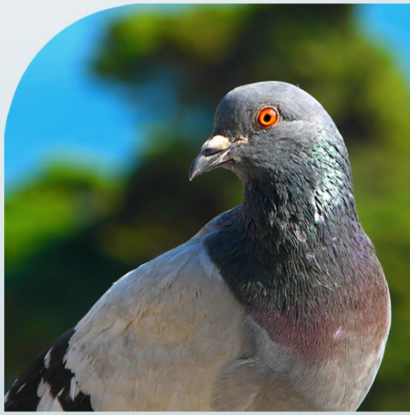


# COMMON ANIMAL DISEASES



A GUIDEBOOK FOR PHARMACISTS  
AND PET OWNERS

This booklet is compiled by Annalise Attard as part of the dissertation carried out in partial fulfilment of the requirements of the course leading to the Degree of Master of Pharmacy. The study was carried out under the supervision of Prof Anthony Serracino-Inglott, Department of Pharmacy, University of Malta.

Annalise Attard sought professional veterinary advice to complete this handbook.

Cover by: Aaron Attard

The author makes no representation, expressed or implied, with regards to the accuracy of the information contained in this book, and cannot accept legal responsibility or liability for any errors or omissions that may be made.

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Published in Malta in August 2015

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A Guidebook for Pharmacists and  
Pet Owners

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August 2015

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Dr Daphne Stafrace

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Marvic Cutajar

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# **Cats and Dogs**

## **Arthritis and Joint pain**<sup>1,2</sup>

### **Description**

Arthritis, which is also known as a Degenerative Joint Disease is one of the most common conditions which affects middle aged to senior dogs and cats. Cartilage is found lining the joints where it acts as a protective barrier. Unstable joint moves in an abnormal manner, eroding the cartilage faster than it can be replaced and eventually bones end up rubbing against each other leading mainly to inflammation and pain.

### **Recognition**

Degenerative Joint Disease has a very negative impact on the animal's quality of life. The first signs that one can notice is that the cat or dog is very slow and not showing interest in daily activities such as walking up the stairs. This is because the pet is uncomfortable to move since it is painful. For cats it may be a little more difficult to recognise since they spend a lot of time sleeping, however defecating outside the litter box or excessive grooming could be some crucial signs.

### **Signs and Symptoms**

- Reluctant to walk, jump and run
- Limping
- Slowing down
- Urinating or defecating outside the litter box (a very useful sign for cats)
- Grooming excessively in one area (indicating focal arthritis pain)
- Trouble jumping
- Cats shows aggressive behaviour whilst dogs whimper when touched in the area
- Social desolation
- Lying down more often
- Stiffness
- Pain
- Inflammation



## Similar Conditions

- Ageing
- Serious illness
- Trauma or Accidents
- Infection (septic arthritis)

## Treatment

- Non-steroidal Anti-Inflammatory Agents; carprofen, robenacoxib
- Steroids; prednisolone

Arthritis is not curable however preventing further erosion is paramount, since it limits the chance of needing surgery in the future.

## Advice

- It is important to stipulate to the correct dosing and not try to adjust it to provide more pain relief.
- Be careful when purchasing any over-the-counter medication.
- Supplement your pet's diet with omega 3 and 6 fatty acids, glucosamine and chondroitin
- Large breed dogs\* are more prone to arthritis, thus it is important to maintain a healthy diet from the start. Provide specifically designed food so that growth takes place at an appropriate rate, since if it occurs too quickly joints might form in an abnormal manner eventually leading to joint disease.
- Certain cat breeds are also more prone to Degenerative Joint Disease, such as Himalayan, Siamese and Persian.
- Arthritis can be prevented by maintaining your pet with a healthy weight.

\*Golden retrievers, Rottweilers, Labrador retrievers, German shepherds

## **Cat flu**<sup>3</sup>

### **Description**

As it can be noted from the nomenclature, this is solely a feline disease. Cat flu is a viral disease and the main strains responsible are the calici, herpes and rhinotracheitis virus. These species are specific meaning that they only transfer the disease from cat to cat. The disease is transmitted through aerosol droplet from secretions (while sneezing) left in the environment. Kittens are more susceptible to the infection since their immune system is not yet completely developed and thus weak.

### **Recognition**

When a cat is seriously unwell, there is no need of a microbiological diagnosis since manifestations of cat flu symptoms are obvious. However, when unsure or when a stray cat is to be vaccinated, a swab of saliva should be taken for microbiological testing of the virus.

### **Signs and Symptoms**

The disease affects the upper respiratory tract; nose, mouth, throat and eyes.

- Sore gums, tongue and eyes (in kittens sore eyes may lead to corneal ulcers)
- Purulent discharge from the eyes and nose (in kittens discharge may cause eyelids to stick together)
- Fever
- Sneezing
- Cough
- Excessive salivation
- Loss of appetite (due to the sore tongue and congestion)

### **Similar Conditions**

- Common cold
- Viral infections

## Treatment

- No cure is available since it is a viral disease.
- Cat flu vaccine is available for prevention.
- Antibiotics; to prevent secondary bacterial infection, such as pneumonia, due to the weak immune response.

## Advice

- Since there is no cure, the cat's immune system should fight the disease and this may take up to 2 weeks to resolve.
- It is very important to nurse and support your cat through the disease by cleaning discharge from its nose and eyes.
- Keep your cat warm, well hydrated and hand feeding may support more intake.
- There are many similarities to the symptoms of human flu, but don't worry humans cannot get the flu.
- Following handling of an infected cat, it is important to wash hands properly and, if possible, change clothes before handling any healthy cats.
- The cat flu vaccine can be given to healthy cats so as to prevent infection and to avoid transmission of the virus to other cats.

## **Dental disease**<sup>4,5</sup>

### **Description**

Dental problems are very common in both dogs and cats because of the difficulty to clean their teeth. Apart from this, old age and sticky food also play a crucial role. Plaque is a colourless film which forms on the teeth and builds up over time as tartar. Since this is not removed by mechanical action like humans do, it leads to swollen, inflamed and red gums, known as gingivitis. Eventually, if this is not tackled it leads to a more serious condition known as periodontal disease, where the gums and tissue that support the teeth will be destroyed slowly and bacteria invade the gums.

Stomatitis is a reaction to the plaque build up and tartar accumulation. This is more common in cats than in dogs and presents with swelling of the gum tissue, and sometimes it extends to the pharynx including the tongue.

### **Recognition**

Tartar accumulation can be visible by the naked eye as a yellow-brown film on the teeth. Swelling and redness can also be noticed which indicates either gingivitis or periodontal disease. Stomatitis is suspected when the dog or cat starts refusing food.

A thorough investigation might be needed to make sure that dental problems are not due to underlying conditions such as; kidney diseases or diabetes.

### **Signs and Symptoms**

- Difficulty eating
- Pain while eating
- Bad breath
- Sore mouth
- Tooth loss
- Loose teeth
- Ferocious behaviour
- Weight loss
- Yellow or brown tartar on the teeth

- Inflamed and red gums
- Excessive salivation
- Bleeding gums
- Rubbing the mouth
- Cats may end up with a dull and matted coat since grooming is painful

### **Similar Conditions**

- Kidney failure
- Diabetes
- Oral foreign body
- Oral cancer

### **Treatment**

Preventing dental problems is the best option, however since bacteria might be an issue, antibiotics are prescribed.

- Antibiotics such as; co-amoxiclav, doxycycline and clindamycin.

Tooth extraction is another option.

### **Advice**

- Do not worry! Dental diseases are curable.
- Support your pet through soft diets and liquids to maintain food intake.
- It is very important to schedule routine oral checkups at your veterinary and regular dental cleanings.
- Provide special pet food that helps to care for the teeth. Avoid sticky food as it sticks to the surface of the teeth and promotes the build up of plaque and tartar.
- Never use toothpaste to clean your pet's teeth.

- Learn how to clean your pet's teeth;
  - Introduce the technique gradually and avoid stressing your pet. Keep session short and positive as much as possible.
  - To start, dip your finger into beef gravy and rub against the teeth gently in a circular motion.
  - Slowly, introduce gauze wrapped around your finger and eventually, try to introduce a soft tooth brush specially designed for pets.
- Normal dry food provides a moderate cleaning action by chewing on the kibbles.

## **Dermatitis**<sup>6-11</sup>

### **Description**

Skin conditions in both cats and dogs cause discomfort and irritation as a result of inflammation of the skin. There are many reasons why dermatitis can occur:

- Allergies; environmental factors such as pollen, dust and mould better known as seasonal allergies which get worse with age. Food allergies are less common than seasonal.
- Infections; bacteria can cause skin-related problems.
- Parasites; such as lice, fleas and mites can cause irritation to the skin. These can affect all type of animals; young and old, healthy and debilitated ones.
- Hormonal imbalance; both high and low.

### **Recognition**

Feline skin problems are more complicated than canine skin problems. Visual inspection doesn't always lead to diagnosis, thus making it more difficult to determine the reason of the allergy.

Seasonal allergies; scratching occurs only in 1 or 2 months out of the whole year mainly in spring and autumn. This is best to identify by undertaking skin or blood tests, but is not as reliable for cats.

Food allergies; typically occur when the pet is intolerant to certain food and is itching and scratching all the time but not during certain months of the year. In this case, there is no food-allergy blood test that is reliable. In order to determine whether it is a food allergy or not it is necessary to provide a hypoallergenic or limited-ingredient diet for 2 to 3 months and then wait for the result. (This diet incorporates ingredients which the pet has never been exposed to, for example, introducing a whitefish and sweet potato diet to the dog.) If the itching does not lessen, then there is no problem with the food.

Parasites; it can be very difficult to detect flea infestation on cats as during grooming most of the fleas become ingested. The only visible signs are excessive scratching and bites on your own ankle. Combing the fur of the cat using a fine-toothed comb

on a sheet of white paper can make it easier to detect flea dirt present as black debris which produces a red stain when rubbed.

## Signs and Symptoms

- Licking, scratching, itching or rubbing
- Bad skin odour
- Chewing fur out
- Little black dots on the fur especially on the abdomen
- Hair loss
- Scaly or flaky patches
- Pimples, spots or red patches
- Crusts or thickened skin

## Treatment

To control ticks (only dogs), fleas, lice and mosquitoes.

- Pyrethrins (natural)
- Pyrethroids; synthetic relatives of pyrethrins. Read safety label as many cannot be used in cats.
  - Permethrin (only for dogs)
  - Etofenprox (safe to use in cats)
- Arylheterocycles; synthetic insecticide.
  - Fipronil
- Insect Growth Regulators; action is against the immature form and not the adult flea. Since this does not kill the adult flea, best to be combined with an adulticide.
  - Methoprene
  - Pyriproxyfen
  - Fenoxycarb
- Carbamate insecticide:
  - Methylcarbamate
- Imidacloprid (kills fleas but no activity against ticks, thus suitable for cats)



- Amitraz (use only for dogs); used as a dip to treat mange in dogs preventing the transfer from Lyme disease.
- Nitenpyram; oral flea control product. It works within 30 minutes and duration of action is 24 hours. Thus a topical application can be useful the following day. Safe to use in pregnant and nursing cats and dogs and kittens and puppies 4 weeks and older.
- Citrus extracts;
  - Linalool
  - d-limonene
- Synergists; used to increase the effectiveness of another ingredient in the product, for example pyrethrins.
  - Piperonyl butoxide
  - N-octyl bicycloheptene dicarboximide
- Sodium lauryl sulphate; natural and non-toxic flea and tick control.
- Spinosad; a derivative of a naturally occurring bacterium in the soil.

To control seasonal allergies:

- Short-term or mild skin allergies; anti histamines, corticosteroids such as prednisolone, fatty acid supplements, shampoos.
- Long-term or severe skin allergies;
  - Dogs: desensitization allergy injections (expensive treatment).
  - Cats: antibiotics, steroids and other drugs like cyclosporine.

## Advice

- Make an early check on your pet for fleas before the hot weather starts, during the warm season, even all year round in order to prevent the problem.
- As a natural remedy for fleas;
  - Flea comb your pet twice a day, every day for months.
  - Give a bath once weekly
- Do not use garlic or essential oils to treat external parasites.
- If you are using a pyrethroid –containing anti-flea medication, it is important to apply high on the neck and give the prescribed amount. Also, make sure to separate other cats in the same household as licking this medication may

cause life threatening symptoms due to poisoning. The first signs of this are; excessive salivation, excessive twitching of the paw and vomiting. Should this occur, the pet should be taken to a veterinarian immediately.

- Avoid using sprays or dips as more effective treatment via the oral or topical route are available.
- It may be difficult to find fleas on your cats' fur as unlike dogs cats like to eat the fleas.
- Treat all the animals in the house against fleas. If, for example, you treat your dog remember that your cat may be a reservoir of fleas.
- Treating your pet for fleas is very important as this is a very painful condition as when us humans are bitten by mosquitoes.
- Do not apply calamine lotion or bitter lemon to sooth discomfort associated with allergies and scratching.

## **Diabetes**<sup>12</sup>

### **Description**

Diabetes is a chronic disorder of carbohydrate metabolism which involves deficiency in insulin production thus a change in the blood glucose levels which can be potentially life threatening. Insulin is essential to regulate the use and storage of blood glucose thus inadequate levels in the blood circulation cause hyperglycaemia and glucosuria. This reduction in insulin levels usually occur due to damage to the pancreas. Risk factors include;

- Body condition: overweight animals have a greater predisposition
- Breed: Burmese cats and Samoyeds, miniature poodles and schnauzers and bichon frise dogs are at a higher risk
- Age: any age, however greatest over 8 years
- Gender: male cats and female dogs are more prevalent
- Stress
- Poor nutrition
- Hormonal abnormalities

### **Recognition**

Apart from the obvious signs which lead to the suspicion of diabetes, diagnostic tests are carried out to confirm the condition.

### **Signs and Symptoms**

- Increased thirst
- Increased urination
- Sudden loss of weight
- Lack of energy
- Lethargy
- Vomiting
- Refusing food
- Strange and ferocious appetite
- Cataracts (in dogs)

- Abdominal pain
- Depressed

### **Similar Conditions**

- Kidney problems
- Cancer
- Dental problems

### **Treatment**

- Insulin
- Exercise
- Proper nutrition

### **Advice**

- Regular blood glucose monitoring is essential to adjust the dosing of the insulin according to the need.
- It is very important to keep a routine to your pet's lifestyle. This means feeding, exercise and medication should be incorporated into a fixed daily schedule. This supports the stabilisation of blood glucose levels.
- Fibre is the golden key in managing diabetes, since fibre lower insulin requirements and blood glucose levels.
- Nutrition is very important to keep the pets' metabolism stable.
- Keep your pet active.
- Avoid protein and carbohydrate meals, processed foods and treats, artificial colours, flavours and preservatives.
- Keep your dog on a short leash when outdoors so as to avoid the indigestion of unwanted foods and material.
- It is very important to restrict the calorie intake of your cat since diabetes is mostly associated with overweight cats.

## **Ear problems**<sup>13-15</sup>

### **Description**

Otitis externa is the inflammation of the ear canal which may or may not involve the pinnae. It can occur either due to primary causes such as; auto-immune disease, allergy, foreign bodies, accumulation of hair and dead skin build up, parasites, etc or due to secondary causes such as medication reactions, bacteria, yeast, fungi or over cleaning. Young animals may be more predisposed to otitis externa and the most commonly affected dog breed is the cocker spaniel.

Otitis media is inflammation of the middle ear canal and is sometimes found together with otitis externa.

### **Recognition**

Physical examination is essential to determine the extent of pain. Redness, swelling, scaling skin or obstruction of the ear canal can all be visible. It is also important to recognise whether it is curable or chronic, since for the latter lifelong management will be required.

### **Signs and Symptoms**

Otitis externa

- Pain on manipulation of the ear
- Head shaking
- Odour
- Exudates
- Inflammation
- Pruritus

Otitis media

- Vomiting
- Tilting the head
- Anorexia

- Uncoordination

## **Treatment**

- Systemic treatment is sometimes necessary since the most common cause of repeated otitis externa is undiagnosed otitis media. Antibiotics and antifungals may be prescribed.
- Topical treatment; usually consisting of antibacterial, anti yeast, corticosteroid and astringent as a combination product
- Pain and swelling managed by corticosteroids.

## **Advice**

- If these signs are present, take your pet to a veterinarian since if left untreated it may lead to deafness.
- Ear hygiene is key in maintaining the ear healthy, however, whilst the pet is suffering from otitis externa it is important not to try and clean it yourself but to take to a veterinary surgeon.
- With the correct treatment, the otitis externa should resolve within 3 to 4 weeks, whilst for otitis media 6 weeks.
- When the ear problem resolves, you might need to clean your pet's ear once or twice a week to prevent further attacks. This is done by using cotton balls dipped in water and wiping clean the ear lobe and the cartilage. Make sure to undertake this procedure when your pet is not going to be disturbed.
- If lifelong treatment is required, you play an important role in the management for the life of the pet.
- It is important not to discontinue treatment since the ear looks better, but to stipulate to the correct dosing schedule.

## **Eye Inflammation**<sup>16</sup>

### **Description**

Anterior uveitis, also known as the red eye syndrome, occurs when the uvea which is the part of the eye which consists of blood vessels becomes inflamed. It could threaten the animals' vision since it also affects the iris and the surrounding pupil tissue. There are various causes including autoimmune disease, tumours, metabolic disease, trauma or injury and infections.

### **Recognition**

Eye inflammation is very easy to recognise, however, other diagnostic tests may be undertaken to eliminate any other possible causes such as; high blood pressure in the eye known as glaucoma or even cataracts.

### **Signs and Symptoms**

- Discharge
- Pain
- Redness
- Excessive tears
- Swelling of the eyeball
- Pupil has an uneven shape or is small
- Front of the eye is cloudy or dull
- Change in the colour of the iris

### **Treatment**

- Topical treatment such as; drops or ointments in combination products.
- Systemic treatment is sometimes necessary for pain and inflammation.

### **Advice**

- Take care to ensure that the living environment is well kept to avoid contracting a rare eye disease.
- Take time everyday to inspect your pets' eye for any changes.
- It is very challenging to instil the drops or ointment in your dog's or cat's eye, however do not give up since the sake of going blind is in your hands.

## **Gastrointestinal and Digestive disorders**<sup>17,18</sup>

### **Description**

A gastrointestinal disorder or disease - when the pet is suffering from a stomach, intestinal or any other related problem.

A digestive disorder – when the passage of food through the digestive tract is altered or there is a reduction in absorption or digestion.

A normal digestive process is paramount in a pet as essential nutrients and minerals are absorbed from the food that a dog or cat is fed. These are required primarily for energy and to support the repair and growth of body tissues.

Any change in the gastrointestinal system can result in; malnutrition, electrolyte imbalance, dehydration and changes in acid base concentrations of the blood.

### **Different types of Gastrointestinal and digestive disorders:**

- Acute gastroenteritis; inflammation or infection or both of the stomach and intestines. This can be caused by eating high fat people food, rancid food, foreign objects or toxic plants. It can also be due to stress, food allergies or internal parasites.
- Colitis; inflammation of the colon which manifests as pain upon defecating. It is most frequently associated with tumours, change in food, swallowed foreign objects or allergies.
- Diarrhoea; results from infection, internal parasites, stress, rancid food or a change in diet.
- Constipation; mainly due to dehydration, increasing age, indigestion of hair or other foreign material and can also be due to tumours.
- Small intestinal malabsorption

### **Recognition**

Digestive disorders can be easily recognised by the simplest signs of diarrhoea and vomiting.



## Signs and Symptoms

- Vomiting
- Regurgitation
- Diarrhoea
- Constipation (food moves through GI tract at a slow rate)
- Flatulence
- Change in appetite
- Blood in faeces
- Weight loss
- Abdominal pain
- Weakness
- Dehydration

## Similar Conditions

- Cancer
- Ageing

## Treatment

Treatment varies according to the condition. The following are some medicines that may be used;

- Intravenous or subcutaneous fluids in extreme cases of dehydration
- Antibiotics in the presence of an infection
- Oral steroids such as prednisolone in the event of inflammation

## Advice

- Severe diarrhoea or vomiting may lead to dehydration. It is important to consult your veterinarian immediately.
- Offer your pet lots of fresh water to maintain hydration.
- Change in diet is crucial to decrease digestive tract problems. Choose food which is high in soluble and insoluble fibre to be easily digestible.
- Never feed your pet scrapes of skin or other left over's which are not good for you. If they are not good for you neither are for your pet.

## **Heart disease**<sup>19-21</sup>

### **Description**

The common heart disease mostly seen in cats is hypertrophic cardiomyopathy which affects the heart muscle. The walls of the heart thicken and eventually the heart is unable to pump out the blood efficiently throughout the body. Also the heart doesn't fill up with a sufficient amount of blood. Eventually, this can lead to congestive heart failure with a build up of fluid in the abdomen and chest. Blood clot formation is another complication of heart disease. With increasing age and weight, there is a higher risk of developing a heart disease.

### **Recognition**

If suspected, medical tests should be carried out such as; echocardiogram, blood pressure measurement, blood and urine tests, x-rays and stethoscope exam.

### **Signs and Symptoms**

- Lethargy
- Tiredness
- Reduced ability to exercise
- Swelling of the abdomen
- Difficulty breathing
- Fainting
- Weakness
- Coughing
- Increased heart and breath rate
- Sudden death

### **Similar Conditions**

- Cancer
- Weight problems

## Treatment

There is no cure, however the control of symptoms is paramount to increase the years.

- Diuretics; furosemide
- Angiotensin II converting enzyme inhibitors; benazepril, pimobendan

## Advice

- Treatment will not reverse your pets' heart disease.
- It is very important to feed your pet a healthy diet, low in sodium so that it will help to reduce the fluid build up and support the heart to work effectively.
- Exercise should not be vigorous but light.
- Weight management should be carried out more often.
- Support your pet through giving the medication daily and at the appropriate time and not how it suits you.

## **Kidney disease**<sup>22,23</sup>

### **Description**

The kidneys are responsible to remove waste substances from the blood and maintain a healthy fluid balance within the body. They are also known as life-sustaining organs, meaning if the kidneys are not functioning well, life-threatening situations may arise. Kidney disease can be either acute or chronic. Acute kidney disease can be a result of; certain drugs, poisons, trauma, surgical stress, infection, obstructed urine flow, shock, blood loss and severe dehydration. Chronic kidney disease is irreversible and progressive. The same factors as for acute disease play a role however hereditary and breed tendencies, immune system defects and nutritional factors are responsible.

### **Recognition**

Some may show early signs of kidney disease; however, serious illness signs usually appear after 75% of the kidney function is lost. It is very important to detect it as early as possible by undertaking blood and urine tests. One crucial sign that suggests kidney problems is increased thirst, and therefore action should be taken immediately.

### **Signs and Symptoms**

- Increased thirst
- Dehydration
- Lethargy
- Weakness
- Confusion
- Increased urine output
- Poor coat appearance
- Sore mouth
- Depression
- Bad breath
- Weight loss

- Less appetite
- Increased sleeping

### **Similar Conditions**

- Heart disease
- Diabetes
- Hyperthyroidism
- Urinary tract disease
- Cancer

### **Treatment**

- Euthanasia
- Kidney transplant (very expensive)
- Intravenous or subcutaneous fluids
- Bicarbonate: to neutralise, either given orally or intravenously
- Antibiotics: if infection is present
- Phosphate binders
- Omega fatty acids

### **Advice**

- Support your dog or cat through this chronic condition. Be patient and caring.
- Dry food and water only can be problematic, since this does not provide the amount of water that canned food would.
- For cats, adding wet food and cat milk provide a good source of water, therefore preventing kidney and bladder problems.
- Low protein, salt and phosphorous food is important to prevent further deterioration of renal function whilst maintaining a positive quality of life.

## **Leishmaniasis**<sup>24-26</sup>

### **Description**

Leishmaniasis most commonly known as sand fly can be a deadly disease in dogs if not diagnosed early. This can also affect cats, however it is more common to affect dogs. It is caused by a bite usually in the muzzle or the ear by a tiny, sand coloured mosquito. The mosquito carries the protozoa *Leishmania infantum* and can bite the dog up to 100 times in an hour. This single cell organism travels to the dog's cells and invades the blood stream affecting the internal organs and eventually end up harming the immune system.

### **Recognition**

Blood serum antibody tests need to be done to detect leishmaniasis. It is best to carry out the test in winter time and also yearly to exclude any possibility, and if present it will be detected as early as possible.

### **Signs and Symptoms**

- Tiny skin lesion in the muzzle or ear
- Severe weight loss
- Loss of appetite
- Diarrhoea
- Vomiting
- Nose bleeds
- Exercise intolerance
- Alopecia
- Hyperkeratosis

### **Similar Conditions**

- Dermatitis

### **Treatment**

- Allopurinol; a human medicine usually used for gout

## Prevention

- Collars containing deltamethrin
- Vaccine; can only be used in leishamania negative dogs
- Essential oils; such as neem, citronella, eucalyptus, lemon eucalyptus, lavender and tea tree. Very important: NEVER apply essential oils undiluted! It is best to dilute 1 part of the essential oil with 9 parts water, store in a spray bottle and always shake before use.

## Advice

- The medication may cause urinary stones on long treatment.
- Proper nutrition is crucial to boost your dogs' immune system.
- Liver and kidney supplements are necessary to strengthen them due to the regular use of the medicine.
- Although the name implies sand, these are not found on sandy beaches but are found around rubble walls and old houses.
- The fly is sensitive to the sun thus it is active from dusk till dawn. To prevent bites it is best to avoid prolonged stays outdoors.
- Apply a natural insect repellent.
- Hairless spots are the areas where the flies bite.
- Don't worry, if your dog is moving it is difficult to be a target, however if it sleeps outside there is a higher risk of contracting this disease.
- In Malta, sand fly season commences in the beginning of May and stops end of September.
- **Be careful, this is a zoonotic disease and the organisms living in the lesions can be contracted by humans!!**

## **Urinary tract disease**<sup>27</sup>

### **Description**

The most common feline urinary tract disorder is feline interstitial cystitis. It is caused by an inflammation of an unknown cause; however stress can be one of the factors.

Urinary crystals or stones are a complication for both dogs and cats. This cause irritation, pain and blockage and is a very uncomfortable experience for the animal. Urinary bladder stones form from mineral crystals that come together as one.

Risk factors for urinary tract diseases include the following:

- Age: cats more than 1 year old and dogs between 2 and 8 years are at higher risk
- Gender: both genders carry an equal risk however males are more predisposed to life threatening urethral obstruction from stones.
- Overweight cats
- Lack of exercise
- Low water intake
- Nutrition: too much calcium, magnesium, phosphorous and protein

### **Signs and Symptoms**

- Urinating outside of the litter box
- Loss of bladder control leading to incontinence
- Straining when urinating
- Licking the genital area
- Reduced appetite
- Blood in urine
- Lack of energy or interest in daily activities
- Frequent attempts to urinate
- Decreased urine flow
- Crying out in pain



## Similar Conditions

- Kidney disease

## Treatment

- Surgery, especially males
- Antibiotics; however not all cases have infections
- Anti-anxieties; for stress. Might take a while to work, however not recommended. Stress relief can be done in other ways.
- Glucosamine; to strengthen the bladder lining.

## Advice

- Episodes usually subside with or without treatment and last only for a few days.
- Cats sometimes associate painful urination with the litter box and end up not using it.
- Stress for cats can occur because there are other guests at the house, conflicts with other pets and also lack of places to hide or rest. It is important to make changes to decrease stress in the environment.
- Be careful when choosing the right food for your pet and make sure that it does not contain high amounts of phosphorous, calcium or magnesium.
- Make sure to increase water consumption by providing fresh and clean water.
- Moist or canned food also helps to increase water consumption.
- Small meals several times a day are much better than one or two large meals a day.
- Any dog or cat which have been treated for urinary tract disease will be at risk of contracting it again, thus it is paramount to make sure to observe your pet to detect the signs early.

## **Weight Management**<sup>28-30</sup>

### **Description**

Excessive weight is not good for anyone even for animals. This can be the cause of serious health problems such as; arthritis, respiratory and heart disease and cancer. Too much eating especially together with lack of exercise is the perfect combination for weight gain due to the increase in body fat which is not being burnt by exercise. However, there are other contributing factors;

- Age: older age results in being less active and thus more prone to weight gain
- Spaying and Neutering: promotes a slower metabolism
- Gender: female cats more at risk
- Feeding habits
- Overfeeding
- Overeating
- Medical disorders
- Breeds: mixed breeds for cats and cocker and Cavalier King Charles spaniel and Labrador retrievers for dogs

### **Recognition**

Some are very obvious to recognise, whilst some may not be that easy. Weight calculators for pets are available online.

### **Signs and Symptoms**

- Ribs cannot be felt easily when running your hand along the side
- Loss of waist
- Slow movement
- Walking difficulties
- Sleeping a lot
- Bad temper
- Shortness of breath
- Looks exhausted when playing or exercising
- Collar needs to be loosen

## Treatment

- Right nutrition
- Right exercise

## Advice

- Never allow your pet to scrape the leftovers from your plate as our food can be the key to obesity.
- After feeding your pet, remove the food containers.
- Do not leave containers full of food, unless it is feeding time.
- Be careful when choosing the right nutrition. Many pet foods are full of fats and salts to make the taste better and may result in over eating.
- It is important to feed your pet low-fat and low-calorie food to promote weight loss.
- Although for you, your pet doesn't seem overweight, it is crucial to monitor the weight at your veterinarian to make sure to maintain a healthy life.
- To promote exercise and weight loss:
  - For dogs: walk your dog at a steady pace, enjoy playing time and try to play a retrieval game such as tossing a Frisbee.
  - For cats: call your cat to follow you, enjoy playing time by using a flash light and shining it on the walls so that your cat can chase it while exercising at the same time.

# **Rabbits**

## **Coccidiosis**<sup>31</sup>

### **Description**

Coccidiosis is a parasitic disease which affects rabbits worldwide. There are 2 forms; hepatic and intestinal, the latter being the most dangerous and deadly. Transmission is carried out by the faecal-oral route for both, however, although good hygienic measures are carried out to eliminate coccidiosis, the intestinal form can still be present even in hygienic environments.

### **Recognition**

This is carried out by microscopic detection of oocytes in the faeces.

### **Signs and Symptoms**

- Anorexia
- Rough coat
- Intestinal lesions
- Hepatic lesions
- Diarrhoea
- Loss of appetite
- Weakness
- Lethargy
- Dehydration

### **Treatment**

- Sulpha-drugs; Sulfaquinoxaline, sulphadimethoxime, sulphadimerazine
- Other coccidostats; amprolium, salinomycin, diclazuril, toltrazuril

**Advice**

- If treatment is successful, your rabbit is immune to the infection.
- Some rabbits may be carrying the disease without knowing, so be careful when your rabbit is in contact with new rabbits.
- It is very important to remove faeces frequently as to prevent the contamination of food and water with faeces.
- If your rabbit is kept in a wired cage even just to sleep overnight, the cage should be brushed daily.
- Using ammonia solution 10 % to sanitise the living areas is the best, since it kills the oocytes produced in the faeces.

## **Dental disease**<sup>32,33</sup>

### **Description**

The teeth are really important for a rabbit. Without the front teeth known as the incisors, the rabbit cannot strip, cut and snip. The tongue is used to push the collected food back to the grinding teeth where these break the harsh fibre down into small pieces that can be swallowed. Chewing all day is a lot of work on the teeth and eventually teeth wears down. However to allow chewing all day, the teeth grow faster than normal teeth would, therefore if the rabbit eats a low fibre diet the teeth won't wear down at a fast rate and result in overgrown teeth.

### **Recognition**

The teeth grow both ways, up and down, so some signs may be strange to be associated with overgrown teeth. This is something really painful for the rabbit, so it is crucial to recognize the signs to take action.

### **Signs and Symptoms**

- Wet chin due to excessive salivation
- Teeth grinding
- Creamy white eye discharge
- Runny nose
- Refuse food
- Matted fur
- Caecotrophs stuck to his bottom ( caecotrophs are the pellets produced by the rabbit to re-eat)
- Facial abscess
- Weight loss
- Tongue or buccal lesions

### **Similar Conditions**

- Pasteurellosis
- Myxomatosis

## Treatment

- Teeth trimming; using scissor clipper or burring. This is done by a trained veterinarian.
- Tooth extraction

## Advice

- The best food to give to your rabbit is grass or hay and not pelleted food.
- It is important to check your rabbit's teeth at home. This is done when the rabbit is calm, by lifting the lip with your fingers.



## **Dermatophytes Infection**<sup>33</sup>

### **Description**

Dermatophytosis, most commonly known as ringworm is a fungal infection. It is transmitted via direct contact and is generally related to poor nutrition, poor hygienic measures and stress.

### **Recognition**

Areas which are infected are usually raised, red and consist of white flakes.

### **Signs and Symptoms**

- Loss of hair
- Patches
- Scratching
- Itching
- Yellowish crusts

### **Similar Conditions**

- Dermatitis

### **Treatment**

- Oral Antifungals; griseofulvin
- Topical antifungals; itraconazole, clotrimazole, miconazole
- Copper sulphate dip

### **Advice**

- Equipment (used for grooming, cleaning) should be disinfected to prevent re-infection.
- Separate other rabbits from the infected one.
- Be careful when introducing new rabbits to the household because they may be asymptomatic carriers.
- **This disease can be transmitted to humans! Take special precautions by using gloves to handle the infected rabbit!**

## **Heat Stroke**<sup>33</sup>

### **Description**

Rabbits are very sensitive to heat. Poorly ventilated areas and humid, hot weather are factors which predispose to heat exhaustion. This can lead to death.

### **Signs and Symptoms**

- Stretching out
- Breathing rapidly
- Redness of the ears
- Confusion
- Slow movement
- Salivating

### **Treatment and Advice**

- Cool water should be available at all times.
- Bathing with cold water during warm weather is ideal, but never attempt to put a rabbit suspected of having a heat stroke under cold running water.
- Provide shady areas and out of direct sunlight.
- Take great care when air conditioning your rabbit because temperature elevation may occur more rapidly after predisposing to heat.
- Grooming your rabbit helps to remove all that excess hair.
- Do not forget to keep your rabbit well hydrated by providing fresh vegetables since they are a good source of water.

## **Mites**<sup>34</sup>

### **Description**

Ear mites infestation is caused by parasites which affect either one ear, both and also surrounding areas such as the neck, head, genital region and the abdomen. The mites create what is known as an ear canker because they irritate the ear and form brown crusts. If untreated it may penetrate the inner ear, cause damage to the brain and can result in torticollis (torsion of the neck).

### **Recognition**

It might not be easy to recognise, however, skin scales might be very visible on the inner ear, which turn into larger and thicker crusted lesions and can also be accompanied by hair loss. Mites might not be visible to the naked eye but your veterinarian will determine the cause.

### **Signs and Symptoms**

- Itching around the ear, neck and head
- Head shaking
- Head scratching
- Hair loss or peeling
- Brown crusty exudates in the ears
- Affected areas may become extremely painful
- Pyrexia
- Lethargy
- Loss of balance

### **Similar Conditions**

- Ear infections

## Treatment

- Antiparasitic drugs: ivermectin, selamectin
- Topical antibiotics
- Oral antibiotics

## Advice

- The mite is contagious, thus it is imperative to isolate the affected rabbit and treat all rabbits in the household. Clean thoroughly the living area and discard of all organic material in the cage.
- The cage should be cleaned everyday during the treatment period and nothing should be reused.
- Any combs and brushes should be discarded to prevent re-infection.
- Do not attempt to remove the crusts from the skin.
- Important to attend for a follow up 1 month after the treatment commences.

Fur mites are not as problematic as ear mites, but are very common and can be easily transmitted by direct contact. Whilst ear mites cause extreme itching, fur mites do not. Dandruff may be noticed coming off your rabbit which can be detected upon placing against a dark background. Insecticides, such as imidacloprid, can be applied to prevent infestations.

## **Myxomatosis**<sup>35</sup>

### **Description**

This fatal disease is caused by a myxoma virus and can occur in all domesticated rabbit breeds. Some rabbits are resistant, such as the cottontail and jackrabbits. Transmission can occur via direct contact and through bites from mosquitoes, flies and fleas.

### **Recognition**

Eye inflammation with milky discharge is the initial symptom.

### **Signs and Symptoms**

- Eye inflammation
- Milky eye discharge
- Anorexia
- Weakness
- Lethargy
- Pyrexia
- Death within 48 hours
- Purulent nasal discharge
- Rough coat
- Depression
- Swollen eyelids, ears, nose and lips
- Swelling of the genital area
- Coma

### **Similar Conditions**

- Dental problems
- Eye infections
- Pasteurellosis

## Treatment

There is no cure to viral infections.

- Fluids
- Antibiotics; to prevent secondary infections

Euthanasia is sometimes recommended, to prevent the long and painful death.

## Advice

- To prevent your rabbit from contracting this disease, protect against mosquitoes and biting flies. This can be done in several ways;
  - Surround the living area (even if indoors) with mosquito netting
  - Avoid outdoors in the early mornings and late afternoons
  - Use flea prevention products such as imidacloprid
  - Vaccination (if available)
- It is very difficult to accept that the best option for your pet is euthanasia, however, this is a fatal disease and otherwise your rabbit will pass through an agonising death.
- It is very important to disinfect all the equipment used by the infected rabbit.
- Wait 4 months before bringing a new rabbit to ensure complete eradication of the virus.

## **Pasteurellosis**<sup>36</sup>

### **Description**

This condition is also known as snuffles because of the characteristic snuffling breathing sound. Some rabbits do not show symptoms of infection, because these microorganisms reside in the nasal cavity and upper respiratory system and are kept in equilibrium by the rabbit's immune system. If the bacteria become active, infection can spread to the sinuses and bones of the face and on long exposure to the eyes, ears and blood. This is a highly contagious disease, and can be transmitted both by direct contact and aerosol.

### **Recognition**

The characteristic breathing sound and exudates coming out the nose and eyes are the main factor to recognise this condition; however, since the signs are so widespread a nasal swab will usually be taken for testing. Sometimes a complete blood count and urinalysis are also undertaken.

### **Signs and Symptoms**

- Strange behaviour
- Staining of the front paws ( with discharge collected whilst grooming)
- Anorexia
- Depression
- Head shaking
- Torticollis
- Excessive tears
- Blockage of the tear ducts
- Shortness of breath
- Scratching of the ears
- Genital infections; thick whitish greyish discharge

## Similar Conditions

- Dental disease
- Ear infection
- Eye infection
- Cold
- Sinusitis

## Treatment

- Antibiotics; enrofloxacin
- Surgery

## Advice

- Infection can spread through the air and is highly contagious especially for rabbits at birth. They can also contract it during birth or shortly after from close contact with an infected mother.
- Separate your rabbit from others and make sure to keep yourself sanitised to prevent from spreading the disease.
- It is very important to support your rabbit through this condition. Help by cleaning the nostrils, keeping him warm and provide the right nutrition.
- It is imperative to encourage oral fluids either as fresh water or also as leafy vegetables and moistened greens such as parsley, carrots, cilantro etc.
- Do not give high carbohydrate or high fat food.
- If your rabbit is not eating, you have to feed using a syringe appropriate gruel mixture.



## **Red Eye Syndrome**<sup>37</sup>

### **Description**

This is one of the most common eye problems seen in rabbits. Red eye is a result of many different causes;

- Bacterial infections
- Glaucoma: can lead to blindness if untreated
- Corneal ulceration: mainly due to trauma
- Conjunctivitis: inflammation of the lining of the eye
- Keratitis
- Dental disease

### **Recognition**

The underlying cause determines different signs, and usually it is a very difficult task to come to the exact cause. However, if your rabbit has a red eye, which can be recognised by swollen and irritated eyes, take immediately to a veterinarian.

### **Signs and Symptoms**

- Eye discharge
- Swollen eye
- Impaired vision
- Extra tissue around the eye
- Nasal discharge
- Cold
- Lethargy
- Crusting
- Hair loss around the eyes and nasal area
- Abnormal posture

## Similar Conditions

- Dental disease
- Myxomatosis
- Pasteurellosis

## Treatment

- Topical antibiotics
- Topical atropine
- Topical steroids

## Advice

- Check you rabbit's teeth.
- Take particular caution when caring for young rabbits since they are more susceptible to eye disease.
- Minimise source of irritation such as dust and dirt by daily cleaning.
- At first, you can use any commercial eye washing product to remove any debris and dirt from the eye of your rabbit.
- Repeated eye checks may be necessary to monitor outcomes of therapy and especially to prevent blindness.

## **Trichobezoars**<sup>38</sup>

### **Description**

Rabbits groom themselves continuously, so hair is often found in the stomach but this doesn't normally cause symptoms. Usually, it is passed with other stomach contents and excreted as faecal pellets. Hair chewing can be due to different reasons, one of them is having a low fibre diet and the other strangely enough is boredom. Rabbits are not capable of vomiting the hair balls like cats, and unfortunately it must be able to pass through the digestive system.

### **Recognition**

It is very difficult to recognise this condition, so it is best to avoid by practising effective preventative measures. An abnormally distended abdomen might be visible and it calls for an emergency veterinary appointment.

### **Signs and Symptoms**

- Weight loss
- Anorexia
- Death within 3 to 4 weeks
- Gastric ulceration
- Decreased food intake
- Abdominal distension
- Pain
- Dehydration
- Diarrhoea
- Weakness
- Teeth grinding

### **Similar Conditions**

- Pasteurellosis

## Treatment

- Add magnesium oxide to the diet
- Motility stimulants; such as metoclopramide
- Fluid therapy
- Pain medication
- Antiulcer therapy
- Probiotics

## Advice

- To stop boredom, provide an environment where the rabbit can play and keep himself busy.
- To treat an early case, pineapple juice can be given since it contains bromelain, which is a digestive enzyme and helps to break up the hairball. Canned pineapple juice is not effective since the enzyme is destroyed with the process of canning.
- The best option is to prevent by providing your rabbit with a high fibre diet.
- Daily combing helps to remove any loose hair.
- Avoid stressing the rabbit by changing the environment for no reason.

## **Ulcerative Pododermatitis**<sup>33,39</sup>

### **Description**

Ulcerative pododermatitis is commonly referred to as sore hocks where the footpad appears to be crusted, swollen and even bleeding. This can even spread to a bone infection known as osteomyelitis and lead to death. Sore hocks can result from excessive weight due to pressure of the skin on wired floor cages or from trauma. Other factors can play a role in predisposing the rabbit such as, nervousness, genetics, heavy breed, urine soaked faeces, type of wire used and posterior paralysis after a spinal cord injury.

### **Recognition**

It is very easy to recognise from the following signs. However, early detection is crucial to prevent infection moving from the wounds to the bones.

### **Signs and Symptoms**

- Swollen foot pad
- Crusts
- Bleeding
- Lethargy
- Bone infection
- Tiptoe walking

### **Similar Conditions**

- Osteomyelitis

### **Treatment**

- Debriding agents; to clean the lesions
- Topical antibiotics
- Leg amputation

**Advice**

- Condition may recur.
- First use debriding agents to clean the lesions and afterwards apply the topical antibiotics.
- Help your pet to lose weight, by feeding more grass and hay rather than pellets.
- Play with your rabbit to help exercising and moving.
- Remove soiled bedding to ensure the area is kept dry. Make sure to provide non-abrasive and soft bedding.
- Daily checking of the feet can prevent this problem.

# Pigeons

## **Coccidiosis**<sup>40</sup>

### **Description**

This is a very common intestinal disease amongst pigeons worldwide due to the protozoa *Coccidia* which reside in the small intestine of nearly all pigeons. It forms long lasting oocytes and following incubation these become infective.

### **Recognition**

*Coccidia* oocytes are first ingested by the pigeon and development takes place in the intestine within 4 to 7 days in different stages, resulting in damage to the intestinal wall. As a result, the pigeon starts to excrete oocytes again.

Two forms of coccidiosis:

1. Asymptomatic form: occurs most frequently. Birds develop resistance/immunity with the help of the internal defence mechanisms to the first small quantities of oocytes ingested. This immunity is strengthened constantly by the ingestion of small amounts of oocytes in turn protecting against the severe form.
2. Acute/ Visible form: occurs at extremes of age; Young pigeons still without resistance to the oocytes or older pigeons whose immunity is lowered by stress factors.

### **Signs and Symptoms**

Asymptomatic form:

- Appear healthy but less lively
- Droppings sometimes soft (small amounts of oocytes present in faeces)

Acute form:

- Noticeably affected
- Noxious, watery-like, greenish and sometimes bloody diarrhoea (large amounts if oocytes present in faeces)
- Puffed up feathers



- General condition impaired: reduced feed and increase water intake resulting in general malaise and malnutrition.

### **Similar Conditions**

- E.coli infection
- Salmonellosis
- Worm infestation

### **Treatment**

Asymptomatic form: Do not treat, although they show mild symptoms of infestation so as not to disturb the resistance being developed.

Acute form:

- Antiprotozoal agent; amprolium which is a coccidiostat

### **Advice**

- Development of feathers will not be disrupted.
- Support treatment by the administration of vitamins particularly A and K3 and supplements of amino acids.
- Use best possible diet.

## **E.Coli infection**<sup>41</sup>

### **Description**

*Escherichia coli* infection is the second most common disease of the digestive tract following salmonellosis. E.coli bacteria are present as part of the normal flora of the gut of both warm blooded animals and humans. These can also survive for many months in faeces provided that there is an adequate environment. An E.coli bacterium is re-introduced into the body with contaminated feed or water or via inhalation through dust particles.

### **Recognition**

Rapid multiplication of the E.Coli bacteria results in inflammation of the intestine with consequent diarrhoea in turn leading to loss of water and electrolytes.

Bacteria can also penetrate into the bloodstream affecting individual organs resulting in a systemic infection which after only a few hour or days leads to death.

### **Signs and Symptoms**

Typical signs of a systemic disorder;

- General condition impaired: reduced feed and increase water intake resulting in general malaise and malnutrition
- Ruffled feathers
- Pain signs; drawn up back and lowered tail
- Respiratory tract may also be involved

### **Similar Conditions**

- Coccidiosis
- Salmonellosis
- Hexamitiasis

## Treatment

- Nitrofurantoin antibacterial agents; furazolidone
- Chloramphenicol
- Penicillin antibiotic agents; ampicillin

## Advice

- Pigeons which are affected with the infection should be selected and separated from the entire flock as these can shed the pathogens.
- Remove factors within the loft which lower the resistance to pathogens: ventilation and waste-air extraction, deficient supply of oxygen, presence of noxious gases, dust in the loft, stocking density.
- Do not leave any feed overnight due to the risk of contamination by insects, mice or rats. Apart from this precaution, feed and water bowls are to be cleaned thoroughly and make sure that no rodents can access the loft.

## **Ectoparasites**<sup>42</sup>

### **Description**

External parasites are very common in pigeons and can lead to harm in many different ways. Feather lice, body scabies and scaly-leg mites spend their life cycle permanently on the pigeon. These 3 types of parasites live up to 3 months, and can reproduce within 3 to 6 weeks. The lice lay its eggs in the pigeon's feathers while the mites attach themselves to the outer layer of the skin. The scabies mice give birth directly to living larvae.

Red bird mites, pigeon and bird ticks attack the pigeon's body only at night to suck on blood. In the early morning they hide themselves within the loft; in cracks, under feeding troughs or nest bowls. These can also transmit pathogens.

### **Recognition**

Feather lice: visible on the pigeon's feathers. Spreading the pigeon's wing under light can aid detection.

Body scabies and scaly-leg mites: not visible by the naked eye but can be detected through signs.

Red bird mites, pigeon and bird ticks: can be detected early in the morning searching for a hiding place.

### **Signs and Symptoms**

Feather lice: feed on feather material and skin scales leading to feather damage.

Body scabies mites: feed on body fluids and tissues leading to scaly dermatitis (rash with sores).

Scaly-leg mites: feed on body fluids and tissues as well but result in scaly deposits.

Red bird mites, pigeon and bird ticks: feed directly on blood leading to anaemia (weight loss)

## Treatment

Pesticide:

As a spray; apply to the loft and all the equipment used. If product chosen is safe, apply directly on the pigeons feathers also from the underside. Apply also to pigeons which show no signs.

As a bath; use luke warm water, and immerse the pigeon up to its neck with the wings spread out leaving it for 1 minute.

Treatment must be repeated according to the type of parasite, to ensure complete eradication.

## Advice

- Before treating with the pesticide, make sure that all the equipment and the loft are cleaned thoroughly.
- Check for parasites within the loft early in the morning by inspecting the cracks in the loft, under feeding troughs and bowls or beneath any other materials within the loft.
- To protect the pigeons against external parasite infestation, give them a bath at least once a week.
- How long parasites take to develop and survive is temperature dependent. In the hot summer days they may develop faster, thus it is important to take more precautions.
- Lifespan of the pigeon and bird ticks is very long about 2 to 4 years. When treating, make sure that these are eradicated.

## **Endoparasites; Worm infestation**<sup>43</sup>

### **Description**

The type of parasites found in pigeon flocks are roundworms, hairworms and tapeworms, the latter being the least common. These survive by feeding in the intestines of the pigeon. As the name implies the hairworm is a hair-like parasite, very slender and long, with their eggs being the most infectious after 8 to 9 days. The hairworm is not a specific parasite to pigeons only, but can also infect other poultry species. The roundworm occurs only in pigeons, and its eggs become mostly infectious after 2 to 3 weeks. Tapeworms depend on intermediate hosts to be transmitted to pigeons. This can occur through the consumption of snails, ants or beetles.

### **Recognition**

Tapeworm infestation can be identified by examining the faeces for eggs or segments. However, other parasite infestations are only visible through microscopic examination of the faeces.

### **Signs and Symptoms**

Period from ingestion of worm eggs to the first excretion of the eggs in faeces for;

- Tapeworm is about 2 weeks
- Hairworm is 3 to 4 weeks
- Roundworm is 5 to 6 weeks
- Following 10 to 12 days of consumption of the eggs, droppings may vary in consistency and appearance.
- Initially, appetite increases, but upon progression of infestation it diminishes.
- Anorexia; weight loss
- General condition impaired: lifeless, laid-back, reluctance to fly.
- Ruffled feathers

## Similar Conditions

- E.Coli infection
- Salmonellosis
- Coccidiosis

## Treatment

- Anthelmintic agents; fenbendazole

## Advice

- All pigeons in the flock should be treated at the same time.
- Examine the faeces for eggs or segments to ensure complete eradication.
- Do not treat if pigeon is nurturing the young or whilst in the main process of moulting.
- Do not leave any feed overnight due to the risk of contamination by insects. Apart from this precaution, feed and water bowls are to be cleaned thoroughly and make sure that no insects can access the loft.

## **Hexamitiasis**<sup>44</sup>

### **Description:**

Pigeons usually present with this disease due to the flagella, *Hexamita columbae* which affects the rectum. Flocks are mostly to become infected during the summer and autumn period. The incubation period is about 4 to 5 days.

### **Recognition:**

Adult pigeons infected with hexamitiasis do not usually present with noticeable signs and symptoms, but it can be recognised because there is an increase in the quantity of droppings.

### **Signs and Symptoms :**

- Watery-like or bloody and noxious diarrhoea
- General condition impaired; reduced feed and increase water intake resulting in general malaise and malnutrition.
- Young pigeons; the entire intestines become involved with bloody diarrhoea, sometimes leading to death.

### **Similar Conditions:**

- E.coli infection
- Salmonellosis
- Coccidiosis
- Paramyxovirus infection

### **Treatment:**

- Antiprotozoal agents; Dimetridazole
- Aminoglycosides antibiotics; Aminosidine sulphate



**Advice:**

- It is important to treat all the pigeons living together at the same time.
- Do not dilute medication if there is the need to increase drinking water (for example, during the hot weather), but following medicated water provide fresh water.
- Do not provide bath water.

## **Infectious catarrh**<sup>41,45</sup>

### **Description**

Infectious catarrh is a disease of the respiratory tract which often results because of mixed infections (mycoplasma, viruses, fungi and trichomonads). The birds' resistance to infection is reduced due to the pathogenic bacteria developed (pasteurella, cocci and coli bacteria) and also due to factors within the loft environment.

### **Recognition**

- Behaviour of the affected pigeon
- Inflammatory changes in the head region and respiratory tract
- Characteristic sound of respiration (example: wheezing)

On first suspicion of the disease a veterinary examination is vital.

### **Signs and Symptoms**

Initial stage;

- Sneezing and aqueous nasal discharge

Acute stage;

- Nasal discharge becoming mucopurulent and yellowish brown in colour
- General condition impaired; reduced feed and water intake, cessation of down moulting, reluctance to fly.
- Wattle and bridge of nose turn grey
- Beak opened: stringy mucus stretching from the retrolingual region to the palate
- Reddening and swelling of pharyngeal mucosa

Advanced stage;

- Inflammation extends to windpipe and lower respiratory tract
- Visible and audible catarrh (wheezing)

- White-yellow deposits in the laryngeal region

### **Similar Conditions**

- Ornithosis
- Trichomoniasis

### **Treatment**

- Pleuromutilin antibiotics; tiamulin, valnemulin
- Aminoglycoside antibiotics; lincomycin, spectinomycin, foramycin
- Tetracycline antibiotics; chlortetracycline
- Macrolide antibiotics; tylosin

### **Advice**

- It is important to start treatment immediately upon appearance of first signs.
- Do not provide bath water.
- Do not give any feedstuffs containing calcium (as it binds to tetracycline antibiotics in turn reducing its efficacy).
- No free flight for affected pigeons.
- Remove factors within the loft which lower the resistance to pathogens; ventilation and waste-air extraction, deficient supply of oxygen, presence of noxious gases, dust in the loft, stocking density.

## **Ornithosis**<sup>46</sup>

### **Description**

Ornithosis is caused by *Chlamydia psittaci* micro organism through invading internal cells. Transmission of infection can occur; indirectly via inhalation of dust particles containing the pathogen and also directly by ingestion of contaminated food and water with faeces.

### **Recognition**

This disease is very difficult to recognise since no clinical sign is definite for ornithosis. A swab either from the nose, eyes or the genital or anal area is taken to confirm diagnosis.

### **Signs and Symptoms**

Acute form (occurs in young pigeons):

- Wheezing (recognised as pigeon breaths with half opened beak)
- Inflammation of one or both eyes (presented as redness, yellow crusts and pus covering the whole eye)
- Watery-like diarrhoea

Chronic form (occurs in adult pigeons):

- Few or no signs shown

### **Similar Conditions**

- Paramyxovirus infection
- Infectious catarrh
- Salmonellosis

### **Treatment**

- Tetracycline antibiotics; chlortetracycline, doxycycline
- Fluoroquinolone antibiotics; enrofloxacin

## Advice

- Pigeons which are chronic carriers (ie. Appearing healthy following survival of infection) should be selected and separated from the entire flock as these can shed the pathogens at irregular intervals.
- Do not provide bath water.
- Do not give any feedstuffs containing calcium (as it binds to tetracycline antibiotics in turn reducing its efficacy).
- No free flight for affected pigeons.
- Remove factors within the loft which lower the resistance to pathogens: ventilation and waste-air extraction, deficient supply of oxygen, presence of noxious gases, dust in the loft, stocking density.
- To prevent transmission it is very important to take precautions, by using gloves and face masks and applying good hygiene measures.
- This disease can also be transmitted to humans and other mammals, leading to atypical pneumonia and also life threatening acute illness!

## **Paramyxovirus infection**<sup>45,47</sup>

### **Description**

This infection can be contracted only by pigeons and not by any other bird species. Infected pigeons shed the virus via secretions from mucous membranes (eyes, nose and throat) and also in faeces.

### **Recognition**

The virus is detected through tissue samples and swabs taken from suspected pigeons. It is best to be recognised during the initial incubation period, since afterwards it may lead to death.

### **Signs and Symptoms**

Incubation period of the infection: 3 to 21 days

Initial signs;

- Reduced intake of feed and increased water uptake
- Anorexia
- Faeces present in a puddle due to increased water excretion

Following some days into incubation period;

- Paralysis of one or both legs
- Reserved
- Torsion of the neck
- Twisting movement of the body
- Walking in reverse
- Death

### **Similar Conditions**

- Salmonellosis

## Treatment

No treatment for viral diseases.

## Advice

- About 30% of the infected pigeons may recover on their own following 4 weeks of infection.
- Support viral infection and other pigeons in the flock by vitamin, herbal extracts, ginseng and amino acid supplements.
- Vaccination should take place if viral infection is suspected in a flock, even in pigeons which appear unaffected, as to avoid spreading of the virus. This is the most effective way of preventing and controlling infection by the paramyxovirus.
- However, affected birds which show symptoms of infection should be selected and separated from the entire flock and cannot be vaccinated.

## **Pigeon Pox**<sup>45</sup>

### **Description**

This viral infectious disease is characterised by changes on the skin and mucous membranes of the pigeons. It cannot be transmitted to humans or other mammals. Its incidence is greater in humid and warm weather.

### **Recognition**

Disease last for about 3 to 4 weeks; if pigeon is malnourished it can also lasts for several months. Both forms of the pigeon pox can be clearly recognised because both scaly skin and lumps are visible.

### **Signs and Symptoms**

Skin form;

- Scaly skin develops especially around the eyes and beak (where mucous membranes meet the skin), and also on the legs. It can be clearly identified from normal skin.
- Virus enters the skin through lesions such as scratches or insect bites

Mucosal form;

- Lumps develop in the throat; these may impair food and water intake and breathing.
- Can be confused with canker but can be easily distinguished as these lumps form part of the tissue underneath.

If virus enters systemically, it impairs general condition through effect on internal organs.

### **Similar Conditions**

- Ornithosis
- Infectious catarrh
- Trichomoniasis



## Treatment

No treatment for viral diseases.

- Antibiotics such as chlortetracycline; to prevent secondary bacterial infections

## Advice

- Support viral infection and other pigeons in the flock by ginseng, vitamins, herbal extracts and amino acid supplements.
- Do not attempt to remove the scaly skin as there is a risk of bleeding.
- Treat any secondary bacterial infection if any suspected, as these may complicate the presentation of pigeon pox.
- No free flights for affected pigeons.
- Do not provide bath water.
- Do not give any feedstuffs containing calcium (as it binds to tetracycline antibiotics in turn reducing its efficacy).
- Prevention is better than cure! Pigeon pox vaccine is available for immunisation against the disease.
- Provide best possible diet.
- Vaccination should take place if infection is suspected in a flock, even in pigeons which appear unaffected to avoid spreading of the disease.
- However, affected birds which show symptoms of infection should be selected and separated from the entire flock and cannot be vaccinated.

## **Salmonellosis=Paratyphus**<sup>41</sup>

### **Description**

This infectious bacterial disease has the highest mortality rate amongst pigeons. The bacterium *Salmonella typhimurium*, can live in the environment given the right conditions for more than 1 year.

### **Recognition**

Apart from the visible signs, samples taken from faeces, blood and tissue of the infected pigeon are taken to confirm diagnosis.

### **Signs and Symptoms**

Acute form (affects mainly young pigeons):

- Enteritis; few watery-like and greenish droppings with white flocculent components.
- Organs become infected and result in growth retardation, malnutrition and sometimes death.

Chronic form (affects mainly adult pigeons):

- Inflammation results in thickening of the joints (esp. Elbow joint), infirmity in legs and wings, balance disorders and torsion of the neck.

### **Similar Conditions**

- Ornithosis
- Paramyxovirus infection
- Worm infestation
- Coccidiosis
- Trichomoniasis

## Treatment

It should be initiated as soon as first symptoms appear. Start with chloramphenicol.

- Antibacterial agent; chloramphenicol
- Penicillins; ampicillin

## Advice

Salmonella transmission can take place via sexual or physical contact and through contamination of the feed and water bowls.

To avoid:

- Remove factors within the loft which lower the resistance to pathogens: ventilation and waste-air extraction, deficient supply of oxygen, presence of noxious gases, dust in the loft, stocking density.
- Do not leave any feed overnight due to the risk of contamination by insects, mice or rats. Apart from this precaution, feed and water bowls are to be cleaned thoroughly and make sure that no rodents can access the loft.
- Care when mating. Blood tests of suspected pigeons should be carried out, since disease can be transmitted from the hen to the egg.
- Also, take care when nestling are fed because of the risk of contaminated crop milk.
- Pigeons which are chronic carriers (ie. Appearing healthy following survival of infection) should be selected and separated from the entire flock as these can shed the pathogens at irregular intervals.
- It is important, to treat the entire flock even if only one pigeon shows symptoms. Before hand, severely affected pigeons should be selected and separated as these are unlikely to be cured.
- Vaccination is the most effective way of preventing and protecting pigeons against salmonellosis. All pigeons in the flock that appear healthy can be vaccinated.
- Remove pigeons which show signs of illness.

## **Trichomoniasis**<sup>48</sup>

### **Description**

Trichomoniasis is also commonly known as canker. Most of the pigeons are carriers of the flagella trichomonads. These live in the mucosal membrane of the throat, beak and oesophagus and are also present in produce. Infected pigeons transmit the parasites through faeces and saliva, in turn, affecting the young pigeons while feeding together.

### **Signs and Symptoms**

Adult pigeons:

- Decreased endurance
- Reluctance to fly
- Diarrhoea
- Bloody coloured throat
- Upon progression; yellow buttons form on oral mucosa growing into yellow deposits ie. canker.

Young pigeons:

- Abscess
- Pungent-smelling liquid droppings
- Subnormal growth
- Constantly crying for food

### **Similar Conditions**

- Sialoliths: salivary calculi; these occur as a result of solidified saliva (secretions of the mucous glands). It presents as white dots (firm and yellowish/white to grey nodules) at the end of the throat.

## Treatment

- Antiprotozoal agents; Dimetridazole
- Aminoglycosides antibiotics; Aminosidine sulphate

## Advice

- It is important to treat all the pigeons living together at the same time.
- Do not remove yellow deposits from oral mucosa (canker) as there is a risk of bleeding.
- Do not dilute medication if there is the need to increase drinking water (for example, during the hot weather), but following medicated water provide fresh water.
- Do not provide bath water.

## **Wet Droppings**<sup>40,50</sup>

### **Description**

The pigeons' state of health can be analysed through the appearance, composition and smell of the faeces. Normal gut contents leave the intestinal tract in the form of a paste (like toothpaste) as contents thicken during their way out and urine is thickened and excreted as uric acid crystals with faeces appearing as white constituents.

Changes in faeces can be due to many possible causes such as;

- Change of weather; low temperature, humidity, drafts.
- Psychological stress; racing season, agitation of individual pigeon, vaccinations, exhibitions, changes in the loft layout and feeding times.
- Disturbance in the fluid balance leading to loss of water, minerals and trace elements; changes in type of feed, intolerance to certain feed.

### **Recognition**

It is very easy to recognise by analysing the appearance, composition and smell of the faeces.

### **Signs and Symptoms**

- Faeces not thickened; gut contents spend less time in the intestine
- Urine not thickened because of increased volume (due to excessive water intake)
- Result: Diarrhoea or wet droppings

### **Similar Conditions**

- Paramyxovirus infection
- E.Coli infection
- Salmonellosis
- Coccidiosis

## Treatment and Advice

- Eliminate any of the possible causes which can result in wet droppings.
  - Avoid temperature changes, especially in the very hot and very cold months; use air-extractors.
  - Avoid changes in the loft layout and feeding times.
  - Provide supplements for stress which pigeons develop before a race.
  - Take care when changing type of food; inspect faeces produced by pigeons for any intolerance to any ingredient in the feed.
- Diarrhoea results in loss of water, minerals and trace elements. It is important to replace this loss to stabilise the flora of the gut; use electrolytes.
- Do not provide bath water.

## **Young Bird Sickness**<sup>49</sup>

### **Description**

This infectious disease is responsible for several deaths amongst young pigeons. The pathogens involved are both bacteria and viruses and are transmitted by air, direct contact between birds and through contaminated water and feed.

### **Signs and Symptoms**

- Sudden death form; no signs of the disease are present prior to death
- Signs of the disease are present prior to death
  - Period between onset of symptoms and death is about 3 to 7 days.
  - Puffed up feathers
  - Lifelessness
  - Refusal of feed
  - Vomiting
  - Weight loss
  - Watery-like and greenish to yellowish puddle-like faeces

### **Similar Conditions**

- Hexamitiasis
- E.Coli infection

### **Treatment**

- Nitrofurantoin antibacterial agents such as furazolidone

### **Advice**

- Support using vitamins (eg; crucifers; extremely effective against bacteria, viruses and fungi) and immunoglobulins which enhance the immune system when there is a suspect of infection due to contact with other young pigeons eg; introducing new youngsters to the flock or during racing season.



- Stress factors promote the onset of the disease;
  - Avoid introducing other birds into the same loft.
  - Support using vitamins when vaccinating since it is stressful.
  - Temperature control is important as heat promote bacterial growth and water shortage.
  - Do not over stress the pigeon when training them for flights.

## **General information**<sup>50</sup>

### **Hygiene**

It is important to clean the loft daily by removing all the droppings, waste matter and litter. Using a vacuum cleaner may aid cleaning difficult areas such as cracks within the loft. The feeding and water containers should be cleaned daily as well using hot water.

Disinfection is crucial to eliminate both parasites and pathogens. Care should be taken when using the product, as some can be applied on the pigeons while some are harmful to the pigeons. It is important to read specific product instructions before use. Control of other insects and small rodents can also be taken but make sure that product won't harm the pigeons or else take special precautions.

### **Support during treatment**

When treating any specific pathogen it is important to complement the treatment using other treatment modalities.

- To support the replenishment of the flora of the gut, natural bacteria and B-complex vitamins can be administered following antibiotic treatment or infection.
- To improve and support the pigeons' immune system, ginseng and other medical herbs can be used.
- To support metabolism and liver function and prevent stress, disease and long recovery time, preparations containing vitamins, amino acids and butaphosphane are essential.

### **Racing pigeons**

Some hints for a successful race:

- Be patient
- Provide a well balanced diet and a suitable loft

- Care should be taken when administering products to support the pigeon during the race. Make sure not to give many different products at the same time due to interactions between different ingredients. It is best to find a preparation which offers all the vitamins in one.
- If the pigeon was on any specific treatment it should be stopped at least 2 weeks before the race.
- For a blood thinning effect, let the pigeon drink lots of fresh water.
- Do not train the pigeons a day before the race to avoid losing energy.
- Amount of feed should be given according to amount of training done.
- Increase the amount of fat and carbohydrates in the feed as this is the main supply of energy during the race. Products which support lipid metabolism are useful before the race such as Caritin and B-complex vitamins.

**Fish**

The health of a fish can be maintained through simple diagnostic tests and observations. Monitoring for diseases and water quality before they set in is the most cost-effective method to prevent fish problems.

The fish's physiological processes are largely affected by changes in water temperature. The internal tissue of freshwater fish is hyperosmolar, meaning that the inside of the fish is more concentrated than fresh water, whereas for saltwater fish it is contrary, hypoosmolar. Fluid balance can be lost by surface injuries, since osmoregulation will be much more difficult.

Poor water quality predisposes the fish to environmentally induced diseases. It is essential to assess the basic parameters of water quality being;

- Dissolved gases
- Nitrogenous compounds
- Carbonate compounds
- Salinity

The requirements of these parameters vary according to different factors such as the type of system, stocking density and species. However, high levels of ammonia and low levels of dissolved oxygen are likely to lead to death. Chlorine is highly toxic to fish and the source is as simple as tap water. Colorimetric tests are available to measure the amount of chlorine in the aquarium, to prevent death by chlorine intoxicification. The result should be zero or undetectable. Hydrogen sulphides result from sediments from; tanks which are not cleaned routinely and well water. This leads to areas in the tank which end up without oxygen. If household plumbing is made up of copper piping, there is a risk of copper ending up in your tank. This can result from copper being leaked into the water, especially if it is allowed to stand in pipes. Sufficient volumes can lead to death. However, there are 2 simple remedies; run the water before placing in the aquarium or use special filtration products such as activated charcoal.

Oxygen is the most important of dissolved gases. When fish end hypoxic (with low oxygen concentration) they move towards the surface of the aquarium. The amount of oxygen that an indoor tank can hold depends on 3 factors; altitude, water temperature and salinity. Oxygen level drops as any of these 3 variables increases,

water temperature being the most important variable. Special care should be taken during the hot summer months, since the risk of hypoxemia increases. Carbon dioxide toxicity is a problem observed mainly due to stocking density. The water system turns acidic, and can be detected by simple tests. The treatment for both oxygen deficiency and excess carbon dioxide is vigorous and increased aeration.

Degradation of fish food and excretions by the fish make entry to nitrogenous gases, because fish food is mainly composed of proteins. Ammonia is converted to nitrogen, which is a volatile liquid and thus can leave the system naturally, through a complex process. Ammonia can be increased in an aquarium by 2 factors; malfunction of the bacteria responsible to break down ammonia and overfeeding. This can be measured by ammonia test kits, and if it indicates high levels, action should be taken by changing at least half the water and moving the fish to a clean and pH-controlled aquarium.

For a marine aquarium, it is very important to maintain the correct salinity around 3%, since micronutrients which are present in sea water are essential. The salinity can be measured by a simple hydrometer and not the chloride test, because sometimes these 2 tests are confused.

Health, growth and reproductive development of the fish is highly determined by nutrition. Today, modifications to fish diets have been greatly made, and specific diets for specific species are available <sup>51-53</sup>.



# References

1. Harari J. Degenerative Arthritis in Small Animals. Musculoskeletal System; Arthropaties and Related Disorders in Small Animals. The Merck Veterinary Manual [Internet]. 2013 Jun [cited 2015 Aug]; [about 1p.]. Available from: [http://www.merckvetmanual.com/mvm/musculoskeletal\\_system/arthropaties\\_and\\_related\\_disorders\\_in\\_small\\_animals/degenerative\\_arthritis\\_in\\_small\\_animals.html](http://www.merckvetmanual.com/mvm/musculoskeletal_system/arthropaties_and_related_disorders_in_small_animals/degenerative_arthritis_in_small_animals.html)
2. Gallagher A. Arthritis in Cats: Recognizing the Signs and Treating the Disease. PetMD, LLC [Internet]. C1991-2015 [cited 2015 Jul 13]; [about 1p.]. Available from: [http://www.petmd.com/cat/centers/nutrition/evr\\_multi\\_how-to-recognize-arthritis-signs-in-pets](http://www.petmd.com/cat/centers/nutrition/evr_multi_how-to-recognize-arthritis-signs-in-pets)
3. Elliott P. Yes, Cats can get the Flu- And No, you can't catch it. Petful [Internet]. 2015 Jan 14 [cited 2015 Jul 15]; [about 3p.]. Available from: <http://www.petful.com/pet-health/cat-flu/>
4. Huston L. Dental and Other Oral Health Issues in Cats. The Daily Vet [Internet]. 2012 Sep 17 [cited 2015 Jul 23]; [about 2p.]. Available from: [http://www.petmd.com/thedailyvet/huston/2012/sept/dental\\_and\\_other\\_oral\\_health\\_issues\\_in\\_cats-27034](http://www.petmd.com/thedailyvet/huston/2012/sept/dental_and_other_oral_health_issues_in_cats-27034)
5. Elliott P. Halitosis in a Cat-When Bad Breath Goes Way Beyond 'Fishy'. Petful [Internet]. 2014 Nov 18 [cited 2015 Jul 23]; [about 2p.]. Available from: <http://www.petful.com/pet-health/halitosis-in-cats/>
6. Lichtenberg D. When Your Cat Has Allergies, You Can Ditch The Itch. Petful [Internet]. 2012 Apr 18 [cited 2015 Jul 11]; [about 4p.]. Available from: <http://www.petful.com/pet-health/cat-has-allergies-treatment/>
7. Lichtenberg D. Dog Allergies Treatment Options-Get to the Bottom of the Itch. Petful [Internet]. 2012 Apr 4 [cited 2015 Jul 11]; [about 4p.]. Available from: <http://www.petful.com/pet-health/dog-allergies-treatment-options/>
8. Lichtenberg D. All about Ticks- and the truth about Frontline, Advantix, etc. Petful [Internet]. 2012 Jun 13 [cited 2015 Jul 10]; [about 3p.]. Available from: <http://www.petful.com/pet-health/all-about-ticks-and-the-truth-about-frontline-advantix-etc/>
9. Elliott P. Flea and Tick Medicine Poisoning in Cats. Petful [Internet]. 2014 Sep 28 [cited 2015 Jul 10]; [about 2p.]. Available from: <http://www.petful.com/pet-health/flea-and-tick-medicine-poisoning-in-cats/>
10. Frontworth D. How To Treat Dog Lice Naturally. Petful [Internet]. 2012 Mar 12 [cited 2015 Jul 9]; [about 2p.]. Available from: <http://www.petful.com/pet-health/how-to-treat-dog-lice-naturally/>
11. Foster & Smith. Flea & Tick Active Ingredients. Foster & Smith, Inc [Internet]. C1997-2015 [cited 2015 Jul 12]. Available from: <http://www.drsofostersmith.com/pic/article.cfm?aid=521>
12. Mahaney P. Canine and Feline Diabetes: Are Care takers and Pet Foods and Fault? . The Daily Vet [Internet]. 2011 Nov 15 [cited 2015 Jul 21]; [about 2p.]. Available from: [http://www.petmd.com/thedailyvet/pmahaney/2011/nov/canine\\_and\\_feline\\_diabetes\\_caretakers\\_at\\_fault-11978#](http://www.petmd.com/thedailyvet/pmahaney/2011/nov/canine_and_feline_diabetes_caretakers_at_fault-11978#)
13. Inflammation of the Middle Ear and External Ear Canal in Dogs. PetMD, LLC [Internet]. C1991-2015 [cited 2015 Jul 13]; [about 1p.]. Available from: [http://www.petmd.com/dog/conditions/ears/c\\_multi\\_otitis externa\\_and\\_otitis\\_media?page=show](http://www.petmd.com/dog/conditions/ears/c_multi_otitis externa_and_otitis_media?page=show)
14. Zeltzman P. When an Ear Infection turns into Ear Surgery. Petful [Internet]. 2014 Feb 14 [cited 2015 Jul 16]; [about 2p.]. Available from: <http://www.petful.com/pet-health/ear-infection-surgery-dogs-cats/>



15. Moriello KA. Overview of Otitis Externa. Eye and Ear; Otitis Externa. The Merck Veterinary Manual [Internet]. 2013 Sept [cited 2015 Aug]; [about 5p.]. Available from: [http://www.merckvetmanual.com/mvm/eye\\_and\\_ear/otitis\\_externa/overview\\_of\\_otitis\\_externa.html](http://www.merckvetmanual.com/mvm/eye_and_ear/otitis_externa/overview_of_otitis_externa.html)
16. Eye Inflammation (Anterior Uveitis) in Cats. PetMD, LLC [Internet]. C1991-2015 [cited 2015 Jul 13]; [about 1p.]. Available from: [http://www.petmd.com/cat/conditions/eyes/c\\_ct\\_anterior\\_uveitis?page=show](http://www.petmd.com/cat/conditions/eyes/c_ct_anterior_uveitis?page=show)
17. Peregrine AS. Tapeworms in Small Animals. Digestive System; Gastrointestinal Parasites of Small Animals. The Merck Veterinary Manual [Internet]. 2014 Sep [cited 2015 Aug]; [about 2p.]. Available from: [http://www.merckvetmanual.com/mvm/digestive\\_system/gastrointestinal\\_parasites\\_of\\_small\\_animals/tapeworms\\_in\\_small\\_animals.html](http://www.merckvetmanual.com/mvm/digestive_system/gastrointestinal_parasites_of_small_animals/tapeworms_in_small_animals.html)
18. Vomiting and Diarrhoea in Dogs and Cats. Petful [Internet]. 2012 Dec 1 [cited 2015 Jun 24]; [about 3p.]. Available from: <http://www.petful.com/pet-health/vomiting-and-diarrhea-in-dogs-cats/>
19. Kittleson MD. Heart Failure. Circulatory system; Heart Disease and Heart Failure. The Merck Veterinary Manual [Internet]. 2013 Sept [cited 2015 Aug]; [about 11p.]. Available from: [http://www.merckvetmanual.com/mvm/circulatory\\_system/heart\\_disease\\_and\\_heart\\_failure/heart\\_failure.html](http://www.merckvetmanual.com/mvm/circulatory_system/heart_disease_and_heart_failure/heart_failure.html)
20. Huston L. Heart Disease in Cats. The daily vet. PetMD, LLC [Internet]. 2012 Feb 27 [cited 2015 Jul 13]; [about 1p.]. Available from: [http://www.petmd.com/thedailyvet/huston/2012/feb/heart\\_disease\\_in\\_cats-12874](http://www.petmd.com/thedailyvet/huston/2012/feb/heart_disease_in_cats-12874)
21. Heart Disease (Hypertrophic Cardiomyopathy) in Dogs. PetMD, LLC [Internet]. C1999-2015 [cited 2015 Jul 13]; [about 1p.]. Available from: [http://www.petmd.com/dog/conditions/cardiovascular/c\\_dg\\_cardiomyopathy\\_hypertrophic?page=show](http://www.petmd.com/dog/conditions/cardiovascular/c_dg_cardiomyopathy_hypertrophic?page=show)
22. Lahey R. Kidney Failure: A common cause of death in cats. Petful [Internet]. 2012 Jan 12 [cited 2015 Jul 14]; [about 2p.]. Available from: <http://www.petful.com/pet-health/why-kidney-failure-common-cats/>
23. Kidney Failure in Dogs. PetMD, LLC [Internet]. C1999-2015 [cited 2015 Jul 14]; [about 4p.]. Available from: [http://www.petmd.com/dog/general-health/evr\\_dg\\_kidney\\_failure\\_in\\_dogs?page=show](http://www.petmd.com/dog/general-health/evr_dg_kidney_failure_in_dogs?page=show)
24. Parasite Infection (Leishmaniasis) in Dogs. PetMD, LLC [Internet]. C1999-2015 [cited 2015 Jul 6]; [about 2 p.]. Available from: [http://www.petmd.com/dog/conditions/infectious-parasitic/c\\_dg\\_leishmaniasis](http://www.petmd.com/dog/conditions/infectious-parasitic/c_dg_leishmaniasis)
25. Sandfly Protection for your Dog. CanineMalta.com [Internet]. 2012 [cited 2015 Jul 12]. Available from: <http://caninemalta.com/index.php/articles-canine-knowledgebase/dog-healthcare/46-health-2>
26. Jankovic Z. Dealing with Leishmaniasis A.K.A Sand-fly Disease. Vetmalta.com [Internet]. C 2004-2014 [cited 2015 Jul 12]; [about 2p.]. Available from: <http://www.vetmalta.com/leishmaniasis-or-sand-fly-disease>
27. Lichtenberg D. Feline Interstitial Cystitis. Petful [Internet]. 2012 May 2 [cited 2015 Jul 14]; [about 4p.]. Available from: <http://www.petful.com/pet-health/feline-interstitial-cystitis-cats/>
28. Zeltzman P. The most common health threat to Dogs and Cats. Petful [Internet]. 2013 Oct 14 [cited 2015 Jul 16]; [about 2p.]. Available from: <http://www.petful.com/pet-health/most-common-health-threat-dogs-cats/>
29. Stay informed to optimise your dog's health. Hill's Pet Nutrition, Inc [Internet]. 2015 [cited 2015 Jul 1]. Available from: <http://www.hillspet.com/dog-care/dog-diseases.html>
30. Stay informed to optimise your cat's health. Hill's Pet Nutrition, Inc [Internet]. 2015 [cited 2015 Jul 1]. Available from: <http://www.hillspet.com/cat-care/cat-diseases.html>

31. McClure D. Parasitic Diseases of Rabbits. Exotic and Laboratory Animals; Rabbits. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 3p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/rabbits/parasitic\\_diseases\\_of\\_rabbits.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/rabbits/parasitic_diseases_of_rabbits.html)
32. Elliot P. The Risk of Dental Disease in Rabbits. Petful [Internet]. 2015 May 1 [cited 2015 Jul 2]; [about 2p.]. Available from: <http://www.petful.com/other-pets/dental-disease-rabbits/>
33. McClure D. Non-Infectious diseases of rabbits. Exotic and Laboratory Animals; Rabbits. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 5p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/rabbits/noninfectious\\_diseases\\_of\\_rabbits.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/rabbits/noninfectious_diseases_of_rabbits.html)
34. Infestation of Mites in the ear in rabbits. PetMD, LLC [Internet]. C1999-2015 [cited 2015 Jul 6]; [about 2 p.]. Available from: [http://www.petmd.com/rabbit/conditions/ears/c\\_rb\\_ear\\_mites](http://www.petmd.com/rabbit/conditions/ears/c_rb_ear_mites)
35. McClure D. Viral Diseases of Rabbits. Exotic and Laboratory Animals; Rabbits. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 4p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/rabbits/viral\\_diseases\\_of\\_rabbits.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/rabbits/viral_diseases_of_rabbits.html)
36. McClure D. Bacterial and Mycotic Diseases of Rabbits. Exotic and Laboratory Animals; Rabbits. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 7p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/rabbits/bacterial\\_and\\_mycotic\\_diseases\\_of\\_rabbits.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/rabbits/bacterial_and_mycotic_diseases_of_rabbits.html)
37. Red Eye in rabbits. PetMD, LLC [Internet]. C1999-2015 [cited 2015 Jul 3]; [about 2p.]. Available from: [http://www.petmd.com/rabbit/conditions/eyes/c\\_rb\\_red\\_eye](http://www.petmd.com/rabbit/conditions/eyes/c_rb_red_eye)
38. Matted Hair and Hairballs in the stomach in rabbits. PetMD, LLC [Internet]. C1999-2015 [cited 2015 Jul 6]; [about 2 p.]. Available from: [http://www.petmd.com/rabbit/conditions/digestive/c\\_rb\\_trichobezoars](http://www.petmd.com/rabbit/conditions/digestive/c_rb_trichobezoars)
39. Greener K. Rabbit Diseases. Justrabbits.com [Internet]. C2015 [cited 2015 Jul 2]. Available from: <http://www.justrabbits.com/rabbitdiseases.html#gs.9d72ccabbdde4d628eb2392902b4835a>
40. Gerhold RW. Overview of Coccidiosis in Poultry. Poultry; Coccidiosis. The Merck Veterinary Manual [Internet]. 2014 Jun [cited 2015 Aug]; [about 4p.]. Available from: [http://www.merckvetmanual.com/mvm/poultry/coccidiosis/overview\\_of\\_coccidiosis\\_in\\_poultry.html](http://www.merckvetmanual.com/mvm/poultry/coccidiosis/overview_of_coccidiosis_in_poultry.html)
41. Gruenberg W. Overview of Salmonellosis. Digestive System; Salmonellosis. The Merck Veterinary Manual [Internet]. 2014 May [cited 2015 Aug]; [about 6p.]. Available from: [http://www.merckvetmanual.com/mvm/digestive\\_system/salmonellosis/overview\\_of\\_salmonellosis.html](http://www.merckvetmanual.com/mvm/digestive_system/salmonellosis/overview_of_salmonellosis.html)
42. Philips JR. Mites of Poultry. Poultry; Ectoparasites. The Merck Veterinary Manual [Internet]. 2013 Oct [cited 2015 Aug]; [about 3p.]. Available from: [http://www.merckvetmanual.com/mvm/poultry/ectoparasites/mites\\_of\\_poultry.html](http://www.merckvetmanual.com/mvm/poultry/ectoparasites/mites_of_poultry.html)
43. Macklin KS. Overview of Helminthiasis in Poultry. Poultry; Helminthiasis. The Merck Veterinary Manual [Internet]. 2013 Oct [cited 2015 Aug]; [about 5p.]. Available from: [http://www.merckvetmanual.com/mvm/poultry/helminthiasis/overview\\_of\\_helminthiasis\\_in\\_poultry.html](http://www.merckvetmanual.com/mvm/poultry/helminthiasis/overview_of_helminthiasis_in_poultry.html)
44. Beckstead RB. Overview of Hexamitiasis in Poultry. Poultry; Hexamitiasis. The Merck Veterinary Manual [Internet]. 2014 Jul [cited 2015 Aug]; [about 1p.]. Available from: [http://www.merckvetmanual.com/mvm/poultry/hexamitiasis/overview\\_of\\_hexamitiasis\\_in\\_poultry.html](http://www.merckvetmanual.com/mvm/poultry/hexamitiasis/overview_of_hexamitiasis_in_poultry.html)
45. Lighfoot TL. Viral Diseases of Pet Birds. Exotic and laboratory Animals; Pet Birds. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 5p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/pet\\_birds/viral\\_diseases\\_of\\_pet\\_birds.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/pet_birds/viral_diseases_of_pet_birds.html)

46. Reinhold P. Overview of Chlamydiosis. Generalized conditions; Chlamydiosis. The Merck Veterinary Manual [Internet]. 2013 Oct [cited 2015 Aug]; [about 4p.]. Available from: [http://www.merckvetmanual.com/mvm/generalized\\_conditions/chlamydiosis/overview\\_of\\_chlamydiosis.html](http://www.merckvetmanual.com/mvm/generalized_conditions/chlamydiosis/overview_of_chlamydiosis.html)
47. Swayne DE. Other Avian Paramyxovirus Infections. Poultry; Newcastle Disease and other Paramyxovirus Infection. The Merck Veterinary Manual [Internet]. 2014 Jan [cited 2015 Aug]; [about 1p.]. Available from: [http://www.merckvetmanual.com/mvm/poultry/newcastle\\_disease\\_and\\_other\\_paramyxovirus\\_infections/other\\_avian\\_paramyxovirus\\_infections.html](http://www.merckvetmanual.com/mvm/poultry/newcastle_disease_and_other_paramyxovirus_infections/other_avian_paramyxovirus_infections.html)
48. Gerhold RW. Overview of Trichomonosis. Poultry; Trichomonosis. The Merck Veterinary Manual [Internet]. 2014 Jun [cited 2015 Aug]; [about 1p.]. Available from: [http://www.merckvetmanual.com/mvm/poultry/trichomonosis/overview\\_of\\_trichomonosis.html](http://www.merckvetmanual.com/mvm/poultry/trichomonosis/overview_of_trichomonosis.html)
49. Lightfoot TL. Pediatric Diseases of Pet Birds. Exotic and laboratory Animals; Pet Birds. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 2p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/pet\\_birds/pediatric\\_diseases\\_of\\_pet\\_birds.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/pet_birds/pediatric_diseases_of_pet_birds.html)
50. Chevita GmbH. Health Guide for Pigeons. Pfaffenhofen (Germany): Chevita GmbH; 2009 Jan. 1p
51. Smith SA. Health Management in Aquaculture Systems. Management and Nutrition; Aquaculture Systems. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 1p.]. Available from: [http://www.merckvetmanual.com/mvm/management\\_and\\_nutrition/aquaculture\\_systems/health\\_management\\_in\\_aquaculture\\_systems.html](http://www.merckvetmanual.com/mvm/management_and_nutrition/aquaculture_systems/health_management_in_aquaculture_systems.html)
52. Floyd RF. Overview of Fish. Exotic and Laboratory Animals; Fish. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 1p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/fish/overview\\_of\\_fish.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/fish/overview_of_fish.html)
53. Floyd RF. Environmental Diseases of Fish. Exotic and Laboratory Animals; Fish. The Merck Veterinary Manual [Internet]. 2011 Jul [cited 2015 Aug]; [about 7p.]. Available from: [http://www.merckvetmanual.com/mvm/exotic\\_and\\_laboratory\\_animals/fish/environmental\\_diseases\\_of\\_fish.html](http://www.merckvetmanual.com/mvm/exotic_and_laboratory_animals/fish/environmental_diseases_of_fish.html)

## List of Veterinary Clinics

All Animal Clinic  
6, Triq ir-Raheb,  
Tarxien, TXN 2144

Tel: 21 693 061  
Mob: 99 420 158

Animal Aid Veterinary Clinic  
49, Triq Oscar Zammit,  
Msida, MSD 1282

Tel: 27 838 838

Animal Wellness Centre  
61, Triq il-Kbira,  
Sliema

Mob: 77 851 025

Blue Cross Veterinary Clinic  
Triq il-Wied tal-Imsida,  
Msida, MSD 9020

Tel: 21 492 174

Dr Trevor's Veterinary Clinic  
56, Triq Kananea,  
Attard, ATD 2705

Tel: 21 423 100

Happy Paws Clinic  
41, Triq is-Salib tal-Marsa,  
Marsa, MRS 1548

Tel: 21 227 127

Highrise Veterinary Clinic  
Triq I-imradd,  
Ta' Xbiex, XBX 1150

Tel: 21 322 150

Ambuserv Animal Ambulance  
F/H 2, Sqaq Seguna,  
Lija, LJA 1820

Mob: 99 333 112

Animal Doctors  
20, Triq Guze' Bajada,  
Hamrun, HMR 2131

Tel: 21 233 011

Best Friends Veterinary Clinic  
109, Triq Hal Luqa,  
Paola, PLA 9043

Tel: 21 896 949

Centru San Frangisk Animal Hospital  
Ta' Qali,  
Attard

Tel: 21 423 100  
Mob: 79 830 935

Galea Veterinary Clinic Gozo  
Triq Wied is-Seqer,  
Victoria, Gozo, VCT 2801

Tel: 21 554 257

Healthy Pets Veterinary Clinic  
Triq Fleur De Lys,  
Birkirakara, BKR 9068

Mob: 79 278 495

Pets Veterinary Clinic  
28, Triq Wied il-Ghajj,  
Zabbar, ZBR 2701

Tel: 21 896 897

Qormi Veterinary Clinic  
3, Triq Santu Rokku,  
Qormi, QRM 2344

Tel: 21 480 480

St Simon Veterinary Practice  
53, Triq Grognet,  
Mosta, MST 3611

Tel: 21 432 280  
Mob: 79 472 542, 99 478 289

The Professional Centre,  
Malta Veterinary Association  
Triq tas-Sliema,  
Gzira

Tel: 52 502 000

VetPlus Services  
St Jacob, Triq ic-Cawqli,  
Qormi, QRM 3900

Tel: 27 296 550  
Mob: 79 296 550

St Ann Vet Clinic  
Triq il-Faxxina,  
Swieqi, SWQ 3042

Tel: 21 385 455

The Animal Doctor  
Triq Karlu Galea,  
Victoria, Gozo, VCT 2605

Mob: 99 823 658

VetCare Animal Clinic  
Misrah Lourdes,  
San Gwann, SGN 2010

Tel: 21 373 277

Vets at Home  
1, Triq Frangisk Xerri,  
Birkirkara, BKR 1020

Mob: 99 922 777

## List of Veterinary Pharmacies

Agrimed LTD  
Triq l-Imdina,  
Zebbug, ZBG 9016

Tel: 21 465 797

Central Veterinary Pharmacy  
Carina Showroom, Triq Valletta,  
Qormi, QRM 3617

Tel: 27 440 606

PharmaVet  
Triq tal-Barrani,  
Zejtun, ZTN 9023

Tel: 21 892 735

Animal Pharm  
Triq il-Papa Piju XII,  
Birkirkara, BKR 1403

Tel: 21 449 058

FarmCare Tas-Salib  
Regent Building, Triq it-Tigrija,  
Marsa, MRS 1633

Tel: 21 255 100

VetMedic Pharmacy  
119, Triq Edgar Bernard,  
Gzira, GZR 1707

Tel: 21324444