Investigating an Epidemic

General Principles

Learning Objectives

1. Define epidemic
2. Describe the purpose of its investigation
3. Sources of its information
4. Precautions to be followed and steps in execution of epidemic investigation

Outbreak: a constant threat!

- Increase in the knowledge of medicine and diseases…
- Improvement in public health services including preventive measures…

BUT…

- Known and unknown outbreaks still occur!

- Outbreak can occur anywhere;
  - Very remote area with no health facility

    Or
  - A sophisticated hospital…

A challenge as well as an opportunity…

Purpose

1. Controlling the current outbreak
2. Prevention of further outbreaks
3. Research to provide knowledge
4. Evaluation of the effectiveness of preventive programs
5. Evaluation of the effectiveness of the existing surveillance system
6. Training health professionals
7. Responding to public, political or legal concern

Definition

- Epidemic = outbreak
- A ***greater*** frequency of disease or any health event than normally expected in a specified period and place
- A ***cluster*** of cases with same illness which can be linked to the same exposure
- A ***single case*** of disease that has never occurred before!

How can an epidemic be detected?

- Monitoring and surveillance: local, national & international level…
- Sources:
  - Health personnel
  - Laboratories
  - Village health volunteers
  - Official disease notification systems (IDSP, HSS, etc)
  - Media

Diseases requiring investigation

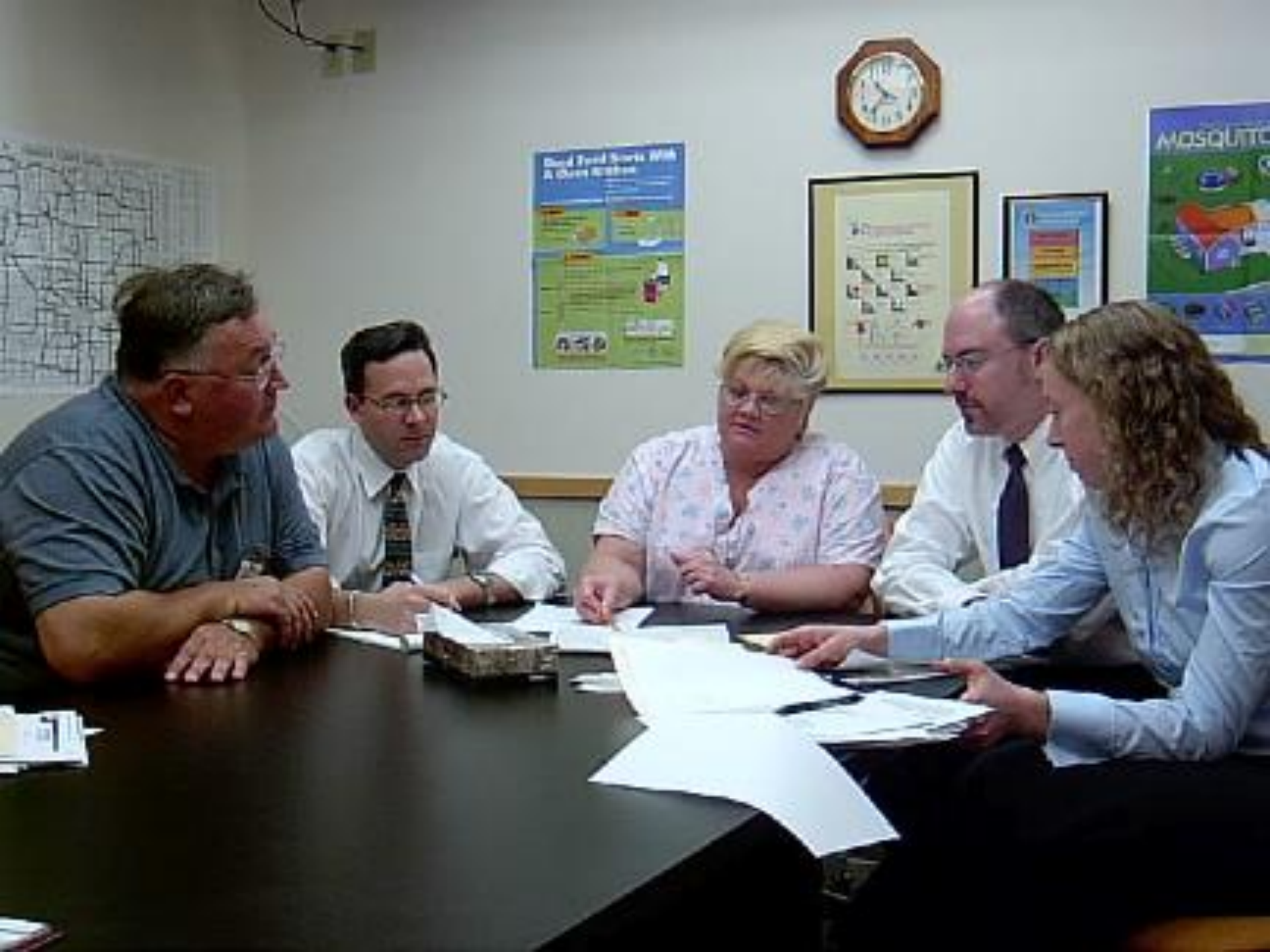
1. Endemic diseases with epidemic potential – malaria, cholera, measles, hepatitis, meningococcal meningitis
2. Even a single case of diseases for which eradication/elimination goals have been set – poliomyelitis, guinea-worm and yaws
3. Rare but internationally important diseases with high case fatality rates – yellow fever
4. Outbreaks of unknown etiology

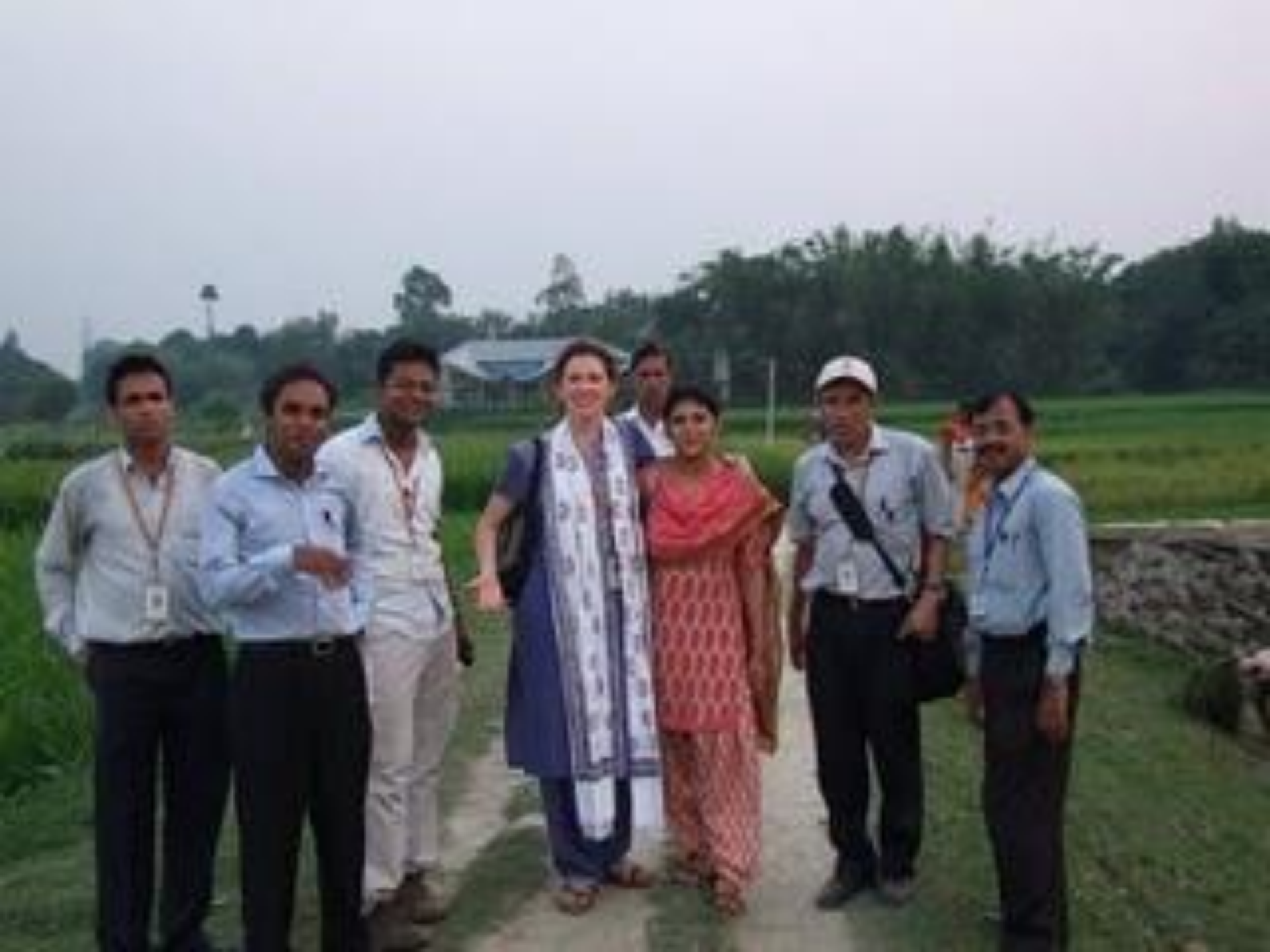
Components of an investigation team

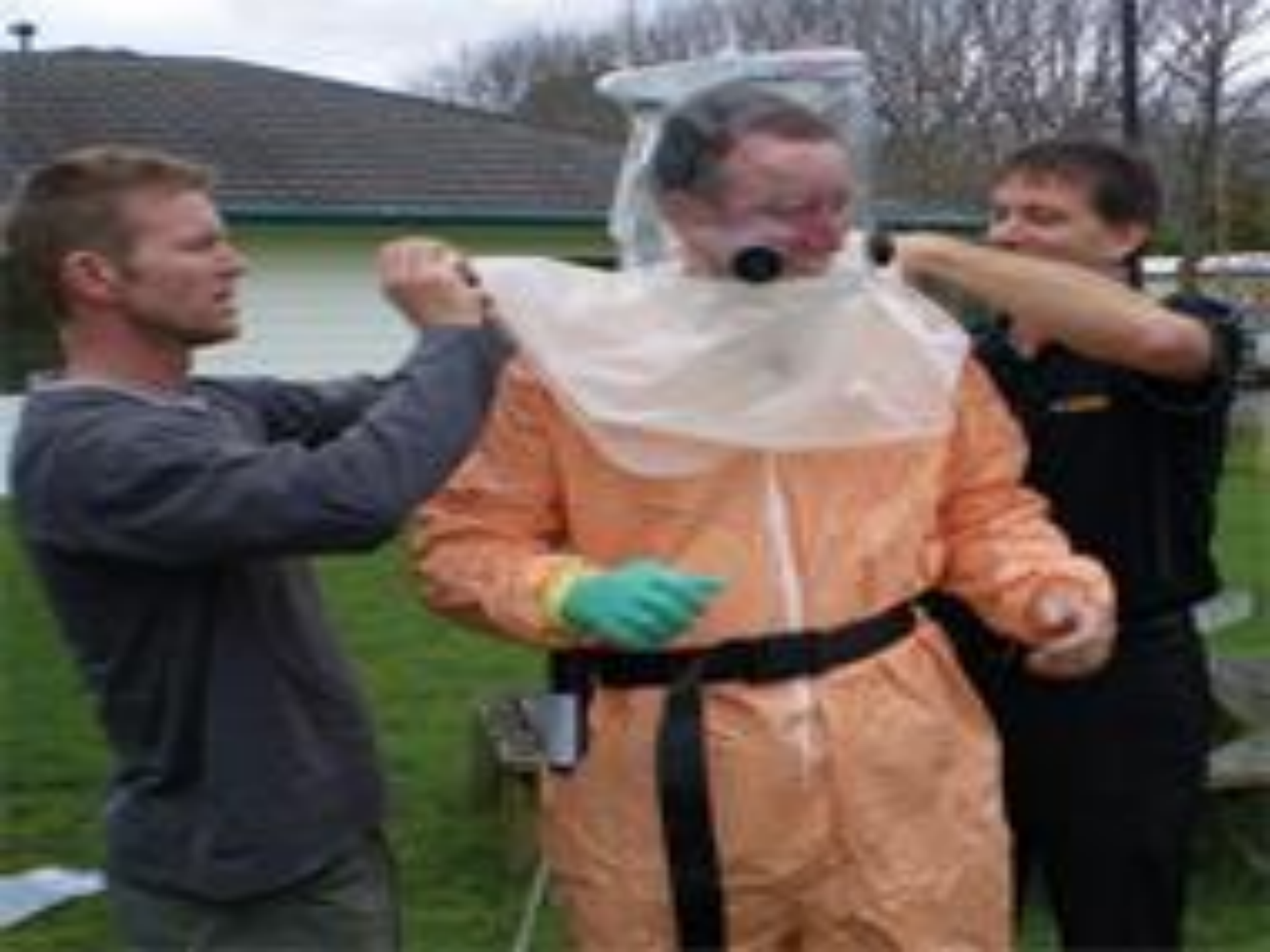
- Members are directly involved in planning and execution of the investigation from start to finish.
- Local health professionals: most crucial role to play
- A good investigating team should look like this…

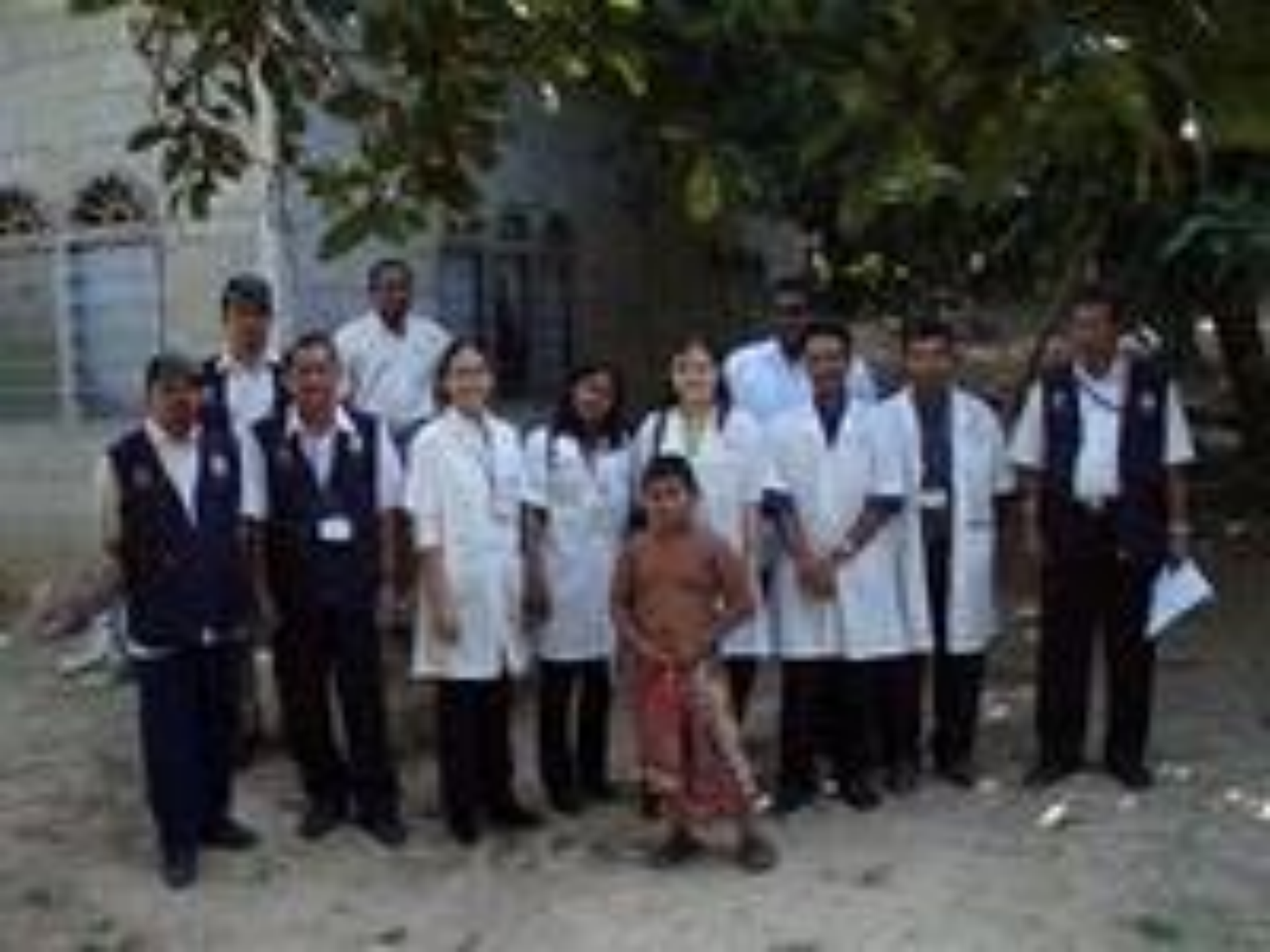
  (a pre planned RRT should be established)

1. **Field epidemiologist** who is technically competent to conduct field investigations systematically, principal investigator, involved in all the steps
2. **Field staff:** food and environmental Sanitation, vector control, vaccination…
3. **Educators/ trainers** to educate the affected communities for their participation
4. **Laboratory technicians**
5. **Specialists and public health administrators**
6. **PR**









Prior to the implementation of Ix…

- Confirm validity of information / assess existence of the epidemic by direct communication
- Gather basic information: main s/s, clinical judgment or lab confirmation, no. of cases, no. of deaths, host factors of the sufferers, any clusters, details of first observation and current trend…

- Gather basic information: details of control measures already applied, any constraints in execution…
- Ensure collection of clinical specimens and other suspected materials…
- Obtain permission and support from local and national authorities
- Planning field operations
- Review existing knowledge of the problem

Steps of epidemic investigation

Ix needs to start with a good descriptive study followed by analytical studies whenever possible and necessary.

Conclusion about the causes, mechanisms and determinants of the epidemic need to be based on sound epidemiological, clinical, laboratory and environmental evidence.

Steps

1. Confirm the existence
2. Verify the diagnosis and determine the aetiology of the disease
3. Develop operational case definition, start case finding and collect the information on cases
4. Describe person, place and time distribution and generate hypotheses

Steps (contd…)

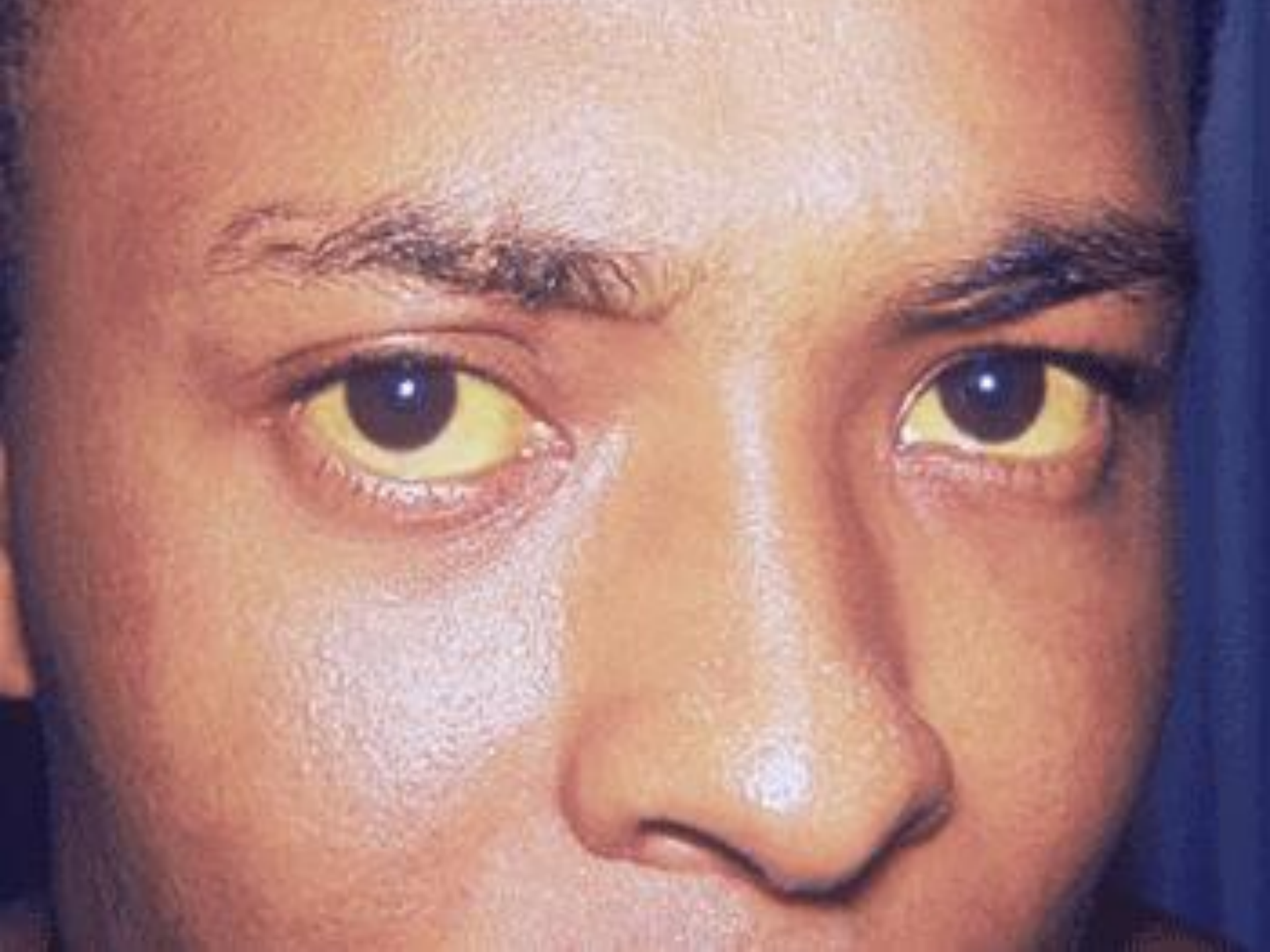
5. Test hypotheses using an analytic study
6. Do necessary environmental or other relevant studies to supplement the investigation
7. Draw conclusions that explain causes or determinants of the epidemic based on evidence

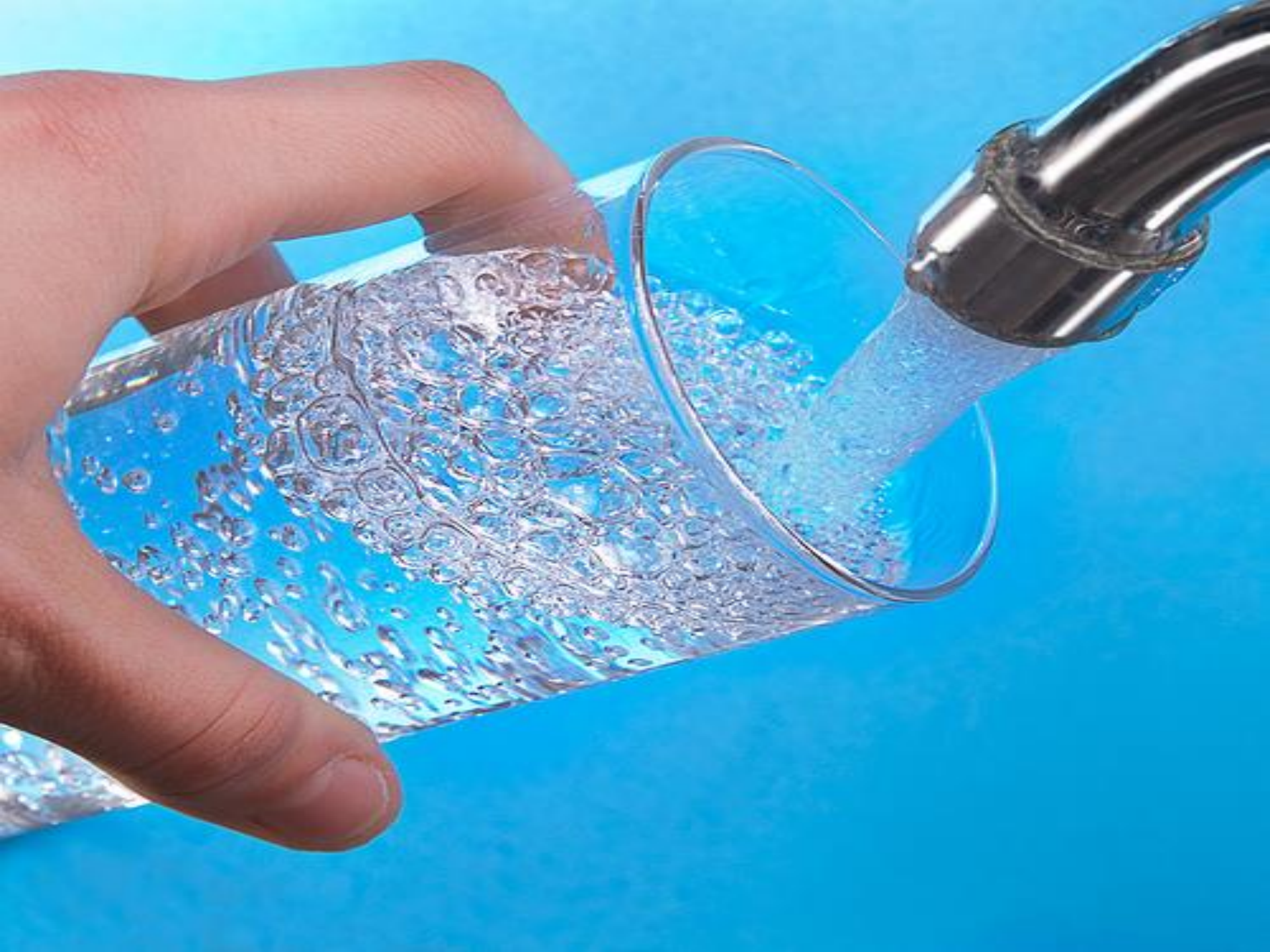
Steps (contd…)

8. Report and recommend appropriate control measures
9. Communicate the findings to educate other public health professionals and general population
10. Follow up to assure implementation of control measures

(not a strict sequence, overlapping of various steps; as per the situation)

- Step 2 & 3: knowledge about the accurate diagnosis and aetiology will help
  - prevent further spread
  - formulate an accurate operational case definition (time and place specific)
  - facilitate active case-finding





- Index case, primary case…
- The very first and very last cases in the epidemic curve should be critically appraised…
- Various epidemic curves…

Co-operation for international outbreak investigation and preparedness

- Whole world is prone to outbreaks, because of:
  - Frequent cross-border movement
  - Civil war
  - Migration
  - Rapid transportation
  - International trading
  - Tourism, etc…

- Outbreak in one country can spread to another one very easily…
- Must be treated as a threat to all countries…
- This emphasizes the importance of building capacity for surveillance, outbreak preparedness, and investigation…
- A wise investment…

Conclusion

- An essential function of public health professionals
- An opportunity to gain new knowledge & to discover weaknesses of the existing systems
- Routine surveillance as well as unofficial sources can be vital for detection
- Well organized and pre-planned investigation

Conclusion

- Follow all 10 steps…
- A competent outbreak investigation combines sound scientific knowledge and good management skills
- Reporting is not an end, follow up is required
- More and more international co-operation is the need of the hour…!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