

# WOAH Collaborative Centre Reports Activities 2022

## Activities in 2022

This report has been submitted : 11 avril 2023 03:32

### Centre Information

<b>Title of WOA Collaborating Centre</b>	Laboratory Capacity Building
<b>Address of WOA Collaborating Centre</b>	Australian Centre for Disease Preparedness. 5 Portarlington Road East Geelong, Victoria, Australia, 3220
<b>Tel.:</b>	+61 35227 5000
<b>E-mail address:</b>	dwane.obrien@csiro.au
<b>Website:</b>	www.csiro.au
<b>Name Director of Institute (Responsible Official):</b>	Prof. Trevor Drew
<b>Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):</b>	Dr. Dwane O'Brien - Research Director Diagnostics, Surveillance and Response
<b>Name of the writer:</b>	Dwane O'Brien

### 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

Training, capacity building	
Title of activity	Scope
	Biosafety workshops were conducted on at ACDP for 14 participants from countries across SE Asia. The attending

<p>Biosafety workshops (supported by Australian Department of Foreign Affairs and Trade [DFAT] and the USA Defence Threat Reduction Agency)</p>	<p>country participants included laboratory quality assurance personnel, biorisk/biosafety managers, laboratory heads and technical laboratory staff. The workshop consisted of both lectures and practical instruction conducted within the high containment area of the ACDP.</p>
<p>Training, capacity building</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>EID surveillance (supported by Australian Government Department of Foreign Affairs and Trade)</p>	<p>Surveillance of wildlife and livestock in high-risk locations (e.g. wet markets) and for EID's such as coronaviruses and influenza A viruses</p>
<p>Training, capacity building</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Australia Indonesia Health Security Program – Lab strengthening Component (supported by DFAT and managed by Cardno)</p>	<p>Priority laboratory diagnostic capacity building activities for Indonesia including Lumpy Skin Disease, ASF/CSF, FMD exclusion testing, and general laboratory QA and Biosafety.</p>
<p>Diagnosis, biotechnology and laboratory</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Provision of technical support to the Regional Animal Health Office No. 6 (RAHO-6) Laboratory, Ho Chi Minh City, Vietnam under the WOAHA supported twinning project</p>	<p>ACDP is providing technical support to RAHO-6 under a WOAHA twinning project. This will support RAHO-6 in its efforts towards an application to be a future WOAHA Reference laboratory for selected swine diseases including African Swine Fever (ASF)</p>
<p>Diagnosis, biotechnology and laboratory</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Provision of technical support to Disease Investigation Centre Wates (DIC DWates) Indonesia, as part of twinning arrangements supported by the Australian Department of Foreign Affairs and Trade (DFAT) Centre for Health Security</p>	<p>ACDP is providing technical support to DIC Wates laboratory under twinning arrangements..</p>
<p>Diagnosis, biotechnology and laboratory</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Provision of technical support to the National Animal Health and Food Testing Laboratory (NAFTL) in Port Moresby Papua New Guinea in collaboration with the National Agriculture, Quarantine and Inspection Authority (NAQIA) and supported by the Australian High Commission</p>	<p>Using African swine fever as a model, ACDP will build diagnostic capability, particularly in PCR testing, support development of field diagnostics and strengthen disease surveillance.</p>
<p>Diagnosis, biotechnology and laboratory</p>	
<p>Title of activity</p>	<p>Scope</p>

Lumpy Skin Disease Preparedness in Timor-Leste supported by the Australian Department of Agriculture, Fisheries and Forestry (DAFF)	Provision of LSD ELISA kits and technical support and troubleshooting to the National Animal Health Laboratory in Timor-Leste.
---	--

## 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
Improved laboratory quality assurance systems	Provide advice and support to laboratories wanting to establish or improve laboratory quality assurance systems such as those provided through AS/NZS ISO 9001:2015 and environmental management systems under AS/NZS ISO 14001:2015	Laboratory expertise
Pilot virtual training content and learning management platform	To enable the remote delivery of laboratory capacity building activities using virtual reality, real time remote viewing and other web-based tools.	Laboratory expertise Training and education

4. Did your Collaborating Centre maintain a network with other WOAHC 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
BSL4ZNet	Global	Americas Asia and Pasific Europe	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	Africa Americas Asia and Pasific Europe	Coordination of the science underpinning the management and control of influenza in animals

		MiddleEast	
OIE ad hoc Steering Committee of the Regional Framework on Aquatic Animal Health in the Asia Pacific Region	Asia Pacific	Asia and Pasific	Increasing collaboration in the region on investigation of emerging aquatic diseases, improving tests capability and proficiency testing, with the view to improve overall capability.
The Fleming Fund	UK	Asia and Pasific	To collaborate on Antimicrobial resistance initiatives.
Burnet Institute	Australia	Asia and Pasific	To collaborate on research projects
Australian Centre for International Agricultural Research (ACIAR)	Australia	Asia and Pasific	To collaborate on capacity building initiatives
FAO Indonesia country program	Asia	Asia and Pasific	Collaboration on surveillance of wildlife and livestock in high risk locations (e.g. wet markets) for EIDs such as coronaviruses and Influenza A viruses. Collaboration to improve biosafety capacity in the Asia-Pacific region
Mahidol Oxford Tropical Medicine Research Unit (MORU)	Asia	Asia and Pasific	Collaboration on surveillance of wildlife and livestock in high risk locations (e.g. wet markets) for EIDs such as coronaviruses and Influenza A viruses. Collaboration to improve biosafety capacity in the Asia-Pacific region
US Defense Threat reduction Agency (DTRA)	USA	Americas Asia and Pasific	Maintain communication and collaboration to improve biosafety and biosecurity capacity in the Asia-Pacific region.

## TOR4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOAHC 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
CEPI	Global	Africa Americas Asia and Pasific Europe MiddleEast	Collaboration to accelerate the development of vaccines against emerging infectious diseases
Global African Swine Fever Disease Research Alliance	Global	Africa Americas Asia and Pasific Europe MiddleEast	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 Aquatic Animal Health Standards Commission	Global	Africa Americas Asia and Pasific Europe MiddleEast	Collaboration to ensure the Aquatic animal health code and Manual of Diagnostic Tests for Aquatic Animals reflect current scientific information.
Global Foot-and-Mouth Disease Research Alliance	Global	Africa Americas Asia and Pasific Europe MiddleEast	A coordinated global alliance of scientists producing evidence and innovation that enables the progressive control and eradication of FMD.
EVAg	Global	Africa Americas Asia and Pasific Europe MiddleEast	A coordinated global network that mobilises expertise in virology to amplify, characterize, standardize, authenticate, distribute, track, collect viruses and derived products.
VetBioNet	Global		A network of facilities researching animal and zoonotic diseases in secure facilities. The network aims to standardize protocols, identify

best practice and develop new technologies.

## TOR6: EXPERT CONSULTANTS

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

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Professor Trevor Drew	Meeting and workshop attendance	WOAH Biological Standards Commission, WOA?H Scientific Commission for Animal Diseases (SCAD), 89th WOA?H General Session.
Dr. David Williams	Meeting and workshop attendance	- WOA?H Standing Group of Experts, ASF meeting Asia-Pacific - WOA?H Regional Laboratory Expert Meeting for African Swine Fever in Asia & the Pacific; 02 -04 Nov 2022; Geelong Australia. - WOA?H Pacific Partners Meeting
Dr. Frank Wong	Meeting and workshop attendance	- WOA?H PVS Lab expert working meeting: Tools for remote missions - WOA?H PVS Sustainable Laboratories Thailand Mission Meeting - WOA?H Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.
Dr. Gemma Clark	Meeting and workshop attendance	- WOA?H AHG on Sustainable Laboratories meeting (PVS Cohort dashboards) - WOA?H Regional Proficiency Testing Provider Training
Dr. Matt Neave	Meeting and workshop attendance	WOAH Regional Laboratory Expert Meeting for African Swine Fever in Asia & the Pacific; 02 -04 Nov 2022; Geelong Australia
Waugh, Caryl	Meeting and workshop attendance	Proficiency testing and its role in supporting laboratory capability. In: WOA?H Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31Oct 2022 - 2 Nov 2022; Geelong Australia.

## TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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 WOA?H, to personnel from WOA?H Members?

Yes

a) Technical visit : 22

b) Seminars : 0

c) Hands-on training courses: 139

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
A	Biosafety training, Risk assessments, spills training and chemical safety, Yogyakarta, Indonesia, 12-16 September 2022	Indonesia	22
C	Regional Proficiency Testing Provider Training, 21-25 February 2022 (Virtual)	China, Vietnam, Thailand, Malaysia, South Korea, Japan, Indonesia, India	14
C	NGS Wet-Lab Protocols for RNA (AIV) and DNA (ASF) viruses Workshop, 21-23 March 2022 (Virtual)	Indonesia	13
C	Biosafety Leadership Training, April – December 2022 (Monthly Engagement) (Virtual)	Thailand, Laos, Vietnam, Cambodia, Malaysia, Indonesia, Papua New Guinea, Singapore, Timor Leste	19
C	Laboratory Refresher Proficiency Test Workshop, Denpasar, Indonesia 4 – 6 July 2022	Indonesia	20
C	Refresher Proficiency Test Workshop, Yogyakarta, Indonesia, 26-27 July 2022	Indonesia	16
C	Validation and Verification Workshop, Yogyakarta, Indonesia, 12-16 September 2022	Indonesia	22
C	Biosafety training, Risk assessments, spills training and chemical safety, Yogyakarta, Indonesia, 12-16 September 2022	Indonesia	22
C	Pathology and Histology Training, Geelong, Australia, 24 October -4 November 2022	Indonesia	2

C	Sequencing and Bioinformatics Training, Geelong, Australia, 24 October -4 November 2022	Indonesia	1
C	Serology Classical Swine Fever (CSF)/Porcine Epidemic Diarrhoea (PEDV)/Porcine Circovirus Type 2 (PCV-2) and Virus Isolation PEDV/PCV2 Training, Geelong, Australia, 7-18 November 2022	Vietnam	4
C	Virus isolation and serology for swine diseases technical training, HCMC, Vietnam, 5-9 December 2022	Vietnam	6

## 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:

*Ardipradja, K.S., Wichmann, C.W., Hickson, K., Rigopoulos, A., Alt, K.M., Pearce, H.A., Wang, X., O'Keefe, G., Scott, A.M., Peter, K., Hagemeyer, C.E., Ackermann, U., 2022. (18)F Site-Specific Labelling of a Single-Chain Antibody against Activated Platelets for the Detection of Acute Thrombosis in Positron Emission Tomography. Int J Mol Sci 23.*

*Au, G.G., Marsh, G.A., McAuley, A.J., Lowther, S., Trinidad, L., Edwards, S., Todd, S., Barr, J., Bruce, M.P., Poole, T.B., Brown, S., Layton, R., Riddell, S., Rowe, B., Soldani, E., Suen, W.W., Bergfeld, J., Bingham, J., Payne, J., Durr, P.A., Drew, T.W., Vasan, S.S., 2022. Characterisation and natural progression of SARS-CoV-2 infection in ferrets. Sci Rep. 2022 Apr 5;12(1):5680.*

*Balkema-Buschmann, A., Fischer, K., McNabb, L., Diederich, S., Singanallur, N.B., Ziegler, U., Keil, G.M., Kirkland, P.D., Penning, M., Sadeghi, B., Marsh, G., Barr, J., Colling, A., 2022. Serological Hendra Virus Diagnostics Using an Indirect ELISA-Based DIVA Approach with Recombinant Hendra G and N Proteins. Microorganisms 10.*

*Barbosa, A.D., Long, M., Lee, W., Austen, J.M., Cunneen, M., Ratchford, A., Burns, B., Kumarasinghe, P., Ben-Othman, R., Kollmann, T.R., Stewart, C.R., Beaman, M., Parry, R., Hall, R., Tabor, A., O'Donovan, J., Faddy, H.M., Collins, M., Cheng, A.C., Stenos, J., Graves, S., Oskam, C.L., Ryan, U.M., Irwin, P.J., 2022. The Troublesome Ticks Research Protocol: Developing a Comprehensive, Multidiscipline Research Plan for Investigating Human Tick-Associated Disease in Australia. Pathogens 11.*

*Barr, J., Boyd, V., Todd, S., Smith, I., Prada, D., O'Dea, M., Jackson, B., Pearce, L., Adams, T.E., Vanderduys, E., Westcott, D., McKeown, A., Baker, M.L., Marsh, G.A., 2022. Detection of filovirus-reactive antibodies in Australian bat species. J Gen Virol 103.*

*Basnet, R., Rai, N., Tamang, R., Awasthi, N.P., Pradhan, I., Parajuli, P., Kashyap, D., Reddy, A.G., Chaubey, G., Das Manandhar, K.,*



- Shrestha, T.R., Thangaraj, K., 2022. The matrilineal ancestry of Nepali populations. *Hum Genet.* 2022 Oct 15.
- Bessoltane, N., Charlot, F., Guyon-Debast, A., Charif, D., Mara, K., Collonnier, C., Perroud, P.F., Tepfer, M., Nogue, F., 2022. Genome-wide specificity of plant genome editing by both CRISPR-Cas9 and TALEN. *Sci Rep.* 2022 Jun 4;12(1):9330.
- Chaber, A.L., Easther, R., Cumming, B., Irving, R., Keyburn, A.L., Smart, C., O'Handley, R., Lignereux, L., 2022. Ehrlichia canis rapid spread and possible enzooty in northern South Australia and distribution of its vector Rhipicephalus linnaei. *Aust Vet J* 100, 533-538.
- Challagulla, A., Shi, S., Nair, K., O'Neil, T.E., Morris, K.R., Wise, T.G., Cahill, D.M., Tizard, M.L., Doran, T.J., Jenkins, K.A., 2022. Marker counter-selection via CRISPR/Cas9 co-targeting for efficient generation of genome edited avian cell lines and germ cells. *Anim Biotechnol* 33, 1235-1245.
- Challagulla, A., Tizard, M.L., Doran, T.J., Cahill, D.M., Jenkins, K.A., 2022. Harnessing Intronic microRNA Structures to Improve Tolerance and Expression of shRNAs in Animal Cells. *Methods Protoc.* 2022 Feb 10;5(1):18.
- Chen, Q., Langenbach, S., Li, M., Xia, Y.C., Gao, X., Gartner, M.J., Pharo, E.A., Williams, S.M., Todd, S., Clarke, N., Ranganathan, S., Baker, M.L., Subbarao, K., Stewart, A.G., 2022. ACE2 Expression in Organotypic Human Airway Epithelial Cultures and Airway Biopsies. *Front Pharmacol.* 2022 Mar 11;13:813087.
- Diggles, B.K., Bass, D., Bateman, K.S., Chong, R., Daumich, C., Hawkins, K.A., Hazelgrove, R., Kerr, R., Moody, N.J.G., Ross, S., Stentiford, G.D., 2022. Haplosporidium acetes n. sp. infecting the hepatopancreas of jelly prawns Acetes sibogae australis from Moreton Bay, Australia. *J Invertebr Pathol* 190, 107751.
- Doneley, R., Suen, W.W., 2022. Anaplastic thyroid carcinoma in a brush-tailed rock-wallaby (Petrogale penicillata). *Aust Vet J* 100, 271-276.
- Edgar, R.C.S., Siddiqui, G., Hjerrild, K., Malcolm, T.R., Vinh, N.B., Webb, C.T., Holmes, C., MacRaid, C.A., Chernih, H.C., Suen, W.W., Counihan, N.A., Creek, D.J., Scammells, P.J., McGowan, S., de Koning-Ward, T.F., 2022. Genetic and chemical validation of Plasmodium falciparum aminopeptidase PfA-M17 as a drug target in the hemoglobin digestion pathway. *Elife* 11.
- Elfekih, S., Metcalfe, S., Walsh, T.K., Cox, T.E., Strive, T., 2022. Genomic insights into a population of introduced European rabbits Oryctolagus cuniculus in Australia and the development of genetic resistance to rabbit hemorrhagic disease virus. *Transbound Emerg Dis.* 2022 Mar;69(2):895-902.
- El-Hage, C., Hartley, C., Savage, C., Watson, J., Gilkerson, J., Paillot, R., 2022. Assessment of Humoral and Long-Term Cell-Mediated Immune Responses to Recombinant Canarypox-Vectored Equine Influenza Virus Vaccination in Horses Using Conventional and Accelerated Regimens Respectively. *Vaccines (Basel)* 10.
- Farr, R.J., Rootes, C.L., Stenos, J., Foo, C.H., Cowled, C., Stewart, C.R., 2022. Detection of SARS-CoV-2 infection by microRNA profiling of the upper respiratory tract. *PLoS One.* 2022 Apr 5;17(4):e0265670.
- Fourie, I., Snyman, J., Williams, J., Ismail, A., Jansen van Vuren, P., Venter, M., 2022. Epidemiological and Genomic Characterisation of Middelburg and Sindbis Alphaviruses Identified in Horses with Febrile and Neurological Infections, South Africa (2014-2018). *Viruses* 14.
- Fourie, I., Williams, J., Ismail, A., Jansen van Vuren, P., Stoltz, A., Venter, M., 2022. Detection and genome characterization of Middelburg virus strains isolated from CSF and whole blood samples of humans with neurological manifestations in South Africa. *PLoS Negl Trop Dis* 16, e0010020.
- George, A.M., Wille, M., Wang, J., Anderson, K., Cohen, S., Moselen, J., Lee, L.Y.Y., Suen, W.W., Bingham, J., Dalziel, A.E., Whitney, P., Stannard, H., Hurt, A.C., Williams, D.T., Deng, Y.M., Barr, I.G., 2022. A novel and highly divergent Canine Distemper Virus lineage causing distemper in ferrets in Australia. *Virology* 576, 117-126.
- Gofton, A.W., Blasdell, K.R., Taylor, C., Banks, P.B., Michie, M., Roy-Dufresne, E., Poldy, J., Wang, J., Dunn, M., Tachedjian, M., Smith, I.,

2022. *Metatranscriptomic profiling reveals diverse tick-borne bacteria, protozoans and viruses in ticks and wildlife from Australia. Transbound Emerg Dis* 69, e2389-e2407.
- Goi, J., Koinari, M., Muker, S., Vinit, R., Pomat, W., Williams, D.T., Karl, S., 2022. *Comparison of Different Mosquito Traps for Zoonotic Arbovirus Vectors in Papua New Guinea. Am J Trop Med Hyg.* 2022 Jan 17;106(3):823-827.
- Horsington, J., Singanallur Balasubramanian, N., Nfon, C.K., Bittner, H., Vosloo, W., 2022. *Investigation into the protective ability of monovalent and bivalent A Malaysia 97 and A(22) Iraq 64 vaccine strains against infection with an A/Asia/SEA-97 variant in pigs. Front Vet Sci* 9, 1027556.
- Jansen van Vuren, P., McAuley, A.J., Kuiper, M.J., Singanallur, N.B., Bruce, M.P., Riddell, S., Goldie, S., Mangalaganesh, S., Chahal, S., Drew, T.W., Blasdell, K.R., Tachedjian, M., Caly, L., Druce, J.D., Ahmed, S., Khan, M.S., Malladi, S.K., Singh, R., Pandey, S., Varadarajan, R., Vasan, S.S., 2022. *Highly Thermotolerant SARS-CoV-2 Vaccine Elicits Neutralising Antibodies against Delta and Omicron in Mice. Viruses.* 2022 Apr 13;14(4):800.
- Jansen van Vuren, P., Singanallur, N.B., Keck, H., Eschbaumer, M., Vosloo, W., 2022. *Chemical inactivation of foot-and-mouth disease virus in bovine tongue epithelium for safe transport and downstream processing. J Virol Methods.* 2022 Jul;305:114539.
- Jonduo, M., Neave, M.J., Javati, S., Abala, D., Bilo, E., Kini, A., Kumbu, J., Laman, M., Robinson, L.J., Makita, L., Susapu, M., Pomat, W., Abdad, M.Y., Williams, D.T., Horwood, P.F., 2022. *Genomic Sequencing of Dengue Virus Strains Associated with Papua New Guinean Outbreaks in 2016 Reveals Endemic Circulation of DENV-1 and DENV-2. Am J Trop Med Hyg.*
- Kanankege, K.S.T., Graham, K., Corzo, C.A., VanderWaal, K., Perez, A.M., Durr, P.A., 2022. *Adapting an Atmospheric Dispersion Model to Assess the Risk of Windborne Transmission of Porcine Reproductive and Respiratory Syndrome Virus between Swine Farms. Viruses* 14.
- Knobel, D.L., Jackson, A.C., Bingham, J., Ertl, H.C.J., Gibson, A.D., Hughes, D., Joubert, K., Mani, R.S., Mohr, B.J., Moore, S.M., Rivett-Carnac, H., Tordo, N., Yeates, J.W., Zambelli, A.B., Rupprecht, C.E., 2022. *A One Medicine Mission for an Effective Rabies Therapy. Front Vet Sci.* 2022 Mar 16;9:867382.
- Kosch, T.A., Waddle, A.W., Cooper, C.A., Zenger, K.R., Garrick, D.J., Berger, L., Skerratt, L.F., 2022. *Genetic approaches for increasing fitness in endangered species. Trends Ecol Evol.* 2022 Apr;37(4):332-345.
- Kuiper, M.J., Wilson, L.O.W., Mangalaganesh, S., Lee, C., Reti, D., Vasan, S.S., 2022. *"But Mouse, You Are Not Alone": On Some Severe Acute Respiratory Syndrome Coronavirus 2 Variants Infecting Mice. ILAR J.* 2021 Dec 31;62(1-2):274. doi: 10.1093/ilar/ilac002. Erratum for: *ILAR J.* 2021 Dec 31;62(1-2):48-59.
- Layton, D.S., Butler, J., Stewart, C., Stevens, V., Payne, J., Rootes, C., Deffrasnes, C., Walker, S., Shan, S., Gough, T.J., Cowled, C., Bruce, K., Wang, J., Kedzierska, K., Wong, F.Y.K., Bean, A.G.D., Bingham, J., Williams, D.T., 2022. *H7N9 bearing a mutation in the nucleoprotein leads to increased pathology in chickens. Front Immunol* 13, 974210.
- Layton, D.S., Mara, K., Dai, M., Malaver-Ortega, L.F., Gough, T.J., Bruce, K., Jenkins, K.A., Bean, A.G.D., 2022. *Interferon Signaling in Chickens Plays a Crucial Role in Inhibiting Influenza Replication in DF1 Cells. Microorganisms* 10.
- Mackenzie, J.S., Williams, D.T., van den Hurk, A.F., Smith, D.W., Currie, B.J., 2022. *Japanese Encephalitis Virus: The Emergence of Genotype IV in Australia and Its Potential Endemicity. Viruses* 14.
- MacRaid, C.A., Mohammed, M.U., Faheem, Murugesan, S., Styles, I.K., Peterson, A.L., Kirkpatrick, C.M.J., Cooper, M.A., Palombo, E.A., Simpson, M.M., Jain, H.A., Agarwal, V., McAuley, A.J., Kumar, A., Creek, D.J., Trevaskis, N.L., Vasan, S.S., 2022. *Systematic Down-Selection of Repurposed Drug Candidates for COVID-19. Int J Mol Sci* 23.
- Manyweathers, J., Hayes, L., Xie, G., Gardner, H., Maru, Y., Woodgate, R., Hernandez-Jover, M., 2022. *On-farm evaluation of a predictive model for Australian beef and sheep producers' vulnerability to an outbreak of foot and mouth disease. Prev Vet Med* 204, 105656.

- Marsh, G.A., McAuley, A.J., Brown, S., Pharo, E.A., Cramerì, S., Au, G.G., Baker, M.L., Barr, J.A., Bergfeld, J., Bruce, M.P., Burkett, K., Durr, P.A., Holmes, C., Izzard, L., Layton, R., Lowther, S., Neave, M.J., Poole, T., Riddell, S.J., Rowe, B., Soldani, E., Stevens, V., Suen, W.W., Sundaramoorthy, V., Tachedjian, M., Todd, S., Trinidad, L., Williams, S.M., Druce, J.D., Drew, T.W., Vasan, S.S., 2022. In vitro characterisation of SARS-CoV-2 and susceptibility of domestic ferrets (*Mustela putorius furo*). *Transbound Emerg Dis.* 2022 Mar;69(2):297-307.
- McAuley, A.J., Jansen van Vuren, P., Mohammed, M.U., Faheem, Goldie, S., Riddell, S., Godde, N.J., Styles, I.K., Bruce, M.P., Chahal, S., Keating, S., Blasdell, K.R., Tachedjian, M., O'Brien, C.M., Singanallur, N.B., Viana, J.N., Vashi, A.V., Kirkpatrick, C.M., MacRaild, C.A., Shah, R.M., Vincan, E., Athan, E., Creek, D.J., Trevaskis, N.L., Murugesan, S., Kumar, A., Vasan, S.S., 2022. Use of Human Lung Tissue Models for Screening of Drugs against SARS-CoV-2 Infection. *Viruses* 14.
- McOrist, S., Scott, P.C., Jendza, J., Paynter, D., Certoma, A., Izzard, L., Williams, D.T., 2022. Analysis of acidified feed components containing African swine fever virus. *Res Vet Sci* 152, 248-260.
- Moody, N.J.G., Mohr, P.G., Williams, L.M., Cummins, D.M., Hoad, J., Slater, J., Valdeter, S.T., Colling, A., Singanallur, N.B., Gardner, I.A., Gudkovs, N., Crane, M.S.J., 2022. Performance characteristics of two real-time TaqMan polymerase chain reaction assays for the detection of WSSV in clinically diseased and apparently healthy prawns. *Dis Aquat Organ* 150, 169-182.
- Munoz-Fontela, C., Widerspich, L., Albrecht, R.A., Beer, M., Carroll, M.W., de Wit, E., Diamond, M.S., Dowling, W.E., Funnell, S.G.P., Garcia-Sastre, A., Gerhards, N.M., de Jong, R., Munster, V.J., Neyts, J., Perlman, S., Reed, D.S., Richt, J.A., Riveros-Balta, X., Roy, C.J., Salguero, F.J., Schotsaert, M., Schwartz, L.M., Seder, R.A., Segales, J., Vasan, S.S., Henao-Restrepo, A.M., Barouch, D.H., 2022. Advances and gaps in SARS-CoV-2 infection models. *PLoS Pathog.* 2022 Jan 13;18(1):e1010161. doi: 10.1371/journal.ppat.1010161. PMID: 35025969; PMCID: PMC8757994.
- Neave, M.J., Mileto, P., Joseph, A., Reid, T.J., Scott, A., Williams, D.T., Keyburn, A.L., 2022. Comparative genomic analysis of the first Ehrlichia canis detections in Australia. *Ticks Tick Borne Dis.* 2022 May;13(3):101909.
- Pagendam, D., Elfekih, S., Nassar, M.S., Nelson, S., Almalik, A.M., Tawfik, E.A., Al-Fageeh, M.B., Hoffmann, A.A., 2022. Spatio-Temporal Modelling Informing Wolbachia Replacement Releases in a Low Rainfall Climate. *Insects* 13.
- Papageorgiou, K.V., Michailidou, M., Grivas, I., Petridou, E., Stamelou, E., Efraimidis, K., Chen, L., Drew, T.W., Kritas, S.K., 2022. Bartha-K61 vaccine protects nursery pigs against challenge with novel european and asian strains of suid herpesvirus 1. *Vet Res* 53, 47.
- Pulscher, L.A., Peel, A.J., Rose, K., Welbergen, J.A., Baker, M.L., Boyd, V., Low-Choy, S., Edson, D., Todd, C., Dorrestein, A., Hall, J., Todd, S., Broder, C.C., Yan, L., Xu, K., Peck, G.R., Phalen, D.N., 2022. Serological evidence of a pararubulavirus and a betacoronavirus in the geographically isolated Christmas Island flying-fox (*Pteropus natalis*). *Transbound Emerg Dis* 69, e2366-e2377.
- Sanchez, C.A., Penrose, M.T., Kessler, M.K., Becker, D.J., McKeown, A., Hannappel, M., Boyd, V., Camus, M.S., Padgett-Stewart, T., Hunt, B.E., Graves, A.F., Peel, A.J., Westcott, D.A., Rainwater, T.R., Chumchal, M.M., Cobb, G.P., Altizer, S., Plowright, R.K., Boardman, W.S.J., 2022. Land use, season, and parasitism predict metal concentrations in Australian flying fox fur. *Sci Total Environ* 841, 156699.
- Sarker, S., Bowden, T.R., Boyle, D.B., 2022. Evidence of a Possible Viral Host Switch Event in an Avipoxvirus Isolated from an Endangered Northern Royal Albatross (*Diomedea sanfordi*) *Viruses.* 2022 Feb 1;14(2):302.
- Sikazwe, C., Neave, M.J., Michie, A., Mileto, P., Wang, J., Copper, N., Levy, A., Imrie, A., Baird, R.W., Currie, B.J., Speers, D., Mackenzie, J.S., Smith, D.W., Williams, D.T., 2022. Molecular detection and characterisation of the first Japanese encephalitis virus belonging to genotype IV acquired in Australia. *PLoS Negl Trop Dis* 16, e0010754.
- Singanallur, N.B., Eblé, P.L., Ludi, A.B., Statham, B., Bin-Tarif, A., King, D.P., Dekker, A., Vosloo, W., 2022. A Vaccine Based on the A/ASIA/G-VII Lineage of Foot-and-Mouth Disease Virus Offers Low Levels of Protection against Circulating Viruses from the A/ASIA/Iran-05 lineage. *Viruses* 14.
- Singanallur, N.B., van Vuren, P.J., McAuley, A.J., Bruce, M.P., Kuiper, M.J., Gwini, S.M., Riddell, S., Goldie, S., Drew, T.W., Blasdell, K.R., Tachedjian, M., Mangalaganesh, S., Chahal, S., Caly, L., Druce, J.D., Juno, J.A., Kent, S.J., Wheatley, A.K., Vasan, S.S., 2022. At Least Three

Doses of Leading Vaccines Essential for Neutralisation of SARS-CoV-2 Omicron Variant. *Front Immunol.* 2022 May 17;13:883612.

Singh, R., White, J.F., de Vries, M., Beddome, G., Dai, M., Bean, A.G., Mulet, X., Layton, D., Doherty, C.M., 2022. Biomimetic metal-organic frameworks as protective scaffolds for live-virus encapsulation and vaccine stabilization. *Acta Biomater* 142, 320-331.

Smertina, E., Carroll, A.J., Boileau, J., Emmott, E., Jenckel, M., Vohra, H., Rolland, V., Hands, P., Hayashi, J., Neave, M.J., Liu, J.W., Hall, R.N., Strive, T., Frese, M., 2022. Lagovirus Non-structural Protein p23: A Putative Viroporin That Interacts With Heat Shock Proteins and Uses a Disulfide Bond for Dimerization. *Front Microbiol* 13, 923256.

Tay, W.T., Rane, R.V., Padovan, A., Walsh, T.K., Elfekih, S., Downes, S., Nam, K., d'Alencon, E., Zhang, J., Wu, Y., Negre, N., Kunz, D., Kriticos, D.J., Czapak, C., Otim, M.H., Gordon, K.H.J., 2022. Global population genomic signature of *Spodoptera frugiperda* (fall armyworm) supports complex introduction events across the Old World. *Commun Biol.* 2022 Apr 7;5(1):297.

Van Brussel, K., Mahar, J.E., Ortiz-Baez, A.S., Carrai, M., Spielman, D., Boardman, W.S.J., Baker, M.L., Beatty, J.A., Geoghegan, J.L., Barrs, V.R., Holmes, E.C., 2022. Faecal virome of the Australian grey-headed flying fox from urban/suburban environments contains novel coronaviruses, retroviruses and sapoviruses. *Virology* 576, 42-51.

van den Bergh, C., Thompson, P.N., Swanepoel, R., Almeida, A.P.G., Paweska, J.T., Jansen van Vuren, P., Wilson, W.C., Kemp, A., Venter, E.H., 2022. Detection of Rift Valley Fever Virus in *Aedes (Aedimorphus) durbanensis*, South Africa. *Pathogens.* 2022 Jan 21;11(2):125.

van Geelen, C.T., Savas, P., Teo, Z.L., Luen, S.J., Weng, C.F., Ko, Y.A., Kuykhoven, K.S., Caramia, F., Salgado, R., Francis, P.A., Dawson, S.J., Fox, S.B., Fellowes, A., Loi, S., 2022. Correction to: Clinical implications of prospective genomic profiling of metastatic breast cancer patients. *Breast Cancer Res* 24, 50.

Waller, C., Tiemensma, M., Currie, B.J., Williams, D.T., Baird, R.W., Krause, V.L., 2022. Japanese Encephalitis in Australia - A Sentinel Case. *N Engl J Med* 387, 661-662.

Wille, M., Grillo, V., Ban de Gouvea Pedrosa, S., Burgess, G.W., Crawley, A., Dickason, C., Hansbro, P.M., Hoque, M.A., Horwood, P.F., Kirkland, P.D., Kung, N.Y., Lynch, S.E., Martin, S., McArthur, M., O'Riley, K., Read, A.J., Warner, S., Hoye, B.J., Lisovski, S., Leen, T., Hurt, A.C., Butler, J., Broz, I., Davies, K.R., Mileto, P., Neave, M.J., Stevens, V., Breed, A.C., Lam, T.T.Y., Holmes, E.C., Klaassen, M., Wong, F.Y.K., 2022. Australia as a global sink for the genetic diversity of avian influenza A virus. *PLoS Pathog.* 2022 May 10;18(5):e1010150.

Woolaston, K., Nay, Z., Baker, M.L., Brockett, C., Bruce, M., Degeling, C., Gilbert, J., Jackson, B., Johnson, H., Peel, A., Sahibzada, S., Oskam, C., Hewitt, C.L., 2022. An argument for pandemic risk management using a multidisciplinary One Health approach to governance: an Australian case study. *Global Health* 18, 73.

Young, A., Isaacs, A., Scott, C.A.P., Modhiran, N., McMillan, C.L.D., Cheung, S.T.M., Barr, J., Marsh, G., Thakur, N., Bailey, D., Li, K.S.M., Luk, H.K.H., Kok, K.H., Lau, S.K.P., Woo, P.C.Y., Furuyama, W., Marzi, A., Young, P.R., Chappell, K.J., Watterson, D., 2022. A platform technology for generating subunit vaccines against diverse viral pathogens. *Front Immunol* 13, 963023.

Karpe AV, Nguyen TV, Shah RM, Au GG, McAuley AJ, Marsh GA, Riddell S, Vasan SS, Beale DJ. A Time-Series Metabolomic Analysis of SARS-CoV-2 Infection in a Ferret Model. *Metabolites.* 2022 Nov 21;12(11):1151

Kuhn JH, Adkins S, Alkhovsky SV, Avšič-Županc T, Ayllón MA, Bahl J, Balkema-Buschmann A, Ballinger MJ, Bandte M, Beer M, Beijerman N, Bergeron É, Biedenkopf N, Bigarré L, Blair CD, Blasdel KR, Bradfute SB, Briese T, Brown PA, Bruggmann R, Buchholz UJ, Buchmeier MJ, Bukreyev A, Burt F, Büttner C, Calisher CH, Candresse T, Carson J, Casas I, Chandran K, Charrel RN, Chiaki Y, Crane A, Crane M, Dacheux L, Bó ED, de la Torre JC, de Lamballerie X, de Souza WM, de Swart RL, Dheilly NM, Di Paola N, Di Serio F, Dietzgen RG, Digiario M, Drexler JF, Duprex WP, Dürrwald R, Easton AJ, Elbeaino T, Ergünay K, Feng G, Feuvrier C, Firth AE, Fooks AR, Formenty PBH, Freitas-Astúa J, Gago-Zachert S, García ML, García-Sastre A, Garrison AR, Godwin SE, Gonzalez JJ, de Bellocq JG, Griffiths A, Groschup MH, Günther S, Hammond J, Hepojoki J, Hierweiger MM, Hongō S, Horie M, Horikawa H, Hughes HR, Hume AJ, Hyndman TH, Jiāng D, Jonson GB, Junglen S, Kadono F, Karlin DG, Klempa B, Klingström J, Koch MC, Kondō H, Koonin EV, Krássová J, Krupovic M, Kubota K, Kuzmin IV, Laenen L, Lambert AJ, Li J, Li JM, Lieffrig F, Lukashevich IS, Luo D, Maes P, Marklewitz M, Marshall SH, Marzano SL, McCauley JW, Mirazimi A, Mohr PG, Moody NJG, Morita Y, Morrison RN, Mühlberger E, Naidu R, Natsuaki T, Navarro JA, Neriya Y, Netesov SV, Neumann G, Nowotny N,

Ochoa-Corona FM, Palacios G, Pallandre L, Pallás V, Papa A, Paraskevopoulou S, Parrish CR, Pauvolid-Corrêa A, Pawęska JT, Pérez DR, Pfaff F, Plemper RK, Postler TS, Pozet F, Radoshitzky SR, Ramos-González PL, Rehanek M, Resende RO, Reyes CA, Romanowski V, Rubbenstroth D, Rubino L, Rumbou A, Runstadler JA, Rupp M, Sabanadzovic S, Sasaya T, Schmidt-Posthaus H, Schwemmler M, Seuberlich T, Sharpe SR, Shi M, Sironi M, Smither S, Song JW, Spann KM, Spengler JR, Stenglein MD, Takada A, Tesh RB, Těšíková J, Thornburg NJ, Tischler ND, Tomitaka Y, Tomonaga K, Tordo N, Tsunekawa K, Turina M, Tzanetakis IE, Vaira AM, van den Hoogen B, Vanmechelen B, Vasilakis N, Verbeek M, von Bargen S, Wada J, Wahl V, Walker PJ, Whitfield AE, Williams JV, Wolf YI, Yamasaki J, Yanagisawa H, Ye G, Zhang YZ, Økland AL. 2022 taxonomic update of phylum Negarnaviricota (Riboviria: Orthornavirae), including the large orders Bunyavirales and Mononegavirales. *Arch Virol.* 2022 Dec;167(12):2857-2906. doi: 10.1007/s00705-022-05546-z. PMID: 36437428.

Annand EJ, Horsburgh BA, Xu K, Reid PA, Poole B, de Kantzow MC, Brown N, Tweedie A, Michie M, Grewar JD, Jackson AE, Singanallur NB, Plain KM, Kim K, Tachedjian M, van der Heide B, Cramer S, Williams DT, Secombe C, Laing ED, Sterling S, Yan L, Jackson L, Jones C, Plowright RK, Peel AJ, Breed AC, Diallo I, Dhand NK, Britton PN, Broder CC, Smith I, Eden JS. Novel Hendra Virus Variant Detected by Sentinel Surveillance of Horses in Australia. *Emerg Infect Dis.* 2022 Mar;28(3):693-704.

Reid T, Singanallur N. B., Newberry K., Waugh C., Bowden T, Colling A. Validation of diagnostic tests for infectious diseases: challenges and opportunities. *International Symposium on Sustainable Animal Production and Health Current Status and Way Forward.* 28 June - 2 July 2021, Joint FAO/IAEA Centre. Accepted for publication in proceedings 7 April 2022.

McAuley AJ Oh Me, Oh My, Omics: Can omics approaches improve the testing of vaccines and therapies for COVID-19 and Disease X? Oct 26, 2022 *INSPIRE 25: International Collaboration for Global Impact* 42-43

Williams, D.T., Paradkar, P., Karl, S. (2022). Arbovirus Detection in Vectors. In: Tyagi, B.K. (eds) *Genetically Modified and other Innovative Vector Control Technologies.* Book Section, Springer, Singapore.

Agus Sunarto, Jessica Grimm, Kenneth A. McColl, Ellen Ariel, Kiran Krishnankutty Nair, Serge Corbeil, Talia Hardaker, Mark Tizard, Tanja Strive, Bonnie Holmes, *Bioprospecting for biological control agents for invasive tilapia in Australia, Biological Control, Volume 174, 2022, 105020, ISSN 1049-9644,*

Blasdel, Kim & McNamara, Bridgette & O'Brien, Daniel & Tachedjian, Mary & Boyd, Victoria & Dunn, Michael & Mee, Peter & Clayton, Simone & Gaburro, Julie & Smith, Ina & Gibney, Katherine & Tay, Ee & Hobbs, Emma & Waidyatillake, Nilakshi & Lynch, Stacey & Stinear, Timothy & Athan, Eugene. (2022). Environmental risk factors associated with the presence of *Mycobacterium ulcerans* in Victoria, Australia. *PLoS one.* 17. e0274627. 10.1371/journal.pone.0274627.

Jain HA, Agarwal V, Bansal C, Kumar A, Faheem, Mohammed M-U-R, Murugesan S, Simpson MM, Karpe AV, Chandra R, MacRaild CA, Styles IK, Peterson AL, Cooper MA, Kirkpatrick CMJ, Shah RM, Palombo EA, Trevaskis NL, Creek DJ, Vasani SS. CoviRx: A User-Friendly Interface for Systematic Down-Selection of Repurposed Drug Candidates for COVID-19. *Data.* 2022; 7(11):164.

Todd Shawn, Ma Yuefang, Ashander Liam M., Appukuttan Binoy, Michael Michael Z., Blenkinsop Timothy A., Yeh Steven, Marsh Glenn A., Smith Justine R. Brief Research Report: Ebola Virus Differentially Infects Human Iris and Retinal Pigment Epithelial Cells *Frontiers in Virology, Volume 2, 2022, 10.3389/fviro.2022.892394 ISSN=2673-818X*

McAuley, Alex. How Do You Solve a Problem Like the Zika?: Development of simple, low-cost methods for the detection of mosquito-borne pathogens in the Pacific. *Inspire Magazine.* 2022; 25:26-27.

Schmidt, T. L., Elfekih, S., Cao, L.-J., Wei, S.-J., Al-Fageeh, M. B., Nassar, M., Al-Malik, A., Hoffmann, A. A. (2022). Close kin dyads indicate intergenerational dispersal and barriers. *BioRxiv* 2022.01.18.476819 Now published in *The American Naturalist*

Arias MB, Hartle-Mougiou K, Taboada S, Vogler AP, Riesgo A, Elfekih S. Unveiling biogeographical patterns in the worldwide distributed *Ceratitis capitata* (medfly) using population genomics and microbiome composition. *Mol Ecol.* 2022 Sep;31(18):4866-4883.

Karawita, A.C., Cheng, Y., Chew, K.Y., Challgula, A., Kraus, R., Mueller, R.C., Tong, M.Z.W., Hulme, K.D., Beielefeldt-Ohmann, H., Steele, L.E., Wu, M., Sng, J., Noye, E., Bruxner, T.J., Au, G.G., Lowther, S., Blommaert, J., Suh, A., McCauley, A.J., Kaur, P., Dudchenko, O., Aiden, E., Fedrigo, O., Formenti, G., Mountcastle, J., Chow, W., Martin, F.J., Ogeh, D.N., Thiaud-Nissen, F., Howe, K., Collins, J., Tracey, A., Smith, J.,

Kuo, R.I., Renfree, M.B., Kimura, T., Sakoda, Y., McDougall, M., Spencer, H.G., Pyne, M., Tolf, C., Waldenström, J., Jarvis, E.D., Baker, M.L., Burt, D.W., Short, K.R., 2022. The swan genome and transcriptome: its not all black and white. *bioRxiv* 2022.05.02.490350. ?PREPRINT

Hayward, J. A., Tachedjian, M., Johnson, A., Irving, A. T., Gordon, T. B., Cui, J., Nicolas, A., Smith, I., Boyd, V., Marsh, G. A., Baker, M. L., Wang, L.-F., Tachedjian, G. (2022). Unique Evolution of Antiviral Tetherin in Bats. *Journal of Virology* 96 (20), e01152-22.

Cox-Witton, K., Baker, M. L., Edson, D., Peel, A. J., Welbergen, J. A., Field, H. (2021). Risk of SARS-CoV-2 transmission from humans to bats – An Australian assessment. *One Health*, 13, 100247.

Adamu, A.M., McNabb, L., Adikwu, A.A., Jibril, Y.J., Idoko, S.I., Turaki, A.U., Abalaka, S.E., Edeh, R.E., Egwu, G.O., Adah, M.I., Halpin, K., 2022. Henipavirus sero-surveillance in horses and pigs from Northern Nigeria. *Frontiers in Virology*, 2, 929715.

Rawlinson SM, Zhao T, Ardipradja K, Zhang Y, Veugelers PF, Harper JA, David CT, Sundaramoorthy V, Moseley GW. Henipaviruses and lyssaviruses target nucleolar Treacle protein and regulate ribosomal RNA synthesis. *Traffic*. 2022 Dec 8. doi: 10.1111/tra.12877. Epub ahead of print. PMID: 36479968

Connors MG, Chen H, Li H, Edmonds A, Smith KA, Gell C, Clitheroe K, Miller IM, Walker KL, Nunn JS, Nguyen L, Quinane LN, Andreoli CM, Galea JA, Quan B, Sandiford K, Wallis B, Anderson ML, Canziani EV, Craven J, Hakim RRC, Lowther R, Maneylaws C, Menz BA, Newman J, Perkins HD, Smith AR, Webber VH, Wishart D (2022) Citizen scientists track a charismatic carnivore: Mapping the spread and impact of the South African Mantis (Miomantidae, *Miomantis caffra*) in Australia. *Journal of Orthoptera Research* 31(1): 69-82.

Blasdell KR, Morand S, Laurance SGW, Doggett SL, Hahs A, Trinh K, Perera D, Firth C. Rats and the city: Implications of urbanization on zoonotic disease risk in Southeast Asia. *Proc Natl Acad Sci U S A*. 2022 Sep 27;119(39):e2112341119. doi: 10.1073/pnas.2112341119. Epub 2022 Sep 19. PMID: 36122224; PMCID: PMC9522346

Gierus L, Birand A, Bunting MD, Godahewa GI, Piltz SG, Oh KP, Piaggio AJ, Threadgill DW, Godwin J, Edwards O, Cassey P, Ross JV, Prowse TAA, Thomas PQ. Leveraging a natural murine meiotic drive to suppress invasive populations. *Proc Natl Acad Sci U S A*. 2022 Nov 15;119(46):e2213308119. doi: 10.1073/pnas.2213308119. Epub 2022 Nov 8. PMID: 36346842; PMCID: PMC9674240.

Adamson, L. S. R., Tasneem, N., Andreas, M. P., Close, W., Jenner, E. N., Szyszka, T. N., Young, R., Cheah, L. C., Norman, A., MacDermott-Opeskin, H. I., O'Mara, M. L., Sainsbury, F., Giessen, T. W., Lau, Y. H. (2022). Pore structure controls stability and molecular flux in engineered protein cages. *Science Advances*, 8 (5), eab17346.

Peng, B., Esquirol, L., Lu, Z., Shen, Q., Cheah, L. C., Howard, C. B., Scott, C., Trau, M., Dumsday, G., Vickers, C. E. (2022). An in vivo gene amplification system for high level expression in *Saccharomyces cerevisiae*. *Nature Communications* 13(1), 2895.

McNeale, D., Dashti, N., Cheah, L. C., & Sainsbury, F. (2022). Protein cargo encapsulation by virus-like particles: Strategies and applications. *WIREs Nanomedicine and Nanobiotechnology*, e1869.

b) International conferences:

Durr, P.A. and Graham, K. "Big challenges with using Big data for animal health surveillance". 4th International Conference on Animal Health Surveillance; 3-5 May 2022, Copenhagen, Denmark,

Williams, David. "Arbovirus Surveillance in Australia: Pivoting to JEV" The symposium Japanese Encephalitis Virus: Emerging Global Threat to Humans & Livestock; October 17th – 19th 2022; University of Georgia, USA; Delivered online.

Williams, David. Combatting African swine fever in the Pacific. In: 6th Congress of The European Association of Veterinary Laboratory Diagnosticians (EAVLD) 24-26 Oct 2022; Seville Spain; Delivered online

Stanger, Kelly. Lumpy Skin Disease - The Australian perspective. LSD workshop (Bill and Melinda Gates Foundation and GALVMed sponsored event); 17 Nov 2022; Dubai UAE

Singanallur Balasubramani, Nagendra. "WO(AH)W Gold is not precious anymore in diagnostic test development". In: Global Foot and

*Mouth Disease Research Alliance (GFRA) Webinar Series: 28 Sep 2022; Online Webinar*

*Singanallur Balasubramani, Nagendra. "Biosafety Measures for the Transport of Dangerous Biological Goods." In: Biorisk Management Workshop for Research Institutions with BSL-3 Laboratories; 19-20 Nov 2022, India, Delivered online.*

*Singanallur Balasubramani, Nagendra. CSIRO - Update and Vaccine efficacy studies. In: WOAHA/FAO FMD Reference Laboratories Network Annual Meeting; 29 Nov 2022 - 01 Dec 2022; Wageningen BioVeterinary Research, Lelystad, The Netherlands.*

*Moody, Nick. Preparing for transboundary aquatic animal diseases: The importance of appropriately evaluated and validated diagnostic assays and establishing effective laboratory networks. In: 14th Aquaculture Association of Southern Africa Conference, Keynote address; 11-14 Jul 2022; Stellenbosch University, South Africa. Delivered Online.*

*Riddell, Shane. SARS-CoV-2 decontamination - is it plane and simple? In: Swiss Biosafety Network 16th Applied Biosafety Meeting; 25-26 August 2022. Geneva, Switzerland*

*Vasan, Vasan. Some Perspectives on Data Science and Coronaviruses. In: FDA professional development webinar; 09 Jun 2022 USA Online Webinar*

*Waugh, Caryll. Proficiency testing and its role in supporting laboratory capability. In: WOAHA Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.*

*Coggon, Amelia and Wong, Frank. OFFLU contributions to WHO VCM on zoonotic influenza. In: WOAHA Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.*

*Wong Frank, Pavade Gounalan, and Coggon Amelia. Overview of the global and regional networks, data bases and information sharing platforms, including WAHIS and OFFLU. In: WOAHA Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.*

*Singanallur Balasubramani, Nagendra. Validation principals for new tests and technologies. In: WOAHA Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.*

*Williams, David. PoC testing guide. WOAHA Regional Laboratory Expert Meeting for African Swine Fever in Asia & the Pacific; 02 -04 Nov 2022; Geelong Australia.*

*Williams, David. Updating the Asia-Pacific laboratory algorithm. WOAHA Regional Laboratory Expert Meeting for African Swine Fever in Asia & the Pacific; 02 -04 Nov 2022; Geelong Australia.*

*Neave, Matthew. African swine fever virus: Genomics and sequencing. In: WOAHA Regional Laboratory Expert Meeting for African Swine Fever in Asia & the Pacific; 02 -04 Nov 2022; Geelong Australia.*

*Au, Gough. Characterisation of SARS-CoV-2 delta variant infection in a human ACE2 knock-in mouse model. In: CSIRO-FDA-UK-ICN Cutting Edge Virtual Symposium on Coronaviruses with "Disease X" Potential; 28-30 Sep 2022; Delivered Online.*

*Pharo, Elizabeth. Using ex vivo human lung models to characterise the innate immune responses of normal, asthma and COPD donors to SARS-CoV-2 variants of concern. In: CSIRO-FDA-UK-ICN Cutting Edge Virtual Symposium on Coronaviruses with "Disease X" Potential; 28-30 Sep 2022; Delivered Online.*

*Paulley, J.T. Balancing the Ongoing Operation of an Ageing Biocontainment Facility with Increasing Regulatory Oversight and Evolving Standards. In: BSL4ZNet International Conference Session 2; 16 Sep 2022; Online webinar.*

*Howard, Rod. Preparing for the ACDP Part Life Refit. International Veterinary Biosafety Workgroup Webinar; 21-22 Sep 2022; Online Webinar*

- Williams, David. *ACIAR One Health Surveillance project overview. LabCap PNG Project Launch and Inception Workshop; 29-30 Mar 2022; Papua New Guinea*
- Williams, David. *LabCap Project Objectives. In: PNG Project Launch and Inception Workshop; 29-30 Mar 2022; Papua New Guinea.*
- Williams, David. *Update on capacity building activities in the region. In: OIE Pacific Partners Meeting; 31 May 2022; Delivered Online.*
- Newberry, Kim. *User beware: Is your diagnostic test fit for its intended purpose. In: 2022 NRL Asian Summit; 23-24 May 2022; Delivered Online.*
- Drew, Trevor W. *HP PRRS. In: BaseCamp Asia Training Programme, Boehringer Ingelheim GmbH. Manila, Philippines, 13-24 March 2022; Delivered Online.*
- Drew, Trevor W. *Aujeszky's disease. In: Base Camp Asia Training Programme, Boehringer Ingelheim GmbH. Manila, Philippines, 13-24 March 2022; Delivered Online.*
- Drew, Trevor W. *Classical swine fever. In: BaseCamp Asia Training Programme, Boehringer Ingelheim GmbH. Manila, Philippines, 13-24 March 2022; Delivered Online.*
- Drew, Trevor W. *Foot & mouth disease in pigs. In: BaseCamp Asia Training Programme, Boehringer Ingelheim GmbH. Manila, Philippines, 13-24 March 2022; Delivered Online.*
- Drew, Trevor W. *African swine fever. In: BaseCamp Asia Training Programme, Boehringer Ingelheim GmbH. Manila Philippines, 13-24 March 2022; Delivered Online.*
- Drew, Trevor W. *Disease emergence – the drivers and the dogma. In: BSL4ZNet Cutting Edge Symposium on Coronaviruses with Disease X potential. 27-30 September 2022; Delivered Online.*
- Drew, Trevor W. *Dual use and gain of function: The responsibilities of scientists and institutions. In: BSL4Znet International Conference Session 4 – Advances in Biosafety, Biosecurity & Surveillance. 14 October 2022; Delivered Online.*
- Eagles, D. *The Importance of a One Health Approach to Preparedness and Response. In: ASEAN Defence Ministers' Meeting – Plus Chemical, Biological and Radiological (CBR) Conference, 12 October 2022.*
- Wong, Frank. *Genetic and antigenic diversity of H5 and H9 viruses. In: Influenza Virus Monitoring Coordination and Management Meeting, FAO-ECTAD and Government of Indonesia Directorate-General Livestock and Animal Health Services (DGLAHS), Jakarta, Indonesia. 24-25 January 2022; Delivered Online.*
- Wong, Frank. *PCR related activities in OFFLU 2021/22. In: 12th WHO Working Group Meeting for the Molecular Detection and Subtyping of Influenza Viruses and the use of Next Generation Sequencing (NGS) in GISRS. Istanbul, Turkey, 13-15 June 2022; Delivered Online.*
- Wong, Frank. *Swine Influenza Overview Australia. In: OFFLU Swine Influenza Virus Technical Activity Meeting. World Organization for Animal Health, Paris, France, 16 June 2022; Delivered Online.*
- Wong, Frank. *Australia country report on avian influenza and update on OFFLU technical activities. In: WOAHS Subregional Meeting on Avian Diseases in Southeast Asia. Tokyo, Japan, 18 July 2022; Delivered Online.*
- Wong, Frank. *Overview of OFFLU avian influenza technical activities 2021/2022. In: ASEAN One Health Bioinformatics Training Workshop for ASEAN and ZDAP Countries. FAO, SMART-ASEAN and Government of Indonesia Directorate-General Livestock and Animal Health Services (DGLAHS), 22-26 August 2022, Yogyakarta, Indonesia.*
- Wong, Frank. *Update on Avian influenza in Australia. In: WOAHS Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong, Australia.*



*Amelia Coggon and Wong, Frank. Overview of the OFFLU Avian Influenza Matching (AIM) activity. In: FAO Regional Consultation on Avian Influenza Surveillance in Asia; 02-04 November 2022; Geelong, Australia.*

c) National conferences:

*Singanallur Balasubramani, Nagendra. 'Systems approaches' in studying host-pathogen interactions. In: The Australasian Society for Microbiology – Veterinary Microbiology special interest group; 06 Sep 2022; Online Webinar.*

*Jansen van Vuren, Petrus. Developing a 'warm' vaccine to combat SARS-CoV-2 variants of concern and address inequity. In: 9th Australasian Vaccines & Immunotherapeutics Development (AVID) Meeting; 01-04 Apr 2022; Kingscliff, NSW*

*Edwards, Sarah. Preclinical evaluation at high containment. In: 9th Australasian Vaccines & Immunotherapeutics Development (AVID) Meeting; 01-04 Apr 2022; Kingscliff, NSW*

*Magor, Joshua; Directional Airflow Versus Differential Pressures – A cautionary tale of misdirection. In: Association of Biosafety for Australia and New Zealand (ABSANZ); 29 Jun 2022 - 01 Jul 2022; Adelaide SA.*

*Moody, Nick. Regulatory compliance – a science perspective. In: Association of Biosafety for Australia and New Zealand (ABSANZ); 29 Jun 2022 - 01 Jul 2022; Adelaide SA.*

*Paulley, J.T. 40 Years in the Making; ACDP's Purpose Built Biocontainment Facility and Lumpy Skin Disease Virus. In: Association of Biosafety for Australia and New Zealand (ABSANZ) Annual General Meeting. 9 Nov 2022; Presented Online.*

*Taylor, Grace. Establishing a husbandry model for the common ring tail possum. In: Australian New Zealand Laboratory Animal Association (ANZLAA); 21-23 Sep 2022; Campbelltown, Sydney, NSW.*

*Soldani, Elisha. COVID Transmission in Ferrets Conducted at BSL4. In: Australian New Zealand Laboratory Animal Association (ANZLAA); 21-23 Sep 2022; Campbelltown, Sydney, NSW.*

*Jansen van Vuren, Petrus. Novel molecular platforms for animal disease diagnosis and surveillance. In: Australian Pig Veterinarian Conference; 08-09 Sep 2022; Geelong Novotel.*

*Sunarto, Agus. Fish Viruses: Friend or Foe? In: Royal Society of Victoria, Melbourne 16 Sep 2022; Melbourne VIC.*

*Sunarto, Agus. Tilapia Biocontrol: Bioprospecting and Evaluation. In: Centre for Invasive Species Solutions (CISS) conference "CISS Celebrations"; 25-26th October 2022; Canberra ACT.*

*Grimaldi, Sheree. Non-surgical and reversible chemical castration to control oestrous and behavioural adversities in ferret colonies. In: Australian New Zealand Laboratory Animal Association (ANZLAA); 21-23 Sep 2022; Campbelltown, Sydney, NSW.*

*Waugh, Caryll. Proficiency testing and its role in supporting laboratory capability. In: DAFF Chief Veterinary Office Forum; 19 Aug 2022; Online Webinar*

*Waugh, Caryll. PT and collaboration in supporting laboratory capability and FMD preparedness. In Thermo-Fisher APJ (Asia Pacific Japan) Animal Health; 15 Nov 2022; Online Webinar.*

*McNabb, Leanne; Di Rubbo, Antonio; Cooke, Julie; Bowden, Tim. 'An IgM antibody capture ELISA for Japanese Encephalitis virus (JEV) in horses. In: Australian Association of Veterinary Laboratory Diagnosticians Conference (AAVLD); 17-18 Nov 2022; Launceston, Tasmania. Peter Kirkland; 2022.*

*Reeves, Andrea. Diagnosis of Bovine Tuberculosis in the laboratory at CSIRO-ACDP. In: Australian Association of Veterinary Laboratory Diagnosticians Conference (AAVLD); 17-18 Oct 2022; Launceston TAS.*

- Giles, Michelle. *Verification of an African Horse Sickness (AHS) Commercial ELISA for AHS Group Antibody Detection*. In: *Australian Association of Veterinary Laboratory Diagnosticians Conference (AAVLD)*; 17-18 Oct 2022; Launceston TAS.
- Di Rubbo Antonio. *A Simplified Approach to Serodiagnosis of Zoonotic Flaviviruses*. In: *Australian Association of Veterinary Laboratory Diagnosis (AAVLD)*; 17-18 Oct 2022; Launceston TAS.
- Klein, Reuben. *mRNA-specific real-time PCR detection of Cyprinid Herpesvirus 3*; In: *Australian Association of Veterinary Laboratory Diagnosis (AAVLD)*; 17-18 Oct 2022; Launceston TAS.
- Lynch, Stacey *African swine fever virus preparedness: Verifying sample collection workflows and establishing virus isolation methods*. In: *Australian Association of Veterinary Laboratory Diagnosis (AAVLD)*; 17-18 Oct 2022; Launceston TAS.
- Barr, Jenn. *Detection of filovirus reactive antibodies in Australian bat species*. In: *Australasian Virology Society AVS11 2022 Meeting*; 05-08 Dec 2022; Gold Coast QLD.
- Edwards, Sarah. *Neuropathogenesis: Mousing around with the henipaviruses*. In: *Australasian Virology Society AVS11 2022 Meeting*; 05-08 Dec 2022; Gold Coast QLD.
- Donnelly, Camilla. *Structural characterisation of the lyssavirus NOP complex reveals a highly conserved interface*. *Australasian Virology Society AVS11 2022 Meeting*; 05-08 Dec 2022; Gold Coast QLD.
- Ford, Mark. *Diagnostic Sampling and Testing*. *Emergency Animal Diseases (EAD) conference organised by the Australian Cattle Veterinarians branch of the Australian Veterinary Association*; 01 Dec 2022; Canberra ACT.
- Lopez-Denman, Adam. *REAPER: mosquito in vivo virus targeting to control viral transmission*. *Victorian infection and immunity network symposium*; 16 Nov 2022; Monash Institute of Pharmaceutical Sciences (MIPS) VIC.
- Klein, Reuben. *Establishing test capability for Panulirus argus 1 (PaV1)*. *Aquatic Animal Health Technical Health Forum*; 17 Nov 2022; Online Webinar.
- Williams, David. *Japanese encephalitis Outbreak in Australia 2022*. In: *2nd Australian Biosecurity Symposium*; 03-05 May 2022, Gold Coast QLD.
- Williams, David. *JEV Monitoring and Surveillance: mosquitoes and vertebrate hosts*. *CSIRO Health and Biosecurity Japanese encephalitis workshop*; 20 Apr 2022; Geelong VIC.
- Williams, David. *JEV in Australia*. In: *CSIRO Health and Biosecurity Japanese encephalitis workshop*; 20 Apr 2022; Geelong VIC.
- Lynch, Stacey. *The African swine fever pandemic: on our doorstep needing vaccine solutions*. In: *Australian Society Immunology: Wild and Comparative Immunology Special Interest Group*; 28th Nov 2022. *The University of Melbourne* VIC.
- Eagles, D. *Future Focused: How science and technology are paving the way forward*. *Keynote Presentation*. In: *2nd Australian Biosecurity Symposium*; 03-05 May 2022, Gold Coast QLD.
- Eagles, D. *Henipavirus Outbreak Investigation in the Philippines – Perspectives from the Field and the Laboratory*. In: *Foreign Animal Disease and Outbreak Preparedness Workshop*, 20 May 2022; Sydney NSW.
- Wong, Frank. *Avian influenza outbreak in Victoria 2020: Virus genome characterisation and government and industry consultation*. In: *Animal Pathology Standards Program (AAPSP) and Australian Society for Veterinary Pathology (ASVP) Foreign Animal Disease and Outbreak Preparedness Workshop*. *Davis-Thompson Foundation Webinar Series*, 19 May 2022; *Delivered Online*.
- 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: