

Dog antiparasitics

A guide for pharmacists



Royal
Pharmaceutical
Society
of Great Britain

FACTS AND FIGURES:

There are eight million dogs in 23% of households in the UK (PFMA 2008) making them one of the country's favourite pets. Dogs are more common in the south west and north east regions where 29% of households claim to own one. Not unsurprisingly, London has fewer dogs with 9% of households keeping such a pet. *The Kennel Club* recognises over 200 breeds of dog and 75% of UK dogs are indeed pedigree. The ten most popular breeds include the Labrador Retriever, Cocker Spaniel, English Springer Spaniel, Alsatian, Staffordshire Bull Terrier, Cavalier King Charles Spaniel, Golden Retriever, West Highland White Terrier, Boxer and the Border Terrier.

Dog owners were asked about the reasons for choosing their pet and the most common reasons were:

- Companionship
- Owner/partner/children always wanted one
- Security
- Walking and exercise

It is clear then that dogs are an important member of the household, or family, for keeping their owners healthy in both body and mind.

ANTIPARASITIC PRODUCTS AND PHARMACY:

With around a quarter of pharmacy customers owning a dog the potential for providing medicines for their pet is a large untapped market. Most dogs get fleas at some point and several species of worms are endemic in the canine population. The market for antiparasitics products to control these problems is over £150 million – £110M+ fleas and ticks; £40M+ worms. Many new, highly effective compounds, in easy-to-dose formulations have come to the market over the last ten years. Most are prescription-only medicines, but a number have been, or are being

reclassified for OTC sales in pharmacies and certain pet shops – see below. It is very important for pharmacists to advise dog owners to regularly use worming and flea products, not just to maintain the animal's health, but also minimise the slight "zoonotic" risk of associated infections in humans. For instance it is recommended that dogs should be wormed routinely every three months and more often if they are in kennel surroundings for any length of time. In households with children, monthly worming treatment is recommended. Fleas are a year-round problem so ectoparasiticides are repeat purchase products by the owner.

ENDOPARASITES OF DOGS (ROUNDWORMS AND TAPEWORMS) (SEE TABLE 1)

Roundworms (or nematodes)

All puppies in the UK are born carriers of roundworm, and 15% of adult cats and dogs are thought to harbour an infection, mostly without any outward signs.

Toxocara sp. Toxocara canis is one of the most common roundworm species of dogs and can be passed on to humans. The zoonotic risk is associated with larval migrans (about 12 cases per year) and can lead to blindness, particularly young children who may play with their pets. Good hygiene should always be practised with children living with pets and regular worming of dogs with effective products is highly recommended. Puppies acquire infection from the bitch in utero and also via the milk. They can also be infected when swallowing eggs from the environment or ingesting paratenic hosts. *Toxascaris leonina* is less common and acquired from ingestion of eggs or a paratenic host. Infection is most likely in kennelled dogs where they have access to grass runs. There are special wormer formulations available to treat the bitch and her pups should this be necessary.

The lungworm *Angiostrongylus vasorum* (known as French Heartworm) is also a roundworm parasite that infects dogs. The adult lungworm lives in the heart and major blood vessels supplying the lungs, where it can cause a host of problems. Left untreated, the infection can often be fatal. The lungworm parasite is carried by slugs and snails and the problem arises when dogs purposefully, or accidentally, eat these garden pests when rummaging through undergrowth, eating grass, drinking from puddles or outdoor water bowls, or pick them up from their toys. Foxes can also become infected with the lungworm, and have been implicated in the spread of the parasite across the country.

Ancylostoma sp. and *Uncinaria sp.* (hookworms) and *Trichuris sp.* (whipworms) are other roundworms that can affect dogs in the UK but are much less common and some may be more of a risk when pets are travelling abroad. *Dirofilaria immitis* (heartworm) is not present in the UK but it is endemic in many south and eastern European countries and can be a serious threat to dogs travelling overseas to such high risk areas.

Tapeworms (or cestodes)

There are a number of species of tapeworm that occur in dogs in the UK (Table 1), infection depends on dogs ingesting intermediate hosts that are carrying infection. Once ingested, the immature tapeworm attaches to the wall of the small intestine using hooks and/or suckers and begins to produce unsightly segments which appear around the anus of the dog (proglottids) containing eggs.

Dipylidium: Perhaps the most common tapeworm in dogs is the flea tapeworm *Dipylidium caninum*. The flea is used as an intermediate host and is swallowed whilst grooming. Once in the gut, the worm larva carried by the flea begins to develop into an adult worm which can grow to a length of two feet! Flea control in the environment is also important to help reduce the risk of infection. Prevention of this worm can be

achieved by ensuring rigorous flea control. However, if you want to be completely confident that your pet does not carry this parasite, you should worm on a regular basis, with a product licensed for the treatment of *Dipylidium* species tapeworm.

Echinococcus sp.: *Echinococcus granulosus* is carried by sheep and can be caught by dogs or foxes if they eat the carcass of an infected animal. *Echinococcus multilocularis*, on the other hand, is found in rodents and can be caught by cats and dogs when they hunt but it is not a problem in the UK. They can both infect humans and cause cysts which can lead to liver failure, or spread elsewhere in the body, requiring surgical removal. However, given the human health risk, all dogs living in areas where *Echinococcus granulosus* is present should be wormed, ideally on a monthly basis, with a product licensed specifically to remove this species of tapeworm.

Under the Pet Travel Scheme (PETS), it is a mandatory requirement that all cats and dogs traveling to mainland Europe are wormed against *Echinococcus multilocularis* prior to their return to the UK.

Taenia sp.: *Taenia* eggs are shed into the environment in faeces, by infected animals. They are then swallowed by sheep, cattle and rabbits as they graze. Dogs can become infected if they are allowed to feed on the carcasses of sheep, cattle or rabbits.

ECTOPARASITES OF DOGS (SEE TABLE 1)

Fleas: Fleas are small black blood-sucking insects and are one of the commonest parasites found on dogs. Indeed nearly all dogs will suffer from a flea infestation at some point in their lives. The symptoms can

vary from no visible signs to severe itching especially the lower back and tail base. Flea faeces are seen as small black grains which can be combed from the dog and dissolve to produce red swirls on wet paper. This is a way of identifying flea infestation.

There are essentially 2 different types of insecticide used to prevent or eliminate flea infestations:

- **Adulticides** – To remove adult fleas from your pet
- **Insect Growth Regulators** – To eliminate flea eggs and larvae in the home

A number of highly effective products are available in spot-on, spray, oral tablet, and injectable formulations (see Table 2). ➡ p.4

TABLE 1

Parasites	Species	Prevalence	Zoonotic risk	Effective parasiticides
ENDOPARASITES				
Roundworms (nematodes)				
Ascarids	<i>Toxocara canis</i> <i>Toxascaris leonina</i>	very common rare	yes (children) none	fenbendazole, febantel, piperazine, selamectin, milbemycin, moxidectin, pyrantel
Hookworms	<i>Ancylostoma</i> sp. <i>Uncinaria stenocephala</i>	very rare rare	possible possible	fenbendazole, febantel, piperazine, pyrantel, milbemycin, pyrantel, febantel, moxidectin, fenbendazole
Whip worms	<i>Trichuris vulpis</i>	rare	none	fenbendazole, febantel, milbemycin, moxidectin, pyrantel
Lungworm	<i>Angiostrongylus vasorum</i>	regionalised	none	moxidectin, (milbemycin – reduction in level of infection)
Heartworm	<i>Dirofilaria immitis</i>	very rare	none	milbemycin, moxidectin, selamectin
Tapeworms (cestodes)				
	<i>Dipylidium</i> sp. <i>Echinococcus</i> <i>Taenia</i> sp.	very common regionalised common	rare rare none	praziquantel praziquantel fenbendazole, praziquantel
ECTOPARASITES				
Fleas	<i>Ctenocephalides</i> sp.	very common	possible	fipronil, imidacloprid, lufenuron, metaflumizone nitenpyram, selamectin, permethrin, propoxur, pyriprole, pyrethrins, methoprene (insect growth regulator)
Mites	<i>Otodectes</i> sp. <i>Sarcoptes</i> sp. <i>Demodex canis</i>	common rare rare	none none none	moxidectin, selamectin amitraz, moxidectin, selamectin
Ticks	<i>Ixodes</i> sp.	isolated	possible (Lyme disease)	amitraz, deltamethrin, fipronil, permethrin, pyriprole
Lice	<i>Trichodectes</i> sp.	very rare	none	fipronil, imidacloprid, selamectin

TABLE 2

DOG ANTIPARASITIC PRODUCTS

Source NOAH Compendium 2009. (Not all manufacturers are members of NOAH so the following list of products is not exhaustive)
 A number of POM(V) products are under review for a possible re-classification to NFA(VPS). Please refer to VMD for latest information.

POM(V) Dog Antiparasitics

Active ingredients	Product	Formulations	Roundworms						Tapeworms			Ectoparasites			
			<i>Toxocara .canis</i>	<i>Toxascaris sp.</i>	<i>Trichuris sp.</i>	<i>Ancylostoma sp.</i>	<i>Uncinaria sp.</i>	<i>Angiostrongylus sp.</i>	<i>Dipylidium</i>	<i>Echinococcus</i>	<i>Taenia sp.</i>	Fleas	Ticks	Mites	Lice
fipronil + methoprene	Frontline Combo®	spot-on											+	+	+
imidacloprid	Advantage®	spot-on											+		
imidacloprid + permethrin	Advantix®	spot-on											+	+	
imidacloprid + moxidectin	Advocate®	spot-on	+	+	+	+	+	+	+				+		+
pyriple	Prac-Tic®	spot-on											+	+	
amitraz	Aludex	liquid concentrate													+
metaflumizone + amitraz	ProMeris Duo®	spot-on											+	+	
milbemycin + praziquantel	Milbemax®	tablet	+	+	+	+			(+) must be weekly	+	+	+			
milbemycin + lufenuron	Program Plus®	tablet	+		+	+							+		
selamectin	Stronghold®	spot-on	+										+		+
deltamethrin	Scalibor®	collar												+	

Note: Advocate, Program Plus, Milbemax and Stronghold are also effective against *Dirofilaria immitis* (heartworm) which is not a UK problem.

NFA(VPS) Antiparasitics

Active ingredients	Product	Formulations	<i>Toxocara .canis</i>	<i>Toxascaris sp.</i>	<i>Trichuris sp.</i>	<i>Ancylostoma sp.</i>	<i>Uncinaria sp.</i>	<i>Angiostrongylus sp.</i>	<i>Dipylidium</i>	<i>Echinococcus</i>	<i>Taenia sp.</i>	Fleas	Ticks	Mites	Lice
fenbendazole	Panacur®, Granofen®, Zerofen®	granules, paste, treats, liq. susp.	+	+	+	+	+				+				
fipronil	Frontline®	spot-on, spray*										+	+		+
pyrantel + praziquantel + febantel	Drontal Plus®	tablet	+	+	+	+	+		+	+	+				
pyrantel + febantel	Drontal Puppy Suspension	Liquid	+	+	+	+	+								
lufenuron	Program®	suspension, tablets, injection*										+			

* POM(V)

AVM(GSL) Antiparasitics

Active ingredients	Product	Formulations	<i>Toxocara .canis</i>	<i>Toxascaris sp.</i>	<i>Trichuris sp.</i>	<i>Ancylostoma sp.</i>	<i>Uncinaria sp.</i>	<i>Angiostrongylus sp.</i>	<i>Dipylidium</i>	<i>Echinococcus</i>	<i>Taenia sp.</i>	Fleas	Ticks	Mites	Lice
nitenpyram	Capstar®	tablet										+			
nitroscanate	Lopatal®, Troscan® + various	tablet	+	+		+			+	+/-	+				
praziquantel	Droncit®	tablet, injection*							+	+	+				
propoxur	VetKem® Breakaway	collar										+			
piperazine	various	tablet, syrup	+	+		+									
permethrin**	various	powder, spray, collar										+	+		
pyrethrins	various	shampoo, spray, powder										+			

* POM(V)

+/- = limited control

** permethrin very toxic to cats

Environmental control of fleas – household sprays/pesticides

Adult fleas are obligate parasites and spend their entire lives on the hosts. The eggs they lay drop off the host around the home and then develop into larvae before pupating and developing into new adult fleas. These new adults emerge from their pupae when they sense a new host is walking past and the lifecycle starts again. The fleas on the pet account for only 5% of the whole flea population, the other 95% is in the environment as eggs, larvae and pupae. It is therefore important to advise owners to regularly vacuum the home and wash the pet's bedding above 60°C to reduce eggs, larvae and pupae. They should also use an effective pesticide (usually in the form of sprays) around the household. Several products are available such as methoprene (an insect growth regulator) and permethrin/pyrethrin based insecticides. There are also non-insecticide silicone-based products available. **It should be noted that permethrin can be extremely toxic to cats.**

Ticks: ticks are small, greyish bean-shaped insects that attach themselves to dogs and cats and feed off their blood. Ticks are temporary parasites that spend 3-10 days feeding on your pet. They rely on their host for a blood meal – all stages of the life cycle, except for the egg, must attach to a host to feed before falling off into the environment to develop into the next stage. The whole lifecycle can take 1-3 years to complete. Ticks are most active in spring and early summer and from late summer in to autumn. They are mainly found in rural areas of woodland, heaths and moorlands but can be picked up in urban parks and gardens too. Most ticks in the UK are 'hard ticks' which means they have a hard outer shell protecting their body. The most common type is *Ixodes ricinus*, known as the sheep or deer tick. It's not only a risk to our pets, but can also infest other animals – and humans too. Ticks can carry a number of potentially serious infectious diseases in the UK. Lyme disease is one zoonotic risk pharmacists need to be aware of that is widely reported in the UK. Tick borne diseases are a more serious problem across Europe so advice for owners travelling with their pets should be available. (Further information can be found at www.fleatickfacts.co.uk)

Mites: mites cause the parasitic skin disease mange. Two different mange mites cause skin disease in dogs. One (the Demodex mite) resides in the hair follicles, while the other (the Sarcoptic mite) lives just under the surface of the skin. Although both mites share some similar

characteristics, there are some important differences. It is important not to confuse the two types of mange because they have different causes, treatments and prognoses.

There are other types of mite which infect dogs, but these are not true mange mites. They include the fur mite, Cheyletiella ("creeping dandruff"), Otodectes, the ear mite, and the harvest mite Trombicula.

Lice: There are several kinds of lice, which are passed from pet to pet through direct contact. Blood-sucking lice, as their name suggests, feed on blood, whilst others chew the skin. Lice are small, dull and transparent, laying their eggs ('nits') on the hair shaft. These often show up well on a dark coat. The most common sign of a louse infestation is a scruffy, dry hair coat. Loss of hair may occur and the dog may itch, sometimes very severely. Very heavy infestations of blood-sucking lice may occur, especially in puppies. You can normally tell that lice are present with the naked eye, with nits usually more visible than the actual louse, but often both can be seen.

PRODUCTS AVAILABLE FOR DOGS (SEE TABLE 2)

A wide range of antiparasiticides are available to control endo and ectoparasites of dogs. Many of these products are relatively new to the market and are prescription only (POM-V) but, fortunately, there are a number of very effective medicines that can be sold OTC in the pharmacy. They are either NEA-VPS (effectively P medicines in the pharmacy, so should be kept behind the counter) or AVM-GSL which can be sold without supervision. (see Table 2)

To summarise, the legal categories are as follows:

AVM-GSL Authorised veterinary medicine – general sales list. This may be sold by anyone. (Formerly GSL.)

NEA-VPS Non-food animal medicine – Veterinarian, Pharmacist, Suitably Qualified Person. A medicine for a non-food animal which must be supplied by a veterinarian, pharmacist or Suitably Qualified Person. (Formerly PML companion animal products and a few P products.)

POM-V Prescription only medicine – Veterinarian. A medicine, to be supplied only on veterinary prescription, which must be prescribed by a veterinarian to animals under his/her care, and which may be dispensed by a veterinarian or pharmacist in accordance with the prescription. (Formerly POM products and a few P products.)

For a complete list of authorised medicines for dogs please refer to the *NOAH Compendium* (see below) or visit www.noah.co.uk

Note: Many AVM-GSL medicines may not be included in the Compendium

FURTHER SOURCES OF INFORMATION:

Textbooks:

The Veterinary Formulary – Yolande Bishop Ph.Press
Veterinary Pharmacy – Steven Kayne & Michael Jepson Ph.Press
The NOAH Compendium – published annually containing veterinary data sheets/SPC information

Websites:

Pet health information:
www.pethealthinfo.org.uk
www.drONTAL.com
www.fleafree.co.uk
www.esccap.org
(European organisation focussed on pet parasite information)

www.lungworm.co.uk

Veterinary Medicines Directorate:
www.vmd.gov.uk

Veterinary Pharmacy Education Programme:
www.vpep.net

