

WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

This report has been submitted : 21 avril 2023 17:23

Title of WOA Collaborating Centre	Zoonoses in Europe
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1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOA

Disease control	
Title of activity	Scope
SARS-CoV-2 - Studies on susceptibility of animals and on their	Continuing from 2021 the enzootic entrenchment of HPAI viruses H5 was confirmed by the unprecedented outbreaks among colony-breeding seabirds along coasts of the Northern Atlantic also involved North Sea areas of Germany severely. Mass mortalities among several tern species and Northern gannets may exert disruptive effects on species population

<p>role in SARS-CoV-2 infections, including diagnostics, pathogen/host interaction and immunology.</p>	<p>structures. Phylogenetically the vast majority of HPAIV sub- and genotypes vanished and was replaced by a single HPAIV H5N1 genotype that dominated outbreaks since April 2022 in the country. Co-operations with scientists in Iceland allowed to follow the spread of HPAI H5N1 viruses from Europe via Iceland on to North America.</p>
<p>Disease control</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Technical Support in Eliminating Rabies in Dogs</p>	<p>Additional field study in Namibia on the use of oral vaccination in free roaming dogs, support to national rabies stakeholder meeting in Namibia, Support in vaccination campaigns in selected wards of Freetown / Sierra Leone.</p>
<p>Training, capacity building</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>German Epidemic Preparedness Team (SEEG): working against epidemics</p>	<p>FLI is together with BNITM, RKI and GIZ a SEEG member. SEEG supports partner countries to prepare for and respond to disease outbreaks that otherwise may develop into epidemics or even pandemics. In 2022 FLI was involved in several missions in Africa and Central Asia.</p>
<p>Zoonoses</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>SARS-CoV-2: Studies on susceptibility of animals and on their role in SARS-CoV-2 infections, including diagnostics, pathogen/host interaction and immunology.</p>	<p>FLI continued its research efforts regarding SARS-CoV-2 in animals. The results of a qualitative risk assessment focusing on the potential of cat to human transmission in COVID-19-positive households was published (“Does having a cat in your house increase your risk of catching COVID-19?”). Selected further results in 2022 are: “The spike gene is a major determinant for the SARS-CoV-2 Omicron-BA.1 phenotype”: Omicron-BA.1 and recombinant Omicron-BA.1 spike gene mutants were characterized in comparison with the variant of concern Delta in well-differentiated primary human nasal and bronchial epithelial cells in vitro, followed by in vivo fitness characterization in hamsters, ferrets and hACE2-expressing mice, and immunized hACE2-mice. The results suggest that the spike gene is a major determinant of replication and pathogenicity. “Compellingly high SARS-CoV-2 susceptibility of Golden Syrian hamsters suggests multiple zoonotic infections of pet hamsters during the COVID-19 pandemic”: Orotracheally inoculation of very low SARS-CoV-2 doses leads to productive infections in Golden Syrian hamsters, accompanied by virus shedding equalling the estimated minimum infective dose for humans. Hence, these animals should be considered as a potential source of SARS-CoV-2 infection for humans that come into close contact with pet hamsters.</p>
<p>Zoonoses</p>	

Title of activity	Scope
<p>NACOH: Nigeria Addressing COVID-19 through a One Health approach</p>	<p>Strengthen Key Capacities of the Veterinary Sector in Nigeria Contributing to Ongoing Efforts of Disease Control under the One Health Umbrella: The project includes an interdisciplinary field studies on understanding the human-animal interface and spill-over events of SARS-CoV-2 in Nigeria</p>
<p>Zoonoses</p>	
Title of activity	Scope
<p>Zoonotic influenza infections in terrestrial and marine mammals in 2022 in Europe</p>	<p>A number of HPAIV H5N1 cases have been detected in several species of terrestrial and marine mammals in 2022 in Europe including Germany. Often, such cases were diagnosed with lethal viral encephalitis indicating neuropathogenic potential of these viruses. The majority of mammalian cases is likely due to alimentary infection via uptake of infected avian carcasses. Reports on human infections with HPAIV H5N1 have been scarce despite significant exposure risks during culling of infected poultry premises. No such cases were reported from Germany. Influenza virus transmission at the swine-human interface is examined in a study in Germany; so far, no zoonotic transmissions have been detected when staff of influenza-positive pig holdings was examined. Nevertheless, a single human infection with a swine derived influenza A virus has been reported from Germany in 2022.</p>
<p>Zoonoses</p>	
Title of activity	Scope
<p>Monkeypox virus: establishment of animal models and monitoring of local rodents</p>	<p>In reaction to the mpox pandemic in humans caused by monkeypox virus, animal infection models were established at the FLI. Tamiops squirrels were used as surrogate model for infection of reservoir host species. Cast mice are to be established as model for defining virulence evaluation of monkeypox virus strains. Passive monitoring of rodent samples was performed to analyse the presence of orthopoxvirus genomes for information about occurrence and distribution of orthopox virus infections in wild rodent species.</p>
<p>Zoonoses</p>	
Title of activity	Scope
<p>West Nile virus: occurrence, distribution, monitoring, characterization</p>	<p>WNV infections in birds and horse was again observed in 2022 in the well-known areas in the eastern part of Germany (Saxony-Anhalt, Saxony, Berlin and Brandenburg). Minor spread to other northern areas, such as Hamburg, was evident. A first phylogenetic analyses show again the circulation of WNV lineage 2 as described for the former years. The WNV and USUV monitoring studies based on the German monitoring network is ongoing in 2022 and again hundreds of wild bird blood samples were examined by molecular and serological methods. The</p>

	evaluation of the results is in progress.
Zoonoses	
Title of activity	Scope
Highly pathogenic BSL4-viruses (filoviruses, henipaviruses, arenaviruses and Crimean Congo Hemorrhagic Fever virus (CCHFV))	Continuous training of staff: In vitro studies of virus-host interaction and pathogenesis of BSL4-pathogens continued for filoviruses, henipaviruses, arenaviruses: further assays for filoviruses and CCHFV were implemented including serum neutralization test; first serosurveillance studies on presence and distribution of highly pathogenic viruses in Africa and Europe were initiated using these newly established tests. Successful participation in external quality assurance tests of its diagnostic capabilities for filoviruses, arenaviruses, and CCHFV. Technology platforms such as FACS analysis and live cell microscopy were applied under BSL4 conditions in studies on virus host-cell interactions and the formation/function of intracellular replication compartments of BSL4 viruses.
Zoonoses	
Title of activity	Scope
zoonotic mammalian bornaviruses (Borna Disease Virus 1 - BoDV-1; variegated squirrel bornavirus 1 -VSBV-1.	In 2022, the work focused on phylogeographic analysis of the occurrence of BoDV-1 in reservoir and spill-over hosts and on the optimization of diagnostic tests. A second proficiency test was organized 2022 with 18 participating laboratories. At least five cases of zoonotic BoDV-1 transmission to humans, resulting in fatal encephalitis, were detected in 2022, whereas VSBV-1 was neither detected in animals nor humans. The establishment of a nonhuman primate model for BoDV-1 as well as VSBV-1 as dead-end host model has been completed and published. This infection model is being used in current studies to further narrow down the possible routes of human infection. In addition, VSBV-1 infection studies are being conducted in the reservoir host model (Swinhoe's striped squirrel) to improve risk analysis. (Schlottau et al. 2022)
Wildlife	
Title of activity	Scope
SARS-CoV-2: Studies on the prevalence of SARS-CoV-2 or antibodies against the virus in various wildlife species in Germany	Several studies revealed that SARS-CoV-2 has not become highly prevalent in the tested wildlife populations in Germany. Neither viral RNA nor SARS-CoV-2-specific antibodies were detected in any of the investigated species. a) SARS-CoV-2 and West Nile virus prevalence studies in raccoons and raccoon cogs from Germany (Keller et al., 2022), b) Molecular surveillance revealed no SARS-CoV-2 spillovers to raccoons (Procyon lotor) in four German federal states" (Hagag et al. 2022), c) Serological screening in wild ruminants in Germany, 2021/22: No evidence of SARS-CoV-2, bluetongue virus or pestivirus spread but high seroprevalences against Schmallenberg virus (Wernike et al., 2022) d) No evidence for the presence of SARS-CoV-2 in bank voles and other rodents in

Germany (Wernike et al., 2022)	
Wildlife	
Title of activity	Scope
Surveillance of hantaviruses and other pathogens in rodents and other small mammal reservoir hosts	The interdisciplinary research network “rodent-borne pathogens” continued its screening of small mammals for viral, bacterial and parasite pathogens with national and international collaborators. Study “Hantavirus Brno loanvirus detection in common noctule bat (<i>Nyctalus noctula</i>) in Central Europe”: Investigation of bats from different European countries (Poland, Austria, Germany) for hantaviruses resulted in the detection of Brno loanvirus in common noctules from Poland, Germany and Austria. The study confirms the host specificity of this hantavirus for a single bat species. The genome of this hantavirus shows some important differences that may have functional impact.

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main focus area for which you were designated

Proposal title	Scope/Content	Applicable area
IHR-PVS National Bridging Workshop on Rabies	Technical design on piloting of a rabies specific workshop format for the WHO-WOAH driven concept of national IHR-PVS bridging workshops (NBW's). The newly designed workshop format resulted from the analysis of feedback given on generic NBW's that a version focusing on a priority zoonosis would be a valuable tool. Mostly WHO and WOAH members indicated rabies as preferred example. The first pilot workshop of this format has been conducted in 2022 in Ghana.	Training and education health management

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

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
			FLI collaborates with multiple national and international partner within international research networks and research consortia to gain and share information on animal

<p>Multiple cooperations with other OIE CCs and RLs as well as other organizations</p>	<p>worldwide</p>	<p>Africa Americas Asia and Pasific Europe MiddleEast</p>	<p>diseases and zoonoses especially in the One Health context. Active participation in several networks, e.g. - Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet) - International alliance against health risks in wildlife trade - Emerging Viruses Disease Laboratory Network (EVD- LabNet, ECDC) - Sharp consortium: Laboratory preparedness and responsiveness (EU funded Joint Action, Health Programme) - VectorNet: European network for sharing data on the geographic distribution of arthropod vectors, transmitting human and animal disease agents - ISIDORe: Integrated Services for Infectious Disease Outbreak Research</p>
<p>ANSES French Agency for Food, Environmental and Occupational Health & Safety</p>	<p>France</p>	<p>Europe</p>	<p>MoU: Strategic cooperation on animal diseases and zoonoses in the context of the One Health approach. Ongoing research projects on different topics: e.g. One Health EJP, EVAg; VetBioNet, ISIDORe, ICRAD-projects: ASFVInt, PIGIE, FMDV_PerslStOmics, TCWDE Joint coordination of SPIDVAC (Improved control of priority animal diseases)</p>
<p>Institute Pasteur and Institute Pasteur in Guinea</p>	<p>Conakry, Guinea and France</p>	<p>Africa Europe</p>	<p>Emerging Diseases: Hemorrhagic Fevers (CCHFV, RVFV, Ebola virus, etc.), transboundary diseases. several research projects: IMI-ZAPI: Zoonoses Anticipation and Preparedness Initiative and other projects, e.g. OneHealthEJP; VEO; VetBioNet, ISIDORe</p>
			<p>MoU – Strategic cooperation including joint PhD-</p>

Pirbright Institute	UK	Europe	programme on topics of common interest: Transboundary diseases, (re-)emerging animal diseases, vector competence studies, poultry immunology) ongoing research EU projects : EVAg; Defend; VetBioNet, REPRODIVAC, ISIDORE; ICRAD-project: ASFVInt
APHA: Animal and Plant Health Agency	UK	Europe	APHA: Animal and Plant Health Agency UK Europe One Health: Animal disease and zoonoses several ongoing EU research projects (rizon2020): OneHealthEJP; EVAG; Delta-Flu; Defend; VetBioNet; VEO; ICRAD-project: PIGIE
Canadian Food Inspection Agency (CFIA),	Canada	Americas	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	Asia and Pasific	Emerging and transboundary diseases, OIE-RABLAB (Joint coordination), Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet),
Australian Animal Health Laboratory, CSIRO, Geelong, Australia	Australia	Asia and Pasific	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)
WOAH Rabies Reference Laboratories	worldwide	Africa Americas Asia and Pasific	A key technical resource and information platform in strengthening high-quality laboratory capacity and improving laboratory-based

Network (RABLAB)		Europe MiddleEast	rabies surveillance in countries around the world. FLI and CDC are coordinators of the network.
ZODIAC (Zoonotic Disease Integrated Action Project – Early Detection and Global Response)	worldwide	Africa Americas Asia and Pasific Europe MiddleEast	ZODIAC: An IAEA initiative towards the early detection and prevention of the next zoonotic outbreaks; moving forward from COVID-19; FLI is national contact point for Germany
PREZODE (Preventing Zoonotic Disease Emergence>>)	worldwide	Africa Americas Asia and Pasific Europe MiddleEast	PREZODE: An international initiative addressing all the challenges related to the prevention, surveillance, early detection and rapid response to risks of zoonotic pandemics.

5. Did your Collaborating Centre maintain a network with other WOAHA 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
Multiple cooperations with other OIE CCs and RLs as well as other organizations	worldwide	Africa Americas Asia and Pasific Europe MiddleEast	As Federal Research Institute for Animal Health in Germany the expertise of the FLI covers in addition to animal diseases and zoonoses the areas of animal welfare, animal nutrition and farm animal genetics. Collaboration with national and international partners to gain and share information are ongoing. The FLI together with Universities of Wageningen and Aarhus is appointed as European Reference Centre for Animal Welfare of Pigs.

6. Did your Collaborating Centre place expert consultants at the disposal of WOAHA?

Yes

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NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
FLI scientists	FLI experts are available on request by the WOAAH for consultation and comment regularly to draft chapters of the WOAAH Terrestrial Manual and Terrestrial Code	Zoonoses and animal diseases, including aquatic diseases. Furthermore, FLI can provide consultancy in the areas of animal welfare, animal feeding and farm animal genetics.
Prof. Mettenleiter	One Health High Level Expert Panel (OHHLEP) - Chair	Four partite Initiative of FAO, WOAAH, UNEP and WHO
Prof. Mettenleiter, Prof. Beer	Expert member in AD HOC GROUPS on SARS-CoV-2	WOAH: Covid-19 at the Animal-Human Interface WOAAH: COVID-19 and Safe Trade in Animals and Animal Products WHO: SARS-CoV-2 Animal Models
Prof. Beer	Expert member in WOAAH AD HOC GROUP: Monkeypox Virus Diagnostics in Wildlife and Other Animals	Develop recommendations of sampling and diagnostic tests in accordance to the epidemiological situation.
Dr. Müller, Dr. Freuling	WOAH AD HOC GROUPS on Rabies	WOAH Terrestrial Code - Revision of the Chapter 8.14. (Infection with rabies virus) WOAAH Terrestrial Manual – Revision of the Chapter Chapter 3.1.18. Rabies (infection with rabies virus and other lyssaviruses) Evaluation of official dog rabies control programs for WOAAH endorsement
Dr. Müller Dr. Freuling	Co-Chair: WOAAH Rabies Reference Laboratories Network (RABLAB)	RABLAB is the key technical resource and information platform in strengthening high-quality laboratory capacity and improving laboratory-based rabies surveillance in countries around the world.
Dr. Müller Dr. Freuling	United Against Rabies (UAR) Forum	Workstream leads including (Development of a template for national strategic plans; Constraints in dog rabies elimination; Revision of WHO recommendations on oral vaccination of dogs; Rapid diagnostic testing)
Prof. Harder	JOINT WOAAH-FAO SCIENTIFIC NETWORK ON ANIMAL INFLUENZA	OFFLU – Wildlife Group OFFLU Applied Epidemiology Working Group

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOAAH, to personnel from WOAAH Members?

Yes

a) Technical visit : 114

b) Seminars : 120

c) Hands-on training courses: 21

d) Internships (>1 month) : 6

TYPE OF TECHNICAL TRAINING PROVIDED (A, B, C OR D)	CONTENT	COUNTRY OF ORIGIN OF THE EXPERT(S) PROVIDED WITH TRAINING	NO. PARTICIPANTS FROM THE CORRESPONDING COUNTRY
a	SEEG-Workshop on the development of SOP's for One Health rapid response Teams (7-11 March 2022)	Gambia	15
a	International Course on Surveillance and Control of Rabies (Côte d'Ivoire, 4-15 April 2022) Organized by Pasteur Institute with WOA, WHO, FAO, FLI, etc.	African Region 8 countries	25
a	GHPP-NACOH: Training in diagnostic of SARS-CoV-2 in animals (PCR, Minlon sequencing) (NVRI, Nigeria; 1-6 May 2022)	Nigeria	7
a	Workshop for scientists from ONARDEP and the National Institute of Public Health Research (INRSP) on the sampling of potentially highly infectious samples from livestock (blood, ticks) and the processing of these samples (9-13 May 2022)	Mauritania, Burkina Faso, Mali, Niger	14
a	SEEG-Response mission on HPAI control and One Health outreach (22-26 Aug. 2022)	Ghana	20
a	Workshop on collecting samples of potentially infectious livestock and vectors and on processing and analyzing these samples (13-17 2022)	Uganda	5
a	Workshop on PCR diagnostics of CCHFV and RVFV (13-17 June 2022)	Zambia, Mazambique	6
a	Workshop on serological and molecular methods for the detection of ebolaviruses and orthonairoviruses (20-22 June 2022)	Guinea	12

a	Workshop on procedures for correct sampling and molecular diagnostics in animals, i.e. ticks, serum samples from goats, sheep and cattle. (20-22 June 2022)	Sierra Leone	10
b	Seminars at National Veterinary Laboratory (LANAVET) on approaches to control vector-borne zoonoses incl. serology, molecular diagnostics and NGS (19-28 May 2022)	Cameroon (Yaoundé/Garoua)	80
b	SEEG-Regional Conference to strengthen diagnostic laboratory systems in Central Asia: a way forward to improve pandemic preparedness and public health (10-12 Oct. 2022, Tashkent, Uzbekistan)	Central Asia	40
c	Training of 2 Scientists from ONARDEP (Mauritania) at FLI on qRT-PCR, Riems DataNet, MinION-Sequencing and Data-Analysis (1-29 July 2022)	Mauritania	2
c	Hand-on Course at FLI on use of Genomics and proteomics for diagnosis of bacterial zoonoses including NGS and AMR (ICRAD Brucellosis Management, EU, Germany) (18-22 July 2022)	Egypt, Turkey, Greece	8
c	Training of scientists from University of Ibadan on sampling strategies and protocols and diagnostic assays for arboviruses (Sep./Oct 2022)	Nigeria	2
c	Training of scientists from LANAVET on qRT-PCR, ELISA, MinION-Sequencing and Data-Analysis (1-17 Nov. 2022)	Cameroon	3
c	Anthrax laboratory diagnosis training at FLI (German Foreign Office, Berlin, Biosecurity Program, Ukraine, 7-11 Nov. 2022)	Ukraine	2
c	Glanders laboratory diagnosis (WOAH twinning with AHRI, Gizeh,	Egypt	1

	EGY. 28.11-2.12.2022)		
c	Training on serological methods for the detection of CCHFV in animals; Introduction to bioinformatic analyses (28.11-3.12.2022)	Ukraine	3

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOAHA?

No

10. Publication and dissemination of any information within the remit of the mandate given by WOAHA that may be useful to Members of WOAHA

a) Articles published in peer-reviewed journals:

b) International conferences:

c) National conferences:

d) Other (Provide website address or link to appropriate information):

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

12. Additional comments regarding your report: