F7 - Vector-borne diseases

F7.1: Applying a multidisciplinary One Health framework to evaluate yellow fever risk factors at selected municipalities in Southwestern Antioquia, Colombia – pilot project
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Yellow fever (YF) is endemic to 30-40% of Colombia’s territory, affecting human and nonhuman primate (NHP) health and economically impacting affected human communities. Most studies conducted to date in the country on YF epidemiology have focused on determining the vectors and vertebrate host(s) involved in the disease transmission cycle and the effects on human populations, but little evaluation of the dynamic interaction of these factors at the interface of human, animal and environmental health. Using a multidisciplinary One-Health framework, we examined potential risk factors for YF in human and NHP populations in Southwestern Antioquia. We incorporated ethnographic methodologies coupled with epidemiological tools to assess the possible causal relationship of occupational activities, degree of interaction with NHP, or NHP trade with the risk of exposure to YF virus. Serological testing using ELISA and hemagglutination inhibition in a captive population of howler monkeys did not identify any YF virus-specific IgM and IgG antibody. Occupational activities, degree of interaction, and presence of NHP trade were determined by conducting observations, focus groups, and standardized questionnaires in different communities located within 10km of captive and free-ranging NHP populations. Preliminary analysis of the qualitative data did not identify any NHP trade in the study area. The main occupational activities identified were agriculture (e.g. coffee, cardamom), livestock production, and housekeeping. The degree of interaction with NHPs was associated with the intensity of landscape modification and local knowledge of the value of natural resource conservation. For instance, participants from La Cascada, which has a largely intact landscape, reported the same degree of interaction with NHPs regardless of their occupation, while those from San Francisco, with a heavily modified landscape, reported zero interaction. Further research incorporating mosquito sampling, wild NHP and human serology is required to confirm these preliminary results and any correlation with human exposure to YF.

F7.2: Towards a resource-based habitat approach for spatial modelling of vector-borne disease risks
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Landscape, including land use and land cover composition and structure, are recognized as important drivers for vector-borne disease risk. Since vector-borne pathogens rely on at least one vector and one host species, the occurrence of a disease is linked to areas where habitats of these species overlap functionally. The fact that these areas do not necessarily coincide with specific vegetation types hampers the correct identification of areas at risk. In this paper, we explore the potential of a resource-based habitat concept (RBHC) in identifying ‘suitable habitats’ for vector-borne pathogens. The resource-based habitat concept has been much used in conservation ecology, but has not been used yet in disease ecology. This concept would offer a framework to systematically study the different resources that are necessary for the completion of the transmission cycle, and link these resources to landscape features and other environmental factors. We show that the RBHC can be adapted to the multi-species setting of a vector-borne pathogen and illustrate this by applying the concept to bluetongue, a midge-transmitted virus in ruminants. We discuss the usefulness of the concept for vector-
borne diseases and we argue that the concept may enable us to study the functional habitats of all the relevant species (vectors as well as hosts), which will give new insight in the spatial and temporal variation in transmission opportunities and the resulting disease risk. Also, it may facilitate communication between modellers and entomologists, help in identifying knowledge gaps and data gaps. Our framework may help act as a bridge between existing bottom-up mechanistic modelling approaches, that do not include landscape factors at all, and top-down satellite image-based approaches that are based on statistical inferences only.

**F7.3: Human vulnerability to Trypanosoma cruzi vector-borne transmission through social representations and practices in Zoh-Laguna, Calakmul, Mexico**

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Introduction: Vector-borne transmission of Trypanosoma cruzi (VBTTc) to humans depends upon multiple factors across a landscape ecosystem use and modification, the biology and ecology of the infected triatomine species, characteristics of dwellings as human nests for the vector, and use of humans as blood source. Using health-disease and socio-territorial appropriation approaches, representations and practices of inhabitants living in a T. cruzi endemic area were analyzed. Materials and methods: This is a qualitative-ethnographic study conducted over 10 months (2011-2012) in Zoh-Laguna, Calakmul. In depth-interviews explored representations and practices regarding variables for an ethno-ecological model for VBT within landscape fragments. The participatory observation recorded relevant practices related to health-disease processes and socio-territorial appropriation. Results: Knowledge and beliefs of VBTTc is heterogeneous among the population, and unrelated to ecological factors recently received information has been insufficient to gain greater social visibility. Men have elaborated knowledge regarding the distribution of bugs and mammals in non-domestic fragments (monte), where they reported bites. Women report that bugs transmit a disease, although their knowledge is based on their comprehension of dengue, mosquitos and non-bloodsucking reduviids. The most important landscape practices affecting vulnerability for VBT are those in and with the ecoctono/crop and pasture areas in the dry season, and preventively the traditional use of bednets. Conclusions: Social representations motivate practices which create and expose VBTTc, implying that both are components of social vulnerability. A landscape approach regarding both gives a more complete understanding of vulnerability components from health-disease perspectives based on territorial appropriation and use. This is a key issue where vectors maintain domestic and non-domestic populations and there is continuous movement of vectors assisted in large part to the human population. Understanding the population’s viewpoint regarding knowledge, beliefs, and practices which create and maintain vulnerability are essential to develop culturally relevant community-based VBTTc.

**F7.4: From the knowledge, perceptions and behaviors of the public to the implementation of Lyme disease preventive interventions: A comparative study between Canada and Switzerland**

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Lyme disease (LD), a bacterial infection transmitted to humans by a tick after it has acquired infection from an animal reservoir, is emerging in Canada. Its annual incidence could reach 8000 cases in Canada in 2050, and this raises concerns both for the public and for health authorities. In the last decade, decision aid tools for LD management have focused on risk quantification in ecological systems. But the population’s knowledge and perceptions of risk are also important determinants of the success of prevention strategies. This presentation will provide results from a comparative research project between Canada and Switzerland which aimed at describing risk perception for LD within the general public and for various decision-making groups; and at describing the impact of risk perception on the adhesion and acceptability of preventive measures. The project used a mixed methods research design. A quantitative analysis of a web-based survey involving 800
participants along with focus groups composed of members of the general public and decision-makers was conducted. This approach has been applied to two different study regions: the Montérégie region, in Québec, Canada, where LD is emerging, and the Neuchâtel Canton, in Switzerland, where the disease has been endemic for more than 30 years. The results are interpreted for each study region, with a comparative analysis between regions. Differences between levels of knowledge and risk perception, as well as between levels of adherence to preventive measures were found between both study regions. The results of this study demonstrate the importance of considering population’s perceptions along with expert’s knowledge to enhance transparency of decision, social acceptability and efficacy of interventions, particularly in the context of emerging diseases in Canada.

F7.5: Social Imaginaries Associated To Vector Borne Diseases As A Foundation For Building An Ecohealth Strategy With The Bari Indigenous Community Of Karikachaboquira, Colombia
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Introduction: The Catatumbo region in Colombia is an endemic area for different vector-borne diseases. The indigenous Bari of Karikachaboquira, are the ancient inhabitants of this territory, and through their daily interaction with their socio-cultural and ecological context, they have created social imaginaries related to vector-borne diseases. The objective of this study is to identify and analyze these imaginaries to formulate with the local community an EcoHealth intervention for the prevention, monitoring and control of vector-borne diseases. Methodology: A transdisciplinary team collected the information using semi-structured interviews, focus groups, guided informal dialogues, participatory action research, social mapping, and time lines. These activities included the participation of locals of different gender, age and occupation. Results: The Bari people identify insects that transmit diseases, from the local perspective, blood-sucking insects are bad, but in previous years this concept is absent, which suggests it is a recent social imaginary. There are names in native language for vectors, which denotes vector traditional knowledge. We identified imaginaries associated with vectors and/or illnesses. Malaria is the only illness with a name in native language derived from its symptoms “dat-dat-ye” which mean shiver disease. We identified traditional treatments for the prevention and cure of disease and for the control of vectors. We triangulated the results and socialized them with the community for validation and complementation of the information. Conclusions: Knowledge about imaginaries allowed us to identify the logic underlying the ways of thinking and acting of locals regarding vector borne diseases, creating a better understanding of the local situation and possible intervention strategies to improve health conditions. The EcoHealth approach was widely applicable through the pillars of: transdisciplinarity, social participation, systems thinking and research to action. These approach in conjunction with an intercultural philosophy provided deep understanding of the imaginaries through real and active participation of the community

F7.6: Ecohealth approach to determinate vector borne diseases among the Bari- Karikachaboquira indigenous group, in Catatumbo, Norte de Santander-Colombia
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Introduction In Colombia, indigenous populations are highly vulnerable to the transmission of vector-borne diseases due to socio-ecological and environment conditions. The aim of this study is to describe the implementation of a transdisciplinary methodology to collect the entomological, ecological and social baseline information for the design of an Ecohealth intervention strategy with the Bari-Karikachaboquira indigenous group located in the Catatumbo Region, Norte de Santander. Methodology The investigation took place with the active participation of the community. We discussed and refined our proposed research protocol with the local leaders and community. We implemented ecological and social research through geo referencing routes, KAP surveys, semi-structured interviews, participatory workshops. Entomological surveillance with local people included training in insect capture, active search for triatomines, light traps to capture Anopheles spp., and inspection of larval habitats for malaria vectors. We presented, discussed and validated with leaders and members of the community all the information collected. Results We achieved an intercultural knowledge dialogue through the participation of community members in several stages of our research activities. Eco-social research allowed for the identification of socio-economic activities, knowledge and practices linked to vector-borne diseases. We captured Rhodnius prolixus in wild habitats, Pastrongylus geniculatus and Eratyrus mucrunatus, which the community name as "shidru" and occasionally enter the houses and are associated to Chagas disease. We identified the presence of Anopheles nuneztovari a primary vector of malaria in Colombia. The abundance of the mosquitoes increases with the rainy season, which generates changes in fishing and agriculture activities. The community has generated attitudes associated with vector control, healing and disease prevention practices. Conclusions In the context of the design of an Ecohealth intervention, the information obtained provides comprehensive information that could serve to build local capacity through the strengthening of traditional medicine, entomological and epidemiological community vigilance, diagnostic and monitoring.