

# The design of fit-for-purpose and sustainable surveillance

*David Paton*  
*The Pirbright Institute*  
*david.paton@pirbright.ac.uk; dajapaton@gmail.com*

## WHY?

To develop and support control measures and monitor their progress

## WHAT?

Actions that provide information about infection, disease and immunity in the susceptible animal population

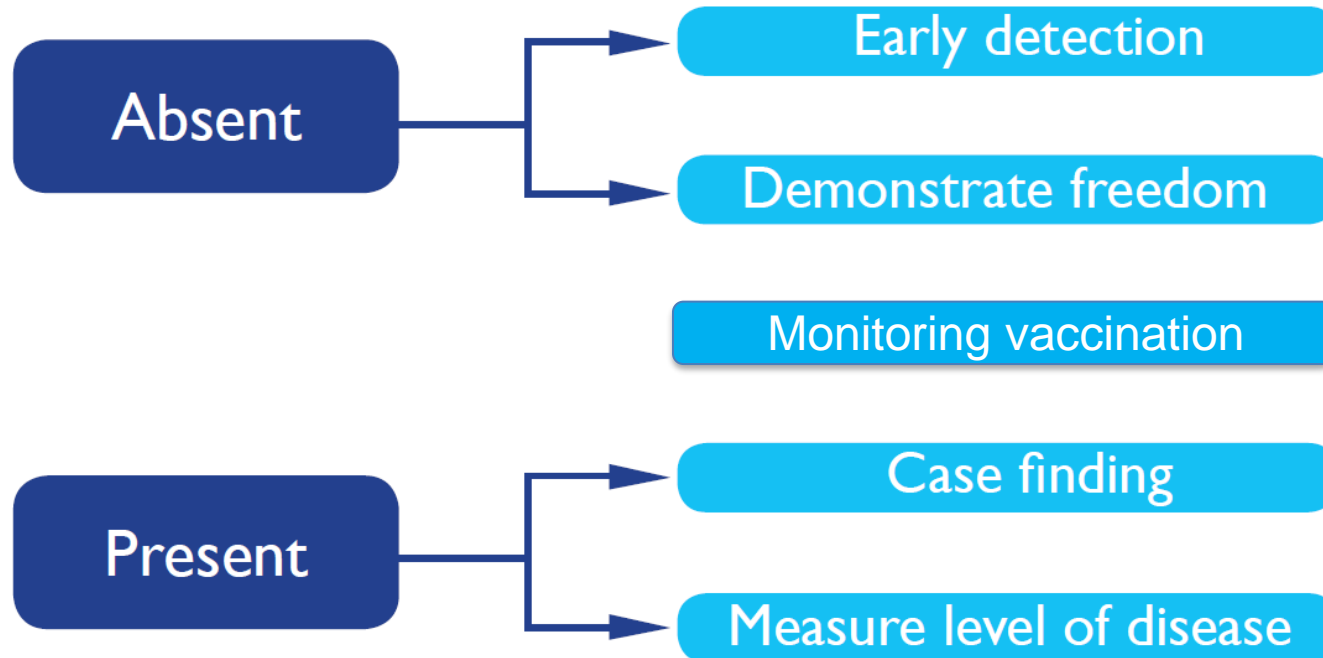
# Manual of Basic Animal Disease Surveillance

Dr. Angus Cameron

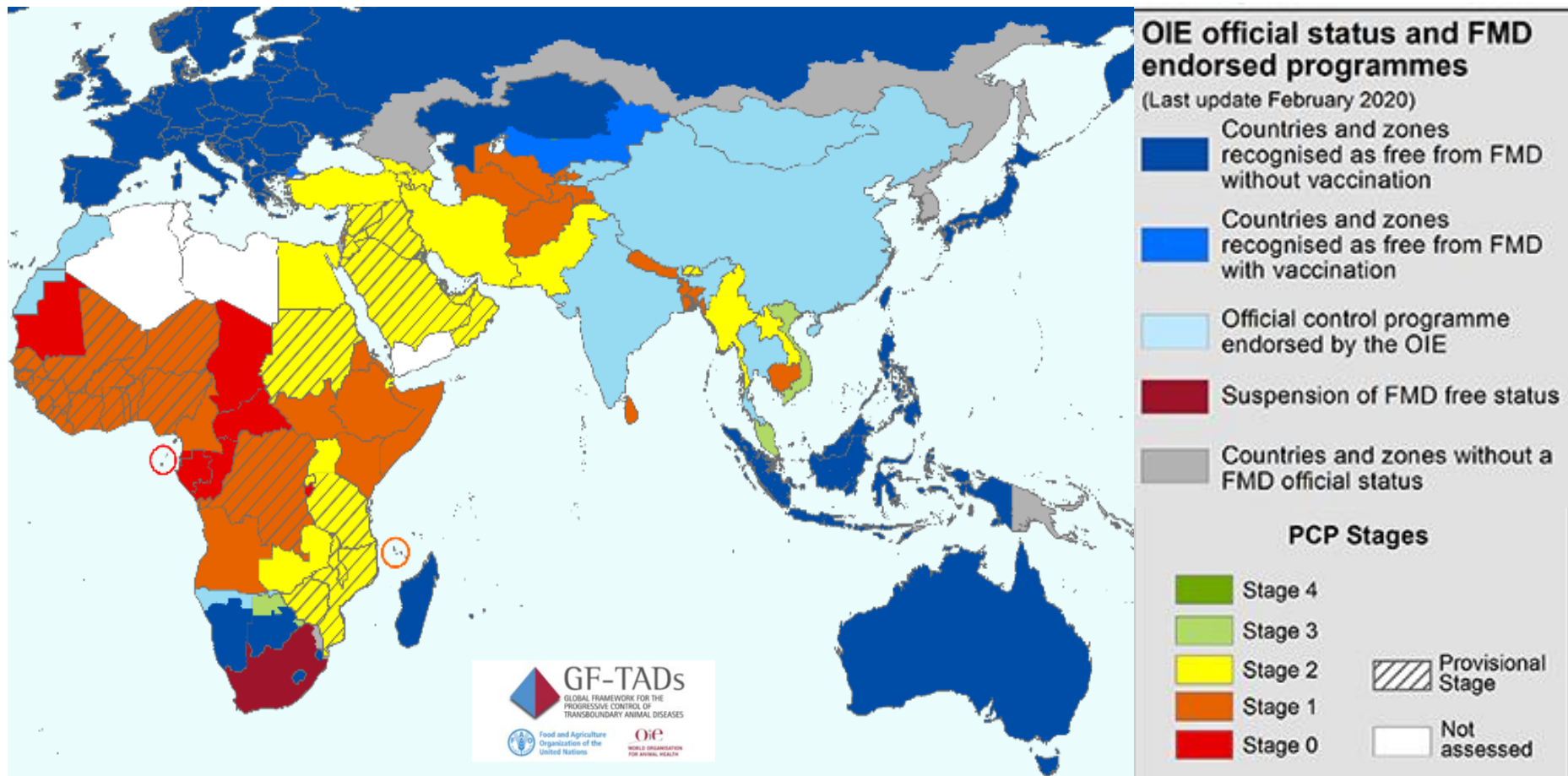
## PURPOSES OF SURVEILLANCE

Before considering how to best implement animal disease surveillance, we should first have a clear understanding of why we need to do surveillance. There is a large number of reasons why veterinary authorities undertake surveillance activities, but these can be summarised into four general purposes:

- Demonstrating freedom from disease
- Early detection of disease
- Measuring the level of disease
- Finding cases of disease



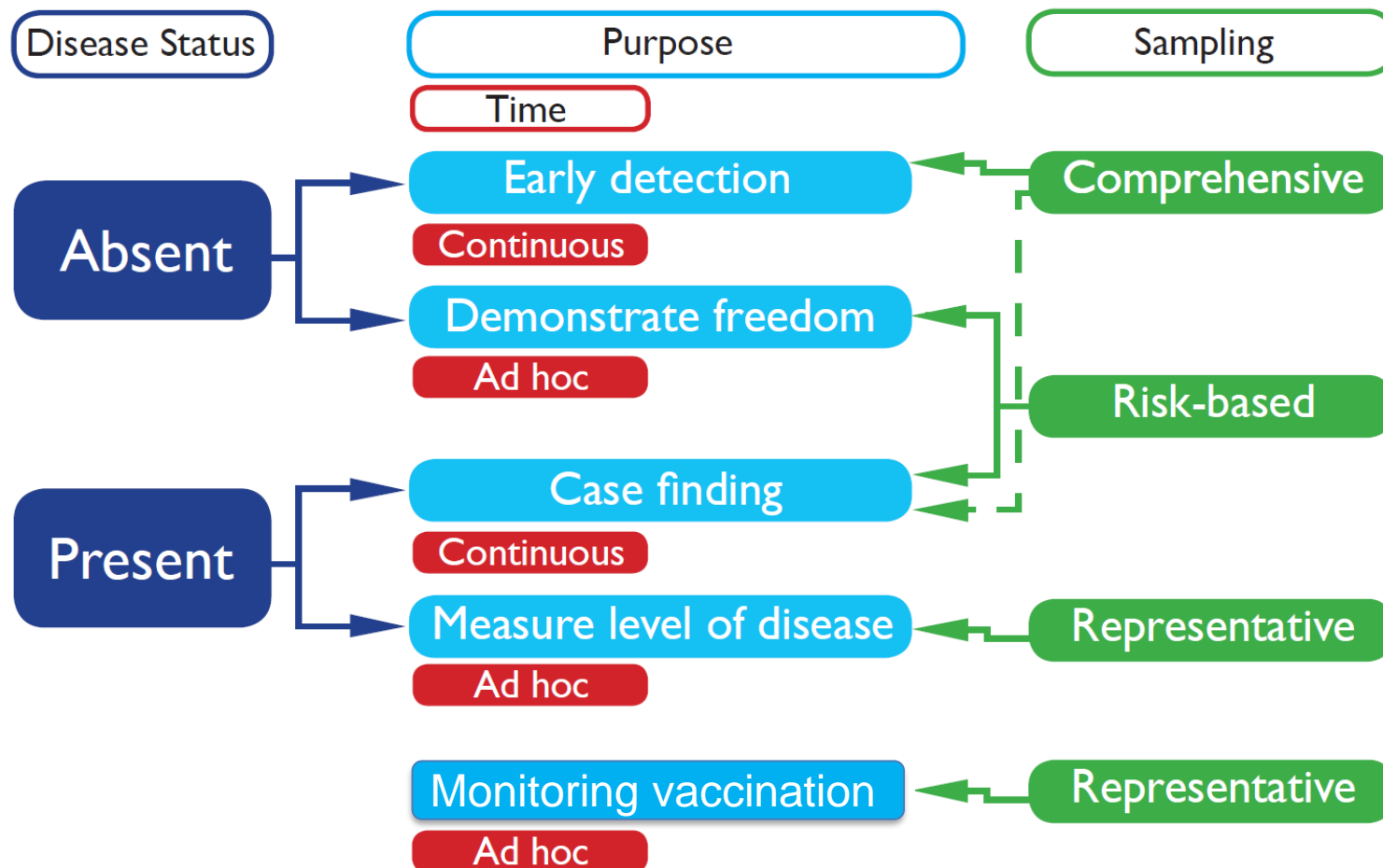
# Countries in SE Asia at Different Stages of FMD Control



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The requirements for different surveillance purposes are summarised in the figure below.



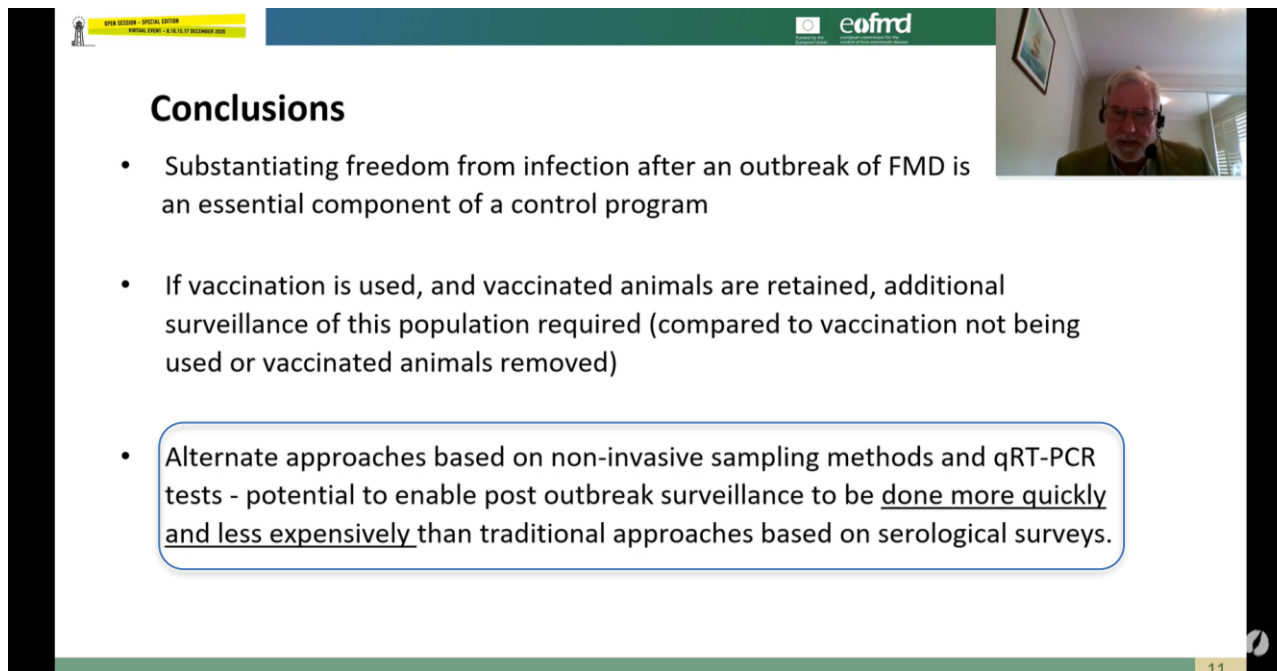
# FMD Surveillance Tools

Tool	Value	Considerations
Passive	Case finding / early detection High coverage / continuous	Clinical recognition Incentives/disincentives Participatory disease surveillance (PDS)
Clinical inspections	Case finding Case investigation	Abattoirs; Risk based; Follow-ups
Infection serosurveys	Estimate prevalence Substantiate freedom	Importance of design and metadata Se/Sp challenges
Virological screening	Alternative or supplement to infection serosurveys	Targeting / coverage
Immunity serosurveys	Vaccination monitoring	Monitoring implementation versus protection
Information gathering on associations	Risk analysis Awareness/attitudes Cost-benefit	Animal movements; impacts; vaccine coverage; questionnaires; PDS

# Something new?

Alternative surveillance approaches using RT-PCR (bulk milk tank, oral swabs, saliva samples) for regaining freedom after outbreaks

<https://www.youtube.com/watch?v=6mbrcWHzf14>



The screenshot shows a video conference interface. At the top, there is a banner with the text "OPEN SESSION - SPECIAL GUEST" and "FMD FREE ZONE - 18 JULY 17 12:00PM GMT". To the right of the banner is the "eofmd" logo. The main content area is titled "Conclusions" and contains a bulleted list. A small video window in the top right corner shows a man with a beard and glasses, wearing a headset, speaking. The slide number "11" is visible in the bottom right corner.

**Conclusions**

- Substantiating freedom from infection after an outbreak of FMD is an essential component of a control program
- If vaccination is used, and vaccinated animals are retained, additional surveillance of this population required (compared to vaccination not being used or vaccinated animals removed)
- Alternate approaches based on non-invasive sampling methods and qRT-PCR tests - potential to enable post outbreak surveillance to be done more quickly and less expensively than traditional approaches based on serological surveys.

# How is surveillance used and sustained



## Monitoring and evaluation

- Is the information collected timely and sufficient?
- Is its analysis timely and sufficient?
  - Calculating measures of prevalence, incidence and immunity
  - Describing temporal and spatial patterns of FMD
  - Identifying and quantifying risk factors for FMD
  - Estimating the effectiveness of vaccines and vaccination
- Is it having any impact on control and future surveillance?

## Planning for sustainability

- Feasibility and cost-benefit
- Core functions versus one-off activities

# Surveillance problems in applications to OIE

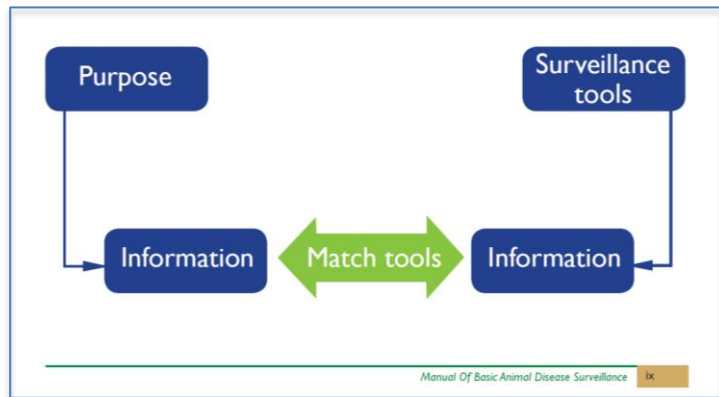


- Evidence of implementation and effectiveness
- Under-reporting and investigation
- Knowledge of illegal activities
- NSP serosurvey design and interpretation
  - Design prevalence and age of sampled animals
  - Follow-up investigations – epi, lab, timeliness
- Implementation and effectiveness of vaccination
- Aggregation of data

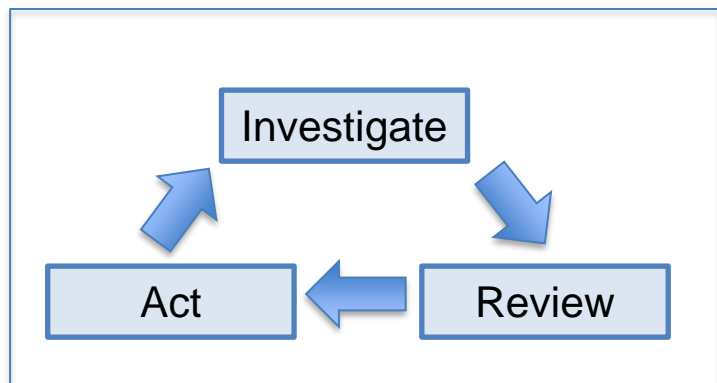


# Conclusions

Different approaches according to need and feasibility



Surveillance should lead to action and better surveillance and control





# References



# OIE Terrestrial Animal Health Code (2019)

## CHAPTER 1.4. ANIMAL HEALTH SURVEILLANCE

[https://www.oie.int/index.php?id=169&L=0&htmfile=chapitre\\_surveillance\\_general.htm](https://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_surveillance_general.htm)

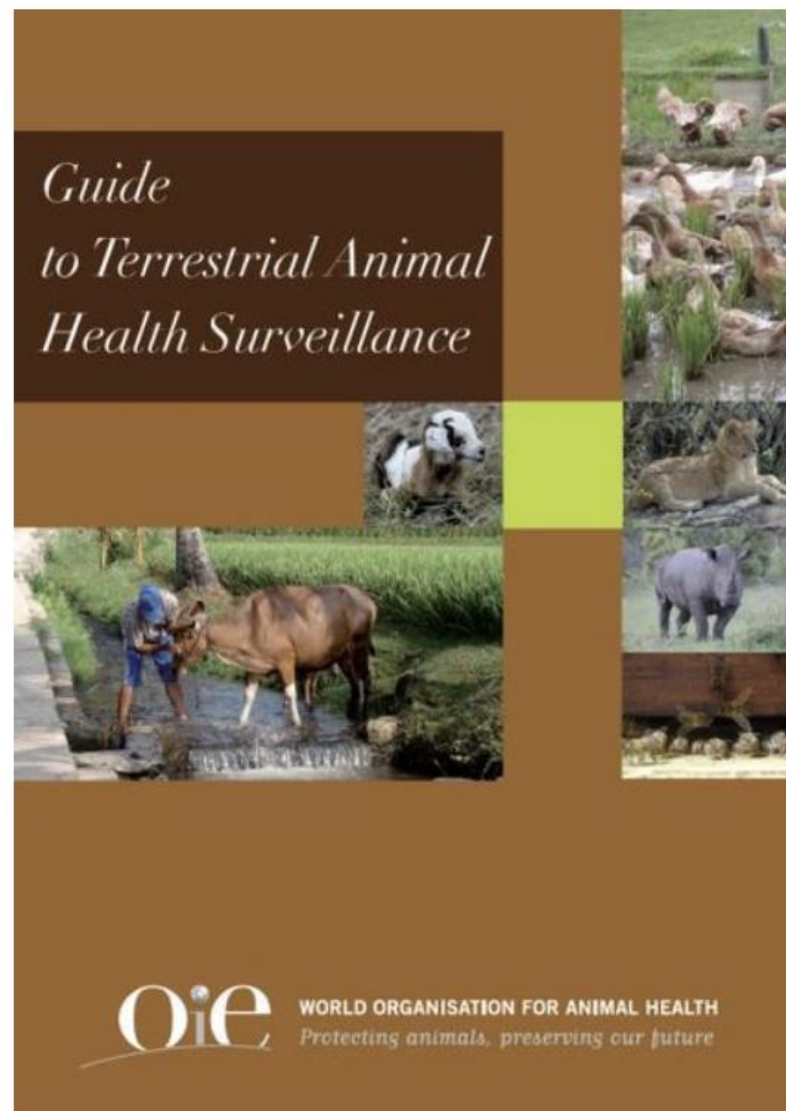
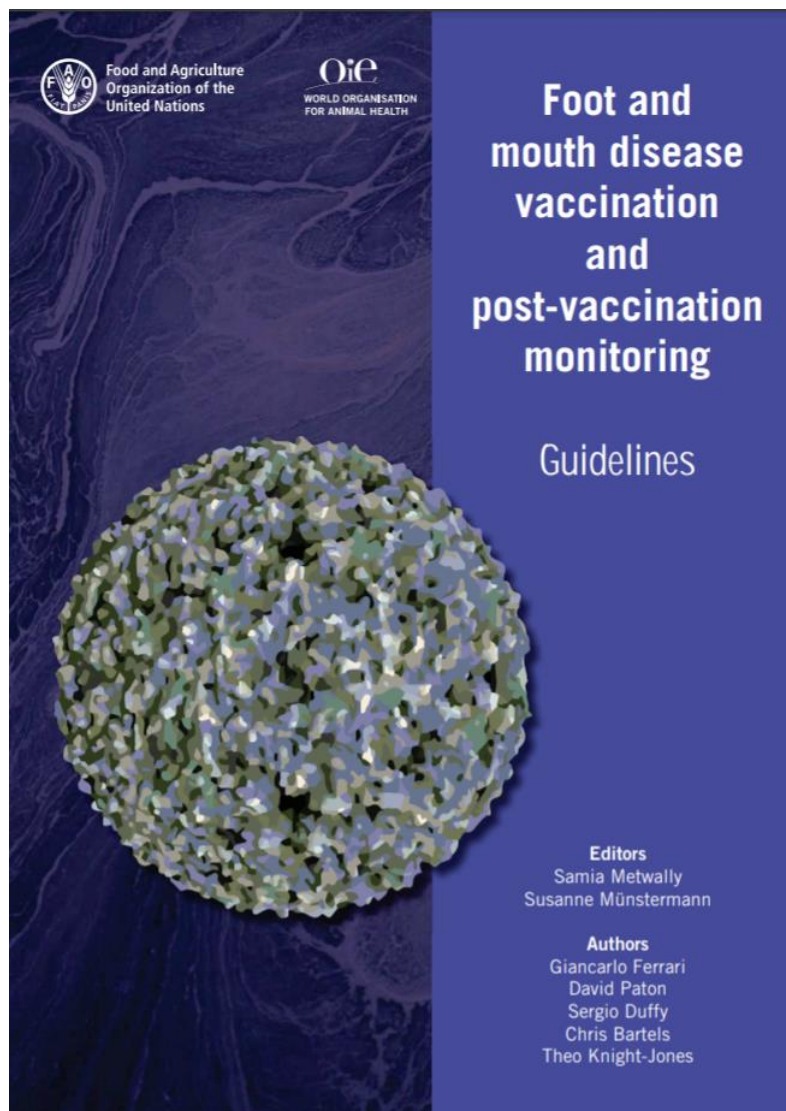
## CHAPTER 8.8. INFECTION WITH FMDV

[https://www.oie.int/index.php?id=169&L=0&htmfile=chapitre\\_fmd.htm](https://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_fmd.htm)

Article 8.8.41. Methods of surveillance

Article 8.8.40. General principles of surveillance

Article 8.8.42. The use and interpretation of serological tests



Guide to Terrestrial Animal Health Surveillance Brückner G. (ed.), Knopf L. (ed.), Mac Diarmid S.C. (ed.), Munstermann A.S. (ed.), Cameron A., Mariner J.C., Paisley L., Parmley J., Roger F., Scott A., Willeberg P., Wolhuter M. Ed. OIE 2014 (cover)



<http://www.fao.org/3/a-i5975e.pdf>

# Manual 5. Surveillance and epidemiology (2018)

<https://rr-asia.oie.int/wp-content/uploads/2019/09/seacfmd-manual-5.pdf>

**Table 1. Surveillance needs for different countries at different stages in FMD control and/or involvement in trade in animals and animal products (Cameron, 2012)**

Country type	Surveillance needs
Endemic disease control program	<ul style="list-style-type: none"><li>– Priority setting: surveillance to establish the level of disease</li><li>– Monitoring program effectiveness: surveillance to measure level of disease at intervals before and after a control program, also surveillance to measure the level of immunity in a vaccinated population (see manual on vaccination and post-vaccination monitoring)</li><li>– Identifying areas/sub-populations where different levels of disease are present and identifying risk-factors (helps to identify areas of high prevalence which may represent critical points for targeting control measures, or areas of low prevalence/absence of disease which may be suitable for establishing zones)</li><li>– Case finding: usually less applicable to FMD, except in vaccinated populations where surveillance may involve searching for FMD infected animals/detecting isolated disease foci (testing for NSP-antibodies in a vaccinated population)</li></ul>
Exporting countries	<ul style="list-style-type: none"><li>– Demonstration of freedom from disease (in the whole country or a zone)</li><li>– Estimating disease prevalence for risk analysis (if unable to demonstrate freedom from disease)</li><li>– Describe distribution of disease to support zoning</li><li>– Early detection of disease incursions</li></ul>
Importing countries	<ul style="list-style-type: none"><li>– If the importing country wishes to prohibit imports from countries where FMD is present, it will need to conduct surveillance, either to demonstrate freedom from disease or as part of an effective control program</li></ul>

Good coverage of participatory surveillance approaches

# ***Manual of Basic Animal Disease Surveillance***

***Dr. Angus Cameron***



AFRICAN UNION  
**INTERAFRICAN BUREAU  
FOR ANIMAL RESOURCES**

Interafrican Bureau for Animal Resources (IBAR)  
African Union (AU)  
P.O.Box 30786 code 00100  
Nairobi, Kenya  
[ibar.office@au-ibar.org](mailto:ibar.office@au-ibar.org)  
[www.au-ibar.org](http://www.au-ibar.org)

tmt\_20130131\_manual\_of\_basic\_animal\_disease\_surveillance\_en.pdf

Risk-based surveillance guidelines <http://www.fao.org/3/a-i4205e>

Manual on Livestock Disease Surveillance and Information Systems  
<http://www.fao.org/3/x3331e/X3331E01.htm>

Manual 5. Surveillance and epidemiology  
<https://rr-asia.oie.int/wp-content/uploads/2019/09/seacfmd-manual-5.pdf>

The RiskSur EU project developed resources for designing risk-based surveillance systems <https://www.fp7-risksur.eu/>.

Graeme Garner presentation at EuFMD OS20 comparing traditional and alternative surveillance approaches (bulk milk tank, oral swabs, saliva samples) for regaining freedom after outbreaks <https://www.youtube.com/watch?v=6mbrcWHzf14>

Reporting guidelines developed in EU setting but principles are applicable  
<https://github.com/SVA-SE/AHSURED/wiki>  
<https://github.com/SVA-SE/AHSURED/wiki/AHSURED-checklist>  
<https://github.com/SVA-SE/AHSURED/wiki/Description-of-surveillance-items-in-the-checklist> (there is also a publication explaining the development process <https://www.frontiersin.org/articles/10.3389/fvets.2019.00426/full> )



Thanks for your attention