

A NEW TOPICAL THERAPY FOR FMD ADDRESSES ANIMAL WELFARE & OTHER ISSUES: AMR?



Peter Windsor

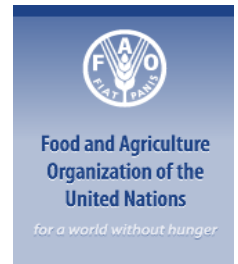
Isabel MacPhillamy, Francesca Earp, Jim Young & Syseng Khounsy*

Mekong Livestock Research Group & Lao PDR DLF*

**Sydney School of Veterinary Science,
NSW, Australia**

peter.windsor@sydney.edu.au

<https://mekonglivestock.wordpress.com/>



OUTLINE: change management; motivating farmers & livestock stakeholders to improve practices?

1. Intro: **Food Security Challenge**, SEACFMD; Philippines, Cambodia & Laos
2. Improved **productivity is a driver** of better health, eventually welfare
3. **FMD therapy largely ignored, yet is common & a farmer priority**
4. Engage farmers in FMD control by a '**new medicine that works**'
5. Replace antibiotics with Tri-Solfen[®] **reduces animal suffering & AMR risk**
6. Motivated farmers; improved reporting, vax & biosecurity? **COMPLEMENTARY!**
7. Conclude: evidence for **efficacious pain relief for husbandry; now FMD etc.?**

Transboundary and Emerging Diseases

ORIGINAL ARTICLE

Foot-and-Mouth Disease Control and Eradication in the Bicol Surveillance Buffer Zone of the Philippines

P. A. Windsor^{1,2}, P. G. Freeman^{1,3}, R. Abila^{4,5}, C. Benigno^{4,6}, B. Verin⁴, V. Nim^{1,7} and A. Cameron⁸

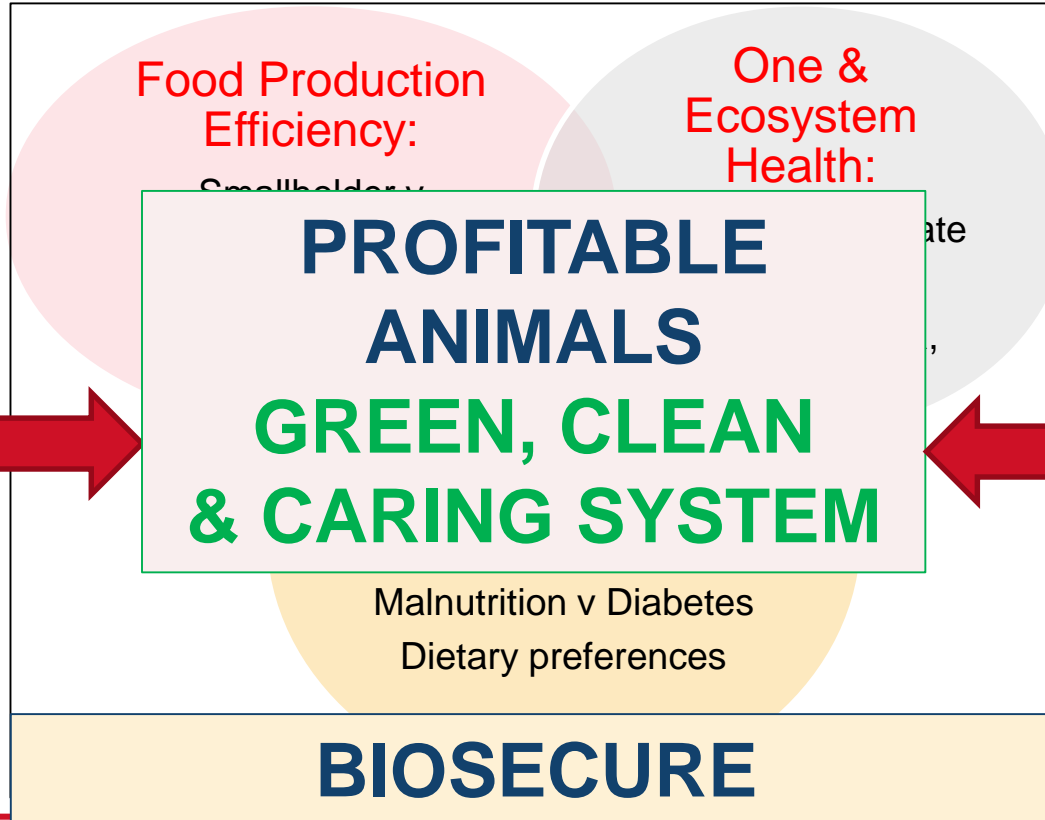
**COOKING
SWILL!**



The Food Security Challenge:

Developing a more efficient & sustainable global food system

Problems



Solutions



Transboundary and Emerging Diseases

ORIGINAL ARTICLE

Assessment of Farmer Knowledge of Large Ruminant Health and Production in Developing Village-Level Biosecurity in Northern Lao PDR

S. Nampanya¹, L. Rast¹, S. Khounsy² and P. A. Windsor¹

¹ Faculty of Veterinary Science, The University of Sydney, NSW, Australia
² Department of Livestock and Fisheries, Vientiane, Lao PDR

Transboundary and Emerging Diseases

ORIGINAL ARTICLE

Investigation of Foot and Mouth Disease hotspots in northern Lao PDR

S. Nampanya¹, J. Richards, S. Khounsy², P. Inthavong², M. Yang², L. Rast and P. A. Windsor¹

¹ Faculty of Veterinary Science, the University of Sydney, Camden, NSW, Australia
² Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, Luang Prabang, Lao PDR

Improving Trade in Large Ruminants and Products by Transboundary Animal Disease Control in Lao PDR

J.R. Young¹, S. Nampanya¹, S. Khounsy², R.D. Bush¹ and P.A Windsor¹

Transboundary and Emerging Diseases

REVIEW ARTICLE

Improving Smallholder Farmer Biosecurity in the Mekong Region Through Change Management

J. R. Young¹, S. Evans-Kocinski², R. D. Bush¹ and P. A. Windsor¹

¹ Faculty of Veterinary Science, University of Sydney, Camden, NSW, Australia
² Behavioural Insights Pty. Ltd., Manly Beach, QLD, Australia

Epidemiology and Infection

cambridge.org/hyg

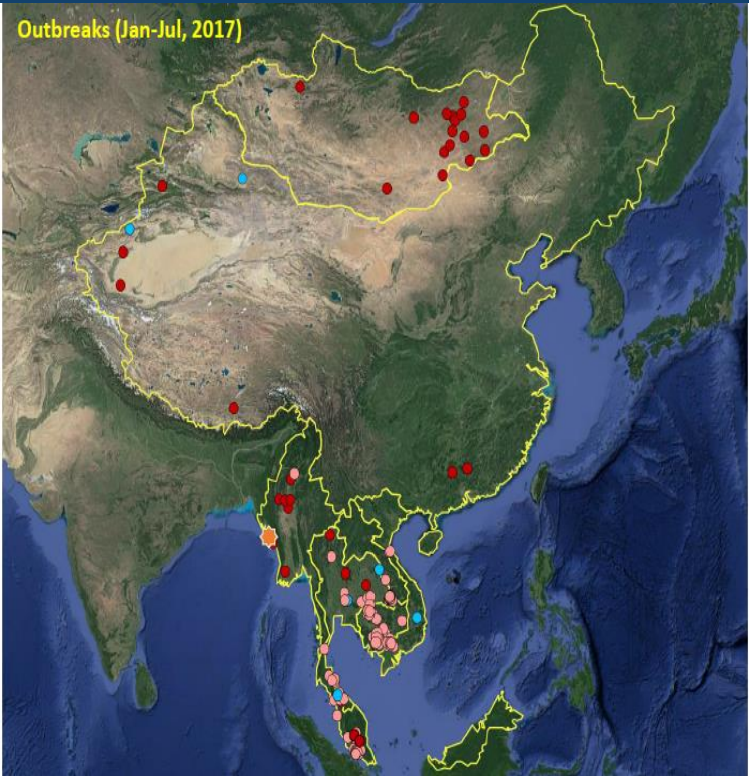
Original Paper

Implementing large Foot and Mouth Disease vaccination programmes for smallholder farmers: lessons from Lao PDR

S. Nampanya¹, S. Khounsy², R. Abila³ and P. A. Windsor¹

¹The University of Sydney, Sydney School of Veterinary Science, Camden, NSW 2570, Australia; ²Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, Vientiane Capital, Lao PDR and ³QIE Sub-Regional Representation for South-East Asia (SRR-SEA), Bangkok, Thailand

Abstract
 This study assessed smallholder finances and their attitudes towards the Foot and Mouth...



- O ● Red
- A ● Blue
- Untyped ● Pink
- Asia 1 ● Yellow Star

1.6m doses Vax in northern Laos 2012-16; suppressed clinical cases 2013 - end 2017; Clinical outbreaks re-emerged 2018-'19; **sustainability of FMD Vax programs issue!**

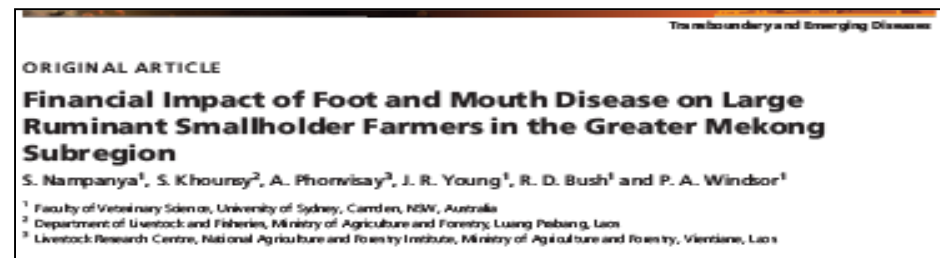
FMD costs families & economies in SE Asia; antibiotic treatment is a major cost



High cost of FMD @ levels:

- village: USD 30,000
- national: USD ~100m

FMD epidemic cost ~ 12%
of farm gate value of large
ruminants



FISQ (n=310) high financial
losses, esp. Tx with antibiotics
Partial budget analysis:
USD22/cow, 33/buffalo if vax

Evidence: strongly positive
incentive if cattle vax 2x/yr

FMD outbreak in Laos; n=136

April 2019 FMD outbreak: 99 buffalo & 37 cattle in Laos: Tri-Solfen® spray on lesions



Conclusion: Tri-Solfen® for FMD is very efficacious

- Improved demeanor; **less suffering!**
- All farmers keen for 'new medicine':
improve reporting / surveillance?
- **Efficacious**; Tx animals eat ~2 days, healed ~5 days
- No antibiotics ; c.f. chlortetracycline or parenteral antibiotics:
less AMR!
- **Inexpensive**: 20cents / spray; decreased cost of FMD!
- **Safe**; recommended WHP: meat 4days, milk 3days, or default
- Likely **viricidal** as pH ~2.7: potential to improve outbreak control?
- **Registered** for FMD Tx in Laos; seeking interest in
trials for registration in other countries?



Pain mechanisms & therapy

What is Tri-Solfen® & how does it work?

Tri-Solfen® topical anaesthetic formulation:

1. TA's: lignocaine 40.6 g/L, bupivacaine 4.5 g/L
2. haemostatic: adrenalin
3. antiseptic: cetrimide 5 g/L
4. gel matrix

Affordable, immediate, prolonged, practical.

Pain Cascade:

1. Nociception – local anaesthetics
2. Sensitization - NSAIDs
3. Cognition – opioids; & 4. Modulation



PRODUCTION ANIMALS

Impact of topical anaesthesia on pain alleviation and wound healing in lambs after mulesing

S LOMAX,* M SHEIL* and P A WINDSOR**

PRODUCTION ANIMALS

Blocks nociception: rapid & prolonged wound analgesia, reduced pain-related behaviour & improved wound healing!

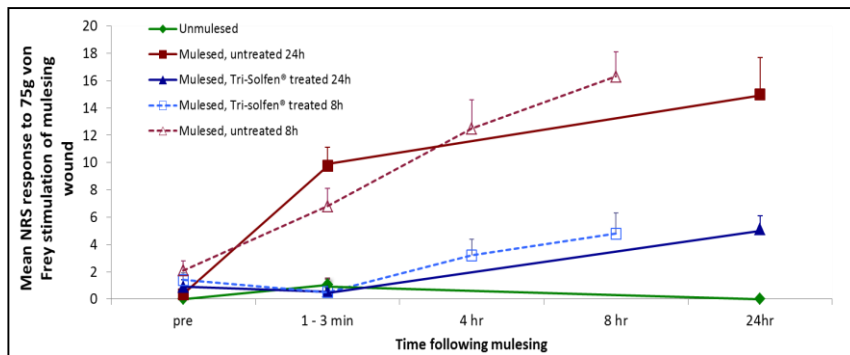
AVJ 96:159

Duration of action of a topical anaesthetic formulation for pain management of mulesing in sheep

S Lomax,** M Sheil* and PA Windsor*

Lasts >24hrs; haemostatic action of adrenalin, barrier effect of gel & inhibition of the inflammatory cascade following blockage of nociception.

AVJ 91:160





THE UNIVERSITY OF
SYDNEY

Tri-Solfen® registered in Australia for calf surgical castration, cauterly disbudding & scoop dehorning



Topical anesthesia mitigates the pain of castration in beef calves

S. Lomax and P. A. Windsor

J ANIM SCI 2013, 91:4945-4952.

doi: 10.2527/jas.2012-5984 originally published online August 21, 2013



J. Dairy Sci. 96:1-9

<http://dx.doi.org/10.3168/jds.2012-5954>

© American Dairy Science Association®, 2013.

The effect of a topical anesthetic on the sensitivity of calf dehorning wounds

C. Espinoza, S. Lomax, and P. Windsor¹

Faculty of Veterinary Science, The University of Sydney, Private Bag 4003 Narellan, New South Wales 2567, Australia



Received: 13 December 2018 | Revised: 28 February 2019 | Accepted: 19 March 2019
DOI: 10.1111/ijwj.13129

ORIGINAL ARTICLE

IWJ WILEY

Innovative pain management solutions in animals may provide improved wound pain reduction during debridement in humans: An opinion informed by veterinary literature

Christopher D. Roberts¹ | Peter A Windsor²

¹Clinical Resolutions, Hessele, UK
²Sydney School of Veterinary Science, Sydney, Australia

Correspondence
Christopher D. Roberts, PhD, Principal Consultant, 378, Boothillery Road, Hessele HU13 0JS, UK.
Email: chris@clinicalresolutions.co.uk

Painful animal husbandry procedures are routinely performed in a range of livestock species without analgesia. Recently, innovative strategies have been developed to address wound pain in these animals. In particular, a farmer-applied “spray and stay” approach that is administered directly to open wounds was developed (Tri-Solfen[®] Medical Ethics Pty Ltd., Melbourne, Victoria, Australia). This strategy anaesthetises the wounds immediately upon their formation, with long-lasting effect. This development, described as a “pain management revolution,” has become firmly established in the Australian livestock industries and has global potential. The positive outcomes of this approach provide insights and highlight potential benefits that may be accrued from its use in human wound care, providing rapid-onset wound analgesia and/or anaesthetising wounds prior to cleansing and debridement procedures. If these benefits are realised from a clinician and patient perspective for wound debridement as an initial indication, it could provide new horizons in pain management for a spectrum of wound-related procedures. Evidence from use in animal husbandry does support the concept that multimodal anaesthesia holds great potential in the field of wound management across many procedures.



- Chronic wounds & ulcers harbor bacterial biofilms
- Need painful debridement
- Esp. diabetes type 2; ‘Medi-Solfen[®]’ in current trials



Journal of Dairy
Science

Available online 25 April 2019
In Press, Corrected Proof



Use of topical local anesthetics to control pain during treatment of hoof lesions in dairy cows

G.T. Stilwell¹, A.M. Ferrador¹, M.S. Santos¹, J.M. Domingues¹, N. Carolino²

Show more

<https://doi.org/10.3168/jds.2018-15820>

Get rights and content

ABSTRACT

Hoof pathologies in dairy cows have a major effect on both production and animal welfare. Trimming of excess or diseased hoof tissue is essential for the treatment of



Pain therapy for husbandry & disease reduces suffering, costs, risks, empowers producers, motivates 'we care' attitude

GREEN, CLEAN & CARING



PROFITABLE & BIOSECURE FOOD SECURITY SYSTEM

Conclusion: FMD Control Programs need effective biosecurity; can a therapeutic intervention motivate this?

ENHANCING TOOLS

	Strategic Vaccination	Movement Controls/Biosecurity	Surveillance Emergency Response	Public Awareness & Biosecurity
INDONESIA 1983	✓	✓	✓	✓
PHILIPPINES 2005	✓/?	✓	✓	✓
SE ASIA/ MEKONG	✓/x	?	?	?

Epidemiology and Infection
cambridge.org/hyg

Review

Cite this article: Blacksell SD, Siengsanon-Lamont J, Kamolsiripichaiporn S, Gleeson LJ, Windsor PA (2019). A history of FMD research and control programmes in Southeast Asia: lessons from the past informing the future. *Epidemiology and Infection* **147**, e171, 1–13. <https://doi.org/10.1017/S0950268819000578>

A history of FMD research and control programmes in Southeast Asia: lessons from the past informing the future

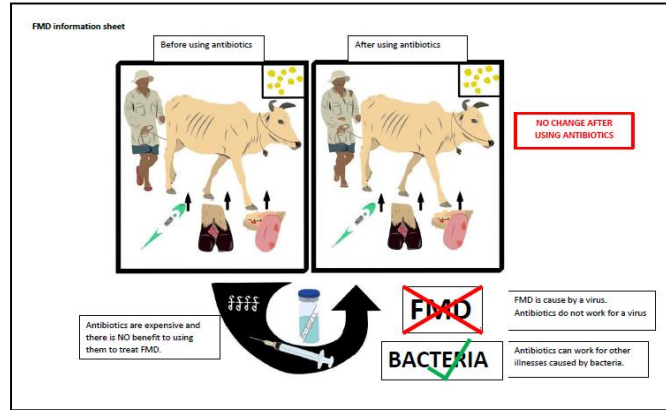
Stuart D. Blacksell^{1,2}, Jarunee Siengsanon-Lamont³, Somjai Kamolsiripichaiporn⁴, Laurence J. Gleeson⁵ and Peter A. Windsor⁶

¹Mahidol Oxford Tropical Medicine Research Unit, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand; ²Nuffield Department of Medicine, Centre for Tropical Medicine and Global Health, John Radcliffe Hospital, Oxford, UK; ³Independent Veterinary Consultant, Canning Vale, Western Australia, Australia; ⁴Independent Veterinary Consultant, Bangkok, Thailand; ⁵Independent Veterinary Consultant, Killarney, Victoria, Australia and ⁶Sydney School of Veterinary Science, University of Sydney, Camden, NSW, Australia

Everything is simpler than you think & at the same time more complex than you imagine.'
Goethe

Late mail & extension materials: Nigeria

Need to reduce antimicrobials in livestock, including FMD as its expense/loss to household, plus risk to food safety & AMR



How do I know if my cow has foot-and-mouth disease?
Usually the first sign is they have a fever and may stop eating and look ill.

They can get ulcers on the tongue and in the mouth and this makes them drool excessively.

They can get ulcers around or between their feet and this makes it painful to walk.

Often they are sick for 1-2 weeks and will lose a lot of weight. A small amount of cattle may die, but most will survive.

They can get ulcers on their teats on their udder, which can make it hard for calves to suckle milk.

EPiVETS

mekonglivestock.wordpress.com

MEKONG LIVESTOCK RESEARCH
ADVANCING SMALLHOLDER LIVESTOCK PRODUCTION AND HEALTH

Success of a 'new medicine' for treating FMD: case report from Laos

mekonglivestock.wordpress.com

Peer-reviewed Journal Articles

2019

Blackburn, B. D., Thompson-Lambert, J., Kamontipichokorn, B., Gleeson, L. A. and P. A. Windsor (2019) A history of FMD research and surveillance in Laos: An Asia lesson from the past informing the future. *Epidemiol. Infect.*, 147:1-13. doi: 10.1017/S0950268819000579

Burns, H. L., Dhanrajasingh, M., Thirupangala, W., Akubaa, M., Wiggan, M. D., Windsor, P. A. and B. D. Blackburn (2019) Foot-and-mouth disease virus (FMDV) genetic diversity and evolution in Laos: Implications for disease eradication in a region of limited connectivity. *PLoS One*, 14(11):e0221830. doi: 10.1371/journal.pone.0221830

Nangprue, S., Kourou, S., Dharel, N. K., Bhat, R. D. and P. A. Windsor (2019) Financial impact of an outbreak of clinically diagnosed bluetongue - a case study from Lao PDR. *PLoS Med.* doi: 10.1371/journal.pmed.1002867

2018

Ashley, R., Windsor, P., Young, J. P., Chan, H. P., Vilvo, S., Sloan, S., Windsor, P. A. and R. D. Bhat (2018) Genetic, epidemiological and seroprevalence of foreign serogroup infections by multivalent cattle vaccines in Cambodia. *Trans. Anim. Health Prod.* 50:83-73. doi: 10.1007/978-94-007-1140-9_7

Ashley, R., Hanson, R., Chan, H. P., Silliman, S., Young, J. P., Windsor, P. A. and R. D. Bhat (2018) A serological and epidemiological investigation of serogroup 1 infections in Cambodia: Implications for multivalent vaccine development and herd immunity to income and food security. *Trans. Anim. Health Prod.* doi: 10.1007/978-94-007-1140-9_8

Burns, H. L., Dhanrajasingh, M., Thirupangala, W., Akubaa, M., Saito, K., Paphan, C., Wiggan, M. D., Windsor, P. A. and B. D. Blackburn (2018) Seroprevalence of foot-and-mouth disease (FMD) virus in selected provinces of Lao PDR's Democratic People's Republic. *PLoS Negl. Trop. Dis.*, 12: e0006141.

doi:10.1371/journal.pntd.0006141

1-4 and 1-5

Cabrera, M. E. D., George, S. D., Windsor, P. A., Bhat, R. D. and J. Sijpesteijn (2018) Comparison of early detection of Foot-and-mouth virus in experimentally infected mummio sheep by real-time PCR, coproantigen ELISA and serodiagnosis. *Vir. Pathol.* 25:85-96. doi: 10.1080/09680965.2018.1513008

Cabrera, M. E. D., George, S. D., Hughes, P., Wilson, R., Malhotra, B., Bhat, R. D. and J. Sijpesteijn (2018) A virus and sample transportable virus egg detection approach for real-time diagnosis of Foot-and-mouth disease from carcasses. *J. Parasitol. Res.* doi: 10.1007/978-94-007-0183-0_20

Adler, A. A., Young, J. P., Nangprue, S., Khinmye, B., Singsangthong, R., Windsor, W., Ashley, R., Hanson, R., Bhat, R. D. and P. A. Windsor (2018) Risk factors for seroprevalence of serogroup 1 foot-and-mouth disease (FMD) virus in an unvaccinated herd in the Greater Mekong Subregion. *Prev. Vet. Med.*, 193:115-121. doi: 10.1016/j.prevetmed.2017.10.007

Nangprue, S., Khinmye, B., Ashley, R. and P. A. Windsor (2018) Seroprevalence of Foot-and-mouth disease virus (FMDV) in unvaccinated herds: lessons from Lao PDR. *Epidemiol. Infect.* doi: 10.1017/S0950268818000440.

2017

Ohno, I., Dye, M. Y., Harshil, M. P., Young, J. P., Nangprue, S., Khinmye, B., Thirupangala, W., Windsor, P. A. and R. D. Bhat (2017) Genetic diversity and evolution of serogroup 1 foot-and-mouth disease virus (FMDV) in Cambodia: Implications for multivalent vaccine development and herd immunity to income and food security. *Trans. Anim. Health Prod.* doi: 10.1007/978-94-007-1140-9_8

Windsor, P. A., Nangprue, S., Puthana, V., Khinmye, B., Jongsomjit, S., Windsor, P. A., Bhat, R. D. and J. Sijpesteijn (2017) The epidemiological challenges in identifying mummio as a good racing strategy from smallholder to commercial production systems. *A. Asia. Trop. Anim. Health Prod.* doi: 10.1016/j.asat.2017.03.008

Windsor, P. A., Nangprue, S., Brown, B., Phommavong, P., Bhat, R. D. and B. Khinmye (2018) Do viral-circulation conditions influence FMD virus entry in control of Foot-and-mouth virus in unvaccinated cattle production in Lao PDR? *Animal Health Prod.* doi: 10.1017/AH17058

2017

Cabrera, M. E. D., Windsor, P. A., Bhat, R. D. and J. Sijpesteijn (2017) Seroprevalence of a highly sensitive multivalent serogroup 1 vaccine in unvaccinated herds in Lao PDR. *PLoS One*, 12(11):e0180883. doi: 10.1371/journal.pone.0180883

Ohno, I., Dye, M. Y., Young, J. P., Sloan, S., Thirupangala, W., D. Windsor, P. A. and R. D. Bhat (2017) Seroprevalence of serogroup 1 foot-and-mouth disease virus (FMDV) in Cambodia: Implications for multivalent vaccine development. *Trans. Anim. Health Prod.* doi: 10.1007/978-94-007-1140-9_7

Ohno, I., Young, J., Silliman, R., Chanthavongthong, P., Khinmye, B., Nangprue, S., Ashley, R., Ashley, R. and P. A. Windsor (2017) Seroprevalence and herd immunity to income and food security in unvaccinated herds in Lao PDR. *Epidemiol. Infect.* doi: 10.1017/S0950268817000440

Foot and mouth disease. This site uses cookies. By continuing to use this website, you agree to our use of cookies. You can manage your cookie settings here. [Privacy Policy](#)

Improving biosecurity
Extension materials:
www.close.thegate.net

FMD affected animals prior, during & after TS therapy

Comfortably numb! What other diseases?

Hyperaesthetic & upset



Responded immediately

