Foot and Mouth Disease

Written Testimony By William Parker: February 11, 2016

To: US House of Representatives

Committee on Agriculture

Subcommittee on Livestock and Foreign Agriculture

Merial Veterinary Public Health

Rabies

A fatal infection of the central nervous system of warm-blooded animals and humans

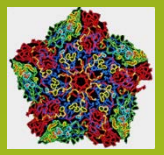
Raboral V-RG®
Oral Rabies Vaccine For Wildlife

Foot-and-Mouth Disease

A highly infectious viral infection of cattle, pigs, sheep, goats, buffalo, and other ruminants

Public Private Partnership

FMD, Wildlife Rabies, RVF, CSF, BTV, EHD




Merial VPH works with government agencies in the control of these diseases

North America Rabies Management Plan (NRMP)

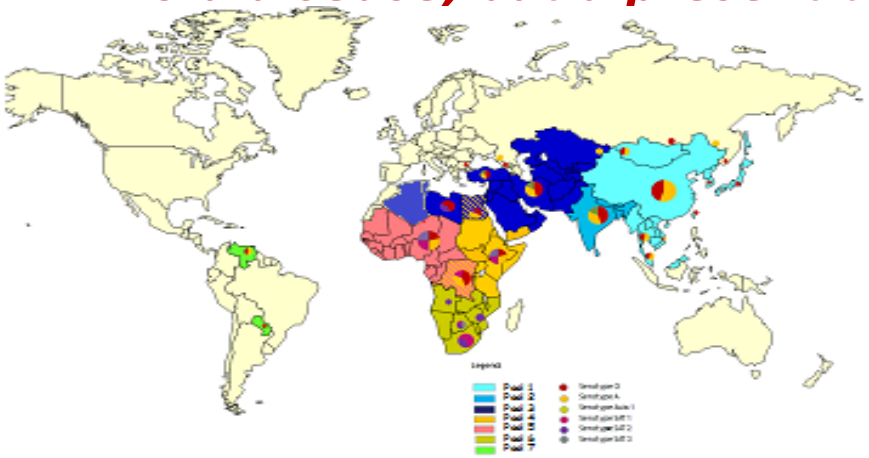
North America FMD Vaccine Bank

- USDA-Veterinary Services
- USDA-Wildlife Services
- Texas State Health Service
- USDA-Nat. Wildlife Res. Center
- State Agriculture Departments, State Veterinarians, State and Local Public Health Departments
- CDC, CFIA, SENASICA, NBAF

Other Merial US Veterinary Public Health infectious and emerging animal diseases areas: Cervid Bluetongue Virus and Epizootic Hemorrhagic Disease, Rift Valley Fever and other reportable animal diseases. VPH collaborates with other Merial entities on Highly Pathogenic Avian Influenza and Classical Swine Fever as related to USDA Foreign Animal Disease (FAD) Planning

Foot and Mouth Disease (FMD)

An old disease, but a present threat

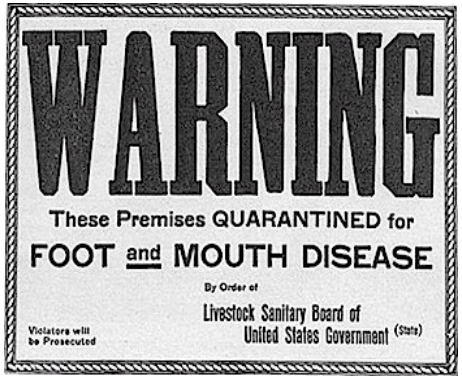


2015

1546
Italy Disease Description

1897
Identification of infectious agent

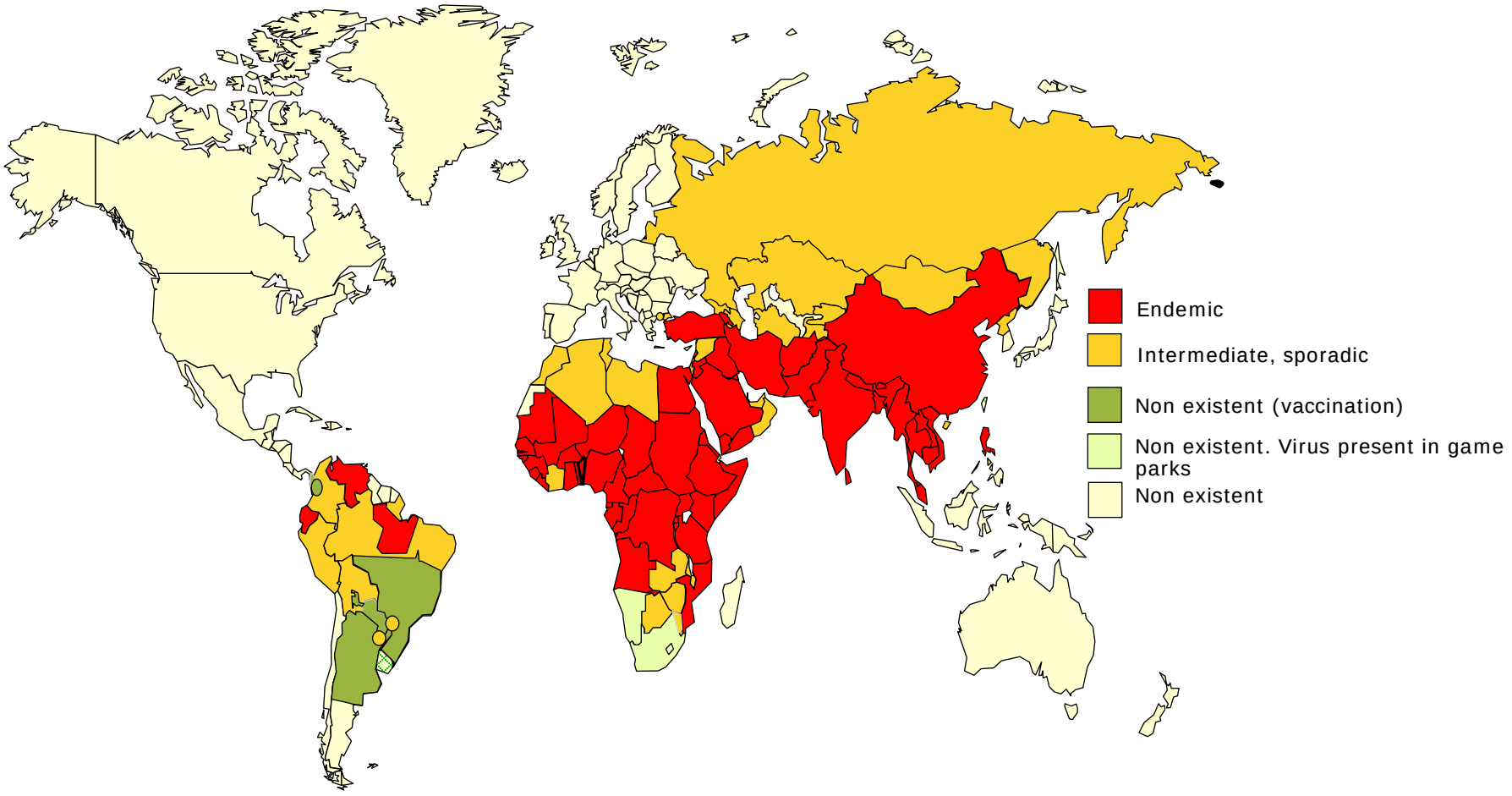
1929
California: last US outbreak



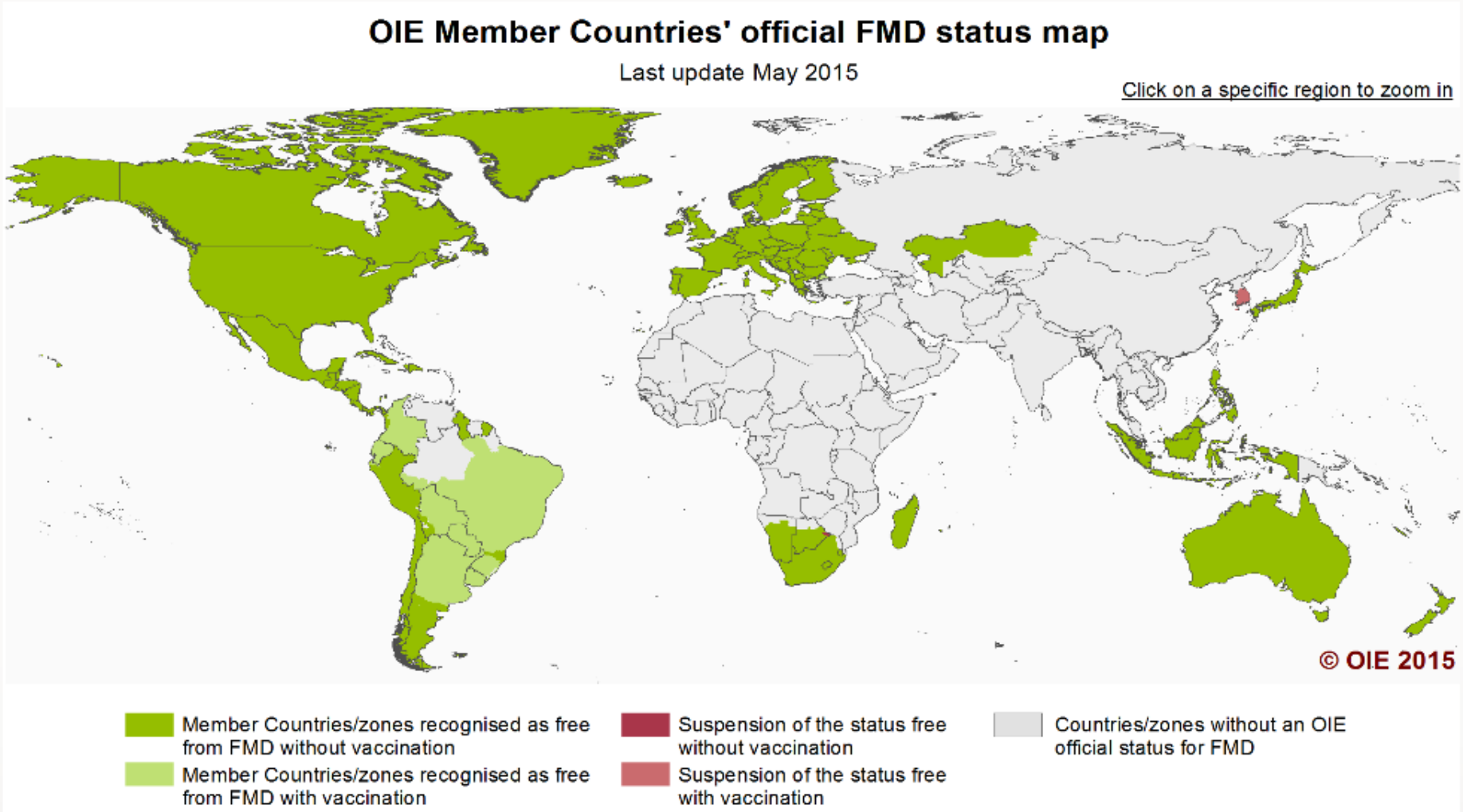
2001
UK outbreak

3 |

The importance of FMD



FMD – OIE Official Status



Virus Transmission Routes

Case study – The South Korea Outbreak

Historical situation

- South Korea historically "FMD free w/o vaccination "
- Increased frequency of FMD incursions from neighbouring, endemic countries over past decade
- Stamping out policy, average direct cost ~ US$165M per incursion before restoration of "FMD free" status

November 2010 outbreak

- Unprecedented magnitude
- Culling of ~3.5 million animals (3.3M pigs /140K cattle)

- January 2011: decision to change control policy into vaccination of the whole susceptible animal population (10M pigs, 3M cattle), culling only unvaccinated animals in new outbreaks.
- Change of country status to "endemic with vaccination".

Indirect & direct impact

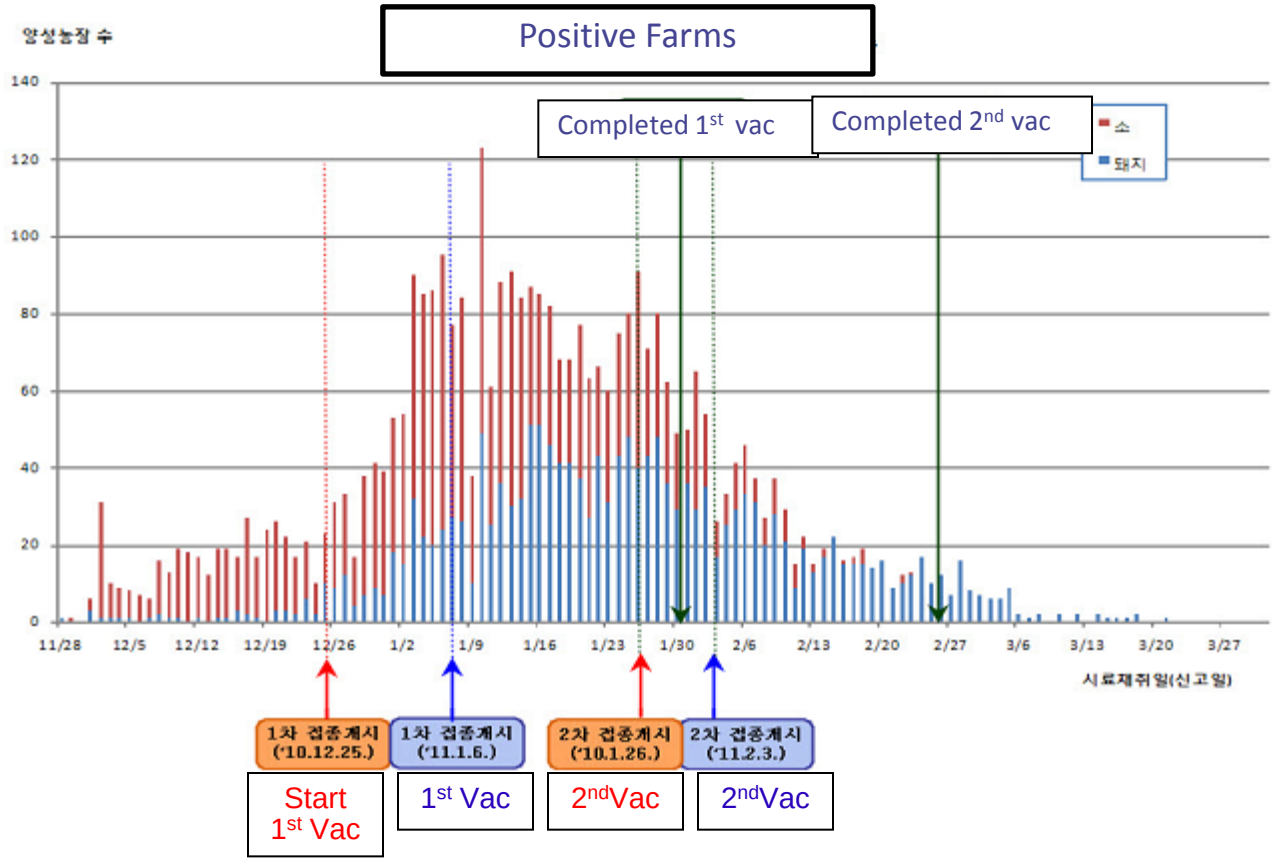
Mass culling and burial of pigs in Korea (Nov. 2010 – Feb. 11)

- **Direct costs (3.3 millions pigs + 140 000 cattle): $2 Bn**
- **Total costs: ~$8 Bn**

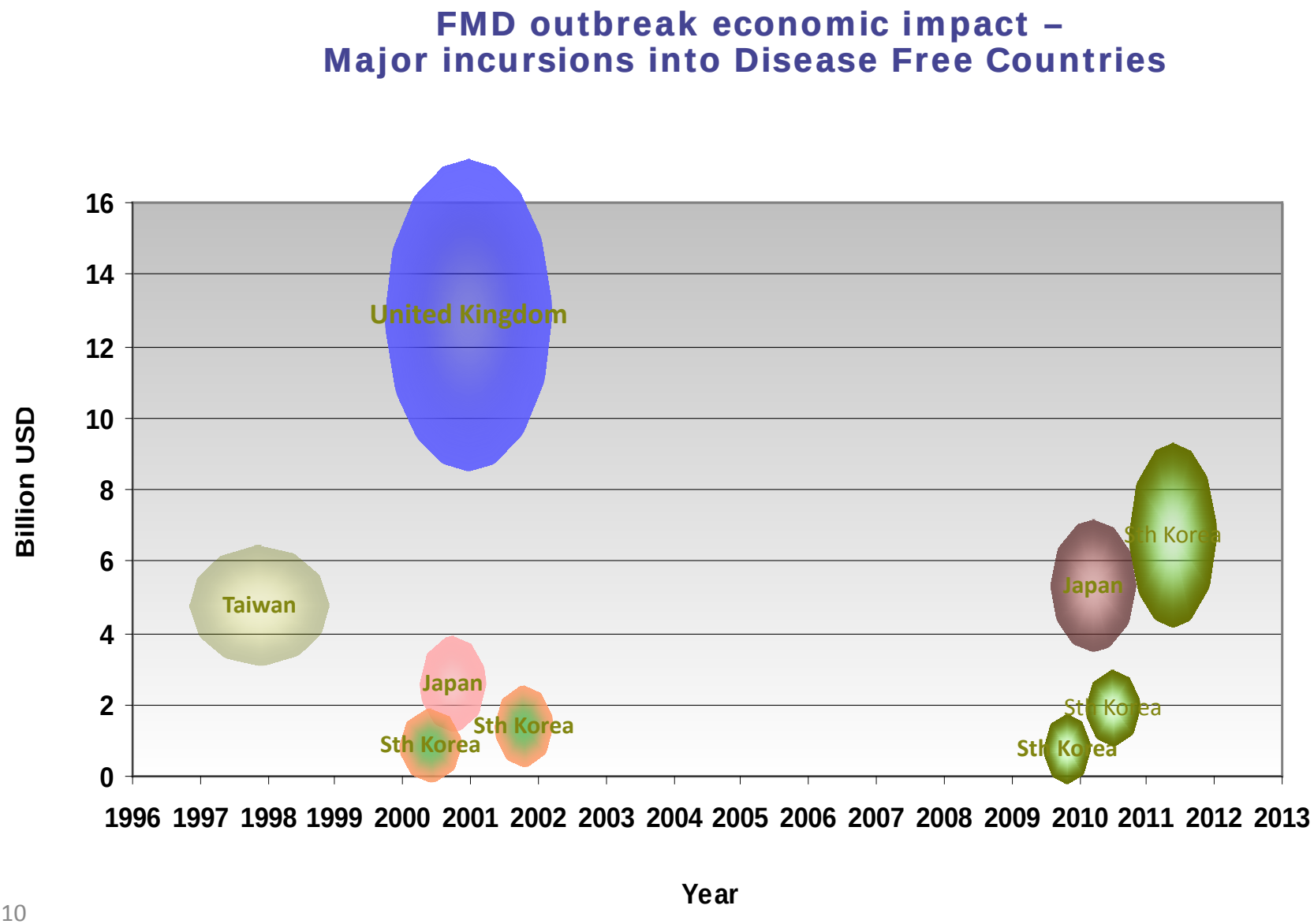
The South Korea Outbreak: Vaccine Impact

Nov 10 - Mar 11 - FMD outbreak evolution.

- Reduction in cattle outbreak cases 2 weeks after completion of 1st vaccination round
- Reduction in pig outbreak cases 3 weeks after completion of 1st vaccination round



FMD cost of incursion - Control



Epidemiology & Vaccine Recommendations

INTRODUCTION TO FMD

EPIDEMIOLOGY OF FMD

FMD VACCINES

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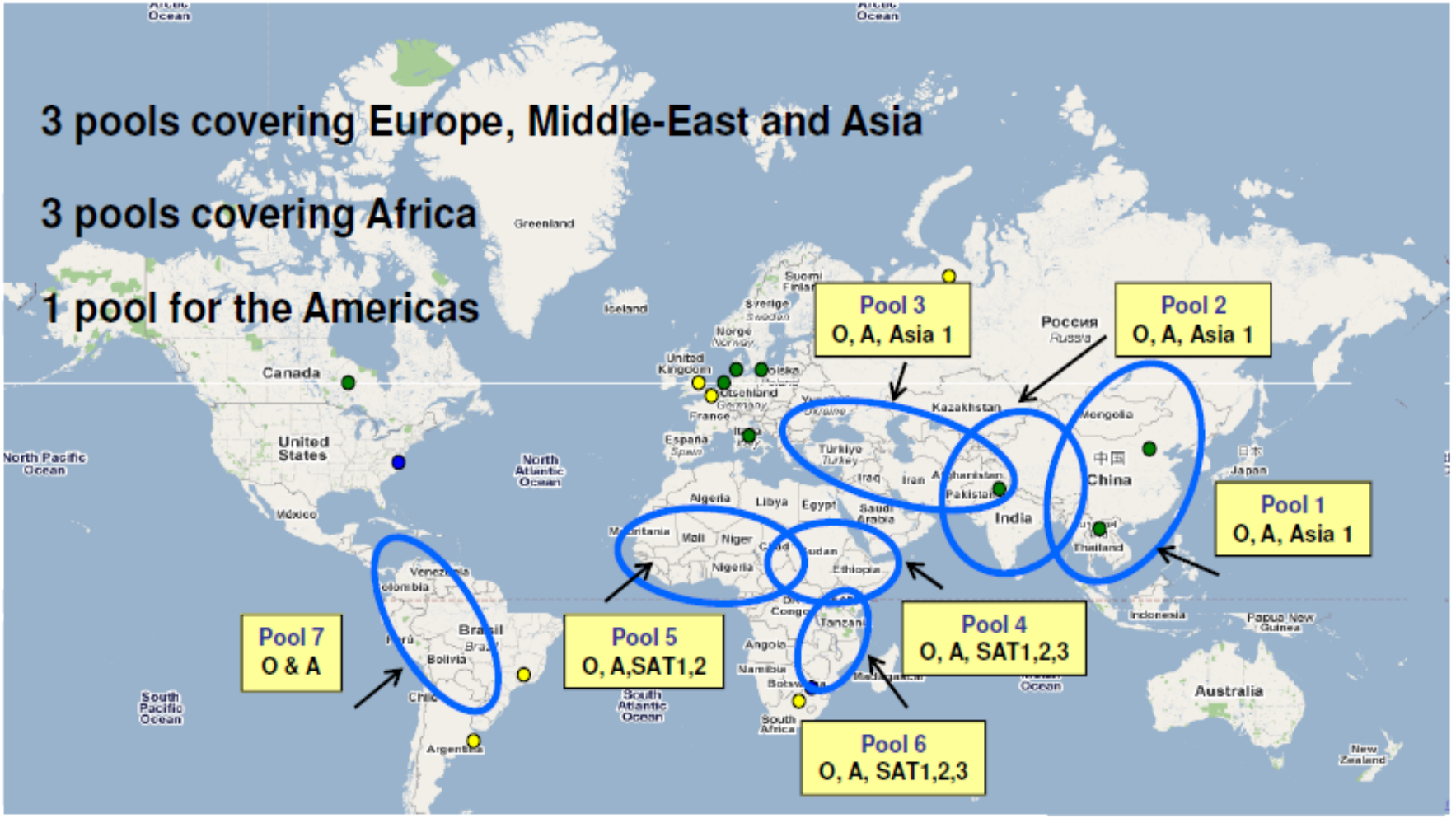
FMD EPIDEMIOLOGY TRENDS PER POOL / JUNE 2015



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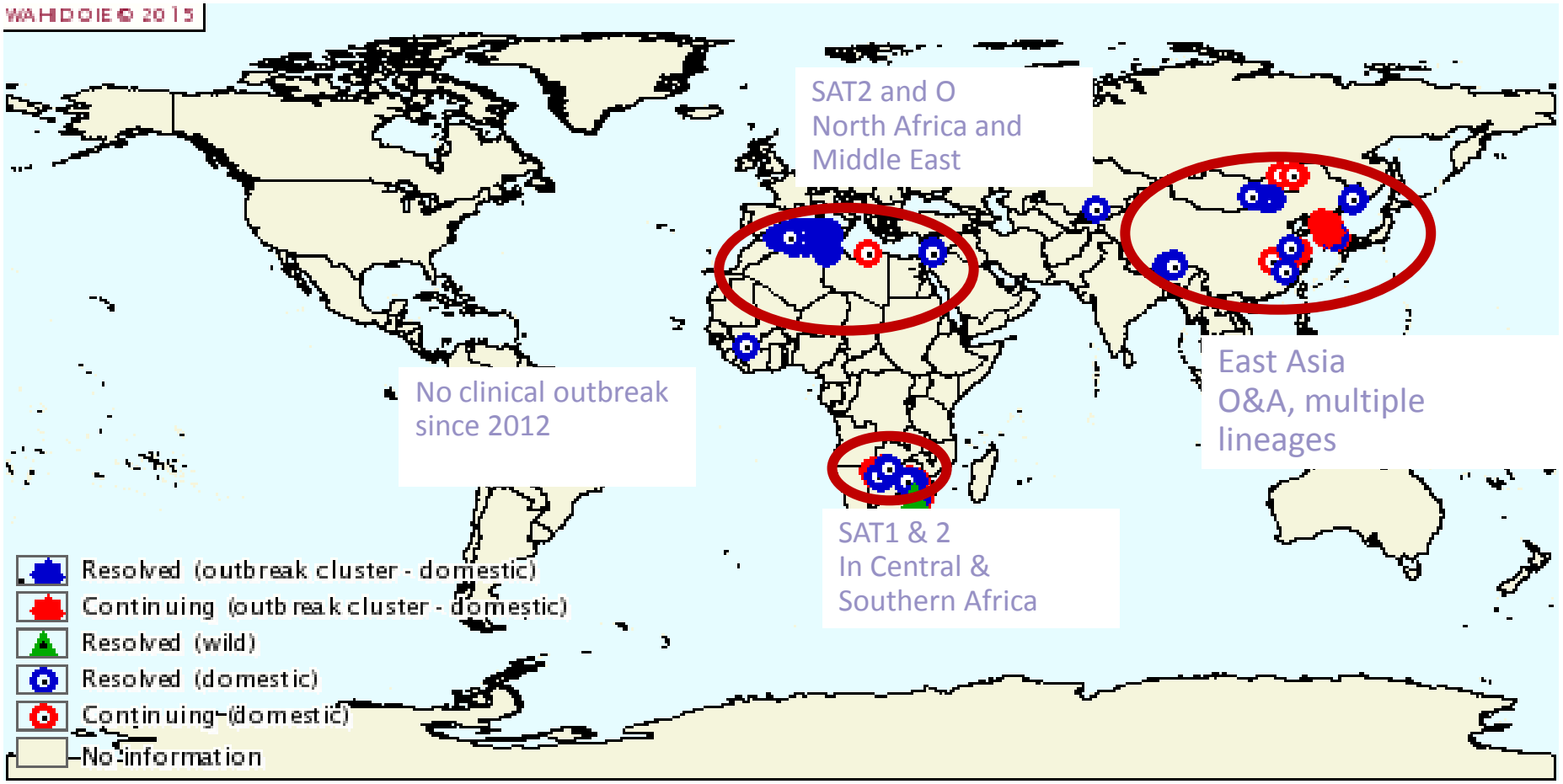
Recent FMD outbreaks (Jan14 - Sep15)



Outbreaks reported to OIE
Courtesy WRL

FMD Vaccines & Vaccination

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EPIDEMIOLOGY OF FMD

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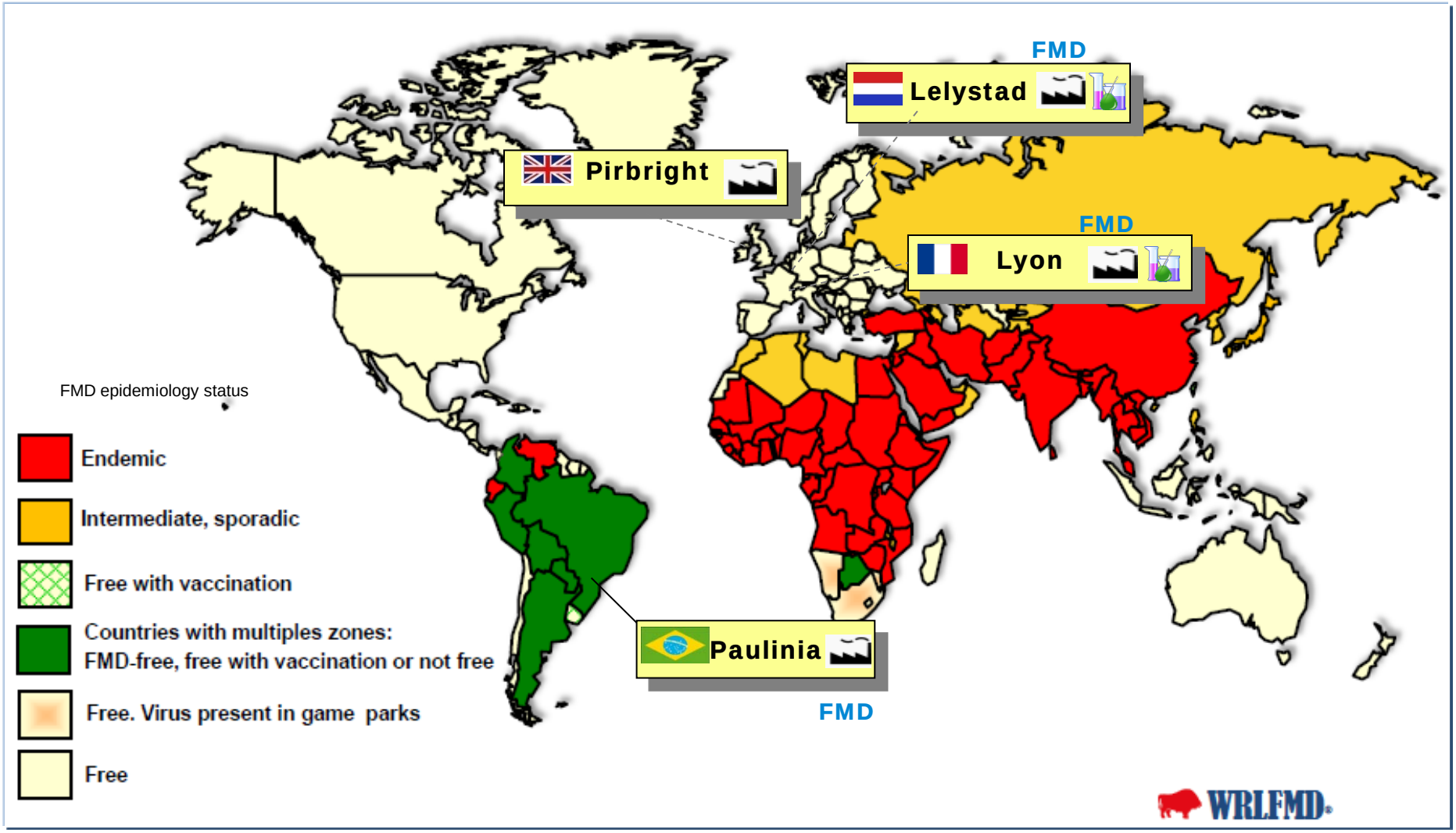
Merial FMD vaccine sourcing



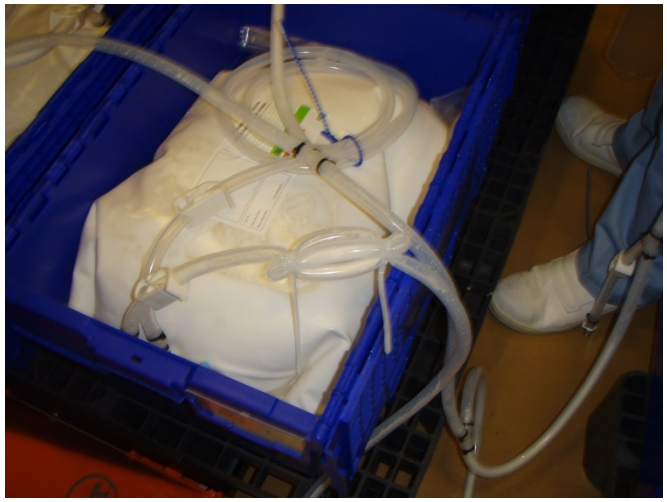
FMD Vaccines

- Non-purified, low potency vaccine for mass vaccination campaigns in endemic countries

- Purified, high potency marker vaccines for disease control/eradication programs
  - ➢Aqueous for ruminant only
  - ➢Oily adjuvant for ruminant and swine

MERIAL FMD Vaccine Supply Alternatives

- **Bulk & Concentrates** for technology transfer in control/eradication programs



- **Antigen banks** for Disease Free Countries

FMDV ANTIGEN BANKS - STORAGE

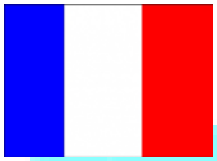
Straw	P1	P2	P3	P4	P5	P6
1		P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071
2	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071
3	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071
4	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071
5			P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071
6	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071
7	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071	P1-1180P071

- Antigen banks are stocks of immunogenic materials ready to be formulated into vaccines in case of introduction into FMD-free country
- FMD virus antigen are highly concentrated and stored over liquid N2 (-130C) to guarantee a shelf life of 5 years
- Banks include strains from major topotypes

FMD Antigen Banks supplied by Merial

EU STRATEGIC BANK

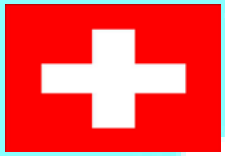
EUROPE


France


Germany


United Kingdom


Belgium

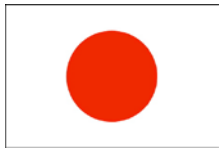

Switzerland


Hungary


Italy

UNITED STATES, CANADA & MEXICO

ASIA & AUSTRALASIA


Japan


Korea


Taiwan


Australia


New Zealand

NORTH AFRICA & MIDDLE EAST

Association with some countries to supply Bulk vaccine or antigen

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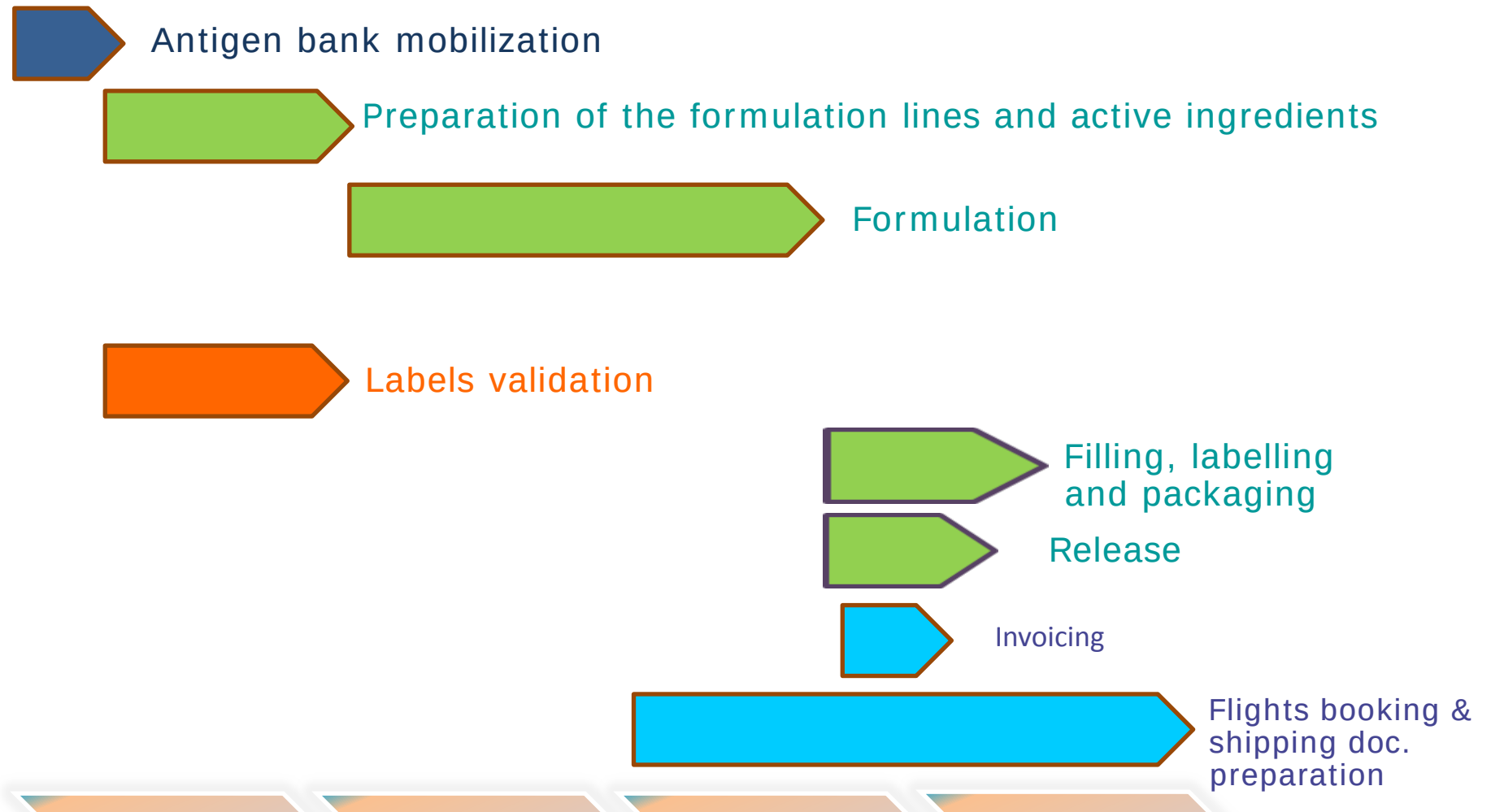
ANTIGEN BANK MOBILIZATION PROCESS



By day 4 vaccines available at factory gate

WRL FMD BANK RECOMMENDATIONS: 7/15

Annex 3

RECOMMENDATIONS FROM WRLFMD® ON FMD VIRUS STRAINS TO BE INCLUDED IN FMDV ANTIGEN BANKS (FOR FMD-FREE COUNTRIES) – March 2015

Note: Virus strains are NOT listed in order of importance

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

NB: Discussions are currently underway to adopt a risk-based approach for different FMD viral lineages to identify priority vaccines for use in Europe and other FMD-free settings.

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