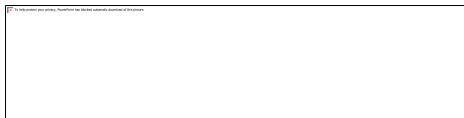




UPDATE ON THE CURRENT FMD GLOBAL SITUATION

Anna Ludi & Donald King

Acknowledgements: Valerie Mioulet, Nick Knowles, Ginette Wilsden, Andrew Shaw, Nick Lyons, Mehreen Azhar, Hannah Baker, Antonello Di Nardo, Bob Statham, Lissie Henry, Jemma Wadsworth, Clare Browning, Britta Wood, Alison Morris, Abid Bin-Tarif, Ashley Gray, Beth Johns, Mark Henstock, Hayley Hicks, David Paton, Dexter Wiseman, Julie Maryan, Sarah Belgrave



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Food & Rural Affairs

OIE/FAO
Foot-and-Mouth Disease
Reference Laboratories
Network



Oie
FMD Reference Laboratory

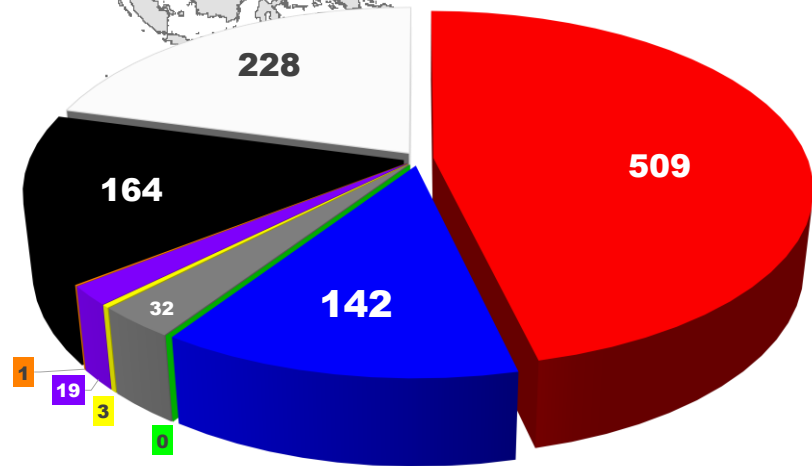
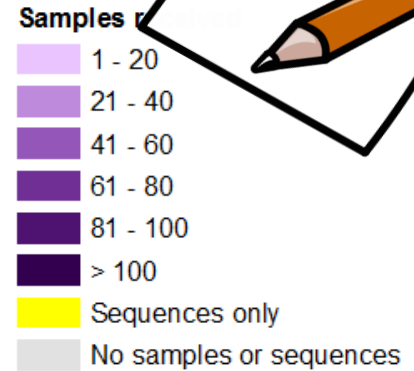
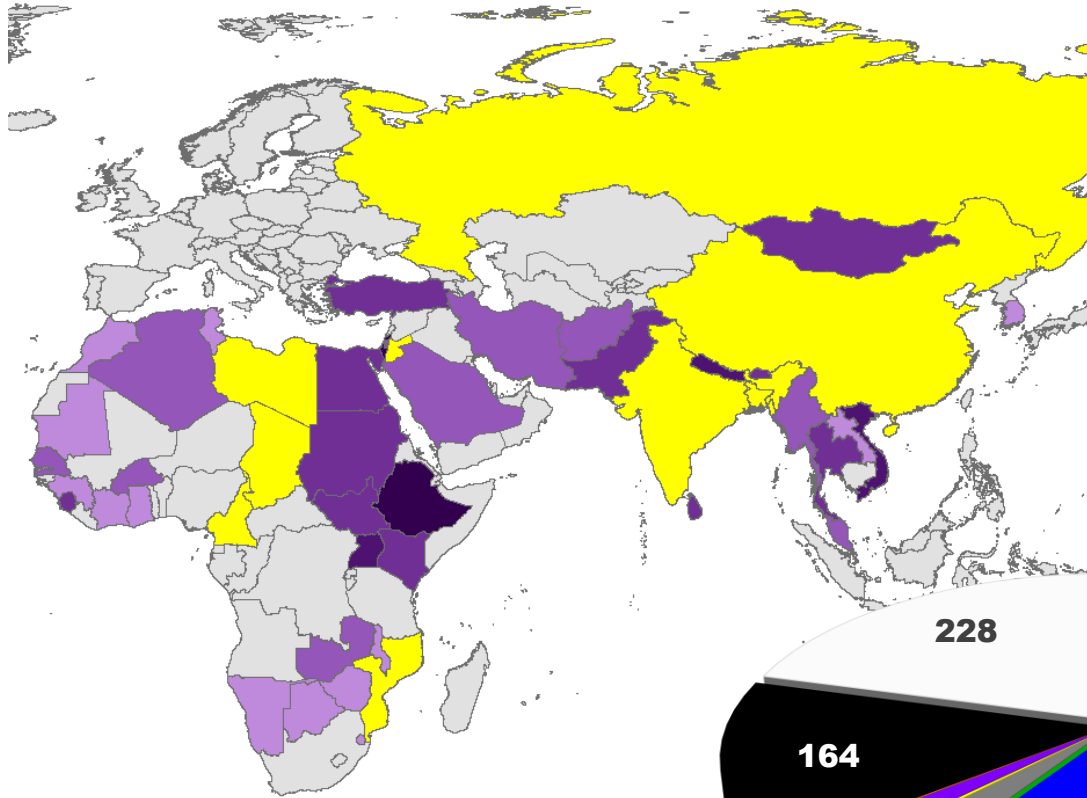


**Global Foot-and-Mouth Disease
Research Alliance**

Advancing FMD research by bridging the
gaps with novel tools

Samples and sequences received at WRLFMD

October 2017 – September 2019 (1096 clinical submissions)



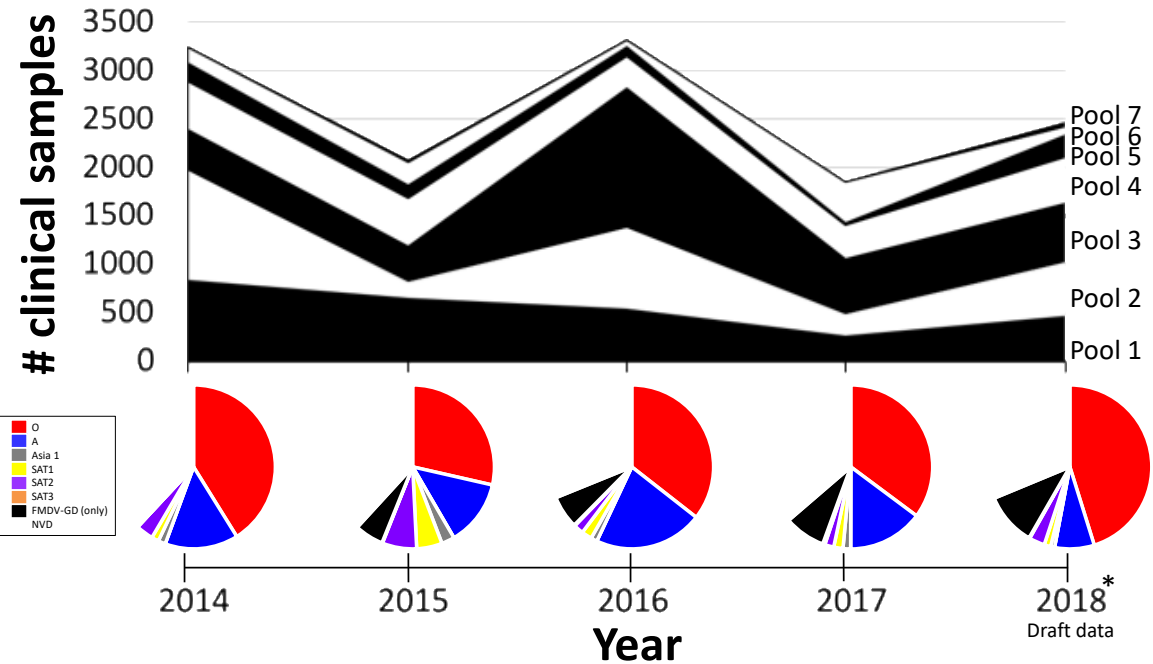
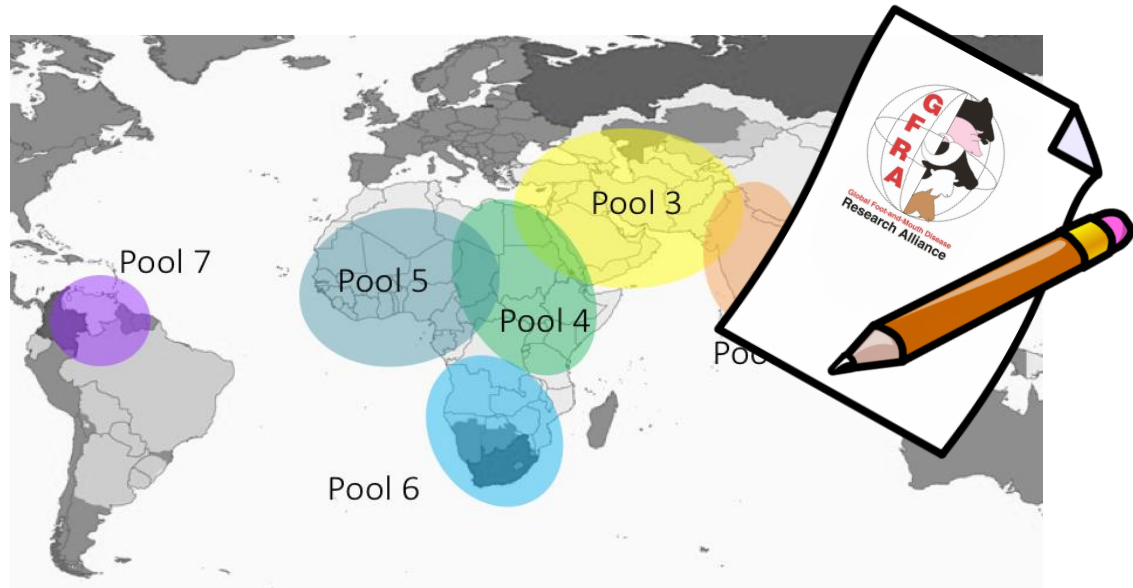
Results/reports can be retrieved from:

www.wrlfmd.org

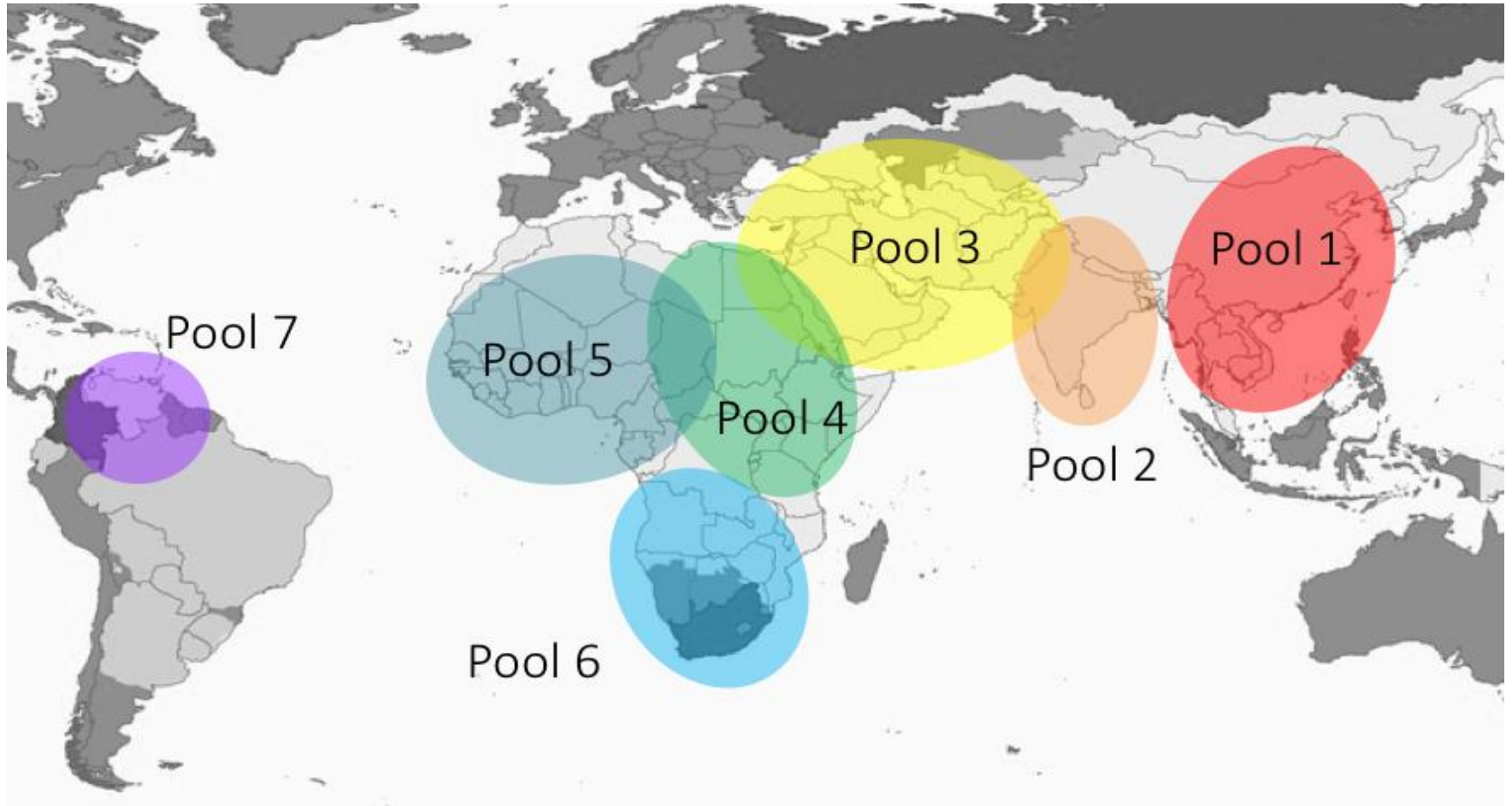
■ O ■ A ■ C ■ Asia-1 ■ SAT 1 ■ SAT 2 ■ SAT 3 ■ FMDV GD ■ NVD

Samples tested by the OIE/FAO FMD Laboratory Network

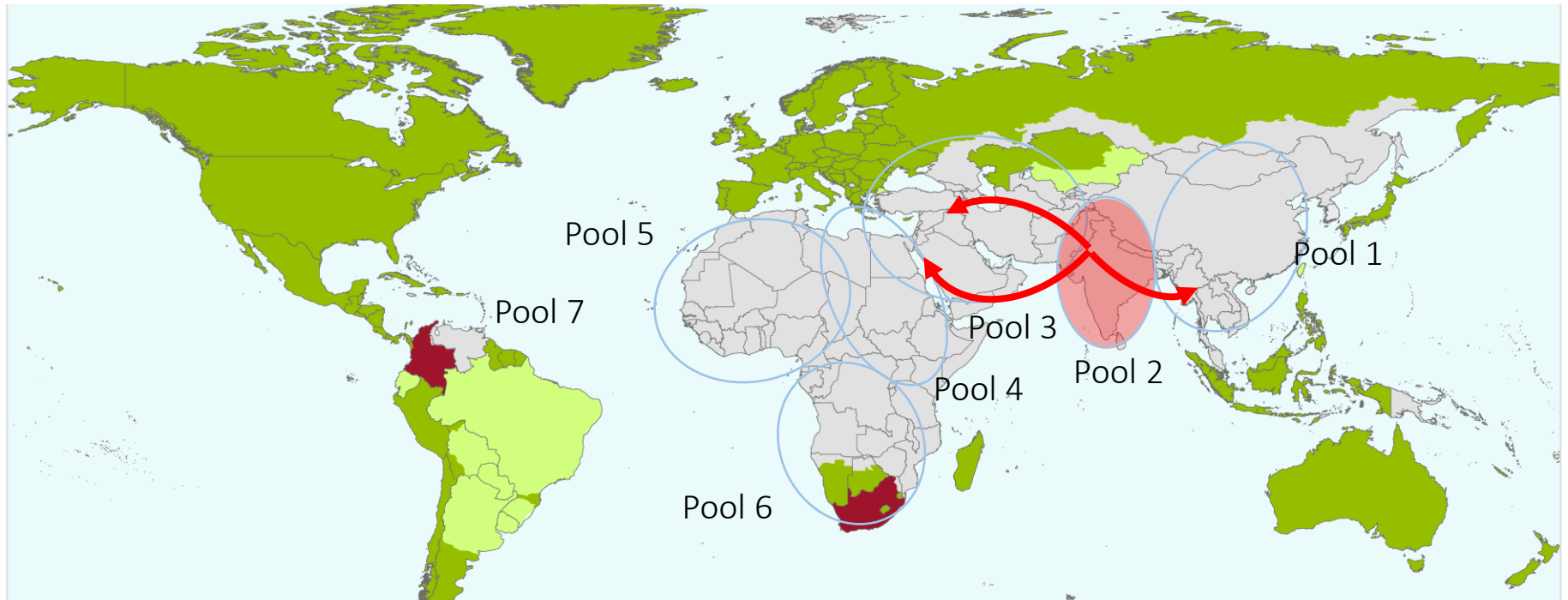
- 2000-3500 samples tested annually
- Data used to define relative importance of different FMD virus lineages in each Pool
- Surveillance gaps in Pool 5 (W. Africa) and Pool 6 (S. Africa)
- Reports available: <http://www.foot-and-mouth.org/>



Virus movement from South Asia



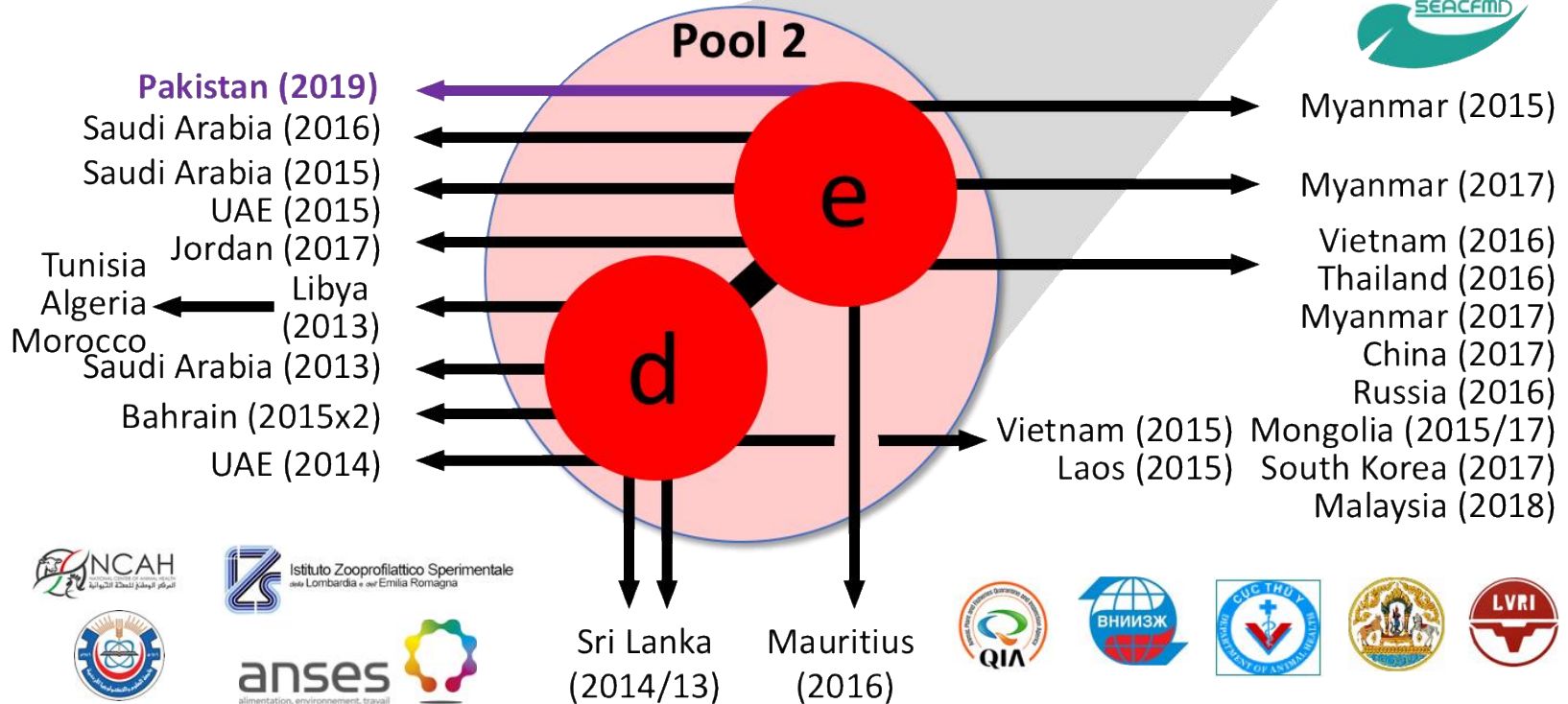
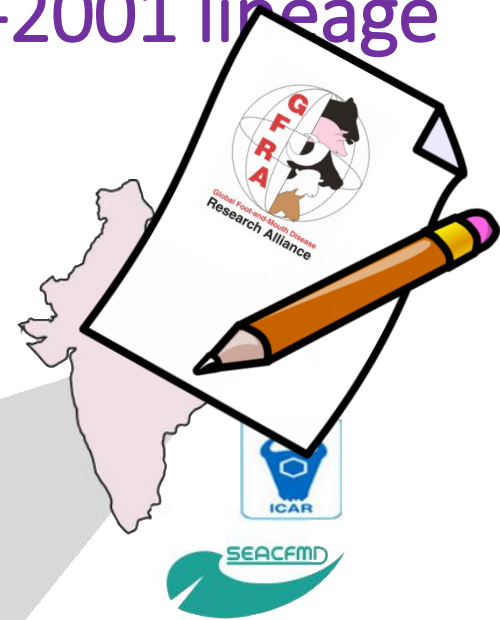
Recent “trans-pool” spread from Pool 2



- Spread of FMD viruses endemic from Pool 2 (India, Bangladesh, Nepal, Bhutan)
- 2015: **A/ASIA/G-VII** into West Eurasia (Iran, Turkey, Saudi Arabia, Armenia and Israel)
- 2017: **serotype Asia 1** into Myanmar

Further expansion of the O/ME-SA/Ind-2001 lineage from pool 2

First detection in a West Eurasian hub-country with potential for onward spread

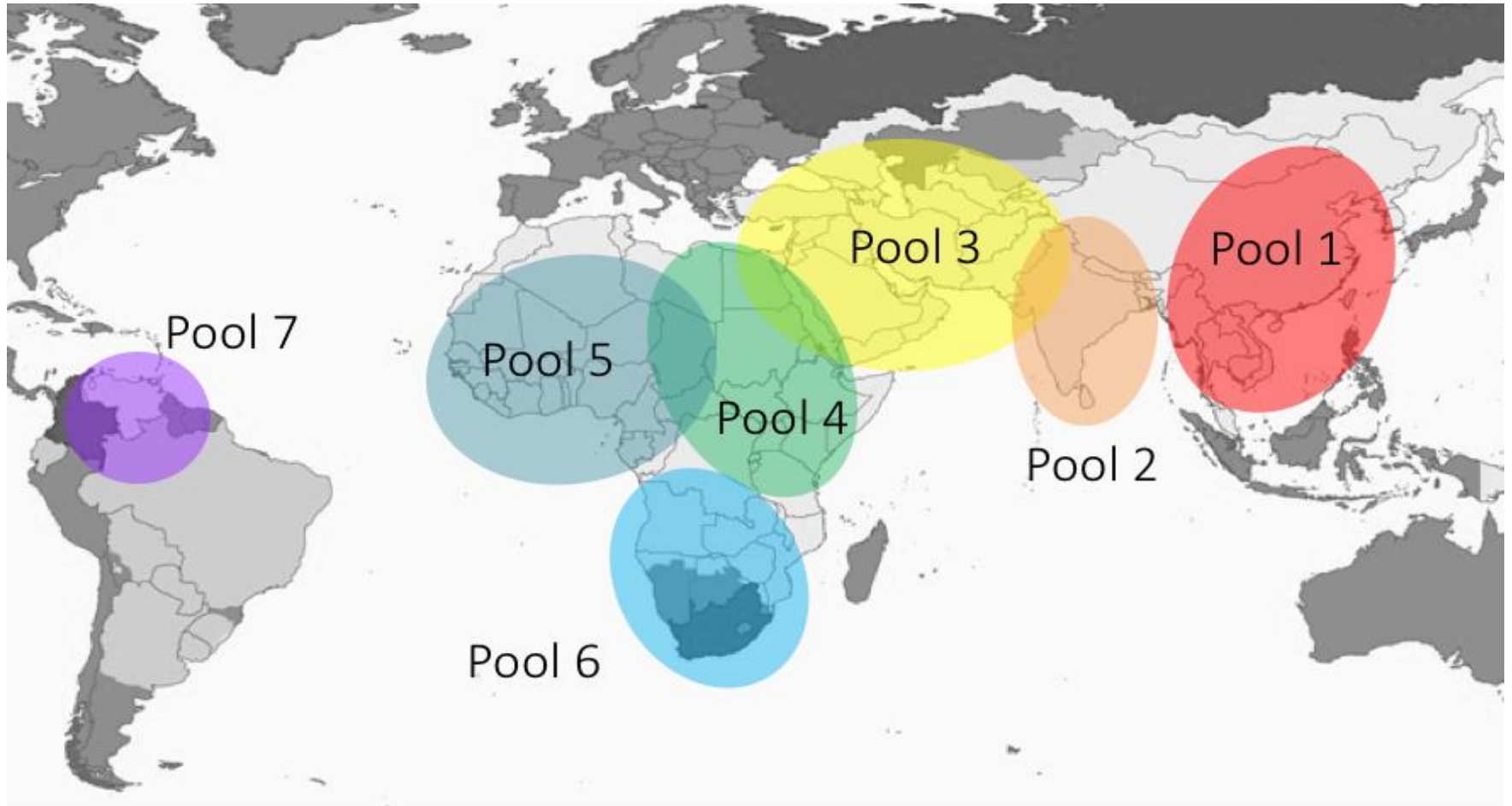


Sri Lanka (2014/13)

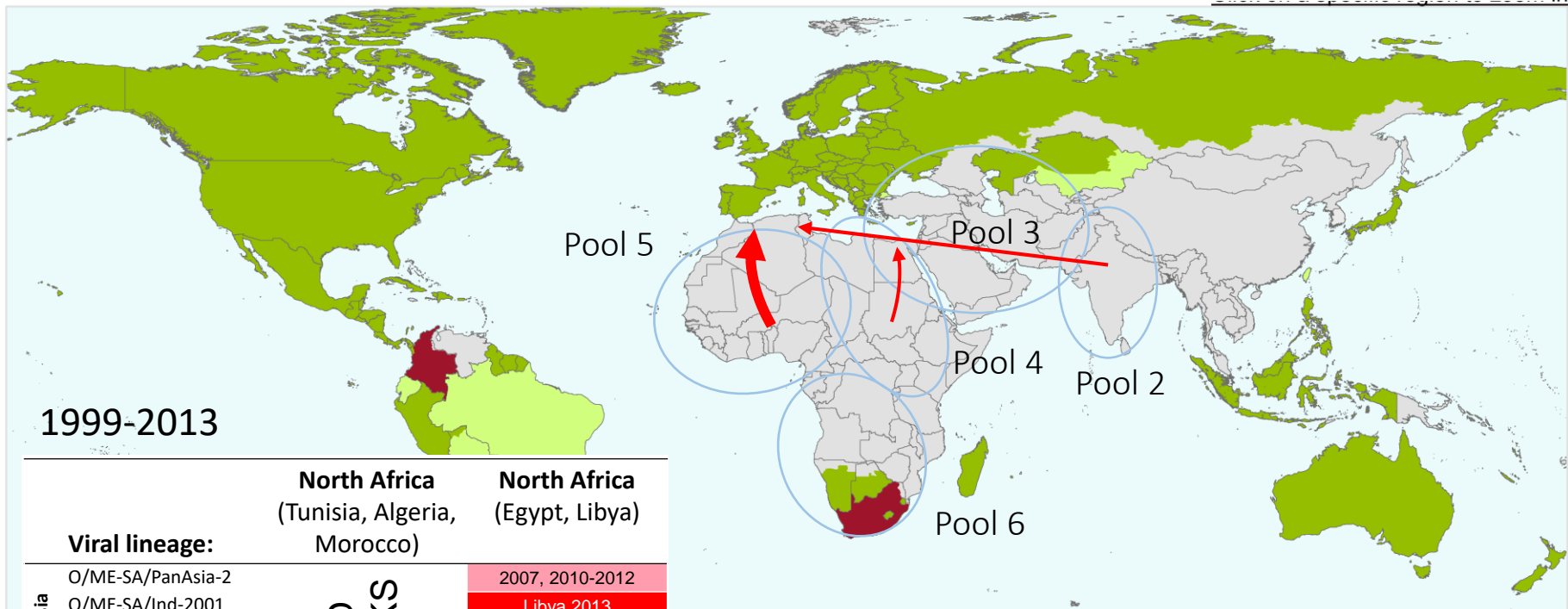
Mauritius (2016)



Outbreaks in North Africa (Maghreb)



New FMD outbreaks in North Africa (Maghreb), new threats to Europe?



1999-2013

	North Africa (Tunisia, Algeria, Morocco)	North Africa (Egypt, Libya)
Viral lineage:		
From Asia		
O/ME-SA/PanAsia-2		2007, 2010-2012
O/ME-SA/Ind-2001		Libya 2013
A/ASIA/Iran-05		2009-2011, 2013
A/ASIA/G-VII		
Asia-1		
From Africa		
O/EA-3		2012-2013
O/ME-SA/Sharqia-72		2006, 2008, 2011
A/AFRICA/G-IV		2012-2013
A/AFRICA/G-VII		2006, 2009, 2012
SAT 2 topotype VII		2012-2013

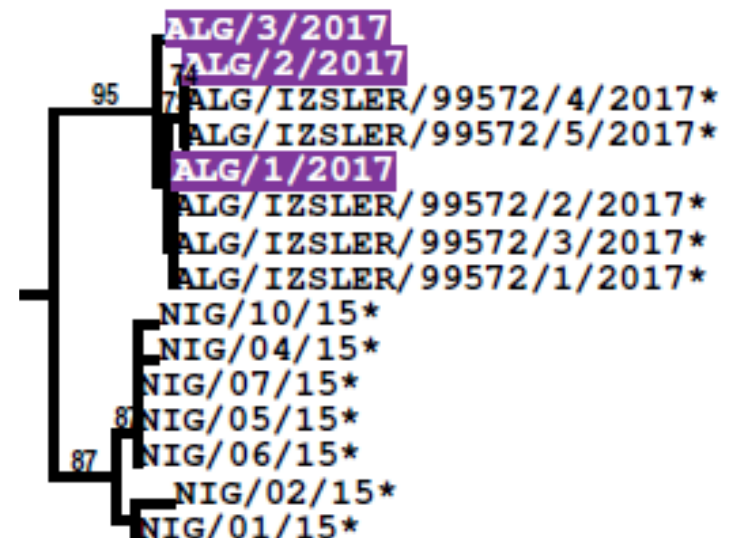
**NO REPORTED
FMD OUTBREAKS**

- 2013-2015: O/ME-SA/Ind-2001
- 2017: A/AFRICA/G-IV
- 2018/19: O/EA-3

FMD cases in Algeria and Tunisia

New Lineage for Region: A/AFRICA/G-IV

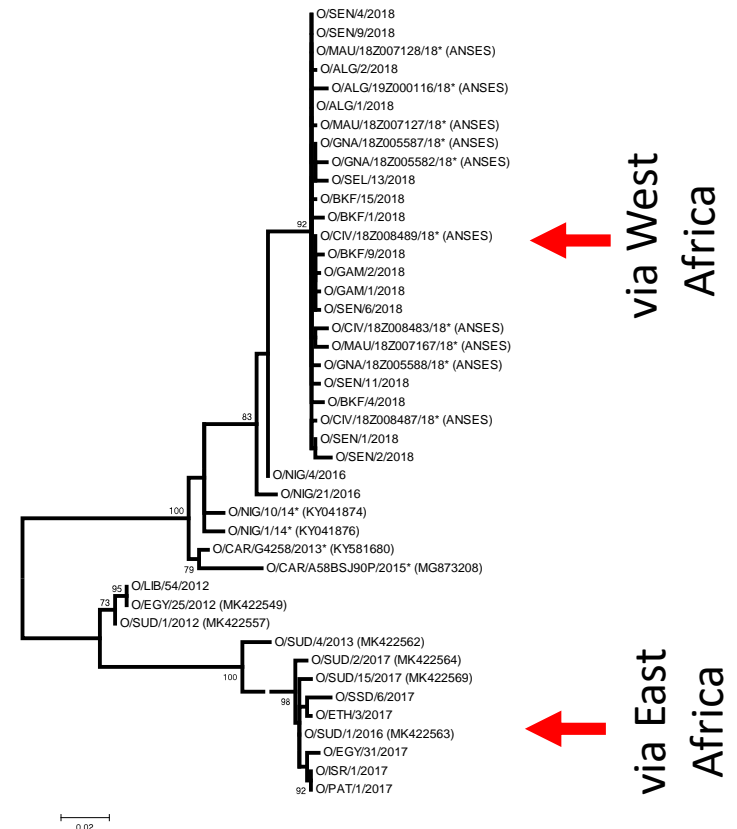
- March – April 2017
- >100 outbreaks in cattle
- First cases of Serotype A in the Maghreb > 30 years
 - Algeria 1977
 - Tunisia 1984
- Sequences from Algeria (March) and Tunisia (April) >99% identity
- Most closely related to FMD viruses from Nigeria



FMD cases in Algeria, Tunisia, Morocco and Libya

New Topotype for Region: O/EA-3

- Since June 2018
- July 2018 -January 2019: Samples tested for FMD outbreaks in Burkino Faso, Gambia, Guinea, Ivory Coast, Mauritania, Senegal, Sierra Leone
- Close epidemiological connections between W. Africa and Maghreb (~99% nt identity between FMD viruses from these regions)



Increased trans-Saharan connectivity?

- New paved road passes through six African countries: Tunisia, Mali, Niger, Nigeria and Chad



Global headline events (2017-2019)

North Africa

A/AFRICA in 2017
O/EA-3 in 2018/19

Turkey

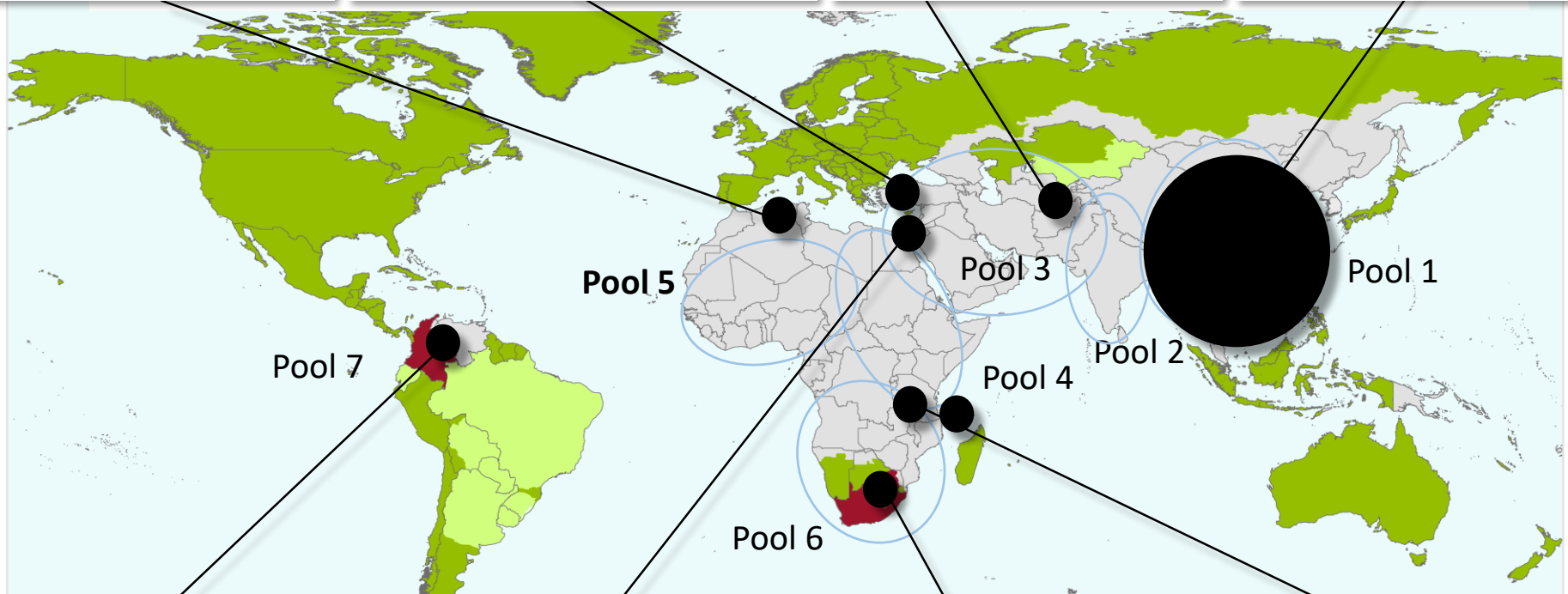
O/ME-SA/PanAsia-2^{QOM-15}
A/ASIA/G-VII

Pakistan

O/ME-SA/Ind-2001e
Ag O/PanAsia-2

Southeast and East Asia

O/ME-SA/Ind-2001e



Colombia

Serotype O

2018: 8 new outbreaks
Links to Venezuela

East Mediterranean

O/ME-SA/PanAsia-2^{QOM-15}
O/EA-3
A/ASIA/G-VII
Serotype SAT 2

South Africa (Limpopo)

Serotype SAT 2

Initially within the protection zone
Jan 2019: spill-over into surv. zone
leading to suspended status

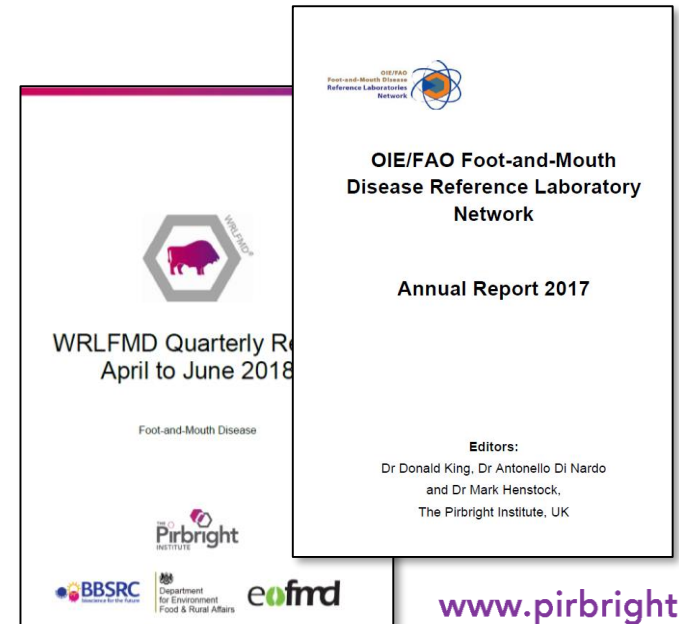
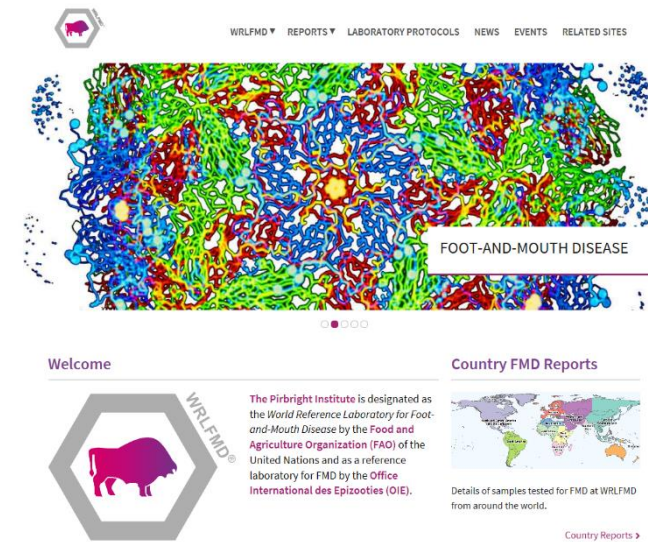
Central Zambia

Comoros

O/EA-2

Reports and information

- New website (wrlfmd.org) launched in November 2018
- In addition to *Genotyping reports*, now contains *Vaccine matching* and *Serotyping reports*
- Other data sources:
 - EuFMD Monthly report
 - Quarterly WRLFMD report



Acknowledgements

- Support for the WRLFMD and research projects
- Collaborating FMD Reference Laboratories and field teams
- Partners within the OIE/FAO FMD Lab Network



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Future proficiency test scheme (Phase XXXII)

- Phase XXXI completed (70 labs)
- Proposed new PTS for Q1-2020
- Designed for endemic countries and international Laboratories
- Complements PTS run by EU-RL (for FMD-free countries)
- Common samples/panels could be used to evaluate diagnostic capacity at different levels
 - Basic capability: NSP serology and Ag-ELISA/rRT-PCR?
 - Advanced capacity: genome sequencing, vaccine matching?

Level	VIROLOGY (Panel 1)		SEROLOGY (Panel 2)	
	Minimum test requirements	Expected lab capability	Minimum test requirements	Expected lab capability
PCP 0	-	n/a	NSP ELISA	Define infection history (FMDV+/-)
PCP 1	either AgELISA or RT-PCR	<ul style="list-style-type: none"> • FMD virus present • FMDV serotype 	NSP ELISA	Define infection history (FMDV+/-)
PCP 2	either AgELISA or RT-PCR	<ul style="list-style-type: none"> • FMD virus present • FMDV serotype 	NSP ELISA SP ELISA	<ul style="list-style-type: none"> • Define infectious status • vaccination status • serotype • +/- PVM
PCP 3 PCP 4+	AgELISA rRT-PCR +/- sequencing +/- VI*	<ul style="list-style-type: none"> • FMD virus present • FMDV serotype • topotype, lineage 	NSP ELISA SP ELISA +/- VNT*	<ul style="list-style-type: none"> • Define infectious status • vaccination status • serotype • +/- PVM
OIE/FAO Reference Laboratories	Enhanced genome sequencing*	<ul style="list-style-type: none"> • FMD virus present • FMDV serotype • topotype, lineage, and relationship between FMDV positive samples in panel 	NSP ELISA SP ELISA +/- VNT*	<ul style="list-style-type: none"> • Define infectious status • vaccination status • serotype • PVM • identify cross-reactivity

* If able to receive the infectious panel