

# WOAH Collaborative Centre Reports Activities 2023

## Activities in 2023

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### Centre Information

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<b>Name Director of Institute (Responsible Official):</b>	Prof. Dr. Christa Kühn
<b>Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):</b>	Prof. Dr. Christa Kühn, President
<b>Name of the writer:</b>	Dr. Jens Schell

### TOR1 AND 2: SERVICES PROVIDED

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

Category	Title of activity	Scope
Disease control (true)	Scientific support of national and international veterinary services in developing and implementing control measures	- High pathogenicity avian influenza in Germany and Europe - Technical Support in Eliminating Rabies in Dogs - Supporting CCHF outbreak response in Namibia - Transmissible spongiforme encephalopathies: Surveillance, Diagnosis and Control (Iceland TSE Network to develop new approaches to eradicate classical scrapie)
Epidemiology, surveillance, risk assessment, (true)	Serological studies on notifiable zoonotic diseases (viral, bacterial, parasitic)	- West Nile virus: occurrence, distribution, monitoring, and characterization - Mycobacterium tuberculosis complex (MTBC): Diagnostic and Surveillance in livestock (ruminants/camelids) and wildlife - Hepatitis-E Virus surveillance in Namibia
Training, capacity building (true)	German Epidemic Preparedness Team (SEEG): working against epidemics-	FLI is together with Charite, 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 2023 FLI was involved in several missions in Africa and Latin America.
		1.) Viral Zoonoses - Zoonotic influenza infections in terrestrial and mammals in 2023 in Europe - Nigeria Engaging One Health (NEOH) - Monkeypox virus:

Zoonoses (true)	Scientific studies on the diagnosis, characterisation and pathogenesis of zoonotic pathogens (viral, bacterial, parasitic)	<p>establishment of animal models and monitoring of local rodents -zoonotic mammalian bornaviruses (Borna Disease Virus 1 - BoDV-1; variegated squirrel bornavirus 1 -VSBV-1. - Highly pathogenic BSL4-viruses (filoviruses, henipaviruses, arenaviruses and Crimean Congo Hemorrhagic Fever virus (CCHFV)) - SARS-CoV-2: role of animals in SARS-CoV-2 infections - Pet Rats as the Likely Reservoir for Human Seoul Orthohantavirus Infection - Arthropod vector monitoring and studies of the vectorpathogen interactions: 2.) Bacterial Zoonoses - Whole genome sequence-based analysis of Staphylococcus aureus isolated from bovine mastitis in Thuringia, Germany. - Whole genome sequencing of Salmonella enterica serovars isolated from humans, animals, and the environment in Lagos, Nigeria. - Genomic insight into Campylobacter jejuni isolated from commercial turkey flocks in Germany using whole-genome sequencing analysis - Phylogeny and pathogenic potential of Clostridium species including antimicrobial resistance</p>
Diagnosis, biotechnology and laboratory (true)	Development and Validation of diagnostic test including proficiency testing	<p>- Validation of a Commercial Glanders ELISA as an alternative test method to CFT in International Trade of Equidae in order to replace CFT in international serological testing of horses traded -Aptitude test for brucellosis serology: Proficiency test for brucellosis serology with 25 Columbian laboratories - Curation of the Clostridium perfringens and Clostridium chauvoei databases in the PubMLST.org platform including the various classical and genomic typing systems in collaboration with the University of Oxford, UK.</p>

### TOR3: HARMONISATION OF STANDARDS

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
Oral Vaccination of dogs	Recommendations for field application and integration into dog rabies control programmes	Veterinary products
Evidence-informed policy approaches for One Health	Support to WHO in implementing the One Health approach at the global and country levels in several relevant thematic areas. WHO and partner organizations are currently facing the task of finalizing and implementing the global One Health Joint Plan of Action (2022-2026).	Training and education health management
ECOWAS Regional One Health Coordination Mechanism - Governance Manual	Drafting of a Governance Manual describing the Regional One Health Coordination Mechanism developed for the ECOWAS region. The Manual describes the Regional One Health Coordination Mechanism purpose, including its vision mission and operating principles, the governance model and working procedures.	health management
Establishment of a service-based NGS/WGS workflow for notifiable priority livestock pathogens	Harmonisation of in silico analysis of NGS/WGS data for tracing of bacterial strains within the frame of ZODIAC, IAEA	Laboratory expertise Training and education health management Animal production Wildlife health and biodiversity

Validation of NGS & Bioinformatics	Validation of bacterial whole-genome-sequencing for genotyping and outbreak analysis. Implementation of bioinformatics pipelines.	Laboratory expertise Training and education health management Animal production Wildlife health and biodiversity
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3. In exercising your activities, have you identified any regulatory research needs\* relevant for WOA?H?

Yes

**Research need : 1**

**Please type the Research need:** Improvement of diagnostic means and development of harmonised protocols especially for serological testing and WGS/NGS applications

**Relevance for WOA?H** Disease Control, Standard Setting,

**Relevance for the Codes or Manual** Code, Manual,

**Field** Epidemiology and Surveillance, Diagnostics,

**Animal Category** Terrestrial,

**Disease:**

Brucellosis (Brucella abortus, Brucella canis, Brucella melitensis)

Brucellosis (Brucella abortus, Brucella melitensis, Brucella suis)

Campylobacteriosis

Glanders

**Kind of disease (Zoonosis, Transboundary diseases)** Zoonosis,

**If any, please specify relevance for Codes or Manual, chapter and title**

(e.g. Terrestrial Manual Chapter 2.3.5 - Minimum requirements for aseptic production in vaccine manufacture)

*Answer:*

**Notes:**

*Answer:*

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

Yes

Name of WOA?H CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Multiple cooperations with other WOA?H CCs and RLs as well as other organizations	worldwide	Africa Americas Asia and Pasific Europe MiddleEast	FLI collaborates with multiple national and international partner within international research networks and research consortia to gain and share information on animal diseases and zoonoses especially in the One Health context. Active participation in worldwide (e.g. BSL4ZNet, International alliance against health risks in wildlife trade) or European (EVD- LabNet, Sharp consortium, VectorNet). FLI is also leading partner in several European research projects like the European Partnership for Animal Health and Welfare (EUP-AH&W), the One Health EJP or

			coordinating Kappa-Flu etc.
ANSES French Agency for Food, Environmental and Occupational Health & Safety	France	Europe	Strategic cooperation on animal diseases and zoonoses in the context of the One Health approach. (MoU) Ongoing research projects on different topics: e.g. EUP-AH&W, One Health EJP, SPIDVAC, WiLiMAN-ID, EVA Global; PREPMEDVET, ICRAD-projects: ASFVInt, PIGIE, FMDV_PerslstOmics, Q-Net-Assess
Institute Pasteur and Institute Pasteur in Guinea	Conakry, Guinea and France	Africa Europe	Emerging Diseases: Hemorrhagic Fevers (CCHFV, RVFV, Ebola virus, etc.), transboundary diseases. Ongoing research projects on different topics:e.g. EUP-AH&W, OneHealthEJP; VEO; CCHVACIM; DURABLE
Pirbright Institute	UK	Europe	Strategic cooperation (MoU) on topics of common interest: Transboundary diseases, (re-)emerging animal diseases, vector competence studies, poultry immunology ongoing research projects: Defend; REPRODIVAC, ICRAD-project: ASFVInt
APHA: Animal and Plant Health Agency	UK	Europe	One Health: Animal disease and zoonoses several ongoing research projects (Horizon2020): OneHealthEJP; Kappa-Flu; Delta-Flu; Defend; VEO; ICRAD-project: PIGIE, ScIce
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: e.g. Kappa-Flu; Delta- Flu; Defend
Centers for Disease Control and Prevention (CDC), Atlanta	USA	Americas	Emerging and transboundary diseases, WOA-H-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)
Zanzibar Livestock Research Institute ZALIRI in Unguja, Zanzibar	Zanzibar	Africa	New cooperation agreement (Long-term Partnership) : Establishment of a One Health-Field Presence for collaborative basic and applied research studies and capacity building:

## TOR4 AND 5: NETWORKING AND COLLABORATION

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

Yes

Name of WOAAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Multiple cooperations with other OIE CCs and RLs as well as other organizations	Europe	Europe	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.

## TOR6: EXPERT CONSULTANTS

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

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
FLI scientists	FLI experts are 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	Prof. Mettenleiter One Health High Level Expert Panel (OHHLEP) - Chair Four partite Initiative of FAO, WOAAH, UNEP and WHO bleibt	Four partite Initiative of FAO, WOAAH, UNEP and WHO
Prof. Mettenleiter	WOAH AD HOC GROUPs	Covid-19 at the Animal-Human Interface COVID-19 and Safe Trade in Animals and Animal Products
Prof. Mettenleiter Prof. Beer	WHO-Working group:	SARS-CoV-2 Animal Models

Dr. T. Müller	WOAH AD HOC GROUP Rabies	Assessment of contry application for
Dr. Müller; Dr. Freuling; Dr. Fahrion; Dr. Busch	Dr. Müller; Dr. Freuling; Dr. Fahrion; Dr. Busch Development of WOA/WHO/FAO recommendations	Recommendations on oral vaccination of dogs; Rapid diagnostic testing
Prof. Harder	JOINT WOA/WHO-FAO SCIENTIFIC NETWORK ON ANIMAL INFLUENZA	OFFLU Executive Committee OFFLU Technical Groups: - Wildlife Group - Applied Epidemiology Working Group
Prof. Knauf	WOAH Collaborating Centre Network for Wildlife Health	Member of the Core Leadership Team

## TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

No

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

Yes

a) Technical visit : 146

b) Seminars : 270

c) Hands-on training courses: 17

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	Regional (AFRA) Training Course on Molecular Diagnostic, Njala University One Health Serology and Molecular Diagnostic Laboratory, Freetown, Sierra Leone (IAEA; 15.-20.06.2023)	Benin, CAR, Eritrea, Eswatini, Libya, Malawi, Mauritania, Mauritius, Seychelles, Sierra Leone	17
A	SEEG-Deployment on HPAI control and diagnostics (2.-12.09.2023)	The Gambia	15
A	Lab training refresher course on AMR bacteria identification and AST analysis (Global Health Protection Programme (GHPP); 11-15 Sep 2023	Namibia	80
A	SEEG-Deployment on HPAI risk assessment and ranger training (10.-21.12.2023)	Guinea	25
A	Technical visit and workshop on Brucellosis Management (Thessaloniki; Greece, 09.-11.07.2023	Turkey, Greece	9
B	Technical visit and workshop on AMR and One-Health (Lagos; Nigeria; 29.04-06.05.2023)	Nigeria	250

B	Webinar at STOR-REMESA Mediterranean Animal Health Network (Brucellosis in North Africa, 23.10.2023)	Algeria, Egypt, France, Italy, Libya, Morocco, Mauritania, Portugal, Spain and Tunisia	20
C	Laboratory training in brucellosis diagnosis (WOAH RL Brucellosis; 11.01.-03.02.2023)	Algeria	1
C	Training at FLI on Basic cultivation, isolation and molecular genetic identification of members of the Mycobacterium tuberculosis complex, Coxiella burnetii, Brucella sp., Anthrax, Burkholderia mallei/pseudomallei (IAEA Fellowship SV programme, March 2023)	Malaysia	2
C	Hand-on Course at FLI on diagnosis of bacterial zoonoses (WOAH RL Brucellosis; 30.06 - 10.07.2023)	Egypt, Pakistan	6
C	Hands-on-training at FLI on SARS-CoV-serology and sequence analysis (GHPP project, 18.09 – 03.10.2023)	Ukraine	2
C	Hands-on-training at FLI on SARS-CoV-serology and sequence analysis (GHPP project, 18.09 – 03.10.2023)	Nigeria	1
C	Hand-on Course at FLI on AMR and diagnosis of bacterial zoonoses for medical students (9.-12.10.2023)	Pakistan, Iraq	2
C	Comparison of different DNA isolation methods, PCR-based detection/identification of Bacillus sp. (22.10.-04.11.2023)	Ukraine	1
C	PCR-based detection/identification of Brucella spp., Bacillus anthracis und Burkholderia mallei; DNA-Isolation and Biosafety (27.11.-01.12.2023)	Tunisia	2
D	Sarbecovirus diagnostic and serology (GHPP project: 2 months research internship)	Nigeria	2
D	AMR along the food value chain (DFG project, 3 months research internship)	Nigeria	1
D	Influenza-A-virus and MERS-CoV lab diagnostics and sequencing (GHPP project; 1 months research internship)	Nigeria	2
D	Serological investigations of bat sera for different zoonotic diseases (GHPP project: 6 weeks research internship)	Nigeria	1

## TOR8: SCIENTIFIC MEETINGS

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

No

## TOR9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

329

*As Germanys Federal Research Institute for Animal Health the work of the FLI focusses on farm animal health and welfare and on the protection of humans from zoonoses. The FLI has published about 330 peer-reviewed articles in 2023. Selected publications are listed here.*

OneHealth OHLEPP

*W. Markotter et al., "Prevention of zoonotic spillover: From relying on response to reducing the risk at source: OHHLEP whitepaper/Opinion piece". (World Health Organization, 2023).*

Highly Pathogenic Avian Influenza A

*C. Baechlein et al., Neurotropic Highly Pathogenic Avian Influenza A(H5N1) Virus in Red Foxes, Northern Germany. Emerging infectious diseases. 29, 2509–2512 (2023), doi:10.3201/eid2912.230938.*

*S. S. Nielsen et al., Vaccination of poultry against highly pathogenic avian influenza - part 1. Available vaccines and vaccination strategies. EFSA journal. European Food Safety Authority. 21, e08271 (2023), doi:10.2903/j.efsa.2023.8271.*

*A. Günther et al., Continuous surveillance of potentially zoonotic avian pathogens detects contemporaneous occurrence of highly pathogenic avian influenza viruses (HPAIV H5) and flaviviruses (USUV, WNV) in several wild and captive birds. Emerging Microbes & Infections. 12, 2231561 (2023), doi:10.1080/22221751.2023.2231561.*

SARS-CoV2

*O. Bagato et al., Spatiotemporal analysis of SARS-CoV-2 infection reveals an expansive wave of monocyte-derived macrophages associated with vascular damage and virus clearance in hamster lungs. Microbiology Spectrum. 12, e0246923 (2024), doi:10.1128/spectrum.02469-23.*

*C. Blaurock et al., Compellingly high SARS-CoV-2 susceptibility of Golden Syrian hamsters suggests multiple zoonotic infections of pet hamsters during the COVID-19 pandemic. Scientific reports. 12, 1–12 (2022), doi:10.1038/s41598-022-19222-4.*

*B. Corleis et al., Efficacy of an unmodified bivalent mRNA vaccine against SARS-CoV-2 variants in female small animal models. Nature communications. 14, 1–8 (2023), doi:10.1038/s41467-023-36110-1.*

*P. V. Markov et al., The evolution of SARS-CoV-2. Nature Reviews Microbiology. 21, 361–379 (2023), doi:10.1038/s41579-023-00878-2.*

Emerging viruses

*K. Matiassek et al., Mystery of fatal 'staggering disease' unravelled: novel rustrela virus causes severe meningoencephalomyelitis in domestic cats. Nature communications. 14, 624 (2023), doi:10.1038/s41467-023-36204-w.*

*M. Müller et al., Analysis of Nipah Virus Replication and Host Proteome Response Patterns in Differentiated Porcine Airway Epithelial Cells Cultured at the Air–Liquid Interface. Viruses. 15, 961 (2023), doi:10.3390/v15040961.*

*E. Heuser et al., Pet Rats as the Likely Reservoir for Human Seoul Orthohantavirus Infection. Viruses. 15, 467 (2023), doi:10.3390/v15020467.*

*P. D. Santos et al., An advanced sequence clustering and designation workflow reveals the enzootic maintenance of a dominant West Nile virus subclade in Germany. Virus Evolution. 9, vead013 (2023), doi:10.1093/ve/vead013.*

*F. Bergmann et al., Reconstruction of the molecular evolution of Usutu virus in Germany: Insights into virus emersion and circulation. PLoS Neglected Tropical Diseases. 17, e0011203 (2023), doi:10.1371/journal.pntd.0011203.*

Bacterial Zoonoses:

*K. O. Akinyemi et al., Whole genome sequencing of Salmonella enterica serovars isolated from humans, animals, and the environment in Lagos, Nigeria. BMC Microbiology. 23, 1–17 (2023), doi:10.1186/s12866-023-02901-1.*

*H. Brangsch et al., Genotype diversity of brucellosis agents isolated from humans and animals in Greece based on whole-genome sequencing. BMC Infectious Diseases. 23, 1–15 (2023), doi:10.1186/s12879-023-08518-z.*

*T. Kozytzka et al., Retrospective Analysis of Official Data on Anthrax in Europe with a Special Reference to Ukraine. Microorganisms. 11, 1294 (2023), doi:10.3390/microorganisms11051294.*

*B. U. Bauer et al., Interdisciplinary studies on Coxiella burnetii: From Molecular to Cellular, to Host, to One Health Research. International Journal of Medical Microbiology. 313, 151590 (2023), doi:10.1016/j.ijmm.2023.151590.*

b) International conferences:

100

*Each year, FLI researchers present at numerous (>100) international conferences.*

c) National conferences:

100

*Each year, FLI researchers present at numerous (>100) 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 (<https://www.fli.de/en/startpage/>)*

*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 (<https://www.who-rabies-bulletin.org/>)*

*The German One Health Plattform (OHP) started in Dec. 2024 to expanding the work of the The German Research Platform for Zoonoses. Both information and service network are mainly funded by the Federal Ministry of Education and Research (BMBF). <https://onehealthplattform.net/> (<https://zoonosen.net/en/node/600>)*

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

*In addition to the existing high containment research facility including (BSL2 to BSL4) including large animal BSL4 room at Greifswald – Insel Riems, FLI is currently expanding its research facilities at our locations in Jena and in Lower Saxony (Lifestock research – Animal Welfare).*

*At FLI-Jena a new research complex (BSL-2/-3) dedicated to our bacteriological research is currently under construction.*

*At FLI-Mecklenhorst a new research complex dedicated to livestock research is also currently under construction. It will focus on animal husbandry and welfare, animal nutrition and farm animal genetics.*

12. Additional comments regarding your report: