



Global FMD Surveillance Report

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Department
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FMD Reference Laboratory



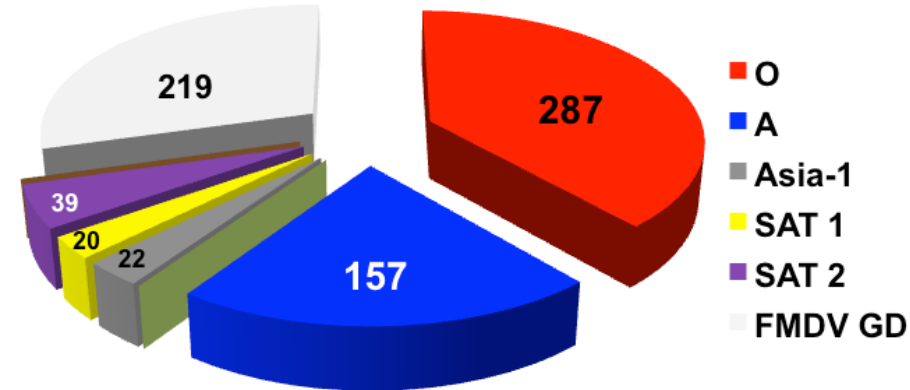
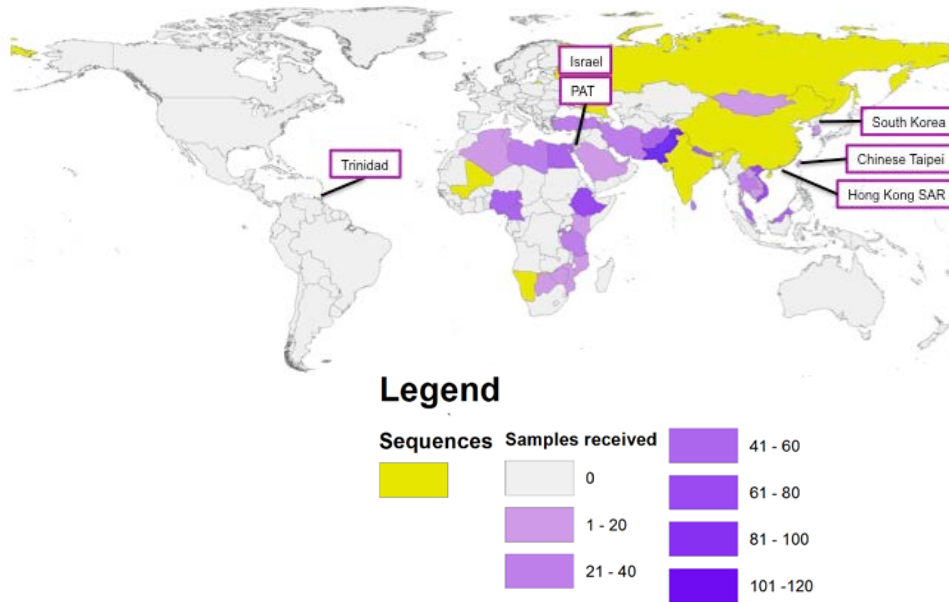
BBSRC National Virology Centre: The Plowright Building

- Jan-Feb 2015: Occupy new high containment laboratory
- Houses all work with “live” FMD and International Reference Laboratories for FMD, BT, PPR, ASF, AHS, Capripox



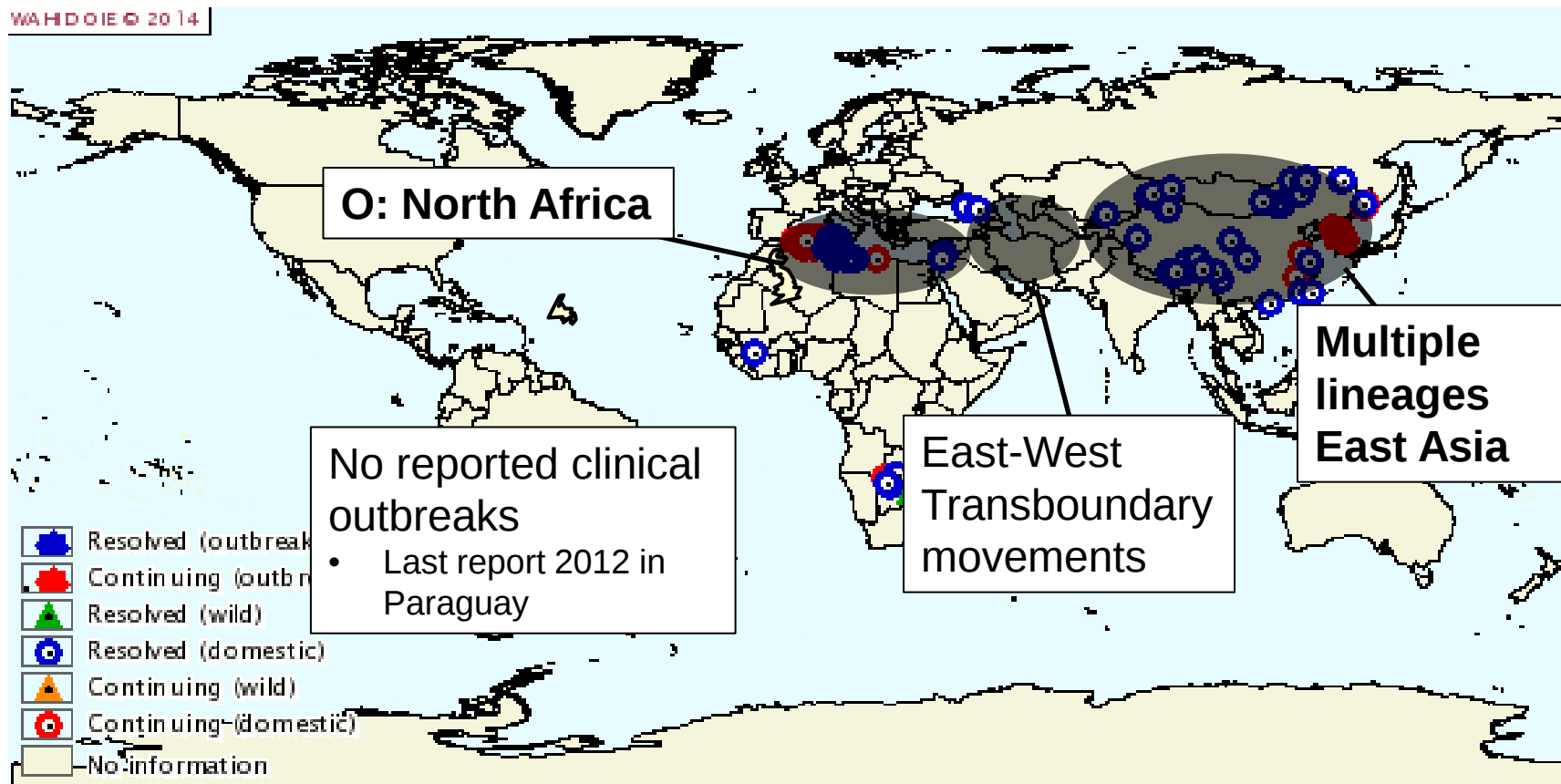
Virology submissions to WRLFMD Pirbright

October 2013 – March 2015 (period of current LoA)



- 874 samples received from 34 countries
- 101 no virus detected and 219 only rRT-PCR positive
- No serotype C since 2004
- Gaps still remain in the East and West African pools.
- Reports for these samples can be found at: www.wrlfmd.org

Changing epidemiological patterns

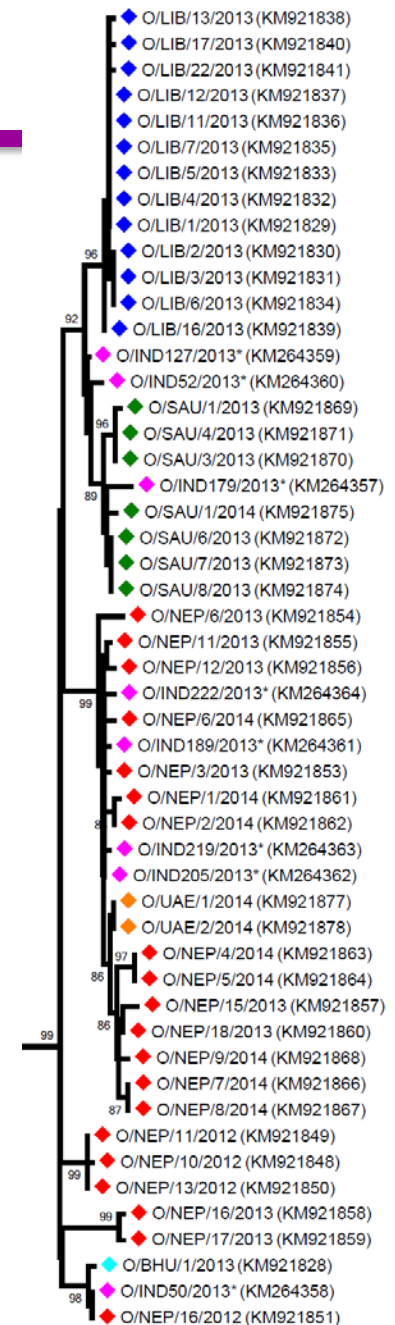


Outbreaks reported to the OIE (change of epidemiological status):
<http://www.oie.int/wahid-prod/public.php?page=home>

2013/14 - O/ME-SA/Ind-2001

Middle East and North Africa

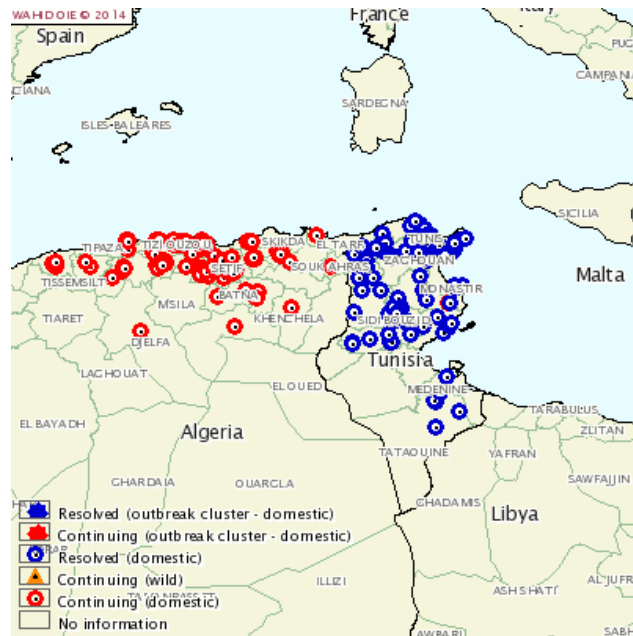
- Samples collected in Libya in Sept/Oct 2013 - submitted via IZSLER (Brescia)
- O/ME-SA/PanAsia-2 and O/EA3 previously reported in the country
- Samples collected in Saudi Arabia in Aug/Nov 2013
- **O/ME-SA/Ind-2001** lineage most closely related to viruses from Bhutan, Nepal and India – and Sri Lanka in 2014



Continued spread of O/ME-SA/Ind-2001

2014: Tunisia and Algeria

- Algeria: reported 27/07/14 (418 outbreaks)
- Tunisia: reported 29/04/14 (134 outbreaks)



Source: OIE (12/10/2014)



Vaccine matching for O/ME-SA/Ind-2001

22 field isolates

	Vaccine strain				
Field Isolate	O-3039	O Manisa	O BFS	O/TAW/98	O/TUR/5/09
LIB 1/2013			nd		
LIB 7/2013			nd		
LIB 17/2013					
LIB 22/2013			nd		
NEP 13/2012		borderline	nd		
NEP 6/2012	borderline		nd		
NEP 21/2012			nd		
NEP 6/2013			nd	borderline	
NEP 18/2013			nd		
NEP 1/2014					
NEP 6/2014			nd		
SAU 1/2013			nd		
SAU 4/2013			nd		
SAU 6/2013			nd		
SAU 7/2013			nd		
SAU 1/2014	borderline		nd		
SRL 1/2013			nd		
SRL 1/2014		borderline	nd		
UAE 1/2014		borderline	borderline		
UAE 2/2014		borderline	nd		
ALG 1/2014	borderline			borderline	
TUN 1/2014	borderline			borderline	

O Manisa Vaccine / O Algeria Challenge

Preliminary Data



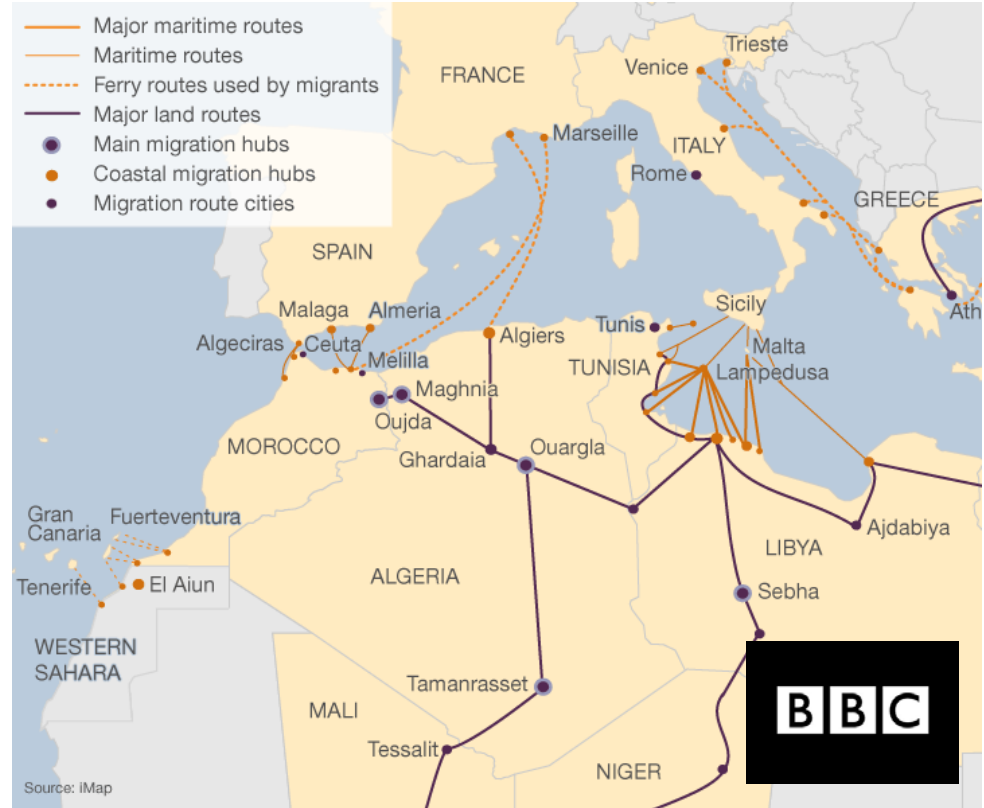
- 3 groups of five cattle were vaccinated with monovalent O₁ Manisa vaccine: 2ml (full dose), 0.5ml (1/4 dose) and 0.125ml (1/16 dose)
- At 21dpv, cattle (+ two unvaccinated controls) were challenged with 100,000 PFU of O/ALG/2014 by tongue inoculation



Vaccine Dose	Number Protected
Full	3/5
1/4	4/5
1/16	0/5

- The heterologous potency was estimated to be slightly greater than 3 PD₅₀

New FMD outbreaks in Algeria: 2015



- 12 FMD outbreaks reported (initial outbreak on 2/3/2015)
- Disease in small ruminants – foci in the west of the country?
- Serotype O
- Genotyping is urgently need to confirm FMDV lineage
- Increased threats to Morocco and Europe?

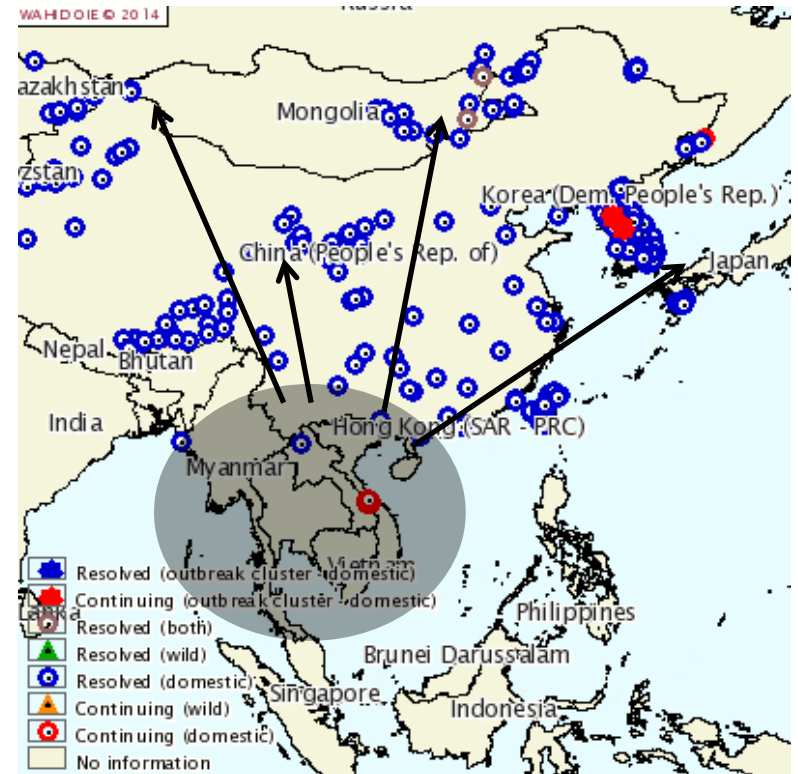
East Asia: outbreaks due to exotic FMDVs

FMD outbreaks since 2008

During 2009-2015:

Spread of three FMD virus lineages from Southeast Asia:

- **O/ME-SA/PanAsia**
China, Russia, Mongolia, Kazakhstan
- **O/SEA/Mya-98**
China, Japan, South Korea, North Korea, Russia, Mongolia, Taiwan
- **A/ASIA/Sea-97**
South Korea, China, Mongolia, Russia, Kazakhstan



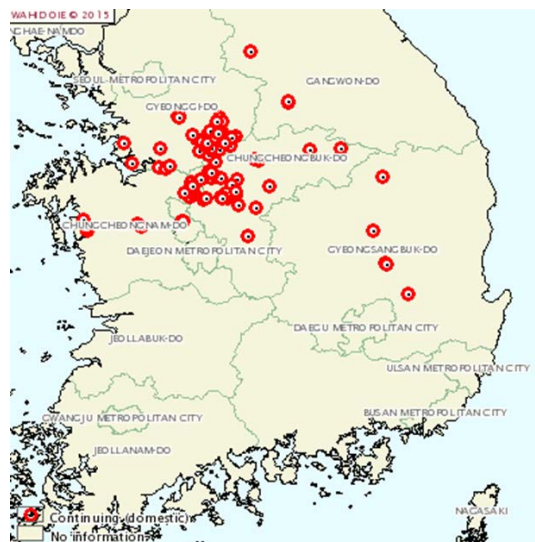
OIE: WAHID

FMD Outbreaks in South Korea

December 2014 – on-going

- New outbreaks (O/SEA/Mya-98)

- 121 outbreaks since December
- Majority of cases in pigs
- Vaccinated with O-Manisa?



- Sequence data indicates another introduction into SKR

- 2 in 2014?
- 3+ in 2010?
- Does this provide an indication of the severity of “infectious pressure” in the country?



Coordinating Global Networks

OIE/FAO FMD Laboratory Network



- OIE and FAO Reference Centres (+ affiliates)
- Annual meeting and report
- **Global surveillance and changing patterns in risk pathways**
- **Harmonised and improved lab capacity**



Brescia, Italy – November 2014

(Increasing) threats to Europe (?)

Mainly from:

1. The Middle East
2. East Asia
3. North Africa
4. South Asia
5. ssAfrica
6. South America



- Outbreaks in UK in 2001
- Increased FMD circulation in East Asia

- 2010-2011
Outbreaks in Bulgaria
- O/ME-SA/PanAsia-2
 - A/ASIA/Irn-05
 - Asia-1

- New FMD lineages in North Africa
- Outbreaks in FMD-free countries

Vaccine Bank Recommendations (March 2015)

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/Sakolnakorn/97) 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 new tool for vaccine antigen selection

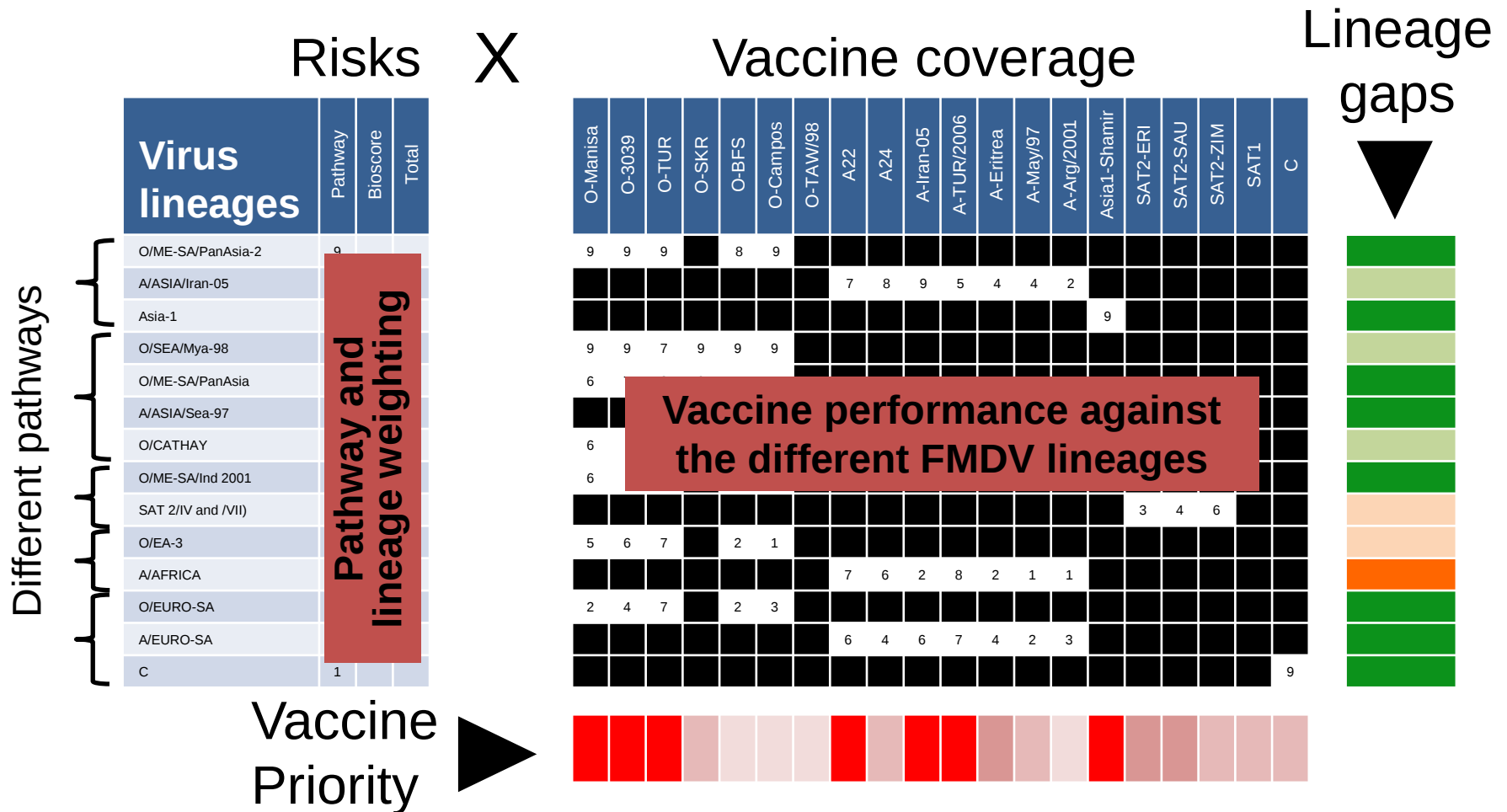
WRLFMD/EuFMD/SAFOSO

- Improved (more transparent) categorisation of different FMDV vaccine antigens
- Ability to respond to changing epidemiological risks
- Accommodates use of vaccines across different lineages
- For use in FMD-free settings

Determines scores as a **product** of two components

1. Different risks and associated FMDV lineages the are specific to a particular region (Europe, NA, Aus/NZ)
 2. Uses available in-vitro, in-vivo and field data to score the ability of available vaccines to protect against the different lineages
- Adds up the cumulative “antigen score” for each vaccine antigen to generate a heat map of vaccine priorities

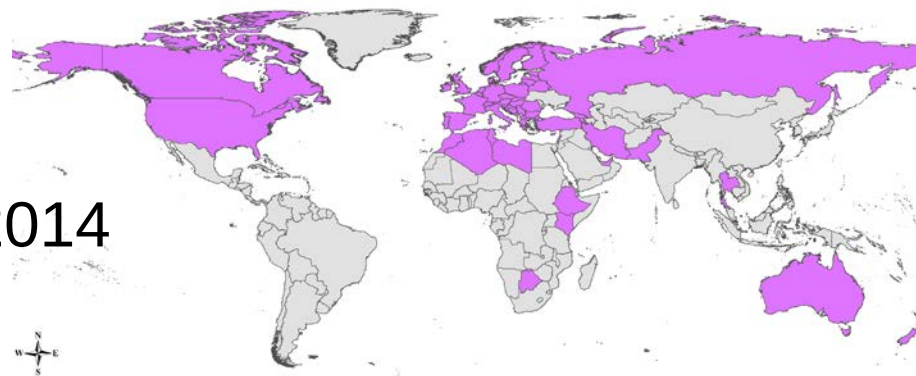
Cartoon overview of tool (draft)



- Further details will be provided by Katie Hickey at side event
- Plan to discuss with FMD Experts and vaccine companies

Annual Proficiency testing scheme

- To assist National FMD Laboratories to develop/improve accurate and reproducible FMD diagnostic tests
- QA requirements to support ISO/IEC 17025
- NRLs from all EU member states must participate
- Feedback (reiterative improvements to assays)
- Covers SVDV* as well as FMDV
 - *From Jan 2015 the EU will not support an EU-RL for SVDV



- Phase XXVI - reported in 2014
- 56 countries worldwide

PTS update

- As part of the LoA – EUFMD supports participation of labs in the PTS
 - Global Network
 - Non EU - EuFMD members
 - Neighborhood states
- Performance (against criteria) generally good and improving
- Results summarized in WRLFMD interim report (Jan 2015)

	2013	2014
Total invited laboratories	86	91
Total number of shipments	60	66
Participants from European Union (funded by EURL for FMD)	27	27
EUFMD funded participants		
Participants from Global Network Labs	BVI, Botswana: ARRIAH, Russia: OVI, South Africa: NAHDIC, Ethiopia: Embakasi, Kenya: Pakchong, Thailand: USDA, USA ³	BVI, Botswana: OVI, South Africa: NAHDIC, Ethiopia: Embakasi, Kenya: Pakchong, Thailand; Lanzhou, China: Panaftosa, Brazil; NVRI Nigeria; LNERV, Senegal; USDA, USA ³
% of labs meeting target performance	Cat-1 0% Cat-2 17% Cat-3 50% Cat-4 33%	Analysis of results pending
Participants from EuFMD Member states (non-EU)	Algeria, Bosnia, Georgia, Macedonia, Morocco, Norway, Serbia, Switzerland, Tunisia, Turkey	Albania, Bosnia, Georgia, Macedonia, Norway, Serbia, Switzerland, Turkey
% of labs meeting target performance	Cat-1 0% Cat-2 0% Cat-3 40% Cat-4 60%	Analysis of results pending
Participants from neighbourhood countries	Armenia, Azerbaijan, Belarus, Iran, Libya, Lebanon, Montenegro.	Algeria, Armenia, Azerbaijan, Belarus, Egypt, Iran, Kosovo, Morocco, Moldova, Tunisia, Montenegro, Lebanon,
% of labs meeting target performance	Cat-1 0% Cat-2 0% Cat-3 43% Cat-4 57%	Analysis of results pending
Summary of EUFMD funded participants		
Invited	33	40
Total number of participants funded by EUFMD	23	29

Summary

- A new high-containment laboratory has recently opened at Pirbright
- Samples tested at the WRLFMD and the OIE/FAO FMD Laboratory Network provide vital intelligence about the circulation of FMD viruses in the field
- The epidemiology of FMD in the regions that threaten Europe is very dynamic, and recent trans-boundary movements of the virus require close monitoring.
- A new risk-based approach is being developed to prioritise the selection of vaccine antigens for vaccine banks.
- The WRLFMD organises an annual inter-laboratory proficiency testing scheme which assists in the harmonisation of laboratory performance

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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