

2017 - issue 71 - Abstracts

AEEMA MEETING, MARCH 23rd, 2017: ONE HEALTH

"One Health": Towards a better collaboration of human and veterinary medicine

Zinsstag Jakob

The modern concept of "One Health" has its roots among others in term "One Medicine" coined by the American veterinary epidemiologist Calvin Schwabe. We define "One Health" today as the added value in terms of human and animal health, financial savings and improved environmental services resulting from a closer cooperation between human and animal health and other academic fields. We validated "One Health" with several case examples in Africa and Asia. While the benefits of "One Health" have been well demonstrated in developing countries, it has also a strong potential for industrialized countries as reverse innovation. "One Health" is part of broader conceptual thinking of ecosystem approaches to health (ecohealth.net) and evolves towards a systemic approach called "Health in social-ecological systems".

Surveillance of zoonotic diseases in wildlife (mammals and birds) in France

Richomme Céline, Rossi Sophie, Mailles Alexandra, Desvaux Stéphanie & Decors Anouk

Wildlife vertebrate species may be involved in the epidemiology of infectious or parasitic diseases transmitted from animals (wild or domestic) to humans. Moreover, environmental interfaces between humans and wild animals evolve with an increasing landscape fragmentation or new uses of nature. The multidisciplinary approach and inter-sectoral vigilance are thus clearly needed, and wildlife investigations are now more regularly implemented as a part of national or local surveillance of zoonosis. After a presentation of the organization of sanitary surveillance of mammals and wild birds in France, we then describe its interactions and connections with the actors of the public health.

Foodborne parasitic zoonosis in France, for which wildlife is a reservoir: impact in public health

Dupouy-Camet Jean, Yera Hélène, Bourée Patrice & Aliouat-Denis Cécile-Marie

We analyse here the impact in public health of foodborne parasitic zoonosis for which wildlife is a reservoir. These are still few, except for the severe alveolar echinococcosis, whose incidence seems to increase. The change of the modes of production of pork outdoor could increase the incidence of trichinellosis. The increasing consumption of raw fish does not appear to have raised the incidence of cases of anisakidosis.

Epidemiological enforcement of the « One Health » concept: the Q fever example

Armengaud Alexis

The integrated approach « One Health » is based on the reinforcement of collaborations between both human and veterinary medicine. Most of Q fever outbreaks described in France and in the Netherlands have been linked to factors promoting contact of humans with livestock like breeding densification or increasing of rural tourism. Based on risk assessment studies, recommendations were proposed in both veterinary and human health fields to limit

exposure to *Coxiella burnetii* and to improve the management of exposed and sick people. Predicting and preventing human exposure is a public health challenge. The example of Q fever shows the usefulness of strengthening collaborations to improve human and animal health.

Investigations in a pig farm contaminated with persistent organic pollutants and identification of a scarcely-documented environmental contamination source

Vaccher Vincent, Picherot Mélanie & Marchand Philippe

During a national monitoring plan commissioned by the French ministry of agriculture, a pork fat sample was declared non-compliant for the sum dioxins (PCDD/Fs) and dioxin-like PCBs (DL-PCBs) according to EU regulation. LABERCA, the relevant National Reference Laboratory, together with veterinary services conducted extended investigations to determine rapidly the contamination source at the farm level. In this perspective, a range of samples representative of potential contamination sources was selected for further characterization (food and environmental samples). A total of 130 samples was therefore gathered and analysed for PCDD/Fs and DL-PCBs by GC-HRMS. While most samples exhibited significant PCB amounts, only one soil sample could explain the amounts recovered in the non-compliant pig fat. Consequently, a hot spot was localized in the farm which corresponded to a pre-feed storage tank. The storage tank paints, which peeled off from the tank sides and were therefore present in the open-pit, presented upon characterization huge DL-PCBs amount (>1.106 pg.g-1 of matrix). The complete overlap of both PCB profiles allowed to identify the storage tank paints as the PCB source responsible for pre-soup and pigs' contamination.

« One Health » concept in the Indian Ocean: a concept on the move!

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In 2005, a Chikungunya epidemic affected thousands of people in the Indian Ocean region. This event confirmed that sharing health information between the countries of the Indian Ocean Commission (Comoros, Madagascar, Mauritius, France/Reunion and Seychelles) was essential. At the same time, zoonosis such as Rift Valley fever and other high-impact animal diseases such as « *peste des petits ruminants* » have burst out endangering food security in the area. To address these threats, a « One Health » approach was developed with the implementation of the SEGA One Health network, in charge of the surveillance of human and animal infectious diseases, and the One Health Indian Ocean platform in partnership, its alter ego for research activities.

AEEMA MEETING, MARCH 24th, 2017: COMMUNICATIONS

Challenges in implementing the « One Health » approach

Danuser Jürg, Bruhn Silke & Balmer Sandra

The aim of using a One Health approach is to achieve an added value in terms of health of humans and animals and of environmental services. Emerging threads may be prevented and

controlled on an efficient way. In Switzerland, a specific institution has been created in order to implement One Health in the administration. The competent federal offices and the execution authorities in the cantons are represented in this institution. Executive managers expect from the institution that important issues like antimicrobial resistance, zoonosis or the consequences of climate change are tackled as well as the institution gets involved in existing strategies.

Modelling enzootic persistence of swine influenza A viruses in pig farms: analysis of persistence features and identification of control strategies

Cador Charlie, Andraud Mathieu, Lander Willem & Rose Nicolas

Farrow-to-finish pig farms are frequently infected by several subtypes of swine influenza A viruses (swIAV) which have become enzootic in pig populations and responsible for influenza outbreaks repeating permanently on each batch, at fixed age. Co-circulation of those different subtypes and their reassortant viruses lead to consecutive or simultaneous infections which favour enzootic persistence of swIAV within farms. However, the determinism of swine flu persistence in farrow-to-finish farms is very complex and involves several non-independent epidemiological, virological and immunological parameters. The proposed stochastic metapopulation model represents the co-circulation of two swIAV in a farrow-to-finish pig farm with the aim of (i) identifying circumstances associated to enzootic swIAV persistence and (ii) evaluating the ability of control strategies related to rearing conditions and vaccination to break the infection cycle. Parameterization of the model was based on experimental data specifically produced to this aim (quantification of swIAV transmission in presence/absence of maternal immunity, evaluation of airborne transmission). Results of the model evidenced the role of maternal immunity, airborne transmission and batch-rearing systems with short intervals between batches as conditions enhancing the probability of enzootic persistence. Although vaccination of the breeding herd was found beneficial, significantly reducing the persistence of the virus in this subpopulation, it didn't achieve swIAV fade-out at the whole population level (the infection was persisting in the growing pig subpopulation). The export of batches of growing pigs at weaning was found as the most efficient strategy to break down the mechanic repetition of infections between batches.

Syndromic surveillance for West Nile Virus using raptors in rehabilitation

Alba Ana, Perez Andrés, Ponder Julia, Puig Père, Wünschmann Arnold, VanderWaal Kimberly, Alvarez Julio & Willette Michelle

Wildlife rehabilitation centres routinely gather health-related data from diverse species. Their capability to signal the occurrence of emerging pathogens and improve traditional surveillance remains largely unexplored. This paper assessed the utility for syndromic surveillance of raptors admitted to The Raptor Centre (TRC) to signal circulation of West Nile Virus (WNV) in Minnesota, USA, between 1990 and 2014. An exhaustive descriptive analysis using grouping time series structures and models of interrupted times series was conducted for indicator subsets. Results indicated that temporal patterns of accessions at the TRC changed distinctively after the incursion of WNV in 2002, suggesting that monitoring of hawks admitted to TRC with WNV-like signs could serve as an indicator of WNV circulation. These conclusions were also supported by the results of laboratory diagnosis. Thus, we demonstrate that monitoring of data routinely collected by wildlife rehabilitation centres has the potential to

signal the spread of pathogens that may affect wild, domestic animals and humans, thus supporting the early detection of disease incursions in a region and monitoring of disease trends. Ultimately, data collected in rehabilitation centres may provide insights to efficiently allocate financial and human resources on disease prevention and surveillance.

Animal health crisis in the Indian Ocean: Foot and mouth disease virus in Mauritius and Rodrigues in 2016

Relmy Anthony, Romey Aurore, Gorna Kamila, Blaise-Boisseau Sandra, Laloy Ève, Meenowa Deodass, Samoisy Karen, Harena Rasamoelina, Ram Ramjee, Aboo Jahangeer, Cardinale Éric, Sailleau Corinne, Lecollinet Sylvie, Zientara Stephan & Bakkali Kassimi Labib

Foot-and-mouth disease (FMD) is a contagious viral animal disease affecting domestic and wild artiodactyls (cattle, pigs, goats, pigs, African buffaloes ...). This disease is widespread throughout the world and is endemic in parts of Asia, Africa, the Middle East and South America. It is more rarely found in islands. The causative agent is a virus of the genus Aphthovirus within the Picornaviridae family and named FMDV (Foot-and-Mouth Disease Virus). This virus has significant genetic and antigenic variability with seven immunologically distinct serotypes (O, A, C, Asia 1, SAT 1 to 3) each subdivided into several subtypes. A health crisis was reported in south-eastern Africa on the Mauritius and Rodrigues Islands in July-August 2016. Upon request, the NRL in Maisons-Alfort implemented an emergency diagnosis aiming at detecting and characterizing the virus involved in this epizootic without delay. The results obtained enabled a precise identification of the FMDV strain involved and guided the choice of the appropriate vaccine to stop its spread. This paper describes the conditions for the detection of this virus, the results of analyses and their interpretation, and the impact of the epizootic in these two islands.

***Mycobacterium microti*, a neglected tuberculosis agent**

Michelet Lorraine, de Cruz Krystel, Karoui Claudine, Hénault Sylvie & Boschirola Maria-Laura
A retrospective analysis was performed by the national reference laboratory for Tuberculosis on data concerning *Mycobacterium microti*, the causative agent of tuberculosis on small rodent, in the last 15 years. Between 2002 and 2016, 103 cases were identified, of which 68 in the last 2 years. This increase is mainly due to the confirmation of cases by molecular methods used for diagnosis of animal tuberculosis in France. As for *M. bovis* and bovine tuberculosis, *M. microti* has a wide geographic distribution with strong regionalization of some genotypes and, also, a great variety of domestic and wild hosts. The increasing number of cases in the last years suggests that the prevalence of *M. microti* infection may have been underestimated. Furthermore, due to the zoonotic potential of this bacterium, the risk of exposure for the human population should also be taken into account in the future. An improved surveillance of TB in animals and humans, based on molecular methods, can contribute to a better understanding of the epidemiology of *M. microti* infection.

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Exposure assessment in the context of the « SPARE » project: A model to spatially assess exotic diseases incursions and spread throughout Europe

Crescio Maria Ines, Maurella Cristiana, Bertolini Silvia, Mastrantonio Gianluca, Francesco Ingravalle, Bona Maria Cristina, Simons Robin, De Nardi Marco, Adkin Amie, Estrada-Peña Augustin & Ru Giuseppe

In this article, we describe a spatially explicit exposure assessment model developed within the SPARE project (www.spare-europe.eu). In particular we show how we estimated the spatial probability that the introduction of one animal infected with a vector borne disease (in our example Bluetongue) will lead to at least one other infected animal, using the Piedmont region of North Western Italy as an example area. An extensive literature search leads to a systematic and structured inventory of exposure risk factors. This inventory was then used to develop scenario tree pathways, detailing the main exposure pathways, along with the equations and their parametrization. A stochastic model was then implemented and run. Based on the model, we provide maps with a different distribution of the probability of a secondary transmission. This is quite high in the whole region and temperature is the factor most influencing it: districts with smaller temperature peaks around 23°C in the period April-November show the highest risk and the lowest uncertainty. Providing a map of the areas where livestock are more likely to be exposed can be useful to inform national surveillance policies.