



Elements of realistic Outbreak Scenarios

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How to Conduct Simulation Exercise (Sim-Ex)

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Presentation covers

- A realistic outbreak scenario includes a set of structured elements that make the exercise *credible, relevant, and operationally useful*.
- These elements ensure the scenario reflects how an outbreak would truly unfold in the field, across surveillance, lab, and response systems.
 - Purpose and Objectives
 - Local epidemiology
 - Credible Trigger
 - Real locations and farm details
 - Clinical and epidemiological realism
 - Step-by-step injects
 - Realistic data and timelines
 - Defined roles and stakeholders
 - Operational constraints
 - Decision Points
 - Communication elements
 - Alignment with actual Contingency Plans and SOPs



1. Clear Purpose and Objective

Before writing the scenario, define:

- What capacities are being tested (early detection, reporting, lab, coordination, vaccination, communication)?
- Who the participants are (district vets, lab staff, epidemiologists, communication officers)?



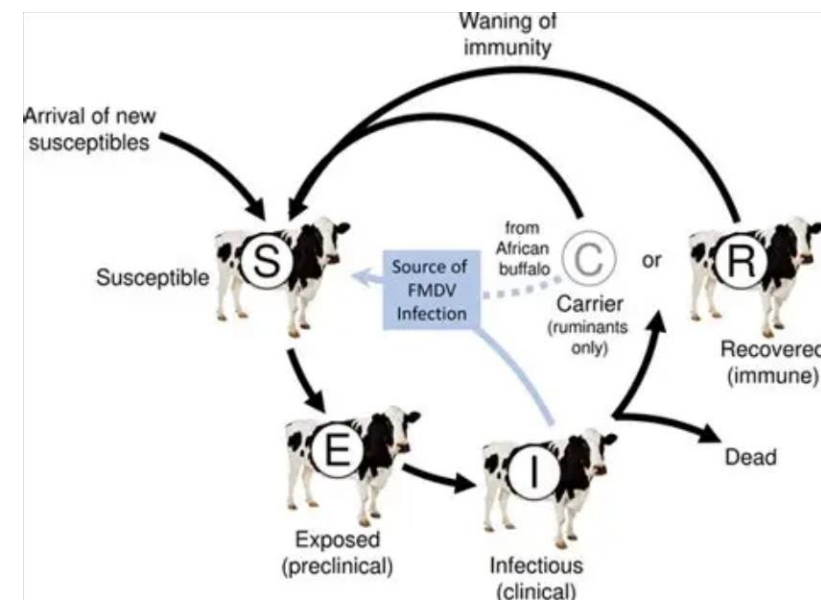
A scenario is realistic only if it fits the objective.



2. Accurate epidemiological Context

Include:

- Local animal production systems/ value chains
- Seasonal factors
- Animal movement patterns
- Risk areas (border zones, markets, main transit routes, migration routes)
- Recent outbreaks in neighbouring countries



These details ground the scenario in the real conditions of the country.

3. Plausible initial trigger

The scenario must start with a **credible first signal**, such as:

- Farmer report of suspicious signs
- Informal trader information
- Community surveillance alert
- Cross-border outbreak notification

T1 - Index detection

Simulate first suspicious case

Trigger local investigation within 24–48 hrs

It should reflect how outbreaks *actually begin*.



4. Real locations and farm details

Provide/List:

- Actual districts/villages
- Geo locations of the affected farms
- Real farms (backyard, commercial, pastoral)
- Species & herd size
- Housing/management systems



Participants recognise these locations, making the situation believable

5. Key clinical and epidemiological Information

Provide:

- Typical signs of the disease
- Mortality and morbidity rates
- Basic reproductive number (R_0)
- Incubation period
- Transmission routes
- Species susceptibility
- Environment persistence
- Diagnostic sensitivity and specificity



This ensures the scenario fits known disease behaviour.



5. Key epidemiological information

Parameter	Why it matters	Example ranges / values
Basic reproduction number (R0)	Determines outbreak growth and control urgency	FMD: 2–5; Avian influenza (HPAI): 1.5–3.5; ASF: low R0 but high persistence
Incubation period	Affects detection window and quarantine timing	FMD: 2–14 days; Rabies (animals): weeks to months; Lumpy Skin Disease: 4–14 days
Species susceptibility	Shapes affected populations and surveillance targets	FMD: cloven-hoofed animals; Avian influenza: domestic/wild birds; ASF: swine only
Transmission routes	Guides control measures (movement, biosecurity)	FMD: direct, short-range airborne, fomites; Rabies: bites; Avian influenza: fecal-oral, aerosol
Environmental persistence	Determines disposal and biosecurity duration	ASF: stable in pork products and environment; Lumpy Skin Disease: vector-borne and persists weeks
Diagnostic sensitivity & specificity	Influences false negatives/positives and inject realism	PCR turnaround 24–72 hrs; serology longer; include 5–15% false negatives where relevant

Key parameters to build credible outbreak scenarios for FMD, Rabies, HPAI, ASF, Lumpy Skin Disease

6. Step-by-Step Timeline (Injects)

An effective scenario unfolds gradually through **injects**, such as:

- Rumours and early warning
- First report
- Field investigation
- Sample results
- Movement history
- Spread to neighbouring farms
- Confirmation
- Public/media pressure
- Resource constraints
- Control decisions



This mirrors the progressive nature of real outbreaks.

7. Data that Matches Reality

Include:

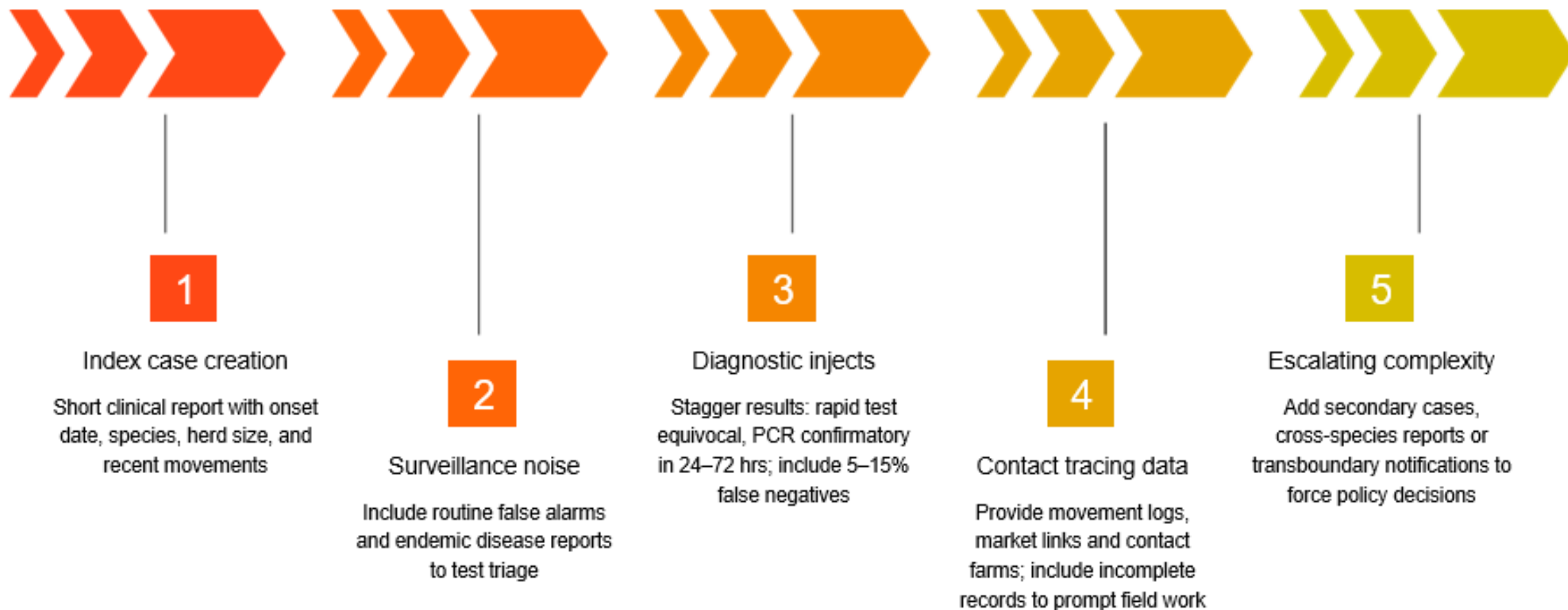
- Number of animals affected
- Lab turnaround times
- Vaccine availability
- Transport distances
- Human resources available



Avoid unrealistic shortcuts (e.g., instant laboratory confirmation).



Developing Realistic Case data & Epidemiology Injects



Practical sequence to drive detection, triage, diagnostics, field verification and policy escalation



8. Defined Roles and Stakeholders

Define clearly:

- Farmer
- Village leaders
- District vet
- Laboratory Officer/Technician
- Provincial/national authorities
- Regulatory/Quarantine Authorities
- Livestock group or industries
- Communication officer
- Border officials



Realistic scenarios reflect real-world communication paths.



Operational elements of realistic outbreak exercises



Operational domains

Resource matrices must reflect personnel, equipment, supplies, and infrastructure limits across operational domains.



Culling & disposal

- Teams of 4–8 persons per cull team with PPE and biosecurity required.
- Disposal methods: burial or incineration; capacity varies by region.



PPE, cold chain & transport

- Specimen transport within a 24–72 hr window; limited cold boxes constrain testing rate.
- PPE shortages: simulate 20–40% shortfall to force prioritization.



Field veterinary services

- Surveillance teams at 1 per 10–20 holdings; logistic delays 24–72 hrs affect response.
- Sample throughput: lab capacity caps set as X samples/day defined per exercise.



Movement controls

- Establish control, surveillance and protection zones per pathogen rules.
- Enforcement: limited checkpoints and staffing force selective trade exemptions.

Logistics, veterinary response, movement controls and resource constraints

9. Operational Constraints

Add realistic challenges/Limitations:

- Delayed sample transport
- Difficult road access
- Limited PPE or cold chain
- Farmer resistance
- Front line workers falling sick
- Outbreak of another disease
- Natural calamities



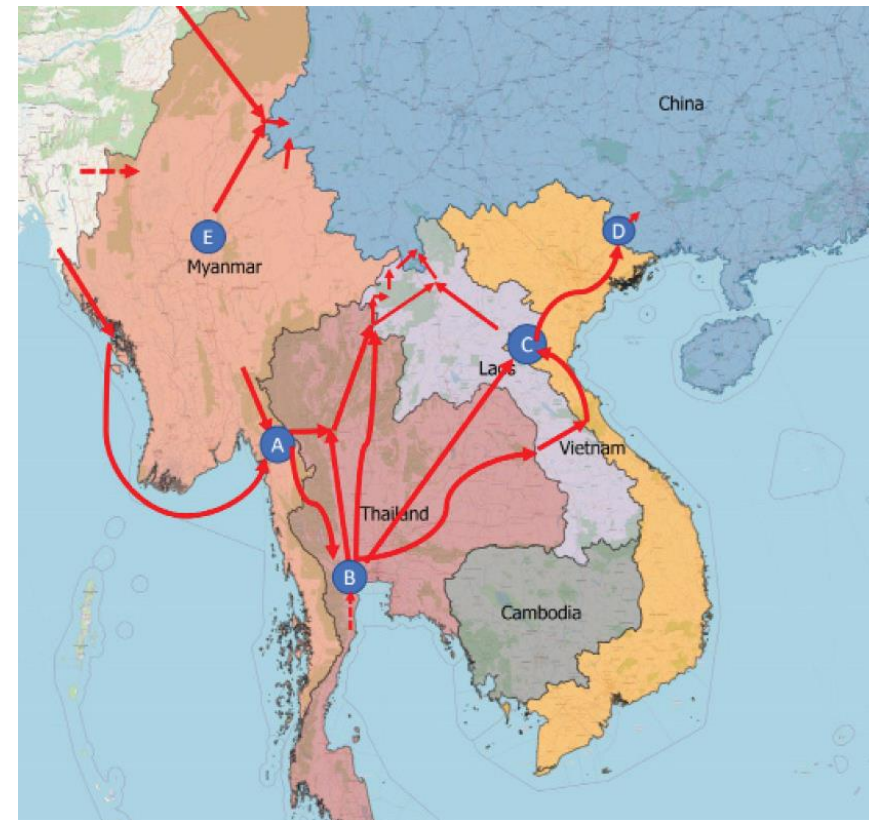
Challenges make the scenario realistic and useful for training



10. Decision Points

Include moments where participants must decide:

- Is this a suspect case?
- Should quarantine be imposed?
- Which farms should be traced?
- When to notify national authorities?
- Whether to vaccinate or restrict movement?



Real outbreaks require decision-making under uncertainty.

11. Communication Elements

Add:

- A journalist asking questions
- A farmer posting on social media
- Village rumours
- Traders seeking clarification,
- Misinformation and disinformation



These simulate real communication challenges.



12. Alignment with Contingency Plan and SOPs

To be realistic, the scenario must align with:

- National contingency plans
- Incident Command System
- Standard operating procedures
- Official reporting channels
- WOAHP disease notification process



Participants must recognise the procedures they use in real events.



Thank you



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