



CALLISTO

CALLISTO

healthy and safe human-animal
relationships in Europe

CALLISTO - Companion Animal multisectorial interprofessional and Interdisciplinary Strategic Think tank On zoonoses - communicates at www.callistoproject.eu, where you can find the **CALLISTO** publications, the First, Second and Third Cycle Reports, as well as the brochures, the newsletter and the posters produced, which tell about the **CALLISTO** experience.

A special issue of the open access Journal of Comparative Pathology (www.journals.elsevier.com) is dedicated to **CALLISTO** with articles concerning the main outcomes of the think tank project.

CALLISTO also has a **Youtube channel** with various videos explaining the three cycles of project activities.

CALLISTO contacts: Federation of Veterinarians of Europe, Avenue de Tervueren, 12 -1040 Brussels, Belgium
ph. **+325337020**, www.fve.org, callisto@fve.org.

Thanks to the **CALLISTO** partners, the Expert Advisory Group members, the supporting Associations and Organisations, the external experts who joined the community and contributed to the activities.

A special acknowledgement in memory of Alex Ploeg, representative of the European Pet Organization and member of a **CALLISTO** Expert Advisory Group.

TABLE OF CONTENTS

04

CALLISTO PROJECT

06

CALLISTO DEFINITIONS

07

TOPICS OF RESEARCH

09

“PARADIGMATIC” INFECTIONS AND
RISK ASSESSMENTS

11

RECOMMENDATIONS

19

FINDINGS



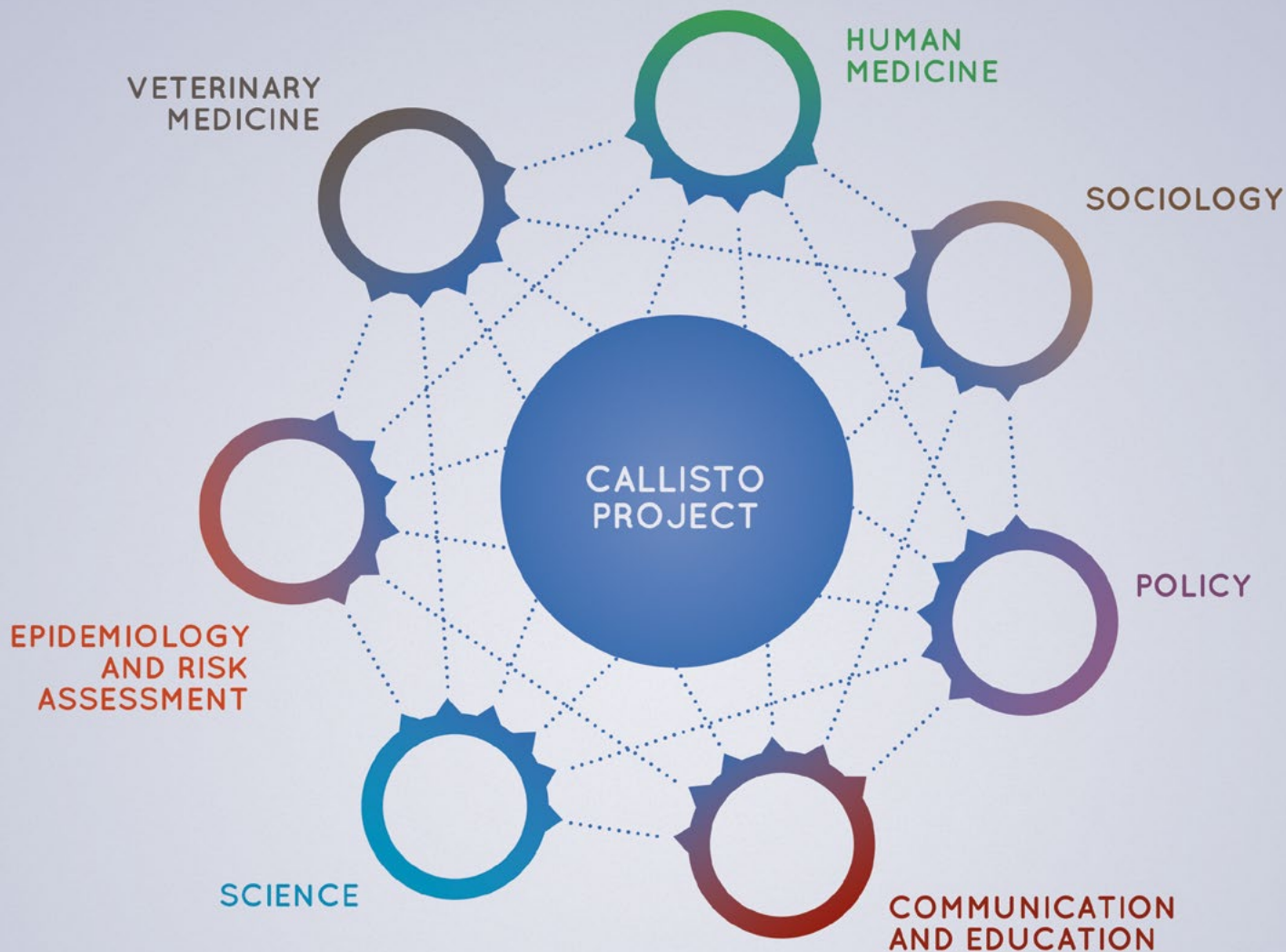
CALLISTO PROJECT

CALLISTO - Companion Animal multisectorial interprofessional and Interdisciplinary Strategic Think tank On zoonoses is the EU 7th Framework funded research project investigating zoonotic infectious diseases transmitted between companion animals - humans and food producing animals.

The CALLISTO consortium is made of 9 partners; in 2012-2014, 7 Expert Advisory Groups (EAGs) worked together executing the 3 project activities cycles:

- 2012 - 1st cycle - Objective: to develop an overview of the role of companion animals as a source of infectious diseases for man and food animals;
- 2013 - 2nd cycle - Objective: to identify knowledge and technology gaps in the management of the most important zoonoses transmitted by companion animals;
- 2014 - 3rd cycle - Objective: to propose targeted actions that contribute to reducing the risk for infectious disease outbreaks and to disseminate the results of CALLISTO to relevant stakeholders with the aim to promote risk-awareness in healthy and balanced human/animal relationships.

In CALLISTO, experts and stakeholders, coming mainly from the European Union, the USA, New Zealand and other Third Countries, as well as representatives of International Organisations, NGOs, Pet industry associations interact and merge multi-sectorial competences and approaches towards zoonoses, potentially transmitted by companion animals.



ZOONOSIS

Zoonosis means any disease or infection which is naturally transmissible from animals to humans. Zoonoses are caused by all types of pathogenic agents, including bacteria, parasites, fungi, and viruses.

EXPERT ADVISORY GROUPS

- EAG I** - User Community
- EAG II** - Policy Actions
- EAG III** - Viral Infections
- EAG IV** - Bacterial Infections
- EAG V** - Parasitic Infections
- EAG VI** - Epidemiology and Underlying Factors
- EAG VII** - Sociology and Welfare

CALLISTO DEFINITIONS



From the very beginning and during the three project cycles, CALLISTO members debated about scopes, meaning and methodologies valuable to develop the research on diseases potentially transmitted by companion animals. This constant process of exchange and negotiation led to produce distinctive definitions, useful to understand the work of CALLISTO, its extensive approach towards companion animal zoonoses, healthy and beneficial human-animals interactions.

According to CALLISTO:

“**COMPANION ANIMALS** are any domesticated, domestic-bred or wild-caught animals, permanently living in a community and kept by people for company, enjoyment, work (e.g. support for blind or deaf people, police or military dogs) or psychological support – including, but not limited to dogs, cats, horses, rabbits, ferrets, guinea pigs, reptiles, birds and ornamental fish.

“**RESPONSIBLE PET OWNERSHIP (RPO)** is a duty of care based on the principle that animals are sentient beings having intrinsic value, are dependent on humans for their health and welfare and are part of the ecosystem. RPO aims to maintain a good level of animal health and welfare, to maximize physical and psychological benefits to humans and to minimise the potential risk that pets may pose to the public, other animals, or the environment. This duty starts with responsible acquisition and continues with providing appropriate care and protection for pets and their offspring. (Second Strategy Report – 2nd Cycle).

TOPICS OF RESEARCH

CALLISTO covers multi-disciplinary areas of research to better understand the diseases potentially transmitted by companion animals.

Each project cycle investigated specific issues described in the related Strategy Reports, published and available at www.callistoproject.eu.

FIRST CYCLE STRATEGY REPORT:

The current situation on the available information concerning zoonoses potentially transmittable by companion animals, demographics of companion animal ownership, and sociological aspects of human-animal interaction are described.

- CALLISTO grouped available data on the growing number of companion animals estimated to be kept within the EU and the major economic contribution made by the associated industry: **66 million cats, 61 million dogs, 39 million ornamental birds, 6 million horses and 9 million aquaria in the EU**. The estimated annual spending on **pet care products** is € 25.7 billion.
- Companion animals contribute to the **wellbeing** of human society. Covering working roles (e.g. dogs for visually or hearing impaired people) and generating **profound benefits** in areas as human healthcare and childhood development, companion animals are also positively influencing the **reduction of human healthcare costs**.
- Major **bacterial, viral and parasitic zoonoses** are identified as well as surveillance systems for these infections; governmental awareness and interest in these diseases are explored.

SECOND CYCLE STRATEGY REPORT:

Companion animals ownership and related benefits vs risks were deeply analysed, together with the prioritization of zoonotic viral, bacterial and parasitic infections diseases.

- Despite unquestionable benefits of keeping companion animals, there are risks that **human owners may contract diseases directly or indirectly from companion animal species**. There are also disease transmission risks from traditional livestock species, increasingly kept as companion animals to farmed animals of the same species.
- Today in Europe, **there is little co-ordination between the numerous groups representing interests of pet owners, farmers or the horse-owning community**. The general public has poor understanding or concern about infectious diseases transmitted between companion animals and humans.
- CALLISTO recognises that the societal benefits of keeping pets comes with accepting **responsibility for the health and welfare of these animals**. Responsible Pet Ownership (RPO) is crucial to take advantage and extend those benefits.
- With few exceptions (e.g. canine rabies virus infection), **there is little serious attempt to monitor the prevalence, emergence or re-emergence of diseases arising from companion animal species**. At legislative level also, there is little awareness of the significance of companion animal zoonoses. A **'One Health'** (joint human and veterinary medical and public health) approach is essential to monitor and control companion animal zoonoses.
- CALLISTO focuses on the **assessment of risk factors** for the spread of selected **"paradigmatic" diseases** within companion animal populations and to human beings. Diseases are ranked by the viral, bacterial and parasitic infection EAGs and prioritised according to a common method of prioritisation proposed by the World Organisation for Animal Health (OIE). Later the risk assessments are based on an analysis of relevant published literature (PubMed and Google archive). Papers were subdivided into those relating to **import risk assessments** (IRAs) for regions where a disease was absent, and **evaluation of risk factors** in endemic areas for a disease.

THIRD CYCLE STRATEGY REPORT:

Connecting the results of the first and second cycles of research activity, CALLISTO produced a series of **recommendations** in various areas of intervention and addressing different target user groups to contribute in reducing the risk for infectious diseases potentially transmitted by companion animals.

“PARADIGMATIC” INFECTIONS AND RISK ASSESSMENTS



CALLISTO has identified 15 ‘paradigmatic’ diseases that formed the basis for a more detailed risk assessment related to those diseases and their spread between companion animals, humans and farmed animals.

VIRAL PATHOGENS

Crimean-Congo haemorrhagic fever virus

West-Nile virus

Foot-and-mouth disease virus (non-zoonotic)

Rabies virus

Bluetongue virus (non-zoonotic)

PARASITIC PATHOGENS

Echinococcus granulosus sensu lato

Leishmania infantum

Toxoplasma gondii

Giardia species

Toxocara canis/cati

BACTERIAL PATHOGENS

Campylobacter jejuni

Leptospira interrogans sensu lato

Salmonella enterica

Bartonella henselae

Extended Spectrum Beta-Lactamase (ESBL) producing organisms

BITE WOUND INFECTIONS

Bite wound infections are included in the priority list.

Campylobacteriosis and salmonellosis result as the most commonly reported zoonosis, but the role of companion animals in the transmission of these pathogens to food-producing animals and people is not clear and needs further investigation. Most of the 15 paradigmatic pathogens are linked to the more commonly kept companion animal species of cats and dogs.

Detailed information on the **“paradigmatic” zoonotic diseases** investigated are available in the **CALLISTO Second Strategy Report**.

The assessment of the risk factors responsible for spreading these diseases among companion animal populations or to human beings is described as well as the methodology used to rank and prioritise the identified diseases.

RISK ASSESSMENTS

One of the conclusions of the risk assessments is that companion animals may be reservoir or source of infection for humans (i.e. toxoplasmosis or alveolar echinococcosis).

The two scenarios must be clearly separated and analyzed accordingly. Moreover, import risk assessment did not specifically aim at evaluating the risks posed by companion animals.

For a proper evaluation of the levels of risk posed by companion animals, the estimation of the population attributable fraction (PAF) of the incidence of human diseases due to companion animals and the use of source attribution methods are of crucial importance.





© Jan Joris Vandenbergh

RECOMMENDATIONS

CALLISTO RECOMMENDS

CALLISTO final recommendations, arising from the three years of activities (current situation analysis, risk assessment and targeted actions) are grouped into five areas:

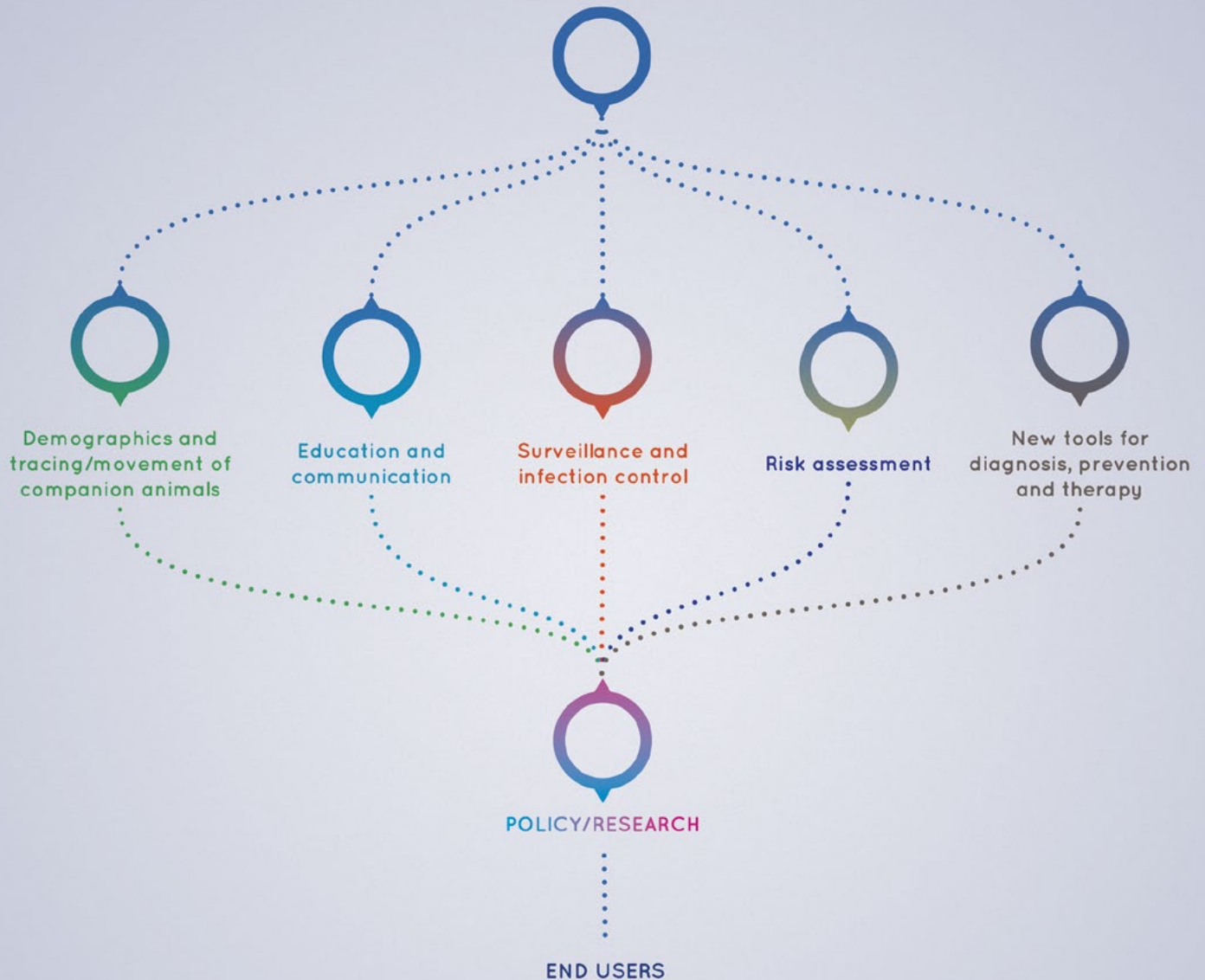
- **Demographics and tracing/movement of companion animals;**
- **Education and communication;**
- **Surveillance and infection control;**
- **Risk assessment;**
- **New tools for diagnosis, prevention, and therapy.**

CALLISTO recommendations are the core of the Third Strategy Report and are categorised as **policy**, **scientific research** and those applicable to both areas. In the report, each recommendation is prioritised using a 3-star ranking (*, ** or ***) and the **target user groups** are identified by a coding system.

CALLISTO recommendations inspire further activities in the field of human-companion animal health and wellbeing.

Veterinary and human healthcare professionals, the pet industry, associations and governments play a crucial role in communicating to pet owners benefits and risks of keeping a companion animal. Owners of companion animals have **to be aware of basic hygiene norms and healthy behaviors and follow the principles of responsible pet ownership, to mitigate the risks of diseases** potentially transmittable by companion animals. Priority recommendations and target end users are also hereby detailed.

RECOMMENDATIONS



Animal food Industry, Academic Research community, Companion animal care takers, Diagnostic Laboratories, Doctors, EU Commission, Farmers, Food industry, Human-animal bond organizations, International animal and human health organizations, Member State Veterinary Offices, Owners, Pet/Zoo shops, Pharmaceutical Industry, Police and armed forces, Public health and veterinary/food institutes, Veterinary staff and other professionals in contact with companion animals.

DEMOGRAPHICS AND TRACING/MOVEMENT OF COMPANION ANIMALS

CALLISTO RECOMMENDS:



More robust **data be gathered on the numbers** and distribution of owned and free roaming (including stray) companion animals in the EU.

Such data are essential in order to be able to quantify the actual risks of zoonotic diseases attributable to companion animals and to develop sustainable interventions to prevent transmission to humans and livestock.



A specific scientific **study of the reasons underlying the re-emergence of rabies in foxes in Eastern Europe.**

Understanding the origin of rabid foxes would help to take directed measures (e.g. vaccination barriers) in appropriate geographical areas for this re-emerging disease.



The development of systems for **microchip identification** of companion animals and **registration of these animals in a cross-border accessible database.**

Identification and registration in a cross-border accessible database are of relevant value for zoonotic disease prevention and control, epidemiological studies and surveys.



The introduction of more robust **monitoring of companion animals imported into the EU** and implementation of schemes **to assess mortality during transportation** of such animals.

Knowledge of trends of imported companion animals can provide an early warning signal of which species should be paid more attention for the presence of pathogens important for human and food animal health; knowledge of trends and monitoring of unexplained death during transport of imported companion animals can provide an early warning signal for the presence of pathogens important for human and food animal health.



To consider the **control of companion animal movement** between areas of the EU endemic for particular zoonoses and areas that are not currently endemic for that disease.

Considering the zoonotic potential of infections such as echinococcosis, leishmaniosis and dirofilariosis, specific legislative rules should regulate animal movements within the EU.

EDUCATION AND COMMUNICATION

CALLISTO RECOMMENDS:



*Any message delivered about companion animal zoonoses achieves **a balance between maintaining, or possibly increasing, the benefits of keeping companion animals** and mitigating or eradicating potential infectious disease risks.*

The final goal is to achieve a balanced communication on benefits of keeping companion animals and mitigating or eradicating potential risks.



*The promotion of, and education in, the concept of **Responsible Pet Ownership** (*).*

Responsible pet ownership aims to maintain a good level of animal health and welfare, to maximise physical and psychological benefits to people and to minimise the potential risks that companion animals may pose to the public, other animals, or the environment.



*To create opportunities for the **education of physicians, veterinarians, owners and other relevant professional categories in companion animal zoonoses**. Specifically, from a **“One Health” perspective**, increasing the knowledge of human physicians in this area is crucial.*

Several zoonotic diseases are likely underdiagnosed by physicians due to lack of knowledge of these diseases and their clinical presentations, often characterized by mild and non-specific symptoms. Potential risks of infections are of special concern for people who are very young, old, pregnant or immunocompromised, who are particularly susceptible to infections.

Owners should be aware of the importance of proper socialisation of pets in reducing unwanted behavior (e.g. dog bites) and why it is important to teach children to interact safely with animals (proper hygiene when they are in contact with companion animals).

SURVEILLANCE AND INFECTION CONTROL

CALLISTO RECOMMENDS:



The implementation of a **European network**, linked to EFSA and ECDC, **for monitoring the prevalence of known zoonotic agents** in the relevant companion animal species and for early detection of new zoonotic infectious diseases using companion animals as sentinels.

Being able to follow dissemination of new pathogens across borders is critical to establish rapid and effective measures to prevent and control disease spread.



The introduction of systems for **monitoring companion animals travelling outside of the EU** for the potential introduction of exotic pathogens as these animals return to the EU.

Companion animals may acquire several zoonotic pathogens (including resistant bacteria) when travelling to exotic destinations.



Companion animals (particularly dogs, cats, and horses) are to be included in **national surveillance programmes on antibiotic resistance** implementation of methods for improved reporting of companion animal zoonotic infectious diseases.



Implementation of methods for improved reporting of companion animal zoonotic infectious diseases.

Many zoonoses are reportable or notifiable in humans or in humans and farmed animals, but not in companion animals. It is therefore impossible to identify possible common geographical distributions or common patterns of temporal trends.



Targeted scientific **research to address the significance of specific pathogens** for which there is currently little information about whether companion animals are sources of these infections, and how transmission of these pathogens might occur between man and companion animals.

RISK ASSESSMENT

CALLISTO RECOMMENDS:



The initiation of **multicentre case-control studies** to evaluate the role of companion animals as a source of infection for people by determining the population attributable fraction of disease due to companion animals.

Quantitative knowledge is essential to estimate the risks associated with animal contact and ultimately to justify and weigh recommendations to omit such risks.



The performance of **studies to identify risk factors for companion animal infection** or colonisation with pathogens known to have a relevant role in human disease.

A better understanding of risk factors for disease and pathogen shedding in companion animals is important to ensure proper and targeted infection control practices. Such knowledge may be acquired through case-control studies, i.e. investigations of the types of exposure observed in pet-owning patients and in matched, unaffected pet owners.



Specific targeted **investigations to assess the potential human pathogenicity of a group of pathogens** associated with companion animals for which there are currently few data on zoonotic risk.

Pathogenity and burden to human diseases have to be assessed for less studied companion animal pathogens (e.g. less studied species within the genera *Bartonella*, *Campylobacter*, *Chlamydophila*, *Giardia* and *Cryptosporidium*).



The performance of **studies to characterise the transmission dynamics of infections moving between companion animal, human and production animal populations in a farm setting**.

Food and companion animals share several pathogens of zoonotic relevance; a better understanding of transmission dynamics may enforce new guidelines to optimize infection barriers/biosecurity within and between farms.

NEW TOOLS FOR DIAGNOSIS, PREVENTION, AND THERAPY

CALLISTO RECOMMENDS:



*Introduction of some form of **regulation of the use of critically important antibiotics (CIAs)** used in human medicine for companion animals, and the **development of new alternative veterinary antimicrobials and alternative treatment strategies** to manage multidrug-resistant infections in companion animals.*

The increasing usage in companion animals of critically important antimicrobials (CIAs) in human hospitals poses serious concerns regarding the possible risk that veterinary usage may create a reservoir of resistance to CIAs in companion animals and contribute to loss of efficacy of CIAs for treatment of life-threatening human infections.



*The development of **rapid field diagnostic test kits** for the veterinary practice.*

Rapid diagnostic tools with high sensitivity and specificity are important, since they facilitate implementation of proper infection control practices and early treatment.



*The development of **new vaccines that protect against diseases transmitted by companion animals.***

Vaccination is an attractive option to prevent infections that are difficult or expensive to control and treat in other ways. *Toxoplasma gondii*, *Leishmania infantum*, rabies are pathogens for which either new vaccines or optimised versions of existing vaccines would be attractive.



*Introduction of **schemes for the regulation and certification of diagnostic laboratories and definition of minimum requirements to ensure quality control of diagnostics** and susceptibility testing within veterinary hospitals.*

The quality of diagnostics and consequently treatment of animals should be optimised to ensure best animal health practice and to facilitate infection control locally; common standards are necessary to enable comparison of prevalence of pathogens and antibiotic resistance from different laboratories and countries.

FINDINGS

Companion animals of varied species are growing in numbers in Europe and play an integral role in human society, providing health and welfare benefits. However close human contact with companion animals may lead to the transmission of zoonotic infectious diseases of numerous different types. A **balanced communication** of benefits and risks of keeping companion animals is crucial to increase awareness of pet owners and **promote healthy behavior and Responsible Pet Ownership**.

CALLISTO proposes a series of recommendations that will contribute to healthy human-animal relations. **CALLISTO** summarises policy and research actions to be implemented at a European and/or national level to reduce risks associated with an everyday closer integration of companion animals into human society:

- *The development of **systems for identifying and registering the most common companion animal species and establishing surveillance programmes** that capture data on zoonoses that occur in these animals.*
- *Closer attention should be paid to the health status of animals entering or re-entering the EU from Third Countries and the **welfare surrounding companion animal cross-border movement**.*
- ***Disease and disease vector spread within Europe should be monitored** and solutions found to limit such spread.*
- *The **emergence of antimicrobial resistance in companion animals should be monitored** and controls should be placed on the use of human critically important antibiotics in companion animal species, developing in parallel new approaches to antimicrobial therapy.*
- ***Education** on companion animal zoonoses should be promoted both for relevant professional categories and owners.*

CALLISTO

WWW.CALLISTOPROJECT.EU

Companion Animals multisectorial Interprofessional Interdisciplinary Strategic Think tank On zoonoses.

Project office: Federation of Veterinarians of Europe (FVE), Avenue de Tervueren 12, B-1040 Brussels,

Tel: +32 (0) 2 533 70 20 - <http://www.fve.org>



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration", under Grant Agreement: KBBE-2011-5-CALLISTO 289316

Contents of this publication reflect only the contributors views and the European Union is not liable for any use that may be made of the information contained therein.

Copyright© 2014