



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



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World Reference Laboratory Global Update

Recent outbreaks and patterns of virus spread

Anna Ludi on behalf of Donald King

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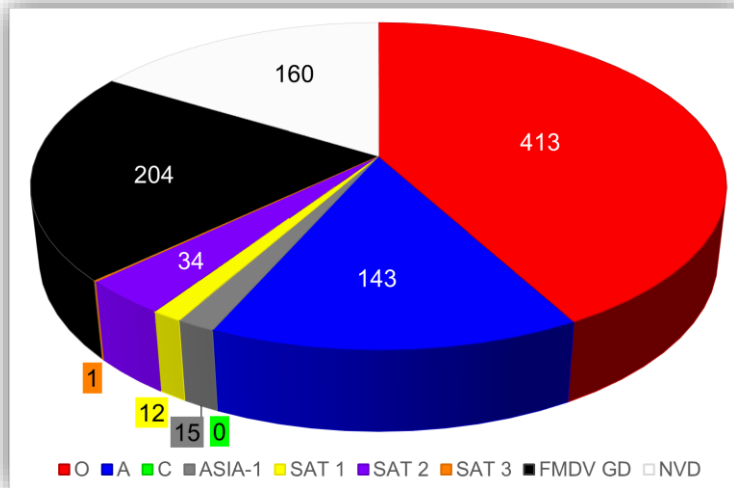
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FMD Reference Laboratory

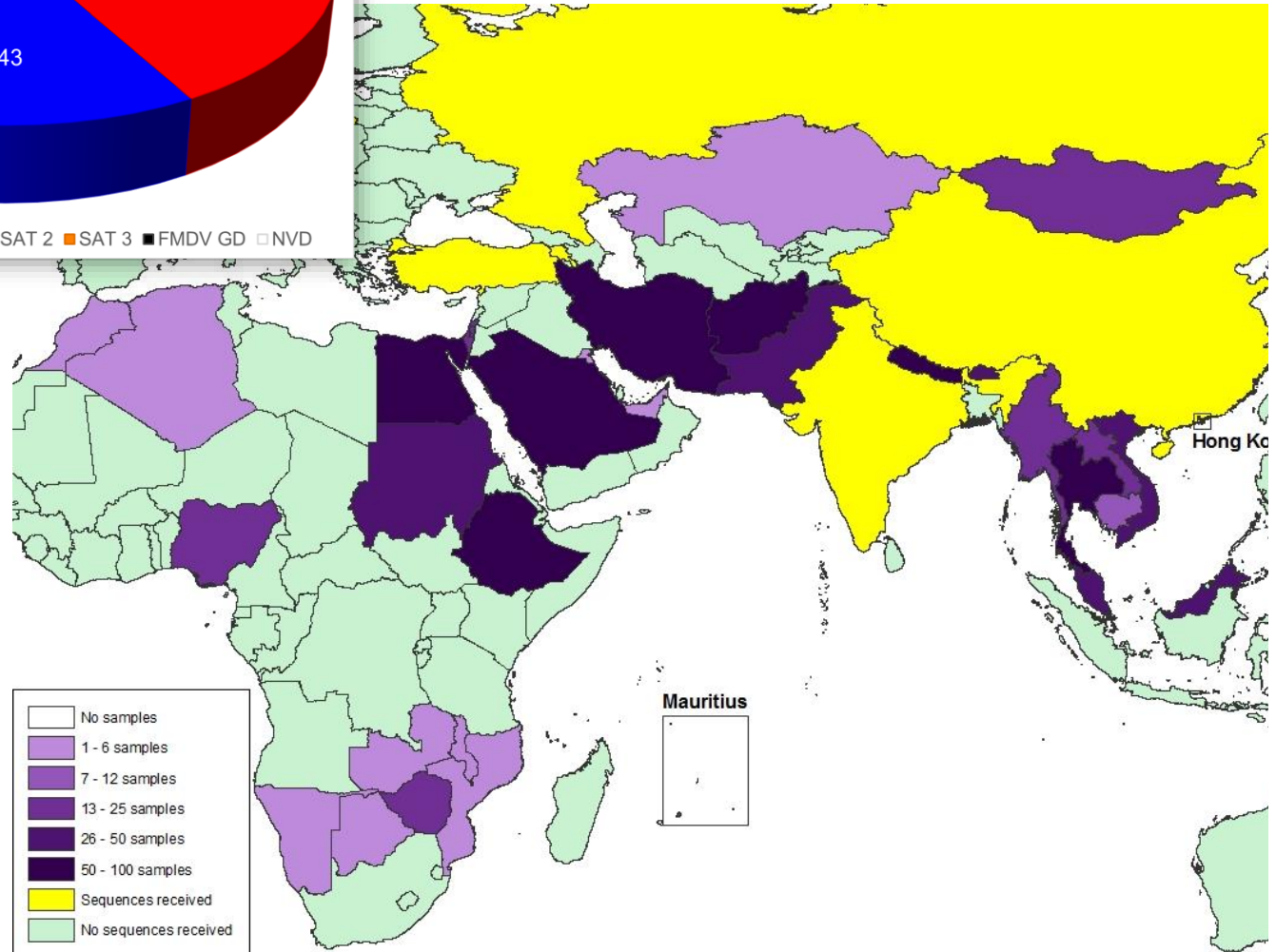


Samples and sequences received at WRLFMD

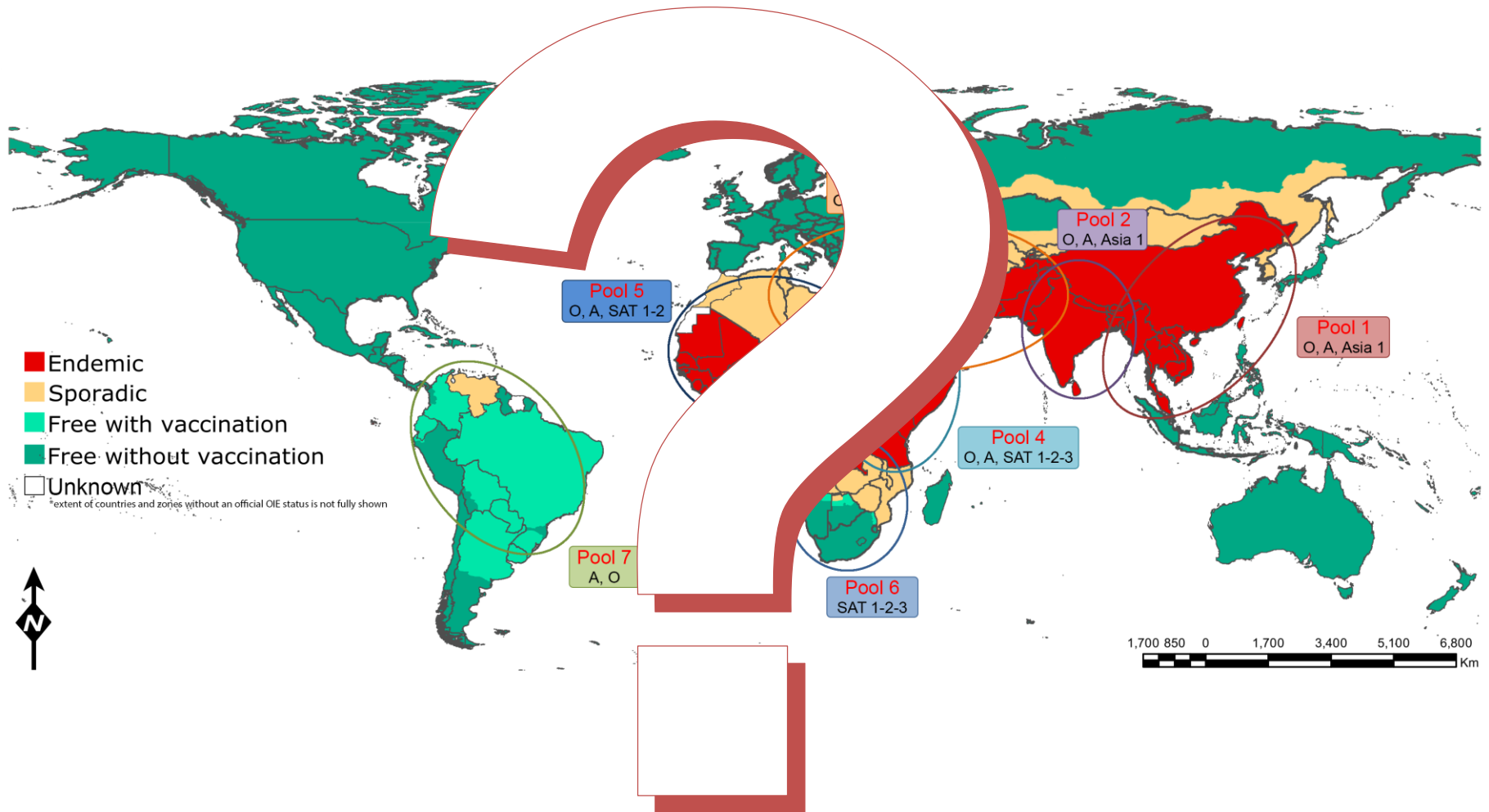
September 2015 – September 2017



986 Samples

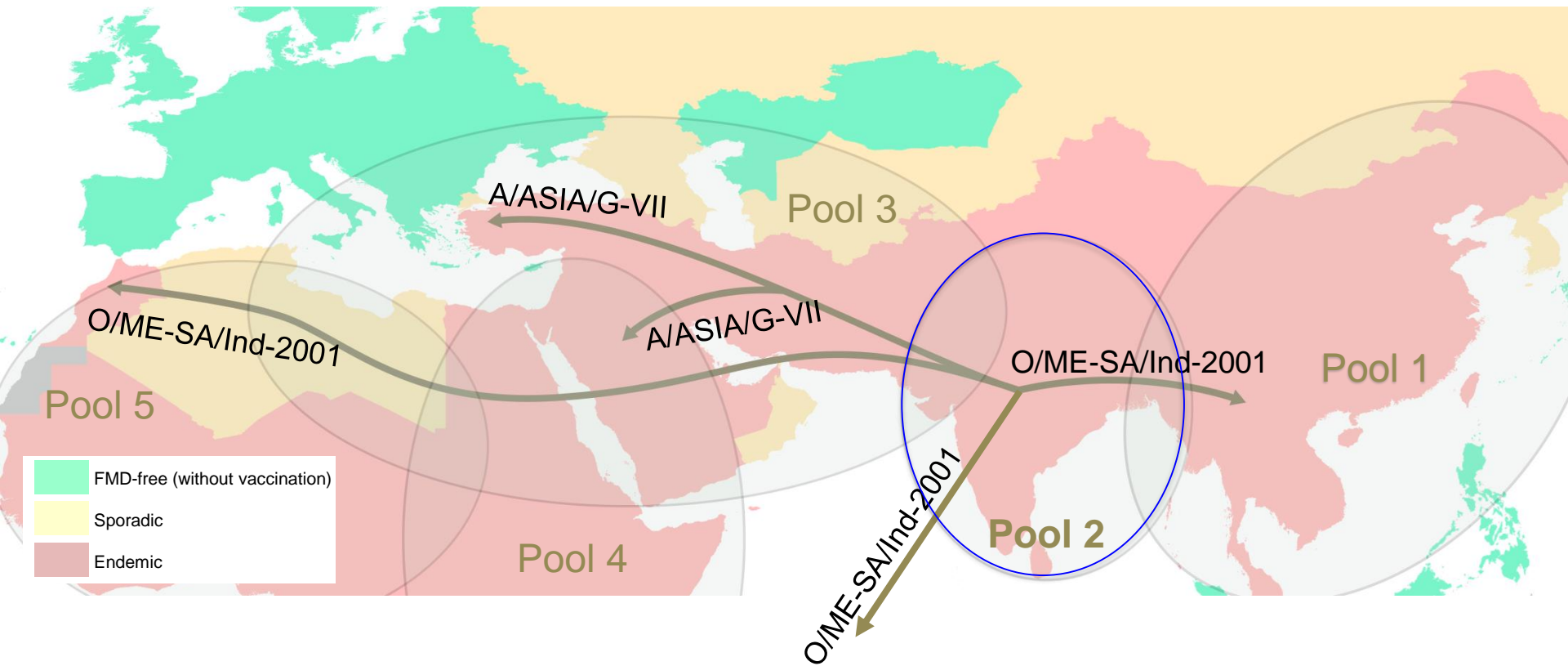


Seven Endemic Pools



- Maintain specific FMD virus strains
- Control via (tailored) vaccination and supporting diagnostics

Long-distance “trans-pool” movements



Vaccines for O/ME-SA/Ind-2001

in vitro vaccine matching:

42 field isolates from Africa, Middle East and southeast Asia:

O 3039	O ₁ Manisa	O/TUR/5/2009
Mostly matched 86%	Some Matches 33%	Almost all matched 95%

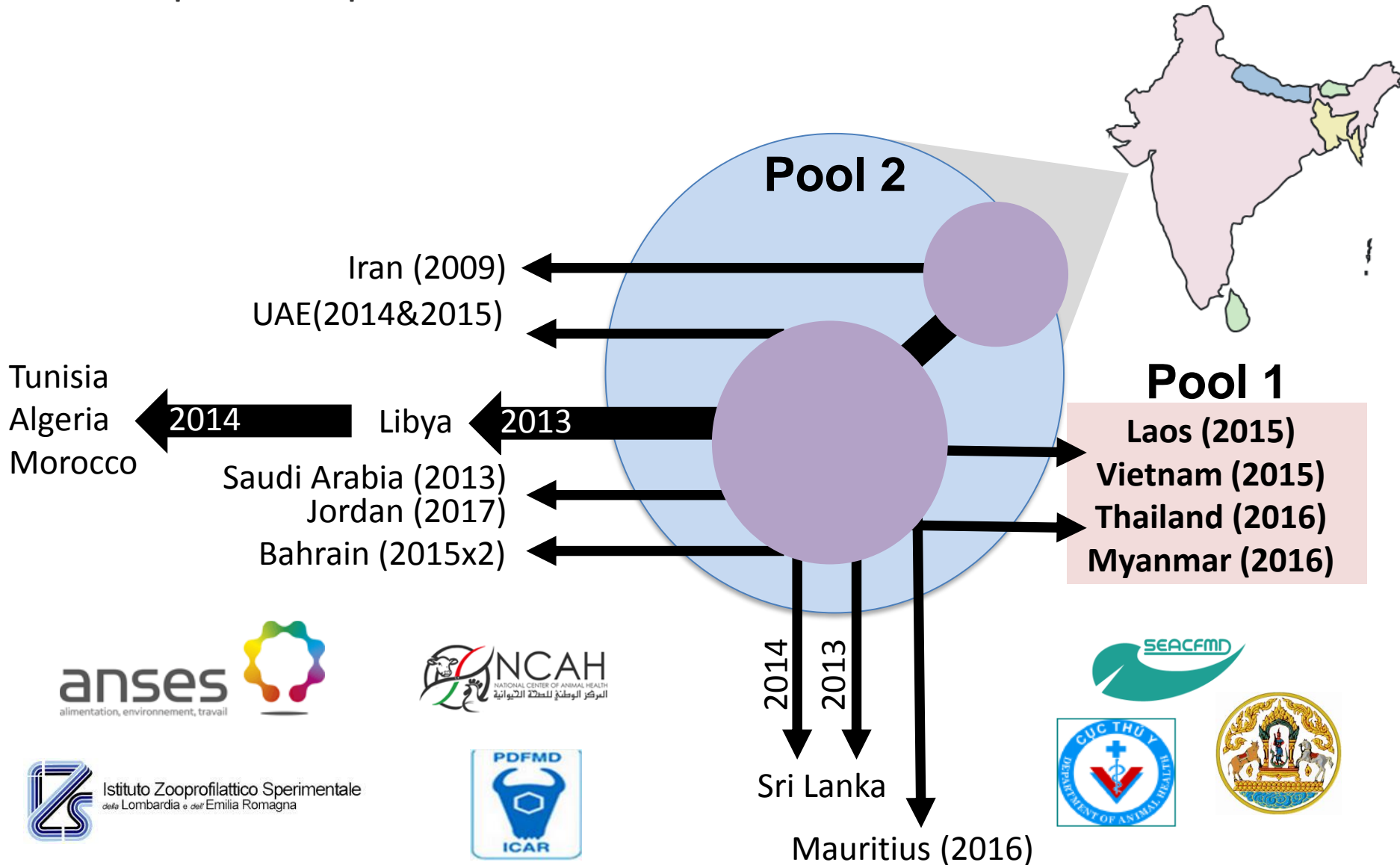
Potency testing in cattle:

- PD50 study [CVL/WRLFMD/IZSLER]
 - O-Manisa – heterologous protection ~ 3PD₅₀
- Emergency Vaccination [CSIRO]
 - O-Manisa
 - O-3039



O/ME-SA/Ind-2001d

Multiple “escapes” from the Indian sub-continent



O/ME-SA/Ind-2001d:

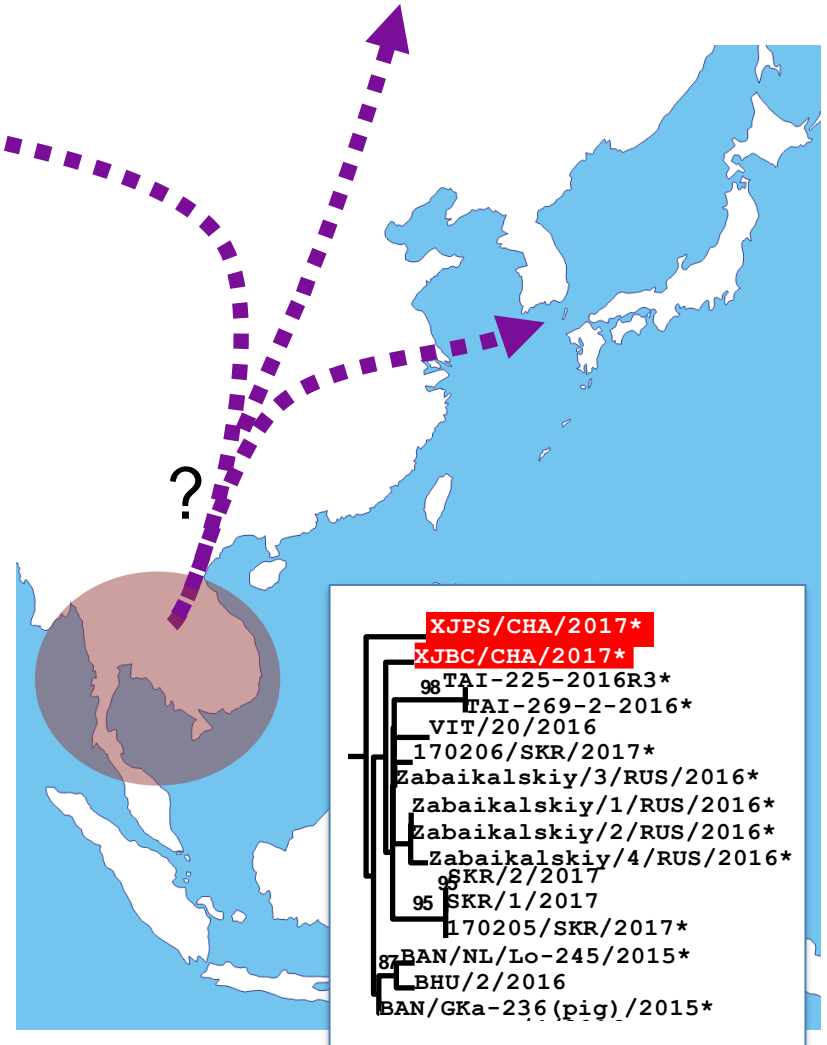
Onward transmission from POOL 1?



November 2016
Russian Federation



February 2017
Republic of Korea

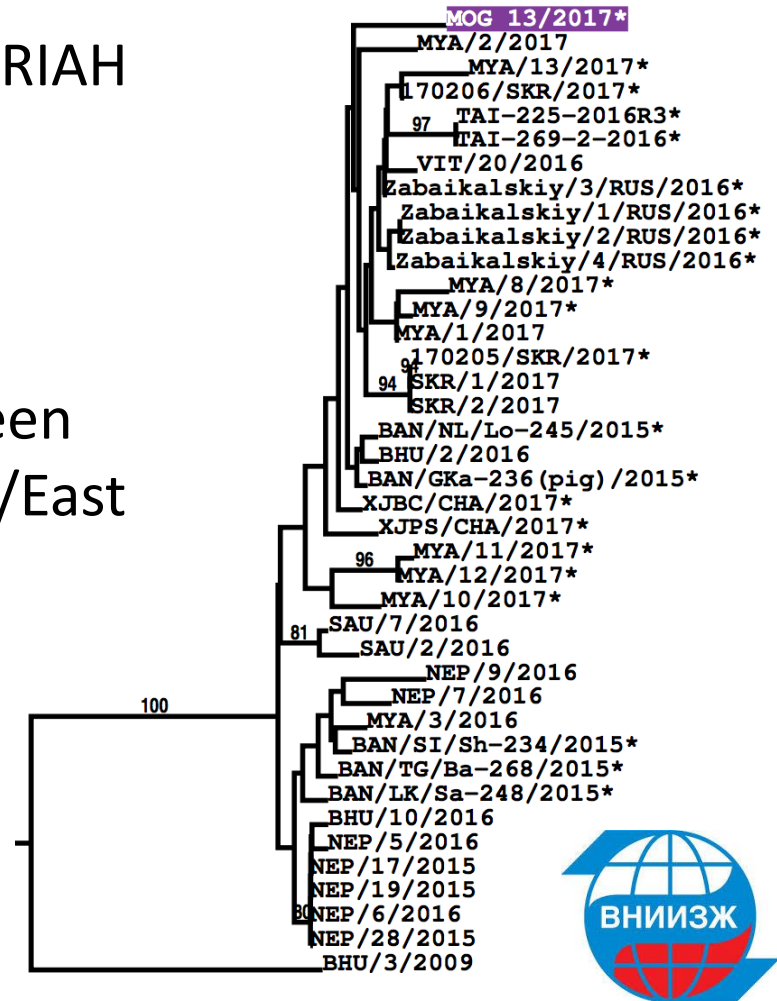


Can this lineage now be found elsewhere in the East Asia region?

Reported at SEACFMD: China (Xinjiang Province in western China)

FMD Cases in Mongolia (O/ME-SA/Ind-2001d)

- New sequences provided from ARRIAH
- FMD outbreaks in cattle
- Sukhbaatar Province in Eastern Mongolia
- Highlight close connections between South Asia (Pool 2) and Southeast/East Asia



**BREAKING
NEWS**

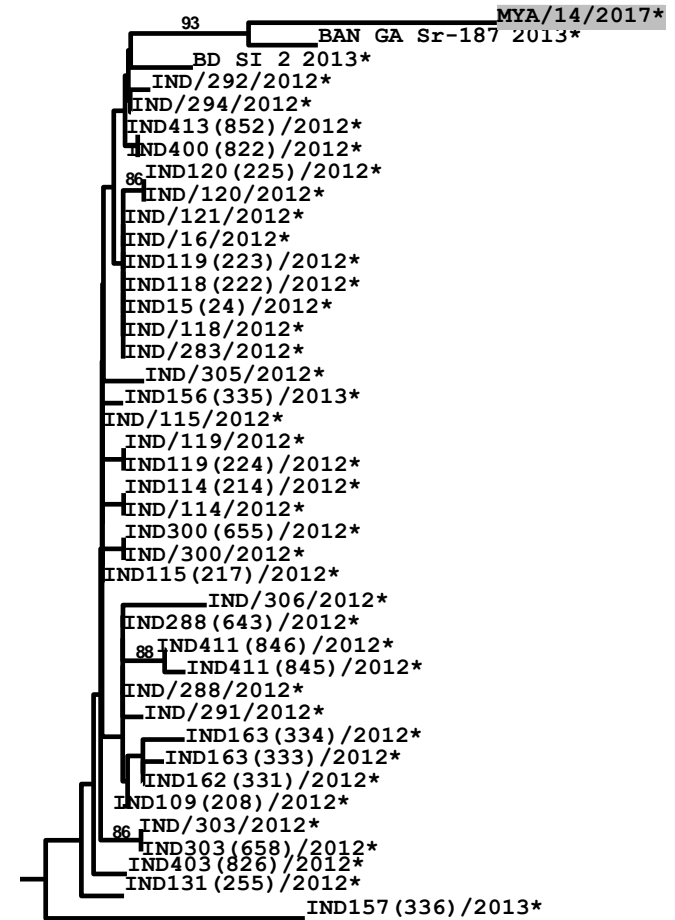
NEW REPORTED FMD EVENT

Introduction of other viruses from the Indian sub-continent

- Re-introduction of **Asia-1** into SEA
- Serotype Asia 1 not reported in Southeast Asia since 2006/7(?)
- February 2017 - FMD outbreaks in cattle in Myanmar

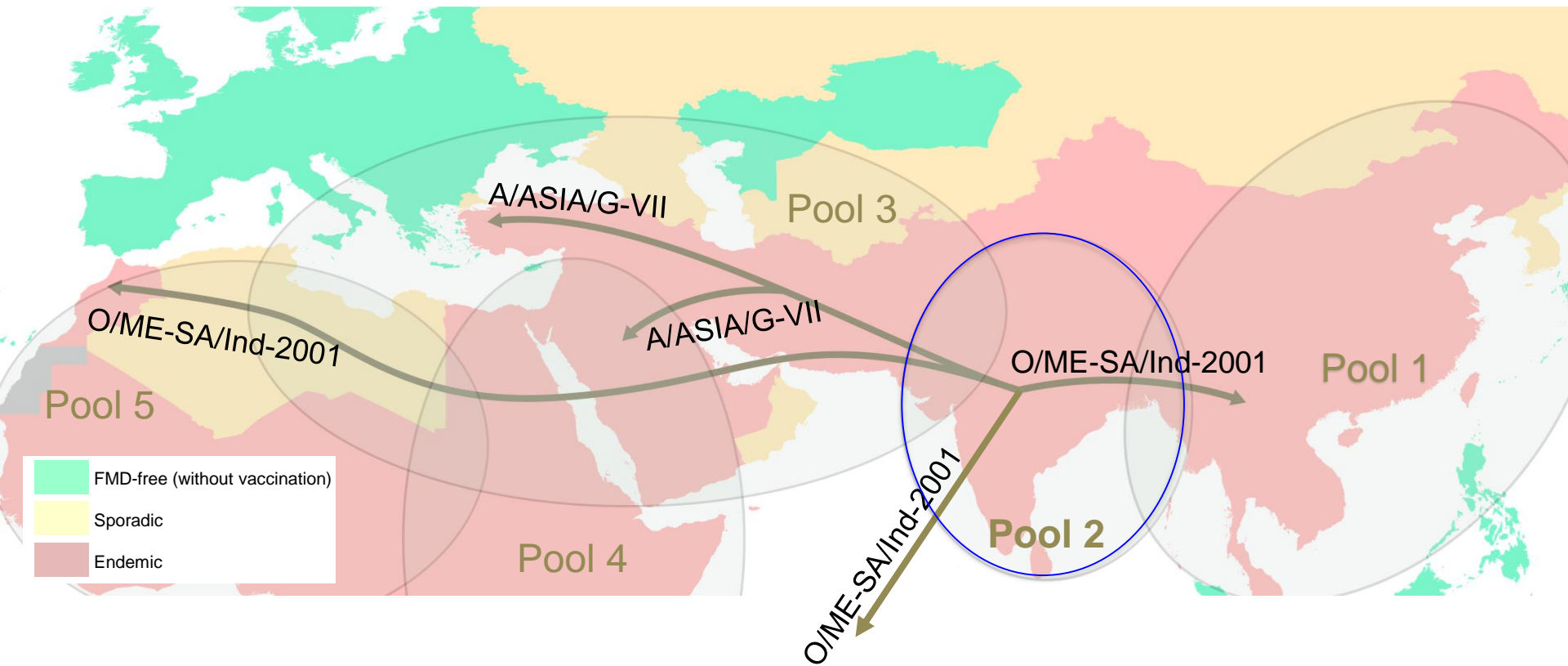
Huachun et al., (SEACFMD – 2017)

- ~500,000 head/year move from Myanmar into Yunnan Province
- 5% infected with FMDV



Sequence from RRL-SEA
Pakchong Thailand

Long-distance “trans-pool” movements



A/ASIA/G-VII

Poor *in vitro* match to many commercial vaccines

r_1 -values

Field Viruses

Field Virus	A/IRN/05	A22/IRQ	A/MAY/97	A/TUR/20/06	A/SAU/95
A/IRN/12/2015	0	0.04	0.15	0.15	0.11
A/IRN/22/2015	0	0.2	nd	0	0.25
A/IRN/25/2015	0	0	nd	0	nd
A/IRN/8/2015	0	0.13	0.23	0	0.26
A/SAU/1/2015	0	0.11	0.14	0.03	0.2
A/SAU/2/2015	0	0.11	0.23	0.06	0.17
A/EGY/19/2016	0	0.17	nd	0	nd
A/IRN/8/2016	0	0.13	nd	0	nd
A/SAU/19/2016	0	0.08	nd	0	0.22
A/SAU/24/2016	0	0.12	nd	0	nd
A/SAU/41/2016	0	0.22	nd	0	nd
A/BHU/3/2017	0	0.11	nd	0	nd

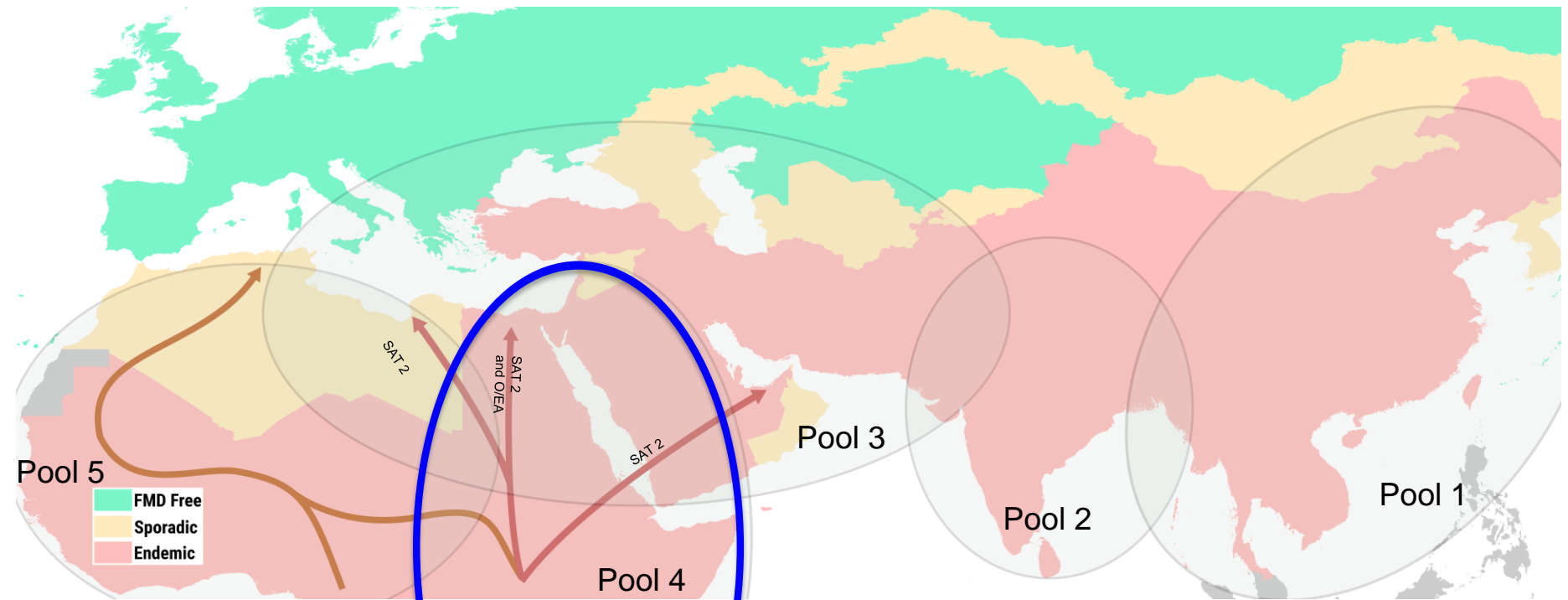
in vivo studies similar story (more later)



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Additional Examples of: Long-distance “trans-pool” movements

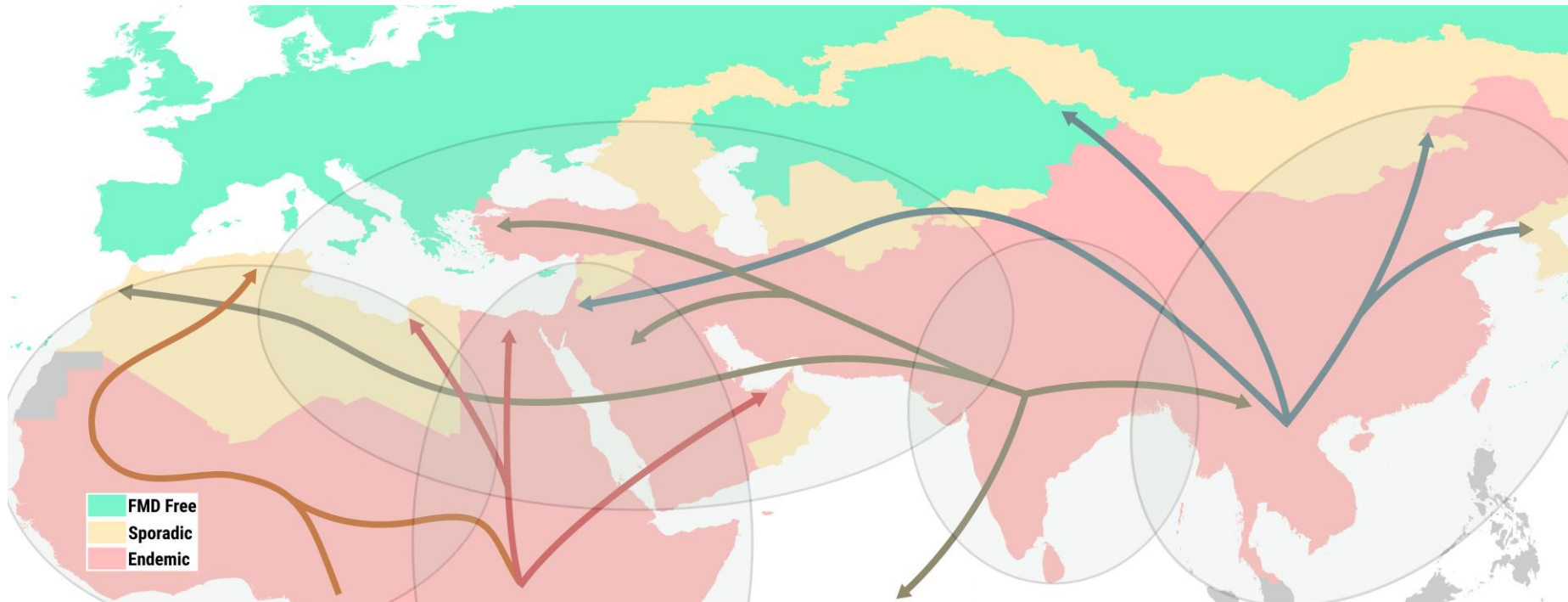
- **SAT 2/VII** Oman [2015], Egypt [since 2012]
- **O/EA-3** Egypt [2016], Palestine [2017] and Israel [2017]
- **A/AFRICA/G-IV** Algeria and Tunisia [2017]



Long-distance “trans-pool” movements

Why now?

- Probably no single factor that underpins these dynamic transboundary patterns;
- although these long distance and rapid movements of FMDV are probably exacerbated by the escalation of regional political crises, and migration of people in North Africa and the Middle East and increased demand for animal products in East Asia.



Thanks...

- 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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