

GF-TADs Foot and Mouth Disease Risk Assessment Training Workshop

19 - 21 September 2023 Johannesburg, South Africa



WOAH Reference Laboratories for Foot and Mouth Disease

Challenges and oppertunities

Dr Livio Heath

Onderstepoort Veterinary Institute
Agricultural Research Council
South Africa institution

Onderstepoort Veterinary Institute

Mission

To provide scientific support for Veterinary Services in effective risk management for quality of life for all in South Africa.

- ▶ OVI promotes animal health and welfare by providing effective veterinary diagnostic and research services.
- ▶ OIE Reference Laboratory / FAO Collaborating center for Foot and Mouth Disease

TAD Diagnostic Laboratory

- OIE/FAO Reference laboratory for FMD
- OIE/FAO Reference Laboratory for African swine fever
- National Reference Laboratory for PPR.
- SANAS ISO 17025 accredited.

FMD Diagnostic Capacity

Clinical Diagnosis

Clinical signs
Lesions
Sampling and shipment

Virus Isolation

Cytopathic Effect
Vaccine Matching

Molecular Testing

Polymerase Chain Reaction (PCR)
Sequencing
Phylogenetic analysis

Biobanks

Reference material
Virus Repository
Serum Bank

Antibody Detection

Competitive ELISA
Non-structural Protein ELISA
Virus Neutralization

ISO 17025 Accredited



Challenges facing FMD Diagnostics

- ▶ Lack of diagnostic testing facilities and capacity at regional and national level.
- ▶ Lack of harmonization of diagnostic methods and quality assurance, biosafety and biosecurity systems.
- ▶ Lack of reference material and Diagnostic reagents.
- ▶ Lack of epidemiological information pertaining to outbreaks.

Diagnostic Support

- ▶ The reference laboratory provides diagnostic testing to member countries where national and region capacity does not exist .
- ▶ **Primary or Confirmatory testing is done at no cost to the member state**
- ▶ The laboratory can assist with passive and active surveillance, but the sender will be charged for the tests conducted.
- ▶ Shipment of samples are often difficult, but the reference laboratory can assist with the logistics and authorization.
- ▶ An FMD proficiency testing scheme will be launched in 2023.

Capacity building and Training

▶ Regional support and training

Namibia (FMD and ASF)

Mauritius (FMD and ASF)

Botswana (FMD)

Malawi (FMD, ASF, PPR)

Uganda (FMD)

Nigeria (FMD, ASF, PPR)

Mozambique (FMD and ASF)

Zimbabwe (FMD and ASF)

SADC training courses (Diagnostics and disease surveillance)



Outbreak Investigations

- ▶ The reference laboratory can assist with outbreak investigation.
- ▶ Our outbreak response team is available to assist with the clinical diagnosis of FMD, collection of samples and advise on appropriate control measures.
- ▶ Primary or Confirmatory testing is done at no cost to the sender.
- ▶ Member states will receive a detailed report including information on:
 - ▶ the FMD status of animal/herds
 - ▶ Serotyping
 - ▶ Genetic relationship
 - ▶ Vaccine matching



FMD Vaccination in South Africa

- The ARC recently registered its FMDV vaccine under Act 36.
- It is anticipated the locally produced vaccine would be available for use in 2023.

ONDERSTEPSPOORT FMD VACCINE
TRIVALENT
SAT 1; 2 & 3 STRAINS
FOR VETERINARY USE ONLY

Reg. No. G 1944 Act 36/1947



Montanide™ ISA 206 VG adjuvanted vaccine for intramuscular immunisation of cattle, sheep, goats and pigs against Foot and Mouth Disease.

CATTLE DOSAGE: 2 ml (Total doses: 50 doses)	100 ml
SMALL STOCK DOSAGE: 1 ml (Total doses: 100 doses)	Net volume

Formulation date: _____ Batch No: _____ Expiry date: _____

Store: 4 – 10 °C & Shake before use

Onderstepoort Veterinary Research, 100 Old Soutpan Road, Onderstepoort, 0110


FMD Diagnostic Services R & D

Validation of Diagnostic Assays

Objective	Expected Outcome
Validation of FMD serological assays in goats	FMD serological assays appropriate for use in goats
Validation of FMD serological assays in wild antelope	FMD serological assays appropriate for use in wildlife

ARC Staff Involved:

Pamela Opperman

Nazeem Cassim

Livio Heath

FMD Diagnostic Services R & D

FMDV Serological assay development

Objective	Expected Outcome
Development of alternative vaccine matching assays	ELISA-based assays for determination of R values (linked with FMD VP)
Identification of FMDV B-cell epitopes using phage display	Identification of cross-reacting epitopes and development of alternative serological assays (similar work being done in VDD)

ARC Staff Involved:

Nazeem Cassim
Pamela Opperman
Livio Heath

FMD Diagnostic Services R & D

FMDV Molecular assay development

Objective	Expected Outcome
Genetic adaptation FMDV during experimental infections and natural outbreaks	Protocol for Full genome sequencing of FMDV Identifying the source of FMD outbreaks and tracking its spread. (linked to VDD)
Implementation of point-of-care molecular assays for FMDV surveillance and Diagnosis.	Access to validated molecular assays for in-field application

ARC Staff Involved:

Danica van Der Merwe
Juanita van Heerden
Keneiloe Malokotsa
Refiloe Malesa
Livio Heath

OIE Reference Laboratories

- ▶ Cross-border has spread emphasized the need for global cooperation to fight this disease.
- ▶ Rapid and accurate diagnosis remain a critical component of FMD control programmes.
- ▶ Collaboration between reference laboratories and national laboratories are encouraged.



**OIE/FAO Reference Laboratory
Network for Foot-and-Mouth Disease**

Dr Livio Heath

Onderstepoort Veterinary Institute
Agricultural Research Council
Onderstepoort 0110
South Africa

Tel: +27-12 529 95.01 Fax: +27-12 529 95.95

Email: HeathL@arc.agric.za