FMD VACCINATION & POST-VACCINATION MONITORING
The multiple aspects of Preparedness

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INTEGRATED SERVICE APPROACH

PREPAREDNESS
• Monitoring of FMD epidemiology
• Input into contingency plans
• Advise/training on diagnostics

ANTIGEN BANK
• Real-time update of bank composition
• Rapid mobilization of sufficient quantities
• Simulation exercises

OUTBREAK RESPONSE
• Sufficient resources (animal ID, injectors, vaccinators...)
• Post-vaccination monitoring approach
• Post-vaccination monitoring assays

INTEGRATED SERVICE APPROACH
MONITORING FMD EPIDEMIOLOGICAL SITUATION
7 endemic pools require tailor-made vaccines and diagnostics

An ever-changing situation
OUTBREAKS TO WRLFMD PIRBRIGHT SINCE MAY 2016

Trends:
- Inter-pool movements
- Role of Indian sub-continent
- Emergence of A-GVII
Vaccine matching measures **antigenic similarity** between:
- A field isolate
- A vaccine strain

By comparing the **cross-reactivity** of:
- Bovine vaccinal serum
- Field isolate & vaccine virus

\[
r_1 \text{ value} = \frac{\text{Antibody titre of vaccinal serum against field isolate (heterologous)}}{\text{Antibody titre of vaccinal serum against vaccine strain (homologous)}}
\]

r1-values of 0.3 and above are **likely to confer** protection
Vaccine selection should never be based on a single r1 result.

Instead, it should be evaluated vs its ability to neutralize the majority of strains from a lineage, topotype or even a geographical pool = immunodominant strains (broad spectrum in time and space).

The risk is to choose a narrow-spectrum strain that will select virus variants escaping neutralization by vaccine-induced antibodies (escape mutants)
The BI VPH centre laboratories - Pirbright & Lelystad

- Monitor FMDV evolution
- Perform vaccine matching

**Pool 1 – 2010 to 2017**

Boehringer Ingelheim vaccine matching results
We provide advise on relevant vaccine strains to our vaccine & antigen bank customers based on:

- BI/WRL matching results & recommendations
- Risk assessment for the considered geography

➡ Guarantee that bank composition is always up-to-date and can address all potential threats
A RELEVANT ANTIGEN BANK
THE ANTIGEN BANK PRINCIPLE

~3-4 months incl tests

~4 days
What is a high quality FMD vaccine?

- High potency (6PD50)
  - Confer broad cross protection despite low vaccine matching values
  - Confer quick protection (4 days)

- 'Immunodominant' strains
  - Broad cross protection beyond single lineage

- Purified
  - NSP removal allows DIVA testing

- Stable – 18 to 24 months

⇒ These are the properties of high potency vaccines made from antigen banks
POST-VACCINATION MONITORING
Foot and mouth disease vaccination and post-vaccination monitoring

Guidelines
Why post-vaccination monitoring?

- Optimize vaccination regimen and program
- Demonstrate the impact of vaccination program on disease burden
- Generate data for justification of program costs
- Identify weaknesses and enable improvements
- Requirement for recognition of official OIE status

How?

- Can be done at all steps, from ahead of vaccination campaign to after completion of campaign
- Available tools: VNT, SP ELISA, NSP ELISA
80% Vaccination Coverage Is A Target

Eligible population (24)  
Total population (30)  
Vaccinated population (20)  
Immune population (14)

Overall population immunity is 14 out of 30 = 47%
I N C O N C L U S I O N ...
For an FMD-free country, antigen banks are an essential tool of FMD control

But preparedness also means

- Constant monitoring of epidemiological situation & vaccine matching in endemic regions
- Resources, systems and tools for post-vaccination monitoring
THANK YOU