Animal &
Plant Health
Agency

Imported disease summaries for Dogs and Cats

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APHA is an Executive Agency of the Department for Environment, Food and Rural Affairs and also works on behalf of the Scottish Government, Welsh Government and Food Standards Agency to safeguard animal and plant health for the benefit of people, the environment and the economy.

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Introduction

In recent years, there has been an increase in the number of companion animals imported into the UK. In some cases, there will be little known about the medical history of these animals and therefore the risk of importing diseases, which are not endemic in the UK, is increasing. Additionally, with the change in climate there is also the risk of the change in distribution of vectors. This document provides a short summary of some of the diseases which could be imported into the UK with the importation of dogs and cats. This list is by no means exhaustive, but hopefully provides a useful summary and signpost to further information for some conditions of concern.

Babesiosis

Causative agent: a tick-borne protozoal parasite, most frequently *Babesia canis,* and sometimes *B. gibsoni* in dogs*. B. felis* is occasionally reported in imported cats.

Species affected: there are many different species of the babesia parasite, each affecting a specific group of hosts. *B. canis* and *B gibsoni* are specific to dogs and canids, cats are occasionally infected by *B. felis*.

Transmission: transmission results from the bite of an infected tick. Tick attachment generally needs to last between 24 to 48 hours for infection to occur. Other means of transmission have been reported, such as blood transfusion, dog flighting and contamination of veterinary equipment. Transplacental transmission is also possible.

Distribution: the distribution of disease is dependent on the distribution of appropriate tick species for transmission and is considered endemic in many areas of the world, including Europe, Africa, Asia and America. An outbreak of *B. canis* was reported in untravelled dogs in the UK in Essex (1) and ongoing cases continue to be found in dogs without any travel history.

Clinical signs: signs progress, starting with fever, anorexia and lethargy to weakness, pale mucous membranes, jaundice and pigmenturia. On blood tests, regenerative anaemia is the most common feature and thrombocytopaenia also being reported commonly.

Diagnosis: diagnosis is possible based on blood smears although this is not very sensitive, PCR is more appropriate as it amplifies the DNA allowing identification of the parasite.

Treatment and prevention: imidocarb diproprionate can be used, although not licensed for this use in dogs in the UK.

Prevention of infection is vital using tick control methods.

Further information:

https://www.esccap.org/uploads/docs/yhwdhifq_0775_ESCCAP_Guideline_GL5_v10_1p.pdf

https://www.langfordvets.co.uk/media/2392/babesia-spp.pdf

Canine Brucellosis

Causative agent: the bacteria, *Brucella canis*.

Species affected: dogs, humans

Transmission: via mating, contact with reproductive materials from infected dogs, such as aborted foetuses or birth products, vertical transmission from mum to pups is probable in utero or via infectious milk, contact with vaginal discharge, contact with infectious seminal fluid, and to a lesser extent, contact with infectious urine. Estrus blood, and to a less extent non-estrus blood which may also be infectious, and to a further lesser estent other bodily fluids such as faeces, saliva and nasal secretions. Mature and intact dogs (including bitches) are more likely to be infectious and susceptible to infection. Humans are less susceptible to infection with *B. canis* than dogs and (although still classified as Hazard Group 3 pathogen by ACDP) B. canis is considered less transmissible and virulent in humans than *B. abortus*, *B. melitensis* and *B. suis*. Highest risk of human infection would be from exposure to birth or abortion products (due to the high levels of bacteria) or occupationally via [inadvertent] culture of *B. canis* in the lab. Veterinarians may also be at risk of infection from clinical material in practice and surgery.

Distribution: Cases in the UK are very rare but some have been recorded, particularly in imported dogs. It is considered endemic in eastern Europe, Asia, USA, Africa and Canada (2).

Clinical signs: abortion between the 45th and 59th day of the first pregnancy following infection in female dogs, subsequent pregnancies are more likely to reach full term, puppies may be born weak and die shortly after birth, other puppies may appear healthy but develop brucellosis later in life, failure to conceive in an otherwise healthy dog, infertile males with abnormal semen quality, enlarged and painful testicles and epididymis that may subsequently decrease in size in chronic infection, non-specific symptoms for both sexes include: lethargy, loss of libido, premature aging, lameness, back pain and generalized lymph node enlargement (3).

Subclinical infection is also possible, with some dogs with no clinical signs still being infectious.

Diagnosis: No test can determine infection status with 100% accuracy and therefore any test results must be considered alongside additional evidence, such as clinical signs, movement history and infection status of contact and related dogs (4).

A positive bacterial culture is definitive evidence of infection, however, blood samples from infected dogs may not always contain *B. canis* or its DNA, so a negative result from these tests is not a sufficient guarantee of absence of infection. There are no validated PCR tests from clinical material, such as blood, available. The specificity and sensitivity of commercially available PCR tests are unknown.

A positive serology test provides evidence of a current or previous *B. canis* infection that the dog's immune system has responded to, however, detectable antibodies against *B. canis* are not produced by all dogs; particularly in puppies because their immune system may not have been sufficiently developed when they were first exposed to *B. canis*.

The number of serological tests reported in the literature is vast, confusing and there is no international standardisation of these methods (unlike the serological tests for livestock). Serology tests conducted at the APHA include the Serum Agglutination Test (SAT) and indirect (i)ELISA. These tests, as conducted at APHA, are estimated to have a 90% sensitivity and 99% specificity when used in parallel (the recommended approach for diagnostic testing, see comment below). SAT test is more sensitive at picking up acute infections where IgM antibodies are high, whilst the i.ELISA test is better for more chronic infections and picking up IgG antibodies. Therefore, it might considered good practice to use both tests in suspect animals.

The GB National Brucella Reference Laboratory at Animal & Plant Health Agency, Weybridge recommends serological testing in most cases in order to obtain results with the most reliable sensitivity. This would also apply for any pre-import testing. Antibodies are typically produced within 2 weeks of infection, however it may take up to 3 months. Therefore, if there is suspicion of infection, a blood sample should be taken for serological testing 3 months after the dog in question was last in contact with an infected dog or infectious material. This provides the highest confidence that a negative result is a true indication of a dog's infection status.

Treatment and prevention:

- Euthanasia: it is very difficult to cure an infected dog, and if it is suffering from disease caused by *Brucella canis* then euthanasia may be the only way to stop it suffering. Once infected the only way to eliminate the risk of disease transmission is euthanasia, whether or not the dog is showing clinical signs.
- Treatment: treatment is not recommended. If owners choose to pursue treatment it is important to note that this can be expensive as it involves several weeks of therapy with antibiotics. Antibiotics in combination (often referred to as dual antibiotic therapy) provide the best option but even this is often unsuccessful at eliminating the infection. There is also no way of determining that treatment has been successful. Recurrence of disease is common, even after continual use of antibiotics as the bacteria can hide in parts of the body that are hard for antibiotics to reach. Therefore the dog may remain infected, be susceptible to recurrence of illness and be an ongoing source of infection for other dogs and humans even if outwardly healthy.

- Neutering: neutering of the dog (male or female) can reduce transmission risk, but this procedure alone has not been proven to eliminate the risk of transmitting infection to others because it does not remove the bacteria from the body. Neutering should only be undertaken once a rigorous, documented and effective risk assessment has taken place in order to protect individuals in the workplace from acquiring infection.
- Antibiotic treatment and neutering: antibiotic treatment before neutering reduces the transmission risk to the veterinary surgeon undertaking the surgery, and minimises a potential infection flare up in the immediate post-surgery period. This combined approach also offers the best chance of eliminating infection from the dog itself but there remains no guarantee.

Detection of brucellosis in dogs is reportable, both detection of the organism and indirect detection of *Brucella canis* by serology. Reporting in England and Wales is via local APHA VI Centres.

Further information:

http://apha.defra.gov.uk/documents/surveillance/diseases/Canine-Brucellosis-Summary-Final-260421.pdf

https://aphascience.blog.gov.uk/2021/11/03/one-health-day-2021/

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/960013/20210210_Brucella_canis_statement.pdf

https://bvajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/vetr.227

https://www.veterinary-practice.com/article/detecting-brucellosis-in-dogs

Other freely available online info should you wish to include

Canine Brucellosis: An Update - PubMed (nih.gov), Santos *et al* 2021.

Brucella canis: An update on research and clinical management - PubMed (nih.gov), Cosford 2018

Canine brucellosis - PubMed (nih.gov), Wanke 2004

Brucellosis in Dogs and Public Health Risk - PubMed (nih.gov), Hensel *et al* 2018

Transboundary Spread of Brucella canis through Import of Infected Dogs, the Netherlands, November 2016-December 2018 - PubMed (nih.gov), van Dijk et al 2021

First Isolation of Brucella canis from a breeding kennel in Italy - PubMed (nih.gov), De Massis *et al* 2021

Dirofilaria repens

Causative agent: a vector-born parasite, *Dirofilaria repens*

Species affected: dogs, and occasionally cats and ferrets.

Transmission: similar to Dirofilaria immitis, the microfilariae are picked up by mosquitoes during feeding. They develop into infective larvae and are then injected back into a dog when the mosquito feeds. These then develop into the adult worms.

The mosquito responsible for transmission is present in the UK, but the colder temperatures compered to southern Europe mean that it is not possible for *Dirofilaria* spp. to complete its lifecycle.

Distribution: *Dirofilaria repens* has a much wider distribution than *Dirofilaria immitis*; and can be found in most countries in Europe. It is not considered endemic in the UK, but sporadic cases in dogs with a travel history have been reported.

Clinical signs: adult worms form skin nodules, and can be found in the subcutaneous tissues and frequently reported in and around the eyes.

Microfilariae can be found in the blood in lymph.

Therefore, clinical signs in dogs are dermatological (distinct nodules or can be more diffuse) and ocular signs.

Diagnosis: can be made based on identification of the adult worm, these worms may be found in and around the eye, migration into an orifice or even via a skin incision.

Histopathology of surgically removed skin nodules.

Blood sample and smear for identification of microfilariae and concentration methods such as the modified Knott's method.

Treatment and prevention: treatment of cases can be done using imidacloprid / moxidectin combination treatments.

In endemic areas, it is important to prevent infection by the use of monthly spot on treatments using a macrocyclic lactone.

Further information:

https://www.esccap.org/uploads/docs/yhwdhifq_0775_ESCCAP_Guideline_GL5_v10_1p.pdf

https://www.esccap.org/uploads/docs/oc1bt50t_0778_ESCCAP_GL1_v15_1p.pdf

https://www.veterinary-practice.com/article/the-latest-on-exotic-worms

http://www.esda.vet/index.php/guidelines

Echinococcus multilocularis

Causative agent: a tapeworm called *Echinococcus multilocularis*

Species affected: dogs, foxes, other canids and occasionally humans

Transmission: dogs are infected when they ingest the larval stage in infected rodents. Rodents become infected through the ingestion of eggs from faecal contamination of the environment. Humans can become infected by the accidental ingestion of eggs from the environment and are then considered dead-end hosts.

Distribution: There have been no known domestically acquired cases of Echinococcus multilocularis in the UK; but sporadic cases have been reported following travel. It is considered endemic in continental Europe.

Clinical signs: dogs and other canids do not normally show clinical signs of infection but will have the eggs of the tapeworm in their faeces. In vary rare circumstances, dogs and other canids can ingest the eggs leading to the development of cysts, which can cause clinical signs such as ascites, weight loss and jaundice.

Diagnosis: *E. multilocularis* eggs may be seen on microscopic examination of faecal samples, although it is difficult to distinguish these from other tapeworm species.

Treatment and prevention: treatment with praziquantel is proven to be effective against *Echinococcus multilocularis*. All dogs must be treated for tapeworms prior to arrival in Great Britain. There are exceptions when travelling from countries that are recognised as tapeworm-free.

***Echinococcus multilocularis* is a notifiable disease. If you suspect it, you must report it immediately by calling the Defra Rural Services Helpline on 03000 200 301, In Wales, contact 0300 303 8268. In Scotland, contact your local Field Services Office. Failure to do so is an offence.**

Further information:

https://www.gov.uk/guidance/echinococcus-multilocularis-how-to-spot-and-report-the-disease

https://www.gov.uk/bring-pet-to-great-britain/tapeworm-treatment-dogs

https://www.veterinary-practice.com/article/echinococcus-multilocularis-a-disease-profile

Ehrlichiosis

Causative agent: a tick-transmitted intracellular bacteria, *Ehrlichia canis*

Species affected: dogs are the definitive host

Transmission: from the bite of an infected tick, mostly *Rhipicephalus sanguineus*

Distribution: it occurs in Europe, Asia, Africa and USA. The tick *R. sanguineus* is not endemic in the UK, but sporadic cases have been reported in untravelled dogs.

Clinical signs: infection can be acute, subclinical or chronic. Signs include lethargy, fever, anorexia, haemorrhage, such as epistaxis and petechiae, due to thrombocytopaenia, plae mucous membranes, lymphadenopathy and splenomegaly.

Diagnosis: *E. canis* morulae are visible on blood smears, but this method is very insensitive. PCR is more sensitive and specific and can be performed on blood samples or lymph or spleen aspirates. Serology for *E. canis* antibodies can also be used, with rising titres used as an indicator of acute infection.

Treatment and prevention: a course of doxycycline is an effective treatment, particularly in acute infections. Chronic infections are more difficult to treat with a resulting poor prognosis.

Prevention is through the prevention of ticks.

Further information:

https://www.esccap.org/uploads/docs/yhwdhifq_0775_ESCCAP_Guideline_GL5_v10_1p.pdf

https://www.langfordvets.co.uk/media/2390/anaplasma-ehrlichia.pdf

Heartworm

Causative agent: a vector-borne parasite, *Dirofilaria immitis*

Species affected: predominantly affects dogs but can infect ferrets and cats.

Transmission: a mosquito will feed on an infected dog and ingest the microfilariae. These microfilariae develop into infective larvae in the gut of the mosquito and then move to the mouthparts, from where they are injected into a dog when the mosquito feeds. These infective larvae migrate into the bloodstream to the heart and surrounding blood vessels where they develop into the adult heartworm, which mate and produce further microfilariae. Adult may live up to 5 years if left untreated.

The mosquito responsible for transmission is present in the UK, but the colder temperatures compered to southern Europe mean that it is not possible for *Dirofilaria* spp. to complete its lifecycle.

Distribution: Heartworm is not endemic in the UK, but sporadic cases have been detected, mostly affecting imported dogs or dogs with a travel history. Heartworm is found in many other parts of the world, in particular USA, Canada and southern and Eastern Europe.

Clinical signs: it can take a significant period of time from the point of infection to the development of clinical signs as it takes the microfilariae several months to develop into adult heartworms. The clinical signs are also dependant on the number of adult worms disrupting the flow of blood and function of the heart valves. The most common clinical signs include a dry cough, weakness, shortness of breath and loss of stamina. Signs are more noticeable following exercise. It severe cases, congestive heart failure may develop.

The microfilariae may also cause clinical signs as they tend to circulate mainly in the small blood vessels, in some cases causes vessels to become blocked leading to tissue injury from lack of blood supply. In the liver this can lead to jaundice and anaemia and in the kidneys, it can lead to a build of toxins and kidney failure.

Diagnosis: An ELISA test is possible to detect the heartworm antigen. This is highly sensitive and specific in dogs with adult worm infestations.

Microfilariae can be seen on direct blood smears, but concentration methods, such as the modified Knott's test can improve the sensitivity of this methods. If microfilariae are seen, it is important to differentiate them from *Dirofilaria repens* (see later).

Ultrasonography and radiographs of the heart and chest may provide an indication of the extent of heart and lung damage and adult worms are highly echogenic.

Blood tests can provide an overview of the extent of liver and kidney damage.

Treatment and prevention: Surgical removal is used in endemic areas by experienced clinicians.

In the UK, the common approach if medical treatment using an injectable product containing melarsoamine to kill the adult heartworm. Dogs may be given concurrent antibiotics (doxycycline) to prevent infection with bacteria which frequently inhabits the adult worms.

Rest following treatment is very important to reduce the risks associated with the dying worms in the blood circulation.

Additionally, microfilarial load should be determined prior to treatment, as high loads may be more likely to lead to increased anaphylaxis risk.

Macrocyclic lactones can be used as preventative treatment in high risk areas and also to kill the microcfilariae following infection.

Treatment can be challenging and carries with it risks. Owners should be made aware of these risks prior to starting treatment (5).

Further information:

https://www.langfordvets.co.uk/media/2395/dirofilaria.pdf

https://www.esccap.org/uploads/docs/yhwdhifq_0775_ESCCAP_Guideline_GL5_v10_1p.pdf

https://www.esccap.org/uploads/docs/oc1bt50t_0778_ESCCAP_GL1_v15_1p.pdf

https://www.veterinary-practice.com/article/the-latest-on-exotic-worms

http://www.esda.vet/index.php/guidelines

Leishmaniasis

Causative agent: a protozoa, *Leishmania infantum,* is the most common species affecting dogs and occasionally cats, although other species of Leishmania have been recorded.

Species affected: dogs, cats, rodents and humans

Transmission: this is a vector borne disease, transmitted by the Phlebotomus species of sandfly; which is not known to occur in the UK.

Distribution: Leishmania is not endemic in the UK, but sporadic cases have been reported in imported dogs and very rarely, in dogs which have been in close contact with infected dogs. Otherwise, the disease is considered endemic in the Mediterranean region, South-America and USA

Clinical signs: the disease can present in different forms with many dogs showing all forms.

Visceral form presents with anorexia, fever, lethargy, lymphadenopathy, weight loss, polyuria, polydipsia, diarrhoea, vomiting and epistaxis. Kidney failure, joint inflammation, muscle pain and testicular swelling may also be seen.

Cutaneous form presents with hyperkeratosis of the muzzle and foot pads, nodules and hard lumps may develop in the skin and the coat may appear dry and brittle with some areas of hair loss.

Ocular signs may also be seen with uveitis, conjunctivitis and keratoconjunctivitis sicca.

Diagnosis: diagnosis is made based on clinical signs, history of travel and diagnostic tests.

Serology in order to detect IgG antibodies can be carried out by ELISA or immunofluorescence (IFAT). Positive ELISA or IFAT indicate exposure to leishmania and when combined with presence of clinical signs and a history of travel can be used for diagnosis. However, not all animals seroconvert, and some dogs can take several months to develop antibodies. Therefore, if leishmania is suspected and serology is negative, other diagnostic methods should be used.

Cytology and histopathology can be used for direct visualisation of the organism. Fine needle aspirates, impression smears and tissue biopsies can be used. The person carrying out the cytology should be experienced at detecting leishmania.

PCR is a highly sensitive and specific diagnostic test which can be carried out on blood samples or tissue aspirates, eg from lymph nodes.

Treatment and prevention: treatment is indicated for dogs with an active infection and associated clinical signs.

Dogs should be treated with allopurinol in combination with either meglumine or miltefosine.

In order to prevent infection in dogs which are travelling to endemic areas, sand fly repellent is very important. Vaccination to prevent clinical disease can also be considered. It is important to be aware that these vaccines will not prevent infection and these animals will test positive on serology.

Further information:

https://www.leishvet.org/wp-content/uploads/2021/10/EN-Guidelines21.pdf

https://www.veterinary-practice.com/article/canine-leishmaniosis-an-overlooked-disease

https://www.langfordvets.co.uk/media/2397/leishmania.pdf

https://www.esccap.org/uploads/docs/yhwdhifq_0775_ESCCAP_Guideline_GL5_v10_1p.pdf

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1049537/20220121_Canine_leishmaniasis.pdf

Onchocerca lupi parasitosis

Causative agent: a filarial nematode, *Onchocerca lupi*

Species affected: predominantly affects dogs, but can occasionally infect cats and humans.

Transmission: blackflies and biting midges are the vectors of *Onchocerca* spp. The vectors ingest the microfilariae during a blood meal. These microfilariae develop into the

infective larval stage in the vector and are then transmitted to a new canine host during when the vector feeds on an animal. The larval then develop into the adult worms which go on to produce the microfilariae.

Distribution: it is endemic in central, southern and eastern Europe, north Africa, the Middle East and USA. Sporadic cases have been reported in the UK in dogs with travel history (6).

Clinical signs: Signs may include conjunctivitis, periorbital swelling, exophthalmia, blepharitis, lacrimation, protrusion of the nictitating membrane, corneal ulcers and uveitis. Infection with adult worms often presents as nodules, mostly in the peri-ocular region.

The pre-patent period can be very long, and therefore *Onchocerca lupi* should be considered as a differential in any dog with a travel history outside of the UK presenting with these signs (6).

Diagnosis: identification of adult worms or histopathology of excised nodules. PCR is also possible.

Treatment and prevention: excision of the nodules followed by treatment with doxycycline or melarsomine is recommended.

Further information:

https://capcvet.org/guidelines/onchocerca-lupi/

Rabies

Causative agent: rabies virus mostly found in dogs and other lyssaviruses mostly found in bats.

Species affected: all mammals including dogs, cats, bats, and humans.

Transmission: The virus is present in the saliva of infected animals and is usually spread by the bite of an infected animal; the virus can also enter the body through open wounds or mucous membranes such as those in the eyes, nostrils, and mouth.

Distribution: The UK is currently free from rabies virus, but there are rare cases of lyssaviruses found in bats.

Rabies is widely distributed and considered endemic in Africa, Asia and some areas of Eastern Europe and Central America.

Clinical signs: Clinical signs vary greatly in different animals. There are two main types of rabies. The furious form and the dumb form. In the furious form, the animals may appear to be agitated and aggressive, whereas, in the dumb form, the animals may develop a staring expression, appear to be tame and have no fear of humans. On rare occasions,

some animals show no obvious clinical signs before death. The incubation period lasts from 7 days to many months. The early prodromal clinical signs of rabies are non-specific. The animals may display behavioural changes, e.g., animals which are normally fearful of humans and other animals may become bold, wandering out of their familiar areas, whilst the previously friendly animals may display nervousness around other animals or humans. Infected animals may develop a hypersensitivity to noise and light. Other clinical signs include temperature rises, dilation of pupils, and excessive salivation. It is important to note that saliva can be infectious during the prodromal phase of the disease. Animals may become thirsty and itchy. They may also develop incoordination, weakness, seizures, paralysis, and coma. Death is inevitable once clinical signs are observed.

Diagnosis: Suspicion is based on clinical signs and their progression over time. However, the clinical signs are not specific to rabies; therefore, cannot be used for diagnosis. The diagnosis of rabies in a live animal is difficult to achieve because the excretion of the virus in saliva is intermittent. The infection is normally confirmed in a laboratory using the brain tissues following the euthanasia/death of an animal.

The rabies virus antigens in an animal brain are detected using the fluorescent antibody test (FAT) and the viral RNA is detected using the reverse transcription polymerase chain reaction (RT-PCR) test. The test can be completed within a few hours after the receipt of the sample at the laboratory.

The serological test is used to determine the vaccination status of a healthy animal. Rabies specific antibodies are rarely detected post exposure; therefore, they are not a reliable indication of the exposure.

The FAT, RNA extraction for RT-PCR and the virus neutralising tests are performed at containment laboratories.

Treatment and prevention: there is no treatment for rabies once clinical signs appear and therefore prevention of infection is vital. Vaccination provides safe and effective protection for humans and animals.

Post-exposure treatment is effective in preventing the disease from developing in humans providing it is administered promptly after a person has been exposed to the virus and before clinical symptoms develop.

Strict rules are in place to prevent the importation of rabies into the UK, including quarantine requirements where necessary: https://www.gov.uk/bring-pet-to-great-britain

Rabies is a notifiable disease. Do not approach live animals that you think may be rabid and do not touch dead animals that may have had the disease without appropriate protection.

You must report the suspected cases immediately by calling the Defra Rural Services Helpline on 03000 200 301, so the animal can be tested.

Further information:

https://www.gov.uk/guidance/rabies

https://www.who.int/health-topics/rabies#tab=tab_1

https://www.gov.uk/government/collections/rabies-risk-assessment-post-exposure-treatment-management

http://www.nhs.uk/Conditions/Rabies/Pages/Introduction.aspx

https://aphascience.blog.gov.uk/2020/09/28/rabies/

https://missionrabies.com/resources/downloads/education

Sporotrichosis

Causative agent: a fungal disease caused by *Sporothrix* species. There are many different species which can cause disease including *S. humicola, S. pallida* and S. *brasiliensis.*

Species affected: mostly cats and occasionally dogs and people.

Transmission: transmission can occur between cats, plants and cats and cats and humans. Most infections are spread via bites or scratches. Transmission is common amongst unneutered male cats which spread infection when fighting.

Distribution: it is endemic in South America, although distribution is spreading. Very rare cases have been reported in the UK with cats that have been imported from South America.

Clinical signs: in both humans and cats, clinical signs include non-healing wounds. In cats, these wounds are often found on their face or digits when inflicted through fights with other infected cats.

Diagnosis: cytology or histopathology can be used to demonstrate pyogranulomatous inflammation, and occasionally fungal elements will be visible (7). Fungal culture and PCR methods have a higher sensitivity and specificity, but culture can take a long time.

Treatment and prevention: itraconazole is the treatment of choice, however, prolonged treatment is often needed and there are frequent reports of adverse events.

Further information:

https://www.cdc.gov/fungal/diseases/sporotrichosis/brasiliensis.html

http://www.abcdcatsvets.org/sporotrichosis/

Thelaziasis

Causative agent: a nematode called *Thelazia callipaeda*

Species affected: dogs, cats, wildlife (for example foxes, rabbits, hares), humans

Transmission: this is a vector borne disease, transmitted by the fruit fly, *Phortica variegate*. The fly feeds on lachrymal secretions, transmitting the infective larvae to the final host. This vector is present in the UK, and therefore there is potential for this disease to become established in the UK.

Distribution: Thelazia is not endemic in the UK, but sporadic cases have been reported, particularly in dogs with a travel history. It is endemic in many European countries such as Spain, Portugal, France, Italy and Switzerland.

Clinical signs: lacrimation, conjunctivitis, ocular pain, excessive blinking, keratitis and corneal ulceration. Subclinical infection is also possible. If left untreated, it could lead to blindness (8).

Diagnosis: by identification of the adult worm which can be seen moving across the eye, or in some cases sedation and flushing of conjunctival sack is needed.

Treatment and prevention: oral or spot on preparations of milbemycin oxime and moxidectin are effective treatments. In order to prevent infections, monthly treatment with milbemycin oxime when animals are travelling in enzootic areas is advised to reduce infection rate (9). Manufacturers guidelines should always be followed.

Further information:

http://apha.defra.gov.uk/documents/surveillance/diseases/thelazia-callipaeda.pdf

https://www.veterinary-practice.com/article/the-latest-on-exotic-worms

Tongue worm

Causative agent: a nasal pentastomid, *Linguatula serrata*

Species affected: dogs are the definitive hosts.

Transmission: dogs become infected by eating uncooked offal. Zoonotic transmission can occur via exposure to the eggs through nasal secretions and occasionally faecal exposure.

Distribution: it is endemic in eastern Europe whilst sporadic cases have been reported in western Europe and in the UK (10).

Clinical signs: many dogs can remain as subclinical carries, but clinical cases can present with gagging, epistaxis and upper respiratory signs.

Diagnosis: identification of the adult worm which is occasionally sneezed out. Eggs can be identified by examination of nasal secretions. Adult worms can be found via use of endoscopy.

Treatment and prevention: treatment can be completed using moxidectin or milbemycin and physical removal of adult worms.

Further information:

https://www.veterinary-practice.com/article/the-latest-on-exotic-worms

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