WOAH Collaborative Centre Reports Activities 2023
Activities in 2023
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Centre Information

Title of WOAH Collaborating Centre	Risk Analysis and Modelling
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Website:	https://www.rvc.ac.uk/research/risk-analysis-and-modelling
Name Director of Institute (Responsible Official):	Professor Stuart Reid (RVC), Mr David Holdsworth (APHA)
Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Professor Stuart Reid, President & Principal, Royal Veterinary College
Name of the writer:	Professor Emma Snary (APHA), Professor Javier Guitian (RVC)

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 WOAH

Category	Title of activity	Scope
Epidemiology, surveillance, risk assessment, (true)	Publication of special edition of WOAH Scientific Review	Publication of WOAH Sci. Tech. Review, comprising 23 papers. Includes studies ranging from the food animal sector to wildlife species and companion animal programmes.
Training, capacity building (true)	Ongoing seminar series	Regular participation in weekly (RVC) or fortnightly (APHA) seminars addressing various technical topics.
Wildlife (true)	Providing data and analysis of wild boar ASF cases in regard to local risk factors.	Participated in a multi-institute collation of risk factors and relationship with predicted wild boar density and habitat.
Epidemiology, surveillance, risk assessment, (true)	Study carried out on vaccination strategies for eradication of PPR	Paper describing the impact of flock heterogeneity on the effectiveness of vaccination for eradication published: https://pubmed.ncbi.nlm.nih.gov/37935076/ of relevance to global effort for PPR eradication.

Epidemiology, surveillance, risk assessment, (true)	Epidemiological input to the development of TB cattle vaccine rollout policy for the UK	Options paper for design of evaluation, sample size calculations for different options.
Epidemiology, surveillance, risk assessment, (true)	Chair of the Bureau of the PPR Global Research and Expertise Network. Membership of the PPR Global Research and Expertise Network.	Chairing of the Bureau leading on preparation of the scientific programme for the annual meeting of the PPR Global Eradication Program in India, November 2023. Ongoing membership of the PPR Global Research and Expertise Network.
Epidemiology, surveillance, risk assessment, (true)	Support to UK Department for Environment, Food & Rural Affairs (Defra) stakeholder group - TB partnership (academic, industry, other stakeholders)	Sharing of knowledge and expertise, advice, provision of data and epidemiological analysis in the area of Bovine Tuberculosis.
Epidemiology, surveillance, risk assessment, (true)	Two members on the expert group to the WOAH observatory	Membership of WOAH expert group. Review and input to WOAH observatory theme and annual reports.
Epidemiology, surveillance, risk assessment, (true)	Meetings and workshop for UK's Defence Science and Technology Laboratory project in Accra, Ghana	Review of existing disease surveillance system by APHA staff with selected stakeholders to map the surveillance system under evaluation and to define the scope of the evaluation; make effective contacts and networking with the in-country surveillance stakeholders beyond the attendants to the workshop (e.g. FAO, regional laboratories, etc).
Epidemiology, surveillance, risk assessment, (true)	APHA staff led workshop at the annual scientific conference of the European College of Veterinary Public Health (ECVPH), 2023	Interactive workshop on the prediction and prevention of AI from wild to kept birds.
Epidemiology, surveillance, risk assessment, (true)	Virtual bovine TB direction of transmission workshop	Organised by the APHA TB Whole Genome Sequencing (WGS) team and the National TB Epidemiology Team (NTET) - May 2023. Involving participants from 12 different institutes from the UK, ROI, France, Spain and the Netherlands.
Epidemiology, surveillance, risk assessment, (true)	FAO-UNEP-WHO-WOAH Quadripartite Global Technical Meeting on MERS-CoV and Other Emerging Zoonotic Coronaviruses	Attendance at a 3-day workshop on MERS-CoV and other emerging zoonotic coronaviruses - Applying lessons learned from COVID-19 for a reinforced global commitment to prevent and control emerging zoonotic coronaviruses. Participation in a panel discussion.
Epidemiology, surveillance, risk assessment, (true)	Support to International Embryo Transfer Society on potential future review of sanitary standards.	Providing advice on data gathering and integration to the International Embryo Transfer Society to support future assessment of pathogen risks with embryo transfers to inform a review of international sanitary standards for trade of embryos.
Epidemiology, surveillance, risk assessment, (true)	Review of EU FMD training materials on risk assessment	Review of materials to be used by EU FMD for online capacity building on risk assessment.
Epidemiology, surveillance, risk assessment, (true)	Hazard Identification for hay & straw	A hazard identification to identify potential pathogens that could enter UK via import of hay and straw.
Epidemiology, surveillance, risk assessment, (true)	Brucella canis risk assessment	A risk assessment on animal health risks of Brucella Canis in GB was conducted. The risk assessment focused on the difference between neutered and unneutered dogs.

Epidemiology, surveillance, risk assessment, (true)	Risk assessment: Import of Blue Tongue Virus (BTV) via camelids from Australia	A risk assessment on import of BTV via import of Alpacas and Llamas to GB from Australia was conducted. The risk assessment focused on serotypes not currently circulating in Europe.
Epidemiology, surveillance, risk assessment, (true)	Risk Assessment: BSE National Feed Audit	A risk assessment was conducted on the GB National Feed Audit programme; in particular the likelihood of additional cases of BSE arising from terrestrial breaches under an alternative risk-based sampling regime.
Epidemiology, surveillance, risk assessment, (true)	Economic analysis: GB Echinococcus surveillance	An economic analysis of the GB Echinococcus surveillance system was conducted, with focus on the costs and effectiveness of using different diagnostic tests.
Epidemiology, surveillance, risk assessment, (true)	Economic analysis: GB Salmonella infantis outbreak	An economic analysis of the GB effort to control outbreaks of Salmonella infantis was carried out, which assessed if the cost of the stamping out effort was justified by the expected prevention of additional cases.
Epidemiology, surveillance, risk assessment, (true)	Analysis of atypical scrapie intensified surveillance	An analysis of the impact of ending the intensified monitoring of atypical scrapie cases in GB by APHA: utilising a back calculation model to estimate the expected number of cases missed.
Epidemiology, surveillance, risk assessment, (true)	Guidelines for design, implementation and evaluation of output-based surveillance systems.	Deliverable for MATRIX EJP project was published: https://zenodo.org/records/7390006
Epidemiology, surveillance, risk assessment, (true)	Inventory of existing data sets associated with avian influenza outbreaks in poultry and wild birds in three selected European regions.	As part of the Horizon Europe project development of an inventory of existing data sets associated with avian influenza outbreaks in poultry and wild birds, and for reference poultry population, in three selected European regions (Italy, Germany and England).
Wildlife (true)	Simulating pheasant movement for potential disease spread.	APHA carried out an internal analysis of GPS tags, and a post-doc with Exeter for a simulation model.
Wildlife (true)	WOAH Guidelines for addressing disease risks in wildlife trade.	Contributed to WOAH Guidelines for addressing disease risks in wildlife trade (to be published 2024).
Training, capacity building (true)	Machine Learning workshop	APHA hosted a workshop on machine learning for animal health in May 2023 for APHA and RVC staff. See: https://www.rvc.ac.uk/research/risk-analysis-and-modelling/news/applying-machine-learning-to-animal-health
Training, capacity building (true)	Post-graduate qualifications	APHA staff member passed their MRes, with a project undertaken at RVC entitled "Impact of Johne's disease status on bovine tuberculosis test results in dairy cattle". APHA staff member passed MSc in "Applied Data Analytics" with a Distinction. Successful completion of PhD's at RVC on: - Antimicrobial use in aquaculture systems - MERS-CoV epidemiology in humans and camels - Sustainability of South African livestock-derived food systems. New APHA-RVC PhD project on "Assessing the effectiveness of gamma testing policies applied to cattle in GB" New APHA-RVC MRes on Patterns and drivers of HPAI occurrence among wild and domestic birds in Great Britain.

Training, capacity building (true)	Attendance at specialist training courses	-Modelling food safety and animal health risks in R (3 APHA attendees, with follow up internal training). - Mapping and Spatial analysis in R -Econometrics and Difference-in-Difference methods -Introduction to Epidemiology -Advanced Epidemiological analysis - Stepped wedge analysis
Training, capacity building (true)	European College of Veterinary Public Health	APHA have recently become an Approved Residency Training Institute for the ECVPH. Three APHA staff members have commenced their residency programme.

TOR3: 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
WOAH guidelines on risk assessment within wildlife settings	Provided risk assessment expertise to the development of WOAH guidance on disease risks in wildlife trade, which will be used as a basis for an international workshop in Spring 2024.	Training and education health management
Discussions with representative of International Embryo Transfer Society to support potential future review of sanitary standards.	Provided advice to the International Embryo Transfer Society to support future assessment of pathogen risks with embryo transfers to inform review of international sanitary standards for trade of embryos.	health management
SARS-CoV-2 in animals: susceptibility of animal species, risk for animal and public health, monitoring, prevention and control	Epidemiological input to an update of the epidemiological situation of SARS-CoV-2 in animals and review of measures put in place by Member States. EFSA Journal 21(2); e07822	health management
Six Scientific Opinions for EFSA relating to animal welfare.	Epidemiological input to opinions reviewing the welfare of laying hens; broilers; ducks, geese and quail on farm; calves; dairy cows; cats and dogs in commercial breeding establishments	Animal production
EFSA Scientific opinion on the vaccination of poultry	Epidemiological input to the review of vaccination of poultry against HPAI. Report focused on available vaccines and vaccination strategies. EFSA Journal 21 (10), e08271	health management
EFSA Scientific Opinion	Assessment of listing and categorisation of animal diseases within the framework of the Animal Health Law (Regulation (EU) 2016/429): Bacterial kidney disease (BKD). EFSA Journal 21 (10), e08326	health management

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
WBVR (NL), SVA (SE), DTU (DE), ANSES (FR)	Netherlands, Sweden, Denmark, France	Europe	Collaborators as part of COVETLAB nowcasting project. Face to face meetings held at WBVR in Lelystad (NL)

			and APHA in Weybridge (UK)
University of Melbourne (Australia), New Zealand Government (Department of Primary Industries), Azure Quality Assurance (NZ), Canadian Food Inspection Agency, USDA Animal and Plant Health Inspection Service (USA)	Australia, New Zealand, Canada, USA	Americas Asia and Pasific Europe	Ongoing collaboration between APHA and groups in USA, Canada, Australia, New Zealand and UK focussing on application of FMD modelling.
Universidad de Castilla-La Mancha (IREC) Spain; Office Francais de la Biodiversite (OFB) France; Institute for Terrestrial and Aquatic Wildlife Research (ITAW), Universita' Degli Studi di Sassari (UNISS) and Universita' Degli Studi di Torino (UNITO) Italy; Mammal Research Institute Policy Academy of Sciences (MRI) Poland; University of Wageningen Netherlands.	Spain, France, Germany, Italy, Poland, Netherlands	Europe	Data collection and modelling of mammal abundance across Europe
VEO consortium (20 institutes in the EU). Led by Erasmus Medical Centre, Netherlands.	Various European countries	Europe	EU Horizon 2020 project in which APHA are providing generic risk assessment tools, data analytic approaches to assess disease incursion into Europe. (https://www.veo-europe.eu/)
WOAH Collaborating Centre in Animal Disease Surveillance Systems, Risk Analysis and Epidemiological Modelling Centers for Epidemiology and Animal Health. USDA-APHIS-VSCEAH. United States of America; WOAH Collaborating Centre in Veterinary Epidemiology and Public Health. EpiCentre and mEpiLab Institute of Veterinary and Biomedical Sciences Massey University. New Zealand. China Animal Health and Epidemiology Centre. China (People's Republic of); WOAH Collaborating Centre in Veterinary Services Capacity Building (Americas), University of Minnesota. United States of America; WOAH Collaborating Centre in Economics of Animal Health. University of Liverpool, Utrecht University, Norwegian Veterinary Institute.	US, China, New Zealand, UK, Netherlands, Norway	Americas Asia and Pasific Europe	Editing a WOAH Sci. Tech. Review on Animal Health Data Management. International scientists invited to collaborate and contribute articles on various aspects of animal health data management, including use for risk analysis and modelling.

Centre for Environment, Fisheries and Aquaculture Science (CEFAS) – WOAH Reference Laboratory, Veterinary Medicines Directorate, Defra, Food Standards Agency, Foods Standards Scotland, Health & Safety Executive, UK Health Security Agency, Public Health Scotland, Business, Energy and Industrial Strategy, Marine Scotland Science	UK	Europe	Regular correspondence via a cross-Government risk assessment group which discusses, and exchanges information on the current and future practices of risk assessment for the UK Government
Instituto Zooprofilacttico Sperimentale Venezie (IZSVe). Collaborating Centre for Epidemiology, Training and Control of Emerging Avian Diseases	Italy	Europe	Collaborators as part of EU Horizon project "Ecology and biology of HPAIV H5 (Kappa-Flu)" Our Collaborating Centre initiated meetings with two IZSVe Collaborating Centres to discuss further potential for collaborative working. Identified synergies in the area of spatial analysis and avian influenza, which will be followed up in 2024.
WOAH Collaborating Centre for Veterinary Epidemiology and Public Health, EpiCentre and mEpiLab, Institute of Veterinary and Biomedical Sciences, Massey University	New Zealand,	Asia and Pasific	Exchange visit to share and learn methods for best practice and latest approaches to exotic disease surveillance, outbreak response, and surveillance evaluation in NZ and UK.

TOR4 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
Collaborating Centre for the Detection and Identification in Humans of Emerging Animal Pathogens and Development of Tools for their Diagnoses. Institute Pasteur	France	Europe	Our Collaborating Centre initiated a meeting with the Institute Pasteur Collaborating Centres to discuss further potential for collaborative working. Identified potential synergy in the area of international development activity, which will be followed up in 2024.
Diseases at the Collaborating Centre for the Animal/Human Interface. Instituto Zooprofilacttico Sperimentale Venezie	Italy	Europe	Our Collaborating Centre initiated meetings with two IZSVe Collaborating Centres to discuss further potential for collaborative working. Identified synergies in the area of spatial analysis and

(IZSVe)			avian influenza, which will be followed up in 2024.
Friedrich-Loeffler-Institut (FLI)	Germany	Europe	Collaborators as part of EU Horizon project "Ecology and biology of HPAIV H5 (Kappa-Flu)" also of the VEO EU Horizon 2020 project (https://www.veo-europe.eu/). FLI have 16 WOAH reference laboratories
The Pirbright Institute – TPI (WOAH reference laboratory)	UK	Europe	Continuing collaboration between RVC and TPI researchers as part of research projects on lumpy skin disease, sheep and goat pox and foot and mouth disease and in capacity building and knowledge exchange in Nigeria. TPI have 10 WOAH reference laboratories
National Academy of Medicine	USA	Americas	Prof. Stuart Reid is a member of the USA National Academy of Medicine
Animal and Plant Health Agency WOAH reference laboratory for Avian Influenza	UK	Europe	As required, provision of ad hoc consultancy and advice in epidemiology, risk assessment and modelling.
Animal and Plant Health Agency WOAH reference laboratory for Bovine Spongiform Encephalopathy (BSE) and Scrapie.	UK	Europe	As required, provision of ad hoc consultancy and advice in epidemiology, risk assessment and modelling.
Animal and Plant Health Agency WOAH reference laboratory for brucellosis	UK	Europe	Collaboration on brucellosis surveillance in endemic settings.

TOR6: EXPERT CONSULTANTS

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

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Dr. Lucy Brunton	Review of WOAH AMR eLearning modules	To provide support to WOAH reviewing the E-Module on General introduction to AMR, with WOAH's lens
Dr. Bryony Jones	Epidemiology	Member of WOAH expert group on strengthening veterinary para-professional capacity.
Samantha Rivers, Claire Cobbold,		Contribution to the development of WOAH Guidelines for

Sebastian Dohne, Dr. Helen Roberts, Prof. Emma Snary	Risk Assessment	Addressing Disease Risks in Wildlife Trade

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

No

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

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 10

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	Field Epidemiology Training Program for Veterinarians: delivery of 4 weeks training course to veterinarians from Turkey veterinary services.	Turkey	25
C	Delivery of 12-week part-time distance learning training on risk assessment to professionals from India and Ethiopia.	India and Ethiopia	20
C	Field Epidemiology Training Program for Veterinarians: delivery of 4 weeks training course to veterinarians from Malaysia veterinary services.	Malaysia	20
C	Field Epidemiology Training Program for Veterinarians (phase 1): delivery of 1 week training course to veterinarians from Philippines veterinary services.	Philippines	9
C	Field Epidemiology Training Program for Veterinarians (phase 2): delivery of 2 weeks training course to veterinarians from Philippines veterinary services.	Philippines	9
C	Field Epidemiology Training Program for Veterinarians (phase 3): delivery of 1 week training course to veterinarians from Philippines veterinary services.	Philippines	9
C	Building Systems thinking into One Health. One day workshop co-organised by RVC and University of Surrey exploring opportunities to enhance One Health through incorporating Systems Thinking Methods.	UK	19
C	3-day training in risk analysis and simulation exercises to participants from 6 countries of the Gulf region. Organized by WOAH Sub-Regional Representation for the Arabian Gulf	Abu Dhabi	12
	As part of the EFSA EU-FORA fellowship,	Multiple countries within Europe	18

C	teaching on quantitative food safety risk assessment. 3 days, Parma, Italy		
C	As part of the EFSA EU-FORA fellowship, teaching on animal health risk assessment and modelling. 1/2 day, online	Multiple countries within Europe	15

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 WOAH?
No

TOR9: 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:
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b) International conferences:
8
Society for Veterinary Epidemiology and Preventive Medicine, Toulouse, France. March 2023.
Three presentations:
- Estimating the risk of within-company spread of Highly Pathogenic Avian Influenza virus in the UK. R Hill-Ernesto.
- Machine learning classification methods informing the management of bovine tuberculosis incidents in England. P. Romero.
- Causal inference in veterinary epidemiology: Developing target trial emulation using observational data as an alternative to randomised control trials. C. Pegram.
Extended abstracts available in proceedings: van Schaik, G. and Brennan, M. (eds). Society for Veterinary Epidemiology and Preventive Medicine, Proceedings: Westport, Ireland, May-June online (SVEPM Proceedings). ISBN 978-0-948073-55-7. - Rowena Hill-Ernesto, APHA

GeoVet2023. Silvi Marina, Teramo, Italy, 19th – 21st September 2023
Two posters:

- *The development and impact of an online bovine TB system for GB – information bovine TB (ibTB) – Stuart McKay.*
- *Cluster analysis of Bovine TB using multiple methods, and considerations when constructing a Composite Index – Dan Brown*

Prion 2023. Faro, Portugal 16th – 20th October 2023.
Three posters:
- *Factors to consider when assessing risk of CWD importation and spread in cervid populations – Dominika Serwin*
- *Classical BSE in Great Britain: Review of its epidemic, risk factors, policy and impact – Brenda Rajanayagam*
- *BSE surveillance in the UK – Julia Thomas*

Safepork – New Orleans, USA. 15-17 May 2023
Three presentations, one poster:
- *Antimicrobial Resistance in Salmonella enterica: Trends and Risk Factor Analysis using Scanning Surveillance Data - Andrea Minter*
- *Assessing pig farm biosecurity measures for the control of Salmonella on European farms - Richard Smith*
- *Epidemiology of Hepatitis E Virus in UK pig farms - Chelsea Voller*
- *Poster presentation: Prioritization of pig farm biosecurity for control of Salmonella and hepatitis E virus infections; results of a European Expert Opinion Elicitation – Elizabeth Waller*

15th Annual Meeting of EPIZONE European Research Group. Novi Sad, Serbia, April 2023:
- *Keynote presentation. Peste des petits ruminants – prospects for eradication - Bryony Jones.*

One Health EJP Final Meeting, 11-12th September 2023, Paris, France. Laura Gonzalez Villeta. – Invited panellist to round tables:
- *"Lessons learned from the cross-sectoral collaboration, testimonies and success stories"*
- *"Interdisciplinary training for the next generation of One Health researchers in Europe"*

Wildlife Disease Association Conference. Athens, Georgia, US. 27th July-4th August:
- *Cross-cultural learning and training of wildlife health professionals: the Wildlife Health Bridge. Stuart Patterson.*

VEO Annual Meeting, Rotterdam, NL. 13-14th June 2023.
Presentation on "Bird modelling and hotspots for disease risk" - Rachel Taylor

c) National conferences:
1
Association for Veterinary Teaching and Research Work (AVTRW) Conference, Moredun Institute, Edinburgh. 4-6th September,
One presentation, One poster:
- *Presentation. Cost-benefit analysis of GB Echinococcus multilocularis surveillance using the Matrix framework - Sam Rivers.*
- *Poster. Using statistics and machine learning to aid badger vaccination studies. Mayur Bakrania.*

d) Other (Provide website address or link to appropriate information):
17
EFSA Publications

1. EFSA (2023). Assessment of listing and categorisation of animal diseases within the framework of the Animal Health Law (Regulation (EU) 2016/429): Bacterial kidney disease (BKD). EFSA Journal 21 (10), e08326.

2. EFSA (2023). Vaccination of poultry against highly pathogenic avian influenza–part 1. Available vaccines and vaccination strategies. EFSA Journal 21 (10), e08271

3. EFSA (2023). Scientific and technical assistance on welfare aspects related to housing and health of cats and dogs in commercial breeding establishments. EFSA Journal 21 (9), e08213

4. EFSA (2023). Species which may act as vectors or reservoirs of diseases covered by the Animal Health Law: Listed pathogens of fish. EFSA Journal 21 (8), e08174.

5. EFSA (2023). Extensive literature review on vectors and reservoirs of AHL-listed pathogens of crustaceans. EFSA Supporting Publications 20 (8), 8122E

6. EFSA (2023). Welfare of dairy cows. EFSA Journal 21 (5), e07993.

7. EFSA (2023). Welfare of ducks, geese and quail on farm. EFSA Journal 21 (5), e07992.

8. EFSA (2023). Welfare of calves. EFSA Journal 21 (3), e07896

9. EFSA (2023). Welfare of broilers on farm. EFSA Journal 21 (2), e07788

10. EFSA (2023). SARS-CoV-2 in animals: susceptibility of animal species, risk for animal and public health, monitoring, prevention and control. EFSA Journal 21 (2), e07822

11. EFSA (2023). Welfare of laying hens on farm. EFSA Journal 21 (2), e07789

Preprints

Birch, C.P.D., Bakrania, M., Prosser, A., Brown, D., Withenshaw, S.M., Downs, S.H., 2023. Difference in Differences analysis evaluates the effects of the Badger Control Policy on Bovine Tuberculosis in England. bioRxiv, 2023.2009.2004.556191. https://www.biorxiv.org/content/10.1101/2023.09.04.556191v1

Published reports
- Mariana Avelino de Souza Santos, José Rojas Gonzales, Manon Swanenburg, Gema Vidal, Dan Evans, Verity Horigan, Jonathan Betts, Roberto La Ragione, Daniel Horton, Fernanda Dórea. "Epizootic Hemorrhagic Disease (EHD) – Systematic Literature Review report. EFSA Journal 2023;20(11):EN-8027. https://doi.org/10.2903/sp.efsa.2023.EN-8027

- Queirós, J., Caballero, J., Blanco-Aguiar, J. A., Bocanegra, I., Torres, M. J., Acevedo, P., Guerrasio, T., Apollonio, M., Berdión, O., Carro, F., Casaer, J., Carvalho, J., Csányi, S., Ferroglio, E., Fonseca, C., Gačić, D., Gavier-Widen, D., Galán, V. G., Gómez-Molina, A., ... Vicente, J. (2023). A pilot on integrated wildlife monitoring at European scale: environmental detection of selected pathogens in the European Observatory of Wildlife. EFSA Supporting Publications, 20(10). https://doi.org/10.2903/sp.efsa.2023.EN-8241

- Acevedo, P., Apollonio, M., Blanco-Aguiar, J. A., Casaer, J., Fernández-López, J., Ferroglio, E., Jansen, P., Keuling, O., Liefting, Y., Scandura, M., Smith, G. C., Podgorski, T, Zanet, S., & Vicente, J. (2023). A guidance on how to start up a national wildlife population monitoring program harmonizable at European level. EFSA Supporting Publications, 20(8). https://doi.org/10.2903/sp.efsa.2023.EN-8218

Datasets
- Dataset on Johne's disease transmission documented and published:https://www.sciencedirect.com/science/article/pii/S2352340923007564

Website
Further development of a website to publicise the work of the WOAH Collaborating Centre for Risk Analysis & Modelling: https://www.rvc.ac.uk/research/risk-analysis-and-modelling. Includes the publication of news articles and a short video that summarises the work of the Collaborating Centre

11. What have you done in the past year to advance your area of focus, e.g. updated technology?
The WOAH Collaborating Centre for Risk Analysis and Modelling edited an edition (Thematic vol. 41 (2) of the WOAH Sci Tech Review. The series of papers focuses on "Animal Health Data Management" and contains 24 peer-reviewed publications, 12 of which were APHA, RVC or joint publications.

APHA collaborated with multiple European Institutes to establish APHA as members of a large consortium for the European Partnership on Animal Health & Welfare (PAHW), led by Hein Imberechts (Sciensano, Belgium). Starting in January 2024, APHA contribution will focus on the development of a mathematical model for outdoor-reared pigs and also on improving epidemic intelligence methodologies via the use of rapid risk assessment.

The WOAH Collaborating Centre for Risk Analysis & Modelling will host the 2026 SVEPM 2026 Annual Meeting in London, UK.

12. Additional comments regarding your report: