



# Prioritization of Companion Animal Transmissible Diseases for Policy Intervention in Europe

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## Summary

A number of papers have been published on the prioritization of transmissible diseases in farm animals and wildlife, based either on semiquantitative or truly quantitative methods, but there is no published literature on the prioritization of transmissible diseases in companion animals. In this study, available epidemiological data for diseases transmissible from companion animals to man were analysed with the aim of developing a procedure suitable for their prioritization within a European framework.

A new method and its associated questionnaire and scoring system were designed based on methods described by the World Organisation for Animal Health (OIE). Modifications were applied to allow for the paucity of specific information on companion animal transmissible diseases. The OIE method was also adapted to the subject and to the regional scope of the interprofessional network addressing zoonotic diseases transmitted via companion animals in Europe: the Companion Animals multisectorial interprofessional Interdisciplinary Strategic Think tank On zoonoses (CALLISTO). Adaptations were made based on information collected from expert groups on viral, bacterial and parasitic diseases using a structured questionnaire, in which all questions were closed-ended. The expert groups were asked to select the most appropriate answer for each question taking into account the relevance and reliability of the data available in the scientific literature. Subsequently, the scoring of the answers obtained for each disease covered by the questionnaire was analysed to obtain two final overall scores, one for human health impact and one for agricultural economic impact. The adapted method was then applied to select the 15 most important pathogens (five for each pathogen group: viral, bacterial and parasitic) on the basis of their overall impact on public health and agriculture. The result of the prioritization exercise was a joint priority list (available at [www.callistoproject.eu](http://www.callistoproject.eu)) of relevant pathogens according to these two criteria. As the scope of CALLISTO was comprehensive in terms of geographical area, animal species involved and impact of the diseases, the list of prioritized diseases had to accommodate the realities in different European countries and the differences in biology and animal–human relationships in a wide range of species including cats and dogs, pet pigs and sheep as well as captive reptiles. The methodology presented in this paper can be used to generate accurate priority lists according to narrower and more specific objectives.

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## Introduction

An increasing number and range of species of companion animals are kept in close interaction with human beings in industrialized societies. In European

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countries, dog ownership involves 23% of households, ranging from 12% in Austria to 45% in Romania, while cat ownership involves 22% of households with a range from 12% in Slovakia to 45% in Romania (FEDIAF, 2012; Eurostat, 2014). The most frequently kept species of companion animals in the European Union (EU) are dogs (61 million) and cats (66 million), followed by pet birds (39 million), small mammals (21 million), ornamental fish (9 million aquaria) and reptiles (8 million) (FEDIAF, 2012). No data are available on the number of households with pets other than dogs and cats.

As companion animals share the same environment with people and can be carriers of microorganisms pathogenic for man, there is an urgent need to clarify the role of companion animals as sources of zoonotic infectious diseases. Companion animals are a potential source of infectious diseases for man, but also for food producing animals. Well known examples are the incursion of Newcastle disease into the poultry industry via trade in pet parrots and the role of dogs in the epidemiology of neosporosis, which can cause abortion in cattle. Nevertheless, the role of companion animals in the emergence and spread of infectious diseases in man and food animals remains a relatively underrepresented area of attention, both in research and in surveillance. Consequently, although various infectious disease risks have been associated with companion animals, crucial details are missing with regard to the magnitude of such risks from a societal perspective, including disease prevalence in the companion animal population, incidence of human disease attributable to companion animals and consequences on livestock production.

Clarification of the role played by pets in the occurrence of infectious diseases in man and farm animals cannot be made for all diseases potentially transmitted by pets. Therefore, a suitable approach to prioritize the most important diseases is needed.

Institutions working in the fields of public health and infectious diseases have different objectives and interests and, in a similar way, experts are increasingly specialized in understanding narrow groups of diseases. This makes it difficult to assess and prioritize a broad range of infectious diseases without being biased by institutional or individual professional focus and knowledge (Krause *et al.* 2008a). Therefore, the involvement of a range of experts is required to ensure that such an assessment is done as objectively as possible. Traditional priority setting procedures entail asking a number of experts to provide the required information and to reach consensus. While this method is relatively straightforward, it is not particularly transparent or repeatable (Havelaar *et al.*, 2010).

Currently, semiquantitative methods are frequently used in which criteria are divided into a

limited number of classes or scored on arbitrary scales. Scores for all criteria are then aggregated using various formulae to produce an overall score (Havelaar *et al.*, 2010). Here, the transparency and repeatability are improved, but the classes are chosen rather arbitrarily. Furthermore, linear relations between the different classes of a criterion or between criteria are often assumed without support by available data (Havelaar *et al.*, 2010).

More recently, truly quantitative methods to rank diseases have been developed. These use clearly interpretable criteria, expressed on natural numerical scales. Furthermore, criteria may be weighted, according to a systematic procedure employed by a panel of judges independent from the authors or scientific experts who produce the final prioritized list (Havelaar *et al.*, 2010).

Sometimes, however, insufficient data are available to allow the adoption of truly quantitative methods. One of these cases is the process of prioritization of diseases for which only incomplete and heavily biased data exist. This is the case with many of the diseases affecting companion animals.

The present study was performed as part of an EU Framework 7 project (Companion Animals multisectoral interprofessional and Interdisciplinary Strategic Think tank On zoonoses [CALLISTO]; Project number 289316), which aimed to develop a European interprofessional network to address zoonotic diseases transmitted via companion animals.

As the resources available for the project were insufficient to analyze all listed diseases, a prioritization strategy was designed. Several methods for disease prioritization in farmed animals are available (Krause *et al.* 2008a,b; DEFRA, 2009; Cardoen *et al.*, 2009; Havelaar *et al.*, 2010; Kurowicka *et al.*, 2010; Phylum, 2010; Humblet *et al.*, 2012) and a method for the prioritization of diseases in wildlife has been published (McKenzie *et al.*, 2007). None of these methods was developed to prioritize transmissible diseases in companion animals, so they are not directly usable for this purpose.

An analysis of the methods available in the literature and of the type of data available on the biological characteristics of the diseases and the options for their prevention and control in companion animals and man was performed, with the aim of developing a procedure suitable for companion animals in a European framework.

## Materials and Methods

### *The Lists of Diseases*

The preliminary activity, carried out during the first year of the project, was to draw up a list that was as

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