



Food and Agriculture
Organization of the
United Nations



FAO/China Intensive Training Course on Tilapia Lake Virus (TiLV)

Sun Yat Sen University, Guangzhou, China

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Session 6

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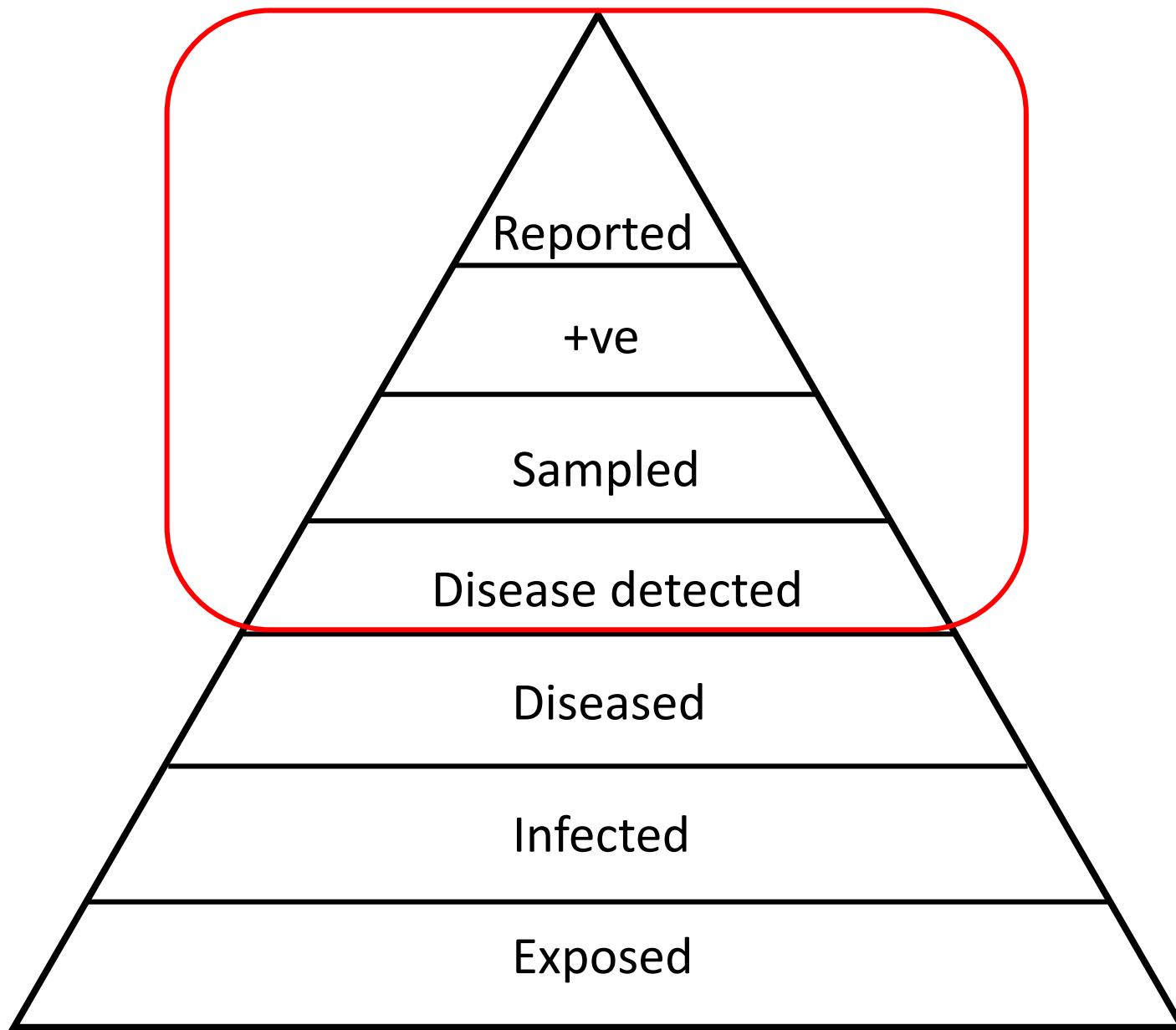
Disease outbreak investigations

and

emergency preparedness exercises

Learning objectives

- Gain an overview of the main steps in disease outbreak investigation in the context of emergency preparedness and contingency planning
- To become familiar with the basic concepts of emergency preparedness simulation exercises and their basic components
 - Discussion-based
 - Operation-based



Adapted from WHO

Ability to investigate/control disease outbreaks include:

- Early warning systems
- Adaptable contingency plans and emergency preparedness routines
- Ability to instigate the required rapid response
- Ability to implement basic control measures prior to outbreak confirmation

Objectives for disease outbreak control

- Control the outbreak -> prevent spread/development of an epidemic
- Prevent future outbreaks
- Prevent unnecessary losses due to disease
- Advance knowledge about a disease
- Provide training opportunities
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The 5 W's

- What?
- When?
- Who?
- Where?
- Why?

Descriptive

Analytical



=> Basis for action and intervention

Steps in the disease investigation (many variants)

- 1) Establish the existence of an outbreak
- 2) Confirm the diagnosis
- 3) Define a case
- 4) Collect data on cases and controls
- 5) Perform descriptive and analytical epidemiology (e.g. time-, place-, animal characteristics)
- 6) Develop hypotheses for explaining exposure & disease
- 7) Evaluate hypotheses
- 8) Communicate findings
- 9) Implement control- and preventive measures

1) Is there an outbreak?

- What is an outbreak?
 - The exact definition may vary between countries
 - General definition for endemic diseases:
 - an increased number of cases beyond what was expected in the affected population and the affected area
 - General definition for exotic diseases/epidemic diseases:
 - One case
 - Surveillance data may have essential contribution -> can allow calculation of Attack Rate (is the incidence increasing?)

2) Confirm the diagnosis

- Interviews
- Laboratory analyses



3) Define a case

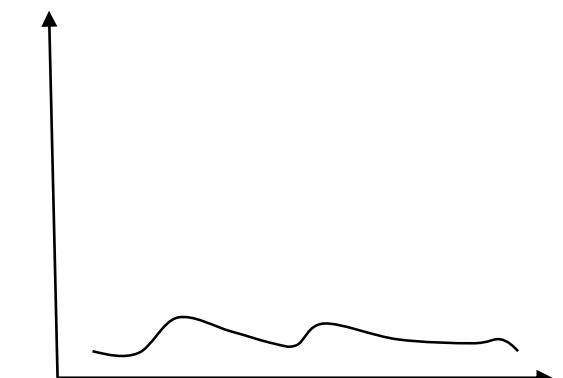
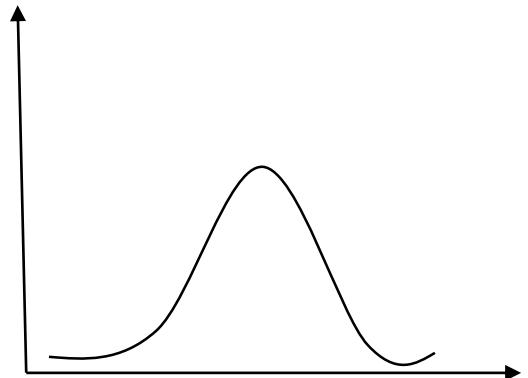
- Case definition based on available scientific knowledge
- Should ideally be available in relevant documents (e.g. disease strategy manual)
- Should be understandable for everyone involved => consistency
- Consider the sensitivity and specificity of the diagnostic tests used

4) Collect data on cases and controls

- Basic, general questionnaire → part of disease strategy manual or emergency preparedness documents
- When? (date of onset, reporting date, overnight/prolonged etc.)
- Who? (fish species, life stages, population sizes, newly stocked etc.)
- Where? (geographical position, geographical features etc.)
- Who to select as controls?

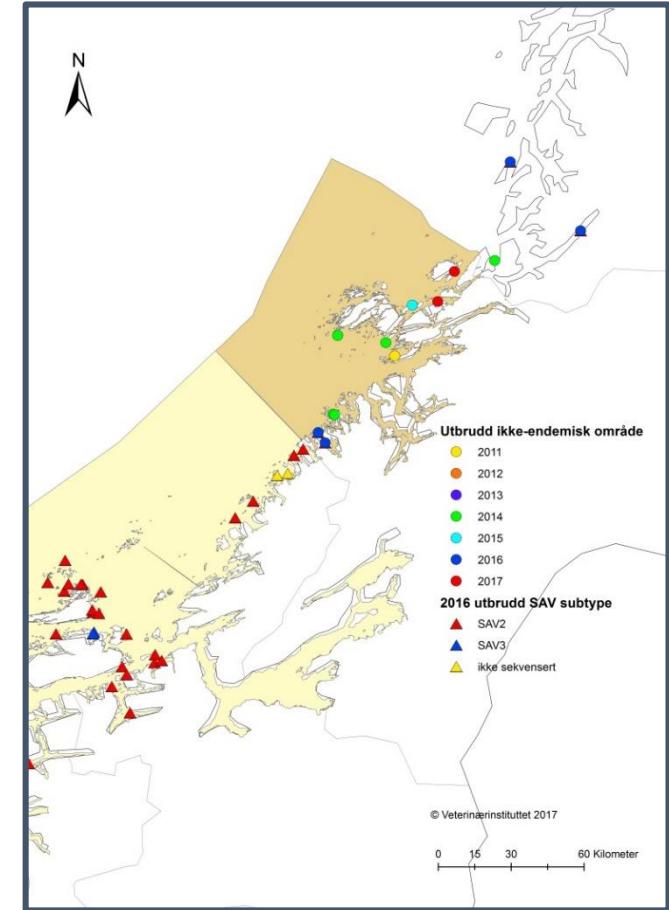
5) Descriptive and analytical epidemiology

- Combine available information to:
 - Verify findings – is there an outbreak?
 - Surveillance/baseline data important as reference
 - Is there a true increase in the number of cases?
 - Attack rate = (new cases/population at risk)*100
 - Determine who is at risk
 - Analyze patterns
 - Spatial patterns - geography
 - Temporal patterns – e.g. number of new cases per day or week
 - Exploratory analyses
 - Attempt to identify risk factors (e.g. OR)



6) Hypothesis development – exposure and disease

- May be obvious from the investigations
- Hypothesis may be:
 - Source
 - Mechanism for spread
 - Alterations in risk factors
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7) Evaluate the hypothesis

- Epidemiological investigation
 - Type of investigation depends on the hypothesis
 - May be relatively simple or very complex



Image: depositphotos ®

8) Communicate findings

- Communication to main stakeholders should occur throughout the investigation
- Ensure that main stakeholders gets all required information to allow collaborative control- and mitigation measures
- Efficient communication of reliable information to the wider public essential (situation dependent)
- Ensure that a media-handling strategy is in place

9) Implement control- and preventive measures

- Exact measures depend on the actual situation
- Evaluate measures
- Make changes as required

Remember

- Disease outbreak investigations may be:
 - Simple or complex
 - Rapid or prolonged
 - Potentially very resource intensive
- Preparedness will significantly improve efficiency

Emergency preparedness simulation exercises

- Essential tools to test, evaluate and improve preparedness plans and routines for managing urgent aquatic animal health events
- Important part of the emergency preparedness
- Two types:
 - Discussion-based (theoretical)
 - Operation-based (practical)

Procedure

- 1) Set objectives
- 2) Identify participants
- 3) Choose exercise type
- 4) Define scenario
- 5) Determine logistics and documentation
- 6) Determine the evaluation plan

1) Set objectives – what to test?

- Elements of emergency plans
- Adherence to the emergency plans
- The speed of response
- The decision processes
- Information sharing (internal/external)
- Cooperation in problem solving (internal/externally)
- Coordination of resources, logistics or support capabilities
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2) Identify participants

- Depends on the objective
- Commonly consist of director, players, observers and evaluators
 - Staff involved in the implementation of the plan
 - Target those most in need of the training
 - Based on professional functions and roles – not individuals per se
 - Make sure required participants are available for the exercise!

3) Choose exercise-type

- Discussion-based
 - Table-top exercise
 - Orientation exercise
- Operation-based
 - Drill
 - Functional exercise
 - Full-scale exercise

Discussion-based exercises

Type	Objective	What	Where	How
Orientation exercise	Familiarise staff with emergency prep. & response plans	<u>Familiarisation</u> with plans, SOPs, procedures. Workshop format	Ordinary workplace (meeting room)	Thinking & discussing
Table-top exercise	Stimulate discussion on a simulated situation in a relaxed atmosphere	<u>Discussion</u> of plans, procedures and SOPs, with or without a <u>trigger scenario</u>	Ordinary workplace (meeting room)	Thinking & discussing

Operation-based exercises

Type	Objective	What	Where	How
Drill	Test staff training, response time, inter-organization cooperation, resources, equipment	Workforce and equipment <u>capabilities</u>	Regular work location or drill site	Learning by doing Alert, alarm, physical action
Functional exercise	Test & evaluate capabilities of an emergency response system	Discussion of plans, procedures and SOPs, with or without a trigger scenario	Regular work location or emergency operations centre	Learning by doing Testing participant's <u>ability to shift to their emergency roles & responsibilities</u>
Full-scale exercise	Test & evaluate a major part of emergency operations in an interactive manner over an extended period	<u>Interactive testing of capabilities, procedures and emergency response</u>	On-scene or emergency operations centre	Learning by doing Simulated info on paper, phone, pseudo-media, external player

4) Define the scenario

- Create a plausible script for the participants that supports the accomplishment of the exercise objectives
 - A narrative that sets the stage
 - May be shared in advance (mainly for discussion-based)
 - A sequence of events designed to guide the players towards achieving the exercise objectives

5) Determine logistics and documentation

- Need to ensure that all required logistics are in place to allow the conduction of the exercise
- The exercise documentation must be complete and available to relevant participants to allow timely conduction and completion

6) Determine the evaluation plan

- More complex scenarios require more evaluation resources
- Common questions to answer:
 - Were the aims and objectives of the exercise achieved?
 - If yes, what were the results?
 - If no, what improvements to plans or performance are required in order to achieve the exercise aims and objectives?
 - How and when should improvements be re-tested?

Summary

- Disease outbreak investigations aim to determine What? When? Who? Where? Why?
- Emergency preparedness simulation exercises should be an integrated part of the emergency preparedness
- Frequency and type depends on the need of the organization
- Evaluation and actual implementation of evaluation findings essential



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