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Department
for Environment
Food & Rural Affairs



FMD and SVD
Reference Laboratories

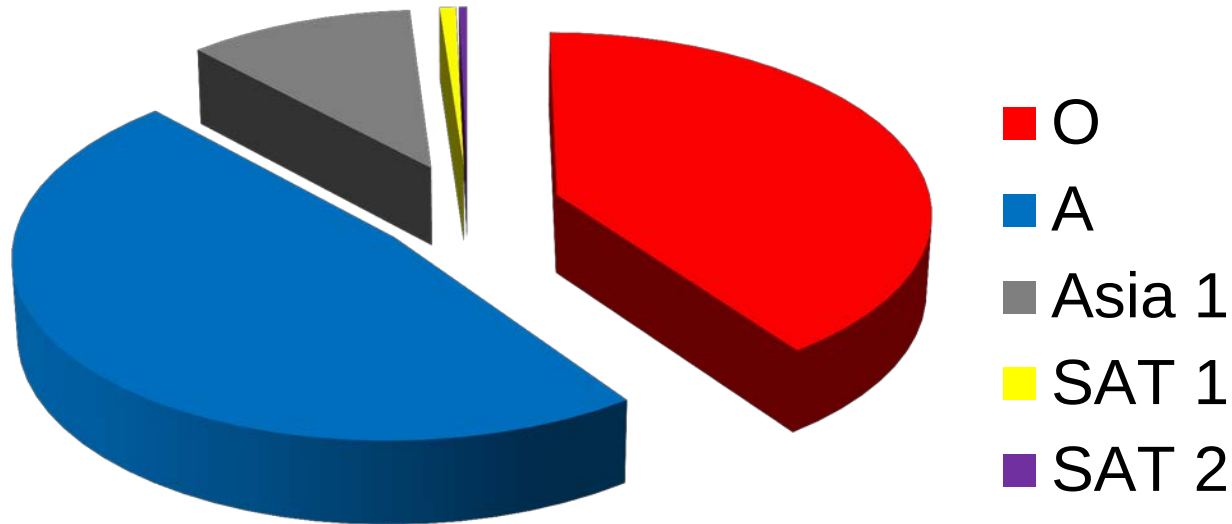


The Pirbright Institute receives strategic funding from BBSRC.

www.pirbright.ac.uk

Recent Submissions

- Jan – Dec 2013: 401 samples
- 259 isolates
- Represent 5 FMDV serotypes:

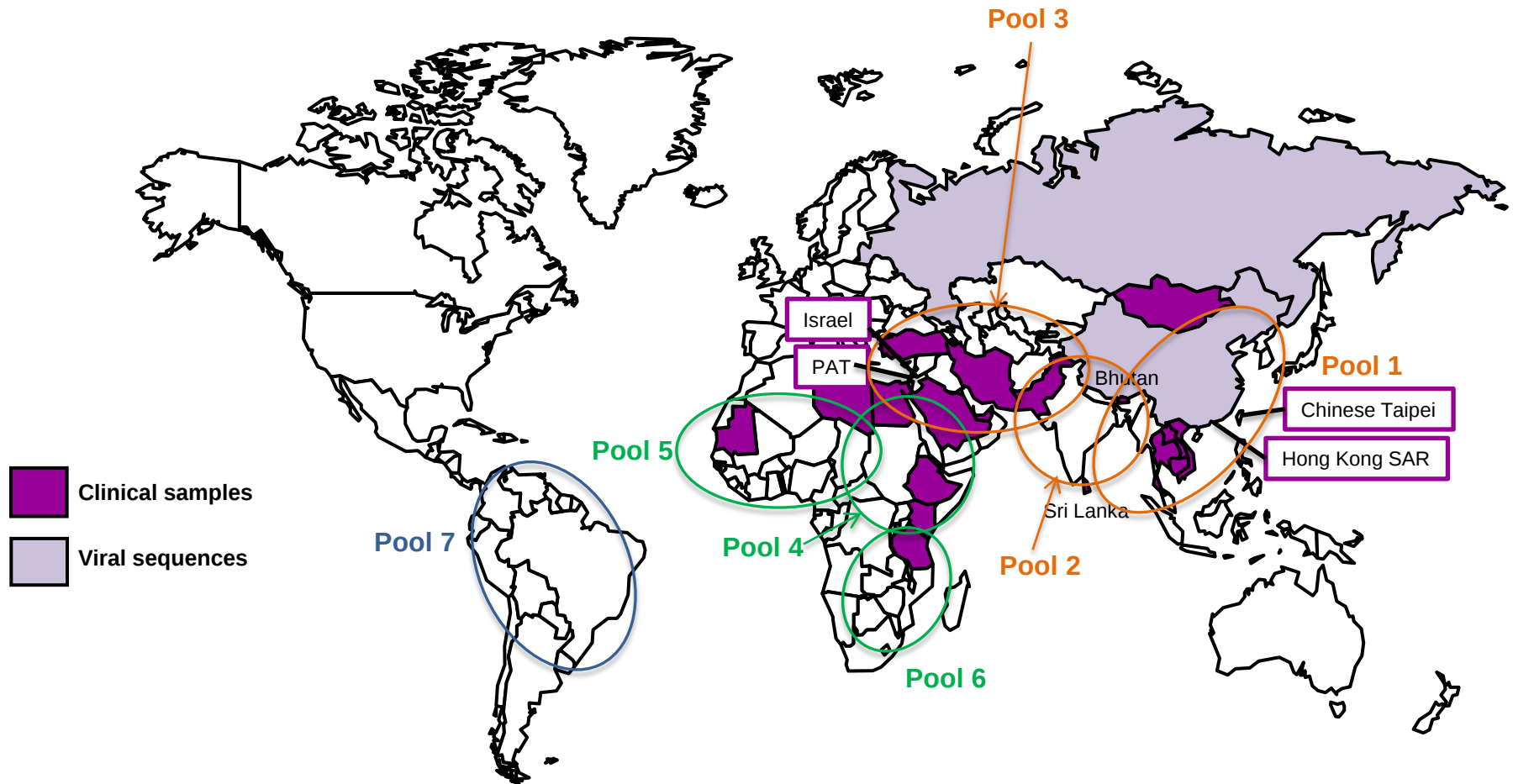


- No virus isolated 32.4% of samples
- RT-PCR negative in 17.7% samples
- No serotype C since 2004

Global Sampling: 2013

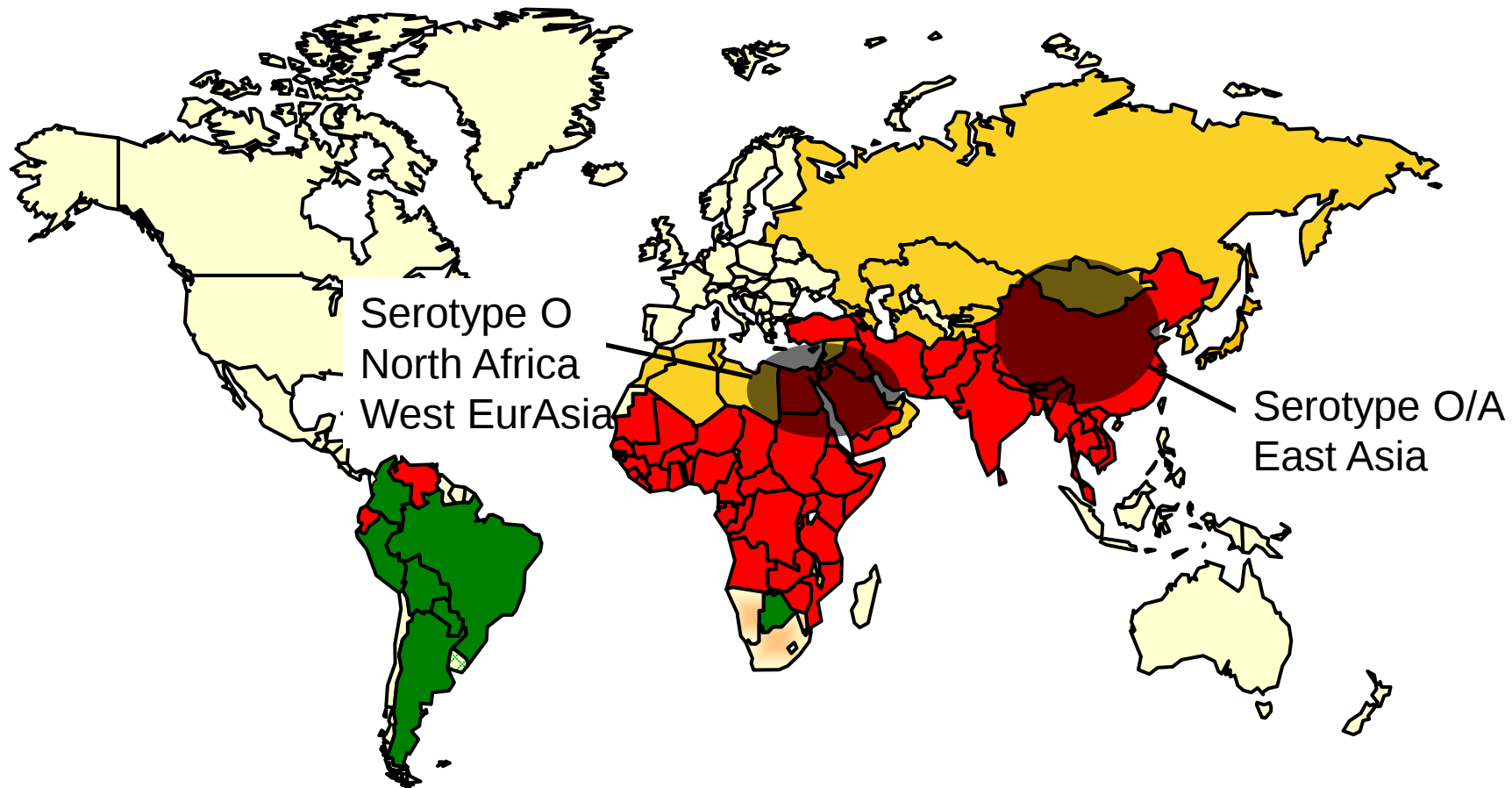
Countries Sending Samples to FMD Reference Laboratory

January 2013 - December 2013



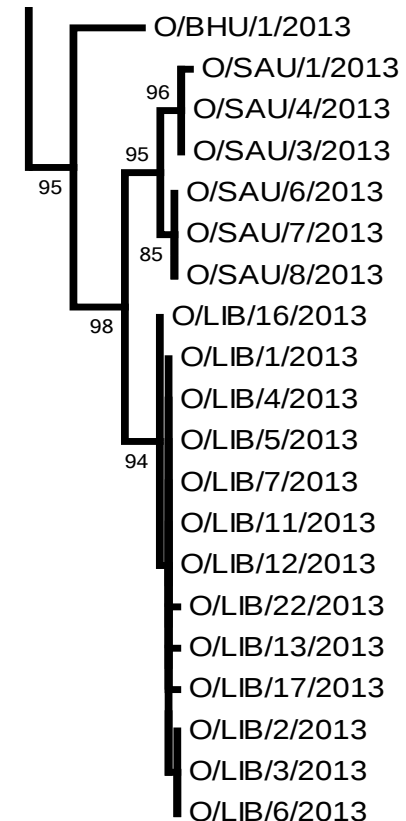
Reports for these samples can be found at www.wrlfmd.org

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, Nepal and India
- O/ME-SA/Ind-2001 lineage normally restricted to the Indian sub-continent



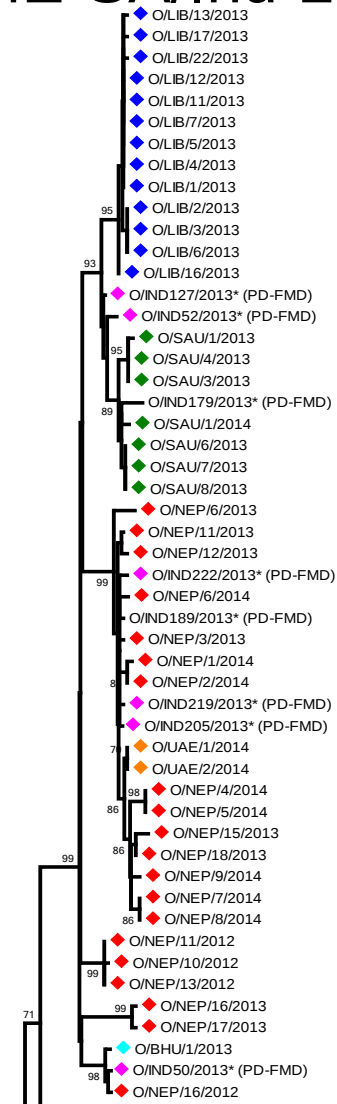
Dr Ibrahim Eldaghayes



OIE/FAO FMD Lab Network in action:

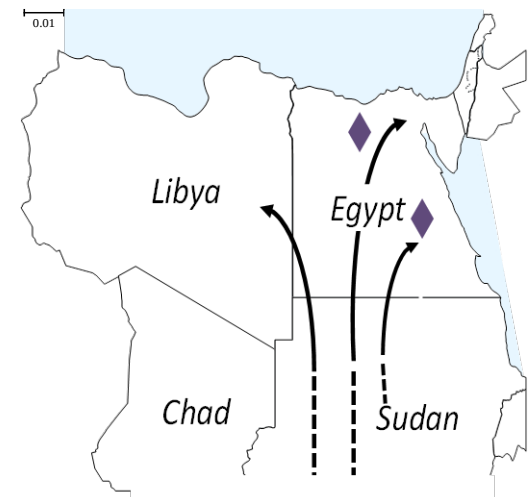
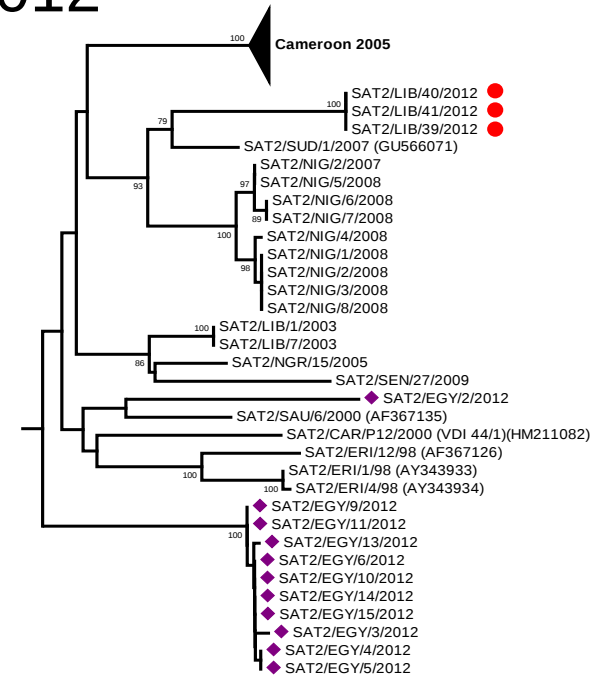
Sharing samples and sequence data - O/ME-SA/Ind-2001

- Involved PD-FMD (Mukteswar), IZSLER (Brescia) 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)



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

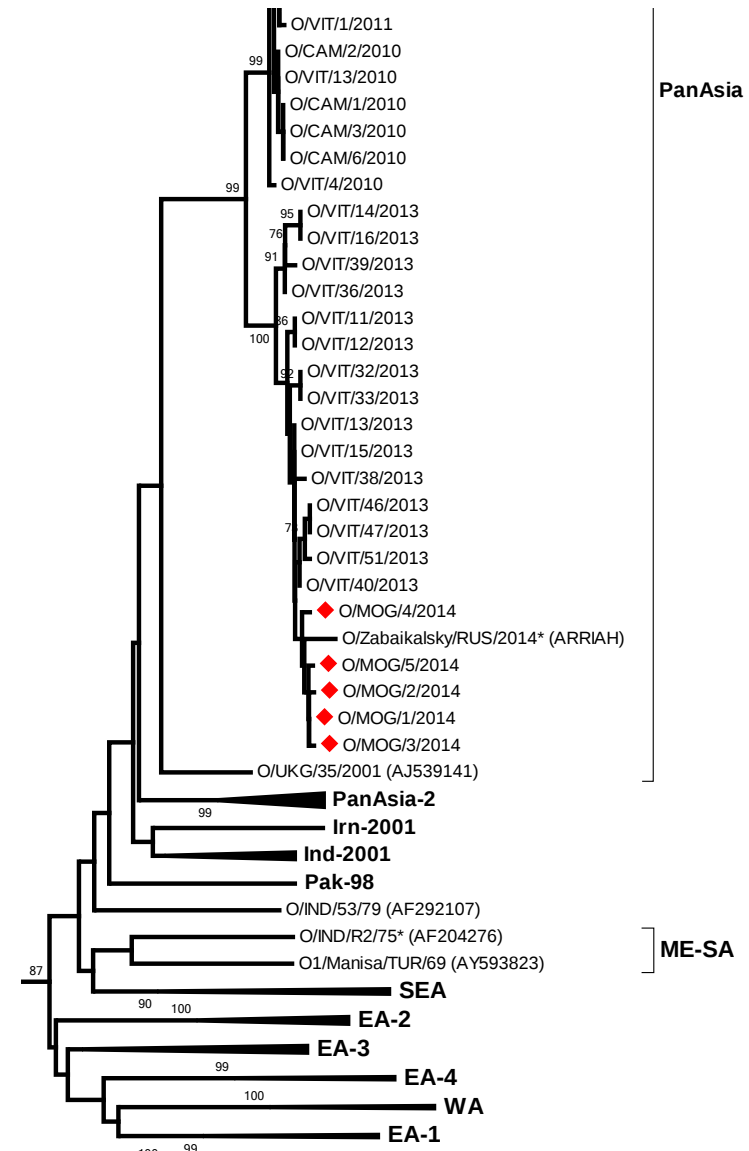
- First FMD cases in Egypt due to serotype SAT 2 since 1950
- Sequence data supported at least two introductions of SAT 2 FMDV into Egypt
Within SAT 2 topotype VII
- Distinct from other contemporary SAT 2 lineages in the Middle East and North Africa
 - topotype VII from Libya
 - topotype IV from Bahrain



Pool 1: O/ME-SA/PanAsia

Recent detection in the Russia Federation and Mongolia

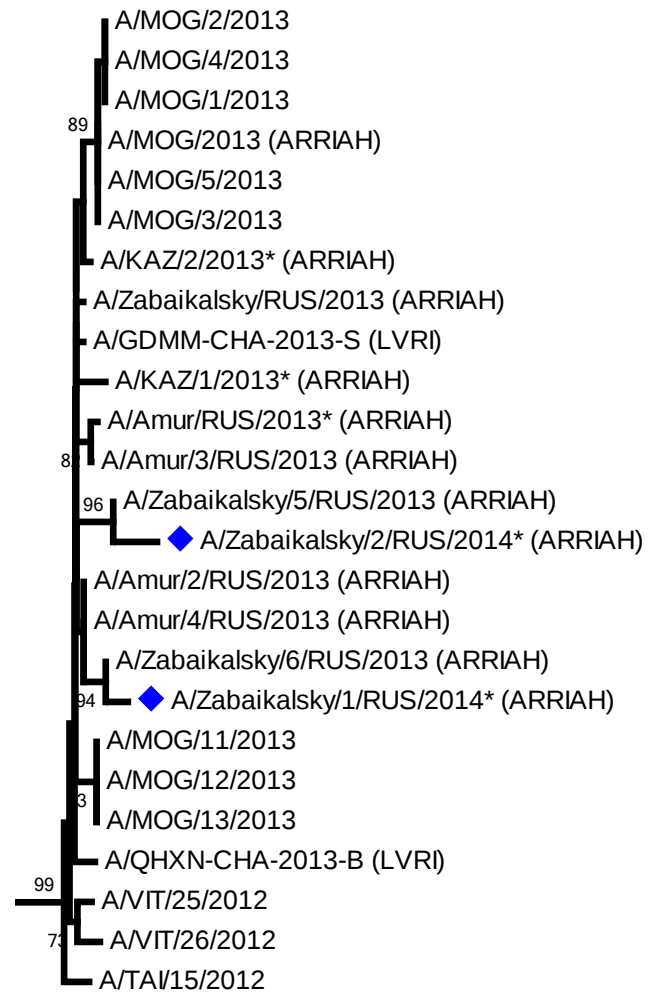
- Recent samples from Mongolia
- Sequences from ARRIAH
 - Outbreaks during 2014 in Eastern Russia (Zabaikalsky)
- O/ME-SA/PanAsia
not O/SEA/Mya-98
- Appear to be separate from sequences sent from China in 2011



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



Regional Threats



O/ME-SA/PanAsia-2

A/ASIA/Iran-05

Asia-1 (Sindh-08 lineage)

O/ME-SA/PanAsia (Pool 1)

O/SEA/Mya-98 (Pool 1)

A/ASIA/Sea-97 (Pool 1)

O/ME-SA/Ind2001 (Pool 2)

SAT 2 (Pool 4)

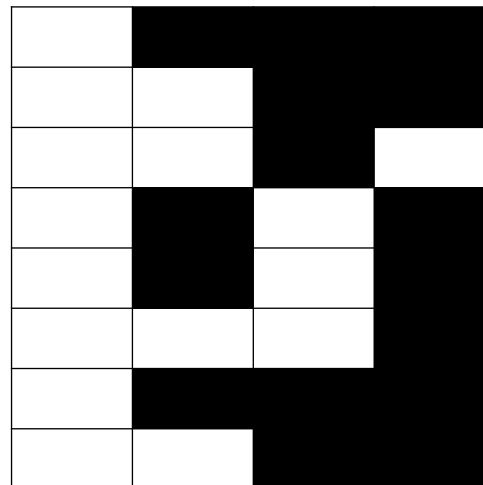
O/ME-SA/PanAsia-2

Sub-lineage nomenclature used to define different viral genotypes

2014 2013 2012 2011

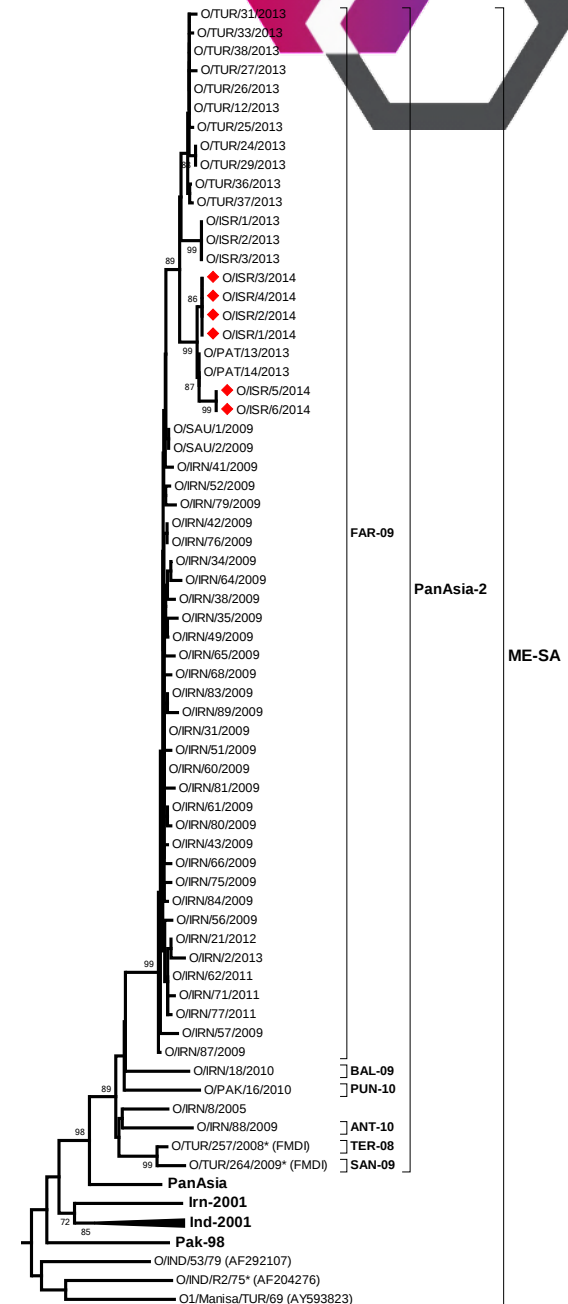
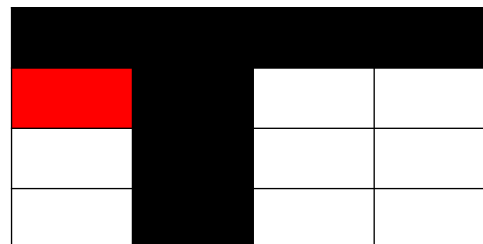
• ANT-10

Iran
Israel
Saudi Arabia
Turkey
UAE
Afghanistan
Pakistan
Libya



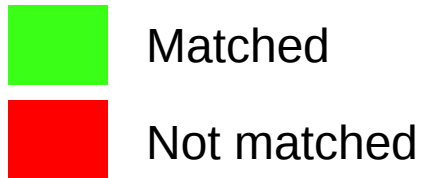
• FAR-09

Iran
Israel
PAT
Turkey



Vaccine matching data (2013)

Serotype O (all O/ME-SA/PanAsia-2 lineages)



Vaccine strain

Field isolate	O/RUSSE					O/TUR
	O-3039	O-4625	O/Manisa	A/2000	TAW/98	5/2009
Iran 2012		Matched				Matched
Iran 2013		Matched				Matched
Pakistan 2012		Matched	Not matched		Matched	Matched
Pakistan 2013	Matched *		Not matched		Matched	Matched
Palestinian AT 2013	Matched		Not matched		Matched	Matched
UAE 2013		Matched	Not matched			Not matched
Turkey 2013	Matched *	Matched	Not matched	Matched	Matched	Matched

* Single values have yielded borderline matches

A/ASIA/Iran-05

In the past 4 years: 8 sub-lineages:

SIS-12

Pakistan and Iran

SIS-10

Iran, Iraq, Turkey and Russia

AFG-07

Afghanistan, Pakistan, Iran,
Turkey

HER-10

Afghanistan, Pakistan, Iran,
Kazakhstan, Kyrgyzstan

QAZ-11

Iran

FAR-11

Pakistan and Iran

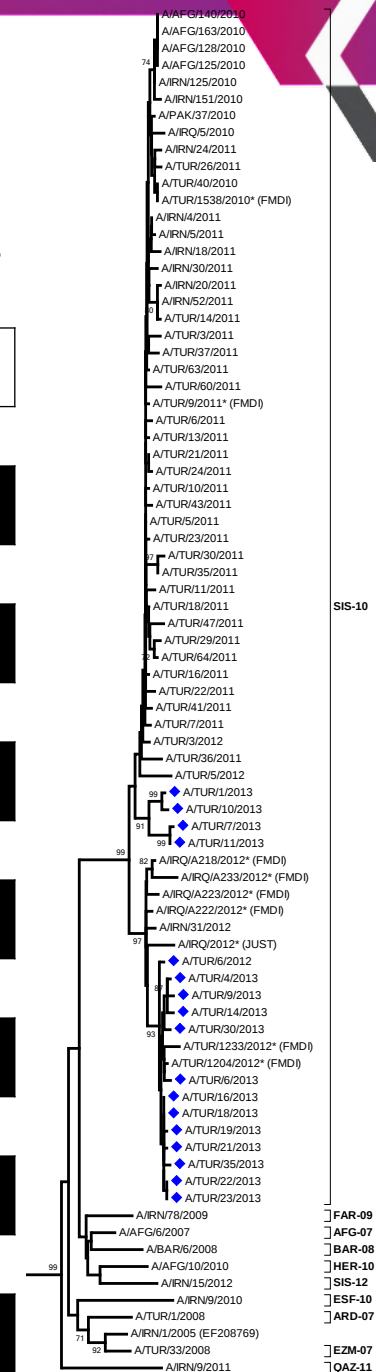
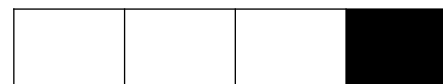
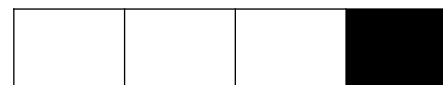
ESF-10

Iran

BAR-08

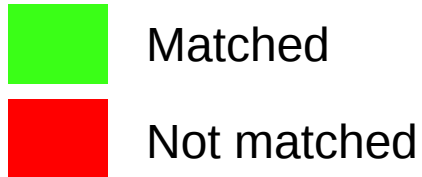
Egypt and PAT

2014 2013 2012 2011

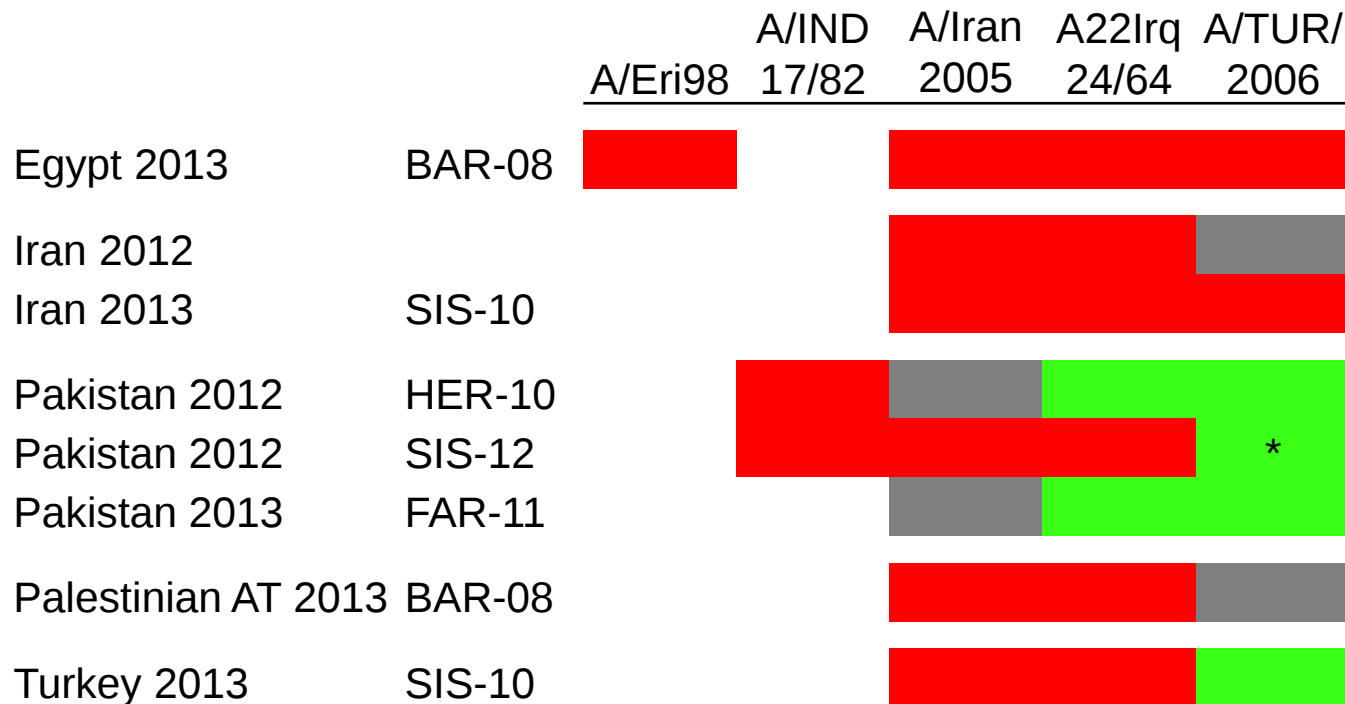


Vaccine matching data (2013)

Serotype A (A/ASIA/Iran-05)



Vaccine strain



* Single values have yielded borderline matches

Challenges / Limitations



- Not all reagents are available at WRL
- In-vitro vaccine matching is only a conservative proxy for in-vivo protection (high potency vaccination will often compensate for poor match)

Vaccine Studies



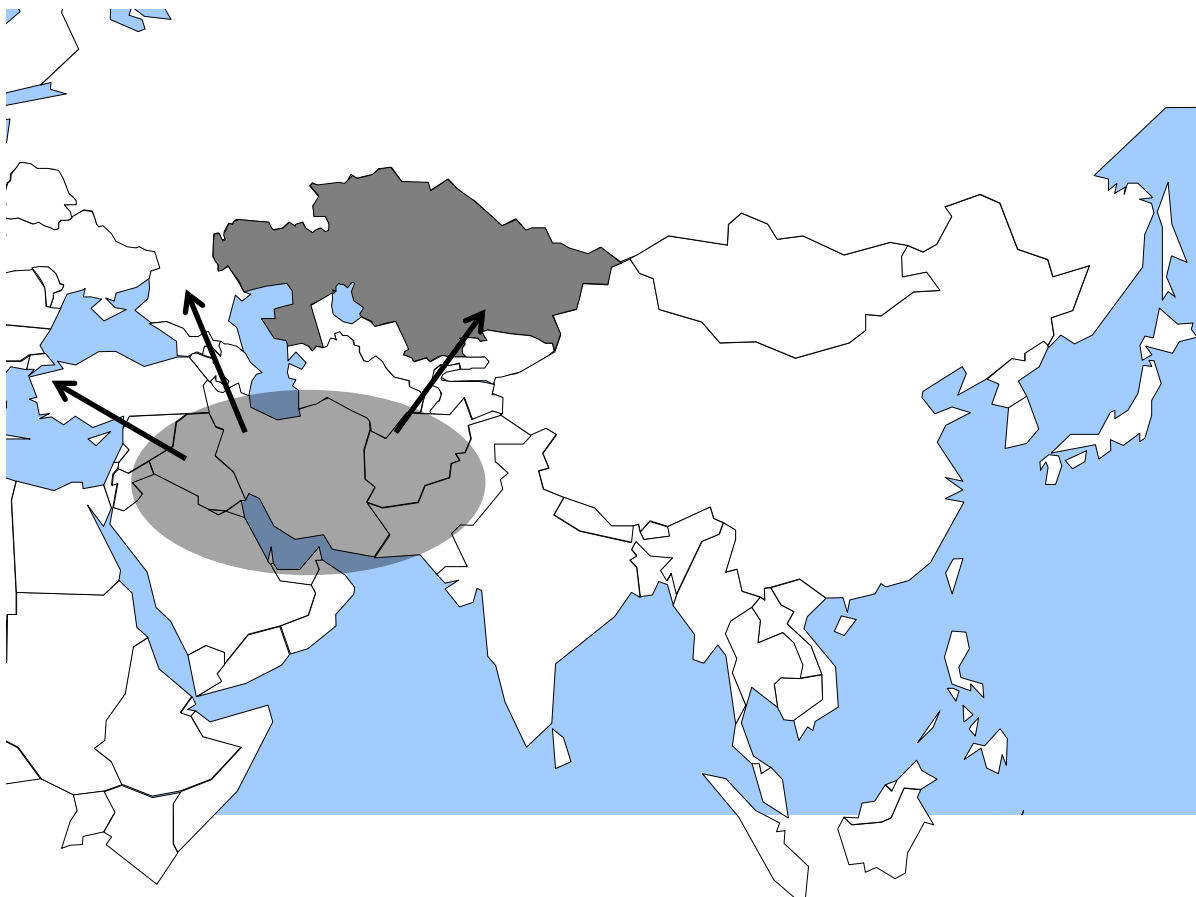
Vaccine Studies





Any questions?

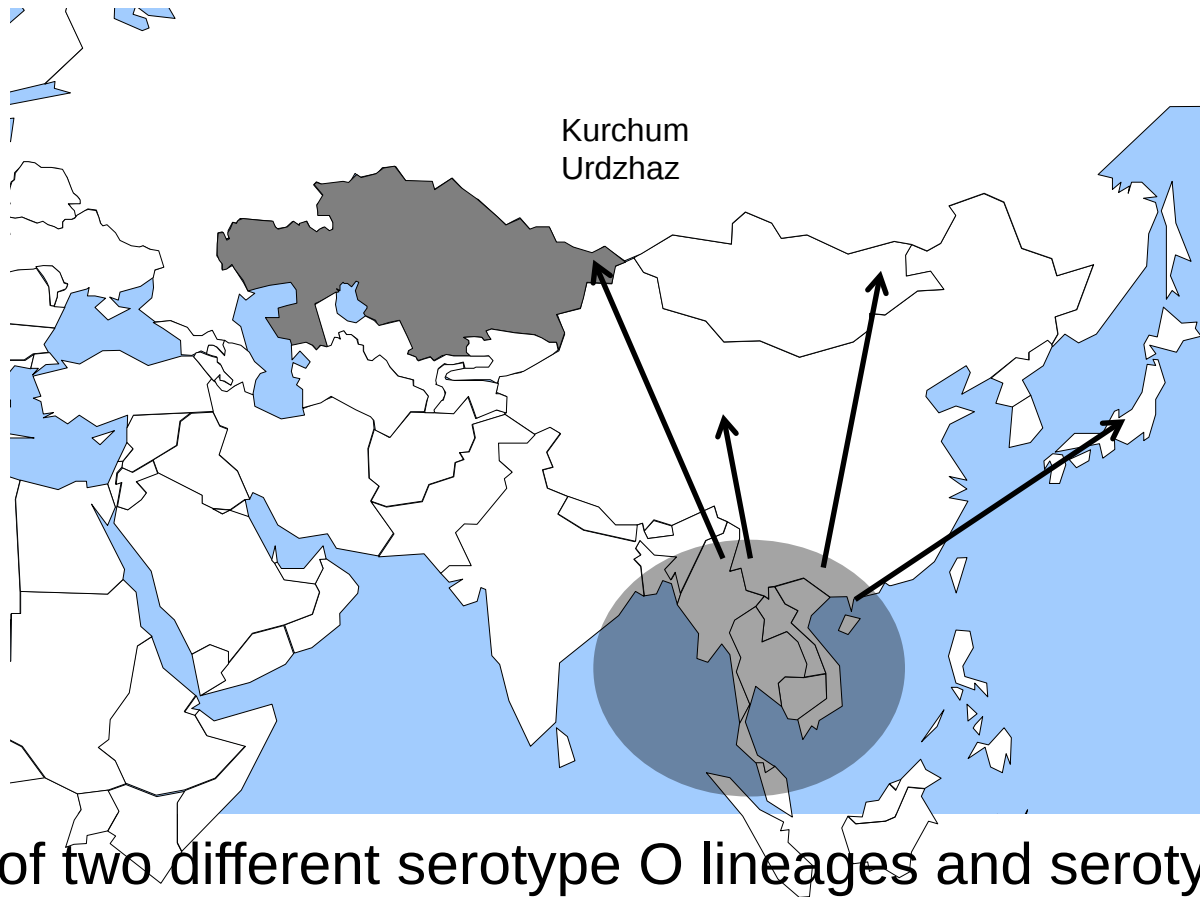
Kazakhstan: FMD Threats



Spread of two different serotypes from South Asia/Middle East

- O/ME-SA/PanAsia-2 - in **Kazakhstan** (2010-2012)
- A/ASIA/Iran-05 - in **Kazakhstan** (2012) also recent incursions into Russia
- Threat from serotype Asia-1 (Sindh-08)?

FMD Threats (South East Asia)



Spread of two different serotype O lineages and serotype A

- O/ME-SA/PanAsia – **Kazakhstan** (2010) – also reported in China
- O/SEA/Mya-98 – a number of outbreaks in China, Russia, Mongolia, N&S. Korea, Japan
- A/ASIA/Sea-97 – **Kazakhstan** (2013) – also reported in China and South Korea