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Importation of stray dogs from Hungary and Romania into Norway

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1. Introduction

The number of stray dogs imported from Hungary and Romania to Norway has increased significantly during the last years. The Norwegian government fears that foreign pathogens will be imported and they are concerned about human and animal health risks. It has become a much discussed topic between the Norwegian government, dog charity organizations, veterinarians and dog owners. Different opinions regarding the consequences of import have become evident and uncertainty whether the import of stray dogs should be legal or not is present within the Norwegian government.

The aim of this thesis is to give an overview of the factors playing a role in the discussion of importation of stray dogs and what changes could be done to make the import more safe. An overview of the regulations regarding the non-commercial import of pet animals in Norway is given. Introduction of the Norwegian governmental bodies engaged in the discussion and studies performed by them is described. These studies give an overview of the opinions and recommendations of the Norwegian government. A few of the dog charity organizations and their work are also described. The reasons and consequences of import are discussed based on literature studies performed by the Norwegian government and studies regarding the prevalence of pathogens from certain journals and articles.

2. Regulations of non- commercial import

2.1 Regulation (EC) No 988/2003 of the European Parliament and of the Council, 26 May 2003

This is the regulation adopted by the European Union, which the Norwegian government through their obligation to European Economic Area follows by law. The regulation (EC) No 998/2003 of the European Parliament and of the Council lays down the animal health requirements applicable to the non-commercial movement of pet animals. The regulation includes movement into a Member State from another Member State or from third countries. It aims to ensure a sufficient level of safety regarding the public and animal health risks involved in the non-commercial movement.

When being moved, pet animals of the species dogs, cats and ferrets must be identified with a clearly readable tattoo or an electronic identification system. They must be accompanied by a passport issued by a veterinarian authorized by the competent authority certifying that a valid anti-rabies vaccination was carried out on the animal. When necessary, preventive health measures regarding other diseases must be carried out on the animal in question.

Member States may authorize the movement of dogs, cats and ferrets that are under three months old and unvaccinated. The animal must be accompanied by a passport and have stayed in the place in which it was born since birth or are accompanied by their mother on whom they are still dependent. They must have had no contact with wild animals due to the risk of being exposed to an infection.

The movement of pet animals between, respectively, San Marino, the Vatican and Italy, Monaco and France, Andorra and France or Spain, and Norway and Sweden may be regulated by import conditions laid down by national rules.

Member States must provide the public with clear and easily accessible information concerning the health requirements that apply for the non- commercial movement of pets and the conditions under which they may enter or re-enter such territory. They shall also ensure that the personnel at the border control are fully informed of these rules and are able to implement them.

At the time of any movement, the owner or person responsible for the pet animal must be able to present the authorities responsible for border control a passport or certificate certifying that the animal meets the requirements laid down for such movement. If border control reveals that the animal does not meet the requirements, the competent authorities shall decide in agreement with an authorized veterinarian what to do with the animal. The pet animal must either be sent back to its country of origin, be put in isolation under the control of the official authority (until time spent in isolation is enough to meet health requirements) or the animal must be euthanized. The decision made will be at the expense of the owner or the natural person responsible for the animal. No compensation will be given if the animal is euthanized. Member States are responsible for housing the animals, which are refused authorization to enter Community territory until their return to their country of origin or any other administrative decision has been made.

The certificate accompanying the animals must also confirm that, 24 hours before dispatch of the animals, a clinical examination was carried out by a veterinarian authorized by the competent authority showing that the animals are in good health and able to withstand carriage to their destination.

The regulation, (EC) No 998/2003, covers the non- commercial import of the animal species dogs, cats, ferrets, rodents, domestic rabbits, invertebrates (except bees and crustaceans), ornamental tropical fish, amphibians, reptiles and birds (except poultry).

The electronic identification system for the identification of pet animals shall be a read-only passive radio frequency identification device (transponder). It must fulfill the ISO Standard 11784, applying HDX or FDX B technology and capable of being read by a reading device compatible with ISO Standard 11785.

The anti- rabies vaccination is considered valid if it is a vaccine other than a live modified vaccine. This means that the vaccine must be an inactivated vaccine of at least one antigenic unit per dose (WHO standard) or a recombinant vaccine expressing the immunising glycoprotein of the rabies virus in a live virus vector. The vaccination is only considered valid if 21 days has past since completion of the vaccination protocol required by the manufacturer. A revaccination must be considered if the primary vaccination was not carried out within the

period of validity (1 year).

2.2 Regulation 2004-07-01 nr 1105

This is the Norwegian regulation regarding the non-commercial import of companion animals. The paragraphs listed below are paragraphs based on (EC) No 998/2003, but are adjusted to the Norwegian requirements.

Transport of dogs, cats and ferrets

Dogs, cats and ferrets imported to Norway from third countries shall be identified by an easily readable tattoo that was applied before 3 July 2011, or an electronic identification system (transducer).

Dogs, cats and ferrets imported to Norway from third countries from 1st of January 2012 must be vaccinated against rabies. Vaccination shall meet the requirements of Regulation (EC) No 998/2003 Annex Ib. Dogs, cats and ferrets imported to Norway from third countries not listed in Annex II, part B (section 2) and part C¹ (EC) No 998/2003 (see Appendix) must have taken a serological test that shows that they have achieved a level of antibodies of at least 0.5 IU/ml. An authorized veterinarian must take the blood sample in an approved laboratory. It must be taken at least 30 days after vaccination and three months before importation. It is not necessary to repeat this testing on animals revaccinated at the intervals of validity according to the EU regulation.

When importing pets from countries listed in Annex II, Part A and B to Regulation (EC) No 998/2003 (see Appendix) and from Svalbard and Jan Mayen the animal and its documents must be presented to Custom control. When importing pets from countries listed in Annex II Part C the animal shall be investigated by the Norwegian Food Safety Authority (NFSA). The importer shall notify the local NFSA at least 48 hours in advance of the time and place of arrival. Importation of pets to Norway from third countries not listed shall be controlled by a veterinarian at the border unless such checks have been carried out on another border inspection in the EEA.

The Norwegian Food Safety Authority (NFSA) may, in special cases, grant exemptions from

¹ See appendix

the provisions of this Regulation. The exemptions must not conflict with international obligations, including the EEA Agreement.

2.3 Commission delegated regulation (EU) No 1152/2011 of 14 July 2011

This regulation establishes preventive health measures for the control of *Echinococcus multilocularis* infection in dogs transported for non-commercial purposes into Member States or parts of Member States. Non-commercial import of dogs to Norway follows this regulation by law. Norway is considered free of *Echinococcus multilocularis*.

The measures are determined by the absence of the parasite *Echinococcus multilocularis* in animals that can serve as the main hosts, or implementation of a program for the eradication of *Echinococcus multilocularis* in wild main hosts.

Dogs transported for non-commercial purposes to a Member State or part of a Member State, must be treated with an antiparasitic veterinary medical product. This treatment should be applied as soon as possible prior to import. Treatment must be done 24-120 hours before entering Norway and must be effective against sexually mature and non-mature intestinal living forms of *Echinococcus multilocularis*. According to the European Food Safety Authority, the risk of introducing the parasite will decrease if treatments of dogs from endemic areas are done prior to import.

The treatment shall consist of a veterinarian prescribing a veterinary medical product. It must contain an appropriate dose of praziquantel or a pharmacologically active substance alone or in combination. The medical product must have shown to reduce the immature and not fully matured intestinal living forms of the parasite *Echinococcus multilocularis* in affected host species.

3. The Norwegian Food Safety Authority and The Norwegian Veterinary Institute

The two main governmental bodies which are engaged in the discussion concerning the importation of stray dogs and which are responsible for changing regulations based on research are described below. The information is taken from their own webpage.

3.1 The Norwegian Food Safety Authority

The Norwegian Food Safety Authority (NFSA) is a governmental body, whose aim is to make sure that food and drinking water are safe and healthy for consumers. They also ensure plant, fish and animal health. Their regulations promotes ethical keeping of animals and encourage production that is friendly towards the environment. They also regulate and control cosmetics and animal health personnel. The Norwegian Food Safety Authority's role is to provide the government with drafts and information on regulations, perform or order risk-assessments, monitor food, plant, fish and animal health safety. The NFSA must also have plans for emergencies concerning these factors. They advise the Ministry of Food and Agriculture, the Ministry of Fisheries, Coastal Affairs and the Ministry of Health and Care Services. Norway is not a member of the European Union (EU), but is required to adopt much of the EU regulations due to our participation in the European Economic Area (EEA). This agreement ensures Norway some access to the work on new EU regulations.

3.2 The Norwegian Veterinary Institute

The Norwegian Veterinary Institute is a biomedical research institute for animal health, fish health and food safety. Their responsibility is research and development, diagnostic work, monitoring, counseling and risk assessments. The Norwegian Veterinary Institute was established in 1891 as a diagnostic unit for animal diseases. During the last 40 years the Norwegian Veterinary Institute has also worked with fish diseases. From 1995, food hygiene and food safety has been a key work for the department. The Norwegian Veterinary Institute also engages in projects and cooperation's with several institutions in Norway and abroad. These institutions usually work with agriculture, aquaculture, health and the environment.

4. Risk assessment 2012

The Norwegian Veterinary Institute published a quick risk assessment 10th of September 2012 because of detection of several foreign pathogens in stray dogs imported from Hungary and Romania. The Norwegian Food Safety Authority and the Norwegian Veterinary Institute were concerned regarding both animal and human health risks, especially due to the significantly increasing number of stray dogs imported after 1st January 2012. The disease status of the Norwegian dog population is different from that of Hungarian and Romanian dog populations. Obviously, this causes an increased risk of importing foreign pathogens. This increased risk has been highlighted by detection of the tongue worm (*Linguatula serrata*), heartworm (*Dirofilaria immitis*), the brown dog tick (*Rhipicephalus sanguineus*) and contagious venereal tumor in dogs imported from Hungary and Romania during 2012 and 2013. The following text is based on the information from the risk assessment. Information from elsewhere is referred to in the text.

On 1st January 2012 EU lifted the mandatory checks of rabies antibody titer prior to import into Member states. Due to the fact that Norway's regulations are based on EU's regulations, we also changed the regulation regarding the rabies antibody titer. This led to making import of stray dogs less difficult. Now dogs could be imported to Norway only 21 days after the rabies vaccination. It is difficult to estimate the number of stray dogs imported annually to Norway, since no registration has been done at the border. The Norwegian Veterinary Institute estimates that at least 200 dogs have been imported into Norway from Romania alone during the past 6 months. This means that during the next decade 5000 stray dogs could be imported. The Norwegian Veterinary Institute carried out a quick risk assessment, to evaluate the current situation and provide recommendations. Only a few pathogens were assessed due to time requirements. However, the pathogens included are those the Norwegian Veterinary Institute considers to be of greatest significance to the Norwegian dog population.

4.1 Risk assessment

In this risk assessment disease agents defined as dangers must fulfil several criteria. They must be able to be imported with the dog, either because the dog is infected or because it carries infected vectors (ticks, lice, fleas etc.). The agents must be present in Hungary or Romania, not exist or rare in Norway and may have a significant health consequence. Following these risk assessment criteria these pathogens are considered:

- Rabies
- *Leptospira interrogans serovar canicola* and *serovar icterohemorrhagiae*
- *Ehrlichia canis*
- *Brucella canis*
- *Linguatula serrata*
- *Echinococcus granulosus* and *Echinococcus multilocularis*
- *Strongyloides stercoralis*
- *Ancylostoma caninum*
- *Leishmania* species
- *Babesia canis* and *Babesia gibsoni*
- *Dirofilaria immitis* and *Dirofilaria repens*
- *Angiostrongylus vasorum*
- *Rhipicephalus sanguineus*
- *Dermacentor marginatus*
- *Dermacentor reticulatus*

4.1.1 Rabies

Rabies is caused by a Lyssavirus (Rhabdovirus), which causes encephalitis. Infection occurs by bite/through saliva or in rare cases through inhalation. The incubation period is usually 1-2 months, but can be both significantly longer and shorter. The virus may be excreted in saliva up to two weeks before symptoms of disease appear. The symptoms may vary in different species but it usually starts with abnormal behavior, eg wild animals can be less shy. The animals may have decreased appetite, stop drinking and may have fever. Symptoms of central nervous system can manifest itself in two ways, a form of hyperactivity and aggressiveness or an ascending paralysis. In the final stages of the disease the animal dies from paralysis of respiratory muscles. Rabies is a serious zoonotic disease. Rabies has not been detected on the mainland of Norway, but on the island of Svalbard it is present.

The following information is from the WHO Rabies Bulletin Europe trend tables and the number of cases of rabies in Romania and Hungary in the time period 2012-2013. The numbers are showing a declining manner, and the main reason is the EU vaccination campaign of wild animals.

Table 1 (WHO Rabies Bulletin, Trend Table 2012-2013)

	Domestic animals 2012	Domestic animals 2013	Wild life 2012	Wild life 2013	Total 2012	Total 2013
Hungary	0	0	0	0	0	0
Romania	139	81	318	212	457	293

Table 2 (WHO Rabies Bulletin, Rabies cases 2012-2013)

	Domestic animals 2012-2013	Wild life 2012-2013	Bat	Human
Hungary	0	3	1	0
Romania	220	530	0	1

4.1.2 Leptospira

Leptospira interrogans is a spirochete infection. The serovars *Leptospira interrogans canicola* and *Leptospira icterhemorrhagiae* are the most common serovars infecting dogs. The main reservoirs for the bacteria are rodents and the fox. The bacteria sheds in the urine and contaminates the environment. Indirect infection is common. The bacteria could penetrate through wounds and mucous membranes, but also through intact surfaces. An infection could be lethal. Clinical signs are a bad general condition, fever, reduced appetite, liver- and kidney-failure and bleeding/icterus. In Norway *Leptospira* is rare. Most dogs diagnosed with *Leptospira* have been infected outside of Norway. Leptospirosis is a zoonotic disease.

In a study in Bucharest, Romania blood samples of dogs suspected to be infected with *Leptospira* were examined for antibodies against *Leptospira* species. 2 out of 37 samples were positive. Blood samples were also taken from the owners of the ill dogs, 4 out of 14 owners were positive (Ivana *et al.*, 2011).

4.1.3 Ehrlichia canis

Ehrlichia canis is an obligate intracellular bacteria replicating in reticuloendothelial cells, lymphocytes and monocytes. This bacteria is transmitted mainly by the vector *Rhipicephalus*

sanguineus (the brown tick). There are three clinical phases of Ehrlichiosis: acute, subclinical, and chronic. Dogs that become clinically diseased may have symptoms as fever, reduced appetite, thrombocytopenia, leucopenia and anemia. Some also have neurological symptoms. In Norway we do not have Ehrlichiosis or *Rhipicephalus sanguineus*. From 2000-2013 three imported dogs have tested positive for *E. canis*. Ehrlichiosis caused by *E. canis* is not a zoonosis. In Hungary and Romania studies are done which proves the presence of *E. canis*.

In a study done in Romania in 2012, 1146 serum samples were tested by SNAP 4Dx for *Anaplasma phagocytophilum*, *Borrelia burgdorferi*, and *Ehrlichia canis* antibodies, and for *Dirofilaria immitis* antigen. Results showed that 2.1% (24/1146) dogs were positive for *E. canis*. The geographical distribution suggested a foci in the southeastern region for *E. canis*. Also from the study, shelter dogs showed to be at a higher risk of getting an *E. canis* infection (Mircean *et al.*, 2012).

In a study from southern Hungary, 348 ticks were collected from shepherd dogs, red foxes and golden jackals during the summer of 2011. The purpose of the study was to detect *Ehrlichia canis* and *Rickettsia massiliae* in ixodid ticks. Results showed presence of *E. canis* in *Dermacentor marginatus*, *Rhipicephalus sanguineus* and *Ixodes canisuga* from red foxes (Hornok *et al.*, 2013).

4.1.4 Brucella canis

Brucella canis is a bacterium, which infects per os or by mating. Both bitches and male dogs could be asymptomatic carriers. The bacteria shed through vaginal discharge, milk, semen and urine after sexual maturity. It causes a long lasting bacteremia, fever, abortion and epididymitis, orchitis and infertility in males. If a kennel becomes infected, prevalence is likely to be high. *Brucella canis* does not exist in Norway. It is a zoonosis, Humans are infected by contact with aborted fetuses.

In a study from Hungary in 2011, *Brucella canis* induced reproductive diseases was detected in a kennel of 31 dogs. *Brucella canis* was isolated from abortions in this kennel. 7 out of 31 dogs tested positive for *Brucella canis* by a rapid slide agglutination test. In the study it is stated that *Brucella* induced reproductive diseases in kennels in Hungary are common. (Gyuranecz *et al.*, 2011).

4.1.5 Linguatula serrata

Linguatula serrata (tounge worm) is a part of the group vermiform parasites, related to arthropods. Especially herbivores are intermediate hosts, and the egg hatches in the gut and the larvae migrates to different organs. When the final host (carnivores) ingests uncooked meat of an intermediate host the adult stage develops inside the respiratory tract (nose and pharynx). Clinical signs are respiratory signs as sneezing, coughing and nasal discharge. The infection may also be subclinical, it usually resolves by itself within 15 months. Linguatulosis is a zoonotic disease. Humans may be intermediate and final hosts. The infection most usually affects the liver of humans. *Linguatula serrata* does not occur in Norway, but was detected in 3 dogs imported from Romania.

To the author's knowledge no published information about the prevalence of *Linguatula serrata* in Hungary and Romania is available.

4.1.6 Echinococcus granulosus and Echinococcus multilocularis

Echinococcus granulosus (dwarf dog tapeworm) and *Echinococcus multilocularis* (dwarf fox tapeworm) are cestodes of the family Taeniidae. The final hosts are dogs and wild canids. Ruminants, primates, pigs and lagomorphs are intermediate hosts of *E. granulosus*, while mostly rodents and man of *E. multilocularis*.

In the intermediate host of *E. granulosus* hyatid cysts are formed in internal organs, usually the liver and lung. In the final host the adult tapeworm lives in the small intestine, thousands could be present without any clinical signs. There is a European and Northern biotype. The European biotype does not occur in Norway, but it has been detected in dogs imported to Norway. The "pig strain" and "sheep strain" have high prevalence in Eastern Europe. In the intermediate host of *E. multilocularis* alveolar hyatid cysts are formed. The growth of the larval stage is invasive and capable of metastasis. There is a sylvatic cycle and a synanthropic cycle.

The European Scientific Counsel Companion Animal Parasites (ESCCAP) made guidelines in 2010 to give an overview of several parasites, including *E. multilocularis* and *E. granulosus*, their significance and suggested control measures to prevent animal and human infections. The following figures give an overview of the geographical distribution of the two species.

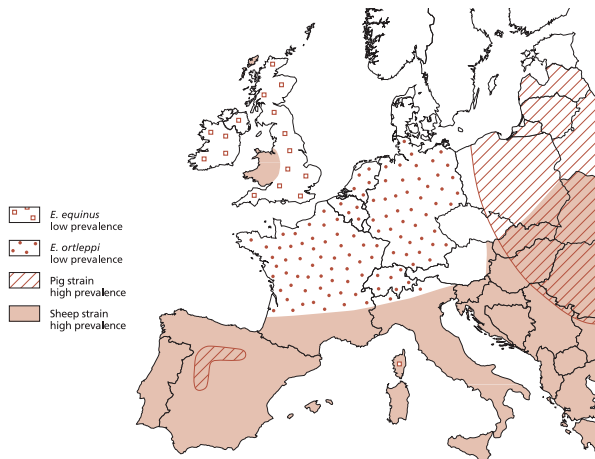


Figure 1: Distribution of *Echinococcus granulosus* and related species in Europe (ESCCAP guideline, Worm Control in Dogs and Cats, 2010)

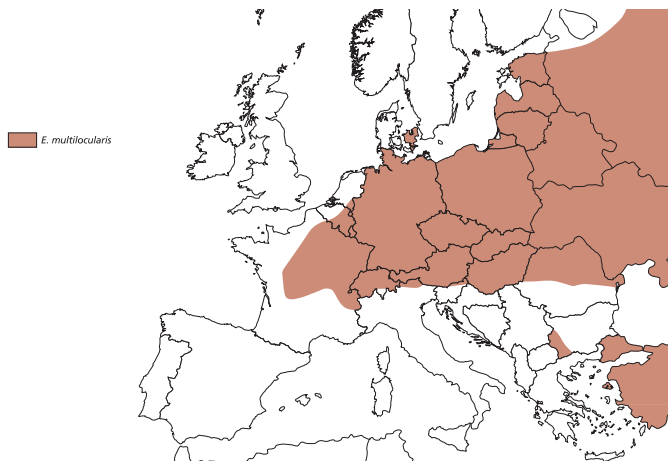


Figure 2: Distribution of *Echinococcus multilocularis* in Europe (ESCCAP guideline, Worm Control in Dogs and Cats, 2010)

4.1.7 Strongyloides stercoralis

Strongyloides stercoralis is a nematode (threadworm) living in the small intestine, infecting carnivores and man. Its lifecycle is somewhat special with a free living and parasitic form. After hatching, through 4 larval stages, adult free-living male and females develops. In unfavorable conditions the L₃ could become parasitic and infect the host percutan, peroral or by autoinfection. Puppies could also be infected through the colostrum. *S. stercoralis* does not occur in Norway, but has been detected in imported dogs. The infection could cause bloody diarrhea. Strongyloidosis is a zoonotic disease. *Strongyloides stercoralis* occurs in both Hungary and Romania (Parasitology lecture notes 2011, R. Farkas), but the prevalence is

difficult to estimate due to its lifecycle.

4.1.8 Ancylostoma caninum

Ancylostoma caninum is a bloodsucking nematode living in the small intestine of dogs and other canids. Its lifecycle is direct and there is no development of the nematode below 12°C. Infection could be percutan, peroral and lactogen. Rodents sometimes function as vectors. The infection may cause anemia and could be a lethal infection in puppies. *Ancylostoma caninum* has not been detected in Norway.

In a study from Hungary, 490 canine fecal samples were collected from the eastern and northern regions. The parasites detected were *Toxocara canis*, *Trichuris vulpis*, *Ancylostoma caninum*, *Capillaria species*, *Toxascaris leonine*, *Taenia species*, *Dipilydium caninum* and *Coccidia species*. Results showed 8.1% positive samples in the eastern region and 13.1% positive samples in the northern region for *Ancylostoma caninum* (Fok *et al.*, 2011).

To the author's knowledge no information about the prevalence of *Ancylostoma caninum* in Romania is available.

4.1.9 Leishmania species

There are several members of the genus *Leishmania*. We generally speak of 3 main forms: cutaneous, mucocutaneous and visceral leishmaniosis. The protozoon is transmitted between animals and humans by its vector *Phlebotomus/Lutzomyia* (sandfly). Depending on the type of infection symptoms could be cutaneous changes, fever, anemia, epistaxis and liver- and kidney failure. The prognosis of a dog with leishmaniosis is poor, treatment is difficult and relapse is common. Sandflies does not live in Norway. It is a zoonotic disease.

Hungary is traditionally regarded as a *Leishmania* free country. Canine and human cases reported in Hungary has been recorded as imported. The vector *Phlebotomus* (sandfly) and several clinical cases of pugs in a kennel in Hungary have recently been detected. The pugs were all born and raised in Hungary. One can therefore not rule out the presence of *Leishmania* in Hungary (Tánczos *et al.*, 2012).

In a study done in Munich, Germany in 2012 a total of 216 imported stray dogs (138 dogs from Romania, 78 from Hungary) were screened by molecular biology, serological and

haematological methods for detection of several parasites. Results showed that a total of 6 dogs tested positive for *Leishmania* (Hamel *et al.*, 2012).

4.1.10 Babesia canis and Babesia gibsoni

Babesia is an intra-erythrocytic parasite of domesticated animals and are transmitted by ticks in which the protozoan passes transovarially via the egg, from one generation to the next. *Babesia canis* is the most common species in dogs. Infection causes haemolysis/icterus, oedema, haemostasis, necrosis of kidney, liver and heart failure do to immune complex deposition. The vectors of *B. canis* are *Dermacentor reticulatus* and *Rhipicephalus sanguineus*. These vectors are not found naturally in Norway. Babesiosis caused by the two species *B. canis* and *B. gibsoni* is not a zoonotic disease.

In the study, results showed that 43.1% of the dogs tested were positive for *Babesia canis* (Hamel *et al.*, 2012).

In a study done in Budapest, Hungary between 2002 and 2004 a total of 44 dogs having clinical signs of babesiosis were tested by molecular biology and haematological methods. Results showed 39 (61.4%) positive samples. 13 positive samples originated from 9 districts of Budapest and 26 from 21 other locations in Hungary. Based on the results babesiosis was considered an endemic disease in Hungary (Földvári *et al.*, 2005).

4.1.11 Dirofilaria immitis and Dirofilaria repens

Dirofilaria immitis is a nematode that lives in the right ventricle, right atrium, pulmonary artery and the posterior vena cava. The final host is the dog, fox, wild canids and felids and rarely man. The lifecycle is indirect, the intermediate host and vector are the mosquitoes of the genera *Aedes*, *Culex* and *Anopheles*. An infection may result in chronic congestive right-sided heart failure. It is unlikely that the parasite will be able to spread from animal to animal in Norway because of our relatively cool climate and due to the short life of mosquitoes. Calculations of HDU (Heartworm Development Units) based on temperatures in 2012 and an expected life span of mosquitoes of 30 days, suggests that the required 130 days it takes to get infective microfilariae will be difficult to achieve. It is still not unlikely that during hot summers the infection could spread. *Dirofilaria repens* causes mild skin lesions and localized itching.

In a study done in Romania in 2012, 1146 serum samples were tested by SNAP 4Dx for *Anaplasma phagocytophilum*, *Borrelia burgdorferi*, and *Ehrlichia canis* antibodies, and for *Dirofilaria immitis* antigen. Results showed that 3.3% (38/1146) of the dogs were positive for *Dirofilaria immitis* (Mircean *et al.*, 2012).

The following figure shows the distribution of *Dirofilaria immitis* and *Dirofilaria repens* in Europe. Infections have now been reported in Hungary (ESACCP guideline, Worm Control in Dogs and Cats, 2010).

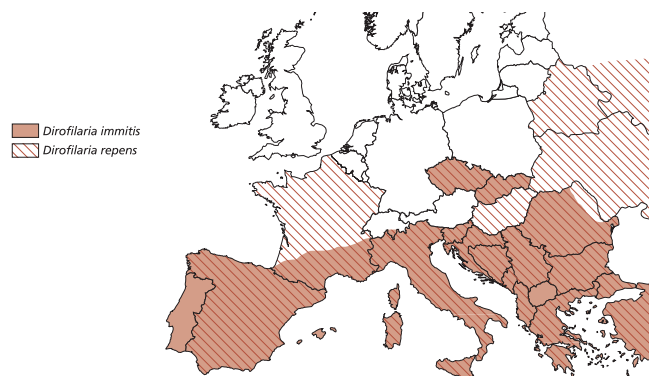


Figure 3: Distribution of *Dirofilaria immitis* and *Dirofilaria repens* and in Europe (ESACCP guideline, Worm Control in Dogs and Cats, 2010).

4.1.12 *Angiostrongylus vasorum*

Angiostrongylus vasorum is a nematode that lives in the right ventricle, pulmonary artery and its branches of dogs, foxes and other canids. The parasite has an indirect lifecycle with a molluscan intermediate host (land snails and slugs). Birds, wild mammals and frogs could be paratenic hosts. An infection causes chronic congestive heart failure. *Angiostrongylus vasorum* has not been detected in Norway, but could easily establish here. It is not a zoonosis.

In a helminthological survey of dogs from Baranya County, Hungary in 2010 two asymptomatic dogs were detected with *Angiostrongylus vasorum*. It is a widespread infection among foxes in Hungary (Gábor *et al.*, 2010).

To the author's knowledge no information about the prevalence of *Angiostrongylus vasorum*

in Romania is available.

4.1.13 *Rhiphicephalus sanguineus*

Rh. sanguineus is a tick that usually lives in warm climates. It does not survive the Norwegian winter outdoors, but establishes itself easily indoors. The tick multiplies rapidly and can produce four generations in one year. It mainly sucks blood from dogs, but also from other species, including cats, rodents, birds and humans. *Rh. sanguineus* may be a vector for a variety of organisms (bacteria, parasites, and viruses). Examples are *Coxiella burnetti*, *Ehrlichia canis*, *Rickettsia conorii*, *Rickettsia rickettsii*, several *Babesia* species, *Hepatozoon canis* and *Anaplasma* species. *Rh. sanguineus* could in rare cases cause Tick Born Paralysis in dogs. The following figure shows the distribution of *Rh. Sanguineus* in Europe. It occurs in Romania and Hungary, but mostly is an ectoparasite of South Europe. Below the red line indicates where the tick occurs most frequently.



Figure 4: Distribution of *Rh. sanguineus* in Europe (ESCCAP guideline, Control of Ectoparasites in Dogs and Cats, 2012).

4.1.14 *Dermacentor marginatus*

Adults mainly suck the blood of mammals; sheep, cattle, deer, dog, human, rabbit and hedgehog. Larvae and nymphs suck the blood of small mammals and birds. *D. marginatus* can be a vector for a variety of pathogens: *Babesia canis* (dogs), *Babesia divergens* (cattle), *Babesia ovis*, *Theileria ovis*, *Anaplasma ovis* (sheep), *Babesia caballi* and *Theileria equi* (horse), *Coxiella burnetti* (Q-fever), *Francisella tularensis*, *Brucella* and *Rickettsia conorii* (Boutonneuse fever).

4.1.15 *Dermacentor reticulatus*

D. reticulatus can be vectors for numerous pathogens, *Babesia canis*, *Babesia gibsoni* (dog), *Babesia divergens* (cattle), *Babesia ovis*, *Theileria ovis*, *Anaplasma ovis* (sheep), *Babesia*

caballi, *Theileria equi* and infectious encephalomyelitis (horse) *Coxiella burnetti* (Q fever), *Francisella tularensis*, *Brucella* and *Rickettsia conorii* (Boutonneuse fever). The following figure shows the distribution of *Dermacentor reticulatus* in Europe. Below the red line indicates where the tick occurs most frequently.



Figure 5: Distribution of *Dermacentor reticulatus* in Europe (ESCCAP guideline, Control of Ectoparasites in Dogs and Cats, 2012).

Some authors do not separate between *Dermacentor reticulatus* and *Dermacentor marginatus*. The adult *D. reticulatus* and *D. marginatus* ticks are cold tolerant, but the eggs and larvae are sensitive to cold. The climate in Norway makes it unlikely that these tick species are able to complete their lifecycle.

4.2 Probability for importation of foreign pathogens

The probability for importation of foreign pathogens will depend on the number of stray dogs imported, the presence of pathogens in the foreign dog population and treatment and preventative measures in the original country. The veterinary control and laboratory tests available will also be important. The number of stray dogs imported to Norway is difficult to estimate. As earlier mentioned it has been estimated that 200 stray dogs were imported during the last 6 months. The probability of importing a foreign pathogen is therefore high, due to the number of animals being imported, even if it is only found in a few individuals. The Norwegian Veterinary Institute calculated that there is a 99% probability of importing a pathogen even though it only occurs in 1 of 1000 stray dogs. There is 39% probability for importing a foreign pathogen that occurs in 1 of 10 000 stray dogs.

The living conditions of stray dogs involve increased likelihood that they may be latent carriers or actively shedding various agents. Absence of disease prevention, under- and mal-

nutrition, trauma by fighting and poor shelter from the environmental forces, all contribute to increased susceptibility to infections and disease outbreaks.

Treatment and other preventive measures on import of dogs can reduce the likelihood of importation of foreign pathogens and the consequence of import. Such measures currently exist for Rabies and *Echinococcus* (*E. multilocularis*). This also protects against imports of *E. granulosus*, but not against other parasites.

4.3 Results

The probability of importing specific pathogens and the impact on animal and human health are summarized in the figure below. The overall assessment is based on the severity of disease in humans, animals, and the risk of importation of foreign pathogens.

Table 3: Risk assessment 2012 (Høgåsen *et al.*, 2012)

Impact on animal and human health	Major	Rabies virus	<i>Echinococcus multilocularis</i>	
	Moderate		<i>Angiostrongylus</i>	<i>Babesia</i> <i>Rhipicephalus sanguineus</i> <i>Leishmania</i> <i>Dirofilaria</i> <i>Leptospira</i> <i>Brucella</i>
	Minor		<i>Ehrlichia</i> <i>Echinococcus granulosus</i>	<i>Linguatula</i> <i>Strongyloides</i> <i>Ancylostoma</i> <i>Dermacentor</i>
		Low	Moderate	High
	Probability of importation			

There is a moderate to high probability that some of these pathogens could establish in Norway. Those of major concern are: rabies virus, *Leptospira* species, *Brucella canis*, *Echinococcus* species, *Linguatula serrata* and *Angiostrongylus vasorum*. Some of the pathogens are more dependent on a warmer climate, but could be able to establish indoors. These pathogens are *Strongyloides stercoralis*, *Ancylostoma caninum*, and *Rhipicephalus sanguineus*. Several of these pathogens could cause severe clinical disease, especially Rabies, *Leptospira*, *Brucella canis* (in breeding kennels), *Echinococcus multilocularis* and *Angiostrongylus vasorum*.

Today the regulations are aimed at preventing the introduction of Rabies and *Echinococcus*

species only. The other pathogens in concern have no regulations and there is no control regarding imported dogs for these pathogens.

4.4 Preventive measures

Stray dogs will always be more susceptible to various infections compared to a dog belonging to a household. There is a significant connection between the number of imported dogs and the risk of importing foreign pathogens. Therefore a reduction in the number of imported dogs will be the most effective prevention. The Norwegian Veterinary Institute recommends the Norwegian people to rather help making the living conditions better in the dogs' original country, instead of importing them. If a stray dog must be imported to Norway it is important that its health status is as good as it can possibly be. A 4-8 week stay at a good kennel with optimal nutrition, social training, vaccinations and necessary treatments would reduce the risk of importation.

4.5 Recommendations

The following pre and post import recommendations from the Norwegian Veterinary Institute were made based upon this risk assessment. The recommendations are meant to improve the health status of the dogs and minimizing the introduction of foreign pathogens. These recommendations are meant to be in addition to the current regulations regarding import.

Prior to export

A detailed veterinary examination, including blood and faecal samples to ensure a good general health status as well as detecting relevant pathogens. Repeated veterinary examinations and sampling could be needed to rule out several infections. Observing the behavioural pattern of the dog to prevent aggressive dogs being exported will also be important. The vaccination protocol of the dog must be checked at this detailed veterinary examination. The dog must be vaccinated against distemper, parvovirus infection, infectious hepatitis and leptospirosis in addition to rabies. Treatment should be given against fleas, lice and ticks and anthelmintic treatment should also be given for the identified intestinal parasites.

At border control

Registration of the number of imported dogs and the country of origin. A veterinary check of the animal and its paperwork must also be done.

Post import

A detailed veterinary examination and sampling for intestinal parasites and other infectious agents. Treatment is given if necessary and depends on the findings during the detailed clinical examination and laboratory tests. The contact between the dog and other animals should be limited until the laboratory test results are analyzed and the treatment necessary is completed. It is important, that the faeces from the dog must be collected and discarded. If the dog bites a human or another animal, especially during the first six months after import, it must be closely observed by a veterinarian. This is to evaluate if the dog could be developing rabies. It is not allowed to euthanize the dog during this observation period.

4.6 Further Measures

Education of the owners is needed to inform about the dangers associated with importing stray dogs. Also, the Norwegian veterinarians should receive proper information and detailed education concerning the health risks associated with imported dogs, the diagnostic tests and treatment options available. It will be important to encourage Norwegian people to help improve the living standard of the dogs in their country of origin. This can be done through well run welfare organizations by donations or voluntary work.

5. Parasitological and serological detection of stray dogs imported to Norway from Hungary and Romania 2013

On behalf of the Norwegian Food Safety Authority, The Norwegian Veterinary Institute conducted a survey of samples from stray dogs imported to Norway in 2012/2013. The aim of this study was to investigate health hazards linked to the import of stray dogs from Hungary and Romania. Dog owners were encouraged to help in the survey by sending in samples from their imported dogs. The dog should have been living as a stray dog in the past, originated from Hungary or Romania and imported to Norway after 1st January 2012. The dog owners were asked to present a copy of the dog's passport or approved veterinary documents, owners name and address, the dog's name, estimated age and identity number. The general condition of the dog, the date of rabies vaccination and treatment against *Echinococcus* and ticks were also asked. All together 75 blood samples and 70 faecal samples were examined.

The faecal samples collected over 3 days were investigated with McMaster's method and Baermans method. Parasites investigated were *Linguatula serrata*, *Echinococcus granulosus* and *Echinococcus multilocularis*, *Strongyloides stercoralis*, *Ancylostoma caninum*, *Giardia*, *Isospora* species, *Uncinaria stenocephala*, *Toxascaris leonine*, *Toxocara canis* and *Trichuris* species. The blood samples were investigated for *Dirofilaria immitis* (Antigen ELISA), antibodies for rabies after vaccination (FAVN), *Babesia canis* (IFAT) and *Leptospira interrogans serovar icterohemorrhagiae* and *serovar canicola* (microagglutination test).

5.1 Results

Rabies antibodies

Of the 75 dogs, 35 (46.7%) had a satisfactory titer ≥ 0.5 IU / ml after vaccination, which is recommended by the World Organization for Animal Health (OIE) on imports from countries with rabies. 40 of 75 dogs (53.3%) had titers < 0.5 IU / ml, and of these, 26 (34.7%) of the antibody titers were between 0.1-0.5 IU / ml and 14 dogs (18.7%) had titers ≤ 0.1 IU / ml. Serum samples with ≤ 0.1 IU / ml are considered negative for this method.

They also wanted to investigate whether the time interval between vaccination and blood sampling affected the outcome of antibody levels of the blood samples. Out of the 75 blood samples only 57 (76%) of the samples had a date for both the vaccination and blood sampling. The interval between vaccination time and date of blood sampling ranged from 1 to 12

months, and it showed no significant correlation between antibody titer and time of vaccination.

Parasites

There was no evidence of eggs/larvae from *Linguatula serrata*, *Echinococcus* species, *Strongyloides stercoralis* or *Ancylostoma caninum*. However, eggs from a number of other parasites, cysts from *Giardia* species. and oocysts of *Isospora* species were detected. Results are summarized in the table below.

Table 4 (Hamnes *et al.*, 2013)

Test material	Parasite	Number % of positive samples
	<i>Trichuris</i> species	8 (11.8)
	<i>Unicinaria stenocephala</i>	5 (5.9)
Feaces (n=70)	<i>Isospora</i> species	2 (2.9)
	<i>Giardia</i> species	9 (15.3)
	<i>Toxascaris leonina</i>	1 (1.5)
	<i>Toxocara canis</i>	2 (2.9)
Blood (n=75)	<i>Dirofilaria immitis</i>	6 (7.5)

Only 7 out of 15 dogs where parasites were detected had the required information concerning the date of arrival and treatment against parasites.

Antibodies against *Babesia canis* and *Leptospira* species

Of the 75 imported stray dogs 9 (11.3%) dogs had antibodies against *Babesia canis*, and 4 of these had very high titres (1:2048). Antibodies against *Leptospira interrogans* serovar *canicola* and serovar *icterohaemorrhagiae* were detected in respectively 10% of the imported street dogs. 3 dogs had antibodies to both serovars. With this test it is not possible to distinguish whether the antibodies in the sample is formed by natural infection or after vaccination against leptospirosis. Results are summarized in the table below.

Table 5: (Hannes *et al.*, 2013)

Pathogen	Number (%) of positive samples	Notification
<i>Babesia canis</i>	9 (11.3)	4 dogs had very high titers
<i>Leptospira interrogans</i> serovar Canicola	8 (10)	
<i>Leptospira interrogans</i> serovar icterohaemorrhagiae	11 (13.8)	
<i>Leptospira interrogans</i> serovar canicola + icterohaemorrhagiae	3 (3.8)	

5.2 Discussion

Rabies

In this study over half of the stray dogs did not have high enough antibody titers ≥ 0.5 IU / ml against rabies after vaccination. 18.7 % of the dogs did not have any titer after vaccination. The Veterinary Institute is critical to whether the dogs were vaccinated at all, even though stated in the passport. The lack of specific antibody protection against rabies increases the risk of importing rabies through the importation of stray dogs. Therefore, the Veterinary Institute concludes that the risk of importation is even higher than assumed. Several factors could influence the dog's antibody reaction towards the rabies vaccine. Competent immune system, correct storage of the vaccine (especially temperature), vaccination procedure and the dog's general health status are factors playing an important part. Another important factor influencing the risk of importation is how long the dog has been in quarantine, or in an area not being exposed to a possible rabies infection. The longer the quarantine, the better.

Parasites

Parasites like *Echinococcus* species, *Ancylostoma caninum*, *Strongyloides stercoralis*,

Dirofilaria immitis and *Linguatula serrata* does not occur in Norway. These parasites were not detected in this survey, with the exception of *Dirofilaria immitis*. However, it was discovered parasites that occur rarely (*Trichuris* species, *Uncinaria stenocephala* and *Toxascaris leonina*) in the Norwegian dog population. Importation of stray dogs can change this and contribute to the spread of these parasites. *Linguatula serrata* has previously been detected in an imported stray dog. The results does not exclude that other serious parasites have been or may be introduced, but it suggests that their occurrence is low.

Babesia canis and Leptospira spp

In this study antibodies against *Babesia canis* were detected in 11.3% of the stray dogs. Several had a very high antibody titer which may indicate an active infection phase. One can not ignore the fact that these dogs can be carriers and thus constitute a source of the parasite if the vector is present. It is generally agreed in the scientific community that the *Ixodes ricinus* is not likely to be a vector. This means that also *Dermacentor reticulatus* must be imported to Norway if spread of *Babesia* is to be possible. 10 % of the stray dogs had antibodies against *Leptospira interrogans* species. It is assumed that these dogs have been infected with *Leptospira* and they could be infectious.

5.3 Conclusion

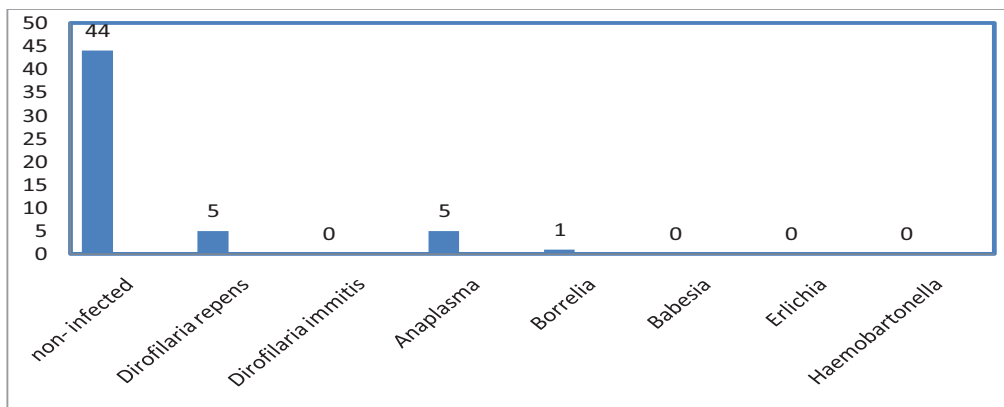
Many dogs did not have adequate protection against rabies and 18.7% were negative for antibodies. The risk of importing rabies is thus higher than previously thought. There may be a low rate of treatment against *Echinococcus* as only one of five dogs was properly treated. The risk of importing *Echinococcus* is thus higher than previously thought. A relative high prevalence of intestinal parasites that are unusual in Norway (*Trichuris* species, *Uncinaria stenocephala* and *Toxascaris leonina*) were detected. A relatively high prevalence of *Dirofilaria immitis*, which does not exist in Norway. The ability of the vector to complete the cycle in Southern Norway can not be excluded. The detection of antibodies against *Leptospira* species and *Babesia canis* in over 10% of surveyed dogs means that an infection of imported dogs can not be excluded. The results underline the need to warn against importation of stray dogs. Measures must be taken to ensure adequate parasite treatment and protection against rabies.

6. Blood donor program

In 2012 Hanne Høykoll Christiansen, a Norwegian student at the Szent István Veterinary University, wrote her thesis about the blood donation project initiated by students at the faculty (2009- 2011). Her thesis was about the blood donation in general, preparation of the blood prior to transfusion and statistics of infected donors in Hungary. 55 stray dogs were tested for several pathogens due to the requirements for a blood donor dog. They used commercially available IDEXX 4Dx Snap test to check for *Borrelia burgdorferi*, *Ehrlichia canis*, *Anaplasma phagocytophilum* and *Dirofilaria immitis*. Furthermore, *Dirofilaria repens* could be detected by modified Knot test from the donor's blood by help of Parasitology Department. *Babesia canis* and *Mycoplasma haemocanis* (*Haemobartonella canis*) were checked by light microscope, further testing by PCR method was refused because of financial causes.

In 5 dogs positivity for *Dirofilaria repens* was observed. 1 dog was positive for *Borrelia burgdorferi* and 5 were positive for *Anaplasma* species. There were no *Erlichia canis*, *Dirofilaria immitis*, *Babesia canis* or *Mycoplasma haemocanis* seropositivity discovered in any of the blood donor dogs. Results are summarized in the table below.

Table 6: Blood donor program (Christiansen, 2012).



7. Dog import charities

Several organizations have been established to try and make the situation for the stray dogs in Hungary and Romania better. They usually offer the possibility for adoption of dogs and/or donations for the organization. Most of the organizations have their own webpage where pictures of the dogs are presented. The dogs are stray dogs found abandoned on the streets and are taken care of by the voluntary people engaged in the work of these organizations. In the following text three of these voluntarily dog charities are described. There are several more of these organizations in both Hungary and Romania. It is not known how many stray dogs there is in Hungary and Romania. In Bucharest alone, 40 000- 60 000 stray dogs are estimated to exist (ROLDA, 2013). In Romania 112 registered charities are found. No certain number of stray dogs exists in Hungary, but is estimated to be several hundred thousands (Caroline Holtet, Budadogs).

7.1 Budadogs

Budadogs was a 100% non-profit, idealistic dog adoption project run by Norwegian veterinary students in Budapest. Their work dealt with rescuing and re-homing unwanted dogs in Budapest. They received unwanted and strays dogs and also rescued dogs from the Budapest city pound. They cooperated with other local rescue organizations or shelters and also took dogs from the veterinary university who had been left by their owners and also strays found by locals or students. The stray dogs were usually fostered by students for several months before they were imported to Norway. Since 2008 Budadogs have re-homed almost 500 dogs. The following table shows an estimate of the re-homed dogs, given by one of the founders of Budadogs, Caroline Holtet.

Table 7: Re-homed stray dogs (Caroline Holtet *et al.*, 2012)

Norway	Sweden	Germany	Hungary	*Others
313 dogs	35 dogs	70 dogs	53 dogs	21 dogs

*Denmark, Canada, Ireland, France

Today, the two main founders of Budadogs are no longer living in Budapest and therefore the fostering and re-homing of dogs on the behalf of Budadogs stopped. Instead they have engaged in Budadogs Norway and FAPF.

7.2 Foundation of Animal Protection in Füzesabony (FAPF)

"Look at what you can do and do it! Be persistent and you will succeed, and always look on the bright side of life and you will survive! " (Zsanett Molnár, FAPF).

FAPF was founded by Attila Biro in 2007 with the main aim of helping unwanted and stray dogs and cats in Hungary. Today it is run by Zsanett Molnár. It is a non-profit organization, which survives on the income from the cost of adopting the dogs (3000 NOK). Zsanett keeps a number of the animals in need of rehabilitation in her own home, both in her house and in the garden kennels. FAPF does not have its own shelter and the organization relies on foster homes until the dogs have been re-homed. The goal of FAPF is to rescue stray, injured, maltreated and unwanted dogs. They try to rehabilitate these dogs in order to make them ready to be re-homed and they also try to initiate legal actions against the person who committed animal cruelty in cases when possible. In the time period 2007-2013 FAPF has rehomed 911 stray dogs. The following table shows an estimate of the number of dogs re-homed given by the head of FAPF, Zsanett Molnár.

Table 8: Re-homed stray dogs (Zsanett Molnár, FAPF).

Norway	Sweden	Germany	Hungary	*Others
220 dogs	134 dogs	121 dogs	300 dogs	100 dogs

*Denmark, Ireland, France

7.3 ROLDA

ROLDA started as a group of animal lovers working hard to follow their dream to change the standard of animal welfare for the stray dogs of Romania. Their mission is to save animals in need and provide care to each of them, based on respect and responsibility. In 2006 ROLDA became a public charity in Romania. In July 2012 they founded a branch in Norway under the name "ROLDA Gatehunder fra Romania." Every year, they rescue and provide daily care to about 600 dogs and re-home other few hundred of dogs. Due to donations, sponsorships and grants received from compassionate individuals, companies and international partners they are able to continue their work.

From the Norwegian website ROLDA stated their concern about EU lifting the mandatory checks of rabies antibody titer prior to import. Prior to this regulation, ROLDA stated that non of their dogs imported to Norway were infected with foreign pathogens. After the new

regulations ROLDA feared that irresponsible people would start importing unhealthy and sick stray dogs. They thought that the moment the quarantine requirements were abolished, based on their knowledge of the Romanian mentality, individuals and unnamed charity groups would appear from nowhere. These charities would begin to “rescue” dogs from dirty, hazardous kennels and ship them off to Norway. The passport and certificates could any person with a stamp and signature sign. According to ROLDA this fear has turned out to be true as several foreign pathogens has been discovered from imported dogs.

To the author’s knowledge no information about the number of re- homed dogs from ROLDA is available.

8. Discussion

During the past years importation of stray dogs to Norway has been a much-discussed topic. The media, the Norwegian Veterinary Institute, the Norwegian Food Safety Authority, the dog charity organizations and dog owners have spoken their opinion clearly. The reason for these discussions is without doubt the detection of foreign pathogens from the imported dogs. Stories of aggressive and bad tempered stray dogs attacking humans have not made the overall impression of these stray dogs any better. The media has a huge impact on the impression and opinions of the Norwegian people towards these stray dogs. Mostly, the media portrays a negative picture of the situation. People who have no knowledge or interest in understanding both sides of the story, will get the impression that all stray dogs are aggressive, dangerous and full of foreign parasites. Recently (30.10.2013), an eight year old boy was bitten by a stray dog imported from Romania only a few days after import. The dog was isolated for observation because of the suspicion of rabies. The media coverage for stories like this, and headlines about dangerous zoonotic parasites invading Norway is a sort of scaremongering. Despite of all this negative media coverage, Norwegian dog lovers continue to import stray dogs. Why is that so? It becomes more of an ethical question. People who loves animals, dogs especially, feels an obligation to help dogs in need. Pictures and stories of the dogs living on the street and in crowded shelters, without food and water makes a huge impression and the willingness to help rises. The easy access to Internet and the dog charity organizations websites makes it very easy to adopt a dog. Pictures of dogs standing on cement flooring, little space and looking at you with adorable eyes, is hard to resist for any dog lover. Only a few clicks, a donation remains and your dog is on its way home.

The easy access and the uncomplicated way of adopting these dogs represent some of the problem. The owners know very little about the adopted dog's past. There is no possibility of fostering to get to know the dog and understanding if it fits into your family and lifestyle. It is important to be aware of that the dogs have never lived in a household, never learned to walk on a leash and never gotten any obedience training. They may be physically and emotionally damaged and may be afraid of people. Owners considering adopting stray dogs must be aware of these factors. Not all owners are capable and have enough time to give the dog the attention, training and affection that it needs. On the other hand, the joy of seeing the change of character, the affection, gratitude and happiness of these dogs is an indescribable feeling for a dog owner. So many become perfect family and companion dogs. They have so much to

give and become incredibly faithful towards their owners. They do deserve a second chance.

After the required vaccinations and deworming prior to importation, there are still risks of foreign infections of the dogs. People with no competence in the field of foreign pathogens do not consider this when importing stray dogs. Most Norwegians are not aware of the fact that pathogens we don't have in Norway may still be present after importation. One of the most important factors when trying to reduce the risk of import will be the education of the dog owners. As of today, there is very little information available about the dangers and consequences of importation. This is the responsibility of the NFSA and the dog charity organizations. Instead of wanting to ban all import, the NFSA should provide the owners with more information and make the regulations more strict. Due to the EEA, Norway is bound to follow the EU regulations regarding import of non-commercial animals. Taking the differences of the pathogenic flora in Norway and Hungary/Romania into consideration, it becomes evident that this will increase the risk of spreading foreign pathogens. The NFSA does have the right to make exemptions from the regulations in certain cases (Regulation 2004-07-01 nr 1105, §12). Banning all import of stray dogs from Hungary and Romania will be difficult. Instead the NFSA should improve the regulations of import. If import becomes more difficult, a lower number of dogs will be imported and the risk will decrease.

A meeting between The Norwegian Food Safety Authority, the Norwegian Veterinary Institute and representatives from ROLDA took place on the 11th of June 2013. The agenda of the meeting was to discuss the guidelines and regulations of importation. The representatives from ROLDA wanted the NFSA to carefully prepare more detailed guidelines and regulations for the dog owners prior to import. The NFSA did not want to change the regulation for import. Their goal is to ban all import of dogs from Eastern Europe, including Hungary and Romania. They also specified that the regulations that exist today are meant for pets travelling with their owners on vacation. They are not specialized for the import of stray dogs. The NFSA felt it would be wrong to make new guidelines and regulations for import of stray dogs. Their goal is to make this import illegal. ROLDA also told stories from the everyday life concerning the attitude of people owning Norwegian dogs towards the imported dogs owners. Imported dogs have not been allowed on dog shows and dog courses such as obedience and agility due to fear of aggressiveness and foreign infections. ROLDA meant this reflected NFSA's and the Norwegian Veterinary Institute's comments and recommendations

in the media. The outcome of the meeting was a mutual agreement of disagreeing. However, the NFSA stated that they would be more cautious regarding their comments in the media.

The risk assessment 2012 and the parasitological/serological detection of imported stray dogs 2013, performed by the Norwegian Veterinary Institute were meant to give the NFSA a complete picture concerning the risk of importation. The results and recommendations were clear. There is an increased risk of spreading foreign pathogens in Norway by the increased number of imported stray dogs. The recommendations included a more detailed clinical and parasitological investigation both prior to and after importation. Close follow up from a veterinarian and keeping the dog isolated from other dogs will be important after importation. This will increase the probability of detecting foreign pathogens and the risk of infecting other dogs will decrease. The result of investigation of the rabies titer (parasitological/serological detection of imported stray dogs 2013) showed that 1/5 dogs with certificates claiming to be fully vaccinated against rabies, did not have the required antibody titer. This proves that the need for the former requirement for blood sampling prior to import still exists. The NFSA, through the EEA agreement and the EU regulation, lifted the demand for blood sampling for the rabies titer. This led to the NFSA giving up the possibility to ensure proper protection towards rabies in Norway. The low titers also raise the question if the passports and certificates accompanying the dogs are valid. In theory, any person could stamp and sign these documents. The operator at the border control has no option, when the passports looks valid the dogs are let into Norway. If dog charities were out to make money from this import, it would be beneficial to not have any veterinary expenses. This is it exactly what ROLDA feared. That unprofessional and non-trustworthy organizations would take advantage of the work the serious organizations are doing. Of course, it is difficult for owners wanting to adopt to tell these organizations apart by the information presented on their webpage.

The main problem regarding the discussion about the importation of stray dogs is the role of the NFSA. They actually facilitate importation by not laying down any new regulations. This which would give them more control of the situation. By stating that the only solution would be illegalizing non- commercial import, which could be very difficult to control, the situation remains unresolved. The Norwegian Veterinary Institute's recommendations regarding pre- and post- import (Risk Assessment 2012, Parasitological/serological detection of imported stray dogs 2013) have not been legalized by the NFSA. If the regulations are not changed it is

only a matter of time before the Norwegian dog population will be infected by several of the foreign pathogens. As a result of the parasitological and serological detection 2013 conducted by the Veterinary Institute, the NFSA illegalized all commercial import from Romania to Norway (04.06.2013). EU supported this decision. This was done to make sure that no more than 5 dogs could be imported at the same time. Still, this will not solve the problem.

9. Summary

The aim of this thesis was to highlight the different factors playing a part in the discussion of importation of stray dogs to Norway. Several aspects of the discussion have been mentioned. It has been proved that an increasing number of stray dogs are being imported, especially after the new regulations regarding the rabies vaccination. According to the studies performed by the Norwegian government, there is a considerable risk to both human and animal health when importing these stray dogs. The different pathogens considered to be a threat towards the Norwegian dog population, has shown to have a higher prevalence in the Hungarian and Romanian dog population than in Norway. This causes the Norwegian government wanting to ban all import of stray dogs. Instead of banning all import, the NSFA should follow the recommendations from the Norwegian Veterinary Institute and change the regulations for import. These changes would make importation of stray dogs safer, both for the dog owners and the Norwegian dog population.

As a conclusion of this thesis, it will be the NFSAs responsibility to make sure that import becomes safer. Banning all import will be difficult, both to establish and control. If the NFSAs wants to make sure that no foreign pathogens are imported, these changes of the legislations will be crucial. Despite the recommendations from the NFSAs to stop importing stray dogs, Norwegian dog lovers will continue to do so because of their urge to help animals in need. Therefore, new and improved regulations and guidelines must be made to ensure safe import.

10. Appenix

Regulation (EC) No 998/2003

ANNEX II: List of countries and territories

Part A

IE Ireland

MT Malta

SE Sweden

UK United Kingdom

Part B

Section 1

(a) DK Denmark, including GL Greenland and FO Faeroe Islands

(b) ES Spain, including the Balearic Islands, Canary Islands, Ceuta and Melilla

(c) FR France, including GF French Guiana, GP Guadeloupe, MQ Martinique and RE Réunion

(d) GI Gibraltar

(e) PT Portugal, including the Azores Islands and Madeira Islands

(f) Member States other than those listed in Part A and points (a), (b), (c) and (e) of this Section.

Section 2

AD Andorra CH Switzerland

HR Croatia

IS Iceland

LI Liechtenstein

MC Monaco

NO Norway

SM San Marino

VA Vatican City State

PART C

AC Ascension Island

AE United Arab Emirates

AG Antigua and Barbuda

AN Netherlands Antilles

AR Argentina

AU Australia

AW Aruba

BA Bosnia and Herzegovina

BB Barbados

BH Bahrain

BM Bermuda

BY Belarus

CA Canada

CL Chile

FJ Fiji

FK Falkland Islands

HK HongKong

JM Jamaica

JP Japan

KN Saint Kitts and Nevis

KY Cayman Islands

LC Saint Lucia

MS Montserrat

MU Mauritius

MX Mexico

MY Malaysia

NC New Caledonia

NZ New Zealand

PF French Polynesia

PM Saint Pierre and Miquelon

RU Russian Federation

SG Singapore

SH Saint Helena

TT Trinidad and Tobago

TW Taiwan

US United States of America (including AS American Samoa, GU Guam, MP Northern Mariana Islands, PR Puerto Rico and VI US Virgin Islands)

VC Saint Vincent and the Grenadines

VG British Virgin Islands

VU Vanuatu

WF Wallis and Futuna

YT Mayotte

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