

OIE Collaborating Centres Reports Activities

Activities in 2018

This report has been submitted : 2019-01-17 06:55:06

Title of collaborating centre:	Laboratory Capacity Building
Address of Collaborating Centre:	CSIRO Livestock Industries 5 Portarlington Road Private Bag 24 (Ryrie Street) Geelong 3220, Victoria AUSTRALIA
Tel.:	+61-3 52 27 50 00
Fax:	+61-3 52 27 55 55
E-mail address:	sam.mccullough@csiro.au
Website:	www.csiro.au
Name of Director of Institute (Responsible Official):	Prof. Trevor Drew - Director
Name (including Title and Position) of Head of the Collaborating Centre (formally OIE Contact Point):	Dr Sam McCullough- Deputy Director
Name of writer:	Dr Sam McCullough

ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories

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

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

Training, capacity building	
Title of activity	Scope
Training course on post mortem techniques and gross pathology and epidemiological investigations of animal disease	Through support from the Crawford Fund Australia, provision of a series of 4 three-day training workshops in Thailand and Bhutan.
SIMA - Austral Chile Project - Integrated Ecosystem-based Sanitary and Environmental Management System for Aquaculture	The aim of the Sanitary Diagnostics and Biosecurity work package was to enhance Chile's capabilities in aquatic animal disease diagnosis, specifically virus isolation and molecular diagnostics for the detection and identification of significant pathogens of major aquatic animals cultured in Chile
FAO Backstopping missions to participating Laboratories in Asia - 2018	Technical Support in country to laboratory personnel to strengthen laboratory diagnostic capacity and ensure implementation of a standardised protocol for diagnosis for priority animal diseases under accredited quality assurance system. The services will contribute to the reduced animal disease and associated human health risks, by enhancing capacity to implement and maintain national and regional approaches to animal disease prevention and control which will contribute to increased sustainable livestock production
Regional PT provision for FAO, OIE and OFFLU programs	<p>To develop and distribute Proficiency Testing panels to assess the capability of national and regional laboratories to detect and characterise virus isolates of key targeted emergency animal health diseases.</p> <p>To provide technical consult for National country laboratories to provide and prepare PT panels to provincial laboratories within individual countries to build and maintain diagnostic capability for key emergency animal health diseases</p>
Zoonoses	
Title of activity	Scope

Diagnostic preparedness for circulating and emerging avian influenza strains from disease outbreaks and surveillance	AAHL provides technical support in country to laboratory personnel to strengthen laboratory diagnostic capacity and ensure implementation of a standardised protocol for diagnosis for priority animal diseases under accredited quality assurance system. The services will contribute to the reduced animal disease and associated human health risks, by enhancing capacity to implement and maintain national and regional approaches to animal disease prevention and control and contribute to increased sustainable livestock production
Development of a regional strategy for bioinformatics to support existing prevention and control strategies on emerging pandemic threat from animal and zoonotic diseases within the region	AAHL serves as a key OFFLU reference lab partner to develop and improve national and regional bioinformatics capacities to ensure the generation of high-quality sequence data, to strengthen national and regional bioinformatics capacities to analyze sequence and associated epidemiological data, to facilitate data and information sharing at the regional level, and to improve the interpretation and communication of results to guide policy making. Under OIE and FAO Programs, AAHL contributed to the development of pilot bioinformatics training modules that align with a regional strategy for bioinformatics to support existing prevention and control strategies on emerging pandemic threats from animal and zoonotic diseases within the Asia-Pacific region.
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Determining the susceptibility of Australian <i>Penaeus monodon</i> and <i>P. merguensis</i> to newly identified enzootic (YHV7) and exotic (YHV8 and YHV10) Yellow head virus (YHV) genotypes.	Studies to determine the pathogenicity of newly-detected yellow head complex viruses to giant tiger prawns, <i>Penaeus monodon</i> , and banana prawns, <i>Fenneropenaeus merguensis</i> .
Comparative pathogenicity of exotic AHPND and the presumptive bacterial hepatopancreatitis detected in farmed <i>Penaeus monodon</i>	Studies to determine the pathogenicity of AHPND-causing bacteria in giant tiger prawns, <i>Penaeus monodon</i> , and banana prawns, <i>Fenneropenaeus merguensis</i> .
Influenza Virus Monitoring (IVM) Online system, for molecular surveillance information management	AAHL provides technical assistance to a USAID supported and FAO managed project fostering the development of a molecular surveillance information management system, "IVM Online", to detect and monitor the occurrence of HxNx variants of the avian, swine and equine influenza viruses in Indonesia. The IVM Online is an advanced national data management and analysis platform used by the Animal Health Department within the Indonesian Ministry of Agriculture. The algorithms within IVM Online also provide phylogenetic and antigenic analysis for detected H5N1 AI viruses to facilitate national decisions on vaccine candidate strains and challenge strains that are appropriate to the latest identified circulating strains.
Provision of technical support to the National Institute of Animal Health (NIAH) Bangkok Thailand under the OIE supported twinning project to enhance and deliver emerging infectious diseases (EID) preparedness in the ASEAN Region	AAHL is providing technical support to NIAH under an OIE twinning project that will conclude in March 2019. Thereafter NIAH will make an application to the OIE to become a Collaborating Centre for New and Emerging Diseases
Provision of technical support to the Regional Animal Health Office No. 6 (RAHO-6) Laboratory, Ho Chi Minh City, Vietnam under the OIE supported twinning project to enhance diagnosis and characterization of emerging diseases (EID) of pigs in the South east Asian region	AAHL is providing technical support to RAHO-6 under an OIE twinning project that will conclude in December 2019. This will support RAHO-6 in its efforts towards an application to be a future OIE Reference Laboratory for swine
Investigations into Newcastle disease pathogenicity	Using RNAseq to compare the immune response of chickens to Australian Newcastle disease viruses of varying pathogenicity.

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

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

Proposal title	Scope/Content	Applicable area
OIE ad hoc Group on the OIE Manual of Diagnostic Tests for Aquatic Animals	Review specific issues in the Aquatic Manual to improve consistency among chapters and improve the quality and completeness of information	<input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare
OIE ad hoc Group on tilapia lake virus	Evaluate published and unpublished methods for detection of TiLV, describe the level of validation of each method and determine additional validation requirements, recommend any additional assays that may need to be developed and facilitate the sourcing and distribution of well-characterised positive control material	<input checked="" type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare

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

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

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

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Global Foot-and-Mouth Disease Research Alliance (GRFA)	A global network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	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	A global network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	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 African Swine Fever (ASF).

EVAg	A global network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	A coordinated global network that mobilises expertise in virology to amplify, characterize, standardise, authenticate distribute, track, collect viruses and derived products
VetBioNet	A global network	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	The project forms a network of facilities researching animal diseases (including diseases which can spread to humans) in secure facilities. It will develop new technologies for this which go considerably beyond the current state of the art as well as activities such as standardization of protocols and best practices as well as connecting with similar institutes outside Europe. New tools will be developed for remote monitoring of the animals' health and welfare.
Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet)	A global network	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	<p>BSL4ZNet is coordinating efforts to establish and sustain a BSL4 trusted partnership Network among Canada, The United States of America, Australia, the United Kingdom and Germany, in order to strengthen coordination, improve knowledge sharing and leverage integrated capacity for diagnostics, research and training.</p> <p>BSL4ZNet will focus on five priority areas: institutional cooperation, scientific excellence, world-class personnel, knowledge sharing and international response</p>

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

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
OFFLU	A global network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Coordination of the science underpinning the management and control of influenza in animals
OIE Aquatic Animal Health Standards Commission	A global network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Collaboration to ensure the Aquatic Animal Health Code (the Aquatic Code) and Manual of Diagnostic Tests for Aquatic Animals (the Aquatic Manual) reflect current scientific information

OIE ad hoc Group on susceptibility of fish species to infection with OIE listed diseases	A global network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Coordination of the science underpinning the management and control of OIE-listed diseases of fish species
WHO	A Global Network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Tripartite (OIE, FAO, WHO) Zoonoses Guide coordination investigation and response working
WHO	A Global Network	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East	Working group on Molecular Detection, Subtyping and Characterisation of Influenza Viruses

ToR: To place expert consultants at the disposal of the OIE.

5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?

Yes

Name of expert	Kind of consultancy	Subject
Dr Nick Moody	Invited Participant	OIE Aquatic Animal Health Standards Commission
Dr Kim Halpin	Invited Participant	Nipah virus as part of the WHO's research and Development roadmaps process for priority diseases
Dr Mark Crane	Invited Participant	Fourth meeting of the OIE ad hoc group on Susceptibility of fish species to infection with OIE listed diseases
Dr Debbie Eagles	Speaker	Regional Workshop on Vector Borne Diseases in the Asia-Pacific region.
Dr Lynda Wright	Speaker	OIE Regional Seminar for OIE National Focal Points for Veterinary Laboratories
Dr John Bingham	Invited Participant	2018 launching Meeting of the OIE Twinning Project for Rabies between Anses-Nancy and AHRI
Dr Mark Crane	Invited Participant	OIE ad hoc group on susceptibility of fish species to infection with OIE listed diseases

Dr Nick Moody	Invited Participant	OIE Regional Expert Consultation Meeting on Aquatic Animal Diseases Diagnosis and Control
Dr Frank Wong	Member of the OFFLU Swine Influenza Group	WHO consultation for the composition of Influenza Virus vaccine, the work of the OFFLU network, various meetings and consultations
Dr John Allen, Dr Jianning Wang, Dr Anthony Keyburn, Dr Kim Halpin, Dr David Williams, Dr Tim Bowden	Invited Participants	Various meetings and consultations as part of the OIE Twinning Project with NIAH Thailand and RAHO-6 Vietnam
Dr Nagendra Singanallur	Meeting Participant	24th OIE Sub regional Representation for South Asia Sub-Commission meeting – FMD Exclusion testing and LEADDR network activities for FMD
Dr Wilna Vosloo	Meeting Participant	OIE ad hoc group on evaluation of FMD status of members
Dr Wilna Vosloo	Invited Participant	Mission to monitor the progress of an endorsed official control programme for FMD of an OIE member state

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

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

Yes

- a) Technical visits: 285
- b) Seminars: 1668
- c) Hands-on training courses: 395
- 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	Backstopping mission at the National Centre for Animal Health as part of the Technical Backstopping Missions to Participating Laboratories in Asia LoA	Bhutan	6
C	Conduct PT training under the OIE twinning project	Thailand	30
A	AMR method comparison project under the OIE Twinning project	Thailand	4

A	NGS development component of the OIE Twinning project for new emerging diseases	Thailand	4
A	RAHO6 as part of the newly approved OIE Twinning project	Vietnam	10
A	SIMA-Austral Collaborative Project (WP4) to meet with Sernapesca colleagues and asses the competence of the commercial testing laboratories	Chile	30
C	IVM Network meeting and training as part of FAO IVM LOA 9	Indonesia	25
C	Network positive control standardised material workshop as part of FAO IVM LOA 9	Japan	30
B	10th International Symposium on Avian Influenza	UK	100
B	Scientific programme committee for the 10th International Symposium for Avian Influenza	UK	20
C	Diagnostic test validation workshop as part of the OIE Twinning project	Vietnam	40
A	AMR project as part of the OIE Twinning project	Bhutan	4
B	Symposium on Prevention and Control of Foot and Mouth Disease and Avian Influenza meeting	Republic of Korea	150
C	Molecular testing for aquatic animal disease agents	Thailand	30
A	National Proficiency Test on Avian Influenza serology test (AI)	Jogyakarta	5
A	Serology test and PCR Newcastle Disease	Indonesia	14
B	Recent advances in Emergency Animal Disease Symposium 2017	Australia	110
B	Early Detection of Transboundary Animal Diseases	Various	40
A	InterVac Advisory Committee	Canada	10
A	Backstopping mission at the National Institute of Animal Health	Japan	10
A	Backstopping mission at the Mongolia State Central Veterinary Laboratory (SCVL)	Mongolia	10
B	8th International Symposium on Aquatic Animal Health (ISAAH)	Canada	400

B	Emergency African Swine Fever (ASF) Countermeasure Workshop	Thailand	70
C	Pathology courses on euthanasia and post mortem skills	Thailand	90
A	Backstopping mission at the Veterinary Laboratory Services Unit, Brunei Agriculture Research Centre	Brunei	10
A	Backstopping mission at the National Centre for Animal Health	Bhutan	10
A	Development of a swine diagnostic testing algorithm as part of the OIE Twinning project	Vietnam	8
B	5th Meeting of the SAARC Laboratory Directors' Forum - AI	Thailand	28
B	10th National Conference on Veterinary Diagnosis	Brazil	150
C	Animal Disease Investigation courses	Thailand/Bhutan	85

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

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

No

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

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

a) Articles published in peer-reviewed journals: 30

1 Artois, Jean; Blasdel, Kim; Duong, Veasna; Philippe, Buchy; Hul, Vibol; Morand, Serge; et al. Effects of mammarenavirus infection (Wēnzhōu virus) on the morphology of *Rattus exulans*. *Infection, Genetics and Evolution*. 2018; 63:404-409.

2 Baker, Michelle. Tools to study pathogen-host interactions in bats. *Virus Research*. 2018; 248:5-12. <https://doi.org/10.1016/j.virusres.2018.02.013>

3 Banerjee, A.; Misra, V.; Schountz, T.; Baker, Michelle. Tools to study pathogen-host interactions in wildlife: Dissecting bats as viral reservoirs. *Virus Research*. 2018; 248:5-12. <https://doi.org/10.1016/j.virusres.2018.02.013>

4 Barr, Jenn; Todd, Shawn; Cramer, Gary; Foord, Adam; Marsh, Glenn; Frazer, Leah; et al. Animal infection studies of two recently discovered African bat paramyxoviruses, Achimota 1 and Achimota 2. *Scientific Reports*. 2018; 8:Article no. 12744. <https://doi.org/10.1038/s41598-018-31193-z>

5 Berto, Alessandro; Anh, P.H; Carrique-Mas, J.J; Simmonds, P; Van Cuong, N; Tue, N.T.; et al. Detection of potentially novel paramyxovirus and coronavirus viral RNA in bats and rats in the Mekong Delta region of southern Viet Nam. *Zoonoses Public Health*. 2018; 65(1):30-42. <https://doi.org/10.1111/zph.12362>

6 Blasdel, Kim; Walker, Peter. Taxonomy of the order Mononegavirales: update 2018. *Archives of Virology*. 2018;

163(8):2283-2294.

7 Certoma, Andrea; Lunt, Ross; Vosloo, Wilna; Smith, Ina; Colling, Axel; Williams, David; et al. Assessment of a rabies virus rapid diagnostic test for the detection of Australian bat lyssavirus. *Tropical Medicine and Infectious Disease*. 2018; 3(4 NA):E109. <https://doi.org/10.3390/tropicalmed3040109>

8 Colling, Axel; Lunt, Ross; Bergfeld, Jemma; McNabb, Leanne; Newberry, Kim; Juzva, Susan; et al. A network approach for provisional assay recognition of a Hendra virus antibody ELISA – test validation with low sample numbers from infected horses. *Journal of Veterinary Diagnostic Investigations*. 2018; 30(3):362-369. <https://doi.org/10.1177/1040638718760102>

9 Gaburro, Julie; Bhatti, Asim; Harper, Jenni; Jeanne, Isabelle; Dearnley, Megan; Green, Diane; et al. Neurotropism and behavioral changes associated with Zika infection in the vector *Aedes aegypti*. *Emerging Microbes and Infections*. 2018; 7(1):Article no. 68. <https://doi.org/10.1038/s41426-018-0069-2>

10 Gaburro, Julie; Bhatti, Asim; Sundaramoorthy, Vinod; Dearnley, Megan; Green, Diane; Nahavandi, Saeid; et al. Zika virus-induced hyper excitation precedes death of mouse primary neuron. *Virology Journal*. 2018; 15:Article no 79. <https://doi.org/10.1186/s12985-018-0989-4>

11 Gaburro, Julie; Duchemin, Jean-Bernard; Paradkar, Prasad; Nahavandi, Saeid; Bhatti, Asim. Electrophysiological evidence of RML12 mosquito cell line towards neuronal differentiation by 20-hydroxyecdysone. *Scientific Reports*. 2018; 8(1 -):10109. <https://doi.org/10.1038/s41598-018-28357-2>

12 Gaburro, Julie; Paradkar, Prasad; Klein, Melissa; Bhatti, Asim; Nahavandi, Saeid; Duchemin, Jean-Bernard. Dengue virus infection changes *Aedes aegypti* oviposition olfactory preferences. *Scientific Reports*. 2018; 8:13179. <https://doi.org/10.1038/s41598-018-31608-x>

13 Hayes, Keith; Hosack, Geoff; Dana, Genya; Foster, Scott; Ford, Jessica; Thresher, Ron; et al. Identifying and detecting potentially adverse ecological outcomes associated with the release of gene-drive modified organisms. *Journal of Responsible Innovation*. 2018; 5(Suppl 1):S139-S158. <https://doi.org/10.1080/23299460.2017.1415585>

14 Horsington, Jacquelyn; Nfon, Charles; Bittner, Hilary; Durr, Peter; Singanallur Balasubramani, Nagendra; Alexandersen, Soren; et al. The protective capacity of high payload A22 IRQ vaccine in sheep against direct-contact challenge with a heterologous, contemporary A strain from South East Asia. *PLoS ONE*. 2018; 13(6):e0195302. <https://doi.org/10.1371/journal.pone.0195302>

15 Horsington, Jacquelyn; Nfon, Charles; Gonzales, Jose; Singanallur Balasubramani, Nagendra; Bittner, Hilary; Vosloo, Wilna. Protection in Sheep Against Heterologous Challenge with Serotype Asia-1 Foot-and-Mouth Disease Virus Using High Potency Vaccine. *Vaccine*. 2018; 36(41):6095.

16 Jenkins, Kristie; Cooper, Caitlin; Challagulla, Arjun; Tizard, Mark; Doran, Tim. Innovative approaches to genome editing in avian species. *Journal of Animal Science and Biotechnology*. 2018; 9(15 0):7. <https://doi.org/10.1186/s40104-018-0231-7>

17 Klein, Reuben; Middleton, Deborah. Virus-neutralising antibody responses in horses following vaccination with Equivac® HeV: a field study. *Australian Veterinary Journal*. 2018; 96(5):161-166. <https://doi.org/10.1111/avj.12689>

18 Kohl, Claudia; Tachedjian, Mary; Todd, Shawn; Monaghan, Paul; Boyd, Vicky; Marsh, Glenn; et al. Hervey virus: Study on co-circulation with Henipaviruses in Pteropid bats within their distribution range from Australia to Africa. *PLoS ONE*. 2018; 13(2):e0191933. <https://doi.org/10.1371/journal.pone.0191933>

19 McKimm-Breschkin, Jenny; Barrett, Sue; Wong, Frank; Pudjiatmoko, Pak; Azhar, Muhammad; Selleck, Paul; et al. Identification of Indonesia clade 2.1 highly pathogenic influenza A (H5N1) viruses with N294D and S246N neuraminidase substitutions with further reduce oseltamivir susceptibility. *Antiviral Research*. 2018; 153:95-100.

20 Neave, Matthew; Hall, Robyn; Huang, Nina; McColl, Ken; Kerr, Peter; Hoehn, Marion; et al. Robust innate immunity of young rabbits mediates resistance to rabbit haemorrhagic disease caused by *Lagovirus europaeus* GI.1 but not GI.2. *Viruses*. 2018; 10:512. <https://doi.org/10.3390/v10090512>

21 O'Brien, Daniel; Athan, Eugene; Blasdel, Kim; De Barro, Paul. Tackling the worsening epidemic of Buruli ulcer in Australia in an information void: time for an urgent scientific response. *Medical Journal of Australia*. 2018; 208(7):287-289. <https://doi.org/10.5694/mja17.00879>

22 Rawlinson, Stephen; Zhao, Tianyue; Rozario, Ashley; Rootes, Chris; McMillan, Paul; Purcell, Anthony; et al. Viral regulation of host cell biology by hijacking of the nucleolar DNA-damage response. *Nature Communications*. 2018; 9(1):305. <https://doi.org/10.1038/s41467-018-05354-7>

23 Smith, Ina; Tachedjian, Mary; Marsh, Glenn; Eagles, Debbie. Reemergence of Reston ebolavirus in *Cynomolgus* Monkeys, the Philippines, 2015. *Emerging Infectious Diseases*. 2018; 24(7):1285-1291. <https://doi.org/10.3201/eid2407.171234>

24 Stephenson, Garth; Morris, Kirsten; O'Neil, Terri; Bruce, Matt; Strom, David; Bean, Andrew. Characterisation of the porcine cytokines which activate the CD131(beta c) common sub-unit, for potential immune-augmentation. *Cytokine*. 2018; 102:131-140.

25 Tachedjian, Mary; Baker, Michelle. Differential Evolution of Antiretroviral Restriction Factors in Pteropid Bats as Revealed by APOBEC3 Gene Complexity. *Molecular Biology Evolution*. 2018; 35(7):1626-1637. <https://doi.org/10.1093/molbev/msy048>

26 Walker, Peter; Blasdel, Kim; Calisher, Charles; Dietzgen, Ralph; Kondo, Hideki; Kurath, Gael; et al. ICTV Virus Taxonomy Profile: Rhabdoviridae. *Journal of General Virology*. 2018; 99(4):447-448.

- 27 Waneesorn, Jarurin; Wibowo, Nani; Bingham, John; Middelberg, Anton; Lua, Linda. Structural-based designed modular capsomere comprising HA1 for low-cost poultry influenza vaccination. *Vaccine*. 2018; 36(22):3064-3071. <https://doi.org/10.1016/j.vaccine.2016.11.058>
- 28 Wang, Jianning; Chen, Honglei; Shan, songhua; Cramer, Sandra; Walker, Som; Bergfeld, Jemma. A novel group A rotavirus associated with acute illness and hepatic necrosis in pigeons (*Columba livia*), in Australia. *PLoS ONE*. 2018; 13(9):Article no. e0203853. <https://doi.org/10.1371/journal.pone.0203853>
- 29 Williams, David. The Molecular Epidemiology of Murray Valley Encephalitis Virus in Australasia. *Microbiology Australia*. 2018; 39(2 NA):109-111.
- 30 Wong, Frank; Deng, Yi-Mo; Komadina, Naomi; Barr, Ian; Donato, Celeste; Deng, Yi Mo; et al. Divergent human origin influenza viruses detected in Australian swine populations. *Journal of Virology*. 2018; 90(15):1-25. <https://doi.org/10.1128/JVI.00316-18>

b) International conferences: 10

- 1 Corbeil, Serge; Neave, Matthew; McColl, Ken; Crane, Mark. Differentially expressed genes in *Halotis iris* (paua abalone) associated with *Halotid herpesvirus* challenge. In: 8th International Symposium on Aquatic Animal Health; 2-6 September 2018; Charlottetown, Prince Edward Island, Canada. American Fisheries Society; 2018. 1.
- 2 Horsington, Jacquelyn; Eschbaumer, Michael; Singanallur Balasubramani, Nagendra; Vosloo, Wilna. Inactivation of Foot-and-Mouth Disease Virus in Tissue Samples to Ensure Safe Transport From Infected Premises to Diagnostic Laboratories. In: ESVV; August 2018; Vienna, Austria. ESVV; 2018. ppt presentation.
- 3 Horsington, Jacquelyn; Van den Born, Erwin; Singanallur Balasubramani, Nagendra; Vosloo, Wilna. Intradermal Application of Foot-and-Mouth Disease Vaccines for Pigs. In: EUFMD; October 2018; Italy. EUFMD; 2018. ppt presentation.
- 4 Jordan, Megan; Hair, S; Besier, Shane; Bunce, Michael; Williams, David; Buller, Nicky. Targeted Amplicon Next Generation Sequencing for Screening and Genotyping of Pathogens in Cattle. In: Global Microbiome 2018; 17th August 2018; Perth. NA; 2018. NA.
- 5 Singanallur Balasubramani, Nagendra; Nampanya, Sonevilay; Soukvilay, Vilayvanh; Keokhamphet, Chattouphone; Khounsy, Syseng; Windsor, Peter; et al. Sero-Surveillance for Foot and Mouth Disease in Smallholder Goat Production in Lao PDR, 2017-2018. In: Keith Sumption, editor/s. EuFMD Open Session 2018; 29-31 October 2018; Puglia, Italy. Borgo Egnazia, Puglia, Italy: EuFMD/FAO, Rome; 2018. 214-215.
- 6 Sunarto, Agus; Neave, Matthew; McColl, Ken. Koi Herpesvirus in Carp: The Tale of Two Countries. In: Agus Sunarto, Maskur and Rohana Subasinghe, editor/s. The 10th Symposium in Diseases in Asian Aquaculture; 28 August - 1 September 2017; Bali, Indonesia. Fish Health Section - Asian Fisheries Society; 2018. 48.
- 7 Williams, David; Certoma, Andrea; Rowe, Brenton; Johnson, Dayna; Gimenez-Lirola, Luis; Zimmerman, Jeffrey; et al. Rapid detection and epidemiological surveillance of African swine fever using oral fluid. In: 2016 ZADD Vaccine Workshop & CEEZAD Annual Meeting; 31 Oct - 2 Nov 2016; Nebraska City. NA; 2018. NA.
- 8 Williams, David; Certoma, Andrea; Rowe, Brenton; Johnson, Dayna; Sastre, Patricia; Redondo, Elena; et al. An evaluation of commercial ELISAs and PCR tests for detection of African swine fever infection using oral fluids and blood. In: 4th GARA Scientific Workshop; 12-14 April 2018; Cagliari, Sardinia. NA; 2018. NA.
- 9 Williams, David; Jaing, Crystal; Rowland, Raymond; Allen, Jonathan; Certoma, Andrea; Thissen, James; et al. Gene expression analysis of whole blood from pigs infected with different pathotypes of African swine fever virus. In: 4th GARA Scientific Workshop; 12-14 April 2018; Cagliari, Sardinia. NA; 2018. NA.
- 10 Williams, David; Jaing, Crystal; Rowland, Raymond; Allen, Jonathan; Certoma, Andrea; Thissen, James; et al. The Ups and Downs of African swine fever virus (ASFV) infection: gene expression analysis of whole blood RNA from pigs infected with different pathotypes of ASFV. In: 7th Wuhan International Symposium on Modern Virology (WISOM); 17-20 Oct 2017; Wuhan, China. Wuhan University; 2018. NA

c) National conferences: 5

- 1 Mohr, Peter; Moody, Nick; Crane, Mark; Eagles, Debbie; Wesche, Stephen; Beattie, Kerrod; et al. White spot disease outbreak in farmed prawns in Queensland, Australia in 2016. In: Society for Invertebrate Pathology; 12-16th August 2018; Queensland. SIP2018; 2018. 1.
- 2 Stevens, Vicky; Broz, Ivano; Davies, Kelly; Wong, Frank. Characterisation of Influenza A viruses by Deep sequencing: Comparisons of Data Analysis methods. In: Australian Association of Veterinary Laboratory Diagnosticians; 15-16 November 2018; Melbourne Convention and Exhibition Centre, South Wharf, Melbourne. N/A; 2018. 21.
- 3 Sundaramoorthy, Vinod; Godde, Nathan; Farr, Ryan; Green, Diane; Laslett, Andrew; Bingham, John; et al. Stem cell-derived human neuronal models to study neurotrophic viruses. In: International Society for Stem Cell Research; June 2018; Melbourne. CSIRO; 2018. 1.
- 4 Williams, David, editor/s. African swine fever: a devastating disease of pigs. Australian Veterinary Association Annual Conference; 13-18 May 2018; Brisbane. Australian Veterinary Association; 2018.
- 5 Williams, David, editor/s. Equine arboviruses of Australia. Australian Veterinary Association Annual Conference; 13-18 May 2018; Brisbane. Australian Veterinary Association; 2018.

d) Other

(Provide website address or link to appropriate information): 2

Reports/Reports chapters;

1. Babcock, Russ; Baird, Mark; Cannard, Toni; Crane, Mark; Herzfeld, Mike; Pillans, Richard; et al. Review of Port of Gladstone Western Basin Strategic Dredging and Disposal Project. Brisbane: CSIRO; 2018. csiro:EP178904.

2. Luczo, Jasmina; Tachedjian, Mary; Harper, Jenni; Butler, Jeff; Sapats, Sandra; Lowther, Sue; et al. Evolution of high pathogenicity of H5 avian influenza virus: haemagglutinin cleavage site selection of reverse-genetics mutants during passage in chickens. www.nature.com/scientificreports: Springer Nature; 2018. csiro:EP186821.

Following on from ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries Question number 6, there was no further option for additional lines. Therefore please see Q6 continued below;

A SIMA-Austral Collaborative Project (WP4)

Chile

30

B 61st American Biological Safety Association (ABSA)

Various

600

C Provide technical support for the implementation of the National Proficiency Test on AI serology test

Jogyakarta

5

A 2018 Regional Animal Health Laboratory Technical Advisory Group (LabTAG) meeting

Singapore 40

A Backstopping mission at the Veterinary Research Institute

Sri Lanka 10

C Balitvet workshop - emerging and re-emerging animal diseases

Indonesia

35

A Final influenza virus monitoring (IVM) Network Meeting

Indonesia 40

C Workshop on Interpretation and Validation of Diagnostic Tests in Veterinary Science

Thailand

25

A Backstopping mission at the National Institute of High Security Animal Diseases

India

10

A Backstopping mission at the Official Laboratory of Veterinary, Food and Phytopathology of New Caledonia (LNC)

New Caledonia 10

A Backstopping mission at the Central Veterinary Laboratory

Nepal 10