Application of One Health approaches to improve animal and human health

Navneet Dhand

Associate Professor in Vet Biostatistics and Epidemiology

Director, Asia Pacific Consortium of Veterinary Epidemiology

Sydney School of Veterinary Science

Sydney Institute for Infectious Diseases

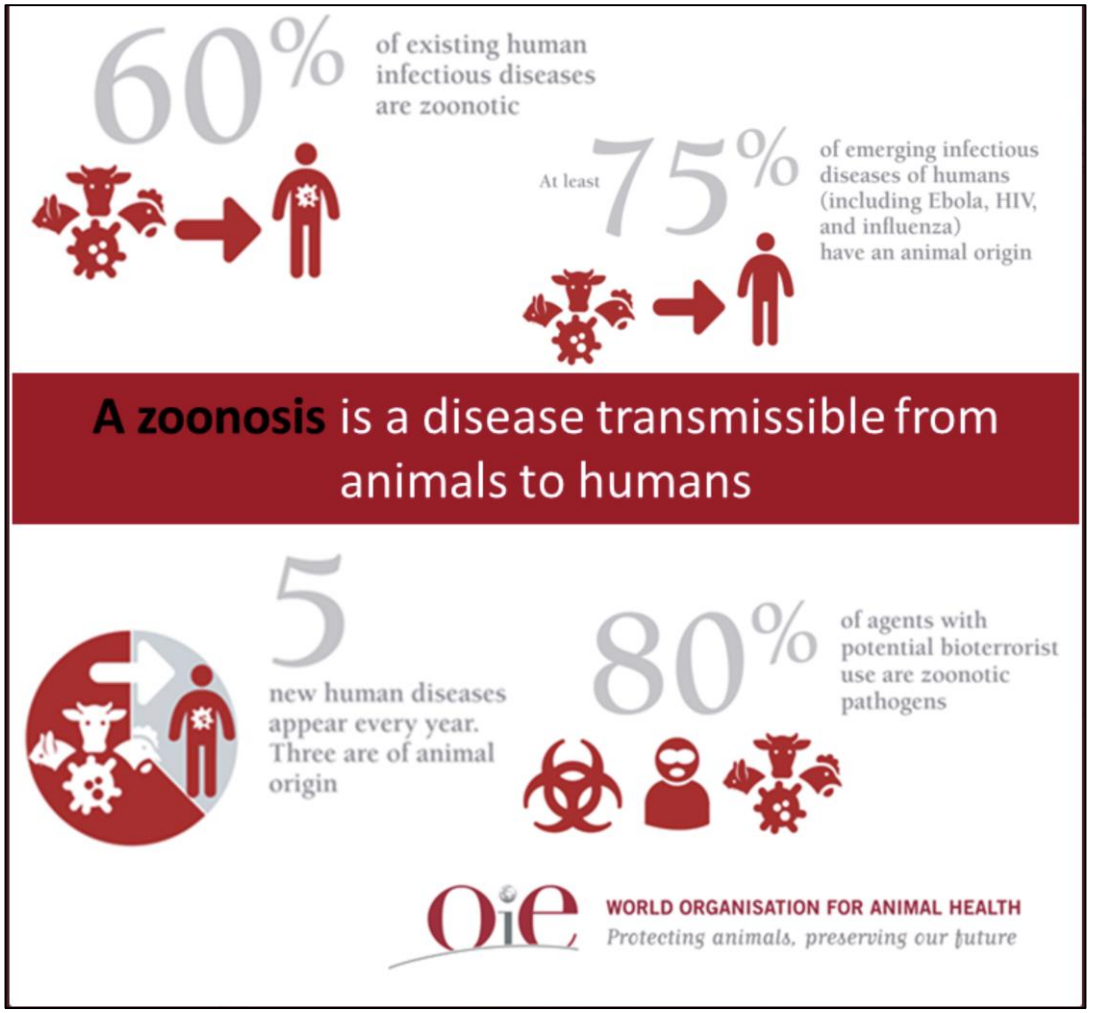
THE UNIVERSITY OF SYDNEY

Outline

- One Health approach
- Example 1: Hendra virus research for early detection of emerging pathogens
- Example 2: Development of an evidence-based brucellosis control program
- Example 3: Strengthening epidemiology capacity in the Asia Pacific

One Health approach

Emerging infectious diseases (EIDs)



https://static.reuters.com
https://cdnuploads.aa.com.tr
https://hsu.net.au

Drivers for emerging infectious diseases (EIDs)

Increasing population

Housing and urbanisation

Deforestation

Food systems

Exploitation of wildlife

International travel

One Health approach is not just for tackling EIDs

It’s equally applicable for

- Endemic zoonotic diseases
- Antibiotic resistance
- Food safety
- Food security

Example 1

Hendra virus research

Early detection of emerging infectious pathogens

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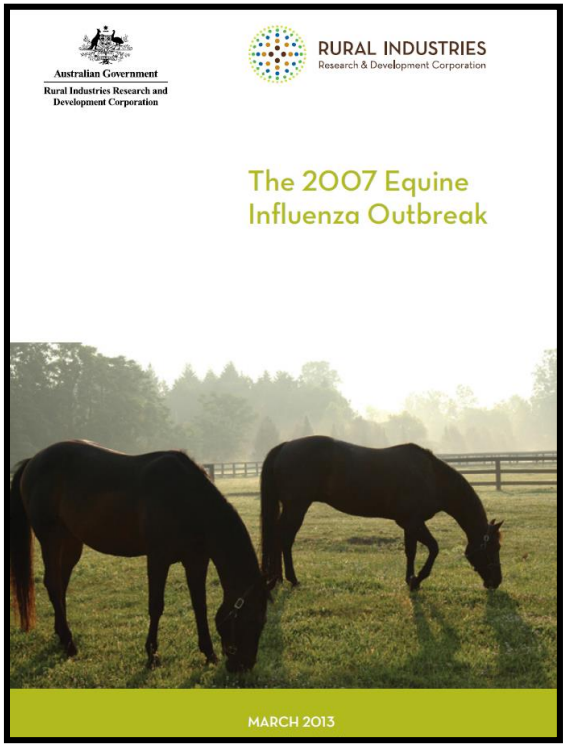
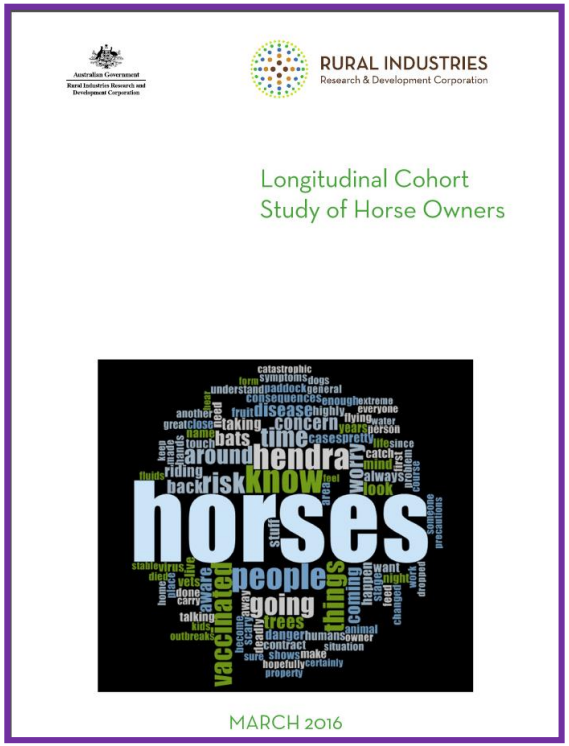
Equine infectious diseases projects



2008 - 2012



2012 - 2016

2017 - 2020

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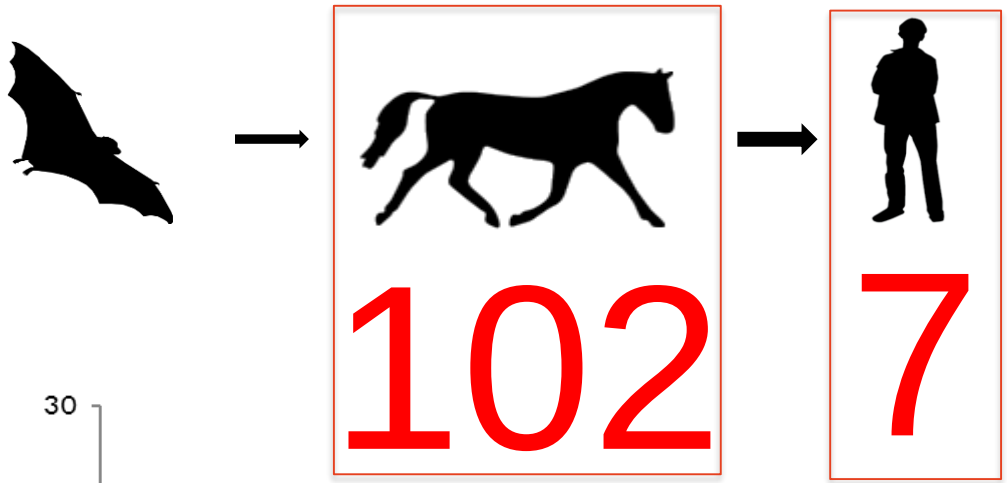
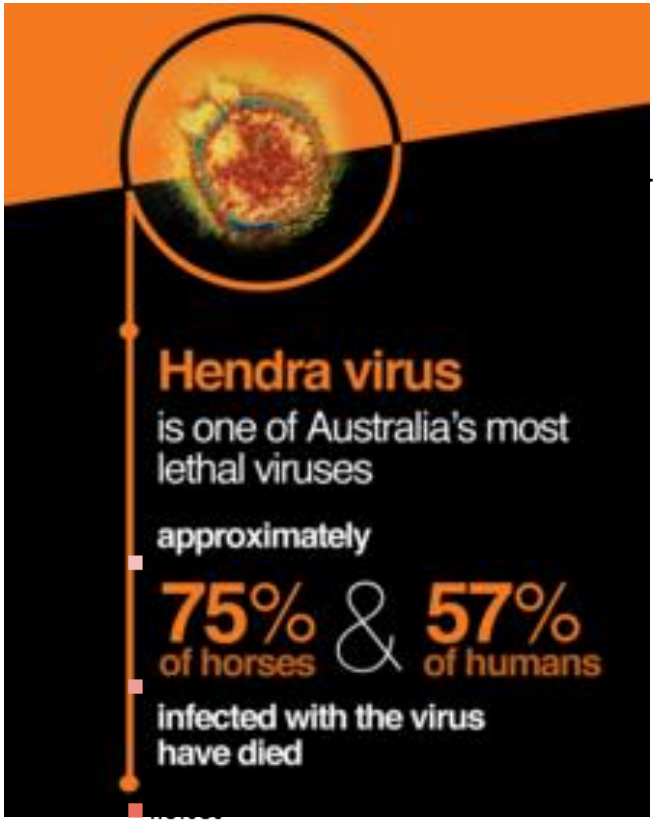
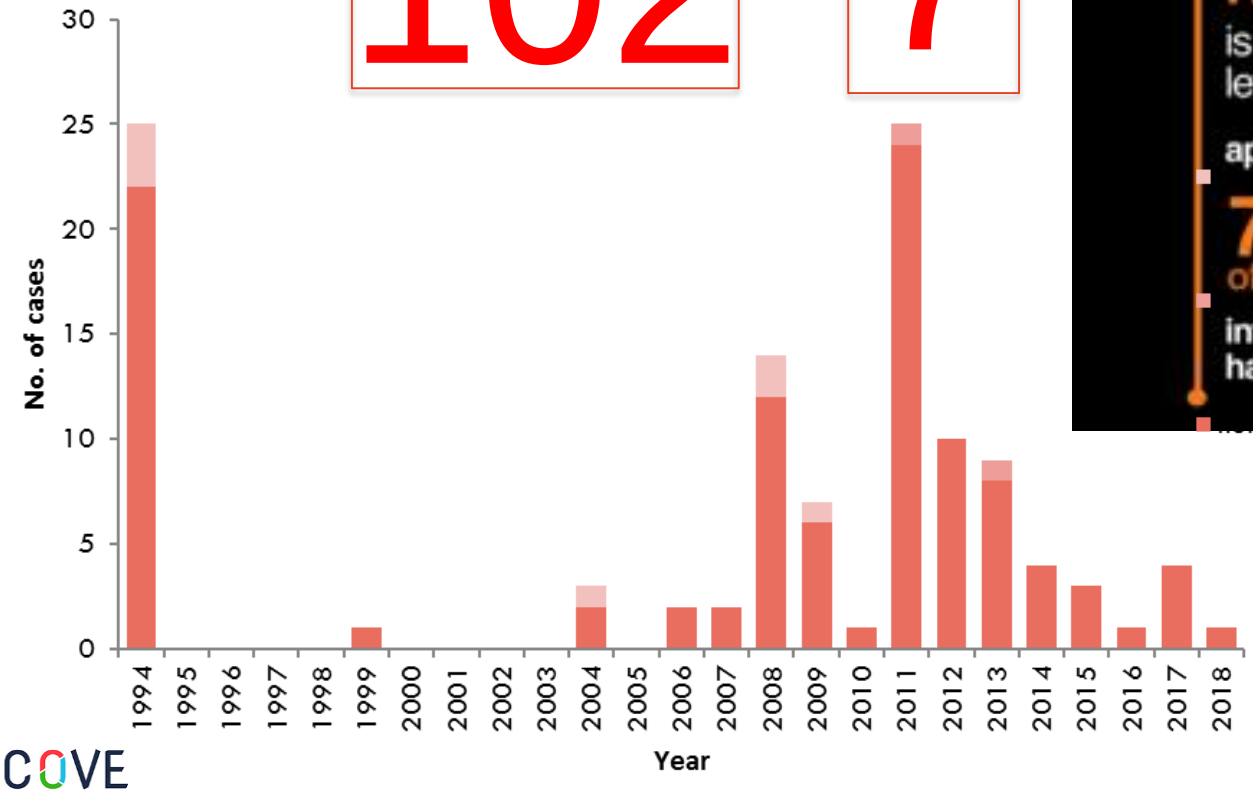
Hendra virus: an Emerging zoonotic disease







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Horse Owners and Hendra virus:
A Longitudinal survey To Evaluate Risk

RURAL INDUSTRIES
Research & Development Corporation

Longitudinal Cohort
Study of Horse Owners

MARCH 2016

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

"We've learned to live with it"—A qualitative study of Australian horse owners' attitudes, perceptions and practices in response to Hendra virus

Anke K. Wiethoelter[a,b,*], Kate Sawford[a], Nicole Schembri[b], Melanie R. Taylor[b,c], Navneet K. Dhand[a], Barbara Moloney[d], Therese Wright[d], Nina Kung[e], Hume E. Field[e,f], Jenny-Ann L.M.L. Toribio[a]

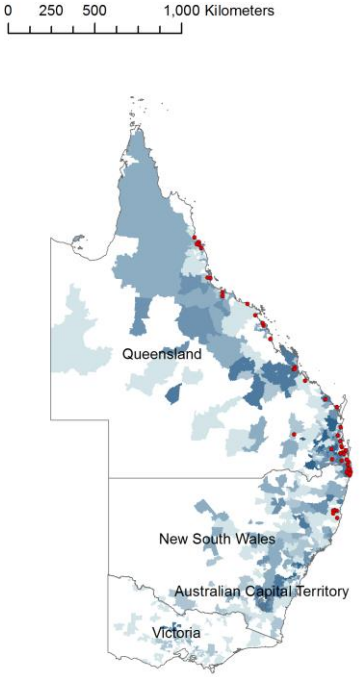
Sawford *et al. BMC Public Health* 2014, **14**:182
http://www.biomedcentral.com/1471-2458/14/182

BMC Public Health

RESEARCH ARTICLE Open Access

The use of a modified Delphi approach to engage stakeholders in zoonotic disease research priority setting

Kate Sawford[1], Navneet K Dhand[1], Jenny-Ann LML Toribio[1] and Melanie R Taylor[2*]



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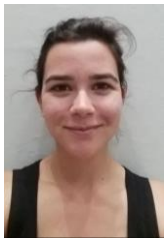


APCOVE

University of Western Sydney
Bringing knowledge to life

Queensland Government

NSW Government Department of Primary Industries

THE UNIVERSITY OF SYDNEY

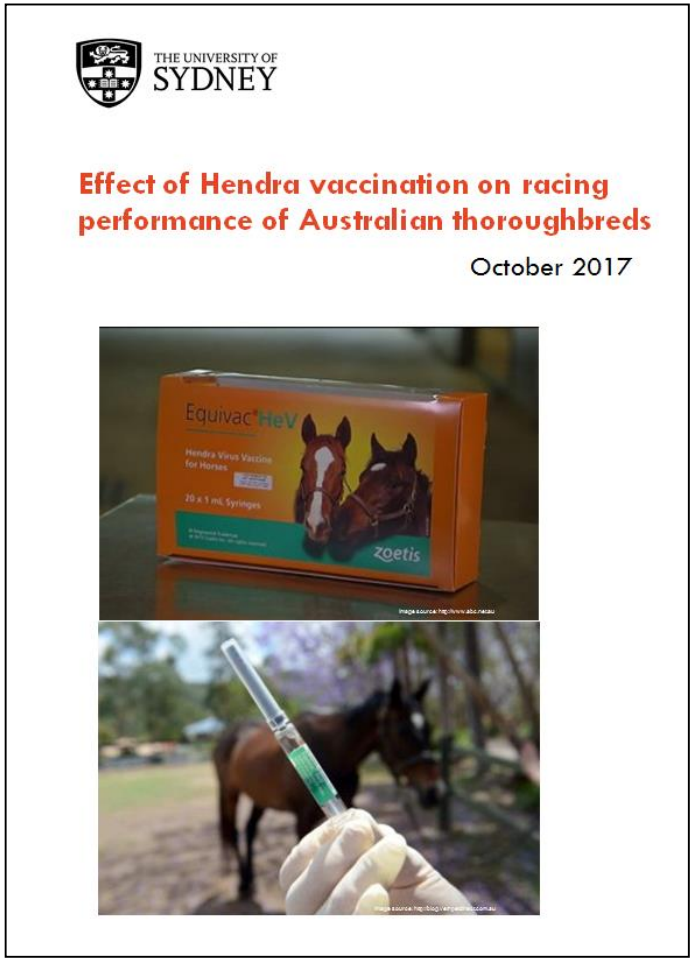
Hendra vaccination – key findings

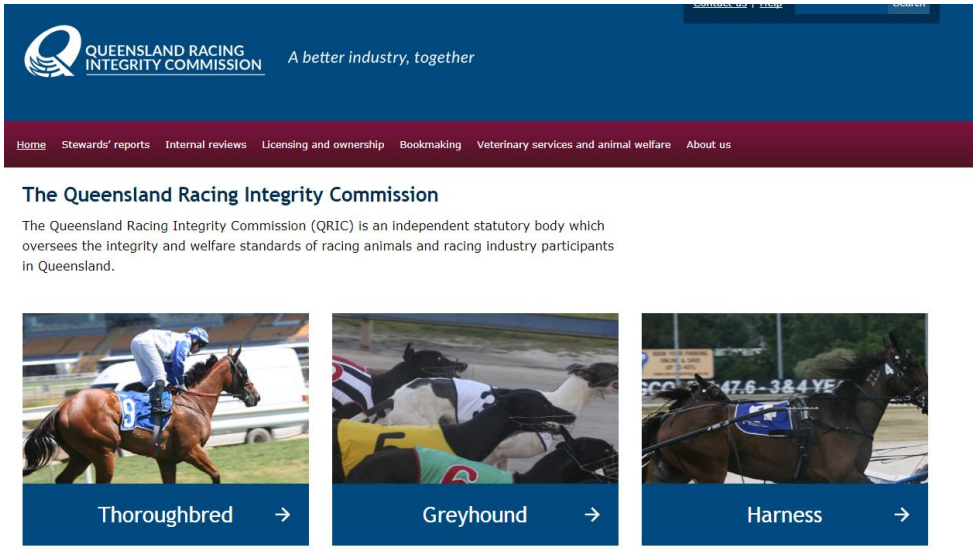
- Horse owners were MORE likely to get their horses vaccinated if:
  - they thought that a Hendra case could occur in their area;
  - they were worried about themselves or their family members getting Hendra virus;
  - they agreed with the establishment of a national horse registration system;
  - they agreed that Hendra virus cases had been well managed;

- Horse owners were LESS likely to get their horses vaccinated if:
  - they had financial difficulties;
  - they had a greater number of horses.

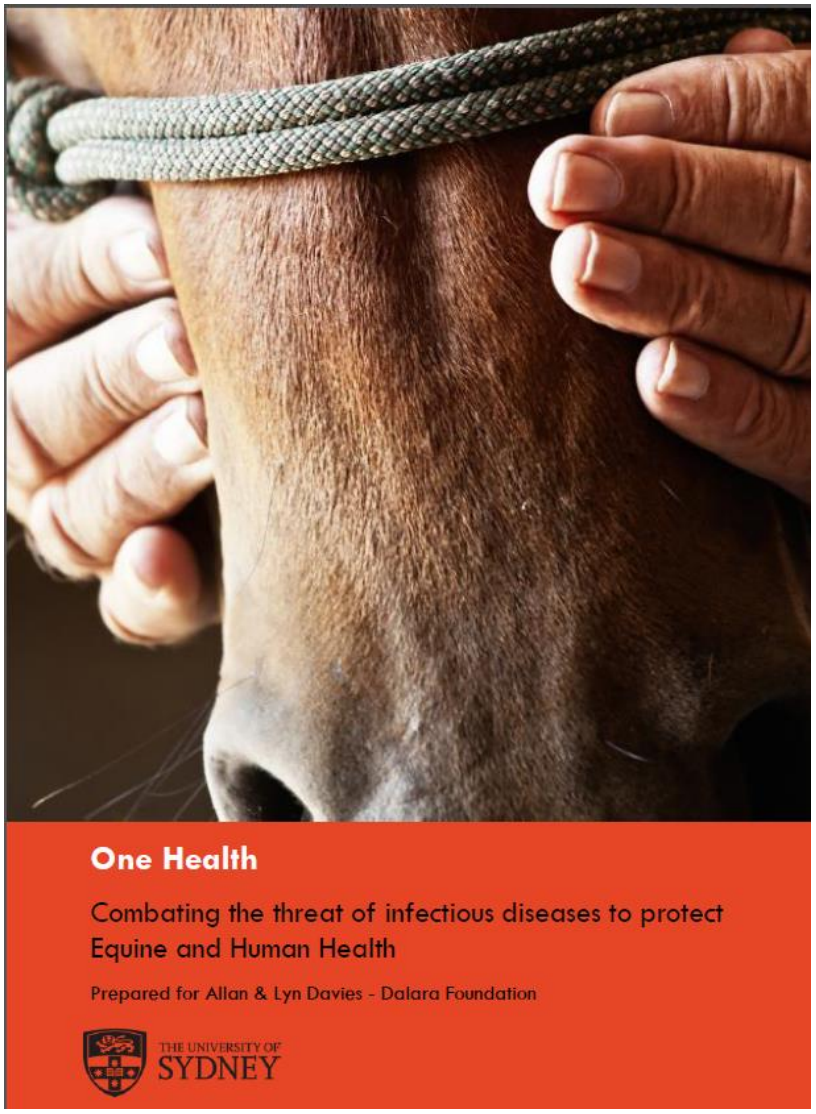
Queensland Racing Integrity Commission

Effect of Hendra vaccine on horse performance





Discovering Emerging Infectious Pathogens causing Hendra like illnesses



Which pathogens are causing neurological and respiratory symptoms in Hendra negative horses?

Joint media release: Researchers develop test for new Hendra variant

9 October 2021

Minister for Agriculture and Northern Australia, the Hon David Littleproud MP
Minister for Science and Technology, the Hon Melissa Price MP

- **New Hendra virus variant (HeV) confirmed in routine surveillance in New South Wales**
- **Researchers recently discovered this new Hendra virus variant in historical samples**
- **New test available nationally to identify Hendra virus variant**

Listen to the full story

Dr Ed Annand

THE UNIVERSITY OF SYDNEY

Example 2

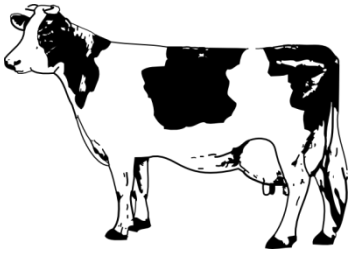
Brucellosis Research

Development of an evidence-based disease control program

THE UNIVERSITY OF SYDNEY

Brucellosis: a neglected zoonotic disease

- Endemic in many developing countries, including India
- Causes abortions, retention of placenta and still births in cattle



Brucella abortus organisms shed in uterine discharge

Transmitted to vet personnel by contact or inhalation

Disease in humans

Impediments to bovine brucellosis control in India

Many countries have eradicated bovine brucellosis by using:

- Vaccination
- Extensive surveillance → Very expensive and can have negative consequences
- Test-and-cull programs → Not possible as cows considered sacred by Hindus

http://www.cowism.com/

http://edition.cnn.com/

Research collaboration with GADVASU started in 2015

Brucellosis control

GADVASU signs pact with Sydney university for research

HT Correspondent
ludhiana@hindustantimes.com

LUDHIANA: The Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana, has signed a memorandum of understanding with The University of Sydney, Australia, for collaborative research and to facilitate exchange of faculty and students.

Dr AS Nanda, vice-chancellor, GADVASU, signed the MoU while University of Sydney was represented by Dr Navneet Dhand, sub

chancellor, GADVASU, exchanging copies of the sity of Sydney representative Dr Navneet Dhand Wednesday.
HT PHOTO

sciences.

Dr Nanda asked GADVASU's faculty members to explore possibilities of collaborative projects with the University of Sydney in their respective areas of expertise under various national and international funding programmes.

Dr Dhand discussed research priorities of the University of Sydney and its keen desire to work with scientists from India. He described it as a "beginning of a long term relationship"

premier insti- pping new tools s for improving animal and public health.

"It is the first-of-its-kind MoU of the University of Sydney with any veterinary university in Asia and will encourage student and faculty exchange besides promoting research collaborations," he said.

The University of Sydney has also funded a health project in collaboration with the school of public health and zoonoses to start research collaborations. Some other projects are also in the pipeline. Both the varsities are also working on a collaborative 'One Health' project to improve health of livestock and people in contact with the livestock. Some other projects are also beings initiated.

To extend the mutual collaboration GADVASU is also organising a 3-day international workshop in association with To extend the mutual collaboration GADVASU is also organising a 3-day international workshop from April 13-15 on "study design and data analysis" in the school of public health and zoonoses.

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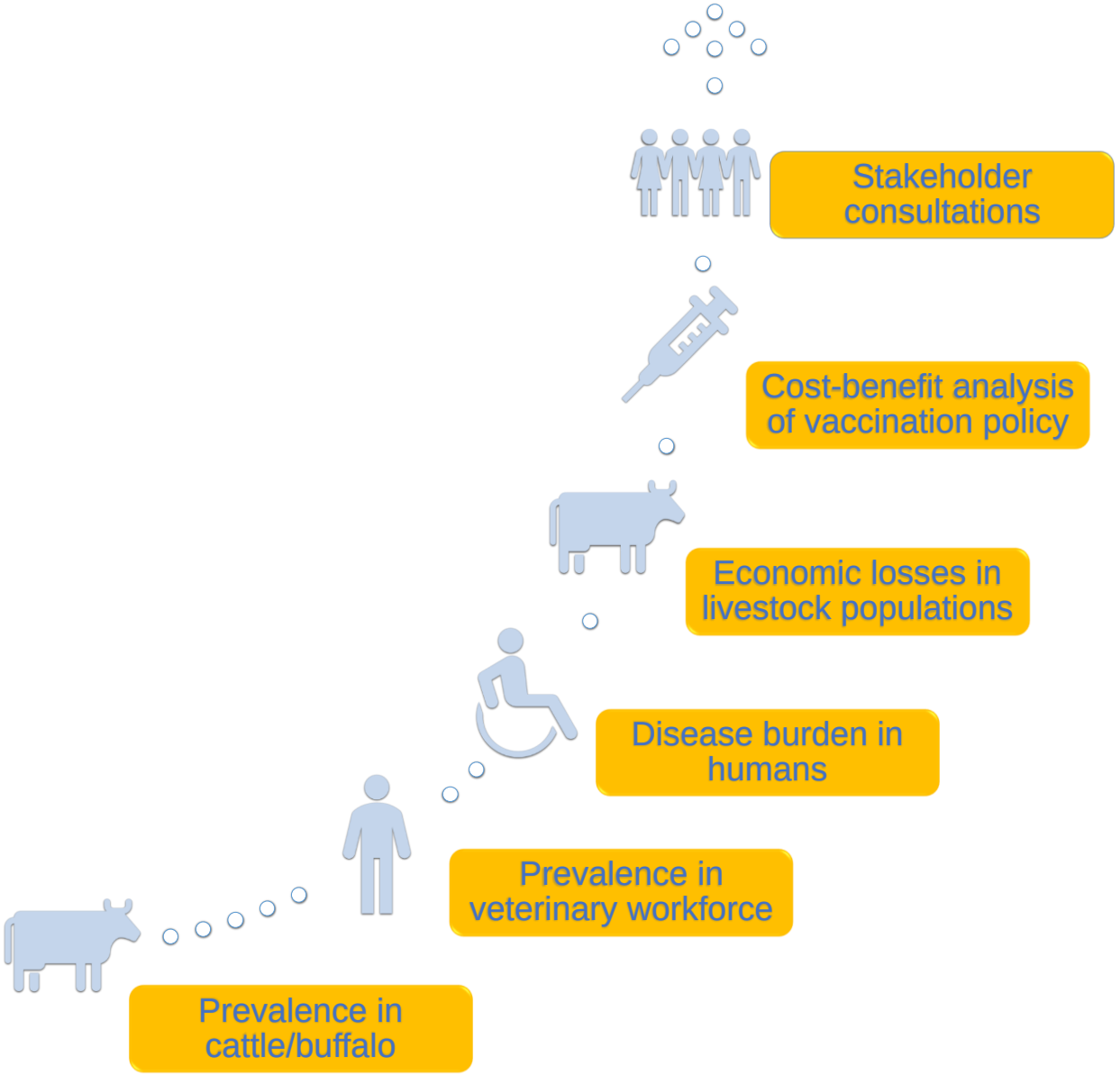
Pathway for the Development of a Brucellosis Control Program



APCOVE

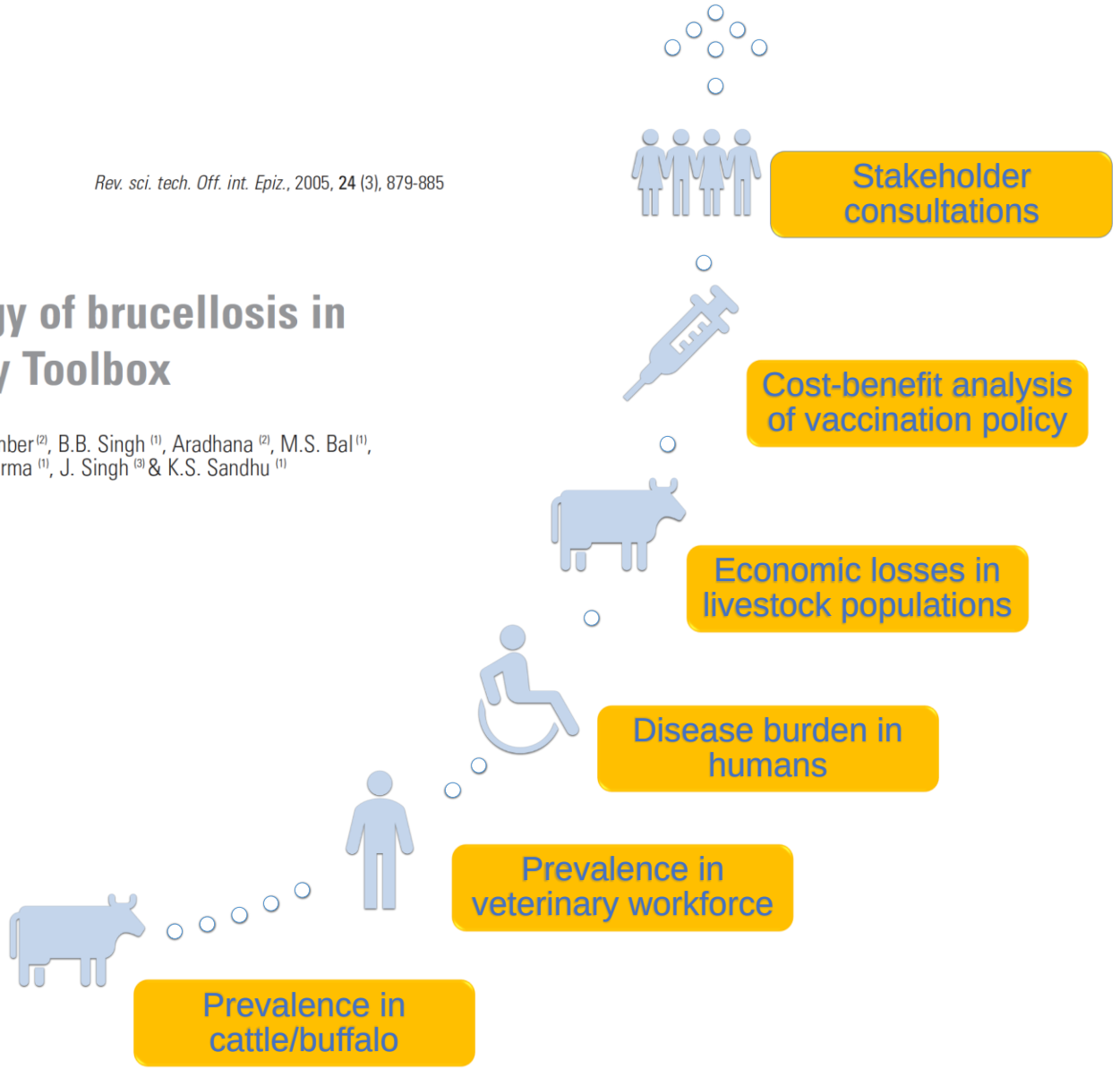
Pathway for the Development of a Brucellosis Control Program

Rev. sci. tech. Off. int. Epiz., 2005, **24** (3), 879-885

A study on the epidemiology of brucellosis in Punjab (India) using Survey Toolbox

N.K. Dhand [1], S. Gumber [2], B.B. Singh [1], Aradhana [2], M.S. Bal [1], H. Kumar [1], D.R. Sharma [1], J. Singh [3] & K.S. Sandhu [1]

10-15%



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Pathway for the Development of a Brucellosis Control Program

ORIGINAL ARTICLE

WILEY Transboundary and Emerging Diseases

Risk factors for occupational *Brucella* infection in veterinary personnel in India

V. Proch[1] | B. B. Singh[1] | K. Schemann[2,3] | J. P. S. Gill[1] | M. P. Ward[2,3] | N. K. Dhand[2,3]

~20%

Prevalence in cattle/buffalo

Prevalence in veterinary workforce

Disease burden in humans

Economic losses in livestock populations

Cost-benefit analysis of vaccination policy

Stakeholder consultations

APCOVE

Pathway for the Development of a Brucellosis Control Program

Preventive Veterinary Medicine 154 (2018) 148–155

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

Estimation of the health and economic burden of human brucellosis in India

B.B. Singh[a,*], M.S. Khatkar[b], R.S. Aulakh[a], J.P.S. Gill[a], N.K. Dhand[b]

[a] School of Public Health & Zoonoses, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, 141004, India
[b] School of Veterinary Science, The University of Sydney, 425 Werombi Road, Camden, 2570, NSW, Australia

177K DALYs

Annual loss: Rs 627 million

Stakeholder consultations

Cost-benefit analysis of vaccination policy

Economic losses in livestock populations

Disease burden in humans

Prevalence in veterinary workforce

Prevalence in cattle/buffalo

DALY: Disability adjusted life years

Pathway for the Development of a Brucellosis Control Program

Preventive Veterinary Medicine 119 (2015) 211–215

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

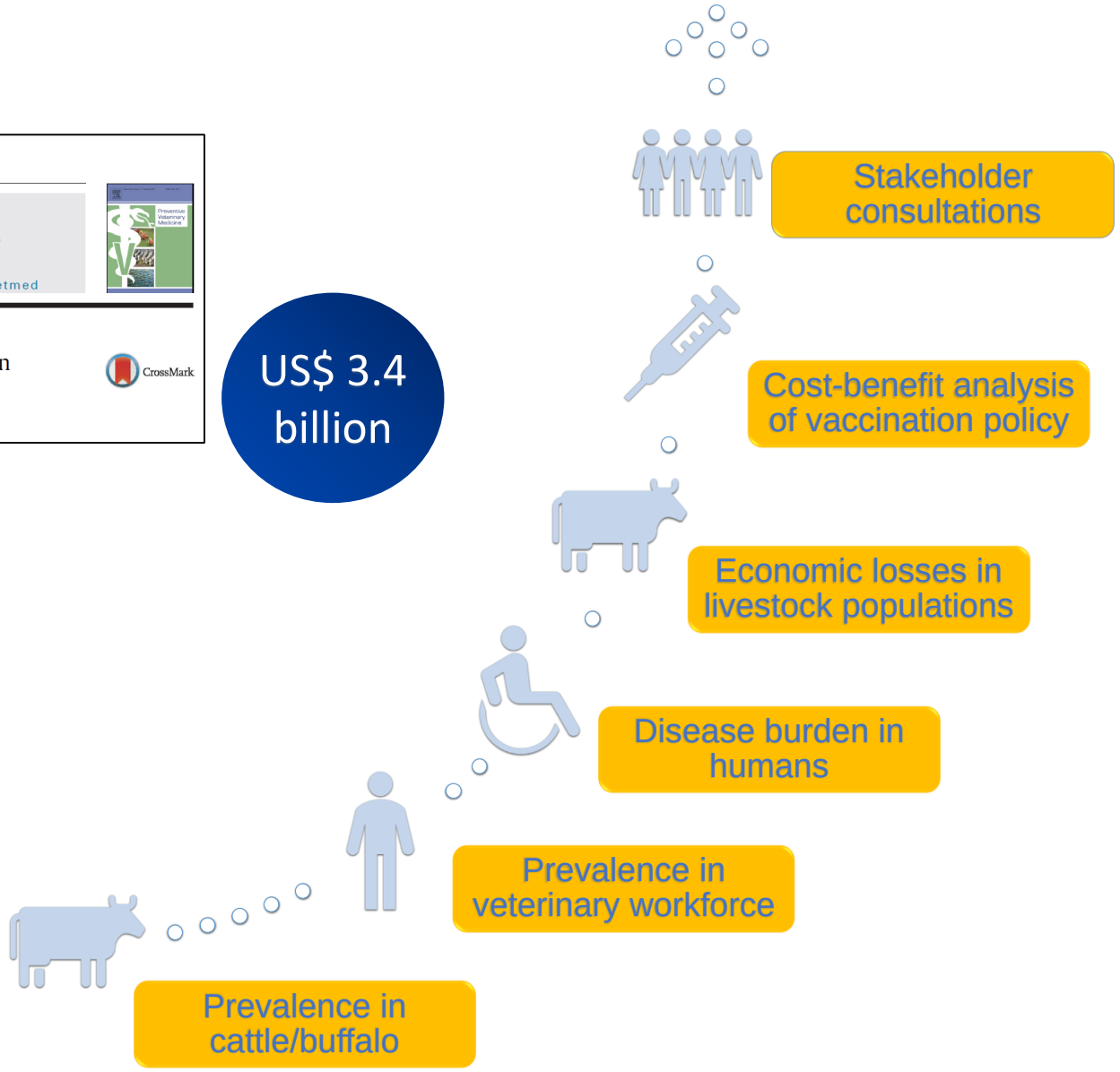
Short communication

Economic losses occurring due to brucellosis in Indian livestock populations

B.B. Singh[a,*], N.K. Dhand[b], J.P.S. Gill[a]

US$ 3.4 billion

Abortions
Infertility
Loss of milk production
Loss of calf



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Pathway for the Development of a Brucellosis Control Program


PLOS | NEGLECTED TROPICAL DISEASES

RESEARCH ARTICLE

Cost-benefit analysis of intervention policies for prevention and control of brucellosis in India

Balbir B. Singh[1]*, Polychronis Kostoulas[2], Jatinder P. S. Gill[1], Navneet K. Dhand[3]

1 School of Public Health & Zoonoses, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India, 2 School of Health Sciences, University of Thessaly, Karditsa, Greece, 3 School of Veterinary Science, The University of Sydney, Camden, NSW, Australia

* bbsdhaliwal@gmail.com

BCR: 8-11

Stakeholder consultations

Cost-benefit analysis of vaccination policy

Economic losses in livestock populations

Disease burden in humans

Prevalence in veterinary workforce

Prevalence in cattle/buffalo

BCR: Benefit-cost ratio

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Pathway for the Development of a Brucellosis Control Program

7 FGDs

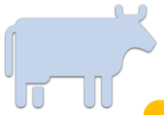
Stakeholder consultations

Cost-benefit analysis of vaccination policy

Economic losses in livestock populations

Disease burden in humans

Prevalence in veterinary workforce



Prevalence in cattle/buffalo

FGD: Focus group discussion

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ELSEVIER

Preventive Veterinary Medicine

Volume 189, April 2021, 105291

The feasibility and acceptability of various bovine brucellosis control strategies in India

Navneet K. Dhand [a], Jaswinder Singh [b], Harmandeep S. Josan [b], Balbir B. Singh [c], Nidhi Jaswal [d], Harish K Tiwari [a], Polychronis Kostoulas [e], Mehar S. Khatkar [a], Rabinder S. Aulakh [c], Manmeet Kaur [d], Jatinder P.S. Gill [c]

Acta Tropica

Evidence-based animal health policy: A ten-point brucellosis control program for India

--Manuscript Draft--

Manuscript Number:	
Article Type:	Opinion Paper
Keywords:	Disease control; brucellosis; India; Epidemiology; One Health; zoonoses
Corresponding Author:	Navneet Dhand The University of Sydney Camden, Australia

10-point brucellosis control strategy

Vaccination

Biosecurity

Animal health infrastructure

Surveillance

Abortion investigation

Veterinary workforce training

Education campaign

One Health: Multi-sectoral involvement

Problem-based research

Program management and leadership

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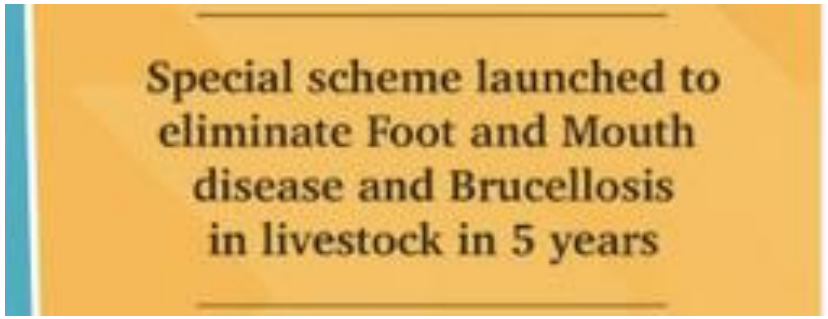
NEWS & FEATURES

When Sick Cows Can't Be Culled: India's Battle With Brucellosis

Increased recognition of the disease problem



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Example 3

Asia Pacific Consortium of Veterinary Epidemiology

Strengthening epidemiology capacity in the Asia Pacific

THE UNIVERSITY OF SYDNEY

‘Field epidemiology’ training programs (FETPs)

On-the-job training programs
The training model developed by the US CDC in 1951
Programs now running in >70 countries

Field epidemiology training programs for veterinarians

https://www.abc.net.au

FETPV workshop in Tanzania – 2015

FETPV workshops in Tanzania and Kenya – 2015 and 2016

FAO Workshops, Rome – Feb and July 2018

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Agreement with the FAO, 2019

News_

MBI and FAO United Nations to collaborate to combat emerging infectious diseases

20 March 2019

Associate Professor Navneet Dhand signs agreement with FAO

The Food and Agriculture Organization of the United Nations (FAO) and The Marie Bashir Institute for Infectious Diseases and Biosecurity (MBI) have joined hands to combat the threat of emerging and re-emerging infectious diseases by increasing capacity in outbreak investigation and disease surveillance.

Veterinary science research

Discover other projects

Associate Professor Navneet Dhand of the MBI has signed an agreement with Food and Agriculture Organization of the United Nations (FAO) to develop technical guidelines for in-service applied veterinary epidemiology training, vital for diagnosing, preventing and controlling infectious diseases. The guidelines will enable the FAO member countries to establish new programs in epidemiology training and to strengthen the existing ones.

> *"MBI is committed to meeting the challenges of emerging and re-emerging infectious diseases. This agreement with the FAO will enable MBI to further expand our global reach and increase our contribution in tackling these infections"*
>
> – Professor Tania Sorrell, Director MBI

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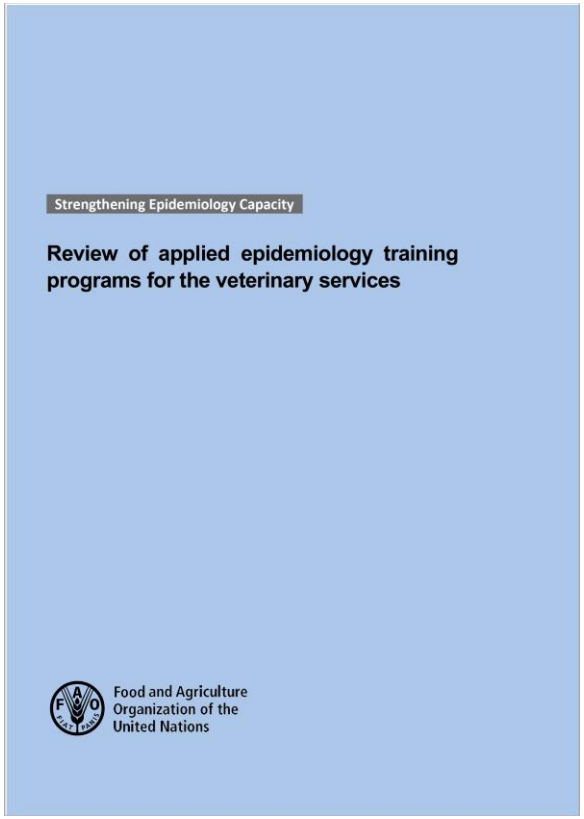
FAO Project to strengthen field epidemiology training

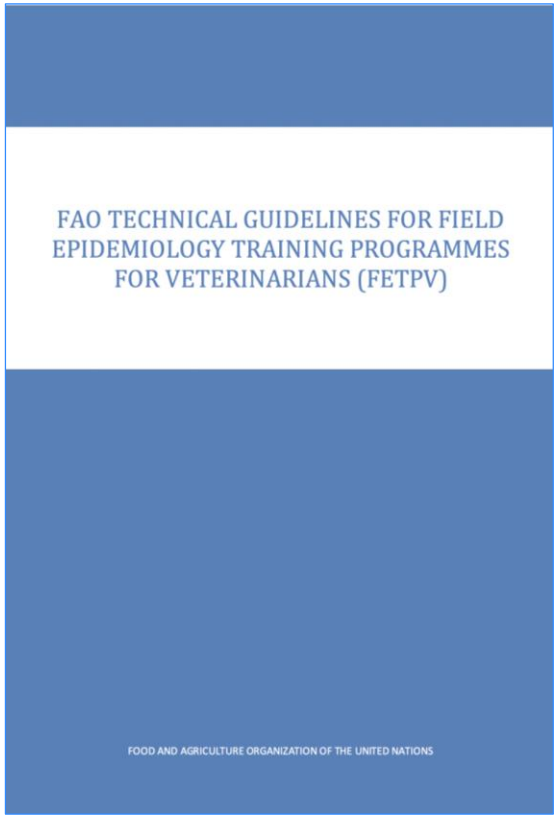
To review the existing programs

To identify core competencies and develop a curriculum

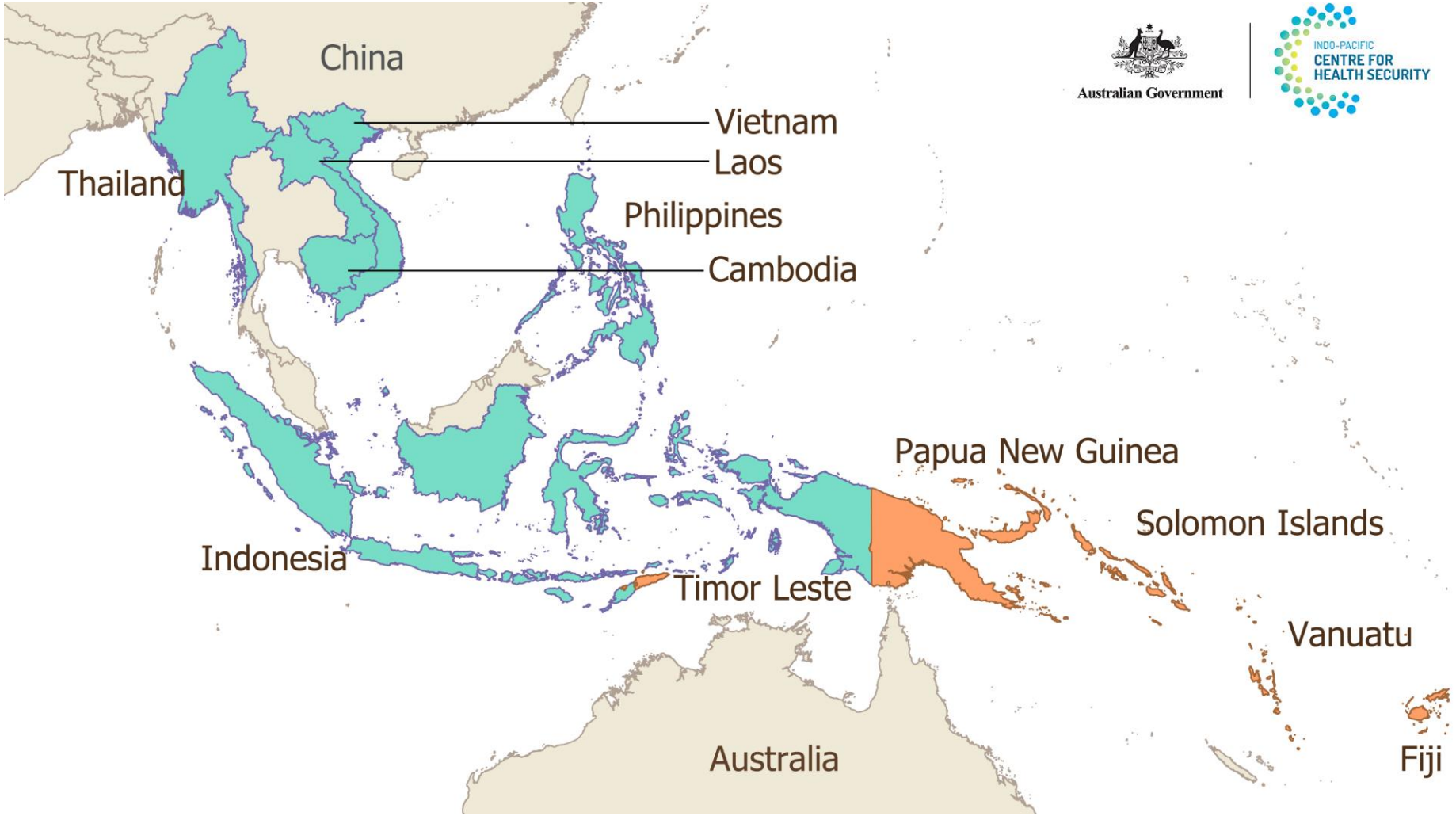
To develop guidelines for establishing a program

FAO project reports





Asia Pacific Consortium of Veterinary Epidemiology (APCOVE)



Australian Government

INDO-PACIFIC CENTRE FOR HEALTH SECURITY

APCOVE

Epidemiologists from all vet schools of Australia and NZ

Consortium Partners | Global Advisory Board | Target Country Partners

The University of Sydney
Australia
Visit Website →

The University of Queensland
Australia
Visit Website →

The University of Melbourne
Australia
Visit Website →

The University of Adelaide
Australia
Visit Website →

Charles Sturt University
Australia
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Murdoch University
Australia
Visit Website →

James Cook University
Australia
Visit Website →

Massey University of New Zealand
New Zealand
Visit Website →

The University of Minnesota
United States
Visit Website →

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Representatives from key international organisations

Consortium Partners | Global Advisory Board | Target Country Partners

Centers for Disease Control and Prevention (CDC)

Visit Website →

Food and Agriculture Organization of the United Nations (FAO)

Visit Website →

Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET)

Visit Website →

World Health Organization (WHO)

Visit Website →

OIE Sub-Regional Representation for South-East Asia (OIE)

Visit Website →

National Centre for Epidemiology & Population Health (NCEPH)

Visit Website →

APCOVE

Prevention Detection Containment

Training animal disease detectives in the Asia-Pacific

Tell me more → Latest news →

APCOVE Activities

Develop eLearning modules and case studies

Train the animal health workforce in target countries

Conduct workshops for FETPV facilitators and mentors

Establish a regional network of FETPVs

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FETPV: Field epidemiology training programs for veterinarians

APCOVE Training Program

Online Training: Starting 10 January 2022

36 modules/case studies across 6 Competencies

- Fundamental Competency
- Outbreak Investigation and Response
- Surveillance and Data Analysis
- Risk Analysis and Disease Control
- One Health and Biosecurity
- Leadership and Communication

THE UNIVERSITY OF SYDNEY

APCOVE

Competency, modules and case studies

Outbreak Investigation and Response	← Competency
1. Prepare for outbreak investigation	Modules
2. Conduct outbreak investigation	
3. Identify drivers for disease occurrence	
4. Avian influenza outbreak in Vietnam	Case studies
5. FMD outbreak in Myanmar	
6. Aquatic animal health outbreak in Indonesia	
7. African Swine fever outbreak in Vietnam	

Four workshops to plan eLearning modules
Aug – Sep 2020

APCOVE

Expression of interest for field epidemiology training

>400 applications received ➔ 120 candidates selected

APCOVE
Asia-Pacific Consortium of Veterinary Epidemiology
Home About Our Key Partners Team Members Resources

Expression of interest for field veterinary epidemiology training

Asia Pacific Consortium of Veterinary Epidemiology (APCOVE) is pleased to invite expressions of interest for field veterinary epidemiology training from eligible candidates in the following target countries: Vietnam, Indonesia, Philippines, Laos, Cambodia, Myanmar, Timor-Leste and PNG.

What is APCOVE?

APCOVE was established in 2020 with funding from The Australian Government's Department of Foreign Affairs and Trade (DFAT) to strengthen veterinary epidemiology capacity in the Asia Pacific region. It involves more than 40 veterinary epidemiologists and animal health experts from Australia, New Zealand, the US and the target countries.

What does APCOVE training involve?

APCOVE field epidemiology training comprises three components:

Online training: It includes 30 online modules, each of about 1-hour duration covering six competencies: Fundamental skills, Outbreak investigation, Surveillance, Risk assessment, One Health and Leadership. Candidates will undertake these modules in their own time and receive a certificate after completion of each competency and an additional one after successful completion of all six competencies. In addition, candidates will receive a prize of AU$100 after completion of each of the competencies (i.e., a total of AU$600). We aim to select a maximum of 20 candidates from each of the target countries for online training.

Hands-on projects: Candidates successfully completing the online training will be eligible to submit a proposal to undertake a hands-on project. A maximum of five candidates from each of the participating countries will be selected based on their performance in online training and the quality of their submitted proposals. Each of the selected candidates will receive A$5000 to conduct a field project for 6 months under the supervision of a mentor.

Visiting fellowship: The best performing candidate from each country will be offered a fellowship to visit Australia for a month after the completion of their project. APCOVE will cover most of the travel costs of visiting fellows including airfares, accommodation and meals. Each fellow will work with an Australian mentor to learn advanced epidemiology skills.

Who is eligible to apply?

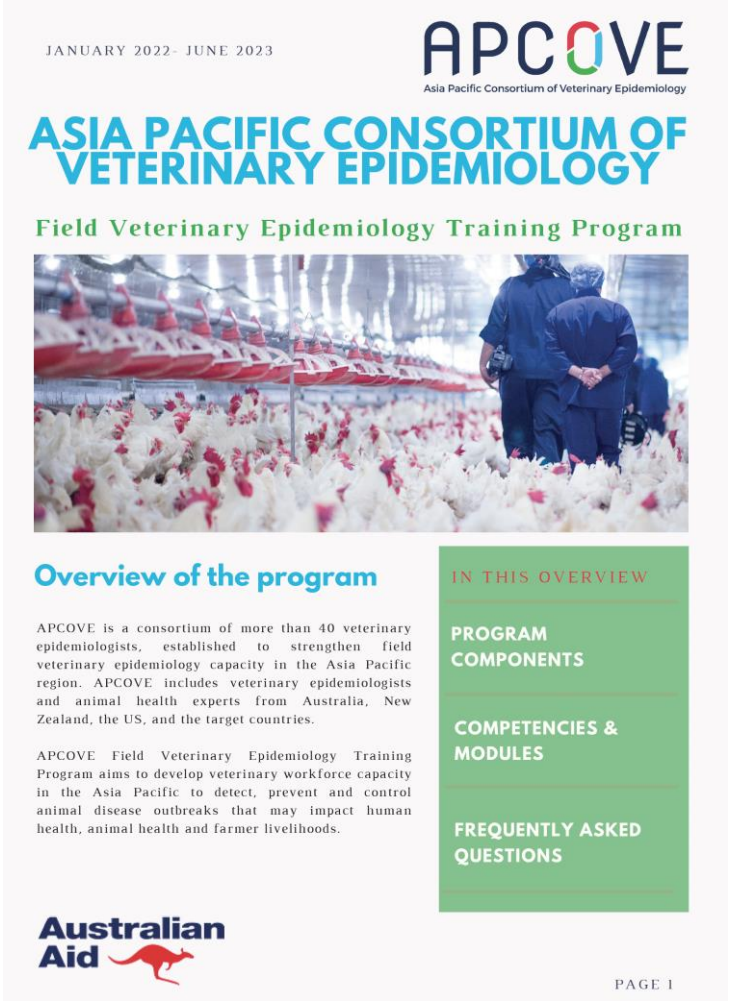
All veterinarians currently working in the field, or with previous experience working in the field, are eligible to apply. Applicants must have access to a computer and the internet, although the modules will also be accessible from mobile devices. They must have adequate computer literacy and be able to use at least MS Word, MS PowerPoint and MS Excel. Applicants should also be able to read and understand English with at least basic proficiency. Although preference will be given to veterinarians in Government roles, private veterinarians involved in field practice are also encouraged to apply. Recent university graduates can apply but preference will be given to applicants with field experience. Applications are also encouraged from those who have previously completed or are currently undertaking field epidemiology training. Animal science graduates may be chosen in countries where sufficient numbers of veterinarians are not available. Women and those with a disability are encouraged to apply. There are no fees for undertaking this training.

How to apply?

Expressions of interest should be submitted here by 15 May 2021:
https://redcap.sydney.edu.au/surveys/?s=EACWCA9L9M

For any queries, please write to Dr Harish Tiwari at Harish.Tiwari@sydney.edu.au or Ms Meg Vost at meg.vost@sydney.edu.au.

Commencement



JANUARY 2022- JUNE 2023

APCOVE
Asia Pacific Consortium of Veterinary Epidemiology

ASIA PACIFIC CONSORTIUM OF VETERINARY EPIDEMIOLOGY

Field Veterinary Epidemiology Training Program

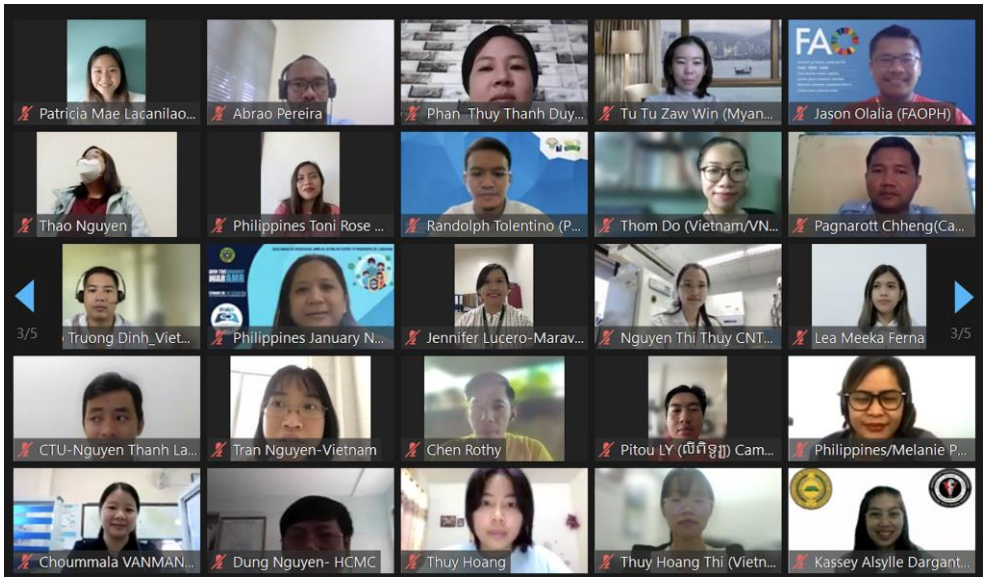
Overview of the program

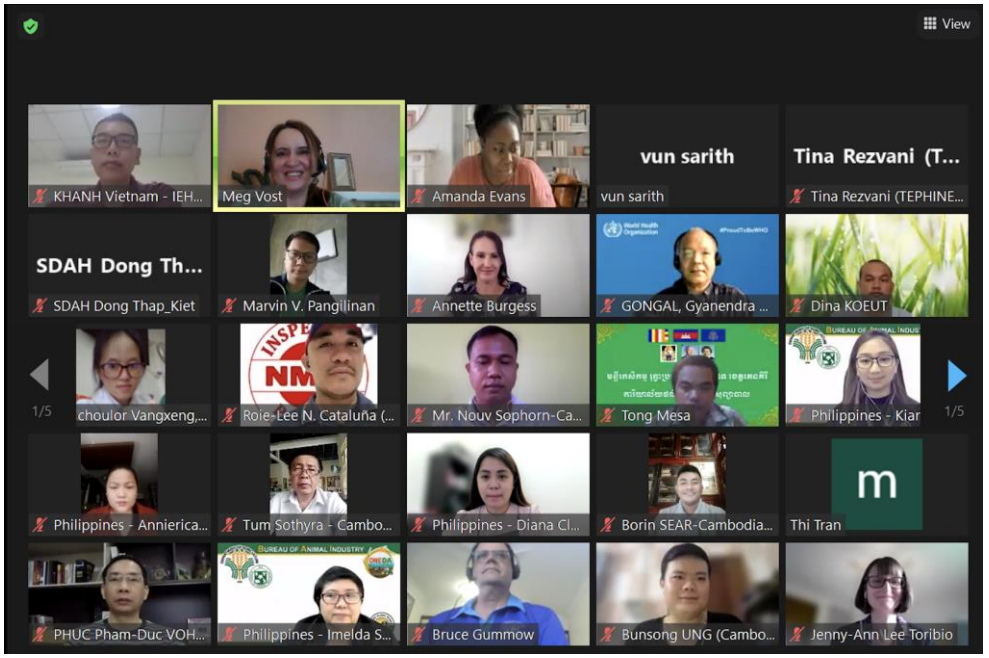
APCOVE is a consortium of more than 40 veterinary epidemiologists, established to strengthen field veterinary epidemiology capacity in the Asia Pacific region. APCOVE includes veterinary epidemiologists and animal health experts from Australia, New Zealand, the US, and the target countries.

APCOVE Field Veterinary Epidemiology Training Program aims to develop veterinary workforce capacity in the Asia Pacific to detect, prevent and control animal disease outbreaks that may impact human health, animal health and farmer livelihoods.

IN THIS OVERVIEW

Australian Aid





APCOVE

APCOVE
Asia Pacific Consortium of Veterinary Epidemiology

Animal disease detectives

APCOVE helps to train animal disease detectives to protect both animal and human health.

Surveillance

Animal disease detectives conduct animal disease surveillance so that diseases are detected early on before they get a chance to spread.

Outbreak investigation

Animal disease detectives investigate outbreaks to identify the source of each outbreak and to contain its spread.

Read more →

Training programs →

APCOVE
Asia Pacific Consortium of Veterinary Epidemiology

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One Health

APCOVE is passionate about One Health.

We believe that the health of animals, humans and the environment is interlinked. Therefore, we aim to eliminate siloed approaches to dealing with health issues at the human-animal-environment interface.

One Health recognises interconnections between humans, animals and the shared environment, and focusses on dealing with health issues holistically through collaboration.

We work with animal and public health organisations in the Asia Pacific region to develop the knowledge and skills of veterinarians in One Health. This will better enable them to work with diverse teams involving people from public health and wildlife health, to improve communication and policy for disease investigation and surveillance.

Team members →

Australian Government

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