World Organisation for Animal Health

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WOAH Collaborative Centre Reports Activities 2024

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CENTRE INFORMATION

***Title of WOAH Collaborating Centre**	New and Emerging Diseases
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***Name Director of Institute (Responsible Official):**	Debbie Eagles, Director, Australian Centre for Disease Preparedness
***Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):**	Dr Debbie Eagles, Director, Australian Centre of Disease Preparedness
***Name of the writer:**	Debbie Eagles

TOR 1 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 WOAH

Category	Title of activity	Scope
		To identify potential AHSV competent

Disease control (true)	Vector competency of Australian species of Culicoides for African Horse Sickness	Australian Culicoides sp. Develop high quality genomic resources of Culicoides spp. Genetic basis for vector competency
Epidemiology, surveillance, risk assessment, (true)	TAPPAS 2	Development of a cloud computing based application that enables biosecurity teams to access modelling tools that assist the surveillance for insect pest incursions via their long-distance wind dispersion (LDWD)
Zoonoses (true)	Pandemic preparedness and prevention	Determining the epidemiological drivers of infectious disease emergence and transmission at the wildlife-livestock-human interface
Avian diseases (true)	Influenza virus testing	Comparison of recombinant viral strains to wild viruses in vivo
Aquatic animal diseases (true)	Surveillance of aquatic animal pathogens	Develop and validate fit-for-purpose levels of pooling for surveillance of aquatic animal pathogens of national and trade significance
Diagnosis, biotechnology and laboratory (true)	Development of molecular DIVA capability for detection and differentiation of wild-type and vaccine strain Lumpy Skin Disease virus (LSDV)	Develop and validate molecular assay, e.g. real-time PCR-based methods for detection and differentiation currently-used vaccine strain (Neethling-strain related virus) and wild type of LSDV including traditional wild-types, and new and emerging recombinant LSDV
Vaccines (true)	Protective T Cell Vaccine for African Swine Fever Virus	Development of a mucosal, plasmid-based T cell vaccine for protection against African swine fever (ASF).
Epidemiology, surveillance, risk assessment (true)	Surveillance for vector-borne zoonotic and livestock diseases	Strengthened surveillance for vector-borne zoonotic and livestock diseases in Papua New Guinea
Epidemiology, surveillance, risk assessment (true)	Wildlife Interface Viromic Regional Emerging Infectious Disease Support	Develop and enhance risk-based targeted EID surveillance pipelines and build field- and laboratory-based diagnostic capabilities for EID screening at

	(WIViREIDS)	intersectional wildlife/urban interfaces.
Epidemiology, surveillance, risk assessment (true)	Lumpy skin disease - important Australian vectors	Investigating high risk insect vectors related to potential incursion into Australia and long distance spread of LSD with Australia.
Avian Diseases (true)	Evaluation of Australian-lineage H5 LPAIVs	Understanding the biosecurity risk posed by Australian-lineage H5 LPAIVs and the potential genesis to highly pathogenic forms.
Aquatic Diseases (true)	Detection of aquatic pathogens using NGS (minION)	To evaluate the mnION for diagnostic testing and completion of pathogen whole genome sequences
Diagnosis, biotechnology and laboratory (true)	Flavivirus serological assay development	Development of a multiplexed serological assay for flaviviruses of health and biosecurity significance
Diagnosis, biotechnology and laboratory (true)	High throughput sequencing improvements	Development of standardised approaches through quality assured frameworks and rigorous controls for high throughput sequencing
Diagnosis, biotechnology and laboratory (true)	Development of Glanders diagnostic tests	Implement and seek accreditation of serological and molecular tests for detection of Glanders

TOR 3: HARMONISATION OF STANDARDS

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

Proposal title	Scope/Content	Applicable Area
Improved laboratory quality assurance and	Continue to provide advice and support to laboratories wanting to establish or improve laboratory quality and Biorisk systems such as those provided through ISO 17025: 2017, General requirements for the competence of testing and calibration laboratories, ISO9001:2015, ISO	Laboratory Expertise

biosecurity systems	17043:2023 Conformity assessment — General requirements for the competence of proficiency testing providers and ISO 35001:2019 – Biorisk Management for laboratories and other related organisms	Training and Education

3. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

No

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

Yes

Name of WOAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
BSL4ZNet	Global/virtual	América Asia y el Pacífico Europa	BSL4ZNet is a network of government mandated organisations with national level responsibility for protecting animal health by working together to enhance knowledge, competency and capacity to meet current and future high containment needs, including for new and emerging diseases
OFFLU	Global/virtual	África América Asia y el Pacífico Europa Oriente Medio	Coordination of the science underpinning the management and control of influenza in animals

TOR 4 AND 5: NETWORKING AND COLLABORATION

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

Yes

Name of WOAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose

European Virus Archiving Group (EVAg)	Global/virtual	Africa Americas Asia and Pacific Europe Middle East	A coordinated global network that mobilises expertise in virology to amplify, characterise, standardise, authenticate, distribute, track, collect viruses and derived products
Global Foot-and-Mouth Disease Research Alliance	Global/virtual	Africa Americas Asia and Pacific Europe Middle East	A coordinated global alliance of scientists producing evidence and innovation that enables the progressive control and eradication of FMD
Global African Swine Fever Disease Research Alliance	Global/virtual	Africa Americas Asia and Pacific Europe Middle East	To establish and sustain global research partnerships that will generate scientific knowledge and tools to contribute to the successful prevention, control and where feasible eradication of ASF
WOAH Collaborating Centre Network for Wildlife Health	Global/virtual	Africa Americas Asia and Pacific Europe Middle East	A network that serves as a resource centre for wildlife health for WOAH.

TOR 6: EXPERT CONSULTANTS

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

Yes

Name of expert	Kind of consultancy	Subject
Dr Trevor Drew	Invited participant/member	WOAH SCAD meeting
Dr Caitlin Holley	Invited participant	WOAH Lab Twinning Evaluation Workshop

Dr Trevor Drew, Dr Dwane O'Brien	Invited participant/co-organiser	WOAH Regional Meeting for Reference Centres, Asia Pacific
Dr Mark Ford	Invited participant/technical advice	WOAH Sub-Regional Workshop on Emergency Management
Dr Wilna Vosloo	Invited participant/technical advice	27th WOAH Sub-Commission for FMD in South East Asia
Dr Mark Ford	Invited participant/technical advice	WOAH Regional Workshop on Lab Exercises for Equine Diseases
Dr Stacey Lynch and Dr Caitlin Holley	Invited participant/co-organiser	WOAH Regional Workshop on Vector Borne Diseases
Dr Nick Moody	Invited participant/co-organiser	WOAH Regional Workshop on Preparedness Aquatic Animals
Dr David Williams	Invited participant/co-organiser	4th WOAH ASF Coordination Meeting for South East Asia
Dr Kim Halpin	Invited participant/technical advice	WOAH Horse Movement meeting
Dr Debbie Eagles	Invited participant	WOAH General Assembly

TOR 7: SCIENTIFIC AND TECHNICAL TRAINING

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

No

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

Yes

a) Technical visit : 216

b) Seminars : 60

c) Hands-on training courses: 83

d) Internships (>1 month) : 0

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
C	Implementation of proficiency testing (focus on LSD, PCR and ELISA)	Indonesia	12
C	Implementation of proficiency testing (focus on FMD PCR and ELISA)	Indonesia	10
A	Preparation of quality assured positive control material for use by national reference laboratory for progressive monitoring of diagnostic assays. Focus LSD, PCR and ELISA.	Indonesia	12
A	Preparation of quality assured positive control material for use by national reference laboratory for progressive monitoring of diagnostic assays. Focus FMD, PCR and ELISA.	Indonesia	10
A	Technical visit to understand current proficiency testing capabilities and needs	Vietnam	40
C	Provision of hands-on training in sampling and testing for dog mediated rabies	Timor-Leste	10
C	Validation of FMD POC	Indonesia	38

B	Provide assistance to enable the development of sovereign capabilities for vaccine development and pre-clinical testing	Malaysia	60
A	Technical consultation on ASF	SE Asia	100
A	FMD Preparedness – development of sample collection and laboratory workflows	Indonesia	20
A	Establishment of workplans for EID surveillance at Wildlife Interfaces	Philippines	34
C	Verification training and testing of ASP IFAT	Vietnam	10
C	Rabies diagnostic training	Timor-Leste	3

TOR 8: 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 WOAH?

Yes

National/International	Title of event	Co-organiser	Date	Location	No. Participants
Internationally	4th ASF Coordination Meeting – Southeast Asia	FAO	2024-11-01	Hanoi, Vietnam	100
Internationally	WOAH Regional Workshop on Vector Borne Diseases	WOAH	2024-09-18	Tokyo, Japan	40

TOR 9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

27

1. Wilson T, Green M, Dunn V, Cummins D, Neave M. 2024. Characterisation of a mesophilic Aeromonas salmonicida and the development of a PCR to differentiate atypical and typical strains. J. Fish Dis. https://doi.org/10.1111/jfd.14028.

2. Ahmed W, Liu Y, Smith W, Ingall W, Belby M, Bivins A, Bertsch P, Williams DT, Richards K, Simpson S. 2024. The effect of diurnal temperature fluctuations on the decay of Japanese encephalitis and Murray Valley encephalitis virus RNA seeded in piggery wastewater. Sci. Total Environ. https://doi.org/10.1016/j.scitotenv.2024.172593.

3. Spinard E, Dinhobl M, Erdelyan C, O'Dwyer J, Fenster J, Birtley H, Tesler N, Calvelage S, Leijon M, Steinaa L, et al. 2024. A standardized pipeline for assembly and annotation of African swine fever virus genome. Viruses. https://doi.org/10.3390/v16081293.

4. Davis SK, Jia F, Wright QG, Islam MT, Bean A, Layton D, Williams DT, Lynch SE. 2024. Defining correlates of protection for mammalian livestock vaccines against high-priority viral diseases. Front. Immunol. https://doi.org/10.3389/fimmu.2024.1397780.

5. Ahmed W, Liu Y, Smith W, Ingall W, Belby M, Bivins A, Bertsch P, Williams DT, Richards K, Simpson S. 2024. Leveraging wastewater surveillance to detect viral diseases in livestock settings. Sci. Total Environ. https://doi.org/10.1016/j.scitotenv.2024.172593.

6. Williams D, Blome S, Mettenleiter T. 2024. African swine fever: advances and challenges. WOAH Sci. Tech. Rev. Retrospective: special edition for WOAH's centenary. http://hdl.handle.net/102.100.100/658462?index=1.

7. Klein MJ, Jackson SA, Suen WW, Payne J, Beveridge D, Hargreaves M, Gillies D, Wang J, Blasdell KR, Dunn M, et al. 2024. Australian Culex annulirostris mosquitoes are competent vectors for Japanese encephalitis virus genotype IV. Emerg. Microbes Infect. 13:2429628. https://doi.org/10.1080/22221751.2024.2429628.

8. Edwards SJ, Luczo JM. 2024. Zoonotic negative-sense RNA viruses. Front. Vet. Sci. Editorial.

9. Donnelly CM, Stewart M, Roby JA, Sundaramoorthy V, Forwood JK. 2024. Structural determination of the Australian bat lyssavirus nucleoprotein and phosphoprotein complex. Viruses. https://doi.org/10.3390/v16010033.

10. Pedrera M, McLean RK, Medfai L, Thakur N, Todd S, Marsh G, Bailey D, Donofrio G, Muramatsu H, Pardi N, et al. 2024. Evaluation of the immunogenicity of an mRNA vectored Nipah virus vaccine candidate in pigs. Viruses. https://doi.org/10.3389/fimmu.2024.1384417.

11. Madhav M, Blasdell KR, Trewin B, Paradkar PN, López-Denman AJ. 2024. Culex-transmitted diseases: mechanisms, impact, and future control strategies using Wolbachia. Viruses. https://doi.org/10.3390/v16071134..

12. Luczo JM, Spackman E. 2024. Epitopes in the HA and NA of H5 and H7 avian influenza viruses that are important for antigenic drift. FEMS Microbiol. Rev. https://doi.org/10.1093/femsre/fuae014.

13. Samad MA, Hossen A, Karim MR, Uddin ASMA, Roy D, Shithi KN, Akter MN, Das TK, Selleck PW, Bulach DM, et al. 2024. Complete genome sequence of a lumpy skin disease virus isolate from a 2021 outbreak in Bangladesh. Microbiol. Res. Announc. https://doi.org/10.1128/mra.00667-24.

14. Mee PT, Buultjens AH, Oliver J, Brown K, Crowder JC, Porter JL, Hobbs EC, Judd LM, Taiaroa G, Puttharak N, et al. 2024. Mosquitoes provide a transmission route between possums and humans for Buruli ulcer in southeastern Australia. Nat. Portfolio. https://doi.org/10.1038/s41564-023-01553-1.

15. Wille M, Broz I, Cherrington T, Crawley A, Farrugia B, Ford M, Frost M, Grimsey J, Kirkland PD, Latimore S, et al. 2024. Contrasting dynamics of two incursions of low-pathogenicity avian influenza virus into Australia. Virus Evol. https://doi.org/10.1093/ve/veae076.

16. Seeyo KB, Choonnasard A, Chottikamporn J, Singkleebut S, Ngamsomsak P, Suanpat K, Balasubramanian NS, Vosloo W, Fukai K. 2024. Evaluation of six commercial NSP ELISA assays for foot and mouth disease virus in Thailand. Nat. Res. https://doi.org/10.1038/s41598-024-75793-4.

17. Javed N, López-Denman AJ, Paradkar PN, Bhatti A. 2024. Flight traits of dengue-infected Aedes aegypti mosquitoes. Comput. Biol. Med. https://doi.org/10.1016/j.compbiomed.2024.108178.

18. Sinclair JE, Vedelago C, Ryan FJ, Carney M, Redd MA, Lynn MA, Grubor-Bauk B, Cao Y, Henders AK, Chew KY, et al. 2024. Post-acute sequelae of SARS-CoV-2 cardiovascular symptoms are associated with trace-level cytokines that affect cardiomyocyte function. Nat. Portfolio. https://doi.org/10.1038/s41564-024-01838-z.

19. Kardena IM, Adi AAAM, Astawa INM, Oka IBM, Sahibzada S, Bruce M, O'Dea M. 2024. Seroconversion, genotyping, and potential mosquito vector identification of Japanese encephalitis virus in pig sentinel settings in Bali, Indonesia. Vet. World. https://doi.org/10.14202/vetworld.2024.89-98.

20. McNabb L, Durr PA, Lunt R, Barr J, Adams TE, Pearce L, Poon LLM, Perera RAM, Demissie GF, Bowden TR. 2024. Development and preliminary validation of a MERS-CoV ELISA for serological testing of camels and alpacas. J. Virol. Methods. https://doi.org/10.1016/j.jviromet.2024.114923.
21. Carey KJ, Smith I, Barr J, Caruso S, Au GG, Hartley CA, Bailey KE, Perriam W, Broder CC, Gilkerson JR. 2024. Foals of mares vaccinated for Hendra virus have a suboptimal response to HeV vaccination. Vet. Microbiol. https://doi.org/10.1016/j.vetmic.2024.110167.
22. Webb RJ, Roberts AA, Rush C, Skerratt LF, Tizard ML, Berger L. 2024. Small interfering RNA-mediated messenger RNA knockdown in the amphibian pathogen Batrachochytrium dendrobatidis. J. Basic Microbiol. https://doi.org/10.1002/jobm.202400081.
23. Luczo JM, Edwards SJ, Ardipradja K, Suen WW, Au GG, Marsh GA, Godde N, Rootes CL, Bingham J, Sundaramoorthy V. 2024. SARS-CoV and SARS-CoV-2 display limited neuronal infection and lack the ability to transmit within synaptically connected axons in stem cell-derived human neurons. J. Neurovirol. https://doi.org/10.1007/s13365-023-01187-3.
24. Valenza LD, Bishop T, Cramieri S, Wang J, Ploeg RJ. 2024. Pteropox infection in a juvenile grey-headed flying fox (Pteropus poliocephalus). Aust. Vet. J. https://doi.org/10.1111/avj.13316.
25. Pawęska JT, Storm N, Jansen van Vuren P, Markotter W, Kemp A. 2024. Attempted transmission of Marburg virus by bat-associated fleas (Thaumapsylla breviceps breviceps) to the Egyptian rousette bat (Rousettus aegyptiacus). Viruses. https://doi.org/10.3390/v16081197.
26. Sett S, Kress WJ, Halewood M, Nicholson D, Nuñez-Vega G, Faggionato D, Rouard M, Jaspars M, da Silva M, Prat C, et al. 2024. Harmonize rules for digital sequence information benefit-sharing across UN frameworks. Nat. Commun. https://doi.org/10.1038/s41467-024-52994-z.
27. Jansen van Vuren P, Parry RH, Pawęska JT. 2024. Detection of Dengue Virus 1 and mammalian orthoreovirus 3, with novel reassortments, in a South African family returning from Thailand, 2017. Viruses. https://doi.org/10.3390/v16081274.

b) International conferences:
4
1. Mohr, Peter. Surveillance of imported prawns for DIV1, CMNV and EHP. Conference Presentation.
2. Ahmed, Asif. Chromosome level genome of Bluetongue virus vector, Culicoides brevitarsis. Conference Presentation.
3. Moody, Nick. WOAH ad Hoc Group on tilapia lake virus. Conference Presentation.
4. Munyanduki, H. Relative contribution to transmission of lumpy skin disease virus (LSDV) by different hematophagous insects – Virology Africa Conference

c) National conferences:
16
1. Munyanduki, Henry. Relative contribution to transmission of lumpy skin disease virus (LSDV) by different hematophagous insects. Conference Presentation.
2. Nazareth, Lynn. Using advanced microscopy to elucidate influenza infection through the olfactory system. Conference Presentation.
3. Le Lay, Callum. RNA virus metagenomics. Conference Presentation.
4. Le Lay, Callum. It's an RNA virus world. Conference Presentation.
5. Thomas, Jesse. Whole genome sequencing of Australian IBDV to inform development of diagnostic qPCR tests. Conference Presentation.
6. McMahon, Amy. Virus neutralisation tests and their cytopathic effects. Conference Presentation.
7. Wang, Jianning. Detection of a Hendra virus genotype 1 variant in a flying fox, Australia. Conference Presentation.
8. Allen, Teegan. Buruli ulcer: Safety in preparedness. Conference Presentation.
9. Luczo, Jasmina. Antigenic characterisation of H7 highly pathogenic avian influenza virus under immunological pressure. Conference Presentation.
10. Grimsey, Jo. H7 HPAI outbreak at bench level. Conference Presentation.
11. Blanch Lazaro, Berta. Bringing ex-vivo models to wildlife health research. Conference Presentation.
12. Le Lay, Callum. 12th Australasian Virology Society Meeting 2024. Conference Presentation.
13. Morgan, Brodie. A Quail-ity idea. Conference Presentation.

14. Luczo, Jasmina. Ecology and diversity of avian paramyxovirus 1, the causative agent of Newcastle disease, in Australian wild birds. Conference Presentation.
15. Azuar, Armira. Next-gen mRNA technologies for animal vaccines. Conference Presentation.
16. Farr, Ryan. microRNA biomarkers for improved detection of infectious diseases. Conference Presentation.

d) Other (Provide website address or link to appropriate information):
0

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: