



Identification of risk factors for LSD transmission in Neverland

Vietnamese team names

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How to investigate the outbreak ?

- Provide a detailed stepwise approach on how to investigate an outbreak

Develop and apply a SOP for LSD outbreak investigation

- Outbreak investigation form
- Who conducting outbreak investigation?
 - Trained veterinarians at district level or provincial level
 - With assistance from communal animal health workers/local authorities



How to investigate the outbreak ?

- Provide a detailed stepwise approach on how to investigate an outbreak

Develop a SOP for LSD outbreak investigation

- Questions need to be answered: (4 W & 1 H concept)
 - ✓ **W**hat infected species: cattle, buffaloes or wild animals (e.g: gaur) [[Animals](#)]
 - ✓ **W**hen did the LSD occur? [[Time](#)]
 - ✓ **W**here? [[Place](#)]
 - ✓ **W**hy did it occur there?
 - ✓ **H**ow was the transmission/spreading?



How to investigate the outbreak ?

- Provide a detailed stepwise approach on how to investigate an outbreak

Preparation before visiting in the field

- Record information of a suspected case of LSD from source of the report (livestock owner, AHW, cattle trader, etc.), Prepare for travelling in the field: protective clothes, cattle restrain equipment, sampling tools, forms, GPS, camera, map, Biosecurity protocols – cleaning , disinfectants and sprayer, etc.
- Vehicle preparation, access to the area
- Contact local AHW
- Travel cost

Case definition and define controls

- Develop a case definition, and then define suitable controls and where to find them

Case definition: based upon

- **Clinical sign:** The disease is characterized by high fever (40-41°C), loss of appetite, lacrimation, nasal discharge, mouth ulcers, enlarged superficial lymph nodes and multiple nodules on the skin 1-5cm in diameter and mucous membranes, OR
- **Virus detection** in a lab by the PCR
- **Serology test:** 2-3 weeks after the first appearance of skin lesions and in chronic cases after skin lesions have disappeared (applied for unvaccinated cattle)

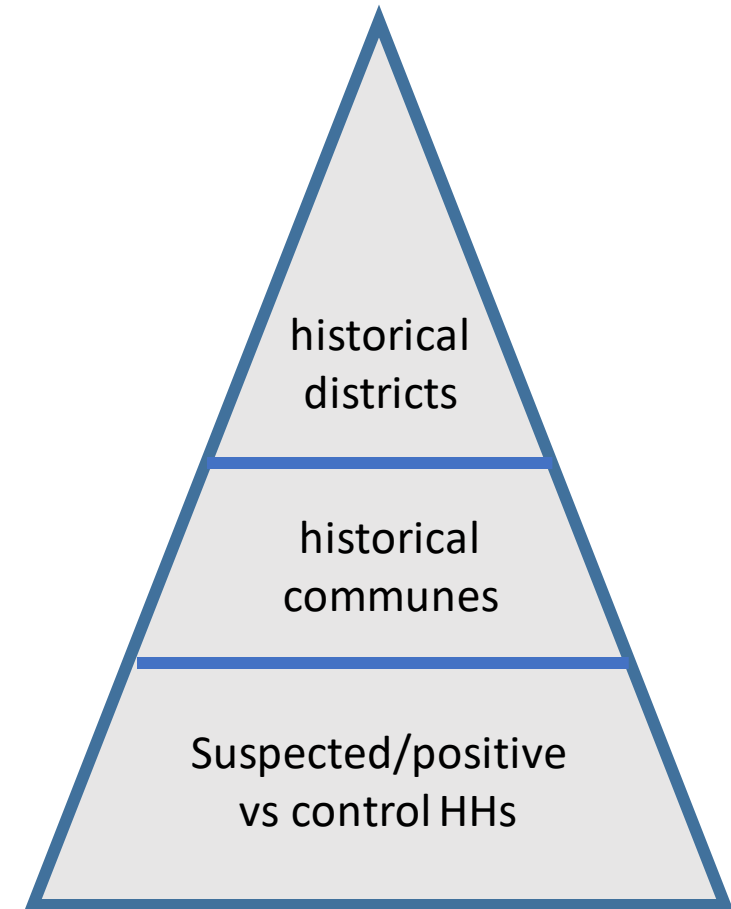
A positive household (HH) is defined if at least a case is confirmed

Control selection: 1 to 3 neighboring cattle HH(s) of the infected HH (e.g: less than 3 km radius) that

- NO clinical signs
- Or/and with NEGATIVE result by neither virus detection nor serology test

Study size

- Multiple stage sampling strategy by selection of:
 - LSD historical districts
 - LSD communes/villages
 - Suspected farms vs control HHs
- Sample size calculation to detect LSD at HH level
- Lab testing methods
 - RT-PCR for LSDV detection
 - ELISA: consider sensitivity & specificity of the kit



Case definition and define controls

Sample size calculation for case HHs

$$N = \frac{\left(z_{\beta} v_{\varphi}^{\frac{1}{2}} + z_{\frac{\alpha}{2}} v_1^{\frac{1}{2}} \right)^2}{(e_1 - e_{\varphi})^2}$$

ψ = Odds ratio for exposure in case and controls.

v = Variance

e = Exponent

Z = Number of standard deviations from the data point mean

α = Type I error probability

β = Type II error probability

N = Number of cases

Stakeholder involved

- Who provides information, who are local people to be involved
 - Livestock owner
 - AHW
 - Cattle trader
 - Neighbor
 - Vet drug shop
 - Abattoir
 - Head of village
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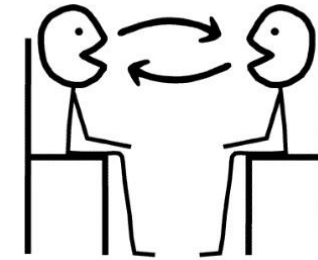


Source and transmission

- How do you generate information about infection sources and factors contributing to transmission within and between villages ?

In the field

- Fill in the investigation form by face to face interview the livestock owner (*including risk factors contributing to transmission*)
- Observe the area, susceptible animals at the farm
- Sampling (skin lesion and/or blood)
- If the outbreak is verified, conduct tracing forward and backward in the farm



Evaluation

Evaluate the consequences of LSD infection of animals, such as production loss associated with mortality and morbidity

Descriptions for:

- Susceptible population
- Temporal (*time period of the outbreak*)
- Spatial distribution (*location of study area – by mapping*)

Calculations for:

- Morbidity
- Mortality
- Incidence rate

Calculations for:

- Odds of case & control groups (HH-level)
- Odds ratio
- Build logistic regression models to identify significant risk factor(s) of LSD transmission



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Summary /discussion

Expected in this survey:

- Determine LSD infected area(s)
- Identify risk factor(s) of the disease transmission
- Suggestions for competent authorities/policy makers for risk mitigation
- Contribute scientific evidence to future research/surveillance program(s)/LSD control program(s)

We thank to Dr Ashish Sutar for his facilitation and support to our group discussion