FMD : Global Surveillance
OIE/FAO FMD Reference Laboratory Network

EuFMD April 2013
The World Reference Laboratory for FMD

Dr Jef M. Hammond WRLFMD®

The Pirbright Institute, Ash Road, Pirbright, Surrey, GU24 0NF, UNITED KINGDOM
FMD Reference Laboratories at Pirbright

- European Community Reference Laboratories for FMD
  - Support and diagnosis for EU Member States
- OIE Reference Laboratory for FMD
  - support of safeguarding and promoting international trade
  - Reference Laboratory Network of OIE/FAO FMD Labs
- World Reference Laboratory for FMD designated by FAO
  - WRLFMD
  - Global surveillance and threat recognition
  - Reference Laboratory Network of OIE/FAO FMD Labs
World Reference Laboratory for FMD- WRLFMD®

FAO, OIE, EU and National Responsibilities

- 24/7 Diagnostic Service
- Global surveillance
- Strain characterisation (China, Russia, Egypt)
- Vaccine matching (Bulgaria, South Korea, Egypt)
- Extensive library of isolates
- Test improvement & Development, validation,
- Quality assurance
- Reagent supply
- Training
- Advice & Reports

WRLFMD Quarterly Report
April-June

World Reference Laboratory Report

Yemen Arab Republic: 38 type O FMD viruses isolated during the previous reporting period were analyzed and shown to belong to the EA 3 genotype. 23 of the viruses, collected in 2009, were closely related to Ethiopian viruses also collected in 2009. Six viruses from 2008 and five from 2009 belonged to a different sub-lineage of EA 3 and were most closely related to viruses from Ethiopia in 2008 and Yemen in 2006.

Batch: WRLFMD/2009/00115; received: 16/03/2009
Visualization of Regional Virus Pools as an Aid to Global Control

Divides the Globe into 7 pools each with

- Multiple serotypes but topotypes mainly confined to that pool
- Each pool may need tailored vaccines and strategies
The conjectured status of FMD showing approximate distribution of regional virus pools.
The conjectured status of FMD showing approximate distribution of regional virus pools.
The conjectured status of FMD showing approximate distribution of regional virus pools.
**Enhanced Surveillance: OIE/FAO Lab network**

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

Approximately ~1800 samples tested during 2012

*Hot off the press*

**OIE/FAO FMD Reference Laboratory Network**

**Annual Report 2012**

Compiled and Edited by Dr Jef Hammond, WRLFMD®, The Pirbright Institute, UK.
The network laboratories received and characterised more than 1800 samples in 2012 from 35 countries. Almost 60% of the samples were serotype O. However, the proportion of serotype A has reduced and the proportions of serotype Asia 1 and serotype SAT 2 have increased.

Increased Asia 1 activity
Increased SAT 2 activity

Still No Serotype C  (not reported since 2004)
Samples Characterised in 2012

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Samples</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRLFMD®</td>
<td>764</td>
<td>27</td>
</tr>
<tr>
<td>PANAFTOSA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>FGI-ARRIAH</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>ARC-OVI</td>
<td>123</td>
<td>1</td>
</tr>
<tr>
<td>LVRI</td>
<td>84</td>
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<td>PDFMD</td>
<td>790</td>
<td>1</td>
</tr>
<tr>
<td>RRLSEA</td>
<td>49</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1,826</strong></td>
<td><strong>37</strong></td>
</tr>
</tbody>
</table>

# samples
In total 537 VP1 sequences were characterised in 2012 by the Network Laboratories:
In total 537 VP1 sequences were characterised in 2012 by the Network Laboratories: 435 (81%) came from WRLFMD® while the remaining 102 (19%) came from other laboratories.
Intermediate, sporadic

Endemic

FMD-Free

Free. Virus present in game parks

FMD -Free

Countries with multiples zones:
FMD-free, free with vaccination or not free

27 countries
> 750 samples
> 400 positive

FMD Outbreaks 2012
~ 750 Samples from 27 Countries
FMD Outbreaks 2012
~ 750 Samples from 27 Countries

27 countries
> 750 samples
> 400 positive

Egypt
O, A & SAT 2

Sudan
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

Turkey
O, A & Asia 1

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
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Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
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O, A, SAT 1 & SAT 2

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China
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KSA
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Israel
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Turkey
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Libya
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Russia
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Kazakhstan
O & A

South Africa
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O, A, SAT 1 & SAT 2

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Zambia
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UAE
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Kuwait
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Iran
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Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1

Kenya
O, SAT 1 & SAT 2

Zambia
SAT 2

Egypt
O, A & SAT 2

PAT SAT 2

UAE
O

Kuwait
O

Iran
O, A & Asia 1

Afghanistan
O, A & Asia 1

China
O

KSA
O

Israel
O

Turkey
O & SAT 2

Libya
O & SAT 2

Russia
O

Kazakhstan
O & A

South Africa
SAT 2

Tanzania
O, A, SAT 1 & SAT 2

Namibia
SAT 1
WRLFMD® carried out individual vaccine matching tests on 1192 samples from 24 countries in 2012. The majority were for isolates from pool 3 with almost 50% of total. Isolates from pools 1, 2 and 4 were also tested by vaccine matching.
Turkey 2012 - Distribution >1000 Outbreaks

The majority of these have been Asia-1.
FMD Outbreaks 2012
SAT 2 in North Africa and Middle East

Recent Foot and Mouth Disease outbreaks in North Africa in 2011/2

Map prepared by IDM

Date prepared 26/06/2012
Egypt has at least 3 serotypes of FMDV and a number of topotypes

<table>
<thead>
<tr>
<th>Number</th>
<th>Serotype</th>
<th>Year Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O/ME-SA/Egy-72</td>
<td>2006-2009</td>
</tr>
<tr>
<td>2</td>
<td>O/ME-SA/PanAsia 2 (Egy-09)</td>
<td>2009 &amp; 2011</td>
</tr>
<tr>
<td>3</td>
<td>A/Africa/G-VII (Ken-05)</td>
<td>2006 &amp; 2009</td>
</tr>
<tr>
<td>4</td>
<td>A/Asia/Iran-05 (Bar-08)</td>
<td>2010-2011</td>
</tr>
<tr>
<td>5</td>
<td>A/Africa/G-IV (ISM-12)</td>
<td>2012</td>
</tr>
<tr>
<td>6</td>
<td>SAT2/VII/Alx-12</td>
<td>2012</td>
</tr>
<tr>
<td>7</td>
<td>SAT2/VII/Ghb-12</td>
<td>2012</td>
</tr>
</tbody>
</table>
Recent Observations - SAT 2 in Sudan 2010

Report on FMDV SAT 2 in Sudan in 2010
Batch: WRLFMD/2012/00028

* indicates viruses in this batch

Software: MEGA 5.0
Analysis
Scope
Statistical Method
Phylogeny Test
Test of Phylogeny
Substitution Model
Substitutions Type
Model/Method
Rates and Patterns
Rates among Sites
Pattern among Lineages
Data Subnet to Use
Gap/missing Data Treatment
Codons Included
No. of Sites: 651
No Of Bootstrap Reps = 1000
Only bootstrap values of 70% and above are shown
*, not a WRLFMD Ref. No.

N.J. Knowles & J. Wardsworth, 13 September 2012

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WRLFMD® Regional Analysis - 2012
WRLFMD® Regional Analysis - 2012
Asia 1 and SAT 2 on the move

Pool 3
O, A, Asia 1 & SAT 2

Pool 1
O, A, Asia 1

Pool 2
O, A, Asia 1

Pool 4
A, O, SAT 1, 2, 3

Pool 5
O, A, SAT 1, 2

Pool 6
SAT 1, 2, 3

Pool 7
O, A
Report on FMDV A in P.R. China in 2013
Batch: WRLMEG/2013/00009

- indicates viruses in this batch

Software: MEGA 5.1
Analysis
Analysis
Scope: All Selected taxa
Statistical Method: Neighbor-Joining
Phylogeny Test: Bootstrap method
No. of Bootstrap Replications: 1000
Substitution Model
Substitutions Type: Nucleotide
Mode Method: Kimura 2-parameter model
Substitutions to Include: 6 Transitions + Transversions
Rates and Patterns
Rates among Sites: Uniform rates
Pattern among Lineages: Same (Homogeneous)
Data Subset to Use
Gaps/Missing Data Treatment: Pairwise deletion
Columns Included: 1st+2nd+3rd+Non-Coding
No. of Sites: 639
No. Of Bootstrap Reps: 1000
Only bootstrap values of 70% and above are shown
*, not a WRLFMD Ref. No.

N.J. Knowles, K. Bachamek-Bankowska & J. Wadsworth, 09 April 2013
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Sender Ref: A-QHXN-2013-B_LVRI
Location: Chengbei district, Xining, QingHai, China
Topotype: ASIA
Genotype/strain: Sea-97

Date collected: ~15/03/2013

Most Closely Related Viruses

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Virus name</th>
<th>Filename</th>
<th>No. nt comp.</th>
<th>No. nt match.</th>
<th>No. of ambig.</th>
<th>% Id.</th>
<th>% Diff.</th>
<th>Topotype</th>
<th>Strain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A/GDMM-CHA-2013-S (LVRI)</td>
<td>CHA13-AA</td>
<td>633</td>
<td>627</td>
<td>0</td>
<td>99.05</td>
<td>0.95</td>
<td>ASIA</td>
<td>Sea-97</td>
</tr>
<tr>
<td>2</td>
<td>A/Zabaikalsky/RUS/2013 (ARRIAH)</td>
<td>RUS13-AA</td>
<td>633</td>
<td>627</td>
<td>0</td>
<td>99.05</td>
<td>0.95</td>
<td>ASIA</td>
<td>Sea-97</td>
</tr>
</tbody>
</table>
Current FMD Threat Analysis: Vaccine matching 2012

- Vaccine matching carried out on representative isolates from each submission
- 2dm VNT carried out with a variety of Merial, Intervet (MSD) and ARRIAH bovine vaccinal reference sera
- ~ 1200 individual tests carried out in 2012 by WRLFMD
- Results presented as traffic light system

<table>
<thead>
<tr>
<th>Result</th>
<th>WRLFMD® Pirbright vaccine matching by 2dm VNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good match</td>
<td></td>
</tr>
<tr>
<td>Some matches</td>
<td></td>
</tr>
<tr>
<td>No match</td>
<td></td>
</tr>
</tbody>
</table>
## Serotype O Vaccine Matching 2012

### Pool 1 Eastern Asia

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Serotype</th>
<th>Topotype</th>
<th>Lineage/Strain</th>
<th>Sub Lineage</th>
<th>Vaccine Matching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>O</td>
<td>SEA</td>
<td>Mya-98</td>
<td>-</td>
<td>O 3039</td>
</tr>
<tr>
<td>Thailand</td>
<td>O</td>
<td>SEA</td>
<td>Mya-98</td>
<td>-</td>
<td>O 4625</td>
</tr>
<tr>
<td>Vietnam</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia</td>
<td>-</td>
<td>O Manisa</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O PA2</td>
</tr>
</tbody>
</table>

**Legend:**
- **Green:** Good match
- **Yellow:** Some matches
- **Red:** No match
## Current FMD Threat Analysis: Vaccine matching 2012

### Pools 3 Eur-Asia (and 4 Eastern Africa)

#### Serotype O vaccine matching

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Serotype</th>
<th>Topotype</th>
<th>Lineage/strain</th>
<th>Sub Lineage</th>
<th>O 3039</th>
<th>O 4625</th>
<th>O Manisa</th>
<th>O PA2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>ANT-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bahrain</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>ANT-10</td>
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<tr>
<td>Egypt</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>-</td>
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<tr>
<td>Iran</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>ANT-10</td>
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<td>O</td>
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<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>ANT-10</td>
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<td></td>
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<tr>
<td>Libya</td>
<td>O</td>
<td>EA-3</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Kingdom Saudi Arabia</td>
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<td>ANT-10</td>
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<td>Sudan</td>
<td>O</td>
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<td>-</td>
<td>-</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>ANT-10</td>
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<tr>
<td>UAE</td>
<td>O</td>
<td>ME-SA</td>
<td>PanAsia-2</td>
<td>ANT-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Green**: Good match
- **Yellow**: Some matches
- **Red**: No match

Pools 3 Eur-Asia (and 4 Eastern Africa)
### Current FMD Threat Analysis: Vaccine matching 2012

#### Pool 2/3 Eur-Asia

Serotype A vaccine matching

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Serotype</th>
<th>Topotype</th>
<th>Lineage/strain</th>
<th>Sub Lineage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>A</td>
<td>Asia</td>
<td>Iran-05</td>
<td>HER-10</td>
</tr>
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<td>Iran-05</td>
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<td>AFG-07</td>
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<td>HER-10</td>
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<td>Turkey</td>
<td>A</td>
<td>Asia</td>
<td>Iran-05</td>
<td>SIS-10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iran</td>
<td>05</td>
<td>06</td>
</tr>
<tr>
<td>A22</td>
<td>Tur</td>
<td></td>
</tr>
</tbody>
</table>
## Pool 1 Eastern Asia

### Serotype A vaccine matching

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Serotype</th>
<th>Topotype</th>
<th>Lineage/strain</th>
<th>Sublineage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>A</td>
<td>Asia</td>
<td>Sea-97</td>
<td>-</td>
</tr>
<tr>
<td>Thailand</td>
<td>A</td>
<td>Asia</td>
<td>Sea-97</td>
<td>-</td>
</tr>
</tbody>
</table>

- **Good match**
- **Some matches**
- **No match**
### Current FMD Threat Analysis: Vaccine matching 2012

#### Pool 2/3 Eur-Asia

**Serotype Asia 1 vaccine Matching**

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Serotype</th>
<th>Topotype</th>
<th>Lineage/strain</th>
<th>Asia 1</th>
<th>Asia 1</th>
<th>Shamir</th>
<th>&gt;6PD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>Asia 1</td>
<td>Asia</td>
<td>Sindh-08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iran</td>
<td>Asia 1</td>
<td>Asia</td>
<td>Sindh-08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>Asia 1</td>
<td>Asia</td>
<td>Sindh-08</td>
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<td>Turkey</td>
<td>Asia 1</td>
<td>Asia</td>
<td>Sindh-08</td>
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</tr>
</tbody>
</table>

[Legend: **Green** = Good match | **Yellow** = Some matches | **Red** = No match]
## Current FMD Threat Analysis: Vaccine matching 2012

### SAT Serotypes Vaccine Matching

<table>
<thead>
<tr>
<th>Pool 4</th>
<th>Pool 3</th>
<th>Pool 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eastern Africa</strong></td>
<td><strong>Eur-Asia</strong></td>
<td><strong>Eastern Africa</strong></td>
</tr>
<tr>
<td><strong>Country of Origin</strong></td>
<td><strong>Serotype</strong></td>
<td><strong>Topotype</strong></td>
</tr>
<tr>
<td><strong>Kenya</strong></td>
<td>SAT 1</td>
<td>I (NWZ)</td>
</tr>
<tr>
<td><strong>Bahrain</strong></td>
<td>SAT 2</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Egypt</strong></td>
<td>SAT 2</td>
<td>VII</td>
</tr>
<tr>
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<td>IV</td>
</tr>
<tr>
<td><strong>Libya</strong></td>
<td>SAT 2</td>
<td>VII</td>
</tr>
<tr>
<td><strong>PAT</strong></td>
<td>SAT 2</td>
<td>VII</td>
</tr>
<tr>
<td><strong>Sudan</strong></td>
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<td>VII</td>
</tr>
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<td>SAT 2</td>
<td>IV</td>
</tr>
</tbody>
</table>

**Legend**:
- **Good match**: Green
- **Some matches**: Yellow
- **No match**: Red

**Pool 4**
- **Eastern Africa**
  - Kenya: SAT 1, I (NWZ)

**Pool 3**
- **Eur-Asia**
  - Bahrain: SAT 2, IV
  - Egypt: SAT 2, VII
  - Kenya: SAT 2, IV
  - Libya: SAT 2, VII
  - PAT: SAT 2, VII
  - Sudan: SAT 2, VII
  - Tanzania: SAT 2, IV

**Pool 4**
- **Eastern Africa**
  - SAT 2 Zim
  - SAT 2 Eri
Current FMD Threat Analysis: 2013

Serotype O- widespread circulation - 2 most common strains
- ME-SA topotype – PanAsia-2 strain
- SEA topotype – Mya-98 strain

Serotype A- widespread circulation 2 most common strains
- ASIA topotype – Iran-05 strain
- ASIA topotype – Sea 97 strain

Serotype Asia 1 – more limited circulation- BUT risk of further spread
- Only 1 topotype and recent dominant strain Sindh-08

Serotypes SAT – restricted circulation
Have not established outside of Africa
But recent spread of SAT 2 into North Africa and Middle East being monitored

Serotype C - No reports since 2004
# Vaccine Recommendations

## (National & European Antigen Banks)

| HIGH PRIORITY | O Manisa* supplemented with O 4625 or O 3039 O PanAsia -2* A-Iran-05 Asia 1 Shamir* SAT 2 Eritrea O BFS or Campos A24 Cruzeiro and A22 Iraq |
| MEDIUM PRIORITY | A Argentina 01 A Iran 96 A Iran 99 A Eritrea A Iran 87 or A Saudi Arabia 23/86 (or equivalent) A Malaysia 97 (or Thai equivalent such as A/Sak/97)* O Taiwan 97 (pig-adapted strain or Philippine equivalent)* SAT 1 South Africa SAT 2 Zimbabwe |
| LOW PRIORITY | A15 Bangkok related strain A Kenya A87 Argentina related strain SAT 1 Kenya SAT 2 Kenya SAT 3 Zimbabwe C Noville |

Within category: not in order of importance
A major combined effort both National and Global is needed for control.

Accurate & Timely disease information is vital.

The FMD Reference Laboratory Network provides the Engine Room for the Global Control Initiative.

Pirbright designated global coordinating lab for OIE/FAO GCP
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