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Post vaccination evaluation tool
Introduction

- Vaccination is key to PPR control
- Vaccination is the main tool in Stage 2 and 3 of the GCES
- Performance of the vaccination campaign has to be evaluated; a set of tools is available for this evaluation:
  A. Serology
  B. Surveillance in vaccinated herds
  C. Sociological surveys
  D. Productivity surveys
- A combination of methods is recommended
General considerations

- Vaccination campaign is a composite of different factors:
  - Quality of vaccine
  - Vaccination delivery & storage
  - Vaccination coverage
  - Vaccination campaign planning
  - Vaccination protocol

- Certain CCPs can be identified along this chain

- There is need for close collaboration with the national laboratories – quick turn around time

- Harmonisation of sampling protocols at national / regional level for interpretation of results
Questions that serology can try to answer:

- The baseline level of epi-units that have been exposed to PPRV prior to vaccination
- Estimate the number of epi-units that demonstrate seroconversion after vaccination, i.e. that are protected
- Increase in the number of epi-units over time that are protected by comparison with the baseline survey
- Analysis of age strata that are protected
1. Objectives for PVE using Serology

- Immune response to vaccination
- Population immunity at a given point in time
- Trend of population immunity over a series of vaccination campaigns
2. Assumptions

- Continuous production of susceptible animals at flock level
  - Animals under 3 mths are protected
- Threshold for successful vaccination: 70% of animals within epi unit is protected
- Study population large – max no of samples
- Animals are not individually identified
- Shoats are sampled
3. Definitions

- Target population: susceptible shoats
- Study population: shoats to be vaccinated
  - stratified by age
  - 3 different husbandry systems (same as in surveillance protocol)
• Epidemiological unit:
  ▪ Same chance of being infected and of being vaccinated
  ▪ Village or flock

• Case definition:
  ▪ When 30% or more in the epi unit are found negative in the serological test - susceptible
4. Sampling frame

- Sample size to detect 30% sero-negative with 95% CI

- Multi-stage sampling:
  1. epi units allocated proportionally to husbandry systems
  2. households/flocks selected within epi units by systematic random sampling
  3. Animals selected in households/flocks using simple random sampling

<table>
<thead>
<tr>
<th>No animals in epi unit</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 6</td>
<td>all</td>
</tr>
<tr>
<td>7 - 10</td>
<td>6</td>
</tr>
<tr>
<td>11 - 25</td>
<td>7</td>
</tr>
<tr>
<td>26 - 55</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 56</td>
<td>9</td>
</tr>
</tbody>
</table>
### 5. Protocols for different PVE objectives

<table>
<thead>
<tr>
<th>Objective</th>
<th>Protocol 1</th>
<th>Protocol 2</th>
<th>Protocol 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immune response to vaccination and population immunity and trend of population immunity</td>
<td>Immune response to vaccination</td>
<td>Trend in population immunity over several vaccination campaigns</td>
</tr>
</tbody>
</table>
| Surveys   | 3 surveys:  
- Baseline – day 0  
- 30 – 90 ds post vacc  
- 30 – 90 ds post 2\textsuperscript{nd} +n vaccination | 2 surveys:  
- Baseline – day 0  
- 30 – 90 ds post vacc | 2 surveys +n  
- Baseline – day 0  
- 30 – 90 ds post vacc: questionnaire  
- 30 – 90 ds post 2\textsuperscript{nd} +n vaccination |

Note: details of sampling strategy are described in the Annex to the GCES
6. Interpretation of results

Taking the SE and SP of the sampling strategy into consideration:

• No of animals/epi unit < 27 : 0 – 1 animal sero-negative
• No of animals/epi unit > 27: 0 – 2 animals sero-negative
  = epi unit is protected
• The results can be differentiated per age group to provide with more specific information on unprotected/protected age strata
B. Surveillance

- Surveillance methods to be used at any of the GCES stages
- **Sero** – surveillance only in *unvaccinated* parts of the national herd
- **PVE** serology in *vaccinated* parts of the national herd

- **Participatory disease search (PDS)**
  
  Semi-qualitative, use of semi-structured questionnaires
  
  **Objective:** assess together with the farmers the disease incidence at the start of the control effort and during implementation of control
C. Sociological surveys

Aim: identify the main drivers impacting on vaccine campaign efficacy

Method: link the information of the 2 partners (the livestock keeper and the vaccinator) and carry out participatory diagnosis

Important ingredients:
- Communication networks and messages that were used to announce the vaccination campaign
- Use of semi-structured questionnaires
- Social network analysis
D. Productivity survey

**Aim:** by measuring the (positive) impact of vaccination on herd productivity, assess the vaccination effectiveness

**Method:** 12MO method is published, valid for small or medium-sized herds

**Ingredients:**
- Species
- Agro-ecological zones and husbandry systems
- PPR status of herd (free or infected)
- Training of enumerators
Final considerations

• A “toolbox” with a set of tools is described to evaluate the effectiveness and the impact of vaccination campaigns

• For all tools harmonisation of protocols at national but also at regional level is important in order to analyse and compare results and progression in the control of the disease

• For all tools it is important to reinforce the national, regional and international networks of epidemiologists, laboratories and sociologists

• Training of people carrying out PVE is imperative

• A dedicated budget needs to be allocated to PVE
Final considerations

• If the results of the methods or a combination thereof indicate that vaccination was not successful, investigations into the sources need to be made

=> check each of the CCPs and introduce corrective action

=> Monitoring system of the vaccination programme

• Importance of regional / international coordination of these M&E systems in view of harmonised interpretation of results
• GCES has a toolbox to evaluate the effectiveness of vaccination campaigns – the key tool in stage 2 and 3
• Each tool is described with sufficient level of detail to be practical and feasible in its application
Thank you for your attention

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