

# OIE Collaborating Centres Reports Activities

## *Activities in 2020*

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<b>Title of collaborating centre:</b>	Zoonoses in Europe
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**ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories**

**ToR: To identify and maintain existing expertise, in particular within its region**

**1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by the OIE**

Disease control	
Title of activity	Scope
Avian Influenza: HPAI H5 outbreaks in Germany and Europe	In 2020, a high number of cases of HPAI H5(N8) in wild birds (n>350) was observed in Germany since October. Similar cases were observed in other European countries. So far, a low number of outbreaks in poultry was reported (n=12) mainly affecting small hobby holdings in coastal areas close to centres of wild bird cases.
Encephalitis disease cluster in a zoo in northern Germany	<p>Does rubellavirus have an animal origin?</p> <p>Up to now, humans were considered the only natural host of rubellavirus, the causative agent of rubella („German measles“). However, the origin of rubellavirus was still unknown. In two independent studies from the USA and Germany, viruses closely related to rubella virus were now first detected in animals. While a research team from the USA found the so-called “ruhuguvirus” in cyclops roundleaf bats in Uganda, the Friedrich-Loeffler-Institut (FLI) detected the also novel “rustrelavirus” in zoo animals and yellow-necked mice. Both viruses show strong structural similarities to rubellavirus and indicate that it originates from animals.</p> <p>Study: “Relatives of rubella virus in diverse mammals”. The potential reservoir of a novel encephalitis virus (Rustrelavirus, family Matonaviridae) was identified to be the yellow-necked field mouse (Apodemus flavicollis). Ongoing investigations are dedicated to find out the current distribution range of this virus within the potential reservoir rodent.</p>
Technical Support for Namibia in Eliminating Rabies in Dogs	OIE/German Project to eliminate rabies in dogs in Namibia: Assessment of epidemiological surveillance data; Monitoring of vaccination campaigns; Phylogenetic analysis of rabies virus isolates
Epidemiology, surveillance, risk assessment, modelling	
Title of activity	Scope

<p>Brucellosis</p>	<p>Brucellosis continues to be one of the most important zoonotic diseases in North Africa, both health-wise and economically. Since most available studies from the respective countries are mainly based on serological test results, much important pathogen-specific information is missing, which is of high importance for epidemiological questions and for control strategies.</p> <p>Study: Molecular genotyping and detection of antibiotic resistance of <i>Brucella</i> spp. isolated from Algeria</p> <p>In the first part of the project, data were obtained on the geographical distribution, pathogen identification and possible risk factors for infection.</p> <p>In addition to the identification of <i>Brucella abortus</i> bv 3 (approximately 85%) and <i>B. melitensis</i> bv2 and bv3 (approximately 15%), it was also found that 60% of serologically positive animals from infected flocks showed no clinical signs.</p> <p>Mauritania has reported clinical cases of Rift Valley Fever in ruminants since summer 2020 again. FLI is collaborating with ONARDEL, Nouakchott for almost a decade on the thematic areas of RVFV and CCHFV diagnostics and control. Consequently, FLI has send ONARDEL diagnostic kits and provided general assistance to assist their Mauritanian colleagues to combat the recent RVFV outbreaks.</p>
<p><b>Training, capacity building</b></p>	
<p><b>Title of activity</b></p>	<p><b>Scope</b></p>
<p>Support of Mauritania in regards to the ongoing RVF epidemic</p>	<p>Mauritania has reported clinical cases of Rift Valley Fever in ruminants since summer 2020 again. FLI is collaborating with ONARDEL, Nouakchott for almost a decade on the thematic areas of RVFV and CCHFV diagnostics and control. Consequently, FLI has send ONARDEL diagnostic kits and provided general assistance to assist their Mauritanian colleagues to combat the recent RVFV outbreaks.</p>
<p>OIE Laboratory Twinning Project: rabies (Namibia)</p>	<p>Improvements of rabies diagnostic capacities and capabilities of the Central Veterinary Laboratory, Windhoek, Namibia: (i) Revision of SOPs, (ii) establishment of realtime PCR, (iii) interlaboratroy comparsion test on FAT</p>
<p>OIE Laboratory Twinning Projects: viral hemorrhagic fevers (Cameroon)</p>	<p>OIE Twinning between FLI and Laboratoire National Vétérinaire (LANAVET) in Cameroon: Strengthening the National Veterinary Laboratory in viral hemorrhagic fever diagnostics, preparedness and research. FLI participates in the EBO-SURSY program and is twinning with LANAVET, Garoua, Cameroon in regards to the RVFV and CCHFV diagnosis and control</p>
<p><b>Zoonoses</b></p>	
<p><b>Title of activity</b></p>	<p><b>Scope</b></p>

<p>SARS-CoV-2</p>	<p>With SARS-CoV-2, a novel zoonotic coronavirus originally believed to have originated from bats occurred in humans first in China, subsequently leading to a pandemic. The work of the FLI focused on studies on susceptibility of animals and on their role in SARS-CoV-2 infections, including diagnostics, pathogen / host interaction and immunology.</p> <p>Selected results in 2020 are:</p> <p>Study „SARS-CoV-2 in fruit bats, ferrets, pigs, and chickens: an experimental transmission study": The study showed that fruit bats and ferrets are susceptible, pigs and chickens are not.</p> <p>Study „Experimental infection of cattle with SARS-CoV-2": This worldwide first experimental study on cattle shows a low susceptibility to SARS-CoV-2, but no transmission of the virus.</p> <p>Study „Susceptibility of Raccoon Dogs for Experimental SARS-CoV-2 Infection.": The study showed that raccoon dogs are susceptible to SARS-CoV-2 infection and can transmit the virus to direct in-contact animals.</p> <p>Study "Multi-species ELISA for the detection of antibodies against SARS-CoV-2 in animals": An RBD-ELISA for detecting SARS-CoV-2-specific antibodies in different animal species was developed and validated.</p> <p>COVID-19 E-Learning section on the German Online Platform for Biosecurity &amp; Biosafety (GO4BSB) of the projects of the German Biosecurity Program. Includes series of self-study modules related to COVID-19 basic science, diagnostics, and biosafety</p>
<p>Avian and animal influenza</p>	<p>Influenza A viruses remain at the top of concern regarding zoonotic potential. Globally widespread occurrence of these viruses in poultry and domestic pigs, and reservoirs in wild life population, create a highly volatile epidemiological situation which requires constant surveillance.</p> <p>Study „Genesis and spread of multiple reassortants during the 2016/2017 H5 avian influenza epidemic in Eurasia": The tracking of new avian influenza viruses becomes possible through modern analyses of genome data. These tools give further insights into the spreading of virus strains and their risk potential.</p> <p>Study „Surveillance of European domestic pig populations identifies an emerging reservoir of potentially zoonotic swine influenza A viruses": Pig holdings are important reservoirs for an increasing number of diverse influenza viruses, some of which can be transmitted to humans and may have pre-pandemic potential. The fact that this also applies to European pig holdings is shown by this study.</p>
<p>Hantavirus: Monitoring and characterisation</p>	<p>Hantaviruses have been known in Germany for many years and cause a notifiable human disease, which in severe cases can lead to kidney failure. The majority of human cases of disease, which in certain years occur in increased numbers, are caused by Puumala virus, with the bank vole as reservoir host. Furthermore, human infections with Dobrava-Belgrade virus have been described in Germany. While Puumala virus occurs exclusively in the western part of Germany, the spread of Dobrava-Belgrade virus is limited to the eastern part due to the occurrence of the striped field mouse as reservoir host.</p> <p>Study "Autochthonous ratborne Seoul virus infection in woman with acute kidney injury.": First detection of human hantavirus infection transmitted by a pet rat in Germany. So far, molecular detection of Seoul virus in Germany has not been successful, although the pathogen has been detected in wild and pet rats in various European countries and some cases of human disease have been described in Europe.</p>

<p>Borna Disease Virus 1 (BoDV-1) and variegated squirrel bornavirus 1 (VSBV-1).</p>	<p>Bornaviruses have been identified in reptiles, fish, birds and mammals. A zoonotic potential for bornaviruses was clearly demonstrated in 2015 with the identification of the variegated squirrel bornavirus 1 (VSBV-1). Furthermore, classical Borna disease virus 1 (BoDV-1), which has long been known as the causative agent of Borna disease in horses, sheep and other mammals, was first identified as the cause of severe human encephalitis in 2018.</p> <p>Study: "Zoonotic spillover infections with Borna disease virus 1 leading to fatal human encephalitis, 1999-2019: an epidemiological investigation"</p> <p>Further cases of human infections with classical Borna disease virus have been identified. The reservoir of the pathogen is the bicolored white-toothed shrew. According to the study, infection through contact with an infected bicolored white-toothed shrews or their excrements can be assumed in the majority of cases. However, the exact transmission route is still unknown. Natural human-to-human, horse-to-horse, or horse-to-human transmission can be ruled out according to current knowledge.</p>
<p>West Nile virus: occurrence, distribution, monitoring, characterization</p>	<p>The epizootic emergence of WNV was again observed in 2020 in the well-known areas in the eastern part of Germany with a distinct focus for the federal states Saxony-Anhalt, Saxony, Berlin and Brandenburg. A spreading tendency to Thuringia and Lower Saxony could be detected for 2020. In total, 63 cases of WNV infections in wild- and zoo birds and 22 cases of WNV infections in horses were reported in Germany. Also, few cases of WNV infection in humans were described in the known endemic areas in the eastern part of Germany (identified by Bernhard Nocht Institute, Hamburg or Charité, Berlin).</p> <p>The WNV and USUV monitoring studies based on the German monitoring network is ongoing in 2020 and hundreds of wild bird samples were examined by PCR and VNTs again. In addition to some PCR-positive findings in the live bird samples, the first specific WNV-antibodies with high titers were also found in several resident birds in eastern part of Germany. All results are currently being prepared for publication.</p> <p>Study "West Nile Virus Epidemic in Germany Triggered by Epizootic Emergence, 2019.": The phylogeographic analyses of the WNV-isolates (2018/2019) showed, that the most of the WNV-lineage 2 strains were assigned in one distinct group, the Eastern German WNV clade.</p> <p>Furthermore, the analyses suggest up to six different introduction events of WNV from neighbouring countries to Germany. This study highlights the risk of a further spread in Germany</p>
<p>Arthropod vector monitoring and studies of the vectorpathogen interactions:</p>	<p>Maintenance of BSL2 and BSL3 insectaries to breed and study mosquitoes, ticks and biting midges. Laboratory colonies of several invasive and native mosquito species and strains, some tick species and a biting midge species (Culicoides) are available. Current work includes studies on vector competence for viruses, bacteria and filarial worms and on ecological aspects of vector species, e.g. temperature tolerance and competitive development.</p> <p>Passive and active monitoring to gain information about occurrence, distribution and ecology of mosquito species in Germany is conducted by trapping and the citizen science project 'Mueckenatlas'. In addition, a monitoring project on German ceratopogonids is running.</p> <p>Selected results include the first report of West Nile virus in German culicids with strong evidence of overwintering (Study "West Nile virus mosquito vectors (Diptera: Culicidae) in Germany"). Further studies demonstrated the vector competence for West Nile virus (WNV) of mosquito strains field-collected in Germany and the replication and transstadial transmission of WNV in Ixodes ricinus ticks.</p>

<p>Highly pathogenic BSL4-viruses (filoviruses (e.g. Ebola virus, Reston virus), henipaviruses (i.e. Hendra and Nipah virus), arenaviruses (e.g. Junín virus), Crimean Congo Hemorrhagic Fever virus (CCHFV))</p>	<p>In vitro studies of virus-host-interactions and pathogenesis of highly pathogenic BSL4-viruses were continued in the BSL4 facility of the FLI for Ebola virus, Junín virus, Hendra virus and Nipah virus. Training for the first FLI-trained BSL4 personnel was completed, and training of additional new staff to support future work continues. A number of new reporter-expressing BSL4 viruses (and BSL2 surrogates) were developed for future use in imaging/diagnostics/antiviral testing. This work was complemented by work with related BSL2 surrogate viruses (e.g. Tacaribe virus and Cedar virus) and the use of reverse-genetics-based life cycle modelling systems, which are continually being developed/improved at FLI for various viruses (in particular for filoviruses, arenaviruses, and CCHFV). Further, the FLI successfully participated in another external quality assurance test of its diagnostic capabilities for filoviruses, arenaviruses, and CCHFV.</p> <p>Selected results includes a study demonstrating that the molecular basis for the impaired in vitro growth of Reston virus (compared to Ebola virus) is due to reduced efficiency of viral RNA synthesis, but not viral entry or budding. Another study identified host factors responsible for regulating this process and clarified the mechanism by which highly pathogenic viruses (i.e. Junín virus) evade this process.</p>
<p>Bunyaviridae: Animal trials with orthonairoviruses</p>	<p>Pathogenesis of Crimean-Congo Hemorrhagic Fever virus (CCHFV). related orthonairoviruses: Infection of cattle and sheep with Hazara virus, Dugbe virus and Nairobi sheep disease virus”</p> <p>Causing severe hemorrhagic fever and fatalities in humans, CCHFV is classified as BSL4 agent. Substitution of CCHFV by related viruses is discussed, therefore we analyzed the susceptibility of farm animals for the related Hazara virus (HAZV), Dugbe virus (DUGV) and the Nairobi sheep disease virus (NSDV) and studied their pathogenesis. NSDV causes large outbreaks with high loss of animals and therefore has been in special focus of the study.</p> <p>Since serological methods are used to monitor the occurrence of orthonairoviruses in farm animals, crossreactivities between the three investigated orthonairoviruses and CCHFV have been studied using plaque-reduction neutralization assays, ELISA, indirect immunofluorescence and Western blot.</p>
<p>Tacaribe virus: Working towards the establishment of a infection model in Guinea pigs</p>	<p>Guinea pigs were challenged with Tacaribe virus (BSL2 Arenavirus) to determine the optimal route of infection and the tissue carrying the highest viral load. This knowledge will now be used for consecutive Tacaribe virus passages in Guinea pigs to establish an animal model mimicking the pathology of highly pathogenic arenaviruses.</p>
<p>Cowpox virus (CPXV)</p>	<p>Infections of humans with cowpox virus do occur regularly and due to the cessation of smallpox vaccination, the number of human CPXV infections have increased. A very low prevalence and a patchy occurrence of CPXV in common and bank voles while absence in other rodent and shrew species in Germany could be shown. In Vivo Characterization of a Bank Vole-Derived Cowpox Virus Isolate in Natural Hosts and the Rat Model showed avirulence in both common voles and Wistar rats. In experimentally inoculated bank voles viral shedding and seroconversion was observed</p>

<p>Bacterial zoonoses: pathogen diagnostic including antimicrobial resistance and pathogen-host interactions</p>	<p>Further studies on the phylogenomic analyses of <i>Campylobacter</i> spp, <i>Aliarcobacter</i> spp, <i>Acinetobacter</i> spp., <i>Salmonella</i> spp and <i>Clostridia</i> spp have been done to understand the clonal structure of the circulating strains in an One Health approach in different countries, to identify the interactions of agents' pathogenicity and the host immune system or to monitor emerging AMR. New projects on <i>Staphylococcus</i> spp will help to control this pathogen in the milk and meat producing industry of different countries. Development of bioinformatics pipelines for the characterization of <i>Francisella</i>, <i>Bacillus</i> or <i>E. coli</i> isolates are under development. Different ongoing projects aim at fostering our understanding drivers of carriage and spread of antimicrobial resistant (AMR) bacteria in livestock and at the animal-human interface.</p>
<p>Q Fever (<i>Coxiella burnetii</i>)</p>	<p>Outbreaks of human Q fever related to a single dairy goat farm in 2009 occurred in the Dutch border region of South Limburg with surprisingly few cases reported from neighbouring German counties. In a retrospective study evidence of yet undetected cross-border region were found.</p>
<p>BSE: Analyzing microglial response in preclinical and clinical classical BSE</p>	<p>Bovine spongiform encephalopathy (BSE) is a fatal neurological disease of cattle which is associated with the accumulation of an altered form of a cellular prion protein termed pathological prion protein (PrP<sup>Sc</sup>) in the central nervous system. The exact mechanism linking this abnormal protein accumulation with the severe neurological disease characteristic of BSE is still unclear. In this project, we analyzed the role of microglia in the pathology of BSE, finding that the activation of a glial response is surprisingly a rather late event in the progress of the disease, most probably associated with a profound accumulation of PrP<sup>Sc</sup>. Therefore, even if a direct immunopathological impact of glial cells on the process of the disease cannot completely ruled out, the evidence obtained in this study, indicate a rather reactive role of microglia triggered by an overwhelming PrP<sup>Sc</sup> accumulation.</p>
<p><b>Wildlife</b></p>	
<p><b>Title of activity</b></p>	<p><b>Scope</b></p>
<p>Surveillance of hantaviruses and other pathogens in rodents and other small mammal reservoir hosts</p>	<p>Within the research network "rodent-borne pathogens" the screening of small mammals for viral and bacterial pathogens was continued together with national and international collaborators                  Study: "Search for polyoma-, herpes-, and bornaviruses in squirrels of the family <i>Sciuridae</i>".                  Detection of novel viruses in Eurasian red squirrels                  Pathogen screening of red squirrels resulted in the identification of novel polyoma- and herpesviruse.                  Study: "Isolation and characterization of new Puumala orthohantavirus strains from Germany".                  During the outbreak year 2019 bank voles, reservoir host of Puumala virus were trapped in a district of Lower Saxony. In field dissection and cell culture inoculation resulted in the isolation of the first Puumala strain in Central Germany.</p>

**ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated specialty**

**2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare**

Proposal title	Scope/Content	Applicable area
Validation of GLANDA Double Antigen Multispecies ELISA for Glanders	In this study, the new ID Screen Glanders Double Antigen Multispecies ELISA (GLANDA- ELISA) (IDvet, Grabels, France) was evaluated using 400 negative and 370 glanders positive field samples of equidae. The GLANDA-ELISA was significantly more specific (99.8%) than the CFT (97.0%). Considering the comparable sensitivities of CFT (96.5 %) and ELISA (98.1%), this new GLANDA-ELISA test appears a suitable confirmatory test and a realistic alternative for serological testing of horses for trade or movement.	<input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare
Development and implementation of new tools for molecular diagnostics of Chlamydia psittaci	An improved real time PCR protocol based on whole genome sequencing data for the detection of Chlamydia psittaci, the causative agent of psittacosis/ornithosis in humans and birds, was developed and validated in cooperation with the Statens Serum Institute, Denmark.	<input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare

**ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same specialty, and should the need arise, with Collaborating Centres in other disciplines**

**ToR: To carry out and/or coordinate scientific and technical studies in collaboration with other centres, laboratories or organisations**

**3. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?**

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Multiple cooperations with other OIE CCs and RLs as well as other organizations	worldwide	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	FLI collaborates with multiple collaborating centers, reference laboratories and other organizations from multiple countries to maintain a network and share information on One Health activities
ANSES French Agency for Food, Environmental and Occupational Health & Safety	France	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	OIE-RL Rabies, Chlamydiosis and Brucellosis EU-RL equine diseases several ongoing research projects: e.g. One Health EJP - Promoting One Health in Europe through joint actions on foodborne zoonoses, antimicrobial resistance and emerging microbiological hazards (Horizon2020: 2018-2022; 41 partners); COMPARE; EVAg; VetBioNet, PALE Blu

Institute Pasteur and Institute Pasteur in Guinea	Conakry, Guinea and France	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Emerging Diseases: Haemorrhagic Fevers (CCHFV, RVFV, Ebola virus, etc.), transboundary diseases several research projects: IMI-ZAPI: Zoonoses Anticipation and Preparedness Initiative and other Horizon2020 projects, e.g. OneHealthEJP; COMPARE; VEO; PALE Blu; VetBioNet
Pirbright Institute	UK	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	MoU - Strategic cooperation including joint PhD- programme on topics of common interest: Transboundary diseases, (re-)emerging animal diseases, vector competence studies, poultry immunology) OIE-RL AHS, BT, ASF, CSF, FMD, SVD, Lumpy skin disease, PPR, RP, sheep and goat pox several ongoing research projects (Horizon2020): EVAG; Defend; PALE Blu; VetBioNet
APHA: Animal and Plant Health Agency	UK	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	One Health: Animal disease and zoonoses OIE-RL Brucellosis, Influenza, TSE, bovine tuberculosis, rabies several ongoing research projects (Horizon2020): OneHealthEJP; COMPARE; EVAG; Delta-Flu; Defend; PALE Blu; VetBioNet; VEO
Canadian Food Inspection Agency (CFIA),	Canada	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Emerging disease: High consequence viruses and TSEs Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet) several ongoing research projects (Horizon2020): e.g. Delta-Flu; Defend
Centers for Disease Control and Prevention (CDC), Atlanta	USA	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	emerging and transboundary diseases, OIE_RL Rabies
Australian Animal Health Laboratory, CSIRO, Geelong, Australia	Australia	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Harmonization of diagnostic approaches for zoonotic diseases, participation in ring trials for the detection of henipavirus infections organized by AAHL Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet) Foot and Mouth Disease (FMD Ready Project)

Harbin Veterinary Research Institute (HVRI) subordinated to the Chinese Academy of Agricultural Sciences (CAAS)	China	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Emerging diseases and zoonoses control (High-containment laboratories and animal facilities BSL-3 and BSL-4) OIE-CC for Zoonoses
Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet)	worldwide	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	BSL4ZNet is a global alliance of biosafety level 4 laboratories to optimize how we combat the global threat of diseases that spread from animals to humans. This network is coordinated by the CFIA and comprises over 60 participants around the world ( <a href="https://twitter.com/hashtag/BSL4ZNet?src=hash&amp;lang=de">https://twitter.com/hashtag/BSL4ZNet?src=hash&amp;lang=de</a> ). In 2020, FLI researchers participated in online trainings, discussions, webinars and mini-symposia, with a focus on SARS-CoV-2.
Emerging Viruses Disease Laboratory Network (EVD-LabNet)	Europe	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	An expert laboratory network for networking, external quality assessments and training of laboratories involved in these activities initiated by ECDC and coordinated by Erasmus MC: The network focuses on virus families and genera that are rare, imported and (re)emerging in EU/EEA countries. These include the genera Alphavirus, Bornavirus, Calicivirus, Coronavirus, Flavivirus, Henipavirus, Picornavirus and the families Arenaviridae, Bunyaviridae, Filoviridae, Poxviridae, Paramyxoviridae, Reoviridae and Rhabdoviridae. Risk class 4 pathogens are a primary focus of the Sharp network <a href="http://www.evd-labnet.eu/index.php#background-evd-labnet">www.evd-labnet.eu/index.php#background-evd-labnet</a>
Sharp consortium (EU funded Joint Action, Health Programme)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	SHARP: Laboratory preparedness and responsiveness Totally 30 countries (24 EU members, 3 EEA/EFTA members and 3 European neighborhood countries) participate in the Joint Action. The SHARP JA will liaise with and collaborate with the ECDC, the WHO EURO regional office and the WHO Health Emergency and IHR unit in Lyon, and IANPHI in relevant activities. Special emphasis will be made to avoid duplication of work for the member states.

#### 4. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
One Health EJP Consortium (Horizon2020)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	One Health EJP - Promoting One Health in Europe through joint actions on foodborne zoonoses, antimicrobial resistance and emerging microbiological hazards (Horizon2020: 2018-2022; 41 partners) <a href="https://onehealth.ejp.eu/">https://onehealth.ejp.eu/</a> FLI involved in several subprojects.

Compare Consortium (Horizon 2020)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Collaborative Management Platform for detection and Analyses of (Re-)emerging and foodborne outbreaks in Europe (Horizon 2020: 29 Partner, 2014-2019); <a href="http://www.compare-europe.eu/">http://www.compare-europe.eu/</a> <a href="https://www.compare-europe.eu/news/Nyhed?id={41DADB84-54BC-471A-948C-9298154B7C15}">https://www.compare-europe.eu/news/Nyhed?id={41DADB84-54BC-471A-948C-9298154B7C15}</a>
Delta-Flu Consortium (Horizon 2020)	Europe, worldwide	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	DELTA-FLU Dynamics of avian influenza in a changing world(Horizon 2020: 2017- 2022; 9 Partner ) <a href="https://delta-flu.fli.de/de/home">https://delta-flu.fli.de/de/home</a>
EVAg Consortium (Horizon 2020)	Europe, worldwide	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	EVAg: European Virus Archive GLOBAL (Horizon2020: 25 Partner; 2020-2022); <a href="https://www.european-virus-archive.com">https://www.european-virus-archive.com</a>
VetBioNet (Horizon 2020)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	VetBioNet: Veterinary Biocontained facility Network for excellence in animal infectiology research and experimentation (Horizon 2020: 19 Partner; 2017-2020); <a href="http://www.vetbionet.eu">http://www.vetbionet.eu</a>
Aedes Invasive Moquitoes (AIM-COST)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Establishment of a transboundary network across Europe to cost effectively address the management of the risk of introduction and spread of Exotic Invasive Aedes Mosquito Borne Viruses. (COST Action CA17108: Partners from 19 countries; 2018-2022)
VectorNet: EFSA and ECDC	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	European network for sharing data on the geographic distribution of arthropod vectors, transmitting human and animal disease agents
VEO Consortium (Horizon 2020)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	VEO: Versatile Emerging infectious disease Observatory forecasting, nowcasting and tracking in a changing world (Horizon 2020: 20 Partners from 12 countries; 2020-2024); <a href="https://www.veo-europe.eu/">https://www.veo-europe.eu/</a>
ZAPI Consortium)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	IMI-ZAPI: Zoonoses Anticipation and Preparedness Initiative (Innovative Medicines Initiative (IMI); 20 Partners from different countries; 03/2015 - 02/2021) <a href="http://zapi-imi.eu/">http://zapi-imi.eu/</a>
HECTOR-Consortium (JIAMR)	Europe	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	HECTOR: The Impact of Host Restriction of Escherichia coli on Transmission Dynamics and Spread of Antimicrobial Resistance (Joint Programming Initiative on Antimicrobial Resistance (jiamr); 9 Partner;06/2017 - 05/2021)

**ToR: To place expert consultants at the disposal of the OIE.****5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?**

Yes

Name of expert	Kind of consultancy	Subject
FLI scientists	FLI experts are available to the OIE at any time for consultation.	Zoonoses and animal diseases, including aquatic diseases. Furthermore, FLI can provide consultancy in the areas of animal welfare, animal feeding and farm animal genetics.
FLI scientists	Comments to OIE Terrestrial Manual and Terrestrial Code	FLI scientist regularly comment on the draft chapters for the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.
Prof. Mettenleiter; Prof. Beer	WHO R&D Blueprint: novel Coronavirus  Member and scientific experts	AD Hoc working group on SARS-CoV-2 Animal Models
Prof. Mettenleiter	Member of different ad hoc Expert Groups in the framework of the OIE Incident Management	AD HOC GROUP on Covid-19 at the Animal-Human Interface AD HOC GROUP on Covid-19 and Safe Trade in Animals and Animal Products
Prof. Harder	FAO/OIE OFFLU Animal influenza virus network	Technical Working Group on Wildlife Diseases Technical Working Groups on Applied Epidemiology
Dr Müller; Dr Freuling	Member of different ad hoc Expert Groups regarding Dog Rabies and the OIE Terrestrial Code Chapter on Rabies	AD HOC GROUP on Rabies - Evaluation of official control programmes for dog-mediated rabies AD HOC GROUP on Rabies - expert opinion to the OIE regarding the post-titer waiting period for dogs to be imported from infected countries or zones
Dr Müller	Leader of the OIE RABLAB – OIE Rabies Laboratories Network	Launch and lead of the OIE Rabies Laboratories Network
Dr Tuppurainen; Dr. Depner ; Dr. Dietze	Invited expert/ OIE GF-TADs standing group of experts	Asia and the Pacific regional meeting on lumpy skin disease, “Preparedness for lumpy skin disease” PPR Global Research and Expertise Network (PPR-GREN), 2nd Meeting, Nairobi, Kenya SGE ASF16: “Some basic considerations regarding ASF on

***ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries***

**6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?**

No

***ToR: To organise and participate in scientific meetings and other activities on behalf of the OIE***

**7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?**

No

***ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated specialty***

**8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE**

a) Articles published in peer-reviewed journals: 422

The FLI has published more than 400 peer-reviewed articles in 2020. Selected publications are listed here.

SARS-CoV-2: (17 Publications in 2020)

Schlottau, K. et al. SARS-CoV-2 in fruit bats, ferrets, pigs, and chickens: an experimental transmission study. *The Lancet Microbe* 1, e218-e225, doi:10.1016/S2666-5247(20)30089-6 (2020).

Ulrich, L., Wernike, K., Hoffmann, D., Mettenleiter, T. C. & Beer, M. Experimental Infection of Cattle with SARS-CoV-2. *Emerging Infectious Diseases* 26, 2979-2981, doi:10.3201/eid2612.203799 (2020).

Freuling, C. M. et al. Susceptibility of Raccoon Dogs for Experimental SARS-CoV-2 Infection. *Emerging Infectious Diseases* 26, 2982-2985, doi:10.3201/eid2612.203733 (2020).

Wernike, K. et al. Multi-species ELISA for the detection of antibodies against SARS-CoV-2 in animals. *Transboundary and Emerging Diseases* (2020).

Influenza A: avian and animal Influenza:

Lycett, S. J. et al. Genesis and spread of multiple reassortants during the 2016/2017 H5 avian influenza epidemic in Eurasia. *Proceedings of the National Academy of Sciences of the USA* 117, 20814-20825, doi:10.1073/pnas.2001813117 (2020).

Henritzi, D. et al. Surveillance of European Domestic Pig Populations Identifies an Emerging Reservoir of Potentially Zoonotic Swine Influenza A Viruses. *Cell Host & Microbe* 28, 614-627.e, doi:10.1016/j.chom.2020.07.006 (2020).

Rodent-borne zoonotic diseases:

Hofmann, J. et al. Autochthonous Ratborne Seoul Virus Infection in Woman with Acute Kidney Injury. *Emerging Infectious Diseases* 26, 3096-3099, doi:10.3201/eid2612.200708 (2020).

Bennett, A. J. et al. Relatives of rubella virus in diverse mammals. *Nature* 586, 424-428, doi:10.1038/s41586-020-2812-9 (2020).

Niller, H.-H. et al. Zoonotic spillover infections with Borna disease virus 1 leading to fatal human encephalitis, 1999-2019: an epidemiological investigation. *The Lancet infectious diseases* 20, 467-477, doi:10.1016/S1473-3099(19)30546-8 (2020).

Q-fever disease:

Hackert, V. H. et al. Q Fever: Evidence of a Massive Yet Undetected Cross-Border Outbreak, With Ongoing Risk of Extra Mortality, in a Dutch-German Border Region. *Transboundary and Emerging Diseases* 67, 1660-1670, doi:10.1111/tbed.13505 (2020).

b) International conferences: 100

Each year, FLI researchers present at numerous national conferences.

c) National conferences: 100

Each year, FLI researchers present at numerous national conferences.

d) Other

(Provide website address or link to appropriate information): 5

Website of the Friedrich-Loeffler-Institut, including general information and actual information on animal diseases ([www.fli.de](http://www.fli.de))

Twitter-Account of the Friedrich-Loeffler-Institut, including special information, press-releases and retweets of special interest. (@Loeffler\_News)

Radar Bulletin Germany - it compiles and evaluates information on the global situation and on the spread of the most important animal diseases which are relevant for Germany and Switzerland.

<https://www.fli.de/en/publications/radar-bulletin-germany/>

Rabies - Bulletin - Europe: Rabies Information System of the WHO ([www.who-rabies-bulletin.org/](http://www.who-rabies-bulletin.org/))

German Research Platform for Zoonoses - an information and service network, funded by the Federal Ministry of Education and Research (BMBF), for all working groups operating in Germany in the field of zoonoses research ([www.zoonosen.net/Default.aspx?tabid=1275](http://www.zoonosen.net/Default.aspx?tabid=1275))

## **9. Additional comments regarding your report:**

As Federal Research Institute for Animal Health, the Friedrich-Loeffler-Institut (FLI) addresses farm animal health and welfare. Its work focusses on farm animal health and welfare and on the protection of humans from zoonoses, thereby fostering the One Health approach. In 2020 the work of the FLI was largely influenced by the SARS-CoV-2 pandemic, which led to increased research activities as reported. However, other activities especially on capacity building and staff exchange had to be cancelled or postponed..