in separate records.

Each animal report received related to the treatment of a single species of animal, and in many cases only one animal. But in some cases, particularly those involving food-producing animals, more than one animal was involved. In these cases, all clinical signs were generally recorded as one report.

For pet animals, there were on average 1.3 (maximum 100) animals treated in each report.

For food-producing animals the maximum number of animals treated in any report was 600,000. The animals treated in this report were farmed fish. Table 2 shows the maximum and median number of animals treated in reports for the major food-producing species.

²⁶ Some safety reports may involve a lack of efficacy element; in these cases, 'lack of efficacy' is recorded with any other clinical signs observed.

Species	Maximum number treated	Median number treated
Cattle	1500	31
Sheep	3000	88
Pig	3000	310
Chicken	40000	16000
Salmon or trout	600000	107000

Table 2 Maximum and median numbers of animals treated in reports involving the most commonly reported food-producing animals

For exotic animals the maximum number of animals treated was 543 ornamental fish, with a median value of 12.5.

Almost 85% of all spontaneous animal reports describe adverse reactions observed after the use of one or more products i.e. unexpected and undesirable effects have occurred. The remaining 15% of reports describe a lack of efficacy of one or more products used i.e. they have not worked as well as expected.

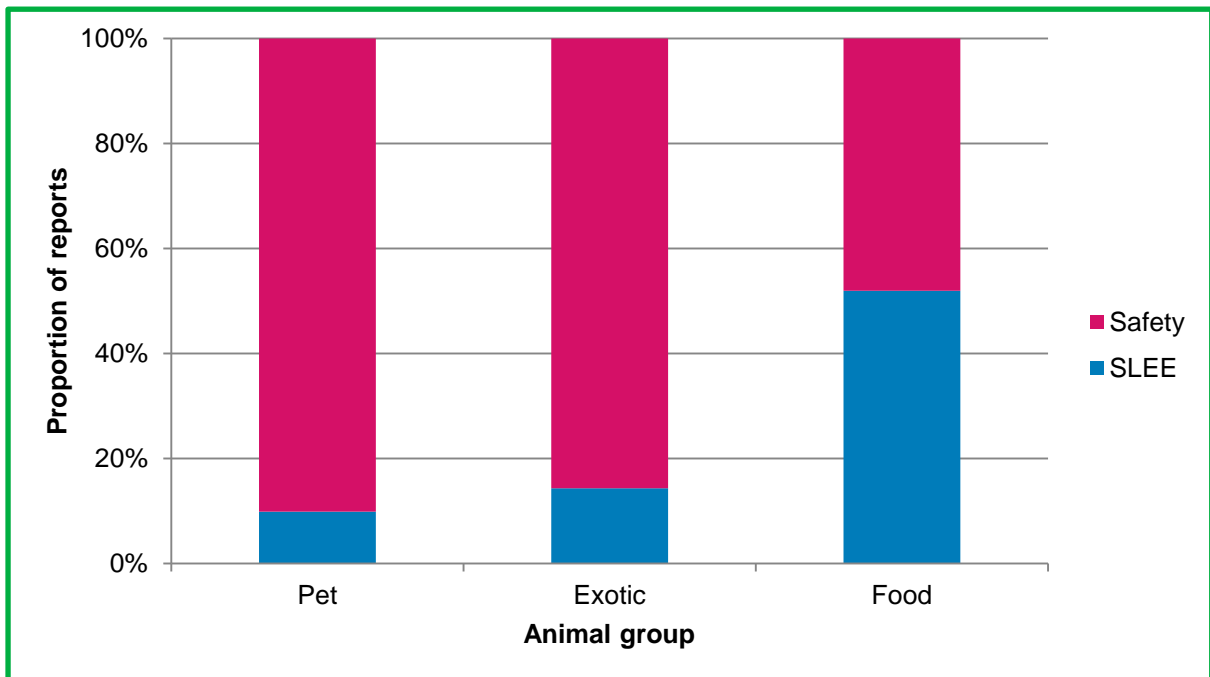


Figure 7 Comparison of numbers of safety and SLEE reports received for different groups of animals

Figure 7 compares the relative number of safety reports to SLEE reports for pet, exotic and food-producing animals.

For pet animals, SLEE reports account for just less than 10% of reports. For exotic animals, they account for just less than 15% of reports. By contrast, for food-producing animals, SLEE reports represent almost 52% of reports.

Four reports describing potential withdrawal issues were received. These are received when residues of veterinary medicines are detected in animal tissue or produce that is intended for human consumption.

Two reports were received from WIIS that described potential environmental issues.

Human adverse reactions

A total of 124 reports describing adverse reactions in humans were received during 2015 either directly by the VMD from someone who experienced an adverse reaction (the Patient) or from someone reporting on behalf of a patient, or from the MAH of a product who had received information about an incident directly from a patient or from another person.

People

Figure 8 shows a breakdown of the types of people affected by the use of all types of products on animals.

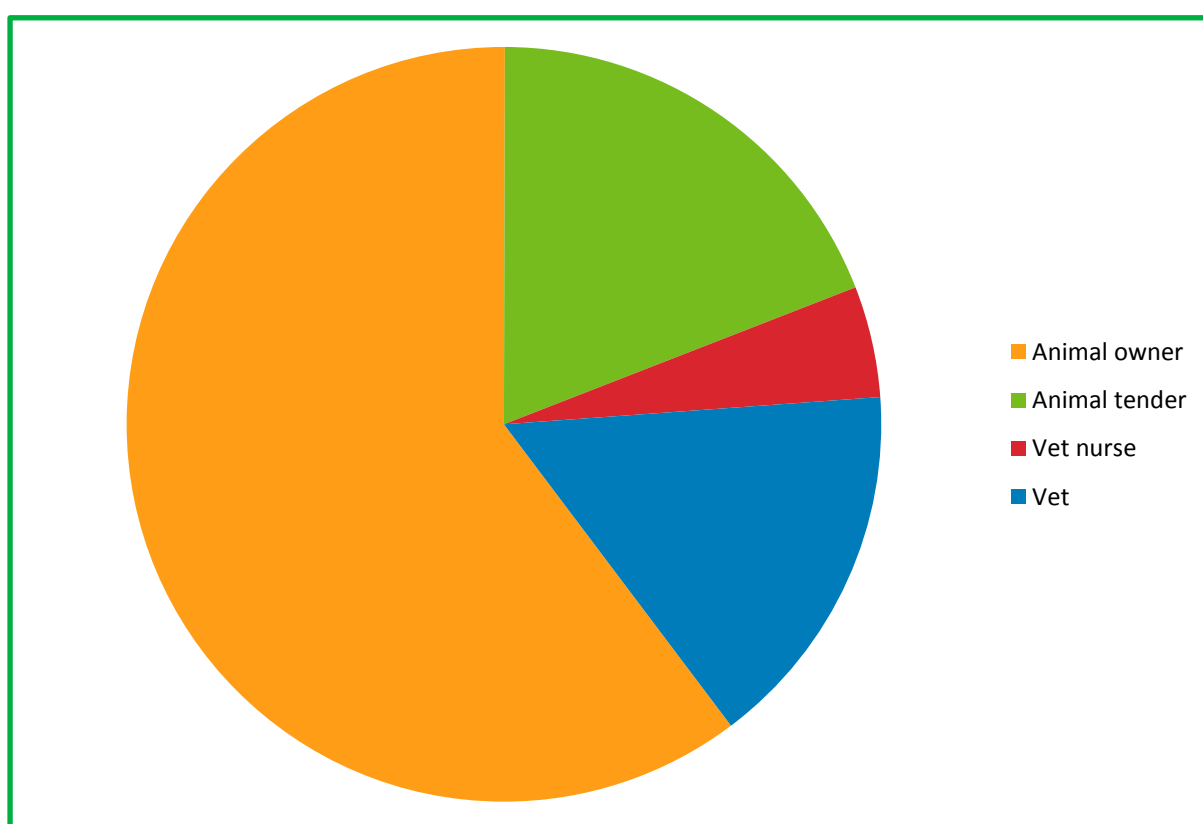


Figure 8 Different types of people appearing in Human adverse event reports

A disproportionately high number of vets who were reported to have experienced adverse reactions were female (85%). According to the RCVS²⁷, in the year ending in March 2014 57% of practising vets in the UK were female. However, the RCVS data also shows that for every male vet of the age of 40 or less, there were more

²⁷ [RCVS Facts 2014](#).

than 2 female vets of a similar age. For the 26 to 30 year age group, there were slightly more than 3 female vets for each male vet.

Slightly more animal owners that were reported to have experienced adverse reactions were female (53%) than male.

Medicines and other products

A total of 132 products were used in 124 reports associated with adverse events in humans. The maximum number of products mentioned in a single report was 4, with 2 products in 2 reports and 1 product in each of the remaining 121 reports.

Authorised veterinary medicines

123 of the 132 products associated with human adverse reactions were authorised veterinary medicines.

Table 3 shows how many of different types of authorised medicines were associated with adverse reactions in different groups of people.

Administration route	Small animal owner	Large/food animal owner/handler	Veterinary professional	Total
Injection	14	16	21	51
Oral	8	2		10
Collar	4		1	5
Skin spot-on	33		2	35
Skin pour-on		12		12
Skin dip		2		2
Skin spray	1			1
Inhalation			2	2
Nasal	3			3
Ear	1			1
In hive		1		1

Table 3 Number of adverse reaction reports received for different groups of people following administration of authorised medicines by different routes

Other products

The remaining cases were associated with adverse reactions following administration of products by the following routes:

- injection (2 cases) – imported fish vaccine
- dermal transfer - pyrethroid insecticide spray
- ingestion – residues of exempt product
- dermal exposure - chlorhexidine disinfectant

- dermal contact (2 cases) – extemporaneous gel product
- inhalation (1 case, 2 products) – the patient’s own asthma medicines.

Adverse reaction reports

Authorised veterinary medicines

Treatments for internal and external parasites were the most often reported type of authorised veterinary medicine (52%). Vaccines (30%) were the next most often reported type of product. The remaining 18% of authorised products mentioned included antibiotics, anaesthetics and treatments for vomiting, inflammation or hormone regulation.

Internal and external parasites

Thirty five cases involved the use of spot-on parasite treatments in cats (10 cases) and dogs (25 cases). The most commonly reported symptoms following administration of a cat product were eye irritation (4 cases) and itching (3 cases) or urticaria (2 cases). After administration of a dog product the most commonly reported symptoms were a strange skin sensation (paraesthesia) (7 cases), dermatitis or eczema (6 cases) and headache (4 cases).

Five cases involved the use of injectable products for the control of parasites. In one case an unknown number of children developed signs of allergy after a cat had been injected with an insect growth regulator. Three cases involved needle stick injuries sustained by farm workers whilst treating cattle or sheep for worms. The final case involved a farm worker who developed vomiting and diarrhoea a short time after his hands became covered in a worming product when his dosing gun broke. He did not wash his hands after exposure, or before eating. He went on to develop blood clots in his lung and leg, but these signs were not considered related to the use of the product.

Vaccines

Of the 16 cases in which a vaccine was administered to a dog, 5 involved an animal owner, the others a veterinary professional.

In two of three cases involving the use of a kennel cough vaccine, an owner later developed a cough (5 days and 3 weeks post-administration). In the third some vaccine was splashed into an owner’s eye during administration. She later reported experiencing muscular or joint pain for several days.

There were two cases in which an owner was injured by a vet with a needle. In one case the injury was minor and did not require any medical treatment, but the second was more serious. It involved an injury to the owner’s hand after her dog was

vaccinated with two vaccines. The owner's hand was immediately disinfected and washed, but by the following day it was too swollen to move. The swelling began to resolve 2 days later, after she was prescribed anti-histamines and anti-inflammatories.

In one case a vet nurse developed a sore eye when vaccine was squirted into it as the needle came off the syringe. The symptoms seemed to be resolving the following day. Eight of 10 needle stick incidents resulted in short term pain and swelling. In another, a vet sustained mechanical damage to a tendon resulting in finger stiffness. In the final case a vet nurse experienced prolonged bleeding, inflammation, pain and swelling after self-injecting into her thumb. The MAH provided her with information to take should she wish to seek medical attention, and no further information was received.

Five cases involving the administration of a vaccine to cattle were received. In one case, a farm worker developed dizziness, a tight chest and felt unwell, 2 days after splashing a nasally administered vaccine into his eye. No further information was received, so the outcome is unknown.

A farmer spilt an unknown quantity of a live rhinotracheitis virus vaccine on his hands, and he thought he may have transferred some of it to his face. He felt unwell an unknown time later, but recovered with no lasting effects.

An unidentified person presented to a doctor with unknown symptoms after sustaining a needle stick injury whilst administering an inactivated bacterial vaccine. Antibiotics were prescribed.

A farmer's daughter's hand became bruised and swollen after suffering a needle stick injury to the palm. After a course of antibiotics and a precautionary tetanus injection, she recovered fully.

A female farm worker sustained an injury from a needle whilst administering a vaccine containing mineral oil. She attended A & E where the injury was cleaned, but refused to be admitted overnight as advised. Several days later she was reported to be well, except for the 'bit of a hole' at the site of the injury.

It is very important that people using injectable products are aware of the possible dangers these products pose, not only to the animals they are treating, but also to themselves. Apart from exposure to infection, some products pose an additional hazard. Vaccines with a mineral oil adjuvant are particularly hazardous. The product information leaflet supplied with these vaccines, including those imported from other countries, explains the specific and prompt action that should be taken in the event of accidental self-injection. You will find a list of injectable products that contain mineral oil in the Annex.

Four cases associated with the vaccination of sheep were received. In one a farmer sustained a superficial scratch whilst administering a live toxoplasma vaccine. In another, a farmer self-injected a small amount of an inactivated pasteurellosis vaccine into his thumb. His thumb and hand became swollen, but had recovered within a week.

Another farmer splashed live toxoplasma vaccine into his eye. 4 days later he reported pain behind his eye, but his vision was not affected. The final outcome is unknown. In the final case associated with sheep, a farmer self-injected with an inactivated pasteurellosis vaccine into his hand. He developed localised swelling and redness, which was treated with antibiotics. An unknown time later the patient developed fever, headache, myalgia and signs of meningitis. Further information was requested, but not received.

There were two cases where the species of animal being treated was not specified. In one a vet experienced brief periods of numbness around the injury she sustained from a needle used for a rabies vaccination. The symptoms lasted for a day. In the other a farm worker reported a painful finger 5 days after he had pricked it on a needle used for a clostridium vaccine.

There was a single incident that involved 2 male poultry workers. They both developed gastrointestinal signs after spraying 88,000 chicks with a live *Salmonella enteritidis* vaccine that should have been administered in drinking water. They recovered within 48 hours.

Two fish vaccinators developed different signs in separate incidents that occurred whilst treating Atlantic salmon. In the first a finger injury resolved without lasting signs after the wound was cleaned. In the second, vaccine was sprayed into the eye of the vaccinator leading to minor pain, irritation and redness. The eye was thoroughly flushed and the signs resolved within 5 days.

The remaining 4 cases involved the vaccination of a cat, a rabbit, a pig and a deer.

The first case occurred when an owner received a drop of live viral rhinotracheitis and calicivirus vaccine in her eye, as a vet expelled air from a syringe, prior to vaccinating the cat. The vet was unaware of what had happened, and the owner flushed her eye 30 minutes later. The owner felt unwell the following day. She experienced nausea, shakiness, pain behind the eye, limb weakness and severe headache, and felt sleepy. The symptoms persisted for 5 days before resolving without treatment.

The second case sustained a needle stick injury as the rabbit she was vaccinating moved. The wound was immediately washed and there were no apparent symptoms. However, 2 days later bruising had developed.

A pig worker self-injected half a dose of inactivated vaccine into her abdomen. The injury site was reddened and cellulitis developed. The outcome is unknown as no additional information was received.

An animal tender stabbed herself in the leg with a dirty needle whilst vaccinating a deer with an inactivated clostridium vaccine. The injection site became swollen and painful within a few hours, but resolved with antibiotic treatment.

Infection control

A dog owner accidentally ingested some of her dog's antibiotic ear drops and then developed a cough which lasted for 4 days. She recovered without treatment.

A cat owner developed various symptoms including wheeziness and a tight chest 2 days after her cat was administered an amoxicillin medication. She then suffered a panic attack when she discovered the identity of the medication two days after that, as she has an allergy to penicillin. No further information was received.

Another 4 cases involved the use of injectable antibiotics in large animals. In one case a retired farmer accidentally self-injected with oxytetracycline. The injection site immediately became swollen, but despite repeated advice to do so, the patient refused to seek medical attention. The product used was out of date, the bottle had been broached over a long period of time and the needle used was dirty. The patient eventually reported that the swelling became discoloured for a few days, but there were no other symptoms.

In another case a vet experienced injection site pain, but no other symptoms after inadvertently injecting a small volume of a macrolide antimicrobial into his thumb.

In another, an unidentified female developed a brief swelling when she injected an unknown volume of a sulfadiazine trimethoprim combination antimicrobial. No other symptoms developed.

Finally, a young male vet scratched his finger with a needle he had used to administer tilmicosin, and he thought a drop may have entered the wound. Nevertheless he did not seek medical attention until more than 3 hours later. Fortunately no treatment was required.

Below is a copy of the warnings included in the product information of every product containing tilmicosin. However, two reports were received in connection with adverse events in treated animals that illustrated that these warnings are either not being read or are being disregarded. In one case the product was administered by someone who was not a vet. In the other, the product was administered to 650 animals using an automatic injector.

You must exercise extreme caution when using an injectable product containing tilmicosin. The following warnings are included in the information leaflets of these products:

INJECTION OF TILMICOSIN IN HUMANS CAN BE FATAL – EXERCISE EXTREME CAUTION TO AVOID ACCIDENTAL SELF-INJECTION AND FOLLOW THE ADMINISTRATION INSTRUCTIONS AND THE GUIDANCE BELOW, PRECISELY

- This product should only be administered by a veterinary surgeon.
- Never carry a syringe loaded with tilmicosin solution for injection with the needle attached. The needle should be connected to the syringe only when filling the syringe or administering the injection. Keep the syringe and needle separate at all other times.
- Do not use automatic injection equipment.
- Ensure that animals are properly restrained, including those in the vicinity.
- Do not work alone when using tilmicosin solution for injection.

In case of self-injection SEEK IMMEDIATE MEDICAL ATTENTION and take the vial or the package leaflet with you. Apply a cold pack (not ice directly) to the injection site

Anaesthetics and sedatives

Three of the 4 cases involving these types of product involved injectable products. In one case a vet pricked her finger with a needle on a syringe full of alfaxalone. Fortunately no product was injected and she experienced no other symptoms than bleeding and pain from the puncture wound.

Another vet was administering pentobarbital to a cat when the needle came off the syringe and between 1 and 20 ml of product squirted back into her eyes and mouth. She rinsed her eyes and mouth, drank some water and ate a banana. 45 minutes later she felt tired and 'fuzzy'. She spoke to her GP by phone, but did not attend the surgery or receive treatment. She recovered within 3 hours.

A locum vet nurse developed swelling around an injury on her hand from a needle on a syringe of medetomidine. She had punctured a blood vessel, but thought only a small amount of product was injected. She felt light-headed and was monitored in hospital for a couple of hours, after which she returned to work with no lasting effects.

The eye of a vet nurse became red and inflamed when she splashed isoflurane into it whilst filling a vaporiser. She was advised to flush it with copious water, and reported it was back to normal the following day.

Prevention of vomiting

Two female vets and a pet owner each suffered a needle stick injury with no lasting effect, on separate occasions whilst an anti-emetic was being administered. The owner was restraining his pet at the time of the incident.

Inflammation control

A dog owner reported that he suffered a bout of diarrhoea an unknown time after starting to administer a non-steroidal anti-inflammatory drug orally to his dog. An adolescent girl vomited twice 36 hours after accidentally ingesting an oral treatment for dermatitis in dogs. A female dog owner experienced slight wheezing and shortness of breath after spraying her dog with a skin treatment, but recovered shortly afterwards.

Hormone control

A male worker in the pig industry had blood tests that revealed the presence of a synthetic progestogen. He had been handling, preparing and administering the product for an unknown period without using protective gloves, as recommended in the product information.

There were two cases involving treatments for Cushing's disease. In one case a woman experienced mild indigestion within 24 hours of accidentally taking her dog's medication. In the other an owner developed an inflamed itchy rash on her arm within 10 days of starting to treat her dog from a new pack of capsules. The dog had been on the same medication for 12 months prior to the reaction.

The final case was a historical report from 2011. A horse owner with a headache mistakenly ingested her horse's pergolide medication instead of a paracetamol tablet, shortly before going for a ride. She later awoke in a ditch having apparently lost consciousness at some time.

Other products

The remaining products that were not authorised veterinary medicines were:

- an imported fish vaccine (2 cases)
- an agricultural insecticide for use in farm buildings
- an exempt veterinary medicine

- a 'vet special' (2 cases)
- a chlorhexidine disinfectant
- two human medications being taken by a pet owner that may have interacted with her pet's medicine.

Two fish vaccinators in separate cases accidentally self-injected with an imported vaccine with a mineral oil adjuvant. One received prompt surgical attention to flush the wound, and was reported to have recovered a week later. In the second case, the vaccinator was admitted to hospital but no action was taken until the following day. The wound was eventually incised, flushed and dressed. The vaccinator was discharged 4 days later with an additional course of antibiotics after being monitored for *Mycobacterium marinum* infection.

A poultry owner experienced a burning sensation on his face and around his eyes when he transferred a pyrethroid insecticide from his ungloved hands to his face. He was recovering the following day.

A chicken keeper had been treating his chickens with an exempt spray product containing ivermectin, when he started to experience mild headaches. He had been eating the eggs produced by his hens. This product is NOT suitable for poultry use.

Two cases following the use of a transdermal gel treatment for hyperthyroidism in cats were received. In one the owner developed skin rashes, followed by swelling of his neck, lips and face. This led to some breathing difficulty, which persisted for up to 6 hours. In the other case an owner developed a red rash on her arms, abdomen and tops of her legs where she had come into contact with the cat. The symptoms resolved after 3 days' treatment with Piriton and antihistamine cream.

A dog owner was injured by a needle whilst her dog was being vaccinated by a vet. The wound was immediately cleaned with a chlorhexidine disinfectant. The following day the dog owner's hand was too swollen to move. The symptoms resolved 2 days later, after antihistamine and anti-inflammatories were prescribed.

In the final case an owner had treated her dog and cats with authorised spot-on endectocides, but was treating herself with 2 inhaled treatments for asthma at the time. She complained of a 'terrible smell' after applying the spot-ons and a headache that lasted 3 days in spite of treatment with paracetamol.

Animal adverse event reports

Figure 9 shows how spontaneous animal reports are distributed between safety and lack of efficacy reports, and between different groups of animals.

5512 animal reports						
829 suspected lack of efficacy			4683 safety ²⁸			
Pet	Exotic	Food	Pet	Exotic	Food	Withdrawal period issues
474	2	353	4329	23	327	4

Figure 9 Number of different types of spontaneous animal adverse event reports received

Less than a fifth of animal reports received during 2015 described events that occurred when products were used to treat an animal, but did not perform as expected. Most reports received reported undesirable events that may, or may not have been connected to the use of medicines or other veterinary products.

Medicines and other products

A total of 7743 products were used in 5512 reports associated with adverse events in animals. This is an average of 1.4 products per report. The maximum number of products mentioned in a single report was 10, but this was exceptional; only 6 of the 10 were authorised veterinary medicines. The largest number of authorised veterinary medicines mentioned in a single report was 8. In 3891 reports a single product was reported, of which 3844 were an authorised medicine.

Almost 97% of reports received involved the use of at least one authorised veterinary medicine. Conversely, slightly more than 3% did not involve the use of a single authorised veterinary medicine.

All but one of the top 20 most commonly reported products were authorised veterinary medicines. Thirteen of the top 20, including the top 9, most commonly reported products were vaccines. The 10th most commonly reported product was a

²⁸ Some safety reports may involve a lack of efficacy element; in these cases, 'lack of efficacy' is recorded with any other clinical signs observed.

cat spot-on endectocide. Other products in the top 20 were treatments for hyperthyroidism, epilepsy, and an NSAID. The 15th most commonly reported treatment was an amoxicillin/clavulanic acid combination authorised for human use.

Authorised veterinary medicines

Authorised veterinary medicines accounted for almost 95% of all products mentioned in spontaneous animal adverse event reports. Figure 10 shows the relative frequency of the different types of authorised veterinary medicines mentioned in reports.

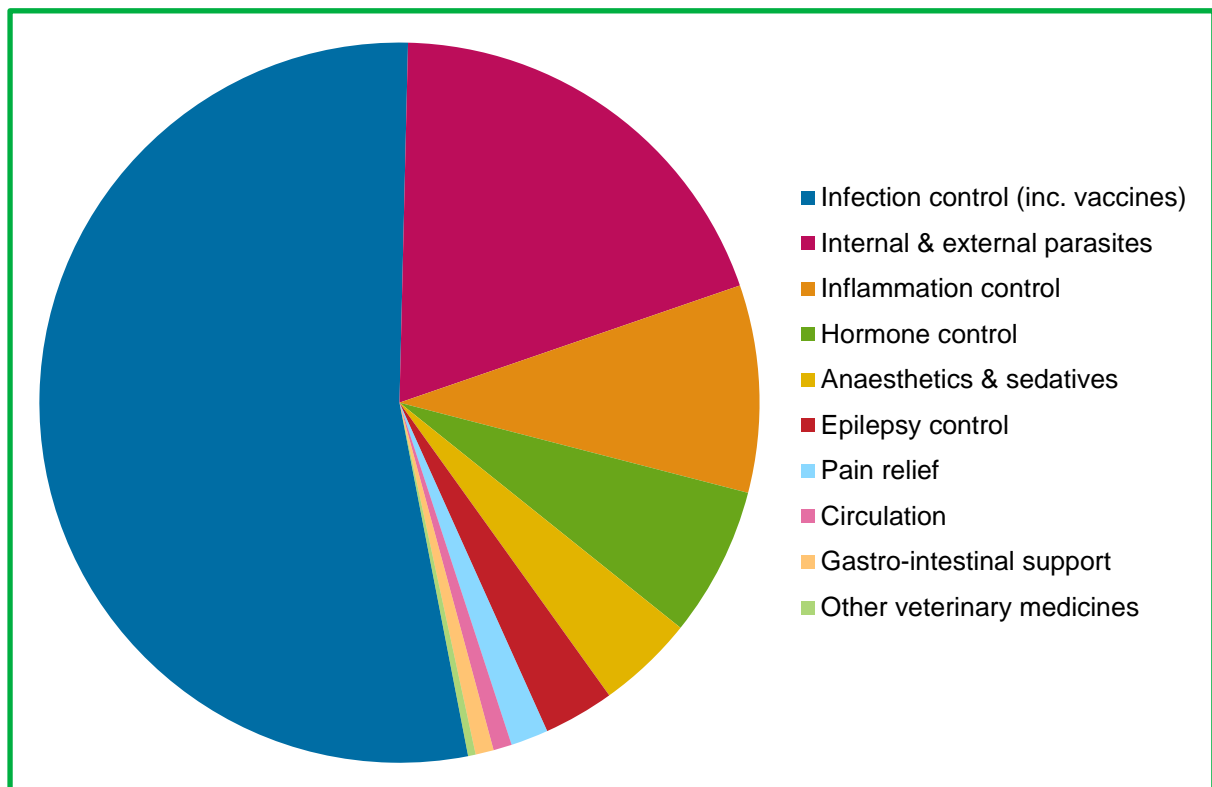


Figure 10 Types of authorised veterinary medicines mentioned in spontaneous animal adverse event reports

This shows that more than half of all authorised medicines mentioned in spontaneous animal adverse event reports have been used to prevent or treat infection. Almost a fifth of medicines mentioned were for the prevention or treatment of internal and external parasites. Less than a tenth of the medicines were for the treatment of inflammation and the remaining medicines that accounted for about a sixth were for:

- hormone control
- anaesthetics and sedatives

- epilepsy control
- pain relief
- circulation support
- gastro-intestinal support
- treatment of lameness in horses
- fluid replacement
- cancer treatment
- respiratory support.

Incompletely identified veterinary medicines

At least one medicine was incompletely identified in 103 reports (almost 2% of reports), with a total of 135 incompletely identified medicines in those reports. The maximum number of incompletely identified medicines in one report was 3. Figure 11 shows the types of medicine that were incompletely identified.

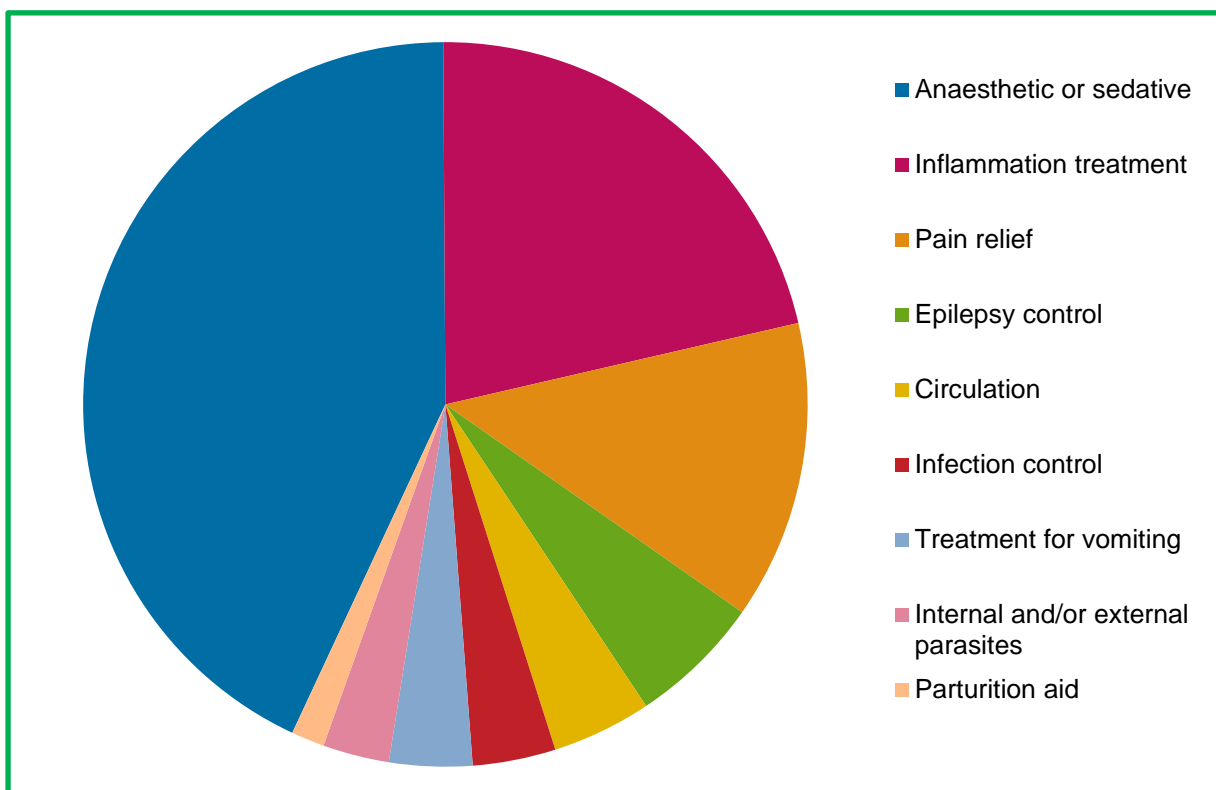


Figure 11 Types of incompletely identified products mentioned in Adverse Event reports

When products are not completely identified, i.e. the specific product is not identified; it makes it impossible to determine whether any signs observed may be due to a product-specific effect. There are groups of products that have exactly the same medicinal ingredients, but they may have different amounts or formulations of other non-medicinal ingredients (excipients). In rare situations interaction between medicinal and non-medicinal ingredients can lead to adverse effects, but without sufficient evidence these unusual situations will remain undetected.

Authorised human medicines (including extemporaneous ‘vet specials’)

A total of 210 individual human medicines or specially formulated veterinary medicines were mentioned in 192 different adverse event reports, often together with other types of product. One case listed 4 of these medicines; 15 listed 2 and the remainder listed only 1.

Most of the human medicines used (54%) were for the control of infection. Others were for the treatment of digestive problems (14%), pain relief (6.5%), hormone control (4%), testing for hormone deficiency (4%), sedation (4.5%), control of epilepsy (3.5%), treatment for allergic reactions (3%), or circulatory support (3%). The remaining medicines (4.5%) each only appear once or twice in reports.

Imported medicines

The use of imported medicines was described in 22 reports. In most cases the medicines were vaccines (10), with treatments for allergies next most common (7). The remaining 5 reports involved a treatment for Leishmaniasis, an injectable tranquilliser, a multivitamin, an ectoparasiticide and a flukicide.

Exempt veterinary medicines

VMD received 29 reports involving exempt medicines, 16 fish treatment cases, 7 external parasite treatments, 5 internal and external parasite treatments and 1 wormer.

Non-medicinal veterinary products

We received 45 reports involving the use of non-medicinal veterinary products. Table 4 shows the types of other products mentioned in reports.

Product type	Number of reports
Ear cleaner	14
Nutritional supplement or diet	12
Joint supplement	5
Skin care	3
Behaviour modification	2
Mineral supplement	2
Eye lubricant	2
Fish food	2
Potassium bromide	2
Pesticide-free flea spot-on	1

Table 4 Numbers of different types of non-medicinal veterinary products

The pesticide-free spot-on flea product contained dimethicone, a silicon-based organic polymer. Potassium bromide is used during the treatment of epilepsy, but until recently has not been available as an authorised veterinary medicine.

There are now two authorised veterinary medicines available that contain potassium bromide for use as an adjunct to phenobarbital in the control of epilepsy; one is a tablet and the other a capsule. As they contain different amounts of potassium bromide, it is important that the specific product used in an adverse event is identified.

Other non-medicinal products

We received one report involving a microchip that had been implanted at the same time as a dog was vaccinated. We also received one report involving the use of an imaging contrast agent.

We have a separate system for reporting adverse events related to the use of microchips. This should be used to report incidents in which the microchip fails to work, moves a significant distance from the place in which was implanted or is thought to have caused other undesirable effects.

You can submit information for a microchip adverse event [online](#)²⁹.

A review of microchip reports received from the launch of the online reporting form to the end of 2015 is available [online](#).³⁰

Biocides

We received eight reports involving the use of biocides. Five of these reports described the use of spot-on products, 2 were household flea treatments and the final report related to the use of an insect repellent.

Suspected lack of expected efficacy reports

Figure 12 shows how many SLEE reports we received during 2015 for different groups of animals.

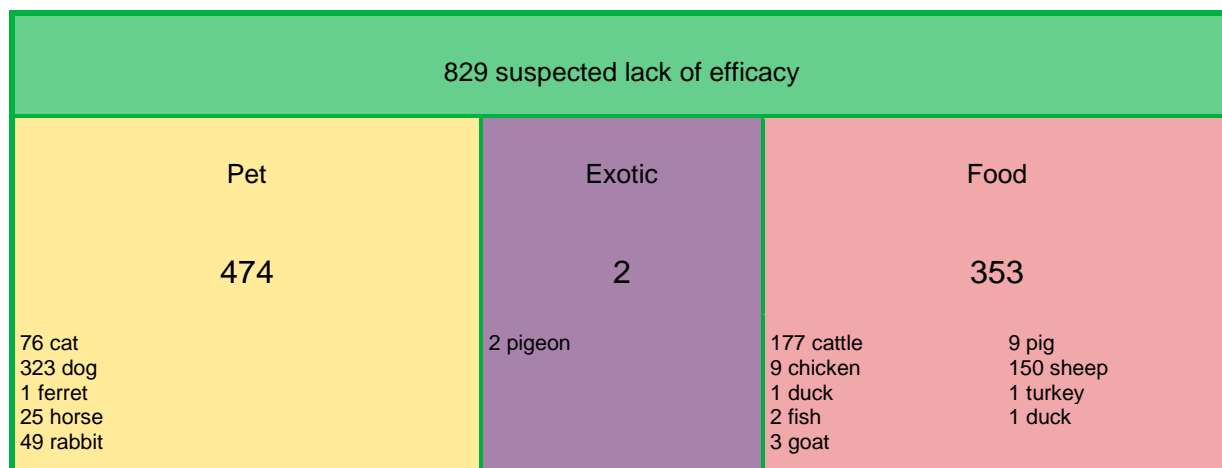


Figure 12 Number of SLEE reports received for pet, exotic and food-producing animals

²⁹ Report a microchip, www.vmd.defra.gov.uk/microchipeventreporting/

³⁰ Microchip adverse event reporting scheme, www.gov.uk/government/publications/microchip-adverse-event-reporting-scheme-2015-review

Pet animals

The following species were involved in the 474 pet animal SLEE reports:

- dogs , 323 (68.1%)
- cats, 76 (16.0%)
- rabbits, 49 (10.3%)
- horses, 25 (5.3%)
- ferret, 1 (0.2%).

The Pet Food Manufacturers' Association commissions and publishes a Pet Population report, which estimates the numbers of specific species kept as pets over a two year period. Using figures from the 2015 report³¹, the number of SLEE reports received for each species was:

- 1 report for every 26,000 dogs
- 1 report for every 97,000 cats
- 1 report for every 20,000 rabbits

The number of horses kept in the UK is estimated to be 944,000³², which means that 1 SLEE report is received for approximately every 38,000 horses.

In only 290 of the 474 reports was there sufficient evidence to suggest that a medicine may not have performed as well as expected.

Table 5 summarises the types of product and species associated with SLEE in the 290 reports in which product involvement was not ruled out.

³¹ Pet Population 2015, www.pfma.org.uk/pet-population-2015

³² British Equestrian Trade Association, National Equestrian Survey 2015, www.beta-uk.org/pages/industry-information/market-information

Product type	Dog [192](66)	Cat [61](21)	Horse [16](5.5)	Rabbit [21](7)	# of reports/product
Internal parasite	1				1
External parasite	9	3			12
Int & Ext parasite	6	18			24
Reproduction control	5				5
Anti-hormone		29			29
Inflammation control	1				1
Circulation		1			1
Hormone	13	9			22
Epilepsy control	80				80
Pain relief	2		1		3
Euthanasia	2	1	13	1	17
Anaesthetic/sedative	11	5	4		20
Vaccine	71	6		20	97
Human medicine	1	1	1		3
Unidentified product	2				2
Total	204	73	22	21	320*

Table 5 Types and number of products associated with different species [number of reports] (% of reports) * - multiple products may have been used

Dogs

Medicines for the control of epilepsy were most often suspected of not having performed as well as expected. A letter³³ was published in the *Veterinary Record* in September 2014 reminding vets to refer to the SPC, in particular to the very specific indications for use of these drugs.

Figure 13 shows the distribution of dog weights associated with SLEE reports received during 2015, following the use of the two available tablet sizes of Pexion, an anti-epilepsy medicine.

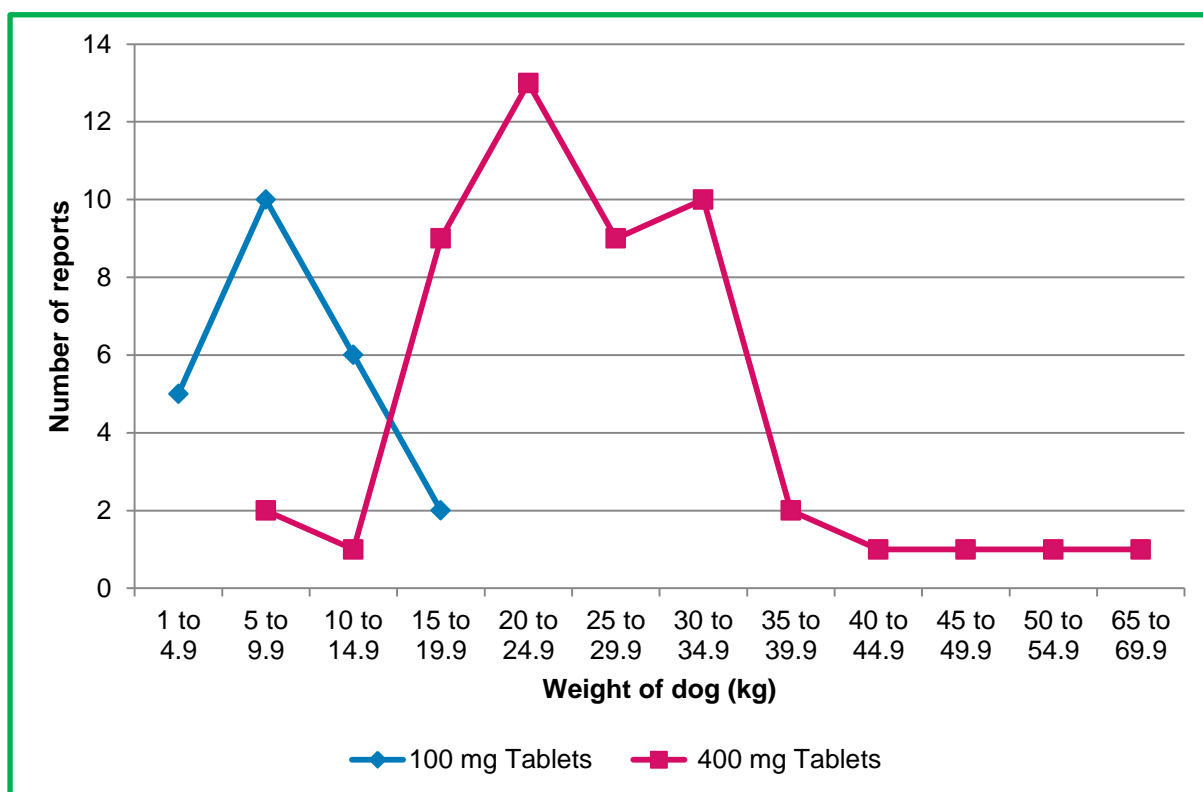


Figure 13 Distribution of dog weights associated with suspected lack of efficacy following use of Pexion

Vaccines were the product type most often reported to have failed to work in dogs. But in many cases evidence suggested the vaccine was not at fault; the most common reasons for the vaccine not being responsible for the SLEE were:

- a full vaccination schedule had not been completed
- the SLEE occurred beyond the expected duration of immunity of the vaccine

³³ Use of Pexion tablets for dogs, *Veterinary Record* 2014, 175(9): 232

- the SLEE occurred before effective immunity could be expected to have developed
- incubation of infection was suspected to have started before immunisation
- protection from the infection observed was not covered by the vaccine.

The vaccines used in dogs most often reported to have not worked as expected were those given to protect against parvovirus infection. But more than half of those cases were attributed to other causes, or there was insufficient information to prove a failure of the vaccine.

Diagnostic tests confirmed infection with parvovirus (26 cases), distemper (3 cases), leptospira (37 cases, one of which was *L. bratislava*) and kennel cough (5 cases).

Cats

Flea spot-on products were those most likely to be reported to have not worked when used to treat cats. You may see live fleas on your cat for a period of time after you have applied a spot-on flea product. This is because these products do not immediately kill fleas. You may be seeing fleas before the product has acted. Also, live fleas may be harboured in a cat's household environment, if it is not treated at the same time. The cat may then become re-infested, when the product applied to it is beyond its normal period of effectiveness.

Lack of efficacy was suspected in 21 cases following the use of spot-on treatments for internal and/or external parasites. Most cases involved medicines containing different combinations of methoprene, eprinomectin and fipronil, but there were also cases involving medicines containing imidacloprid, moxidectin and selamectin.

For vaccines used in cats, in three cases there was insufficient information to determine the role of a vaccine in the lack of efficacy, four cases in which the disease that occurred was not covered by the vaccine and 1 in which the vaccination schedule was incomplete. Diagnostic tests revealed the presence of feline leukaemia virus (3 cases), feline herpesvirus (1 case) and panleucopenia virus (2 cases).

Eighteen cases describing lack of efficacy following treatment for hyperthyroidism in cats mostly (11 cases) involved 2 tablet sizes. Another 9 cases described lack of efficacy in the treatment of diabetes with insulin.

Rabbits

Diagnostic tests were not carried out to confirm the infection involved in a third of the cases in which vaccination against myxomatosis and rabbit haemorrhagic disease (RHD) was thought to have been ineffective. Therefore, there was insufficient

evidence to support failure of the vaccine. The reasons that cast doubt on vaccine failure in the remaining two thirds of these cases were:

- the positive identification of another cause of the signs seen
- the SLEE occurred before effective immunity could be expected to have developed
- the SLEE occurred beyond the expected duration of immunity of the vaccine
- protection from the infection observed was not covered by the vaccine.

New variant RHD was positively identified in 4 of 8 cases, and its presence was suspected in another 4. The currently authorised vaccine against RHD does not protect against this variant of the disease.

Horses

Nine of the 25 cases relating to horses provided insufficient information or were otherwise judged not to be product related. In summary:

- incomplete information was received for 7 cases involving worming products (6) and an antibiotic (1)
- a euthanasia product was used off-label; it was administered too slowly
- the time since the previous dose of a wormer was greater than the expected duration of activity of the product.

Most (12) SLEEs in horses involved the use of euthanasia products. Delayed onset of effect was observed in cases with prior sedation and those without. In some cases multiple overdoses were administered without effect, even though catheters were correctly placed.

The number of cases involving lack of efficacy, when using euthanasia products in horses, serves as a reminder that an alternative means of administering euthanasia should always be available, in case the chosen method does not proceed as planned.

A single case was reported describing a problematic anaesthesia of a horse. Induction was carried out with ketamine, diazepam, romifidine and butorphanol. After 15 to 20 minutes, the horse was still moving, and another dose of ketamine was administered with little effect. Movement was again observed after another dose of ketamine, and the horse attempted to rise. Finally, a dose of ketamine with

detomidine and further butorphanol achieved anaesthesia, but the horse was very excitable during recovery.

There were a further 3 cases involving a treatment for Sweet Itch (1) and treatment for the prevention of internal and external parasites (2). In one case an 8-month old foal developed colic and died. *Post mortem* examination revealed a heavy worm burden and gut perforation. As the foal was reported to be one of 25 animals treated simultaneously 5 months earlier, it is likely that the product use was off-label, due to its age.

Ferret

A ferret was reported to still have ear mites 12 hours after an ivermectin-moxidectin combination spot-on treatment was applied.

Exotic animals

The two 'exotic' animal SLEE reports received related to pigeons.

Pigeons

In one of the pigeon cases, the storage conditions of the vaccine, which was received through the post, were not met. Consequently, it may not have worked as well as expected. However, no diagnostic tests were performed to confirm the identity of the disease that killed the vaccinated birds.

In the second case, diagnostic tests revealed that the deaths of the birds were due to an organism not covered by the vaccine that had been used.

Food-producing animals

During 2015, 353 food animal reports describing a suspected lack of efficacy were received. These reports involved the following food producing species:

- cattle (50.1%)
- sheep (42.5%)
- pigs (2.5%)
- chickens (2.5%)
- ducks (0.8%)
- goats (0.8%)
- farmed fish (0.6%).

Using figures from [Defra's Farming Statistics](#)³⁴, the number of SLEE reports received for each species was approximately:

- 1 report for every 55,000 cattle
- 1 report for every 154,000 sheep
- 1 report for every 491,000 pigs.

The population of goats is unknown.

As with pet animals, the number of reports with sufficient evidence to support a conclusion of lack of efficacy is significantly lower than the total reported (162/353). Tables 6 and 7 show the species and types of product associated with SLEE in these 162 reports.

Product type	Cattle [73](45)	Sheep [76](47)	Pig [1](0.5)	Goat [2](1)	# of reports/product
Int & Ext parasite	16	26			42
Hormone control	3	1			4
Infection control	7	1			8
Vaccine	62	51	1		114
Euthanasia				2	2
Species total	88	79	1	2	170*

Table 6 Product types involved in SLEE cases in cattle, sheep, pig & goat [Number of reports] (% of reports) * - multiple products may have been used

³⁴ Farming statistics: livestock populations at 1 December 2015 – UK, www.gov.uk/government/statistics/farming-statistics-livestock-populations-at-1-december-2015-uk

Product type	Fish	Chicken	Duck	Turkey	# of reports /product type
Vaccine	2	6	1		9
Specified Feed Additive				1	1
Species total	2	6	1	1	10

Table 7 Product types involved in SLEE cases in farmed fish, chicken, duck and turkey

The population of farmed fish is unknown, but for poultry, including turkeys, 1 SLEE report was received for approximately every 21 million birds.

Cattle

For cattle, 177 reports of a suspected lack of efficacy involving 224 products were made. Of these, 60 cases involving 75 products were assessed as not being a lack of efficacy, because:

- another disease, not covered by the medicine, was identified as having caused the signs observed,
- the disease for which the vaccine was intended to provide protection, was not isolated
- the programme of treatment was incomplete or was not followed correctly
 - the interval between vaccinations was not as recommended
 - the animals treated were too young
 - the vaccination programme was not completed before heifers were serviced
- the SLEE occurred before effective immunity of a vaccine could be expected to have developed
- the SLEE occurred beyond the expected duration of immunity of a vaccine.

A further 49 cases, involving 61 products, provided insufficient information to determine the contribution of those products to the SLEE reported.

The remaining 88 products (Table 6) were used in 73 cases. The 62 vaccines were of the following types:

- viral (46)
- bacterial (8)
- mixed viral and bacterial (7)
- parasitic (1).

The 16 products for the treatment of internal and/or external parasites were:

- pour-on solutions (7), containing permethrin, deltamethrin, ivermectin, eprinomectin, doramectin, closantel or clorsulon
- oral medicines (8), containing fenbendazole, triclabendazole or oxcyclozanide
- injection (1), containing ivermectin and clorsulon.

The 3 medicines used for the control of hormones were:

- progesterone
- gonadorelin
- an unidentified prostaglandin.

The 7 products used for infection control contained oxytetracycline, tulathromycin, halofuginone, imidocarb or bismuth nitrate.

Sheep

For sheep, 150 reports of a suspected lack of efficacy involving 168 products were made. Of these, 34 cases involving 34 products were assessed as not being connected to a lack of efficacy. For vaccines (26 cases), this was because:

- the programme of treatment was incomplete or was not followed correctly
- the disease for which the vaccine was intended to provide protection, was not isolated
- another disease, not covered by the vaccine, was identified as having caused the signs observed,
- the SLEE occurred before effective immunity of the vaccine could be expected to have developed

- the SLEE occurred beyond the expected duration of active or passive immunity of the vaccine.

For treatments against internal and external parasites (6 cases):

- the product was applied incorrectly
- too little product was applied
- the product did not claim to treat the parasite present
- another product used at the same time had not worked
- another disease caused the symptoms seen.

For the two cases involving antibiotics, the products used were not responsible for the lack of efficacy, as susceptibility of the organisms being treated to the active ingredients in the products had not been assessed prior to use, as advised in the product leaflet.

A further 48 cases, involving 55 products, provided insufficient information to determine the contribution of those products to the SLEE reported.

The remaining 79 products (Table 6) were used in 76 cases. The 51 vaccines were of the following types:

- bacterial (37)
- parasitic (9)
- viral (5).

The 26 products for the treatment of internal and/or external parasites were:

- pour-on solutions or sprays (11), containing dicyclanil, cypermethrin, alpha-cypermethrin, cyromazine
- oral medicines (14), containing moxidectin +/- triclabendazole, ivermectin +/- triclabendazole, triclabendazole, abamectin
- injection (1), containing doramectin.

The one medicine used for the control of hormones was flugestone.

The one antibiotic was spectinomycin.

Pigs

For pigs, nine reports of a suspected lack of efficacy were received. These all involved the use of vaccines.

In each of the first five cases, lack of efficacy was excluded as a cause of the clinical signs observed for one of the following reasons:

- the vaccine was administered below the recommended minimum age
- another disease, not covered by the vaccine(s), was diagnosed
- the pigs were not healthy at the time of vaccination.

In another three cases (3 products), there was insufficient information provided to determine the contribution of any vaccines to the SLEE reported.

In the final case, clinical signs of porcine reproductive and respiratory syndrome virus were observed in 300 of 600 pigs that had been vaccinated 3 months earlier. Approximately 30 of the pigs died. Blood and other diagnostic tests confirmed the diagnosis. There was no evidence of incorrect use of the vaccine.

Goats

For goats, three cases of a suspected lack of efficacy were reported.

One case involved the use of a clostridial vaccine. Two of a herd of 110 goats became unwell and one died within 2 months of vaccination of the herd. *Post mortem* examination suggested pulpy kidney disease, but the attending vet thought this was more likely to be due to some of the herd not receiving the second vaccination than a lack of efficacy of the vaccine. The product is not authorised for use in goats, therefore no efficacy can be claimed in this species.

In two cases xylazine was used to pre-medicate animals prior to euthanasia. In both cases pentobarbital was injected, but was found to be ineffective. Multiple administrations of the drug were required before some animals died, up to 15 mins after first administration. Clinical signs of vocalisation, paddling and excitation were common to both cases. Xylazine is not authorised for use in goats.

Farmed fish

For trout, one case of suspected lack of efficacy was reported during 2015. Enteric Red Mouth disease was reported to have occurred in an unknown number of fish. Specific vaccination details were lacking, but lack of efficacy was suspected.

For salmon, a single case of suspected lack of efficacy was reported. In this case furunculosis was diagnosed close to the estimated time of onset of immunity. This was 3 months after vaccination against furunculosis and infectious pancreatic necrosis virus. It was thought possible the fish were infected before full immunity was achieved. The potential cross-contamination from wildlife or by staff from associated work sites was considered possible.

Chickens

Of the nine reports of a suspected lack of efficacy in chickens, two were considered to be unrelated to vaccine failure.

In the first case, only half a dose against coccidiosis was administered to each of 14,000 chickens. This was off-label use and full efficacy could not be expected. A total of almost 100 birds died. Although an *Eimeria* infection was suspected, it was not confirmed.

In the second case, approximately 20,000 chickens were vaccinated, using 2 brands of vaccine against Marek's disease, in France at 1 day of age. An outbreak of Marek's disease was reported in these chickens at 18 weeks of age in the UK. However, no evidence of Marek's disease was revealed by several different diagnostic tests.

In the first of three cases involving Marek's disease, approximately 4% mortality occurred in 25,000 chickens vaccinated 6 to 8 weeks previously. The disease was confirmed at *post mortem* with three of 24 samples showing a low level of field virus. One sample had a high level of field virus.

In a second case, almost a quarter of 19,000 birds vaccinated against Marek's disease died 5 months post-vaccination. No confirmatory diagnostic tests were carried out, but the liver and spleen tumours seen were typical of this disease.

In the third case, over 55% of birds vaccinated at a hatchery had died with signs of Marek's disease up to 37 weeks of age. No discrepancies were found in the hatchery records relating to the storage or use of the product, and no product quality issue was revealed for the batch involved.

A lack of efficacy was suspected when *Salmonella typhimurium* was isolated from 6-week-old chickens, after a bivalent Salmonella vaccine was administered at 1-day and 2-weeks-of-age. However, the product instructions had not been followed as the first dose of vaccine was administered as a coarse spray, not in drinking water, and the second dose should have been administered between six and eight weeks-of-age.

An *E. necatrix* infection was confirmed 2 months after vaccination against coccidiosis; a number of birds appeared unwell and an unknown number died. Treatment with Baycox improved the condition of the remaining birds.

Two cases related to the use of infectious bursal (Gumboro) disease vaccine. In both cases Gumboro disease was suspected, but not confirmed. Birds were being rejected at slaughter because of fatty livers, perihepatitis and small size.

Ducks

There was one case of a suspected lack of efficacy involving ducks reported during 2015. Over 450 birds, of mixed breeds and sex, were vaccinated with an imported duck plague virus vaccine. Within a month over 60 of the ducks had died. The attending vet reported that the vaccinations had not been carried out according to the SPC (unknown reason), but confirmed that the deaths were due to duck viral enteritis.

Turkey

A single report of a suspected lack of efficacy involving turkeys was received. In this case, birds had been given medicated feed containing a coccidiostat (maduramicin) from hatching. At 27-days of age, evidence was present at *post mortem* and microscopically of coccidiosis. Failure of the product to protect these birds against this disease could not be confirmed without further information about dosing and any other significant factors.

Unidentified poultry

In the final case associated with a suspected lack of efficacy, 495 birds of a flock of 550 were vaccinated against Marek's disease. The remaining 55 birds were not vaccinated as the vaccine ran out. By 11 weeks later, 20 of the birds had died, and Marek's disease was confirmed at *post mortem*. It was not known whether the birds that died were those that had not been vaccinated, or whether the vaccine was used off-label, because the birds were not chickens. In either case, a lack of efficacy could not be claimed.

Safety reports

Figure 14 shows how many safety reports we received during 2015 for different groups of animals.

4683 safety ³⁵			
Pet	Exotic	Food	Withdrawal period issues
4329	23	327	4
1 budgerigar 1348 cat 2582 dog 1 donkey 6 ferret 1 goat 4 guinea pig 2 hamster 1 hedgehog 212 horse 169 rabbit 1 rat 1 tortoise	1 crocodile 18 fish 1 hedgehog 1 reindeer 2 laboratory mice	5 alpaca 4 bee 202 cattle 8 chicken 7 fish 1 goat 1 partridge 1 pheasant 9 pig 89 sheep	4 cattle

Figure 14 Number of safety reports received for different groups of animals

For pet and exotic animals, safety reports accounted for 90 and 86% respectively of all reports for those groups of animals. For food-producing animals, they accounted for only 48% of all reports.

Pet animals

Of the 4329 pet animal safety reports 2582 (59.6%) involved dogs. Further reports related to:

- cats (31.2%)
- rabbits (3.9%)
- horses (4.9%).

³⁵ Some safety reports may involve a lack of efficacy element; in these cases, 'lack of efficacy' is recorded with any other clinical signs observed.

Other species mentioned in reports were ferrets, guinea pigs, hamsters, a donkey, a goat, a hedgehog, a rat and a tortoise.

Using the Pet Food Manufacturer's pet animal population figures for 2015³⁶, we can calculate that we received:

- 1 safety report for every 3,300 dogs
- 1 safety report for every 5,500 cats
- 1 safety report for every 6,000 rabbits.

Using figures from the British Equestrian Trade Association³⁷, we can calculate that we received 1 safety report for every 4,500 horses.

Dogs

We received 2582 reports describing adverse reactions in dogs.

A total of 3836 products of all types were recorded in the 2582 reports associated with adverse reactions in dogs following the use of authorised medicines and various other products.

For 3.9% of those products, their use was not considered likely to be related to the clinical signs observed. For a further 16.9% of products, there was insufficient information to determine their role in the clinical signs observed.

For the remaining 3034 (79.1%) products a degree of involvement in the reaction was suspected.

Table 8 shows a breakdown of the types of products suspected of involvement in adverse reactions in dogs.

³⁶ Pet Population 2015, www.pfma.org.uk/pet-population-2015

³⁷ British Equestrian Trade Association, National Equestrian Survey 2015, www.beta-uk.org/pages/industry-information/market-information

Product type	Number
Authorised veterinary medicine	2815
Incompletely identified vet medicine	43
Human authorised medicine	131
Imported medicine	8
'Special' veterinary medicine	8
Non-medicinal veterinary product	16
Other non-medicinal product	2
Biocide	3
Unidentified product	8

Table 8 Breakdown of product types thought to be related to adverse reactions in dogs

Authorised veterinary medicines

Vaccines were the largest group (48.3%) of authorised veterinary medicines recorded as being involved in adverse reactions in dogs. Table 9 shows the top 10 groups of authorised veterinary medicines recorded.

Medicine type	Number	%
Vaccine	1360	48.3
Parasites	472	16.8
Inflammation control	412	14.6
Infection control	151	5.4
Hormone control	145	5.1
Epilepsy control	79	2.8
Anaesthetics & sedatives	74	2.6
Pain relief	55	2.0
Anti-vomiting	22	0.8
Heart & circulation	19	0.7

Table 9 The 10 most often recorded groups of authorised veterinary medicines associated with adverse reactions

A further 27 products were authorised medicines for:

- reversal of anaesthesia and sedation
- cancer treatment
- treatment of various other ailments
- treatments intended for other species
- treatment for poisoning.

Vaccines

We received 888 reports involving the use of vaccines in dogs. 46 of these reports recorded the use of 3 vaccines. A further 380 recorded the use of 2 vaccines, leaving 462 using a single vaccine.

Figure 15 shows the relative distribution of groups of clinical signs associated with the use of specific types of vaccines. For all types of vaccine the most commonly reported signs were general signs or symptoms, such as lethargy or pyrexia. In the absence of sales information it is not possible to directly compare the incidence³⁸ of particular clinical signs following the use of different vaccines. However, as 'general signs' was the most common sign recorded, for the purposes of this review the number of times this sign has been recorded has been used as the baseline reference value to which the relative frequency of all other signs have been calculated. For each type of vaccine the bar relating to general signs have been 'normalised' and given a value of 1. The bars for other groups of signs are sized proportionately to that i.e. if there were 1000 general signs and 500 cardiac rhythm signs, the bar size for cardiac signs will be 0.5.

It is important to remember that in many cases more than one vaccine and/or other products may be associated with the clinical signs recorded.

The types of vaccines included in Figure 15 are:

- DAP, with components for protection against distemper, adenovirus (herpes), parvovirus
- DAPI, as DAP, with the addition of parainfluenza
- DAPILci, as DAPI, with the addition of *Leptospira canicola* and *L. icterohaemorrhagiae*
- Lci, *Leptospira canicola* and *L. icterohaemorrhagiae*
- Lciag, as Lci, but with 2 additional *Leptospira* components; *australis* and *grippotyphosa*

³⁸ Incidence is normally calculated by dividing the number of times a clinical sign is recorded by the number of times an associated product may have been used (based on the size of the dose administered and how much product has been sold) and multiplying by 100. An incidence of 0.01% is equivalent to 1 reaction in 10,000 doses administered.

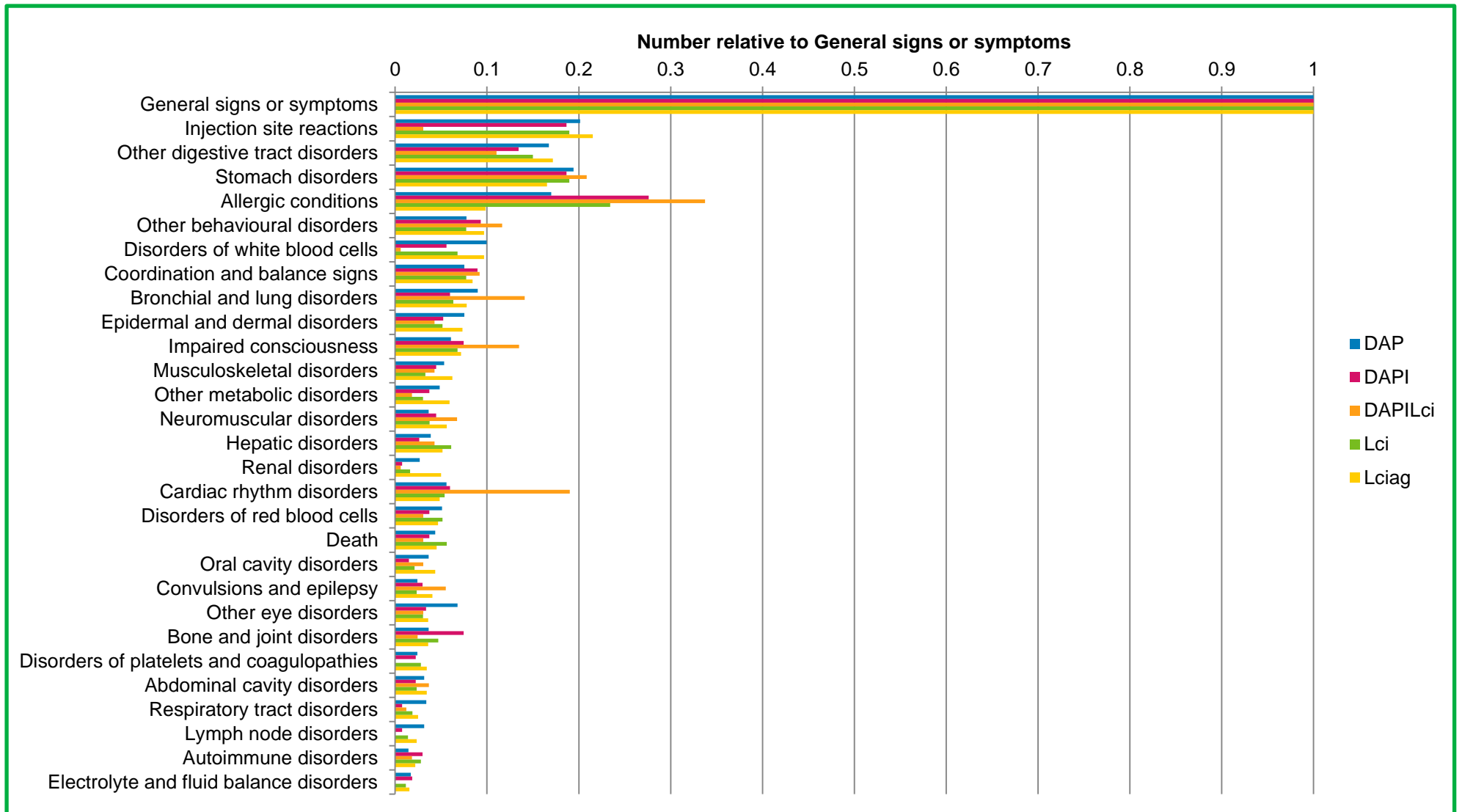


Figure 15 Number of clinical signs relative to the number of general signs for different types of vaccine

Spontaneous adverse event reports
 Animal adverse event reports
 Safety reports

More detailed illustrations of the relative occurrence of more specific clinical signs are included in the Annex.

Figure 16 shows the 10 most commonly reported clinical signs after the use of a kennel cough (*Bordetella*) vaccine. As with other vaccines there will have been cases in which other vaccines were administered simultaneously. Furthermore, there are two kennel cough vaccines available, one of which also contains a parainfluenza component that may have contributed to the signs recorded.

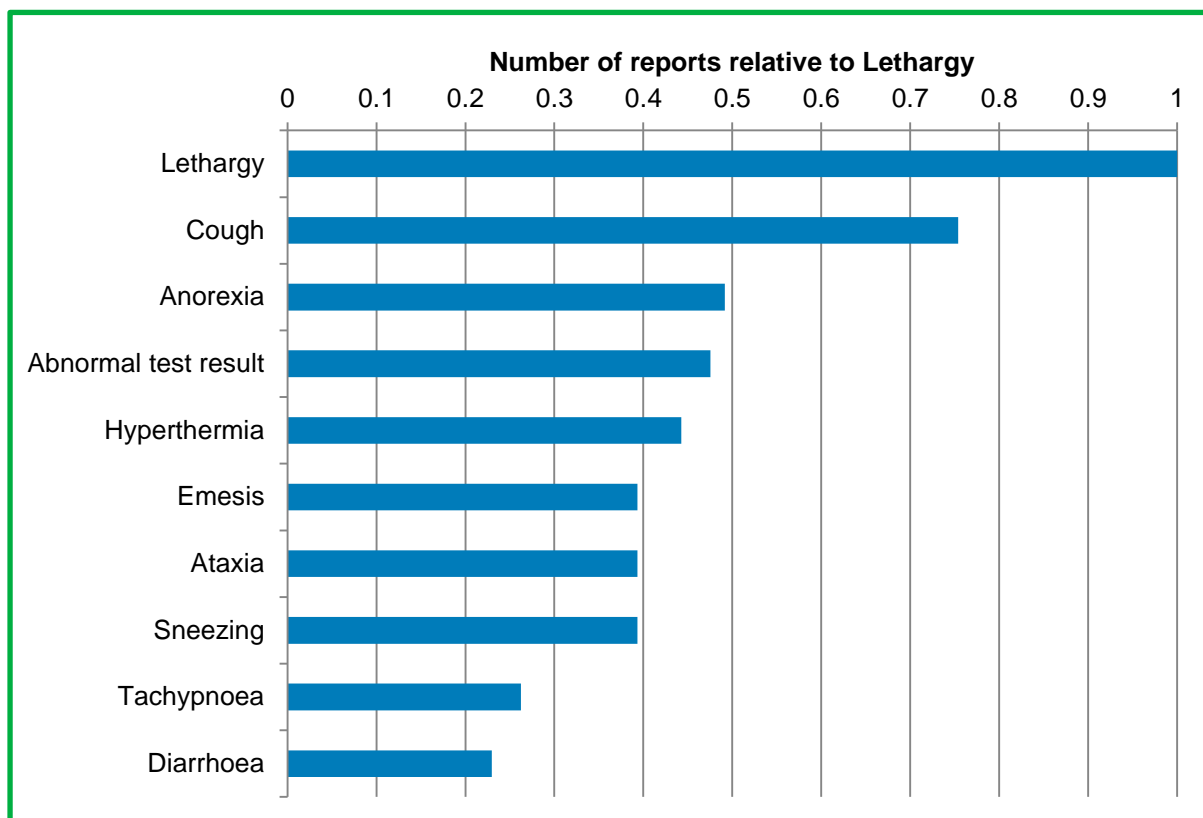


Figure 16 Clinical signs associated with the use of kennel cough vaccines

Reports relating to other vaccines with other combinations of components were received, but the size of the datasets for these were too small for comparison with the vaccines above.

We only received one report relating to the use of a vaccine against Lyme disease. This described a minor injection site reaction. There were no reports of adverse events associated with the use of Leishmania or Herpes vaccines, but there was one describing the off-label use of an equine vaccine against flu and tetanus. In this case the dog was vaccinated at the same time with a canine vaccine for distemper, adenovirus, parvovirus and parainfluenza. Within a few hours the dog developed a high temperature (>40C) and was panting, shivering and lethargic. After overnight treatment with meloxicam and intravenous fluids, the dog's temperature had reduced sufficiently for it to be allowed to go home.

Parasites

External parasites

We received reports of adverse reactions involving the use of 100 systemic treatments for external parasites. All of these treatments were tablets.

We also received reports of adverse reactions involving the use of 103 topical treatments for external parasites. Most of these treatments were spot-on products, but sprays, shampoos and collars are also in this category.

Figure 17 shows a comparison of the most commonly reported clinical signs associated with systemically and topically used products.

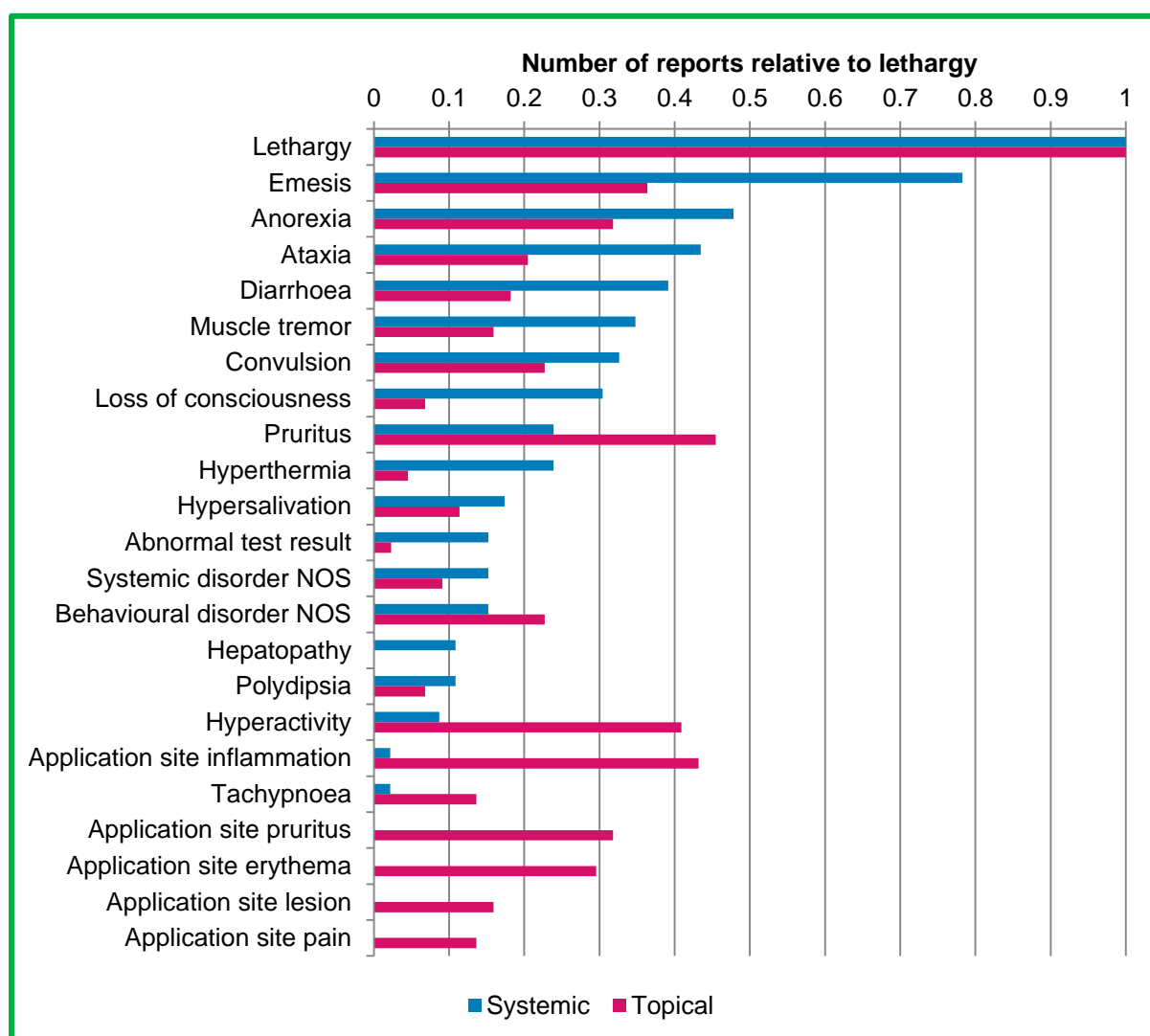


Figure 17 Comparison of clinical signs reported after use of systemically and topically administered external parasite treatments

Internal and external parasites

We received reports involving the use of 149 combined treatments for internal and external parasites in which the use of these products was thought to be associated with the clinical signs observed. 94% of these products were spot-ons; the remainder were tablets.

Figure 18 summarises the most commonly seen signs and the values are relative to the number of times lethargy was recorded in those cases.

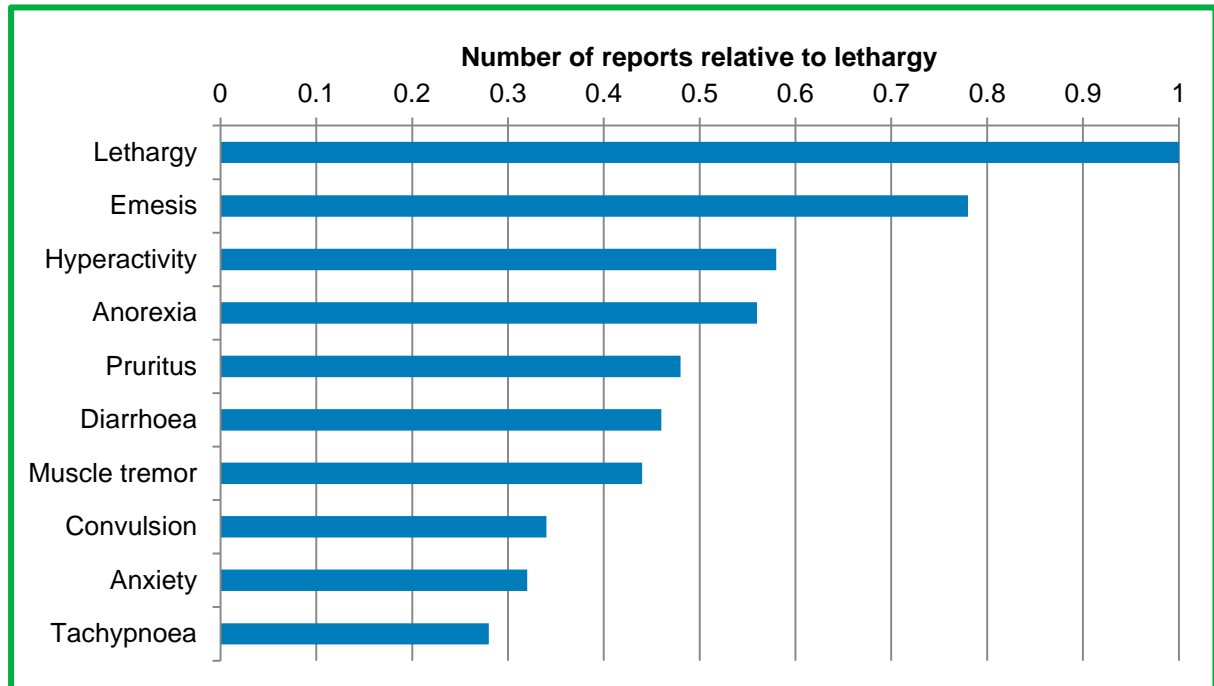


Figure 18 Clinical signs associated with the use of treatments for both internal and external parasites

Internal parasites

95% of the medicines reported following treatment of internal parasites were tablets. The remainder were oral granules. Figure 19 shows the most commonly reported clinical signs after the use of these products.

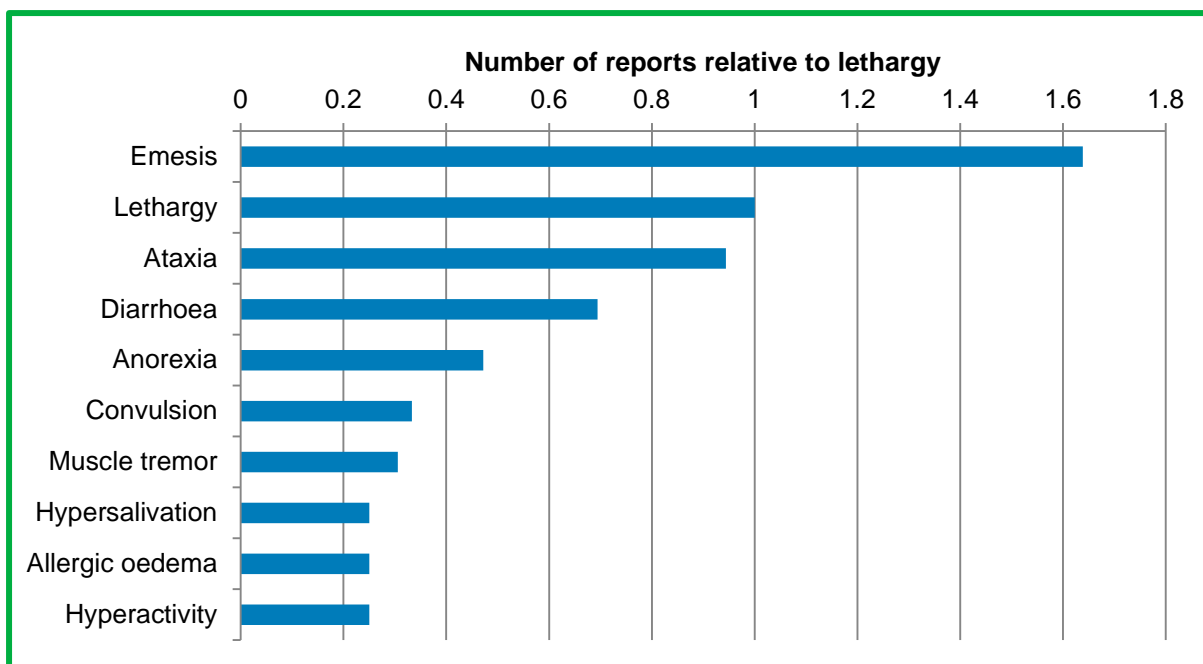


Figure 19 Clinical signs associated with the use of treatments for internal parasites

Inflammation control

We received 364 reports describing the clinical signs observed after the administration of medicines used to control inflammation. Almost three quarters of the medicines that were involved in these reactions contained a non-steroidal anti-inflammatory drug (NSAID). This was most often meloxicam, but other families of NSAID medicines were also reported.

Figure 20 shows a comparison of the signs most often observed following the use of NSAIDS and other anti-inflammatory drugs. The numbers are relative to the number of times lethargy was observed.

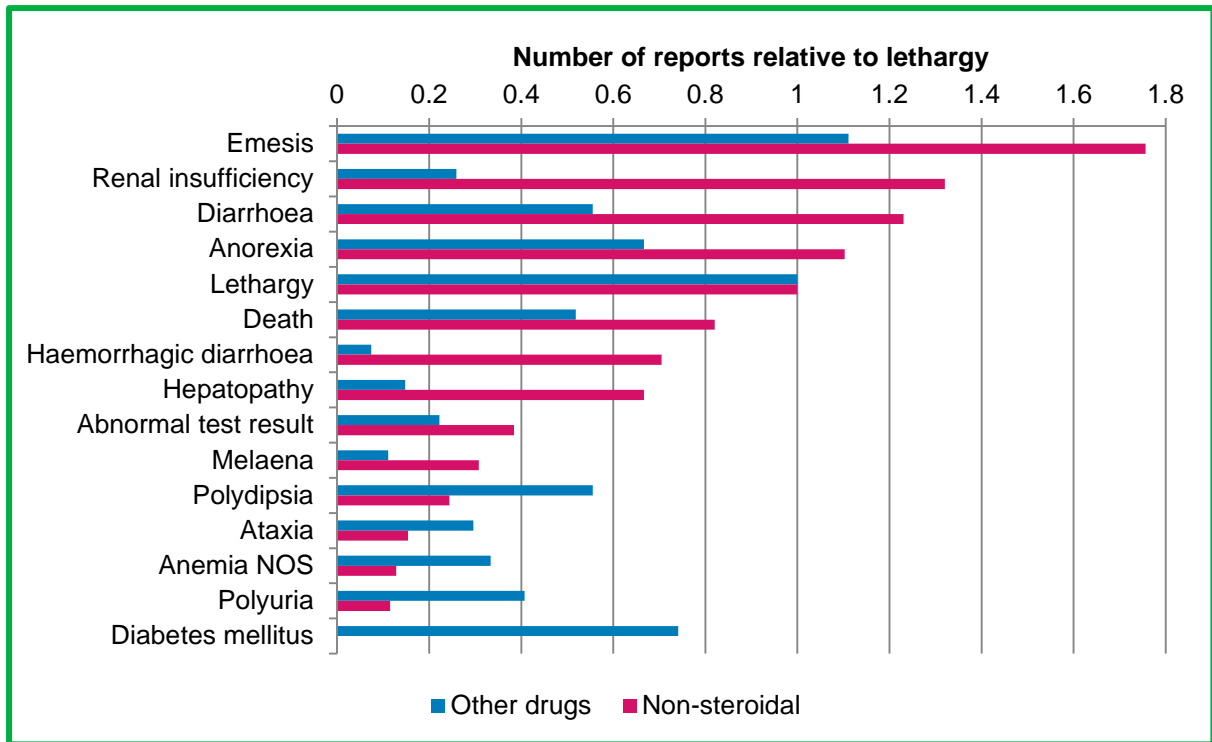


Figure 20 Comparison of clinical signs observed following the use of non-steroidal and other medicines for the treatment of inflammation

Figure 21 shows the distribution of different types of clinical sign relative to 'general disorders', which include signs such as lethargy, high temperature and not eating, following the administration of medicines for the control of inflammation. This shows the different distributions of these signs for medicines that are administered as tablets, oral liquids or injections.

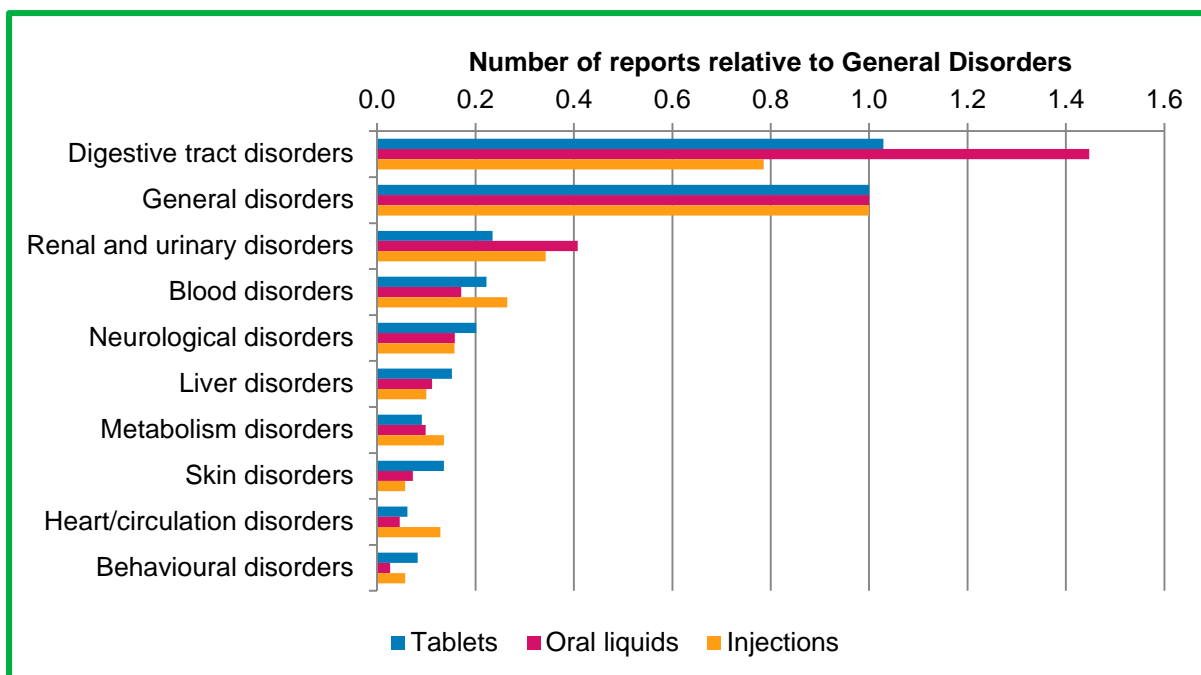


Figure 21 Distribution of different types of clinical signs observed following treatment with anti-inflammatory medicines in different presentations

Infection control

Treatments for infection covered either bacterial or fungal infections, or both. A total of 148 authorised veterinary medicines for the treatment of infection were recorded in the 142 reports involving these treatments. Table 10 shows the numbers of different presentations and types of medicines reported.

	Bacterial	Bacterial and fungal	Fungal
Shampoo		3	
Oral solution			1
Tablets	61		2
Eye drops	6		
Injection	26		
Ear drops	28	21	

Table 10 Presentations of medicines for infection control

Following the use of tablets, lethargy, vomiting or not eating were the most commonly reported clinical signs. Lethargy was also most commonly reported after antibiotic injections. For ear treatments, deafness was the most commonly reported clinical sign.

Hormone control

Figure 22 shows the distribution of different types of clinical sign relative to 'general disorders', following the administration of replacement hormones (insulin or thyroxine) and medicines for treating overactive adrenal glands.

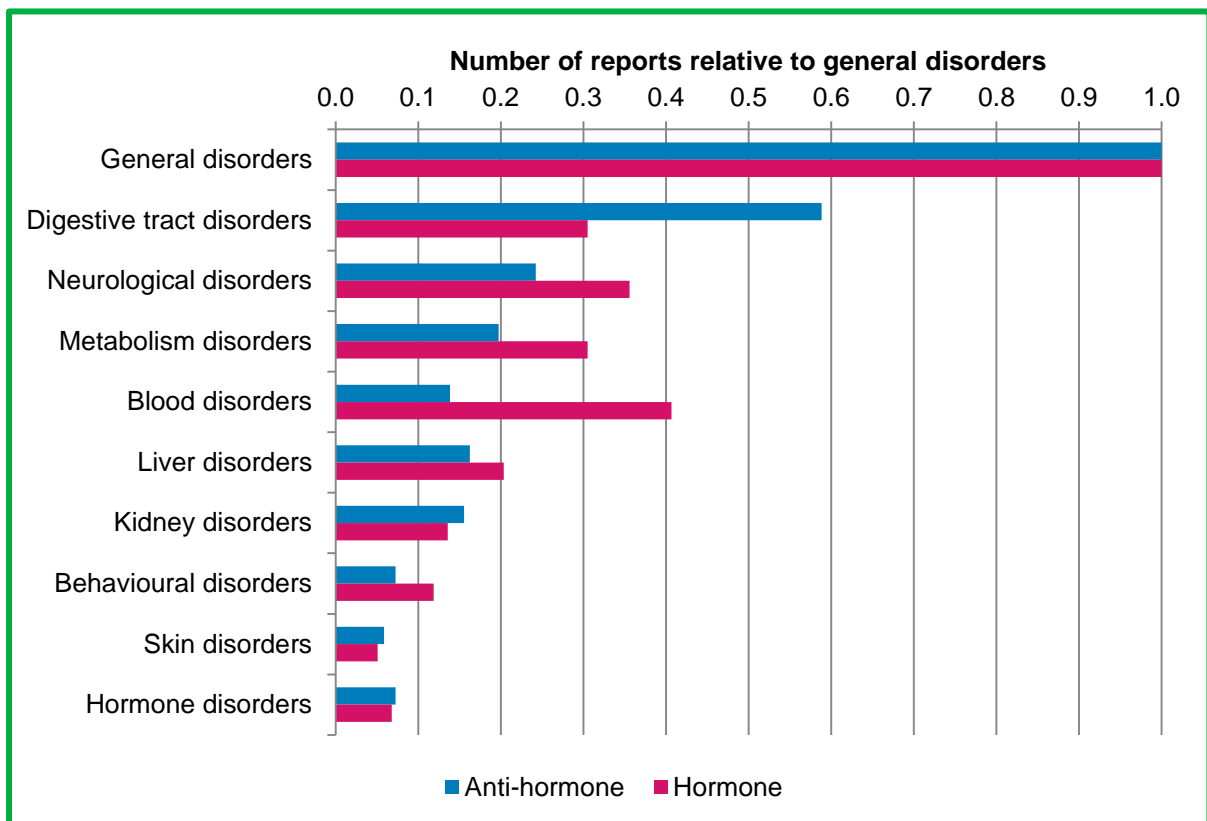


Figure 22 Distribution of groups of clinical signs following treatment with hormones or hormone reducing medicines

Human authorised medicines

The human medicine most often related to adverse reactions in dogs in 2015 was an amoxicillin-clavulanic acid combination. In 96 reports involving this medicine, almost two thirds of all clinical signs recorded were allergic conditions:

- allergic oedema
- urticaria
- hypersensitivity reaction

- anaphylaxis.

Swelling around the eyes, low blood pressure and cardiac rhythm disorders were also reported, but less frequently. A letter was published in the Veterinary Record regarding the use of Augmentin Intravenous Powder for Solution for Injection³⁹.

There were only three reports describing adverse reactions after the use of tramadol for pain relief, but there were over 40 clinical signs recorded in these cases. Most signs were general signs, but others included renal, hepatic, stomach and other digestive tract, cardiac rhythm and behavioural disorders. You must remember that the signs observed may have been due to other medicines used at the same time.

No other human medicines, which included:

- metronidazole
- ranitidine
- chlorphenamine
- diazepam
- azathioprine

were reported sufficiently to form clear profiles of clinical signs.

'Special' veterinary medicines

Only tetracosactide and trilostane were reported to have been involved in adverse events after the use of specially formulated veterinary medicines.

For both products general signs such as:

- abnormal test result
- lethargy
- anorexia

were reported. For tetracosactide, behavioural and neurological disorders were also reported. For trilostane, metabolic, renal and hepatic disorders were reported. But for neither product was there sufficient information to form a clear profile.

Non-medicinal veterinary products

The clinical signs observed in 6 of the 24 reports involving non-medicinal veterinary products were considered unconnected with the products. The remaining 18 reports

³⁹ Adverse event reports relating to Augmentin [Veterinary Record \(2015\) 176, 602](#)

involved various ear, eye, digestive and dietary supplement products. There was insufficient information to form profiles for any of these products.

Prescription or dispensing errors⁴⁰

A dog with heart failure was being maintained with daily 7.5 mg doses of benazepril. Then 20 mg tablets were dispensed accidentally, resulting in the dog receiving a 4 times overdose for over a week. The dog began to vomit, collapsed and died.

Another dog with a history of heart disease was accidentally dispensed thyroxine instead of pimobendan. After 2 weeks on the incorrect medication the dog started to have seizures. The owner realised the error, after which the vet intended weaning the dog off the thyroxine, and restart the correct medication.

Accidental exposure to treatments intended for other species

Oral horse wormers

Two of 5 dogs that chewed discarded dosing syringes for horse worming products were euthanased because they did not respond to treatment after being poisoned by the medicine they had ingested. Four of the cases involved products containing moxidectin, with one involving ivermectin.

In another case, a dog was suspected to have ingested left-over horse-feed to which paste or gel had been added. It recovered from neurological signs, after treatment.

Another case highlights the risk of allowing dogs to run free in areas where treated animals are kept. A dog was allowed access to pasture in which a mare and her foal were running. The animals had been treated 9 days previously with an oral worming paste. The dog was hospitalised for 4 days with vomiting, abdominal swelling and rash over its stomach, axillae and ears. No specific link was established between these signs and ingestion of treated horse faeces, but these signs could be indicative of an overdose of pyrantel.

Injectable endectocide for cattle & sheep

A collie puppy developed hypersalivation, photophobia, muscle tremor, lethargy, depression and dilated pupils within 24 hours of possibly ingesting dung from a horse treated with a doramectin product approximately 10 days previously. The puppy was eating and drinking normally 8 days later, but the clinical signs were persisting.

In another case, a Border collie was left unattended for a few minutes in an area where a bottle of injectable doramectin had been dropped and smashed. Twenty

⁴⁰ Adverse events relating to dispensing errors [Veterinary Record \(2015\) 177, 360-362](#)

hours later the dog suddenly became blind. Otherwise the dog was well. The final outcome is unknown.

Cattle bolus

We received four reports of dogs chewing monensin boli that had been regurgitated by cattle after administration. In 3 of the 4 cases the dogs either died or were euthanased due to the severe toxicity symptoms. Intravenous lipid infusion therapy was used to treat the dog that survived and at least one of the dogs that didn't.

Cattle pour-on

A Border collie and another dog of unknown breed became blind within 24 hours of ingesting an unknown quantity of a closantel/ivermectin pour-on from the floor. The dogs recovered after 48 and 72 hours respectively, following symptomatic treatment.

Sheep pour-on

We received a report involving two Australian Kelpies that were poisoned when they came into contact with an alpha-cypermethrin sheep pour-on. They had been in the back of a farm vehicle where there was a residue of the product from a leaking applicator. Their feet became contaminated and subsequently developed irritation and a localised skin reaction. The dogs ingested the product by licking the affected skin, which led to vomiting. The dogs were hospitalised due to the muscle spasms and neurological signs that developed. Two days later, the dogs were discharged, following a special lipid treatment and tranquilisation.

Sheep ovulation control

We received two cases following the ingestion of up to 5 discarded flugestone-impregnated sponges by dogs. Both dogs began to vomit. In one case, three sponges emerged with the vomit, but endoscopy was planned to look for remaining blockages. In the other, three sponges were surgically removed during an exploratory laparotomy.

Game bird feed

A lurcher was reported to have consumed a quantity of grouse grit medicated with flubendazole. It is unknown whether it recovered with I/V fluid treatment.

Dog owners should be aware that they must not allow their pets to ingest anything they may find on the ground in areas where large animals are kept or treated. Even dung can contain medicinal residues that may be harmful to a dog if ingested.

People who administer medicines to large animals should dispose of 'empty' containers, so that they cannot be accessed by dogs or other animals. If any medicine is spilt, it must be dealt with immediately.

Cats

Of the 1348 safety reports involving cats, 167 either provided insufficient information to determine the role of the product(s) used in the development of the clinical signs observed, or there were other causes responsible for those signs. Therefore 341 of the products used could not be related to the signs observed. Table 11 shows a breakdown of the types of the remaining 1673 products related to adverse reactions in cats.

Product type	Number
Authorised veterinary medicine	1621
Incompletely identified vet medicine	18
Human authorised medicine	6
Imported medicine	2
'Special' veterinary medicine	5
Non-medicinal veterinary product	9
Biocide	7
Unidentified product	5

Table 11 Breakdown of product types thought to be related to adverse reactions in cats

Authorised veterinary medicines

As with dogs, vaccines were the largest group (43.9%) of the authorised veterinary medicines recorded as being involved in adverse reactions in cats. Table 12 shows the top 10 groups of authorised veterinary medicines recorded.

Medicine type	Number	% of vet medicines
Vaccine	712	43.9
Hormone control	230	14.2
External parasites	195	12.0
Internal & external parasites	188	11.6
Internal parasites	83	5.1
Inflammation control	72	4.4
Infection control	58	3.6
Anaesthetics and sedatives	49	3.0
Pain relief	22	1.4
Heart & circulation	5	0.3

Table 12 The 10 most often recorded groups of authorised veterinary medicines associated with adverse reactions

A further 7 (0.4%) products were authorised medicines including:

- sedation reversal
- epilepsy treatment
- prevention of vomiting
- vitamin.

Vaccines

We received 453 reports involving the use of vaccines in cats. One of these reports reported the use of 3 vaccines, 258 reported the use of 2 vaccines and the remainder reported only 1 vaccine.

Figure 23 shows the most commonly observed clinical signs after use of a live viral vaccine with calicivirus, panleukopenia and rhinotracheitis virus components.

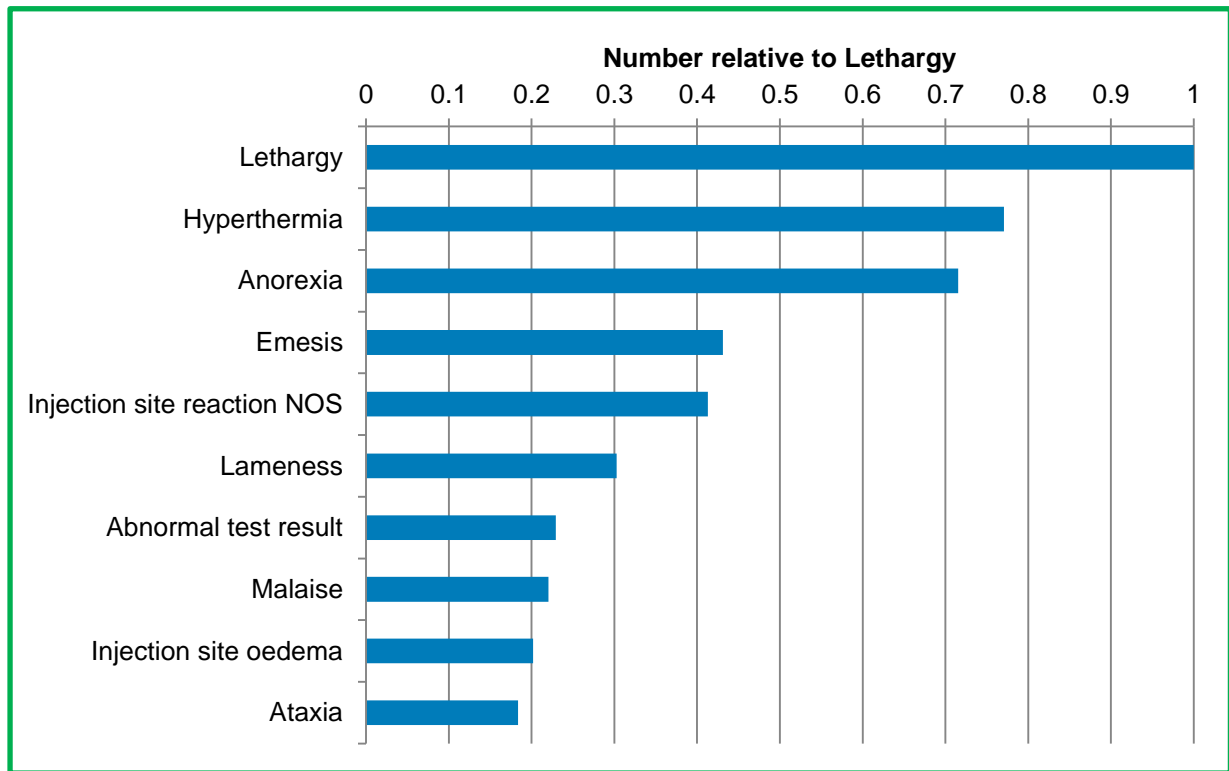


Figure 23 Clinical signs observed after use of a live viral vaccine in cats

Figure 24 shows the most commonly observed clinical signs after the use of an inactivated viral vaccine with only a feline leukaemia component.

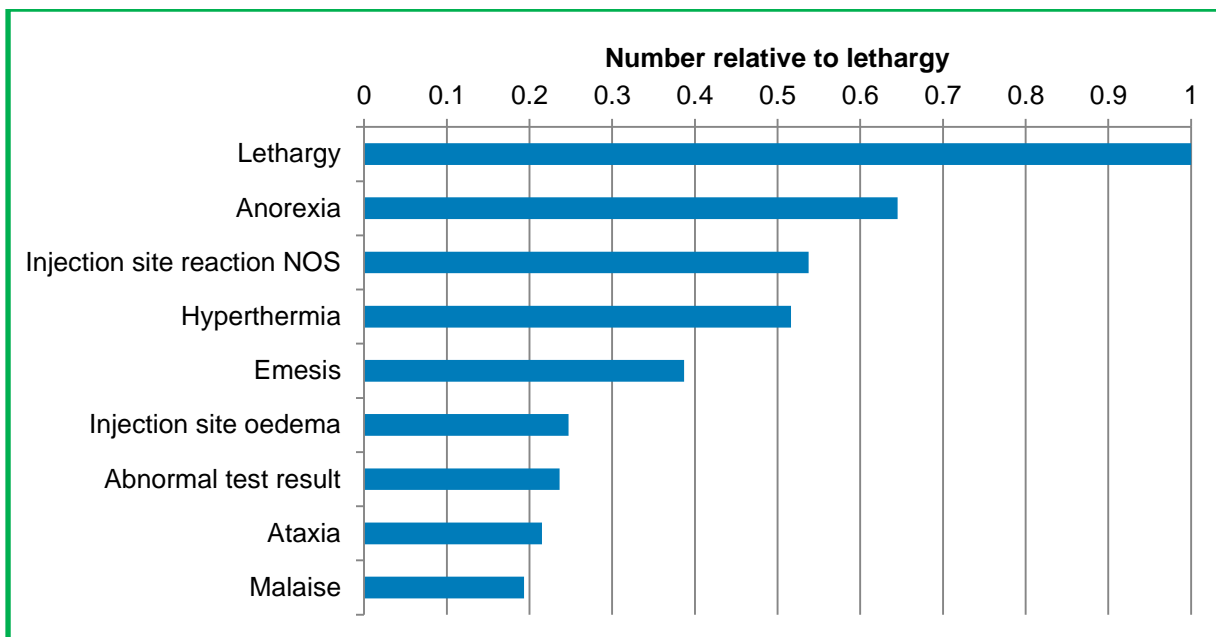


Figure 24 Clinical signs observed after use of an inactivated feline leukaemia virus vaccine

Hormone control

Almost 96% of all clinical signs recorded following the use of authorised medicines occurred during the use of treatments for an overactive thyroid. Signs of liver disease were most common, often with abnormal blood test results. Not eating, lethargy and weight loss were frequently associated with these other signs.

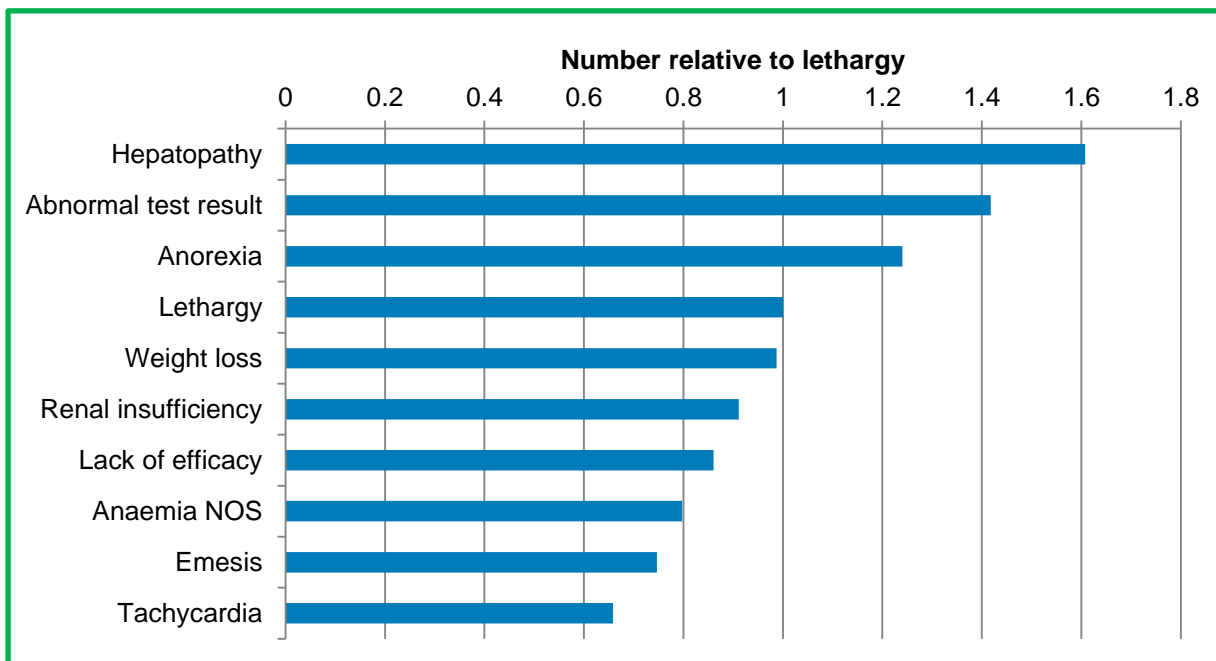


Figure 25 Clinical signs recorded during treatment for hyperthyroidism

Figure 25 shows further signs observed.

External parasites

Figure 26 shows the most common clinical signs observed following any treatment for external parasites. For spot-ons and sprays, ataxia, emesis and muscle tremor was most often reported. Hair change at the site of application was also reported.

For tablets, emesis and ataxia were also most commonly reported. Collars were reported to have caused localised hair changes, pruritus and ulcers, although reports relating to collar use were much less frequent than for those after spot-on use.

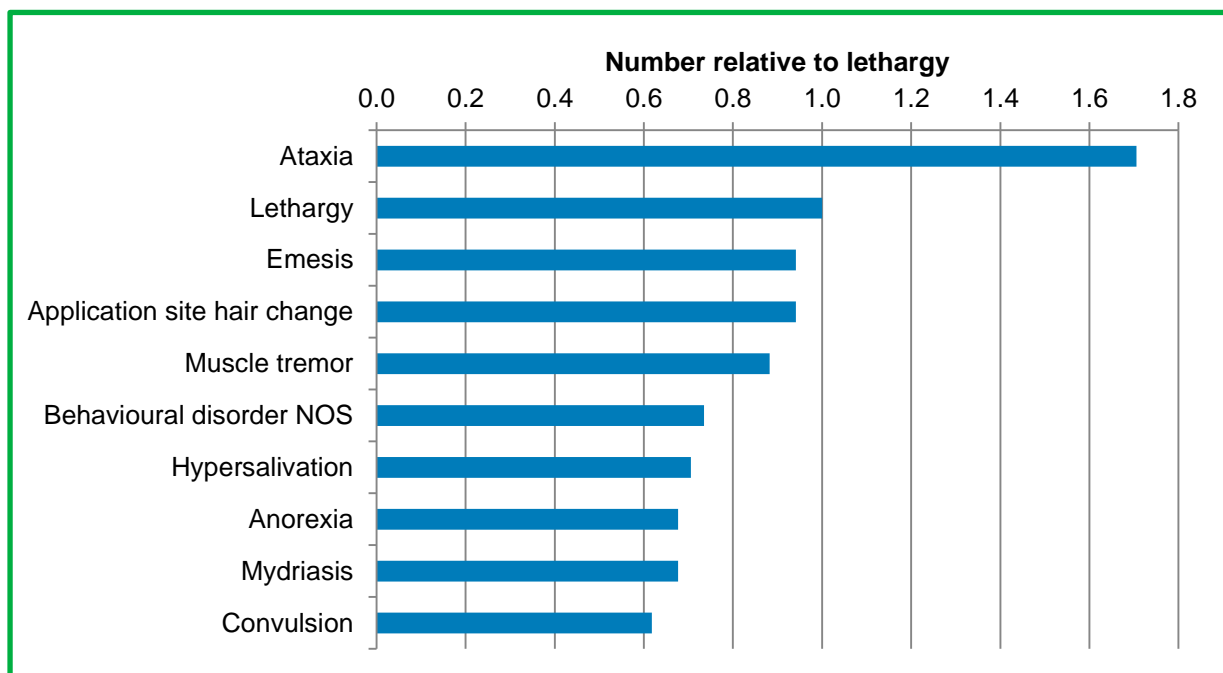


Figure 26 Clinical signs recorded following treatment for external parasites

Internal and external parasites

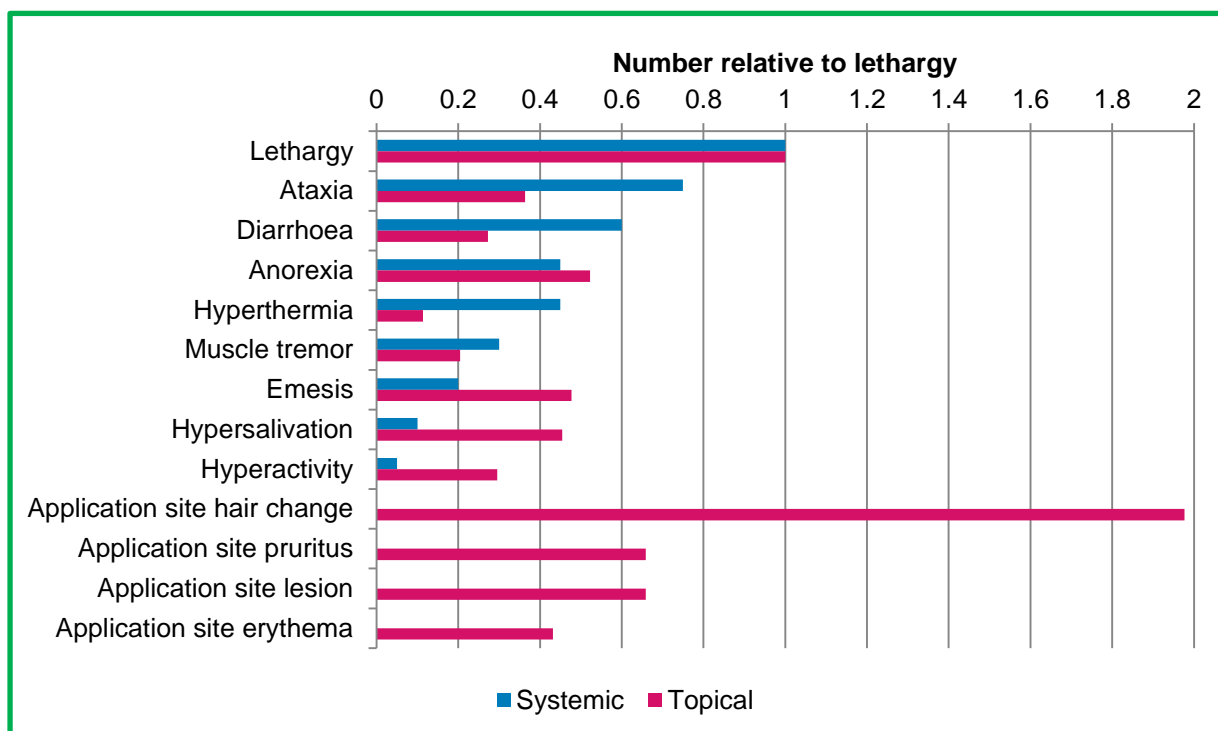


Figure 27 Comparison of clinical signs recorded for product applied topically or systemically, as tablets

Figure 27 shows a comparison between products for the treatment of internal and external parasites applied topically or administered as tablets i.e. those with a systemic effect.

Off-label exposure to treatments intended for other species

We received eight reports of dog spot-on products being applied to cats by their owners. Two cases involved products containing imidacloprid and permethrin. In one case, the owner applied one half of a large dog pipette to their cat. The cat had seizures and was hospitalised for 3 days. In the other, a medium dog pipette was applied, and the cat took 5 days to recover from the resulting seizures.

Two cases involving spot-ons containing imidacloprid and moxidectin were received. An owner applied one quarter of an extra-large dog pipette to a cat. The cat recovered from seizures following 24 hours of treatment. Another cat took 4 days to recover from twitching and other neurological signs, after its owner applied a large dog pipette to it.

Four cases involving spot-ons containing permethrin were received. In two cases, a total of three cats experienced seizures or twitching, but recovered. In each of the other 2 cases, a cat became blind soon after the product was applied. In the first

case, the cat also died. In the second the cat recovered, but its vision seemed to be impaired.

YOU MUST NOT administer any product to any animal for which it is not intended. Only a vet is able to advise whether it is safe to use an authorised product 'off-label', but pharmacists and SQPs can supply a product for use 'off-label', providing there is a prescription issued by a vet. Without such advice, you are risking the health of your pet and may be liable for a hefty vet bill.

Accidental exposure to treatments intended for other species

During 2015, we received two reports in which cats had been affected after coming into contact with a dog that had been treated with an external parasite spot-on. In one case, a kitten died after being exposed to a permethrin product. In the other, a cat had a seizure the day after coming into contact with a dog treated with a selamectin spot-on.

If you have both cats and dogs in your household, you should ensure that when treating your pets with spot-ons, they are unable to ingest the products, either by grooming themselves or each other. Keep your pets separate, especially cats from treated dogs, until the product is completely dry.

A cat was reported to have accidentally eaten a dog's imepitoin epilepsy treatment. This appeared to make the cat sleepy and ataxic. The final outcome is unknown.

Another cat was reported to have possibly eaten a dog's food, which contained 1 or more 20 mg carprofen tablets, over a period of 4 days. The cat developed diarrhoea, stopped eating and became dehydrated. It also had haematuria and signs of kidney failure. The cat was treated symptomatically.

Prescription or dispensing errors⁴¹

A cat with a recurrent campylobacter infection was accidentally given 50 mg enrofloxacin tablets, instead of the appropriate 15 mg tablets. The cat received 2 x 50 mg on 2 consecutive days. On the second day the cat was vomiting, behaving strangely and hiding. The dosing error was discovered when the cat was examined the following day, and the correct tablets were dispensed. The owner did not administer more medication, as they thought the cat was unwell; it was walking into things and tripping over. The owner also described the cat's eyes as dilated and cloudy. The cat was hospitalised and put on intravenous fluids five days after the initial overdose. It was diagnosed with chronic renal failure. The final outcome is not known.

⁴¹ Adverse events relating to dispensing errors [Veterinary Record \(2015\) 177, 360-362](#)

A cat was accidentally prescribed 400 mg thyroxine tablets. The cat was given 500 mg twice daily for an unknown number of days. Ten days after the start of treatment the cat was euthanased because it had developed renal failure. The identity of the intended treatment is not known.

A cat was accidentally prescribed 1.5 mg/ml meloxicam oral suspension for dogs instead of 0.5 mg/ml oral suspension for cats. The medicine was administered for 3 or 4 days. The cat was presented at the vets as it was vomiting. Renal insufficiency was diagnosed; the blood renal parameters were raised. The cat was given intravenous fluid therapy.

Another cat had been treated daily for approximately 3 months with 0.5 mg/ml meloxicam oral suspension. The cat was then given the same dose volume of 1.5 mg/ml oral suspension, resulting in a 3 times overdose. Blood renal parameters were raised and the cat was put on intravenous fluid therapy.

A cat with heart disease was unintentionally given 10 mg trilostane daily for 3 weeks instead of treatment for the heart disease. The cat then went missing for 2 days, and collapsed and died on its return.

'Special' veterinary medicines

All of the reports relating to this type of product described application site reactions. These generally started to appear after several weeks or months of treatment and resolved when treatment was stopped. The reactions seen were localised hair loss, skin discolouration, slight reddening and crusting. In the most extreme case, ulceration developed, which resolved following product withdrawal.

Imported products

Only two cases of 'imported' products were reported. In the first case, a cat was vaccinated against rabies in France before returning to the UK. The cat developed alopecia, moist dermatitis and pruritus within 3 days of the vaccination.

In the second case, an owner bought a flea spot-on product in Portugal, but did not use it until she returned with it to the UK. She applied the product to her cat. The cat had convulsions within hours of application, and had to be treated for permethrin poisoning, as the product used was only intended for use on a dog.

It is illegal to buy authorised veterinary medicines outside of the UK and bring them back to the UK to use. If you buy medicines for your pet whilst you are abroad, you must use them there, or at least start a course of treatment, before you return.

It is also illegal to buy from websites that are not based in the UK. If you buy products from these websites, you cannot be sure that what you receive is a genuine veterinary medicine. You are not only risking the health of your pet, but are also putting yourself at risk of prosecution.



Look for the AIRS⁴² logo on websites that sell veterinary medicines.

Rabbits

169 safety reports were received during 2015 involving pet rabbits. In only 70 of the reports was there sufficient information to suggest a possible connection between the signs observed and the use of a veterinary medicine.

Authorised veterinary medicines

For most types of medicines there were too few reports to be able to determine a pattern of typical clinical signs seen. But for after vaccine use, general signs and symptoms, such as lethargy, anorexia and death were most often seen. Injection site necrosis and other injection site disorders were almost as common. All of these signs were associated with the use of the myxomatosis/rabbit haemorrhagic disease vaccine.

Off-label exposure to treatments intended for other species

Six of the cases in which the death of a rabbit was reported involved the use of products intended for use in cats and dogs. Two followed the use of cat spot-on products for external parasites. Two followed the use of products that contained meloxicam, and the others contained enrofloxacin and metoclopramide.

Prescription or dispensing errors⁴³

The diuretic furosemide was administered to a rabbit in error, pre-castration, instead of metoclopramide. Intravenous fluid therapy was administered immediately.

⁴² Accredited Internet Retailers Scheme (AIRS) [Check if an online animal medicine retailer is accredited.](#)

⁴³ Adverse events relating to dispensing errors [Veterinary Record \(2015\) 177, 360-362](#)

Horses

In 2015 we received 212 safety reports involving horses. More than half of these reports involved the use of a vaccine.

We received 119 safety reports following the use of vaccines.

Figure 28 shows the most common clinical signs observed in horses following the use of one or more vaccines.

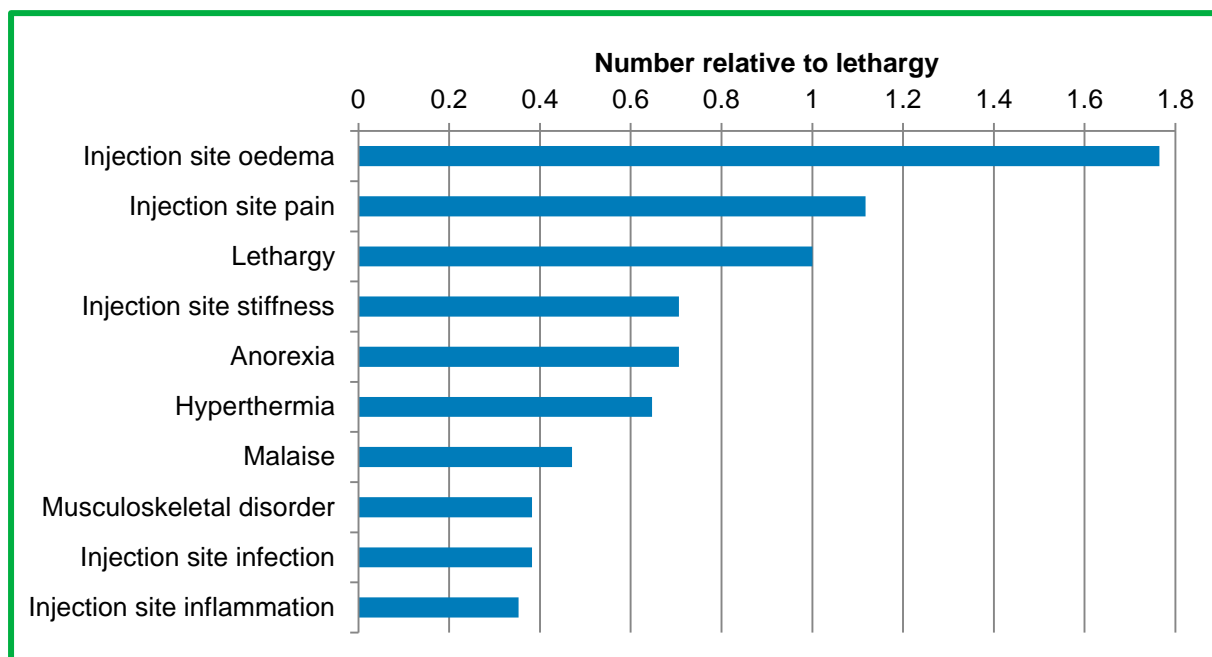


Figure 28 Commonly observed clinical signs after vaccination

29 cases were received involving the use of medicines for the treatment of internal and/or external parasites. The most commonly reported clinical signs following the use of these medicines were:

- Application site reactions, including localised swelling, mouth inflammation
- Behavioural disorders, including hyperactivity
- General signs or symptoms such as lethargy, swelling, anorexia, lying down
- Neurological disorders affecting co-ordination or balance
- Digestive tract disorders such as diarrhoea.

For other types of medicines, there were too few cases to show commonly observed signs.

WARNING

If you treat horses for parasites with oral pastes or gels, you should ensure that used syringes are disposed of quickly and safely. In 2015, we received five reports of dogs chewing used syringes and suffering serious adverse reactions to the medicine they ingested. These medicines contained either moxidectin or ivermectin and praziquantel. In two of the cases the dogs affected had to be euthanased. In the other three cases the dogs recovered with treatment.

In another case, a dog was suspected to have ingested left-over horse-feed to which paste or gel had been added. It recovered from neurological signs, after treatment.

Another case highlights the risk of allowing dogs to run free in areas where treated animals are kept. A dog was allowed access to pasture in which a mare and her foal were running. The animals had been treated 9 days previously with an oral worming paste. The dog was hospitalised for 4 days with vomiting, abdominal swelling and rash over its stomach, axillae and ears. No specific link was established between these signs and ingestion of treated horse faeces, but these signs may be indicative of an overdose of pyrantel.

Donkey

A donkey vaccinated (off-label) against equine flu developed acute laminitis of all 4 feet, a high temperature and the injection site became painful 2 days post-vaccination. The donkey was reported to be improving following symptomatic treatment.

Budgerigar

A bird owner administered a drop of an exempt veterinary medicine to each of 72 budgerigars one morning. He had confirmed that each bird weighed at least the minimum specified. The product was applied to the back of the neck as instructed. He noted that all the birds appeared drowsy immediately after treatment. Several hours later, he found that a 7 to 8 week-old bird had died. By the following day, all the remaining birds had recovered.

Ferrets

Six safety reports involving ferrets were received during 2015.

One of 2 ferrets, treated with an imidacloprid/moxidectin endectocide indicated for use on ferrets, became lethargic and anorexic within 24 of the product being applied. The product was washed off, but the ferret died. A *post mortem* examination failed to discover a cause for the death.

A ferret was treated for mastitis with a clindamycin oral solution indicated for use in cats and dogs. It was treated concurrently with meloxicam. An unknown time later the ferret died. Gastric bleeding was revealed at *post mortem*. The vet knew of another ferret with similar symptoms that had died; this was being treated with amoxicillin and clavulanic acid. The vet suspected a cause of death other than the treatment being responsible for the deaths.

A jill ferret developed cystitis 7 days after proligestone was administered to suppress the ferret's oestrus cycle. This should have prevented the development of associated infections. Two months later the ferret showed signs of oestrus starting. The vet involved did not consider the treatment to have completely failed.

Another ferret developed lethargy, pale mucous membranes and circulatory collapse 5 days after proligestone was administered. It was treated with warmed subcutaneous fluids.

One of 3 ferrets had convulsions approximately 7 days after being administered a dog vaccine (off-label) to protect against distemper. No other information was available.

An exempt ivermectin spot-on was applied to 2 ferret dams, which were still feeding kittens. The kittens were approximately 5 weeks old. Roughly 10 days later the kittens began to die. At *post mortem* the liver of one was found to be black and haemorrhagic. No other information is available.

Goat

A pet goat was injected with a doramectin endectocide indicated for use in cattle and sheep. The following day, the goat had collapsed, was recumbent and had a low temperature. Blood test revealed a low blood protein. A faecal egg count showed a high level of strongyles, so lack of efficacy was suspected. Lack of efficacy could not be claimed, as the product is not indicated for use in goats.

Guinea pigs

A pair of guinea pigs exhibited agitation, self-trauma, adipsia, anorexia and shaking within 4 hours of application of an exempt permethrin spot-on product. The symptoms persisted for 48 hours, even after the owner attempted to wash the product off.

Another pair of guinea pigs was treated with an exempt s-methoprene spot-on product. They developed severe swelling and redness at the application site, and stopped eating and drinking.

A feed mix containing robenidine, normally used to control coccidiosis in breeding and fattening rabbits, was labelled as suitable for guinea pigs. Less than 48 hours after starting feeding on the product, two guinea pigs had died.

A litter of four 5-day-old guinea pigs were prescribed amoxicillin/clavulanic acid drops to treat cornea/ocular opacity. Within 3 days all four had died after developing convulsions.

Hamsters

A hamster was treated with oral enrofloxacin solution for a urinary infection. Two days into a 5 day course of treatment the hamster became anorexic and was not drinking. It lost weight and died an unknown time later. The dose given was an overdose.

An owner accidentally administered an overdose of an exempt ivermectin spot-on product. Within 12 hours the hamster's hind limbs were paralysed. The hamster began crying, developed convulsions and died.

African pygmy hedgehog

An albino hedgehog with ringworm was treated with a fungicidal cream. For 24 hours after the treatment it appeared to be sleepy, but recovered. However, three days after the treatment the owner reported that blood was seeping from the hind legs of the hedgehog. The owner did not present the animal for examination, it became anorexic and weak, and 11 days later it died.

Rat

A rat was overdosed with an enrofloxacin oral solution administered as treatment for a respiratory infection. Following 10 days of treatment, the rat was jaundiced. An enlarged spleen was diagnosed by ultrasound. Blood tests revealed anaemia and neutrophilia. Immune mediated haemolytic anaemia was diagnosed. The rat died 9 days after initial presentation. No *post mortem* was performed.

Tortoise

On two occasions, 2 days apart, a tortoise vomited within 24 hours of an enrofloxacin injection. It was not clear if the tortoise was injected on the intervening day, but had not vomited.

Food-producing animal reports

During 2015, 327 food animal safety reports were received. These reports involved the following food producing species:

- cattle (61.8%)
- sheep (27.2%)
- pigs (2.8%)
- chickens (2.4%)
- farmed fish (2.1%)
- goats (0.3%).

The remaining reports involved alpacas, bees, partridges and pheasants.

Using figures from [Defra's Farming Statistics](#)⁴⁴, the number of safety reports received for each species was approximately:

- 1 report for every 49,000 cattle
- 1 report for every 260,000 sheep
- 1 report for every 491,000 pigs.

Cattle

Authorised veterinary medicines

Only for vaccines were there sufficient reports to determine a pattern of clinical signs seen.

Vaccines

Most adverse reactions occurred after the use of vaccines. The majority of those reported still relate to the use of Pregsure BVD, a product that was withdrawn from the market in September 2011. In these reports, death, haemorrhage and bone marrow abnormalities in the calves of vaccinated dams still predominate.

For all other vaccines, there are too few adverse reactions to determine a pattern of clinical signs seen.

⁴⁴ Farming statistics: livestock populations at 1 December 2015 – UK, www.gov.uk/government/statistics/farming-statistics-livestock-populations-at-1-december-2015-uk

Off-label use of veterinary medicines

A significant number of safety reports were received following incorrect use of medicines in cattle.

The types of incorrect use reported were:

- overdose (9 cases)
- use of expired product (3 cases)
- the treatment programme not being followed (3 cases)
- disregarding warnings or contraindications (3 cases)
- maladministration of bolus wormers (2 cases)
- administration of a vaccine normally indicated for use in heifers and young calves to a bull
- coat being clipped before the application of a pour-on product
- underdose.

One of the overdose cases involved a cow that was accidentally given a second monensin bolus 20 days after the first. This resulted in toxicity leading to recumbency and death of the cow an unknown time later.

Sheep

Only 63 of the 89 sheep safety reports provided sufficient evidence to determine the role of one or more products in the clinical signs observed, or the clinical signs could not be attributed to another cause. All of the products involved in these cases were authorised veterinary medicines.

For none of the groups of medicines used was there sufficient data to perform any analysis.

Off-label use of authorised veterinary medicines

A significant number of safety reports were received following incorrect use of medicines in sheep.

The types of incorrect use reported were:

- overdose (9 cases)
- the treatment programme not being followed (4 cases)
- use of medicine intended for another species (4 cases)
- disregarding warnings or contraindications (1 case)
- incorrect route of administration (1 case).

The overdose cases usually involved a worming product; the weights of animals were overestimated, resulting in the administration of an incorrect dose of the medicine.

Two cases were reported in which a vaccine against erysipelas, intended for use in pigs, was used in sheep. In both cases pregnant sheep aborted.

In another case, lambs were treated with a product intended to reduce diarrhoea in young calves due to cryptosporidiosis. A lamb died, but no evidence of cryptosporidiosis was found.

A cattle pour-on for the treatment of internal and external parasites was accidentally applied to 50 lambs. It is estimated that the lambs received up to 5 times the recommended dose. One lamb died.

Pigs

Nine safety reports describing adverse events in pigs were received during 2015.

One case involving the use of a macrolide antibiotic resulted in signs of pain, with lameness and stiffness, in piglets within 12 hours of administration by injection. *Post mortem* examination of 1 piglet that died, probably of suppurative meningitis, revealed haemorrhage and oedema at the injection site that may have explained the signs of pain observed.

In another case, rectal prolapse in 2 of the 10 pigs treated with a different macrolide antibiotic administered in feed was reported an unknown time after administration.

One case involved the use of a vaccine to prevent oedema disease. In this case some piglets were injected intramuscularly with penicillin on the same occasion at a different site. Within 10 to 15 minutes most of the piglets treated were subdued, lying in huddles, trembling, vomiting profusely and scouring. The signs were the same whether the piglets had received antibiotic or not. These signs persisted for 6 hours and full recovery occurred within 12 hours. The use of this product greatly reduced the 15% mortality rate due to oedema disease that was being experienced prior to its use.

One case followed the concurrent use of vaccines against circovirus type 2 and mycoplasma. Two pigs developed a hypersensitivity reaction with reddening of the skin and lethargy within 30 minutes, but recovered in less than 2 hours after administration of meloxicam.

In the other case 1 of 150 pigs died about 8 weeks after vaccination against circovirus. Blood was found around the dead animal. *Post mortem* examination revealed a gastric ulcer that had eroded and burst a large blood vessel leading to catastrophic blood loss.

One case involved a combined vaccination against *Erysipelas* and porcine parvo virus. Two sows developed anaphylaxis immediately after their second vaccination. They recovered, but were stiff and lame afterwards.

A farrow to finish unit had been assessed as being endemically infected with PRRS virus. A mass vaccination strategy was undertaken with various vaccines including against PRRS. Several litters were born with blue discolouration and swelling around the head and died within 24 hours of birth. Evidence of PRRS was not revealed at *post mortem*, however, the signs seen were attributed to the presence of *E. coli* septicaemia.

In one case, an unspecified number of sows exhibited anorexia within 24 hours of vaccination against PRRS, but recovered within a week. A high number were also

reported to have returned to oestrus. Gilts were slow to come into heat, or did not come into heat at all. Some lameness was also reported. The farmer was aware that some animals were unwell at the time of vaccination.

In the final case, 6 sows aborted 3 or 4 days after vaccination against PRRS. The farmer suspected that this was not due to the vaccination, but due to a possible outbreak of PRRS.

Farmed fish

Seven reports of adverse reactions involving fish produced for food use were received. All occurred after the use of one or more vaccines, and on one occasion a coincident treatment for a fungal infection.

Salmon

Table 13 summarises the details of the cases involving salmon.

Vaccine type ^a [+ concurrent product(s)]	Number of cases	Clinical signs observed
F + IPNV	1	Abdominal cavity adhesions, death
F + IPNV + SPDV	1	Fungal skin infection, death
F + IPNV + M	2	Melanisation

^a**Key:** F – furunculosis, IPNV – infectious pancreatic necrosis virus, SPDV – salmon pancreatic disease virus, ERM – enteric redmouth disease, M – *moritella* (winter ulcers)

Table 13 Summary of cases involving Atlantic salmon

The two cases resulting in internal melanisation followed poor administration technique involving either intra-muscular or intra-organ injection.

Trout

Table 14 summarises the details of the cases involving trout.

Vaccine type ^a [+ concurrent product(s)]	Number of cases	Clinical signs observed
F + V	1	Melanisation
F + V [+ ERM]	1	Granuloma, internal adhesions
F + V [+ ERM + antimycotic]	1	Granuloma, internal adhesions, melanisation

^aKey: F – furunculosis, V – vibriosis, ERM – enteric redmouth disease

Table 14 Summary of cases involving Rainbow trout

In the cases resulting in melanisation, there was a possibility of poor administration technique involving either intra-muscular or intra-organ injection.

Bees

A total of four reports involving honey bees were received. All 4 reports occurred after treatment of hives for Varroa mite. Three treatments were with formic acid, the other with thymol.

In the first case a hive was treated with formic acid strips as a precaution, having been treated earlier in the spring. The queen was found dead in front of the hive within 24 hours of application of the strips. The ambient temperature was within the recommended limits and the hive was well ventilated.

In the second case a hundred dead bees were found in front of 2 of 3 hives that had been treated 24 hours earlier. This was not considered to be a higher mortality rate than would normally be expected for the time of year. Again the ambient temperature was within the recommended limits and the hive was well ventilated.

In the third case the bee hives were not of the size and construction recommended. As a result the ventilation was not as good as it should have been. This was exacerbated by the accumulation of dead bees in the already narrow entrances. Three of 7 colonies treated died within a week of treatment.

Improper application of thymol strips resulted in the death of 7 of 180 hives treated in the final case. Another 11 hives were weakened by incorrect treatment. The

beekeeper had placed the gel trays upside down, which gave access to too much product.

Goats

One safety report involving goats was received during 2015.

A farmer mistakenly administered an oral monepantel anthelmintic to 8 goats by subcutaneous injection. 3 days later one of the goats died. The attending vet thought this was likely to have been due to the high worm burden. The product is not authorised for use in goats.

Chickens

Eight safety reports involving chickens were received during 2015.

Two cases followed the use of autochthonous vaccines. The specially prepared vaccines used were both for the treatment of or protection from *Erysipelas* infection. In both cases weight loss in chickens was observed. In one case the signs were seen after the first injection, but in the other the signs were only observed after the second injection. In this case there was use of a multivalent (infectious bronchitis, Newcastle disease, avian rhinotracheitis, infectious bursitis) vaccine at the same time as the second injection.

Four cases described the use of infectious bronchitis (IB) vaccines. In one case, one in five hens began to produce misshapen eggs 10 days after vaccination. In a second case a flock had been vaccinated alternately with 2 different IB vaccines. These hens also began to lay misshapen eggs within 1 week of the fourth vaccination. Egg production was also reduced. In another reduced growth rate and lethargy were reported in >30,000 birds within 3 days of vaccination. In a fourth case, hens stopped eating within 2 weeks of a second vaccination; treatment with a wormer failed to prevent a further drop in production.

Hatchability in a chicken breeder flock dropped to zero after feed was contaminated with feed containing monensin. The hens had been exposed for 3 to 4 weeks. It took 6 months to recover to an 80% hatch rate. A link to the contaminated feed was not proven.

In the final chicken case, 150 of 30,000 chickens treated with a combined trimethoprim and sulfamethoxazole antibiotic to prevent respiratory infection caused by *E. coli*, had reduced water uptake, anorexia and had died within 24 hours of administration. There was insufficient information to determine the medicine's involvement in the event.

Alpacas

Five alpaca cases were reported during 2015.

In the first case, a 2-year-old male animal exhibited stiffness, recumbency, lethargy and anorexia within 12 hours of (off-label) treatment with an oxytetracycline antibiotic. He had recovered one day later after unspecified treatment.

Two hundred alpacas were vaccinated (off-label – species not indicated) against clostridial infection. Young alpacas were vaccinated at 3-days-of-age and again at 3 weeks. However, up to 50 died aged between 2 and 4 weeks. Various causes of death, such as *E. coli* septicaemia, peritonitis, enteritis and thymic atrophy, were revealed at *post mortem*.

Seventy alpacas vaccinated (off-label) against clostridium infection and pasteurellosis together were also treated with a fenbendazole wormer and received a multi-vitamin injection. The flock appeared lethargic and subdued immediately after the treatment and one died three days later. *Post mortem* examination did not reveal a cause of death, but poor condition was noted.

Two very similar, possibly related, cases involved (off-label) clostridium vaccination. In both cases a 4-year-old male alpaca collapsed within 3 minutes of the vaccination, but recovered within 5 minutes without treatment. The other 2 animals vaccinated at the same time were not affected.

Game birds

A flock of 4000 partridges was vaccinated with an autogenous vaccine of unknown composition. An unknown number of birds were found at slaughter to have lesions in the breast muscle. It was thought that the lesions were due to infection at the injection site, or poor injection technique.

Half of a flock of 1100 pheasants of unknown age were administered a paromomycin antibiotic (off-label) at a dose rate of 12.5mg per kg body weight to control Hexamita infection. Overnight, 20% of the birds died. No investigations were made to determine the cause of death. The other half of the flock was treated with an alternative combination of tiamulin and doxycycline, and was unaffected.

Exotic animal reports

Crocodile

An African pygmy crocodile was administered a parenteral enrofloxacin antibiotic to treat skin lesions caused by an *Aeromonas* infection. It was also bathed daily in a dilute chlorhexidine disinfectant. The condition of the animal improved during treatment; it exhibited increased appetite. The animal died unexpectedly 5 days later after showing increased lethargy and anorexia. *Post mortem* examination did not identify a definite cause for death, but there were signs that may have been indicative of dehydration.

Ornamental fish

All 18 reported cases involved the death of some or all of the fish treated. The most frequently reported (10 cases) products were exempt combined anti-bacterial and anti-fungal treatments, followed by combined treatments for external parasites and fungus (3). Other cases involved the use of an anti-parasitic (2), a general tonic and fish food (2).

In none of the cases was product involvement in the deaths confirmed, but in some, other factors were identified that may have influenced events. The factors identified included over-stocking, incorrect dosing and incorrect water changes.

Hedgehog

An underweight hedgehog, covered in ticks and fleas, initially improved after being given food and fluids. Half a pipette of a small cat imidacloprid/moxidectin spot-on endectocide was applied (off-label – species not indicated, possible overdose) to the back of the hedgehog's head. Within a few hours the animal was very unwell and not eating. It died the following day. *Post mortem* examination revealed an old healed foot fracture, poor condition of the teeth and possibly enlarged adrenal glands. There were no internal parasites. The vet indicated that the animal seemed to be improving before the application of the endectocide.

Reindeer

Three reindeer were treated with a triclabendazole (off-label – species not indicated, overdose) flukicide and a doramectin (off-label – species not indicated) endectocide. All 3 animals showed signs of ataxia 2 days later. Two recovered a day later, but the third did not. The vet suspected the animal had sustained a spinal injury.

Laboratory mice

One group of 5 mice, out of 9 groups, died within 24 hours of treatment with enrofloxacin. The cause of death was not determined.

Twenty mice were anaesthetised using xylazine and ketamine before a procedure. It is suspected these were administered intraperitoneally. Twenty minutes later, anaesthesia was reversed with atipamezole diluted with phosphate buffered saline, rather than water for injection. Nothing unusual was noted as the mice recovered normally. However, 2 hours later the mice were observed to be unconscious and twitching. The mice were euthanased, because full recovery was thought unlikely.

Withdrawal period issues

Four cases of the detection of veterinary medicine residues in animal produce intended for human consumption were reported. All four cases involved cattle.

Three of the cases involved the detection of antibiotic residues in milk. In two cases the residues were detected after the use of an intramammary suspension. In one case, the bulk milk test was failed 2.5 months after administration and 5 days after calving. It was another 5 days before the test was passed. The correct withdrawal period appears to have been observed.

In the second case, a heifer aborted approximately 1 month after product administration at drying-off, but 80 days after drying-off the milk was still failing the Delvo and bulk milk tests. As the cow may have aborted within 54 days of product administration, it is possible that the 54 day plus 96 hours post-treatment withdrawal period was violated.

In the third case, residues were detected in the milk from three cows that had received 5 daily injections. The reporter stated that this occurred after the recommended withdrawal period, but the actual time between treatment and test failure was not provided.

In the final case, residues of a liver fluke treatment were detected in the liver sample taken at slaughter of 1 of 180 treated cows, approximately 3 months post-treatment. The following week similar residues were found in another 3 carcasses from the same group of cows. All 4 carcasses were condemned. The farmer's records did not reveal any issues. A cow slaughtered 4 months post-treatment had residue levels below the maximum limit allowed.

Environmental incidents

Two reports of adverse effects from possible exposure to a veterinary medicine in the environment were received during 2015.

The two reports related to incidents that occurred in 2014. In the first case 2 dogs were reported to be suffering from sickness and diarrhoea. There was also anecdotal evidence of other dogs in the area being affected and a suspicion that the cause was spraying of nearby fields. Residues of imidacloprid were detected in a vomit sample from one of the dogs, but it was established that none of the nearby fields had been treated with products containing this substance. However, the owner of the dogs revealed that they were treated each month for fleas with an imidacloprid spot-on. It would appear that ingestion of the flea treatment was the cause of the dogs' clinical signs and this was not an environmental incident.

The other case from 2014 involved the death of bees from 1 of 5 hives at one site. Residues of imidacloprid were detected in samples of dead bees. Fields near to the hive site were sprayed during the 2 weeks prior to the death of the bees, but no residues of agricultural pesticides were detected in the dead bees. The beekeeper's dogs had been wearing flea collars containing imidacloprid and flumethrin for the 3-months preceding the incident. The dogs were known to regularly lie in the grass adjacent to the hives, and the bees had been seen to crawl through this patch of grass. No pesticides were used in the surrounding garden. The source of the imidacloprid found in the dead bees could not be definitely identified. The transfer of the substance from flea collar to grass to bee was one possibility, but it cannot be certain that the beekeeper did not contaminate the dead bees used for analysis by contact with the dogs and their collars.

Conclusions

The number of reports received in 2015 was very slightly lower than those received in 2014. This decrease may be attributed to a continued decrease in the number of reports received relating to animals used in food production (see Annex).

No new major pharmacovigilance issues arose during the year. The following issues were highlighted:

- Full product information (including brand and strength) will improve quality of data
- Vets, vet nurses, large animal handlers and pet owners should be particularly careful when administering injectable or pour-on/spot-on products, to avoid needle-stick and eye injuries
- An alternative means of euthanasia should always be readily available when horses are involved.

An [article](#)⁴⁵ was published in the Veterinary Record regarding dispensing or prescription errors, as an increased number had been reported during the year. A [letter](#)⁴⁶, also published in the Veterinary Record, raised awareness to an increase in the number of reports relating to the use of Augmentin Intravenous Powder for Solution for Injection, a product authorised for use in human patients. Readers were also reminded that human adverse reactions following accidental exposure to this product in a veterinary setting should be reported to the MHRA⁴⁷ [Yellow Card Scheme](#), rather than to the VMD.

Vets are [reminded](#)⁴⁸ that they should always check the VMD's [product information database](#)⁴⁹ to ensure that they are aware of recent changes to product information.

Owners are reminded that they should always obtain medicines for their animals from reputable sources, such as their vet or pet shops. If you want to buy medicines online, you should check that the website you are using is based in the UK and, preferably, is registered with the [accredited internet retailer scheme](#)⁵⁰ (AIRS). This ensures that the medicines you are buying are genuine. You are breaking the law, if

⁴⁵ Adverse events relating to dispensing errors [Veterinary Record \(2015\) 177, 360-362](#)

⁴⁶ Adverse event reports relating to Augmentin [Veterinary Record \(2015\) 176, 602](#)

⁴⁷ Yellow Card yellowcard.mhra.gov.uk/

⁴⁸ Using the VMD's product information database, [Veterinary Record \(2015\) 177, 448](#)

⁴⁹ Product information database, www.vmd.defra.gov.uk/ProductInformationDatabase/

⁵⁰ List of Accredited Internet Retailers, www.vmd.defra.gov.uk/InternetRetailers/accredited-retailers.aspx

you import prescription medicines from another country into the UK, unless you have a prescription from a vet and a [suitable import certificate](#)⁵¹.

⁵¹ Apply for a certificate to import a veterinary medicine into the UK, www.gov.uk/guidance/apply-for-a-certificate-to-import-a-veterinary-medicine-into-the-uk

Annex

Annex.....	1
Trends	3
Reports received per year.....	3
Lack of efficacy of antimicrobials in animals	7
Number of suspected lack of efficacy reports received per year for different groups of antimicrobials	8
Cat injection site sarcomas	13
Additional information	14
Comparison of clinical signs recorded after dog vaccine use.....	14
Injectable products containing mineral oil	17
Glossary of clinical and other terms	18

Trends

Reports received per year

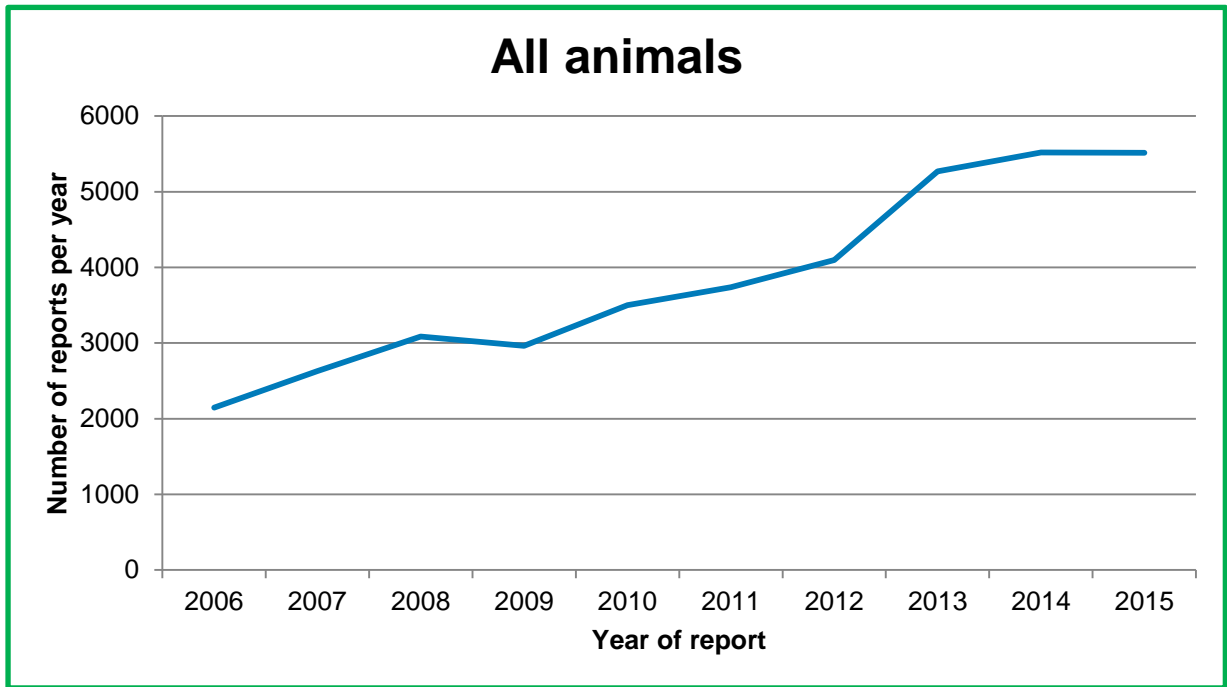


Figure 29 Number of animal reports received since 2006

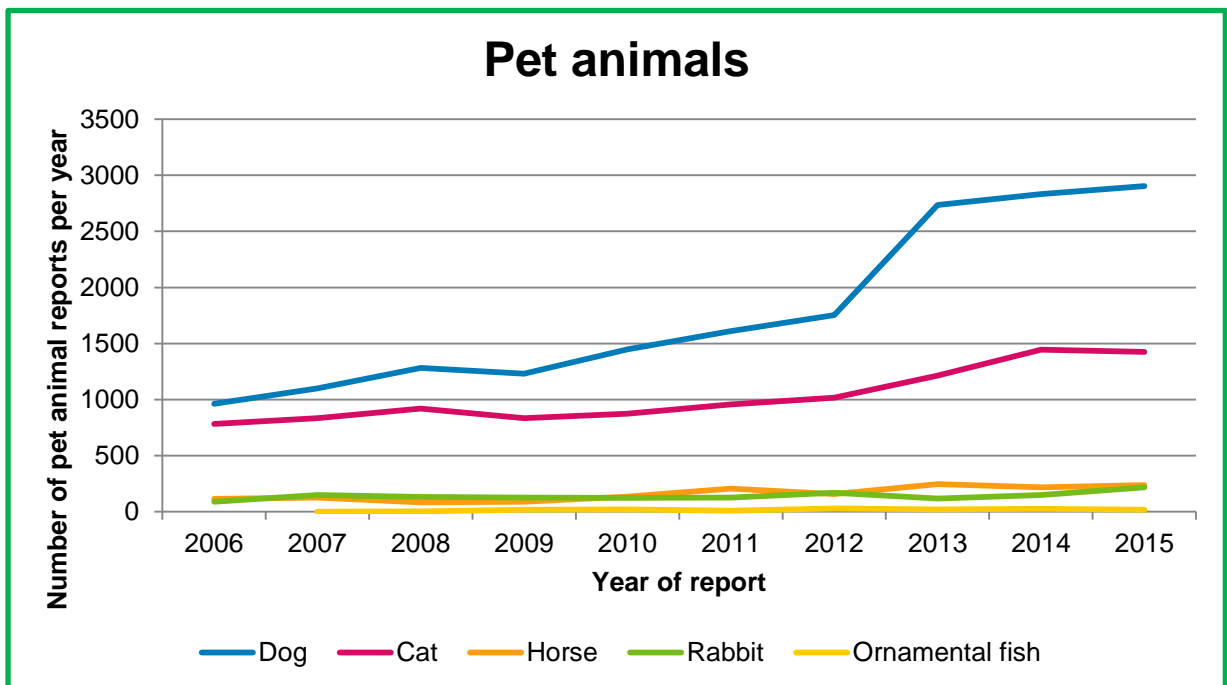


Figure 30 Number of pet animal reports received since 2006

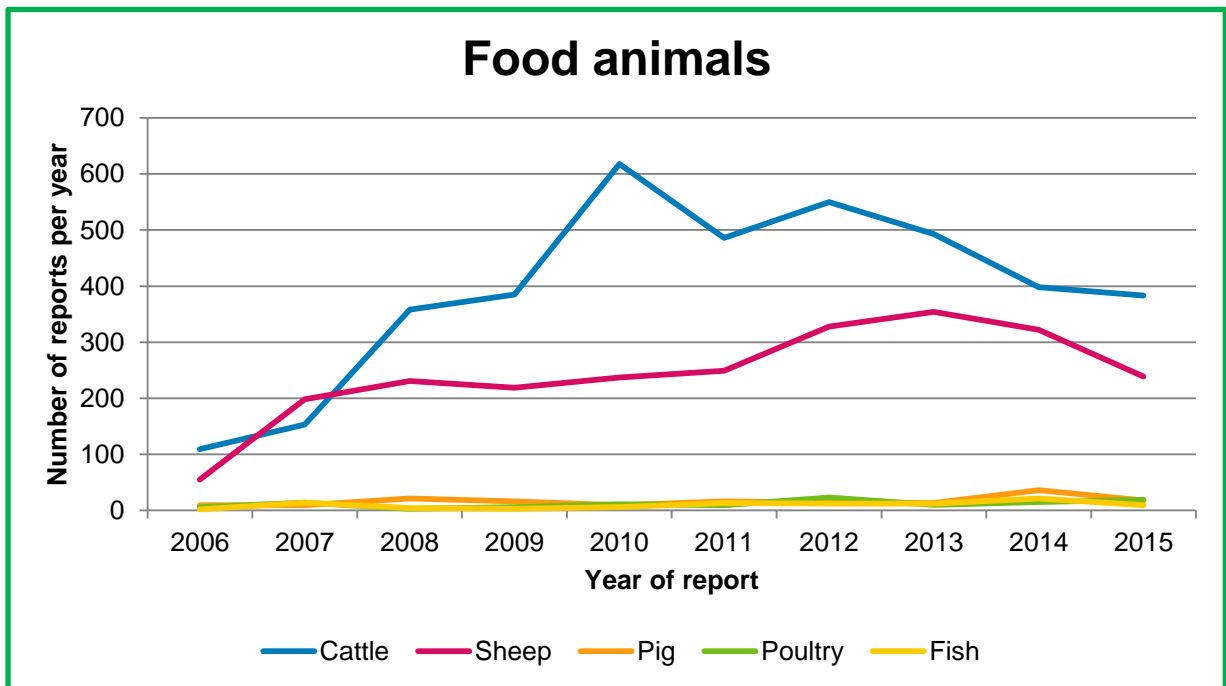


Figure 31 Number of food animal reports received since 2006

Overall there has been an almost continuous increase in reports received per year since 2006. However, since a peak in 2010 for cattle, and 2013 for sheep, there seems to have been a decline in the number of reports received in relation to these animals. However, when the figures for food animals are broken down into the two main types of reports we receive, a slightly different picture emerges.

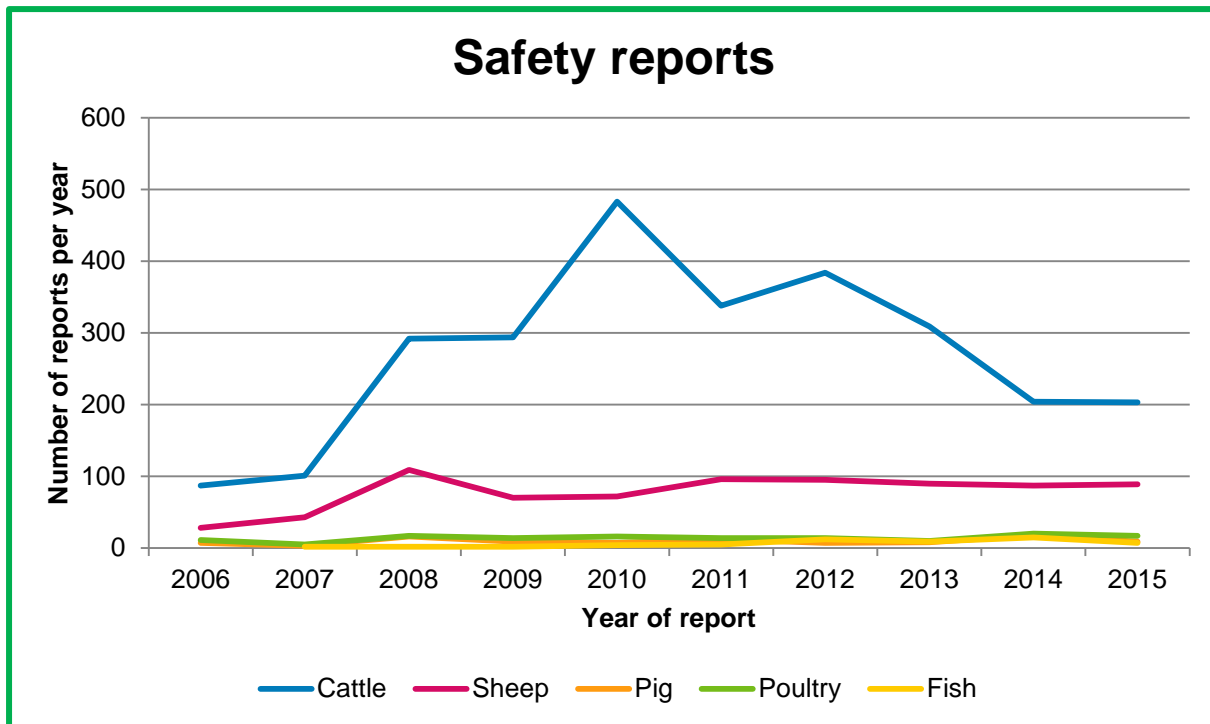


Figure 32 Number of food animal safety reports received since 2006

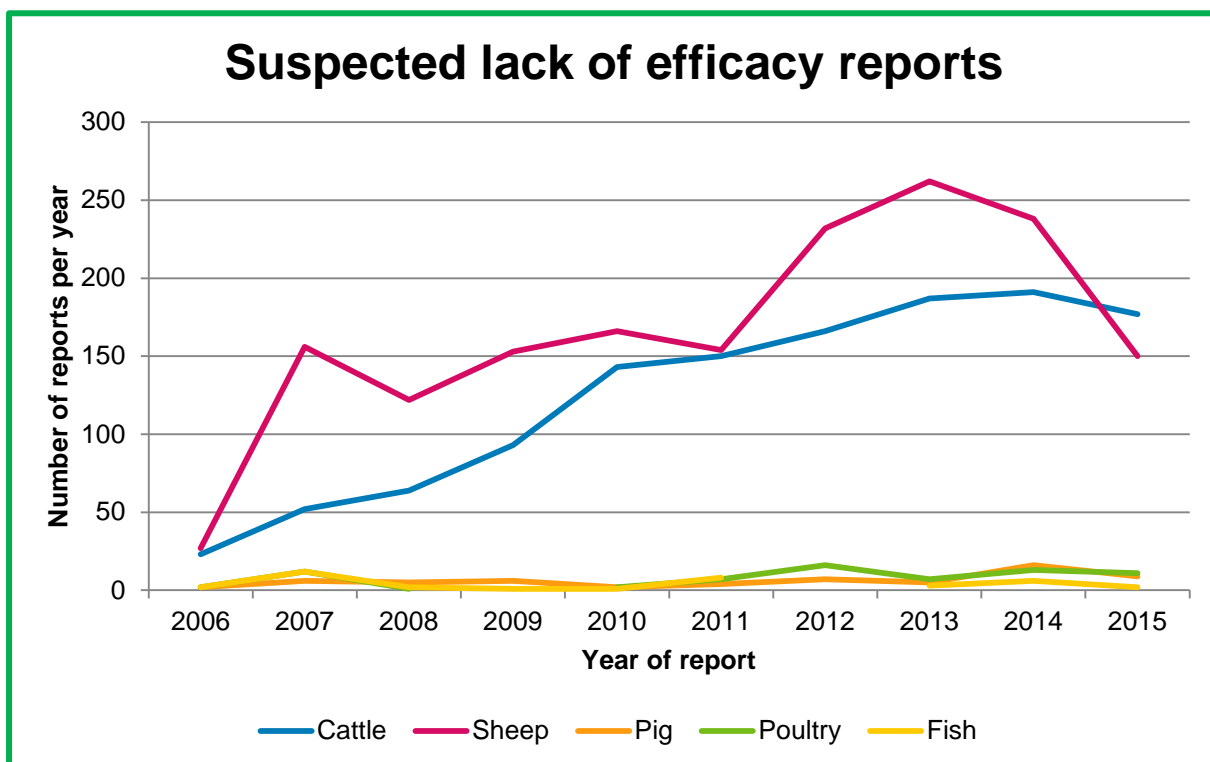


Figure 33 Number of food animal suspected lack of efficacy reports received since 2006

We have tried to make reporting easier and quicker, but accept that there is still room for improvement. We are actively trying to address this, but would welcome any feedback, so that we can identify what we could do to improve the rate of reporting from this sector.

Lack of efficacy of antimicrobials in animals

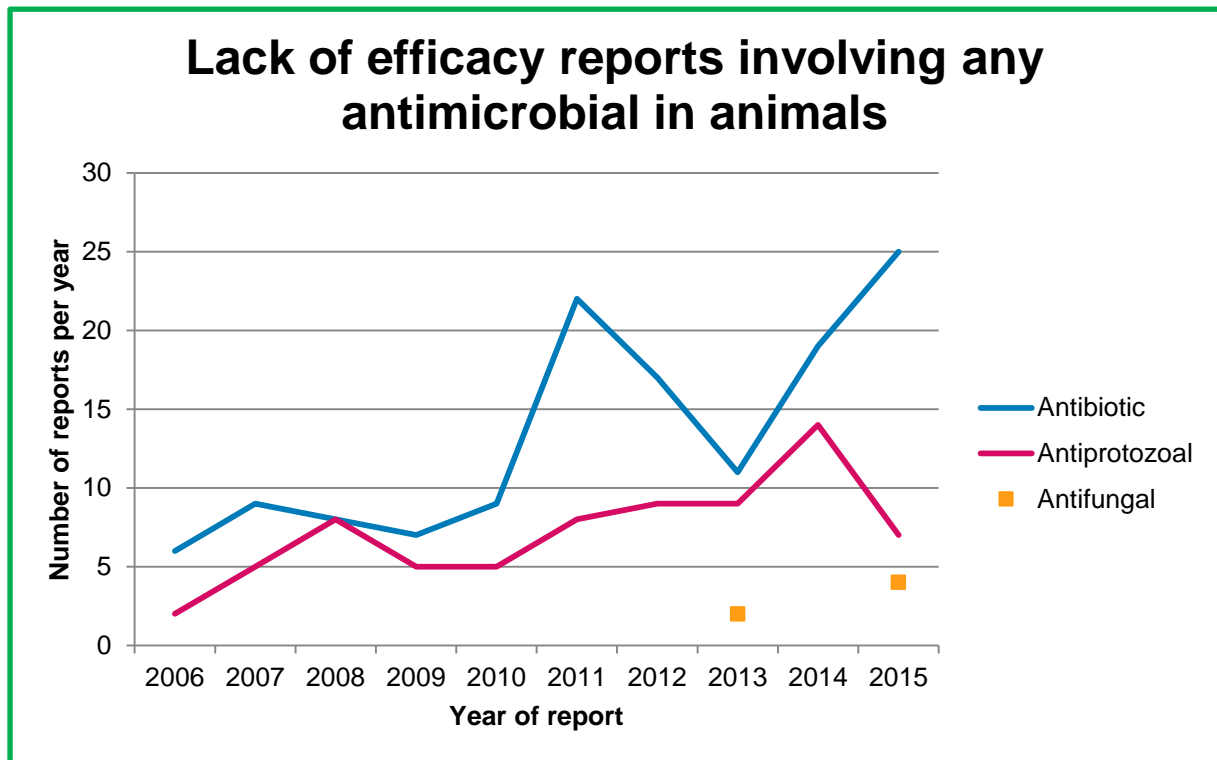


Figure 34 Number of reports of lack of efficacy for different groups of antimicrobial products used in animals since 2006

Number of suspected lack of efficacy reports received per year for different groups of antimicrobials

	06	07	08	09	10	11	12	13	14	15
Amprolium									1	
Decoquinat					1			1	2	
Diclazuril			4	4	4	5	3	3	2	1
Halofuginone		3	3	1		3	5	5	7	3
Imidocarb	1								1	2
Lasalocid			1						2	
Maduramicin										1
Toltrazuril	1	2	1				1		1	

Table 15 Number of reports of lack of efficacy for antiprotozoal ingredients used in animals since 2006

Active	Year	06	07	08	09	10	11	12	13	14	15
Bronopol								1	1		
Itraconazole											1
Miconazole									1		1
Nystatin									1		
Terbinafine											2

Table 16 Number of reports of lack of efficacy for antifungal ingredients used in animals since 2006

Tetracyclines (QJ01A)

Active	Year	06	07	08	09	10	11	12	13	14	15
Chlortetracycline								1			
Oxytetracycline											2

Amphenicols (QJ01B)

Active	Year	06	07	08	09	10	11	12	13	14	15
Florfenicol			4		2	1	4		1		2

Table 17 Number of reports of lack of efficacy for tetracycline and amphenicol antibiotics used in animals since 2006

Penicillins and clavulanic acid (QJ01C)

Active	Year	06	07	08	09	10	11	12	13	14	15
Amoxicillin					1			2		2	1
Ampicillin								1			
Cloxacillin							1	2	2	1	1
Penethamate				1			1			1	1
Procaine Benzylpenicillin				1	1		1			1	1
Clavulanic acid					1			2		2	1

Cephalosporins (QJ01D)

Active	Year	06	07	08	09	10	11	12	13	14	15
Cefovecin			1	2					2		2
Cefquinome			1	1		1	5			1	2
Ceftiofur								1			
Cefalonium							1			1	2

Sulfonamides and trimethoprim (QJ01E)

Active	Year	06	07	08	09	10	11	12	13	14	15
Sulfaquinoxaline		1									
Trimethoprim		1									

Table 18 Number of reports of lack of efficacy for penicillin, clavulanic acid, cephalosporin and sulfonamide and trimethoprim antibiotics used in animals since 2006

Macrolides (QJ01F)

Active	Year	06	07	08	09	10	11	12	13	14	15
Gamithromycin								1			
Tildipirosin							1	3	1	3	1
Tilmicosin	1			1						1	
Tulathromycin	2	3			1	5	1	1			1
Tylosin							2	1	1	1	
Tylvalosin							1				

Aminoglycosides (QJ01G)

Active	Year	06	07	08	09	10	11	12	13	14	15
Dihydrostreptomycin					1						
Framycetin				1			1		1	1	1
Gentamicin							3				
Neomycin											1
Streptomycin											1

Quinolones (QJ01M)

Active	Year	06	07	08	09	10	11	12	13	14	15
Enrofloxacin								1			1
Marbofloxacin											1

Table 19 Number of reports of lack of efficacy for macrolide, aminoglycoside and quinolone antibiotics used in animals since 2006

Others (QJ01X)

Active	Year	06	07	08	09	10	11	12	13	14	15
Polymyxin B									1		1
Spectinomycin						1					2
Tiamulin		1				1			1	2	

Table 20 Number of reports of lack of efficacy for other antibiotics used in animals since 2006

Cat injection site sarcomas

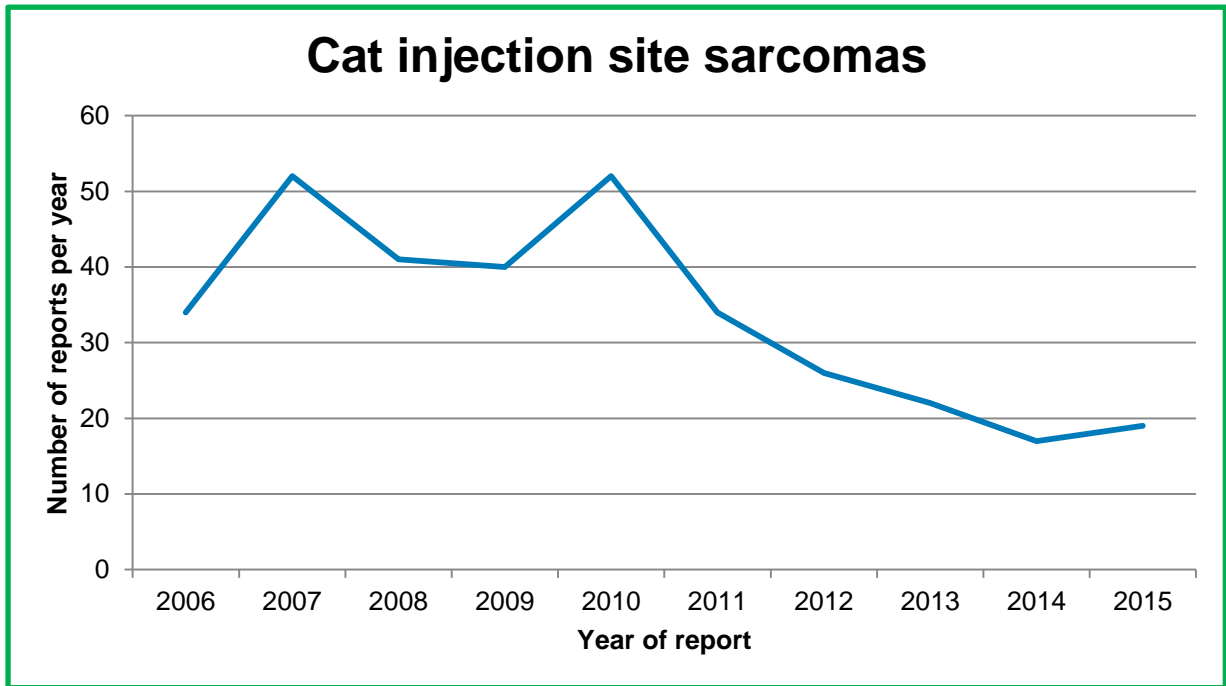


Figure 35 Number of cat injection site sarcoma reports received since 2006

Additional information

Comparison of clinical signs recorded after dog vaccine use

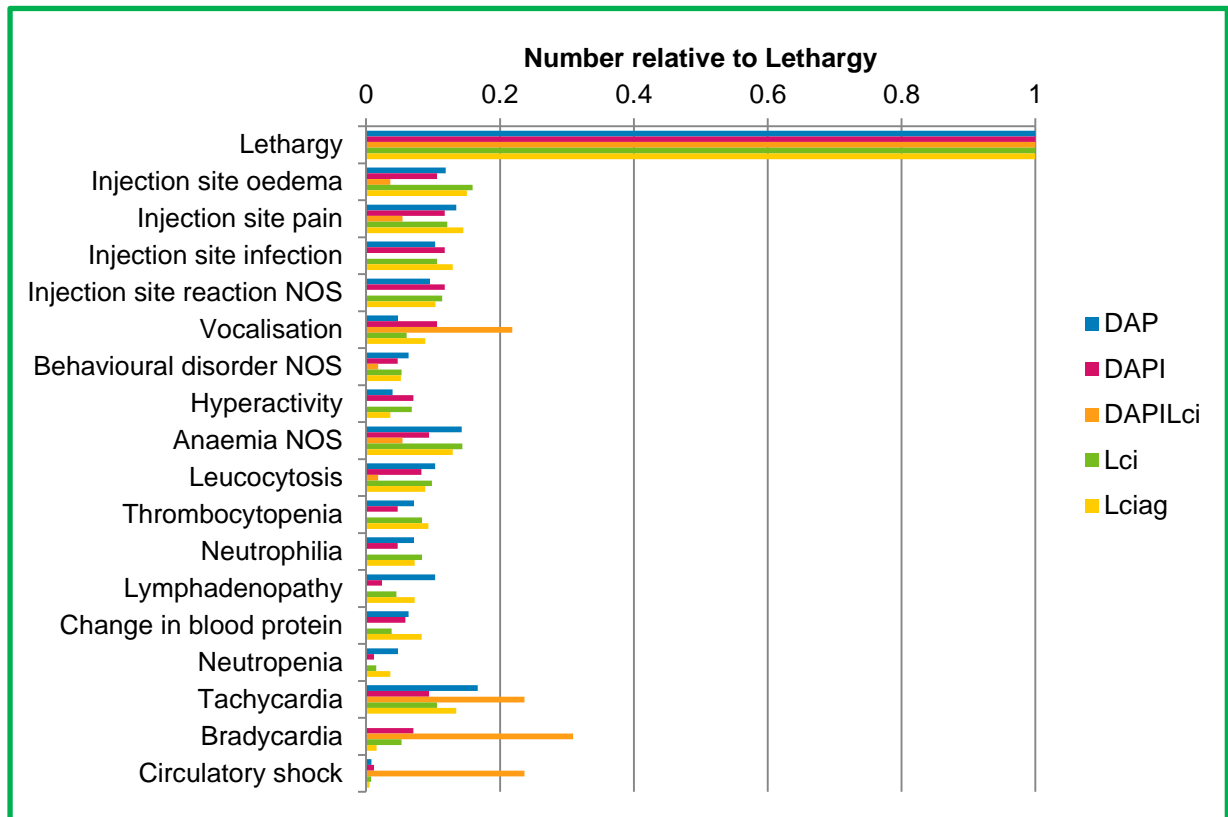


Figure 36 Comparison of relative numbers of clinical signs following the use of different types of canine vaccines – injection site reactions, behavioural disorders, blood and lymph disorders, circulatory disorders

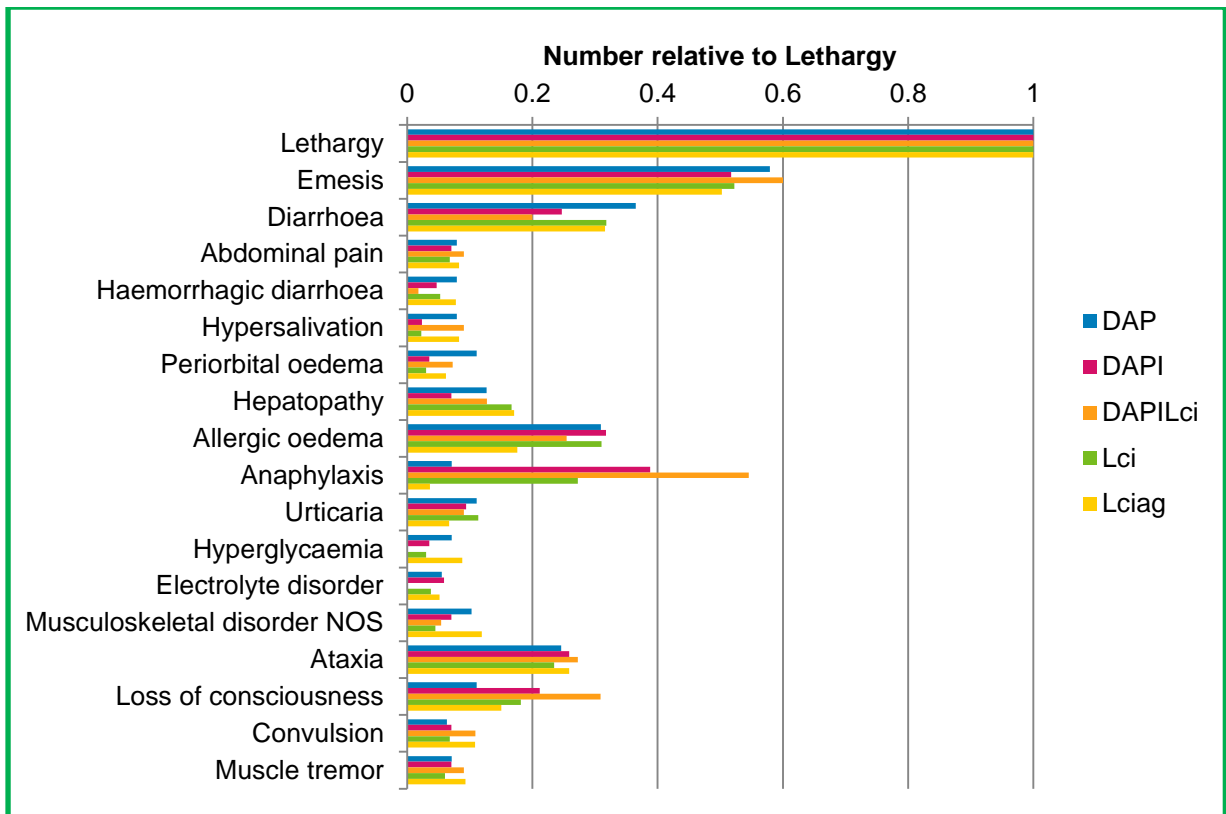


Figure 37 Comparison of relative numbers of clinical signs following the use of different types of canine vaccines – digestive tract disorders, eye disorders, liver disorders, allergic disorders, metabolic disorders, musculoskeletal disorders, neurological disorders

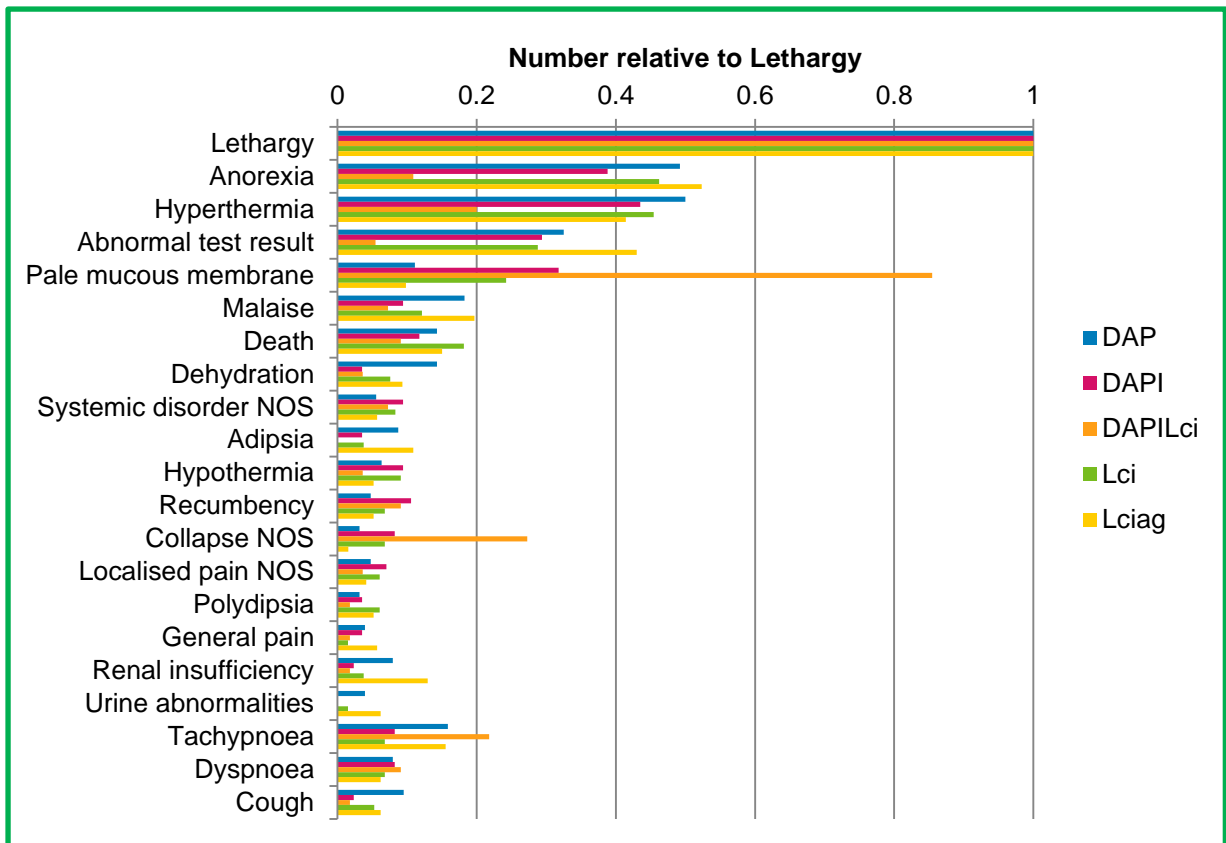


Figure 38 Comparison of relative numbers of clinical signs following the use of different types of canine vaccines – general signs and symptoms, renal disorders, respiratory disorders

Injectable products containing mineral oil⁵²

Aftopur DOE	Gallimune Se + St, Water-in Oil Emulsion for Injection	Nobilis Reo + IB + G + ND	Stellamune Once
Aftovaxpur DOE Emulsion for Injection for Cattle, Sheep and Pigs	Hiprabovis Somni/Lkt Emulsion for Injection for Cattle	Nobilis REO Inac	Suvaxyn Aujeszky 783 + o/w, Powder and Solvent for Emulsion for Injection
Alpha Ject 2-2 Emulsion for Injection	Hyogen Emulsion for Injection for Pigs	Nobilis RT + IBmulti + G + ND	Suvaxyn Parvo/E
ALPHA JECT micro 1 PD Emulsion for Injection, Vaccine for Atlantic Salmon	Inactivated Oil-adjuvanted Furunculosis, Winter Ulcer and IPN Vaccine "Novartis"	Nobilis RT + IBmulti + ND + EDS	Tur-3
AquaVac PD3 Emulsion for Injection, for Atlantic Salmon	Lapinject VHD	Parvovax	Winvil 3 Micro Emulsion for Injection for Atlantic Salmon
Birnagen Forte As Emulsion for Injection for Atlantic Salmon	Louping-III Vaccine	Porcilis M Hyo ID Once Emulsion for Injection for Pigs	
Bovalto Ibraxion Emulsion for Injection	M+PAC	Porcilis PCV Emulsion for Injection for Pigs	
CattleMarker IBR Inactivated Emulsion for Injection for Cattle	Mydiavac	Porcilis PCV ID	
Circovac, Emulsion and Suspension for Emulsion for Injection for Pigs	Nobilis E.coli inac	Porcilis PCV M Hyo Emulsion for Injection for Pigs	
Entericolix, Emulsion for Injection for Pigs	Nobilis IB + ND + EDS	Porcilis Pesti Emulsion for Injection	
ERAVAC Emulsion for Injection for Rabbits	Nobilis IBmulti + ND + EDS	Porcilis Porcoli Diluvac Forte	
Footvax	Nobilis Influenza	Rispoval Pasteurella	
Gallimune 302 ND + IB + EDS	Nobilis Influenza H5N2 Emulsion for Injection for Chickens	Rotavec Corona Emulsion for Injection for Cattle	
Gallimune 303 ND + IB + ART	Nobilis OR Inac Emulsion for Injection for Chickens	Startvac Emulsion for Injection for Cattle	
Gallimune 407 ND + IB + EDS + ART	Nobilis Paramyxo P201	Stellamune Mycoplasma	

⁵² This list was correct on 05 Jan 2017. Check the Product Information Database for other products.

Glossary of clinical and other terms

A clinical term is a word or phrase used by a veterinary or medical professional to describe symptoms observed in, or experienced by, an animal or human patient. Whilst not exhaustive, this glossary explains some of the more obscure expressions in layman's terms.

Term	Meaning
Addison's disease	Hypo-adrenalism or adrenal insufficiency
Adjuvant	Immune system stimulant
Anaphylaxis	Severe allergic reaction
Ataxia	Lack of muscle co-ordination
Bronchial	To do with the main airways to the lungs
Bolus (plural boli)	Large tablet
Cellulitis	Bacterial infection of inner skin layers
Coagulopathy	Bleeding disorder
Cushing's disease	Hyperadrenocorticism
Ectoparasiticide	Treatment for external parasites
Emesis	Vomiting
Endectocide	Treatment for both internal and external parasites
Erythema	Reddening
Euthanasia	Put to sleep (end of life)
Fibrosarcoma	Connective tissue tumour

Term	Meaning
Glässer's disease	Bacterial disease of young pigs
Haematuria	Blood in urine
Haemorrhagic	Bloody
Hepatic	To do with the liver
Hepatopathy	Liver disease or disorder
Hyperthermia	Raised temperature
Hyperthyroidism	Over active thyroid
Lethargy	Lack of energy, inactivity
Liver fluke	Parasitic flatworm
Mast cell tumour	Type of skin cancer
Malaise	Discomfort, illness
Melaena	Dark (digested) blood in faeces
Melanisation	Excessive pigmentation due to tissue damage in fish
MRI	Magnetic resonance imaging
Mydriasis	Dilated pupils
Necrosis	Death of body tissue
Nematode	Roundworm

Term	Meaning
Oedema	Swelling
Paraesthesia	Pins and needles
Polydipsia	Excessive drinking
Pruritus	Severe itching
Pyrexia	Raised temperature
Recumbency	Lying down
Renal	To do with the kidney

Term	Meaning
Scour	Diarrhoea
Spasmolytic	Relieves muscle spasms
Suppurative meningitis	Bacterial infection of the membranes surrounding the brain and spinal chord
Tachycardia	Fast heart rate
Tachypnoea	Breathing quickly
Urticaria	Nettle rash, raised and itchy

Follow VMD



[@vmdgovuk](https://twitter.com/vmdgovuk)

Website: [GOV.UK/VMD](https://gov.uk/vmd)

Email: postmaster@vmd.defra.gsi.gov.uk



Veterinary
Medicines
Directorate