



WRLFMD Global update

April 2014

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Department
for Environment
Food & Rural Affairs



FMD and SVD
Reference Laboratories



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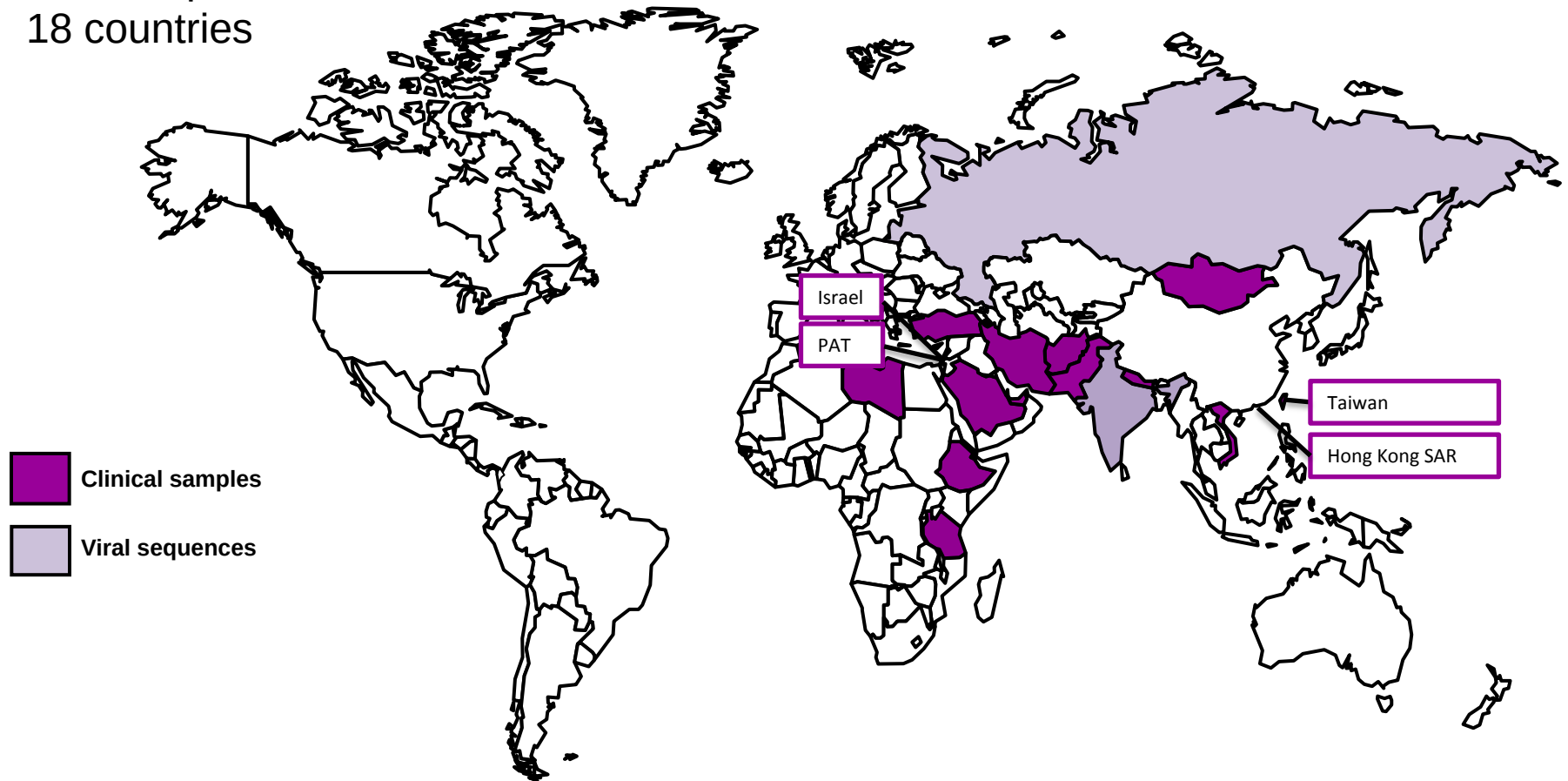
Recent submissions to WRLFMD

Since October 2014

October 2013 – April 2014

373 samples

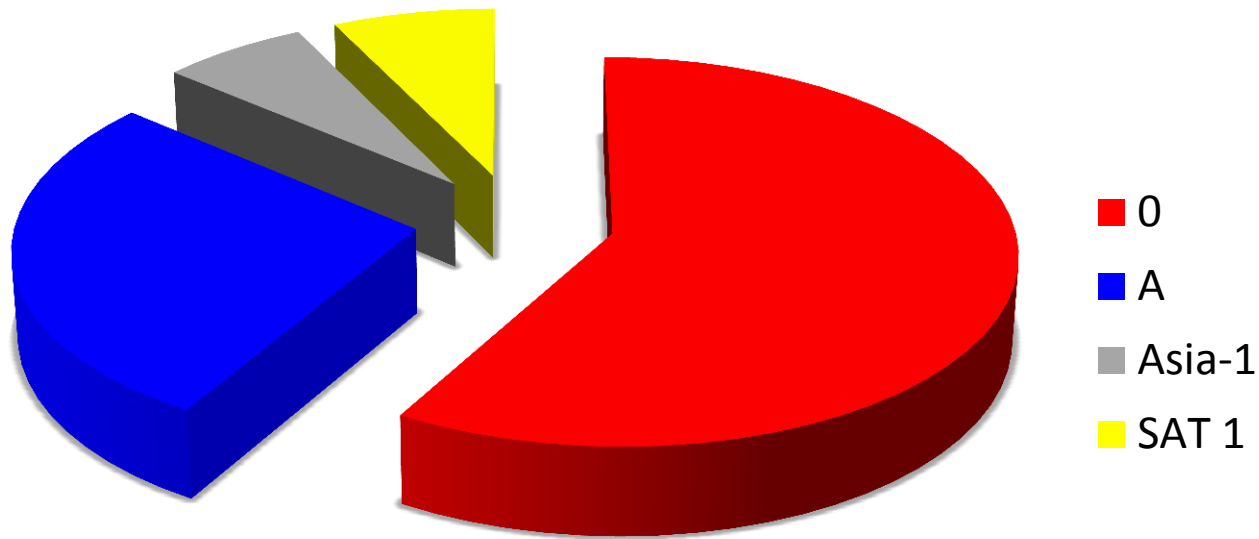
18 countries



Multiple shipments received from Saudi Arabia, Libya, Hong Kong

Serotypes recovered

137 Isolates



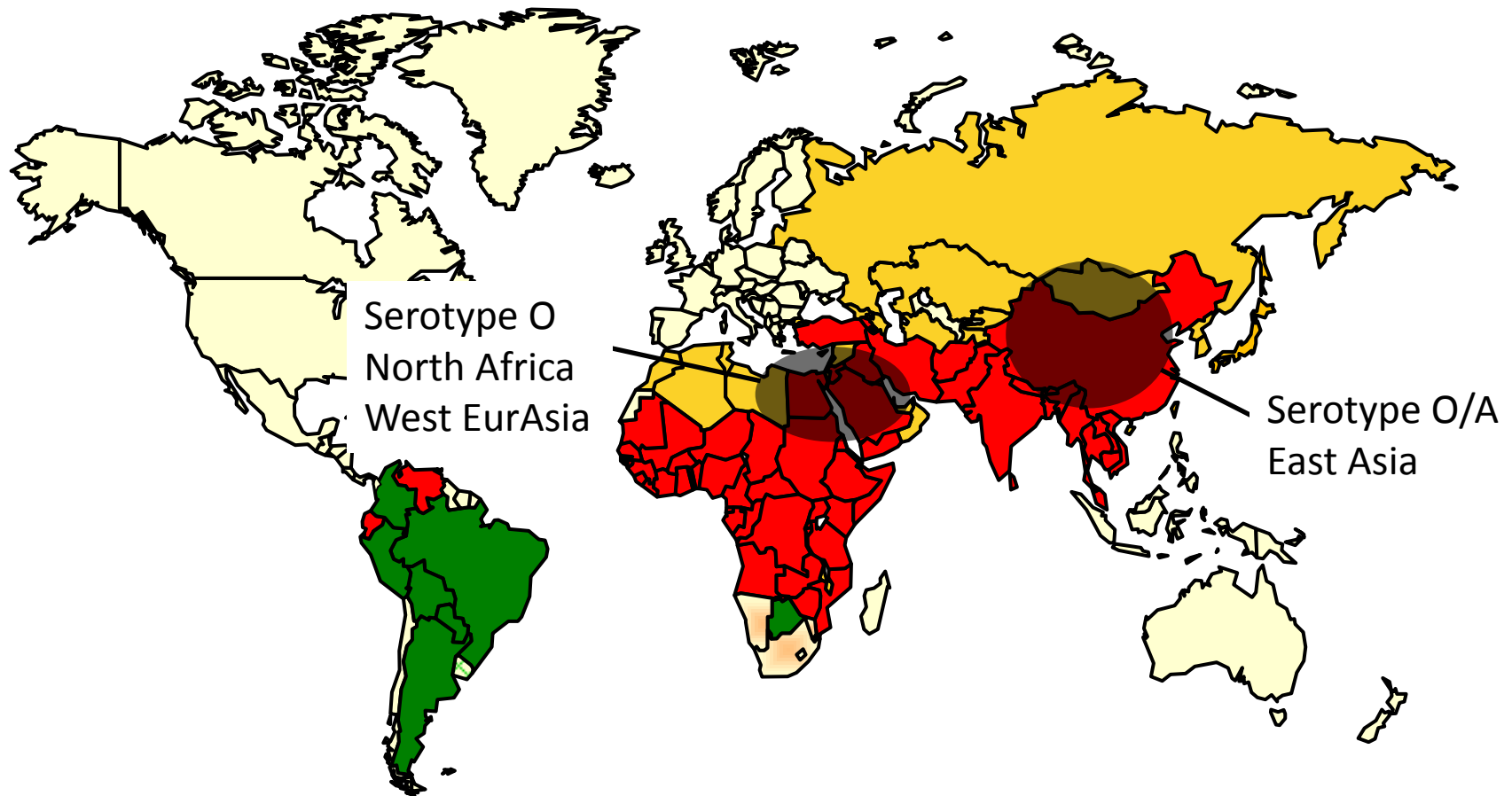
Serotype-specific rRT-PCR assays have been used recently for VI negative samples from Tanzania
No serotype C since 2004

Expected shipments

- Egypt (SAT 2?)
- Nigeria
- DPR Korea (serotype O outbreaks reported recently)

2013-2014:

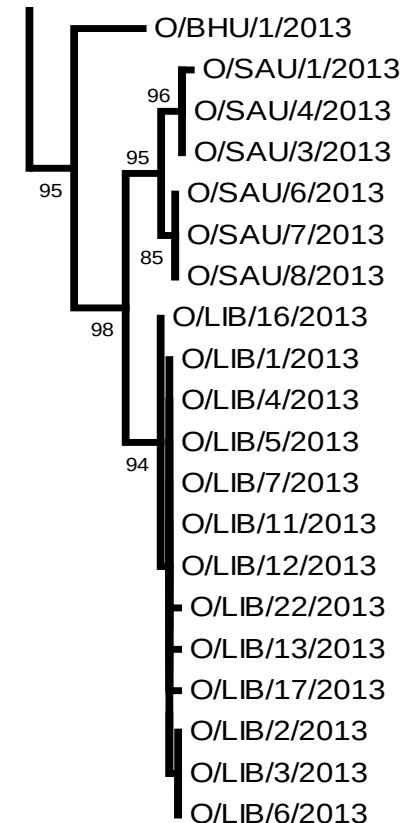
Changing patterns and threats



Changing global patterns:

Serotype O from Indian sub-continent in Libya and Saudi Arabia

- Recent reports
 - Samples collected in Libya in Sept/Oct 2013
 - Samples collected in Saudi Arabia in Aug/Nov 2013
 - Samples from UAE received during Jan 2014
 - Samples from Nepal in 2014
- **O/ME-SA/Ind-2001** lineage most closely related to viruses from Bhutan and India
- O/ME-SA/Ind-2001 lineage normally restricted to the Indian sub-continent



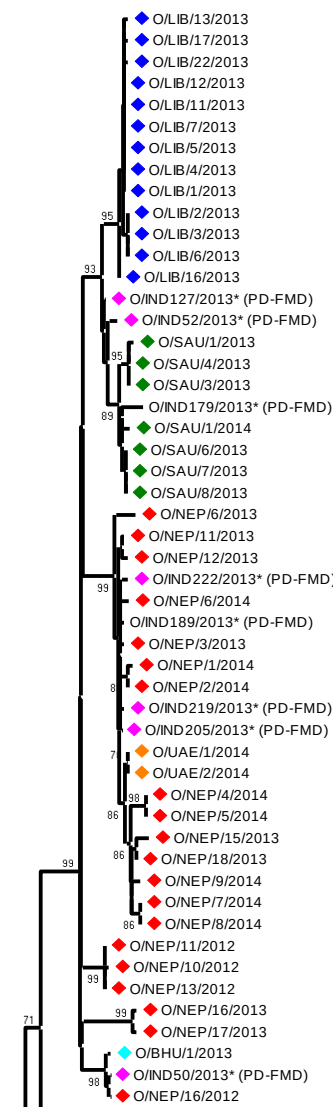
Dr Ibrahim Eldaghayes



OIE/FAO FMD Lab Network in action:

Sharing samples and sequence data - O/ME-SA/Ind-2001

- Involved PD-FMD, IZSLER and Pirbright
- Indicates multiple independent introductions of this lineage from the Indian sub-continent
- Reports provided to OIE, FAO and local authorities (can be found at: www.wrlfmd.org)



O/ME-SA/Ind-2001:

Distribution in 2014



O/ME-SA/Ind2001

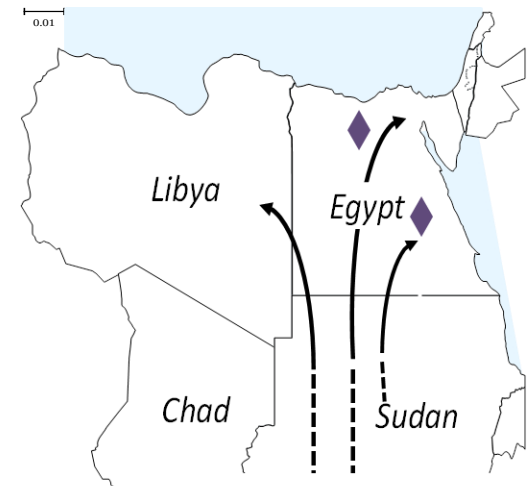
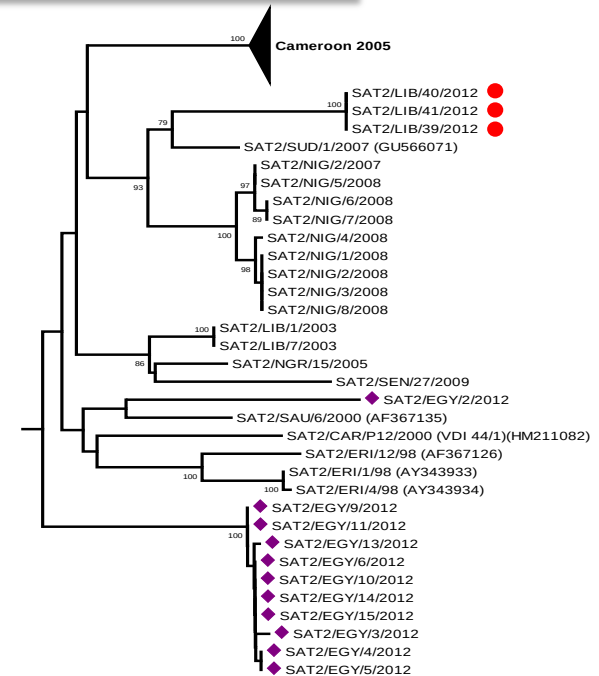
Other Activities at WRLFMD

- Complete genome sequences of a representative from Libya, Saudi Arabia and Bhutan have been sequenced
 - Sequences submitted to GenBank (KJ206908-10)
 - Rapid communication to “Genome Announcements”
- Lineage-specific real-time RT-PCR developed
 - Validated on recent representative samples
 - Able to discriminate between serotype O viruses normally found in Pool 3
 - Protocol leaflet can be provided

	isolate	PCR date	topotype	lineage	3D	Ind2001-P2	notes
1	BHU/1/2013	28/11/2013	ME-SA	Ind-2001	13.69	13.58	sequences used for assay design
2	LIB/1/2013	28/11/2013	ME-SA	Ind-2001	17.41	18.92	
3	LIB/2/2013	28/11/2013	ME-SA	Ind-2001	18.17	19.48	
4	LIB/3/2013	28/11/2013	ME-SA	Ind-2001	16.76	17.62	
5	LIB/4/2013	28/11/2013	ME-SA	Ind-2001	16.89	18.21	
6	LIB/5/2013	28/11/2013	ME-SA	Ind-2001	16.9	17.96	
7	LIB/6/2013	03/12/2013	ME-SA	Ind-2001	15.15	15.29	
8	LIB/7/2013	03/12/2013	ME-SA	Ind-2001	16.02	17.39	
9	SAU/1/2013	03/12/2013	ME-SA	Ind-2001	16.52	17.08	
10	SAU/3/2013	03/12/2013	ME-SA	Ind-2001	15.08	15.3	
11	SAU/4/2013	28/11/2013	ME-SA	Ind-2001	18.04	18.82	validation data- positive samples
12	SAU/6/2013	18/12/2013	ME-SA	Ind-2001	10.85	11.35	
13	SAU/7/2013	18/12/2013	ME-SA	Ind-2001	11.83	11.36	
14	SAU/8/2013	18/12/2013	ME-SA	Ind-2001	11.87	11.47	
15	SAU/1/2014	04/03/2014	ME-SA	Ind-2001	13.61	14.58	
16	NEP/3/2013	04/03/2014	ME-SA	Ind-2001	15.34	15.34	
17	NEP/4/2013	04/03/2014	ME-SA	Ind-2001	32.97	32.56	
18	NEP/6/2013	04/03/2014	ME-SA	Ind-2001	15.4	15.94	
19	NEP/11/2013	04/03/2014	ME-SA	Ind-2001	13.98	13.82	
20	NEP/12/2013	04/03/2014	ME-SA	Ind-2001	15.67	16.21	
21	NEP/15/2013	04/03/2014	ME-SA	Ind-2001	14.6	15.15	
22	NEP/16/2013	04/03/2014	ME-SA	Ind-2001	16.73	14.99	
23	NEP/17/2013	04/03/2014	ME-SA	Ind-2001	15.28	14.05	
24	NEP/18/2013	04/03/2014	ME-SA	Ind-2001	13.34	14.27	
25	NEP/1/2014	04/03/2014	ME-SA	Ind-2001	15.33	15.63	
26	NEP/2/2014	04/03/2014	ME-SA	Ind-2001	14.28	14.16	
27	NEP/4/2014	04/03/2014	ME-SA	Ind-2001	13.33	13.45	
28	NEP/15/2013	04/03/2014	ME-SA	Ind-2001	30.24	30.8	
29	NEP/5/2014	04/03/2014	ME-SA	Ind-2001	13.88	13.77	
30	NEP/6/2014	04/03/2014	ME-SA	Ind-2001	14.96	13.8	
31	NEP/7/2014	04/03/2014	ME-SA	Ind-2001	16.55	16.56	validation data-negative samples
32	NEP/8/2014	04/03/2014	ME-SA	Ind-2001	15.95	15.26	
33	NEP/9/2014	04/03/2014	ME-SA	Ind-2001	17.57	15.92	
34	UAE/1/2014	04/03/2014	ME-SA	Ind-2001	15.32	15.92	
35	UAE/2/2014	04/03/2014	ME-SA	Ind-2001	14.95	15.27	
1	LIB/1/2012	28/11/2013	ME-SA	PanAsia-2	18.57	No Ct	
2	LIB/2/2012	28/11/2013	ME-SA	PanAsia-2	20.61	No Ct	
3	LIB/3/2012	28/11/2013	ME-SA	PanAsia-2	15.48	No Ct	
4	LIB/5/2012	28/11/2013	ME-SA	PanAsia-2	22.77	No Ct	
5	LIB/7/2012	28/11/2013	ME-SA	PanAsia-2	25.19	No Ct	
6	LIB/48/2012	28/11/2013	ME-SA	PanAsia-2	22.23	No Ct	
7	LIB/74/2012	28/11/2013	EA-3	unnamed	24.54	No Ct	
8	LIB/54/2012	28/11/2013	ME-SA	PanAsia-2	17	No Ct	
9	PAK/5/12	03/12/2013	ME-SA	PanAsia-2	14.24	No Ct	
10	PAK/53/12	03/12/2013	ME-SA	PanAsia-2	13.15	No Ct	
11	PAK/55/12	03/12/2013	ME-SA	PanAsia-2	12.37	No Ct	
12	PAK/3/13	03/12/2013	ME-SA	PanAsia-2	13.2	No Ct	
13	PAK/4/13	03/12/2013	ME-SA	PanAsia-2	13.04	No Ct	
14	PAK/8/13	03/12/2013	ME-SA	PanAsia-2	12.91	No Ct	
15	PAK/12/13	03/12/2013	ME-SA	PanAsia-2	15.52	No Ct	
16	PAK/14/13	03/12/2013	ME-SA	PanAsia-2	12.7	No Ct	
17	PAK/15/13	03/12/2013	ME-SA	PanAsia-2	11.45	No Ct	
18	PAK/16/13	03/12/2013	ME-SA	PanAsia-2	11.78	No Ct	
19	PAK/20/13	03/12/2013	ME-SA	PanAsia-2	15.49	No Ct	
20	PAK/22/13	03/12/2013	ME-SA	PanAsia-2	12.77	No Ct	

Pool 3: Changing global patterns: serotype SAT 2 in North Africa during 2012

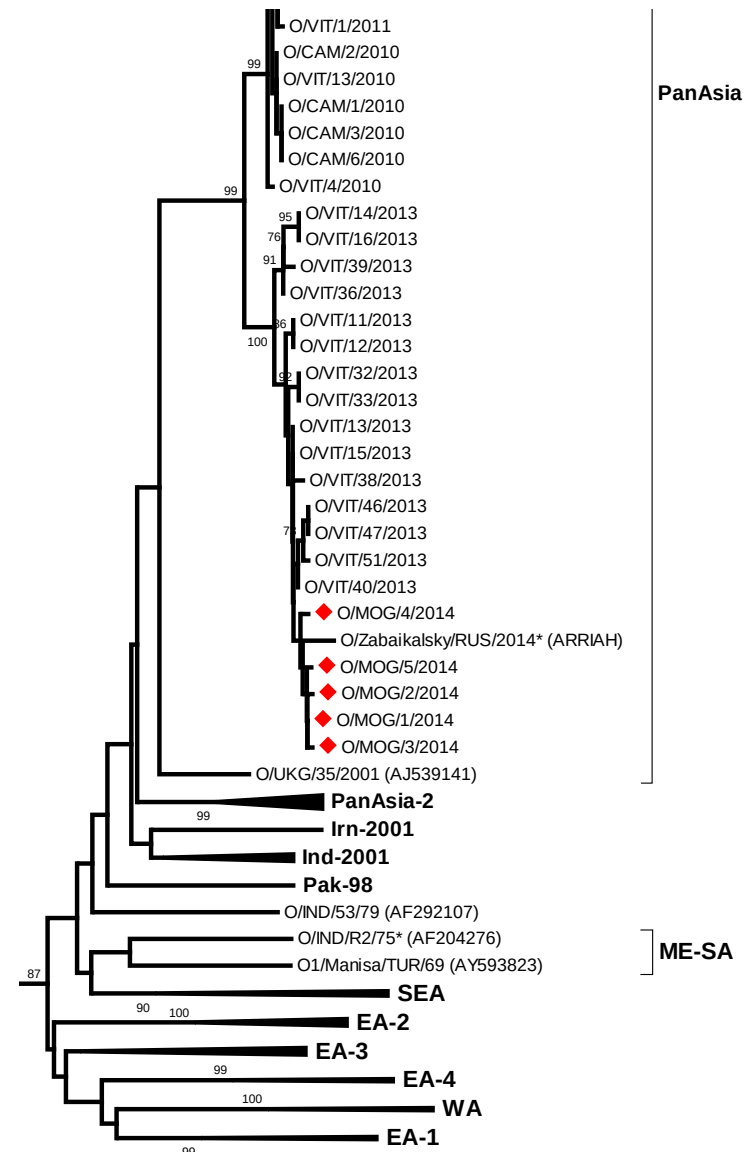
- First FMD cases in Egypt due to serotype SAT 2 since 1950
- Sequence data supported at least two introductions of SAT 2 FMDV into Egypt
Within SAT 2 topotype VII
- Distinct from other contemporary SAT 2 lineages in the Middle East and North Africa
 - topotype VII from Libya
 - topotype IV from Bahrain



Pool 1: O/ME-SA/PanAsia

Recent detection in the Russia Federation and Mongolia

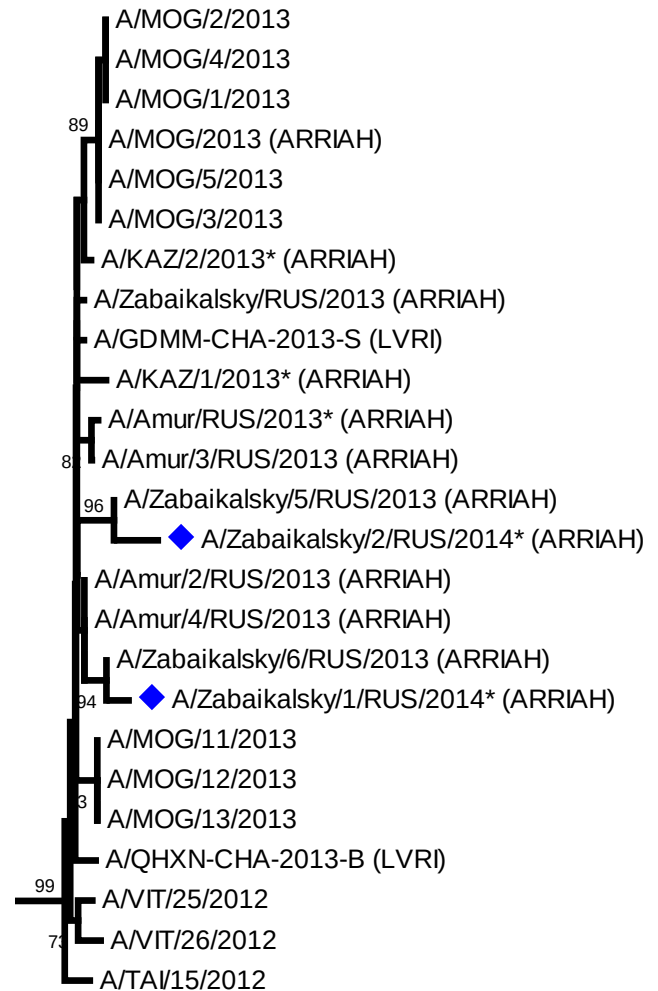
- Recent samples from Mongolia
- Sequences from ARRIAH
 - Outbreaks during 2014 in Eastern Russia (Zabaikalsky)
- O/ME-SA/PanAsia
not O/SEA/Mya-98
- Appear to be separate from sequences sent from China in 2011



Pool 1: A/ASIA/Sea-97

Recent detection in the Russia Federation

- Sequences provided from ARRIAH
 - Outbreaks during 2014 in Eastern Russia (Zabaikalsky)
- Outbreaks in Eastern Russia
 - O/SEA/Mya-98
 - O/ME-SA/PanAsia
 - A/ASIA/Sea-97
- Outbreaks in Black Sea region
 - A/ASIA/Iran-05



OIE/FAO FMD Lab Network

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



WRLFMD: Pirbright, UK
RRLSEA: Pakchong, Thailand
LVRI: Lanzhou, China
FGI ARRIAH: Vladimir, Russia
PD-FMD: Mukteswar, India
RRLSSA: Gaborone, Botswana
PANAFTOSA: Rio de Janeiro, Brazil
LFADLCT-SENASA: Argentina
ARC-OVI: Onderstepoort, RSA
PIADC: Plum Island, USA
CODA-CERVA-VAR: Belgium



- **Network meeting in Bangkok (12-14th November 2013)**
- Report published on an annual basis (draft with partners)

OIE/FAO Laboratory Network

Annual meeting

- Communication between partners
- Update on global and regional FMD situation during 2013
- Regional FMD vaccine strain recommendations
- Activities of the Network in connection with the OIE/FAO plan control of FMD
- Update on regional quality assurance undertaken in support of FMD laboratory testing
- Agreement on action plan for 2014



Key Recommendations:

- Address gaps in the Network
- More efforts are required to harmonise tests used in different laboratories
- Vaccine matching
 - A current focus of vaccine matching work undertaken within the network (particularly at WRLFMD) is to provide recommendations for FMD-free countries regarding antigens held in international vaccine banks
 - There needs to be more emphasis on locally produced vaccines used in endemic pools.
 - Where possible, vaccine recommendations should be tailored for each of the endemic pools
 - Reagents used for vaccine matching studies need to be standardised (and more widely shared between laboratories), and the nomenclature used to define the reagents should be made clearer (as an example see table below)
 - Efforts to harmonise approaches used by the different reference centres are urgently needed (see 2014 work-plan and suggested PT for vaccine matching)
 - Once harmonised, it may be possible to share data between different reference centres to more effectively coordinate vaccine matching
 - Data needs to be presented in a more coherent manner (matrix system)

New tools for sequence data exchange: OpenFMD

- Tool for the FMD community
- Similar to “OpenFlu” developed by: Swiss Institute of Bioinformatics
- Annotated and curated database
- Proposed data exchange with Reference Labs
- Partners endorsed concept but emphasized importance of engaging with the FMD Network to ensure that the platform is “fit-for-purpose”
- First phase of project will focus on public data
- Beta version: <http://www.openfmd.org>



☒ PD263/2010	A	Bassas da India	cattle	2010	
☐ PD266/2010	A	Bassas da India	cattle	2010	
☒ O/CHA/31/2010	O	China/India	swine	22.02.10	
☒ O/CHA/7/2011	O	China/India	cattle	29.03.11	
☐ PD 155/2010	Asia 1	Bassas da India	cattle	02.02.10	
☒ PD 509/2010	Asia 1	Bassas da India	cattle	07.07.10	
☒ PD 18/2011	Asia 1	Bassas da India	cattle	12.2010	
☐ O/BY/CHA/2010	O	China/India	swine	03.2010	
☒ O/GZ/CHA/2010	O	China/India	cattle	03.2010	
☐ R1	O	Bassas da India	cattle	26.03.11	
☐ R2	O	Bassas da India	cattle	26.03.11	
☐ R3	O	Bassas da India	cattle	26.03.11	
☐ R4	A	Bassas da India	cattle	26.03.11	
☐ R5	A	Bassas da India	cattle	26.03.11	
☐ R6	A	Bassas da India	cattle	26.03.11	
☐ R7	A	Bassas da India	cattle	26.03.11	
☐ R8	A	Bassas da India	cattle	26.03.11	

Total Items: 169(Showing Items: 20)
Selected Items: 7

Page Size: 20

download fasta download Excel googleMap View Mult. Seq. Align. uniq sequences ☐

Vaccine bank recommendations

	Vaccine strain (for each category are not listed in order of Importance)
High Priority	- O Manisa - O PanAsia-2 (or equivalent) - O BFS or Campos - A24 Cruzeiro - Asia 1 Shamir - A Iran-05 (or A TUR 06) - A22 Iraq - SAT 2 Saudi Arabia (or equivalent i.e. SAT 2 Eritrea)
Medium Priority	- A Eritrea - SAT 2 Zimbabwe - SAT 1 South Africa - A Malaysia 97 (or Thai equivalent such as A/NPT/TAI/86) - A Argentina 2001 - O Taiwan 97 (pig-adapted strain or Philippine equivalent)
Low priority	- A Iran '96 - A Iran '99 - A Iran 87 or A Saudi Arabia 23/86 (or equivalent) - A15 Bangkok related strain - A87 Argentina related strain - C Noville - SAT 2 Kenya - SAT 1 Kenya - SAT 3 Zimbabwe - A Kenya

Considerations for FMD-free countries

Suggestions

- Threats to FMD-free countries (based on historical evidence of trans-boundary movements of viruses) and frequency of FMD outbreaks in endemic pools
 - West EurAsia (pool 3)
 - O/ME-SA/PanAsia-2
 - A/ASIA/Iran-05
 - Asia-1
 - East Asia (via southeast Asia: Pool 1)
 - O/SEA/Mya-98
 - O/ME-SA/PanAsia
 - A/ASIA/Sea-97
 - North Africa (via sub-Saharan Africa: Pool 4)
 - SAT 2
 - O/EA-3
- Redundancy in vaccine coverage

Revised vaccine bank recommendations?

	Vaccine strain (for each category are not listed in order of Importance)
High Priority	O Manisa O PanAsia-2 (or equivalent) O BFS or Campos A24 Cruzeiro Asia 1 Shamir A Iran-05 (or A TUR 06) A22 Iraq SAT 2 Saudi Arabia (or equivalent i.e. SAT 2 Eritrea)
Medium Priority	A Eritrea SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 (or Thai equivalent such as A/NPT/TAI/86) A Argentina 2001 O Taiwan 97 (pig-adapted strain or Philippine equivalent)
Low priority	A Iran '96 A Iran '99 A Iran 87 or A Saudi Arabia 23/86 (or equivalent) A15 Bangkok related strain A87 Argentina related strain C Noville SAT 2 Kenya SAT 1 Kenya SAT 3 Zimbabwe A Kenya

FMD Diagnostic kit reserves

- UK (and other EU member states?) funds diagnostic kit contingency reserve
- Provides supply of serological kits (mainly NSP) and reserve contingency for a large number of additional kits in the event of an outbreak in the UK
- Are there opportunities to share the costs between member states and how might this be organised?
- Will be raised at NRL meeting (or EU member states) in May 2014