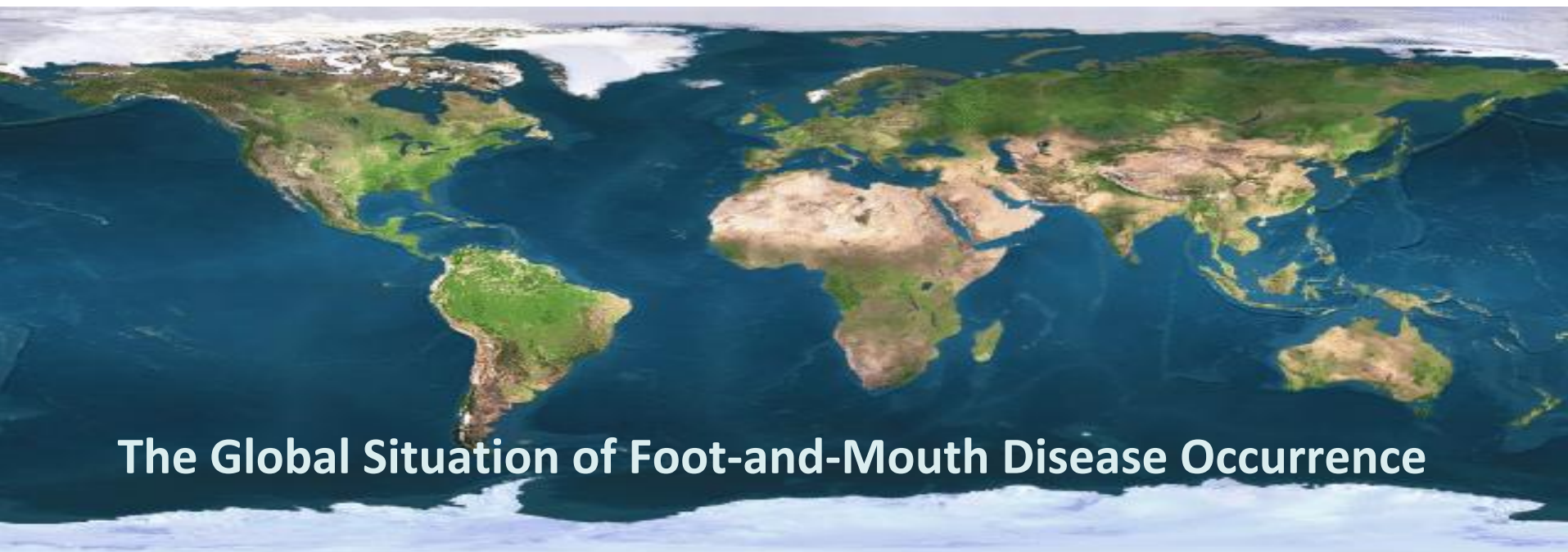


OIE/FAO Global Conference on Foot and Mouth Disease  
with the support of the EC

# THE WAY TOWARDS GLOBAL CONTROL

24-26 June 2009, Asunción Paraguay

(Spanish) (French)



## The Global Situation of Foot-and-Mouth Disease Occurrence

### An Overview

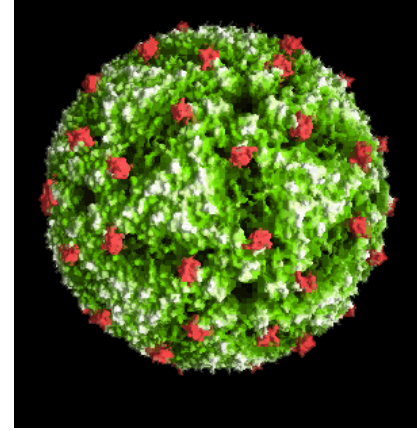
Jef M Hammond, Nigel Ferris, Yanmin Li, Nick Knowles,  
Donald King and David J Paton



WRLFMD, Institute for Animal Health,  
Ash Road, Pirbright, Surrey, GU24 0NF, UNITED KINGDOM



# Talk Overview



- Introduction to WRLFMD
- FMD situation update
- Global Control through Regional Knowledge
- Other activities
- Future Issues and Gaps



# Principal Activities of WRLFMD

OIE Reference Laboratory  
FAO World Reference Laboratory

- 24/7 Diagnostic Service
  - Referral diagnosis
- Global surveillance
- Sequence analysis and strain identification
- Test development, improvement and validation
- Quarterly and Annual reports



# Principal Activities of WRLFMD

- Quality assurance
- Reagent and kit supply
- Training
- Consultancy and research priorities
- Reference laboratory Network co-ordination
- Proficiency testing
- Advice



FAO World Reference Laboratory for Foot-and-Mouth Disease

# Ref Lab Reports

- Navigation**
- Home
  - FMD BioPortal
  - Ref Lab Reports**
  - FMD Manual
  - FMDV Serotyping
  - FMDV Genotyping
  - F&M Disease
  - FMD Diagnosis
  - FMD Vaccine Manuf.
  - FMD Labs
  - FMD Agencies
  - FMD Meetings
  - OIE FMD Links
  - Related Sites














## Reference Laboratory Reports

click on the icon to download/open

## Annual FAO/OIE FMD Reference Laboratory Network Reports

-  2005
-  2006
-  2007
-  2008

## Quarterly FAO/OIE FMD Reference Laboratory Reports

- |                                                                                                |                                                                                                |                                                                                                |                                                                                                |                                                                                                  |                                                                                                |                                                                                                |                                                                                                  |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|  Jan-Mar 2006 |  Apr-Jun 2006 |  Jul-Sep 2006 |  Oct-Dec 2006 |  Jan-Mar 2007   |  Apr-Jun 2007 |  Jul-Sep 2007 |  Oct-Dec 2007 |
|  Jan-Mar 2008 |  Apr-Jun 2008 |  Jul-Sep 2008 |  Oct-Dec 2008 |  Jan-March 2009 |                                                                                                |                                                                                                |                                                                                                  |

## Presentations to EUFMD

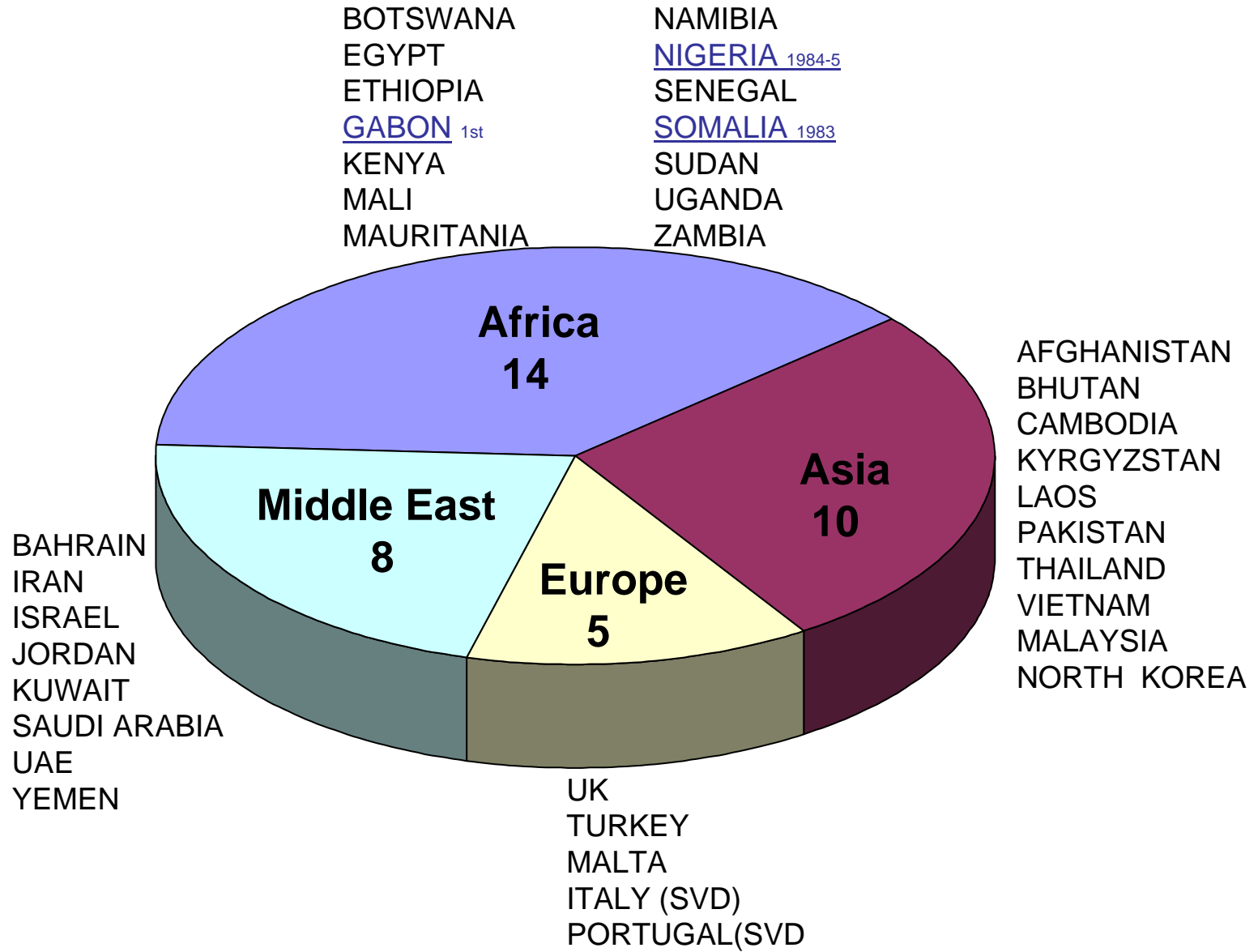
-  Jan 2007
-  Jun 2008
-  Dec 2008

The WRLFMD website contains quarterly and annual reference laboratory reports and can be found at [http://www.wrlfmd.org/ref\\_labs/fmd\\_ref\\_lab\\_reports.htm](http://www.wrlfmd.org/ref_labs/fmd_ref_lab_reports.htm)

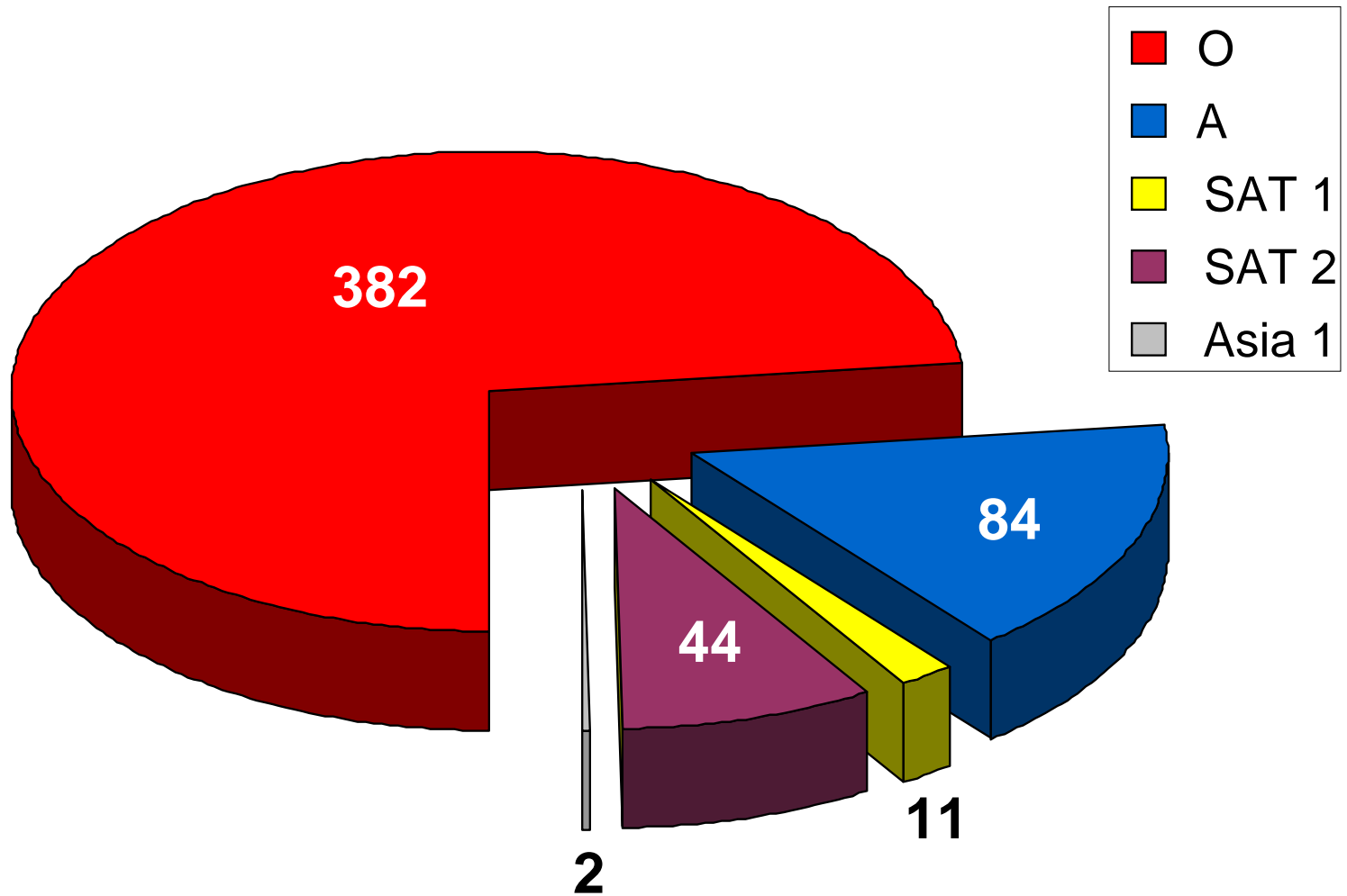


# WRLFMD: 1250 samples from 37 countries

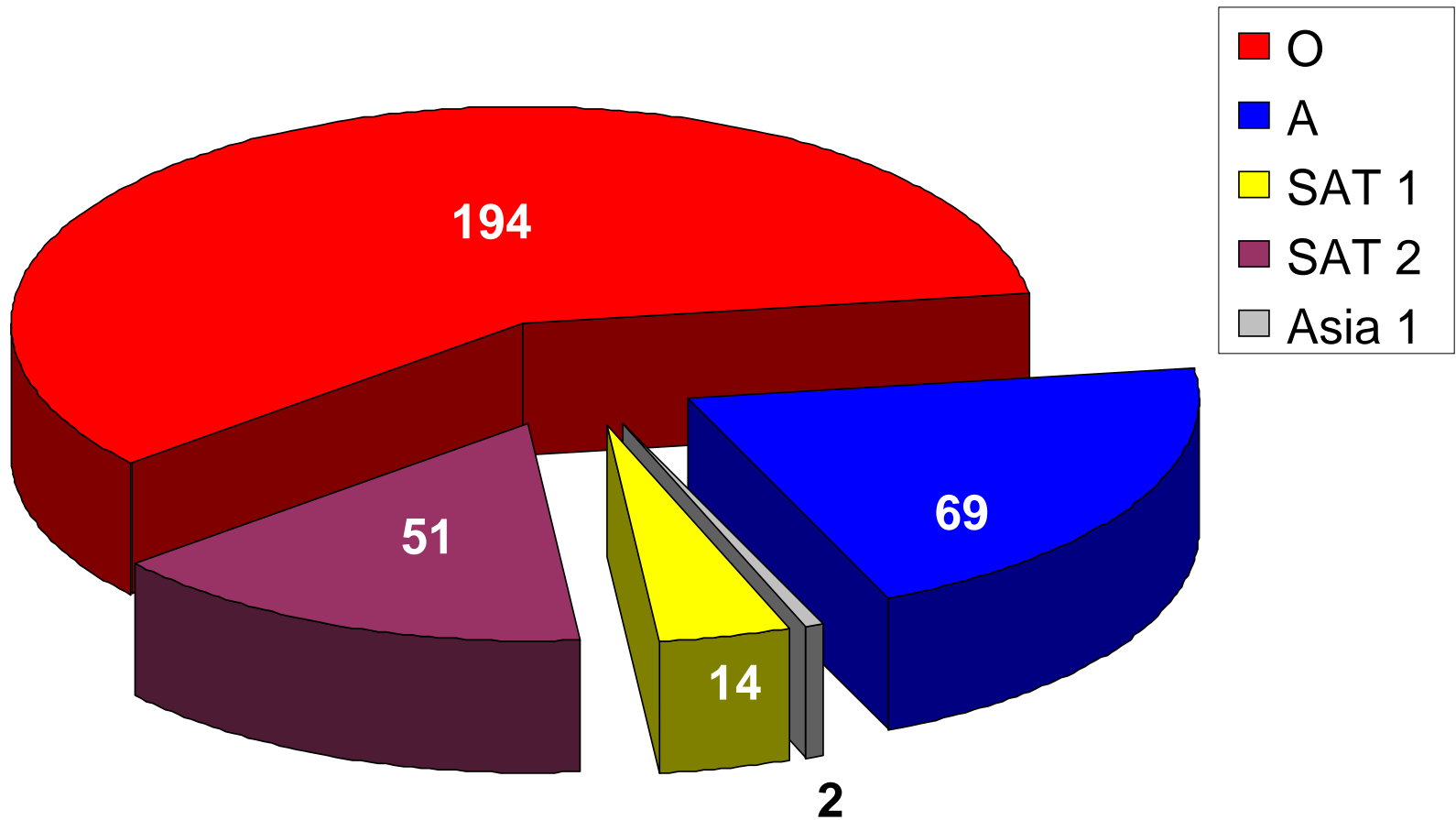
## October 2006 - 2008



# 523 FMD Viruses Isolated Between October 2006-2008



# WRLFMD: 330 Viruses Sequenced (VP1) 2007-2008



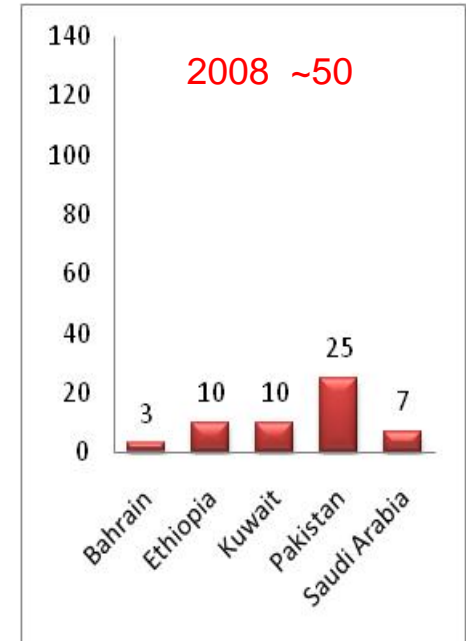


# 2009

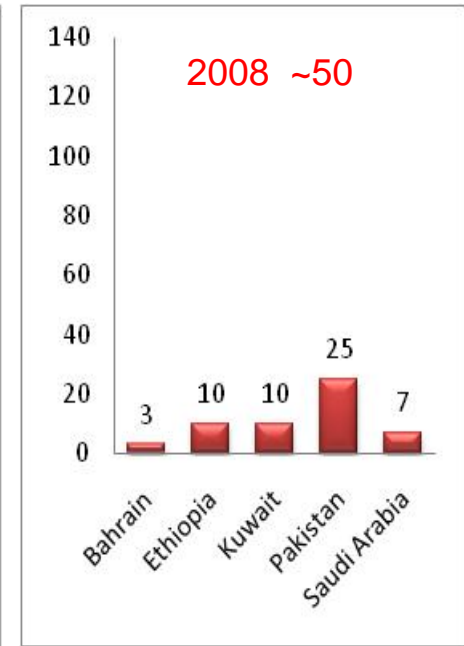
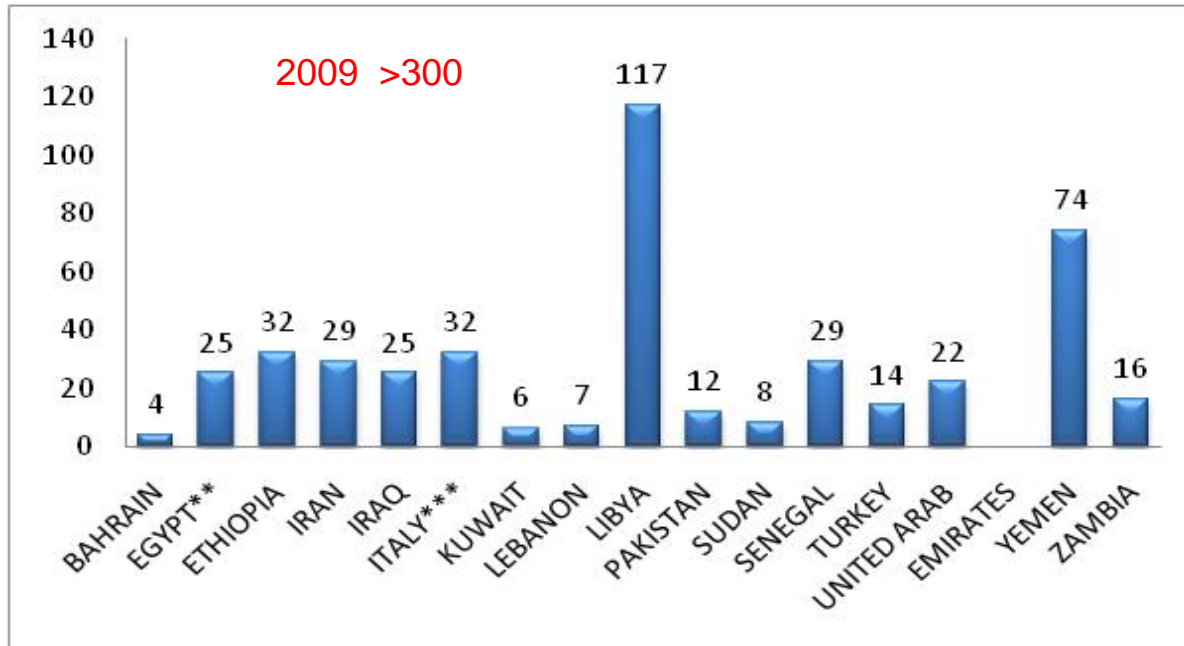
- Very high numbers of samples submitted to WRLFMD
- Middle East Region
- Increase in A serotype
  - A-Iran-05 lineage
  - O-PanAsia 2



# WRLFMD Number of positive samples 1<sup>st</sup> quarter 2008 vs 2009



# WRLFMD Number of positive samples 1<sup>st</sup> quarter 2008 vs 2009

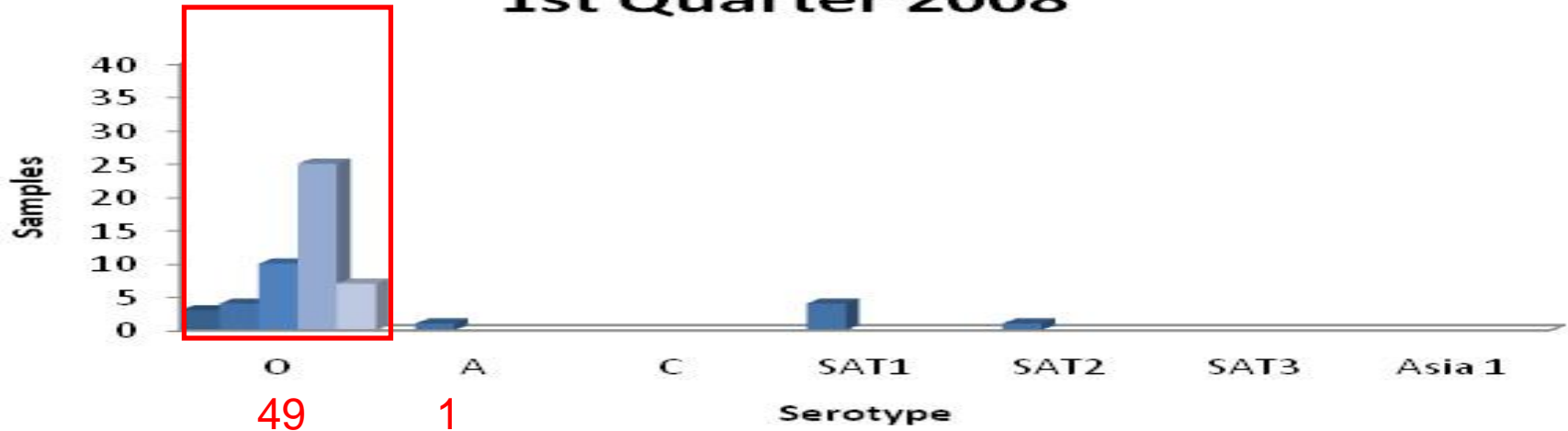


187 positive samples in total in 2008

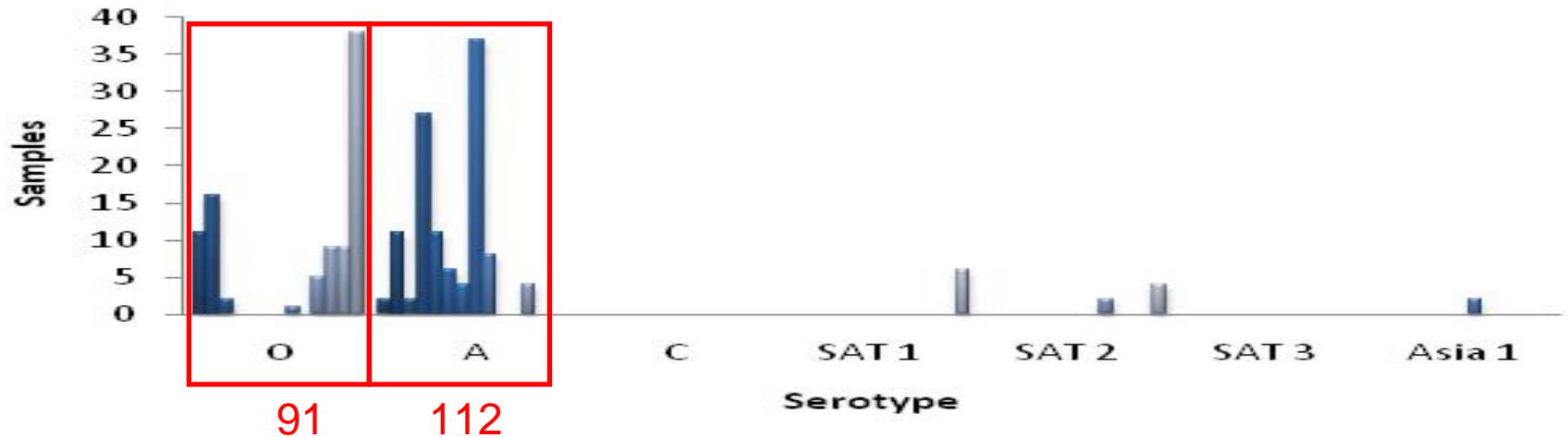
>450 samples in 1<sup>st</sup> quarter 2009



### 1st Quarter 2008



### 1st Quarter 2009



# FMD Reports in 2009

## Southern/Southeast Asia

- China Asia 1 & A
- Taiwan O
- Chinese Taipei O
- Hong Kong O
- Thailand O
- Myanmar O

## Central Asia

- Pakistan O, A & Asia1

## Africa

- Angola SAT2
- Botswana SAT2
- Kenya O, A, SAT1 & SAT2
- Ethiopia O & A
- Zambia SAT1 & SAT2



# FMD Reports in 2009

## Southern/Southeast Asia

- China Asia 1 & A
- Taiwan O
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- Hong Kong O
- Thailand O
- Myanmar O

## Central Asia

- Pakistan O, A & Asia1

## Africa

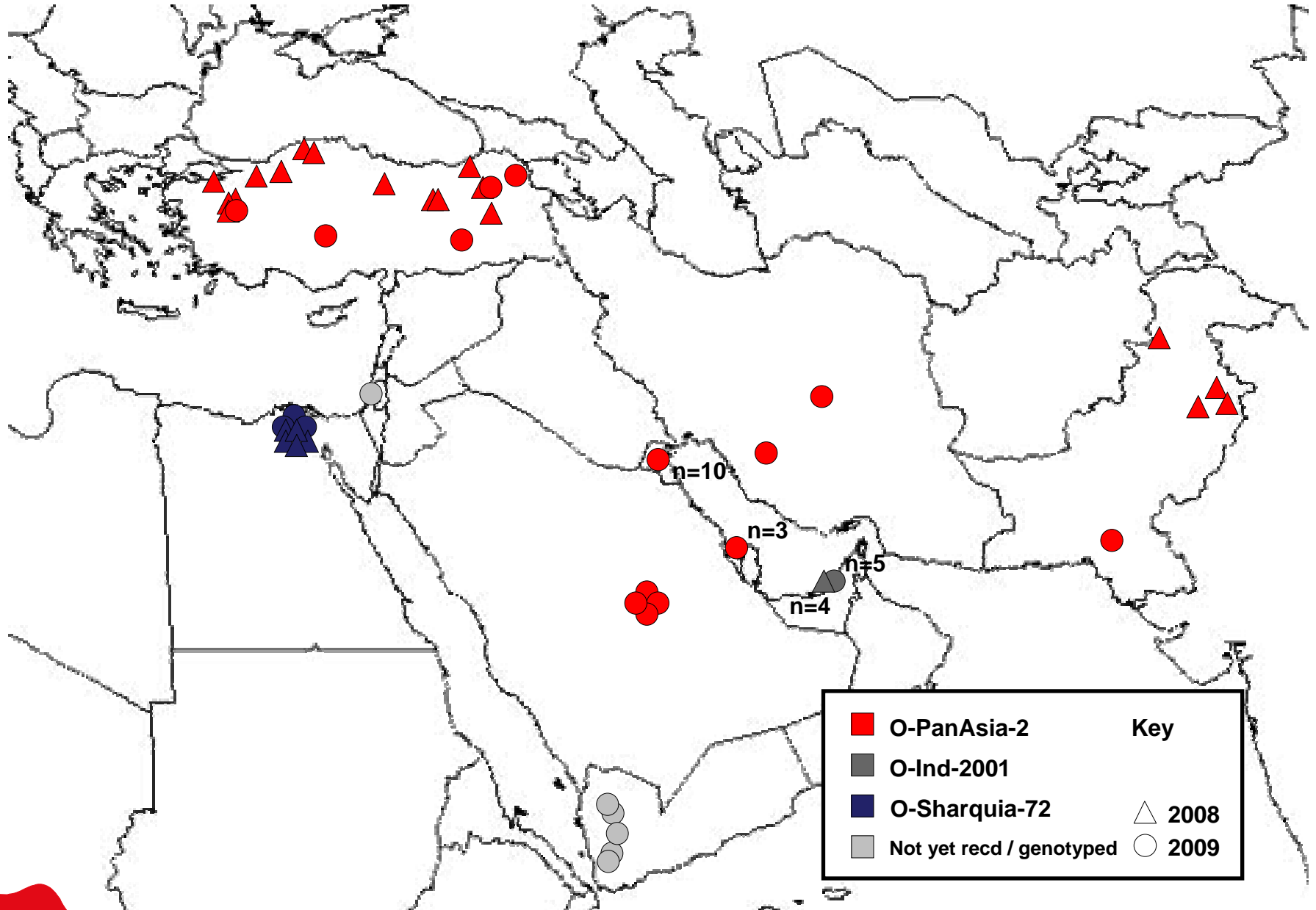
- Angola SAT2
- Botswana SAT2
- Kenya O, A, SAT1 & SAT2
- Ethiopia O & A
- Zambia SAT1 & SAT2

## Middle and Near East

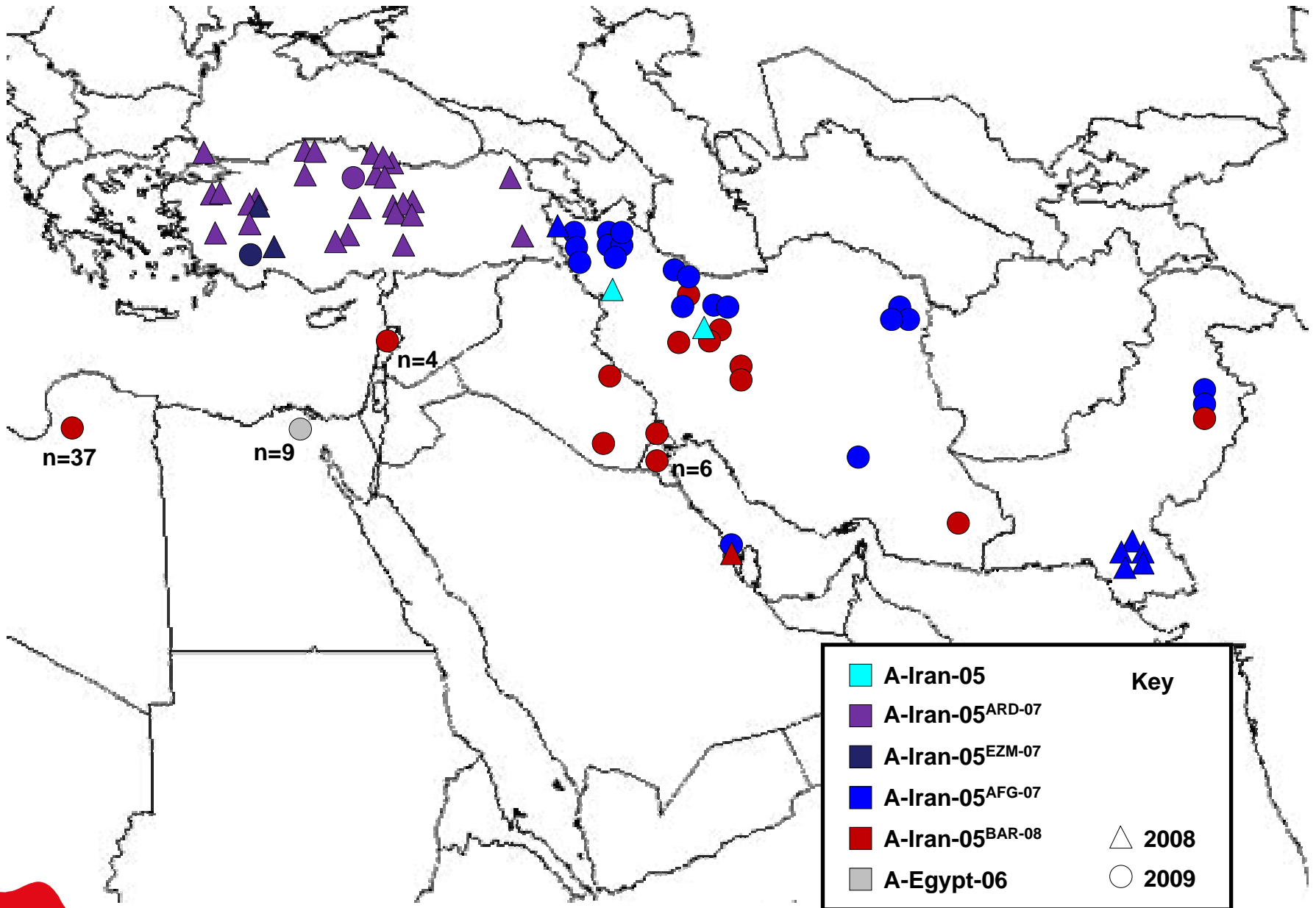
- Bahrain A & Asia1
- Egypt O & A
- Iran A
- Iraq A
- Israel O & A
- Kuwait A
- Lebanon A
- Libya A
- Sudan O
- Turkey O & A
- UAE O
- Yemen O



# FMDV-O genotyping in 2008 & 2009

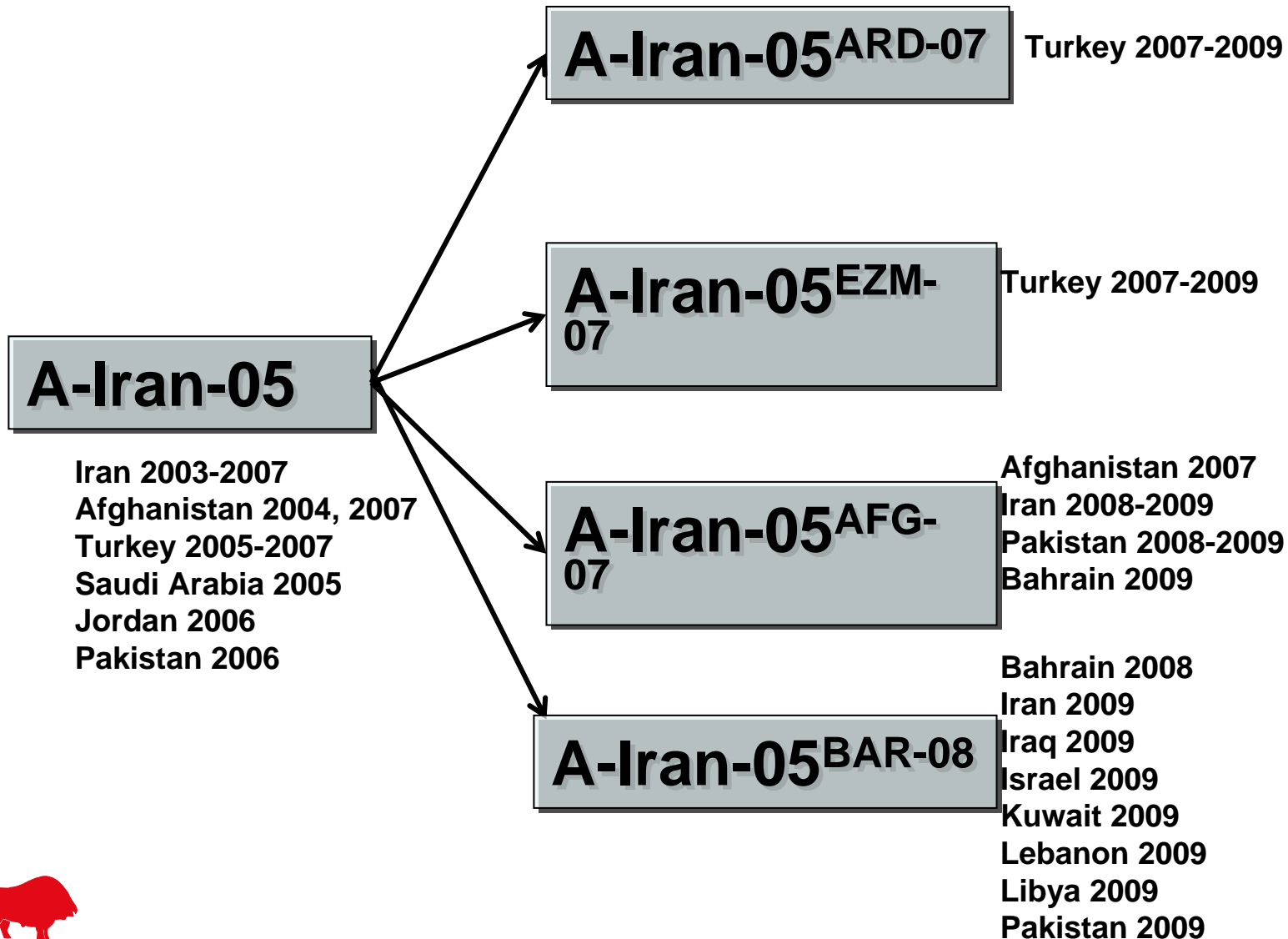


# FMDV-A genotyping in 2008 & 2009



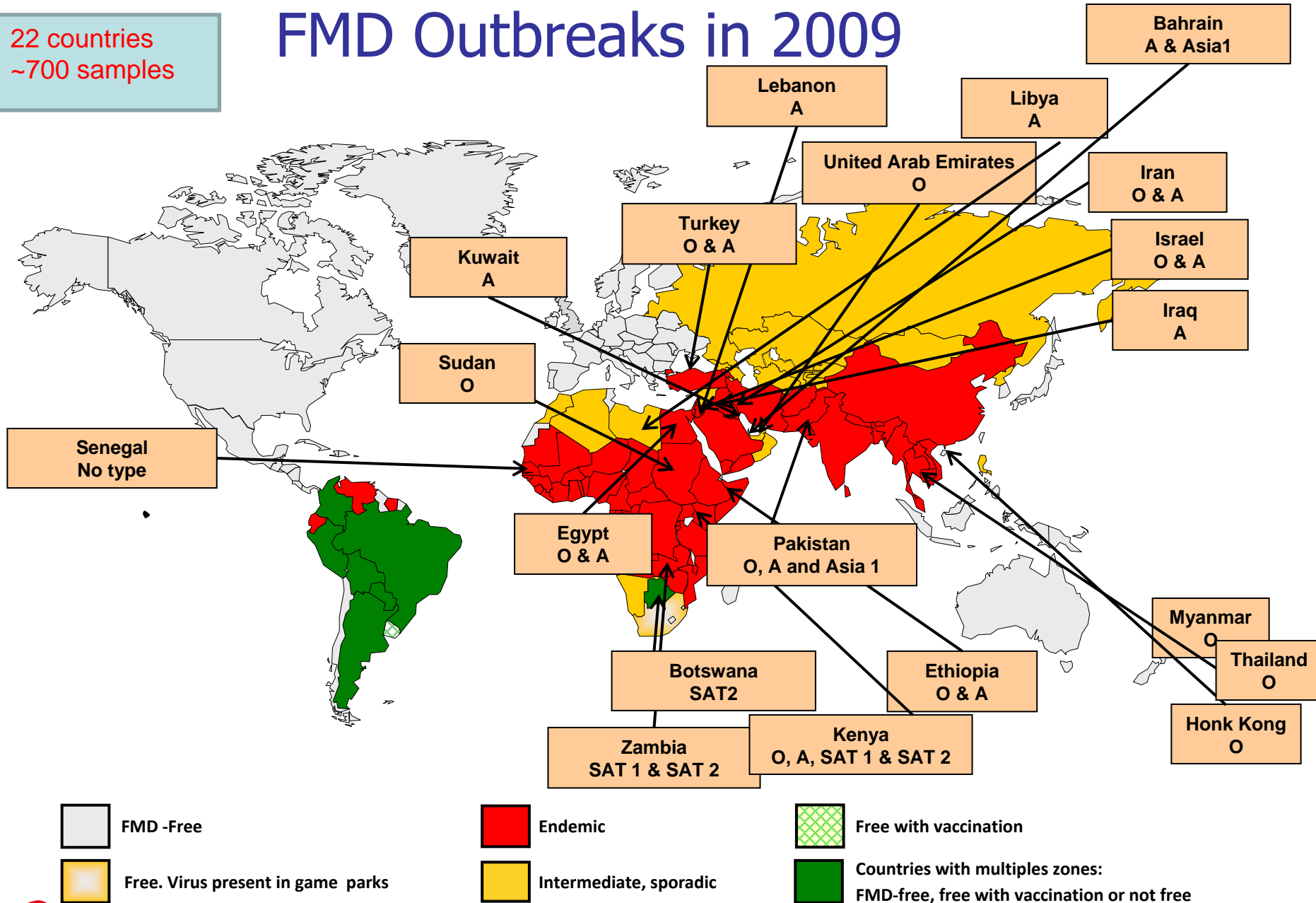


# Sub-lineages of A-Iran-05



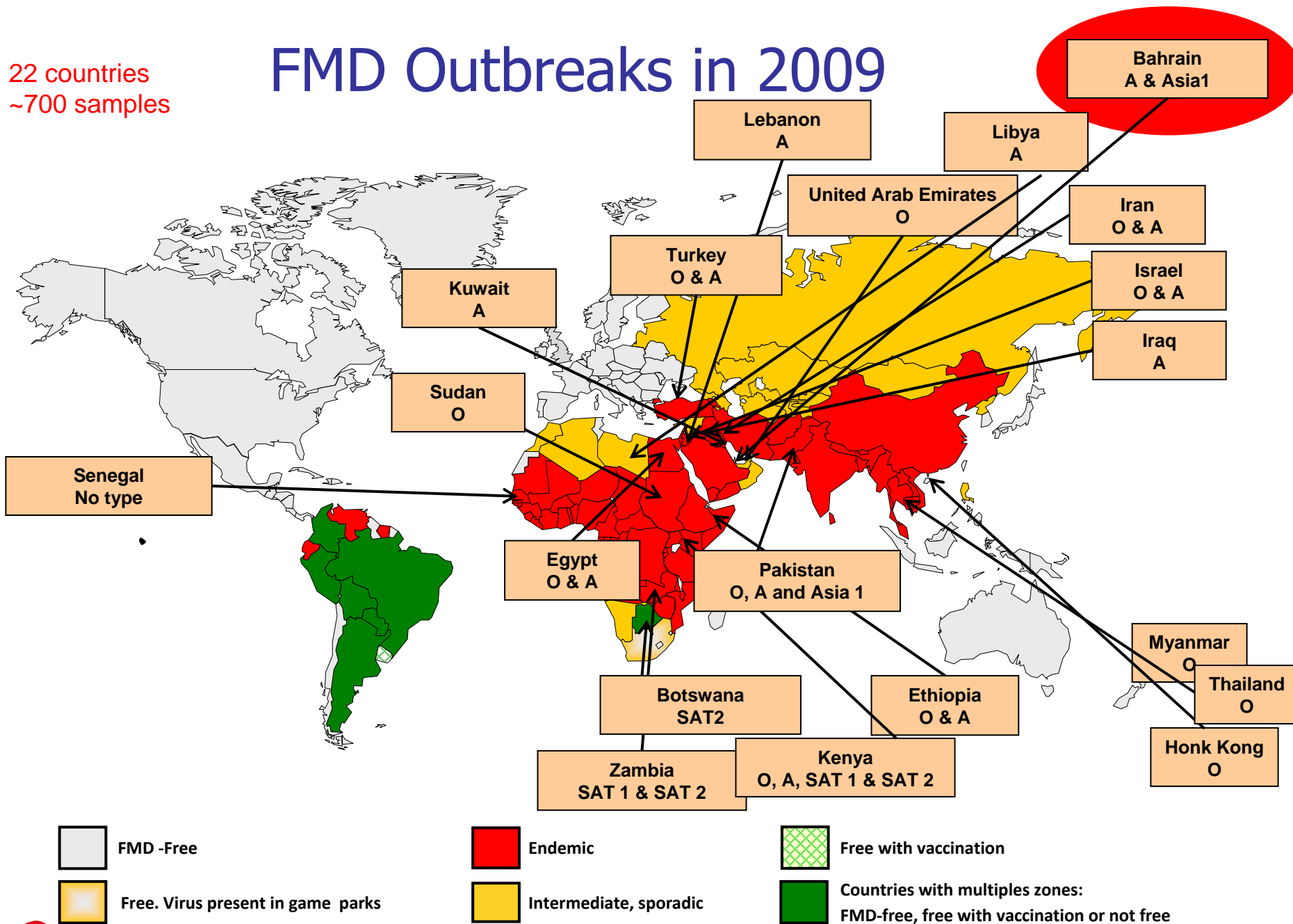
# FMD Outbreaks in 2009

22 countries  
~700 samples



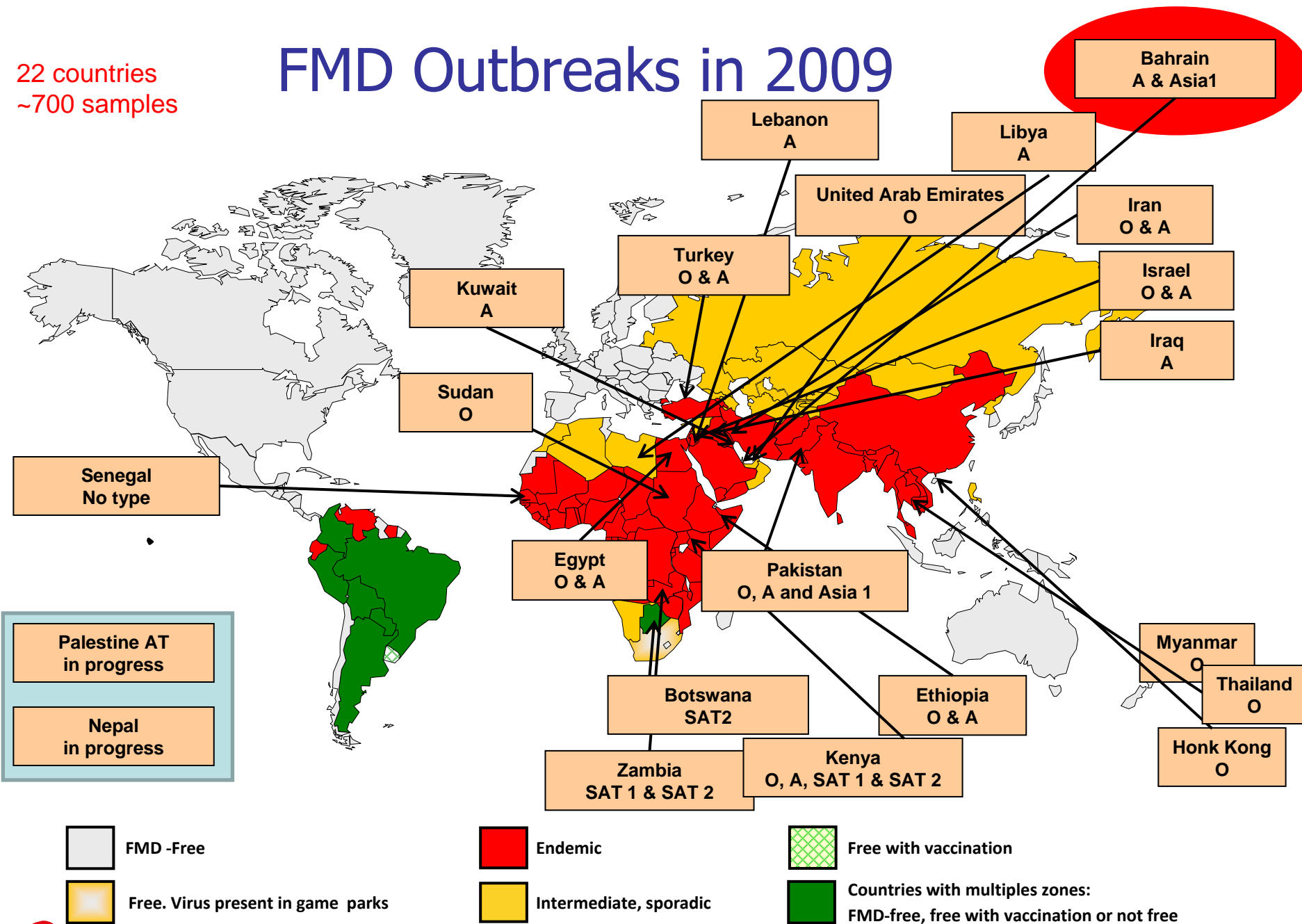
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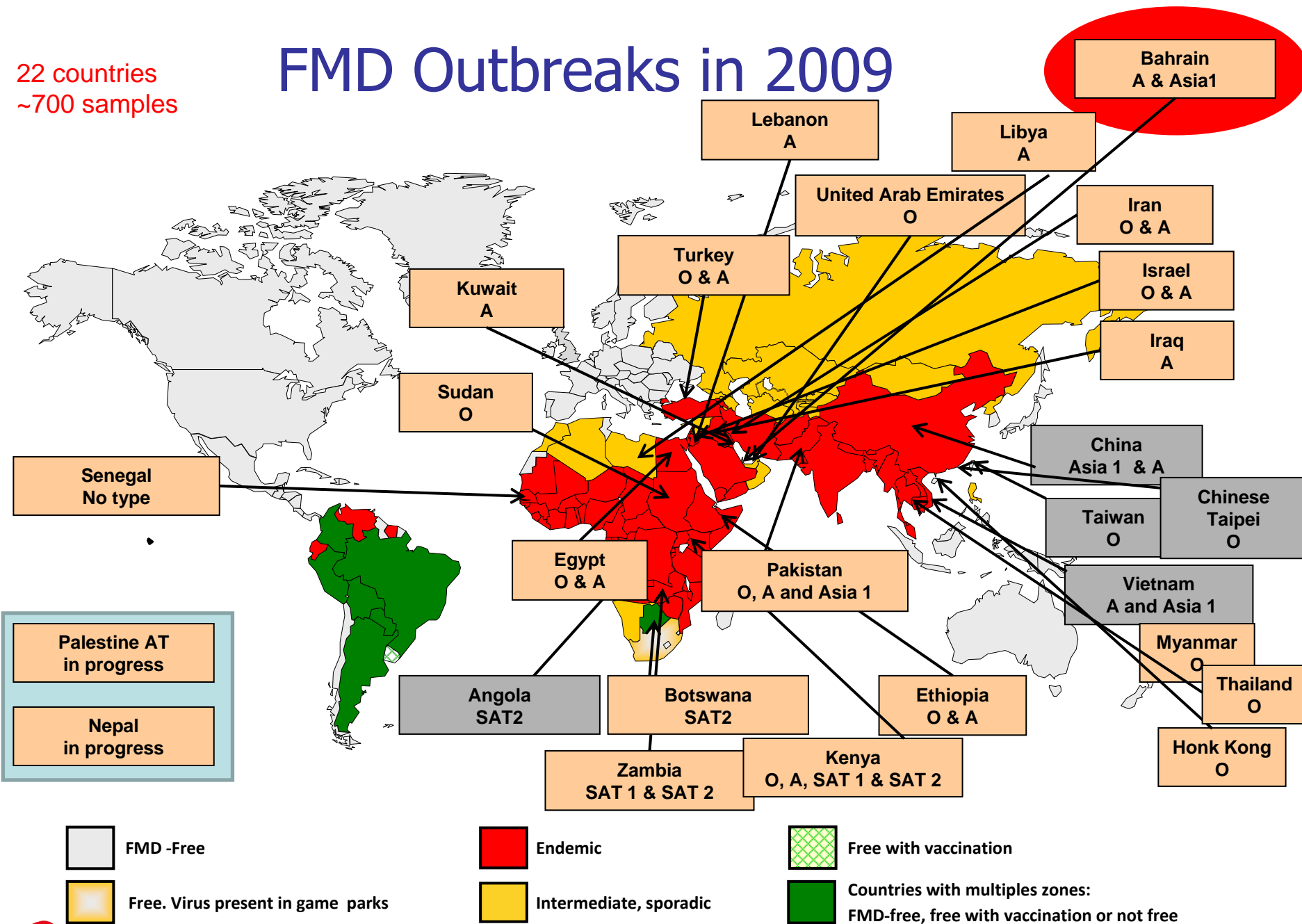
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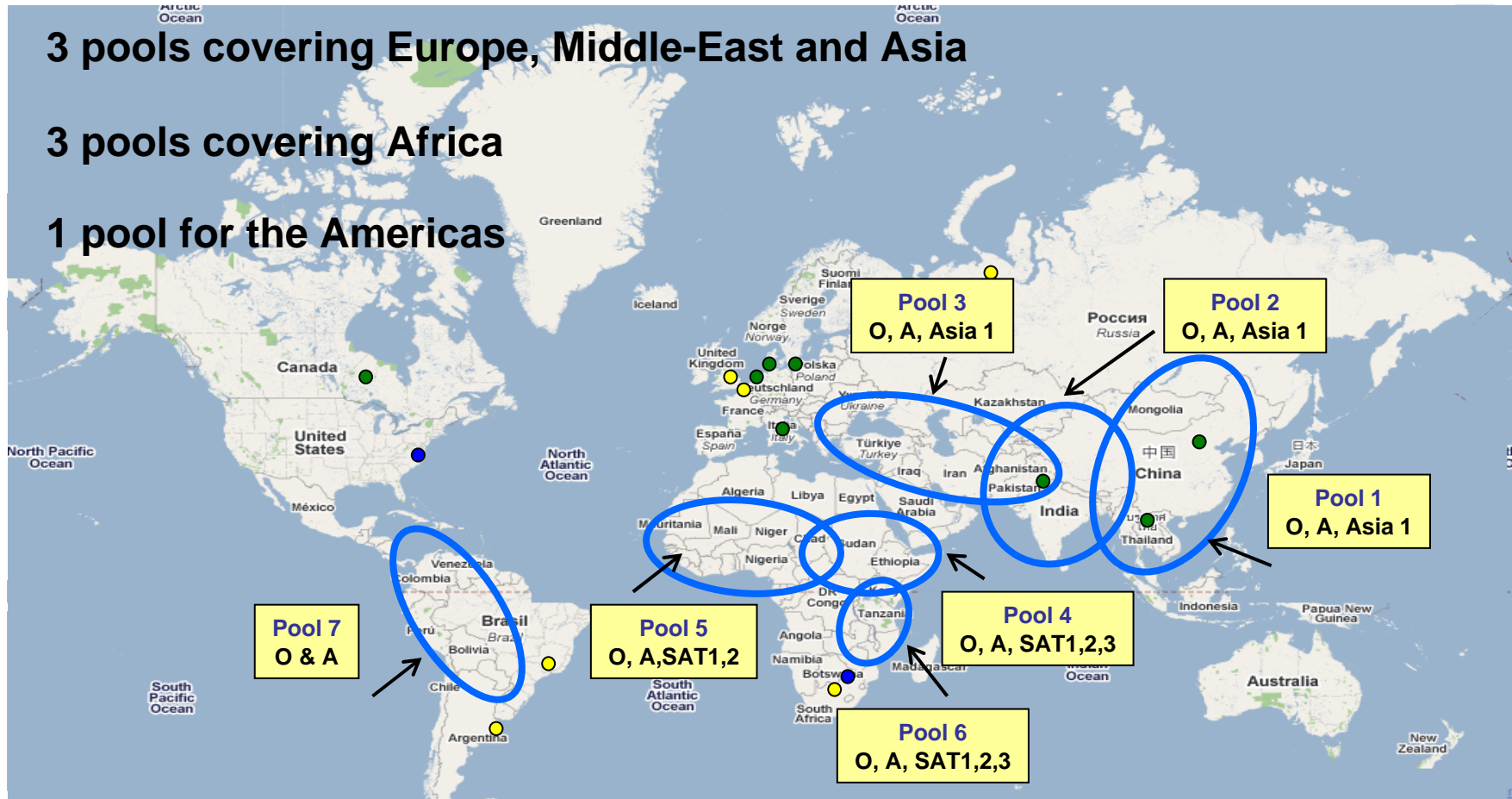



## Global Control through Regional Knowledge

If We Divide the Globe into 7 pools each with;


- Multiple serotypes but topotypes mainly confined to that pool

# Visualization of Regional Virus Pools as an Aid to Global Control



 OIE Reference Laboratories  
And Collaborating Centres

 FAO Additional Reference Centres

 Regional/National  
Reference Centres



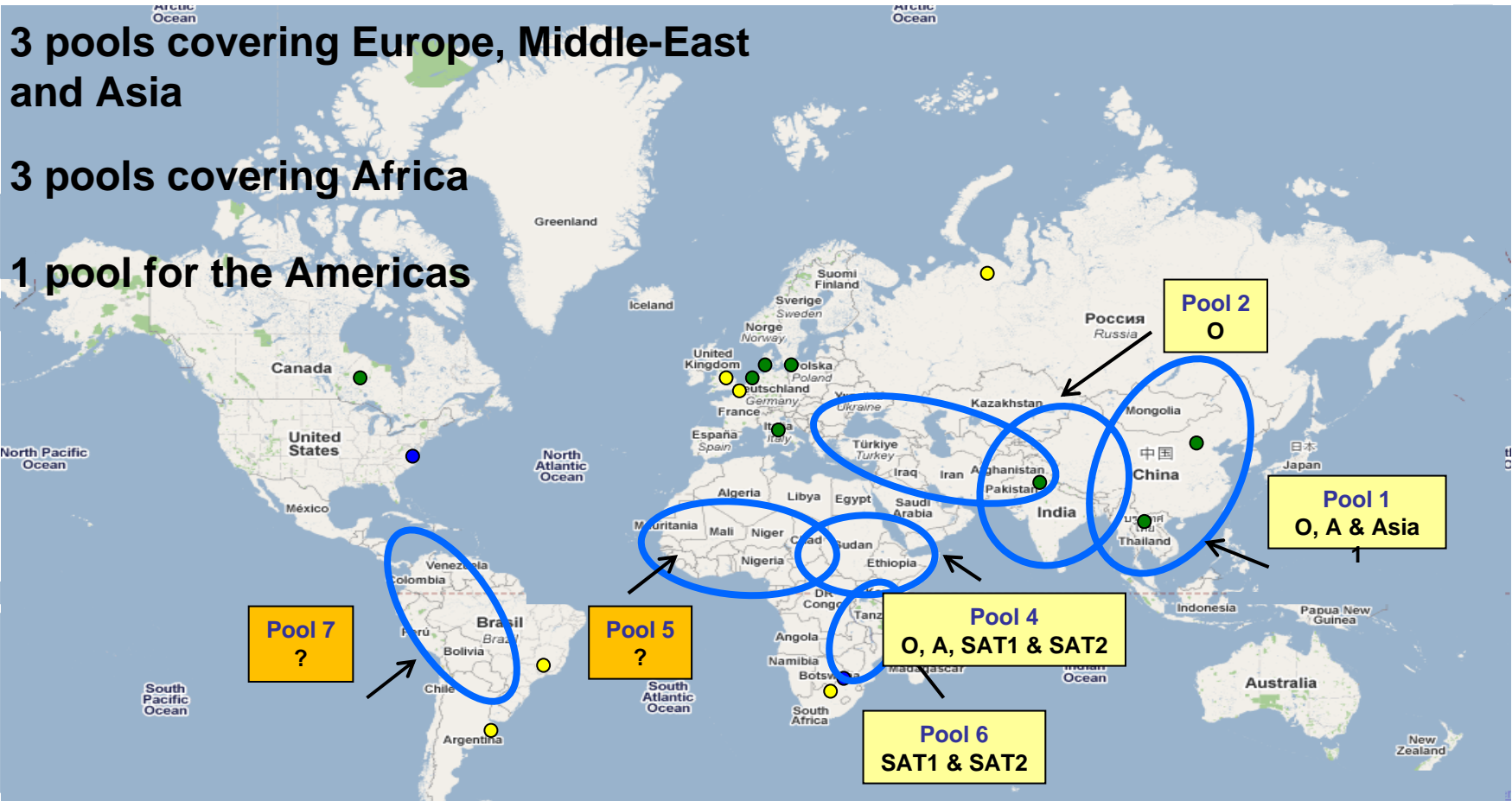
# Global Control through Regional Knowledge

If We Divide the Globe into 7 pools each with;

- Multiple serotypes but topotypes mainly confined to that pool
- If vaccination is to be a major tool then each pool may need tailored vaccines
  - currently, there is an asymmetry of effort to identify vaccines (little information for west and east African pools)
- This approach requires that each pool needs support for typing and vaccine matching



# What Do We Know So Far In 2009?



● OIE Reference Laboratories  
And Collaborating Centres

● FAO Additional Reference Centres

● Regional/National  
Reference Centres

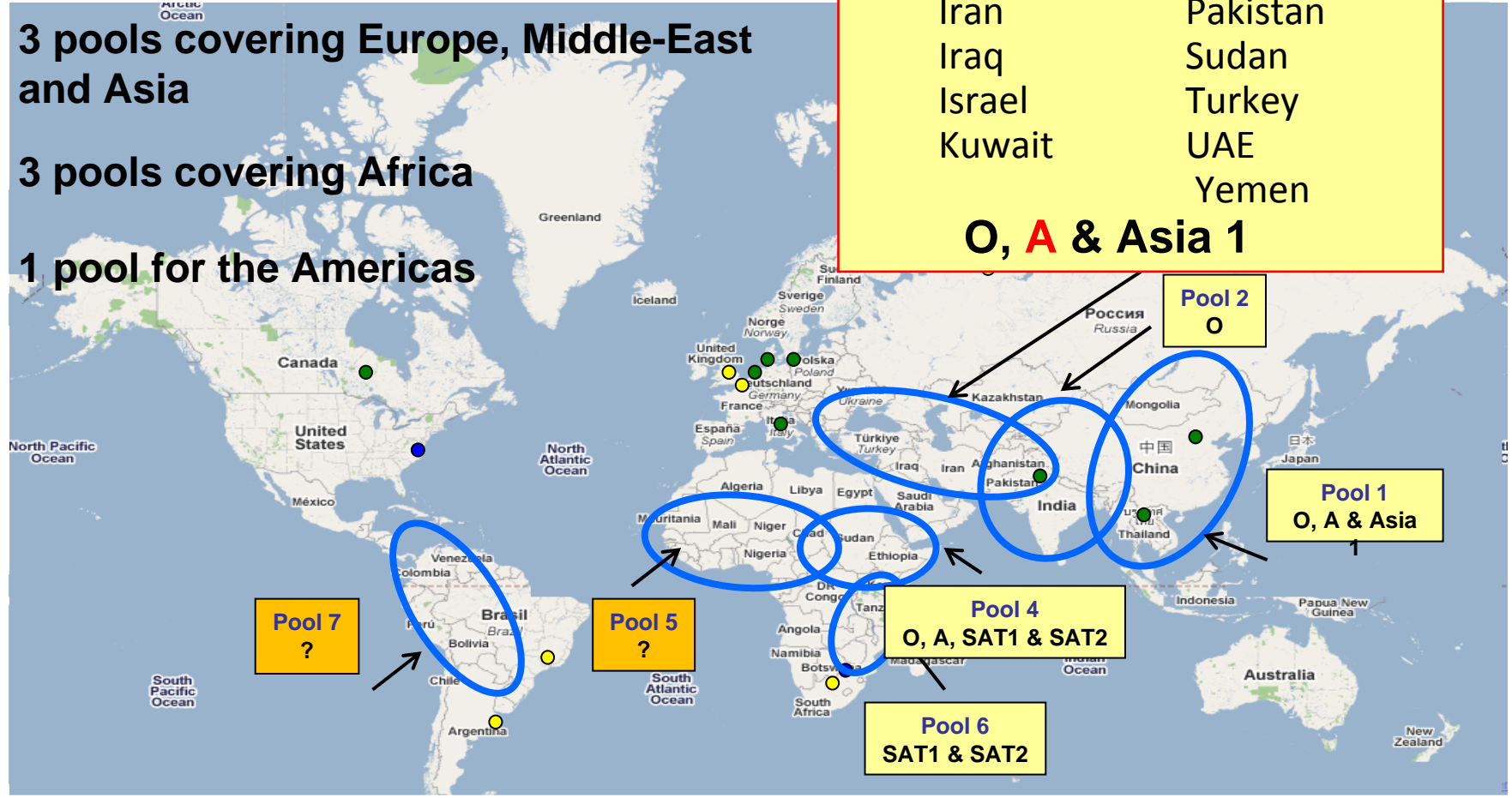
# What do we know so far in 2009?

3 pools covering Europe, Middle-East and Asia

3 pools covering Africa

1 pool for the Americas

- Pool 3**
- |         |          |
|---------|----------|
| Bahrain | Lebanon  |
| Egypt   | Libya    |
| Iran    | Pakistan |
| Iraq    | Sudan    |
| Israel  | Turkey   |
| Kuwait  | UAE      |
|         | Yemen    |
- O, A & Asia 1**



● OIE Reference Laboratories And Collaborating Centres     
 ● FAO Additional Reference Centres     
 ● Regional/National Reference Centres

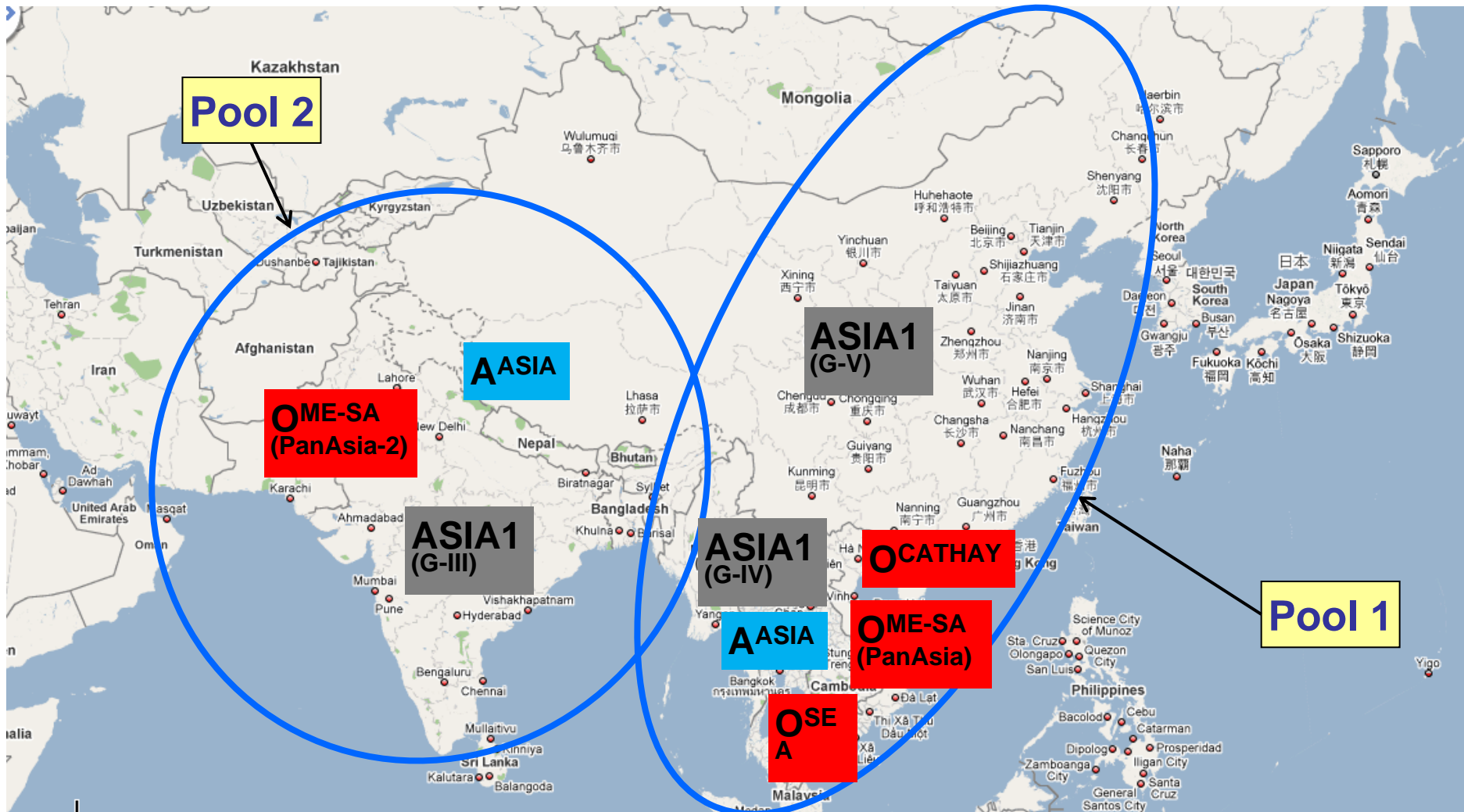
# More Detailed Breakdown of Regional Pools

## Label Nomenclature

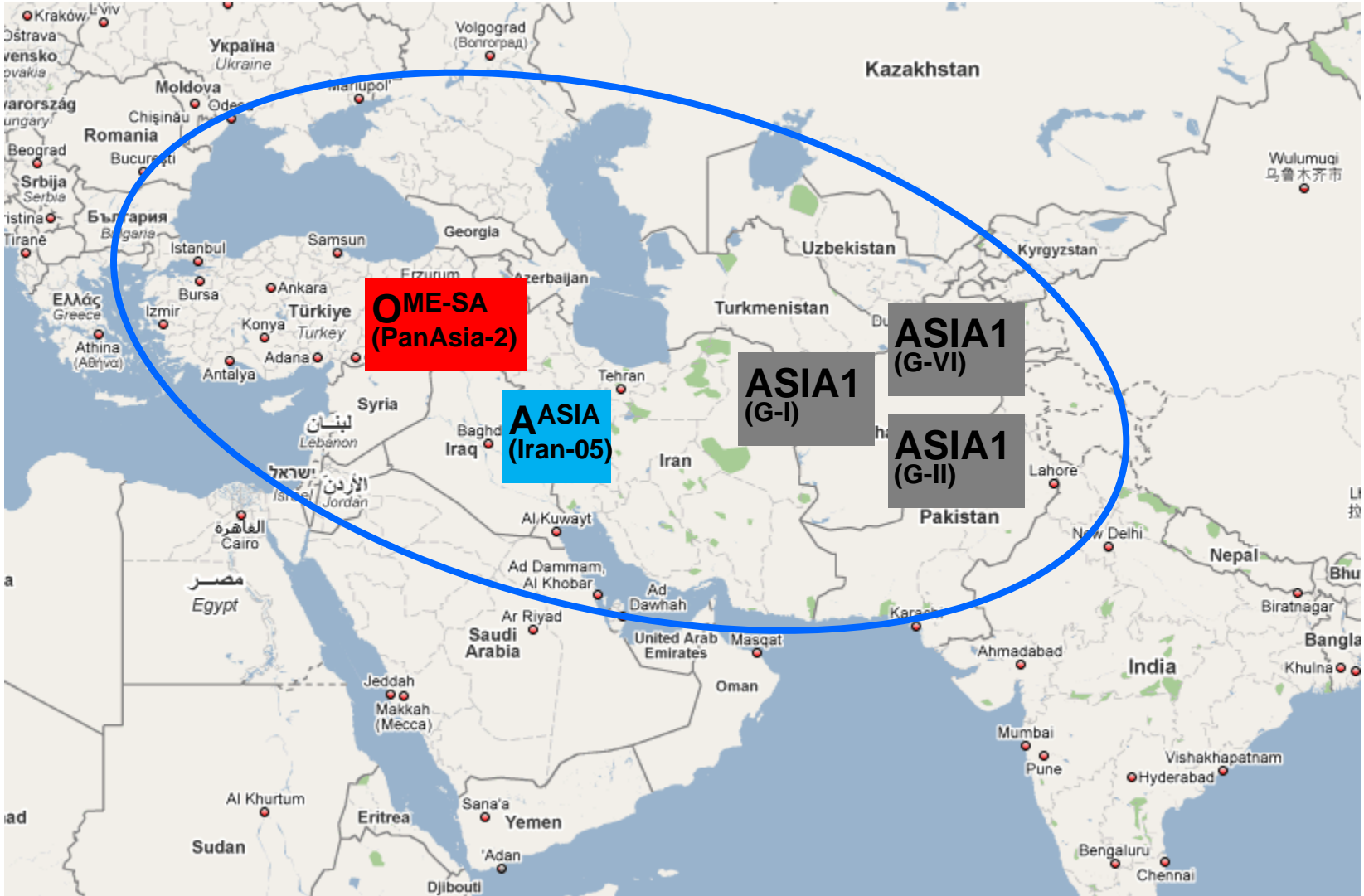
**SEROTYPE**<sup>T</sup>**OTOPOTYPE**  
**(Strain)**

**WRLFMD** disclaimer: The virus pool boundaries are approximations and further data are needed to improve and more accurately define these regions

# Pools 1 & 2 : O, A & Asia 1

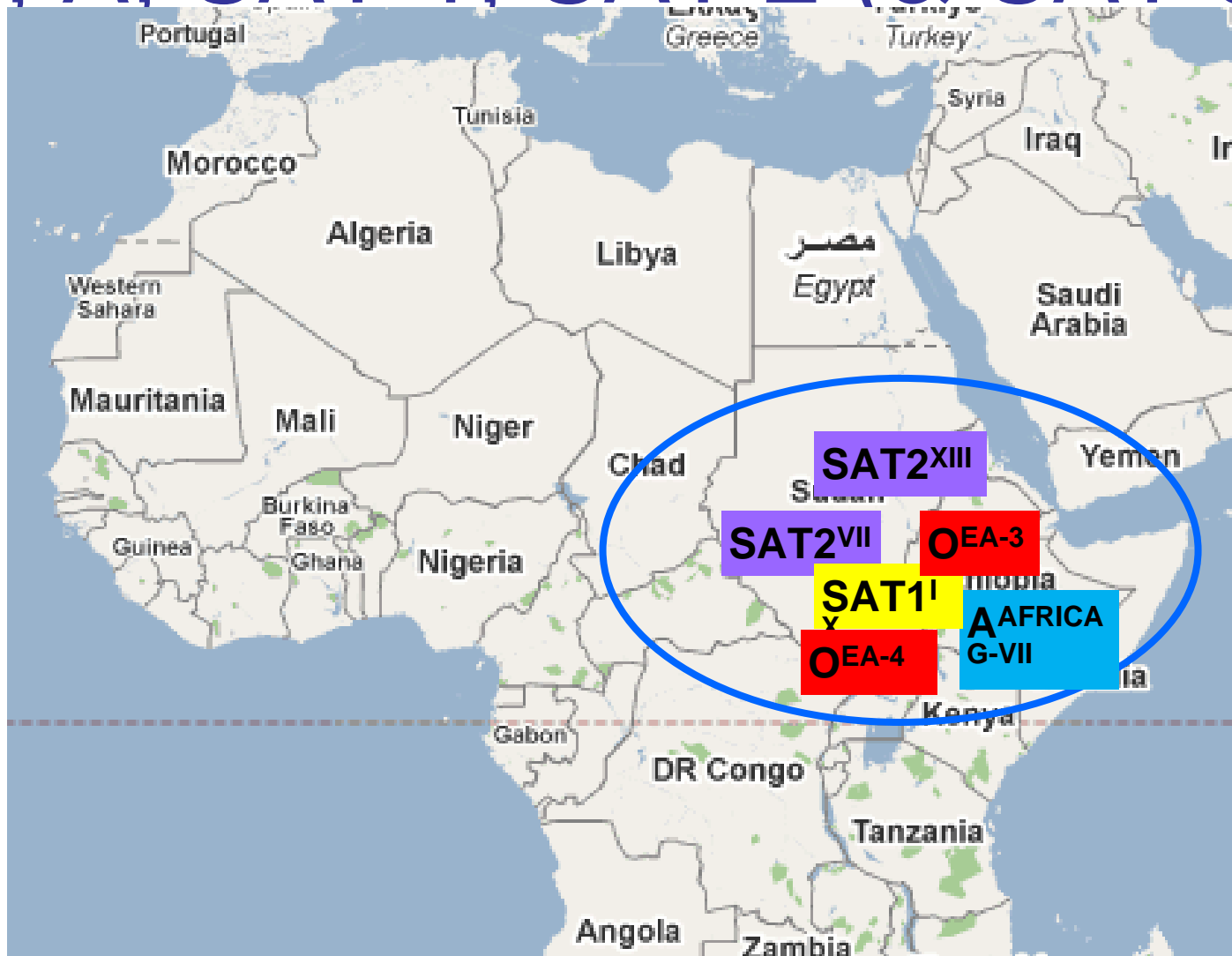


# Pool 3 : O, A & Asia 1



# Pool 4 :

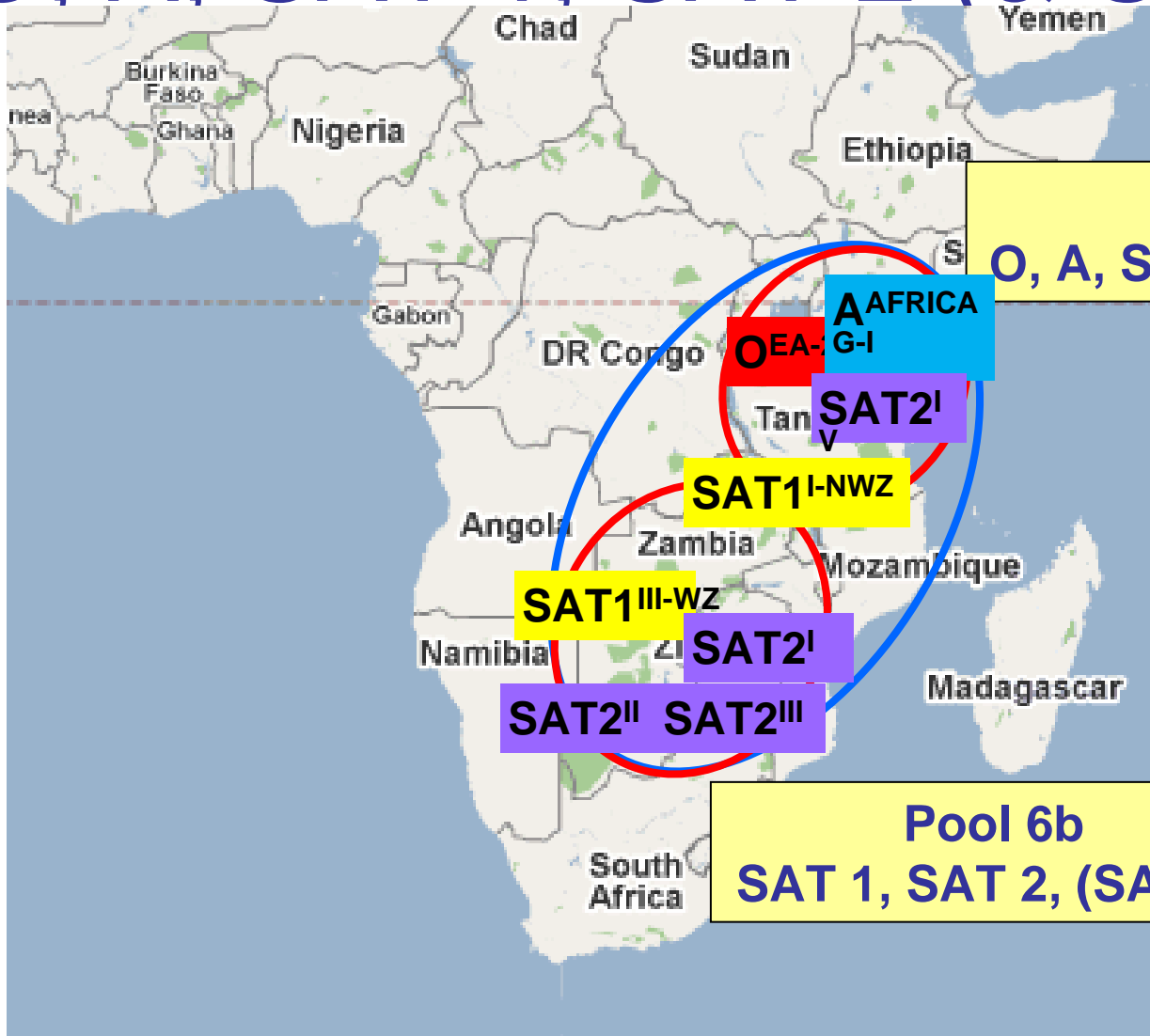
O, A, SAT 1, SAT 2 (& SAT 3?)





# Pool 6 :

## O, A, SAT 1, SAT 2 (& SAT 3?)



**Pool 6a**  
O, A, SAT 1, SAT 2, (SAT 3)

**Pool 6b**  
SAT 1, SAT 2, (SAT 3)



# Pool 7 : O & A



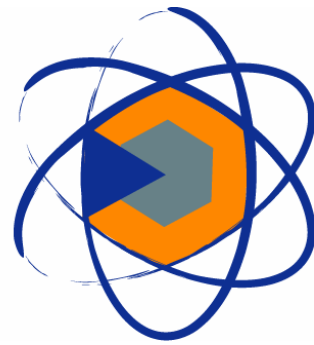
# Other Activities

- ISO 9001 and ISO 17025 Accreditation
- Training- Diagnostics and veterinary
- Interlaboratory proficiency tests for virus detection and serology
- OIE/FAO FMD Ref Labs Network- vaccine matching
- LFD penside test launched with Svanova and IZS-Brescia
- Major development work with Smiths detection on rapid field based PCR-BioSeq
- Global FMD Research Alliance (GFRA)



# The Need for a FMD Ref Lab Network

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

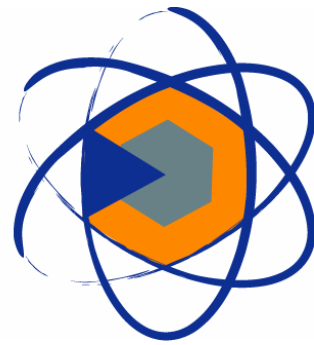


- To make available accurate and timely global surveillance information
  - Value of sharing information on transboundary diseases
  - Developing trust and shared vision through ongoing contact and joint programmes of work



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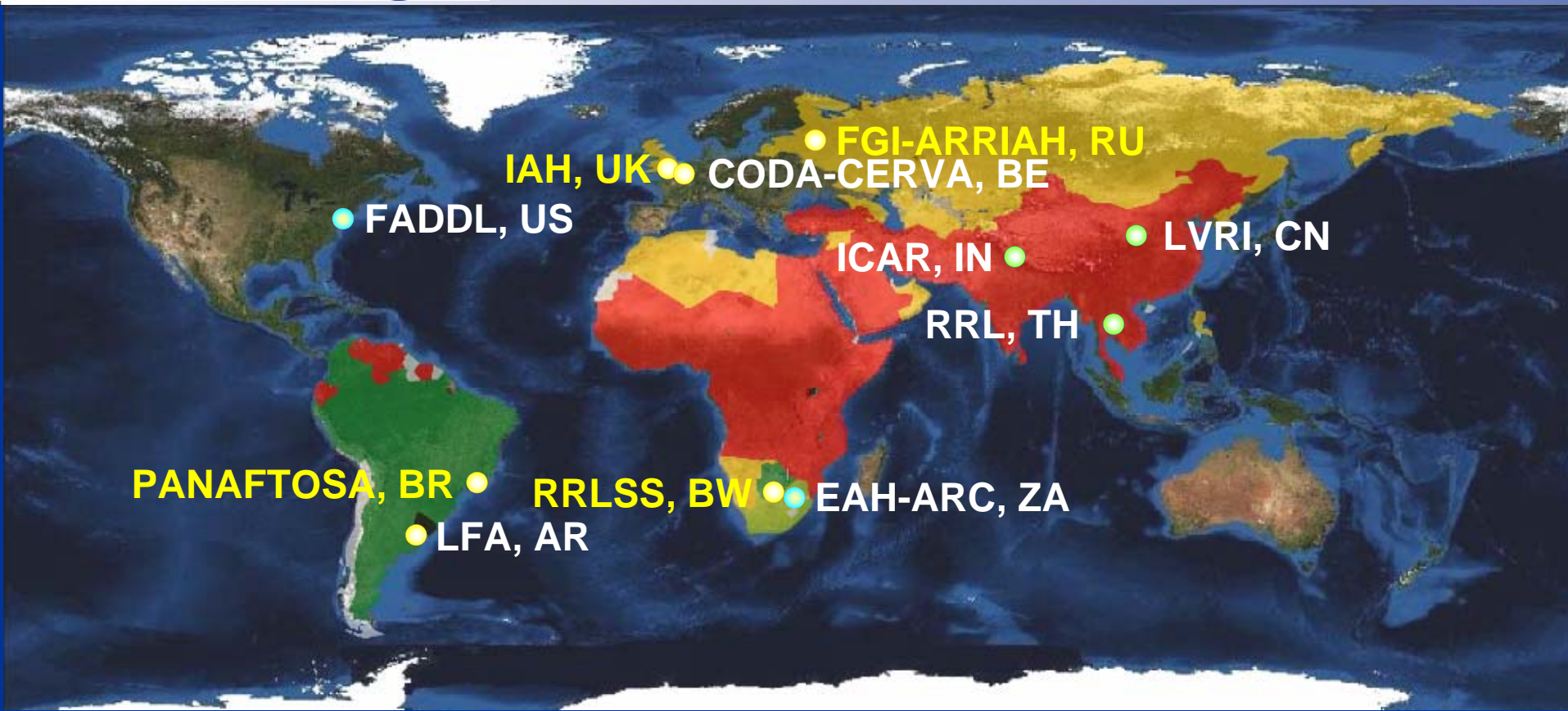


- To make available accurate and timely global surveillance information
  - Value of sharing information on transboundary diseases
  - Developing trust and shared vision through ongoing contact and joint programmes of work
- Network goals
  - Understanding global FMD virus distribution and patterns in order to identify threats and make vaccine recommendations
  - Improving the quality of laboratory tests from international and national reference laboratories
  - Building up local capability in support of regional control programmes






- Pirbright**
- Buenos Aires**
- Lanzhou**
- Rio de Janeiro**
- Onderstepoort**
- Mukteswar**
- Vladimir**
- Plum Island**
- Pakchong**
- Gabarone**
- Brussels**



  Reference Laboratories and Collaborating Centres

  Reference Centres

 Regional/National Reference Centres



# A Potential Vaccine Bank Network

- An international FMDV vaccine/antigen bank network would be beneficial in many ways
  - Exchange of technical know-how and information on strain selection and performance
  - Access to the vaccines/antigens in other banks could reduce the burden of stockpiling on individual members and increase the range of strains available



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- The administrative challenges to making this a reality are great
  - Constraints related to confidentiality, varying standards, conflicts of interest and complex administration



# Other Activities

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# Future Issues and Gaps

- Increase knowledge of circulating viruses in Africa
  - Lack of information on effective vaccine strains in Africa
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  - Type A – Turkey/Iran
  - SATs – Africa
- Vaccine Matching studies
  - Antigenic Cartography
- Next Generation Vaccines



# Future Issues and Gaps

- Improve interactions and information sharing with other reference laboratories and industry
  - Network meetings and 2-way training visits
  - Better communication with vaccine manufacturers
  - Better communication with Government and decision makers
- Rapid field detection devices
- Improved field data- GPS coordinates



# WRLFMD Summary

- WRLFMD provides antigenic characterisation and epidemiological monitoring of circulating virus strains
  - Need for improved submissions from some regions



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- FMD activity increasing this year in Middle East
- Vaccine recommendations have been modified
- WRLFMD offers its full support to the Global FMD Control Initiative



# Vision for the New Pirbright



## World Reference Laboratory for Foot-and-Mouth Disease

◇ Laboratory Diagnosis of FMD ◇

Serotyping by ELISA

Virus Isolation on Sensitive Cell Cultures

RT-PCR

Real-Time RT-PCR

◇ FMD Virus Characterisation ◇

VP1 Sequencing

Phylogenetic Analysis

Vaccine Matching

◇ FMD Virus Reference Collection ◇



Thank you for your attention

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