

Surveillance

Dr. Htun Tin

Director (Epidemiology)

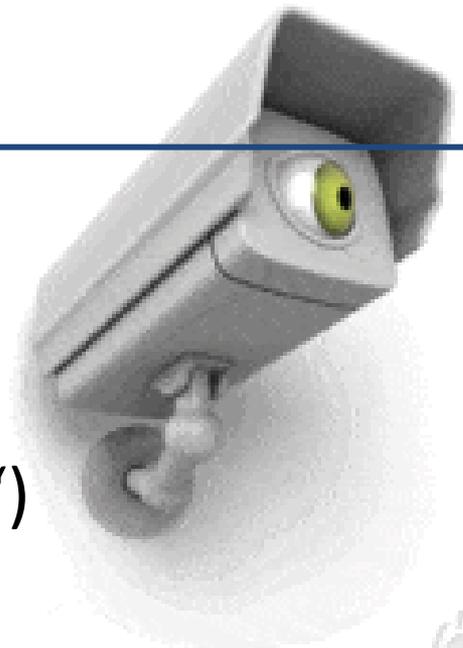
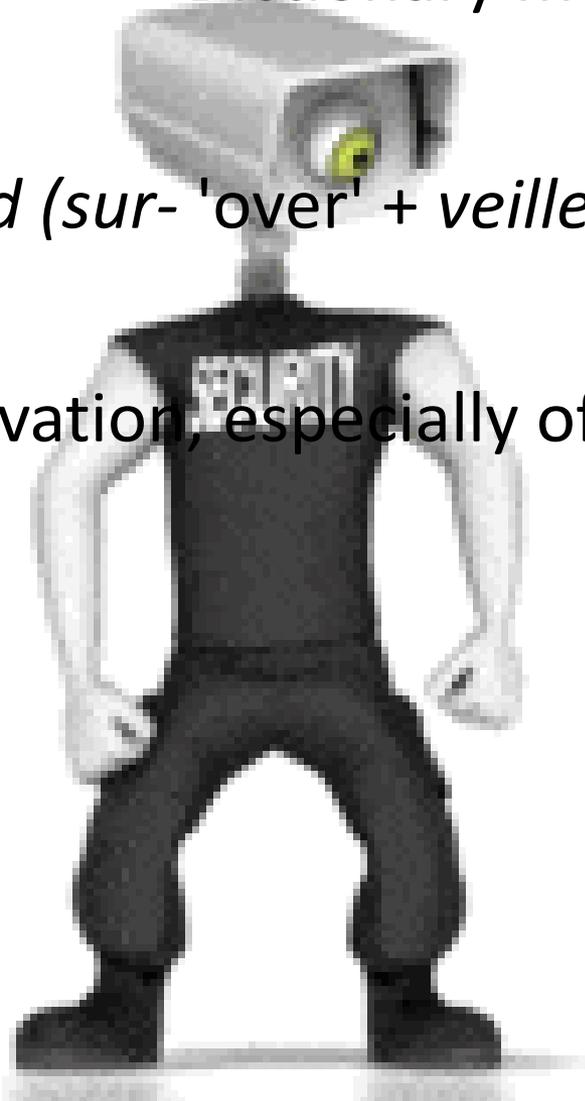
Department of Public Health



Surveillance

Dictionary meaning

- *French word (sur- 'over' + veiller 'watch')*
- Close observation, especially of a suspected spy or criminal

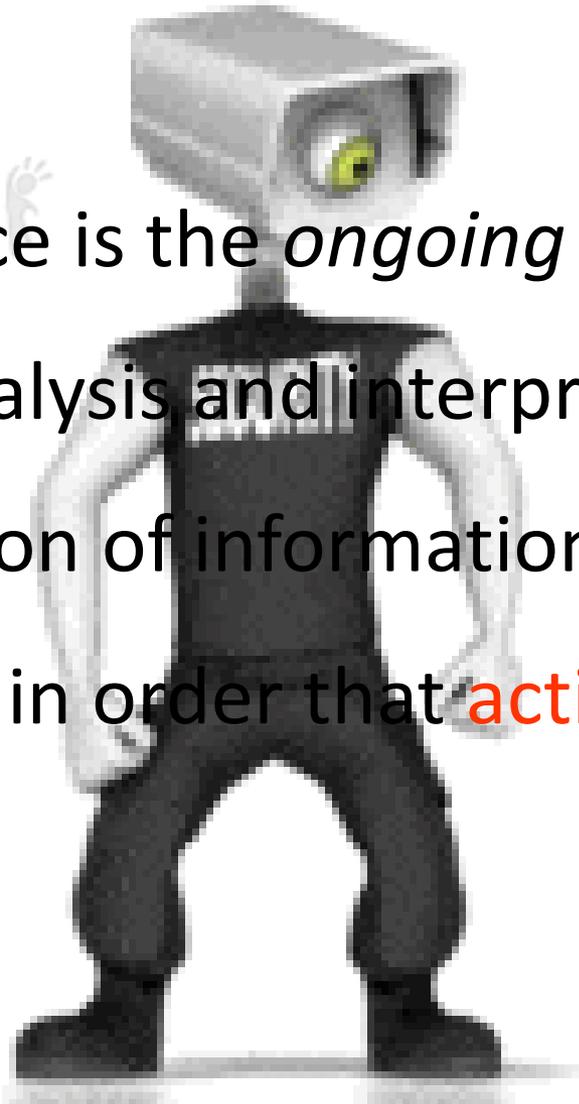




What is surveillance ?



Surveillance is the *ongoing systematic* collection, collation, analysis and interpretation of data; and the dissemination of information to those who need to know in order that **action** may be taken



What is surveillance ?

Surveillance is the ongoing, systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely feedback of these data to those who need to know.

(Centers for Disease Control)

What is surveillance ?

“Surveillance, when applied to a disease, means

- the continued watchfulness over the distribution and trends of incidence
- through the systematic collection, consolidation and evaluation of morbidity and mortality reports and other relevant data.
- Intrinsic in the concept is the regular dissemination of the basic data and interpretation to all who have contributed and to all others who need to know.
- The concept, however, does not encompass direct responsibility for control activities.”

A.D. Langmuir, 1963

What is surveillance ?

1. The **Collection** of relevant data for a specified population, time period and/or geographic area;
2. Meaningful **analysis** of data;
3. Routine **dissemination** of data with accompanying interpretation.

"Information for action"

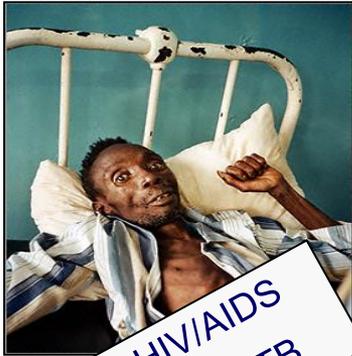
**Surveillance for communicable diseases
remains important...**



Surveillance is a way for outbreak detection !

**Surveillance is information for action & it
should be an essential component of any
control programme**

Global Health Security



HIV/AIDS
XDR-TB



Chernobyl



Plague



VHV
/Ebola /
Marburg



BSE/
vCJD



Nipah



Anthrax



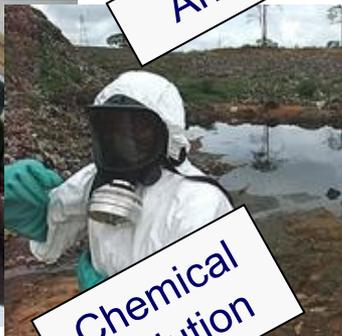
SARS



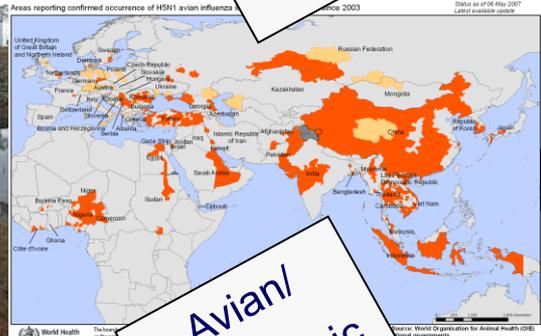
meningitis



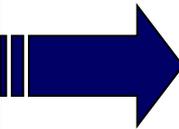
cholera



Chemical
pollution



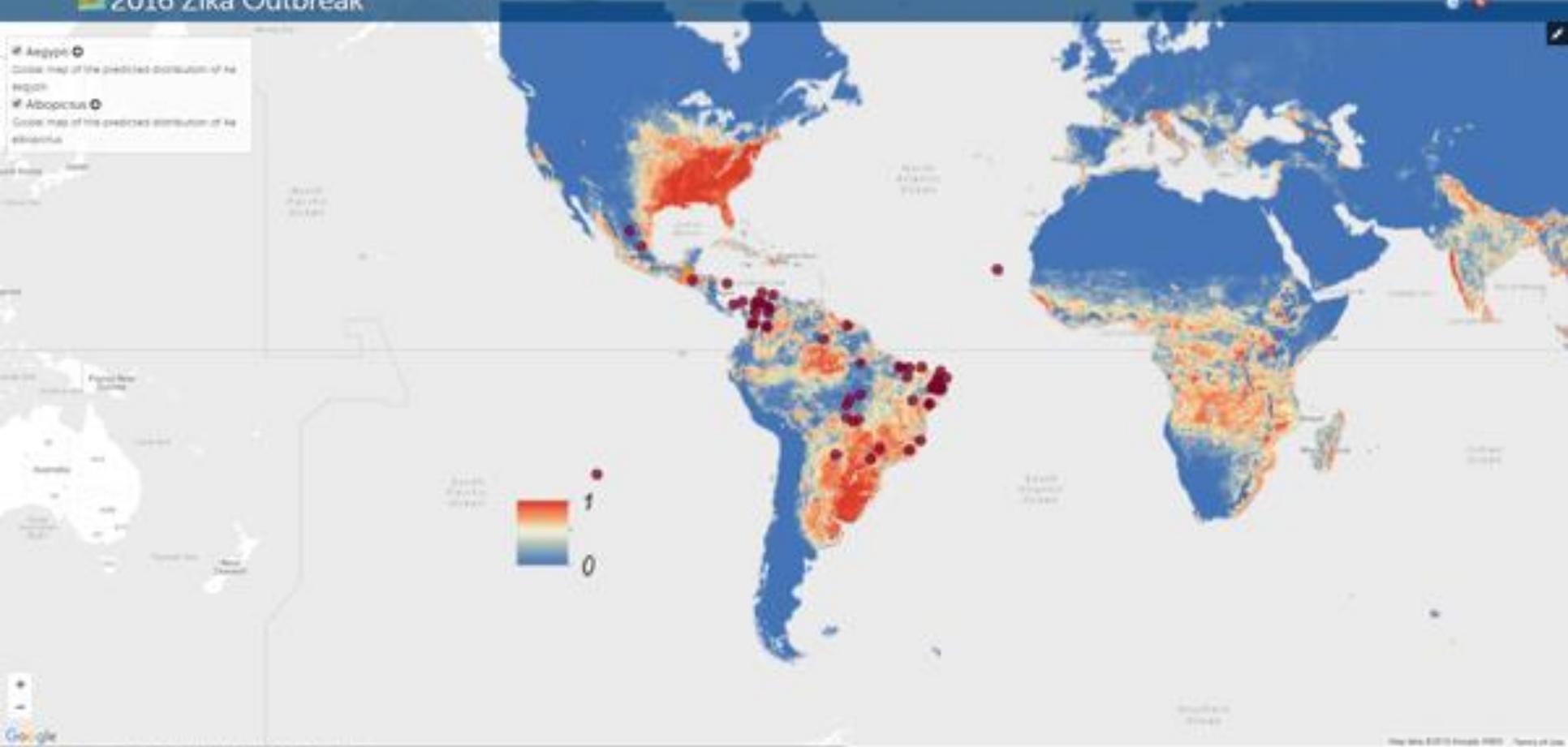
Avian/
Pandemic
H1N1 Flu





2016 Zika Outbreak

- Aegypti
Close map of the predicted distribution of Ae. Aegypti
- Albopictus
Close map of the predicted distribution of Ae. Albopictus





<https://www.flightradar24.com/16.69,95.28/2>

Surveillance for communicable diseases remains important...

- The world population is highly mobile
- International travel and troop movements increase the risk of communicable disease transmission
- Migration for war and famine, and voluntary immigration increase communicable disease risk
- Naturally occurring disease is not our only threat



Surveillance for communicable diseases remains important...

Emerging infections: Our world is changing as never before

Populations grow, and move...urbanization...weak PH

Infrastructure

Diseases travel fast

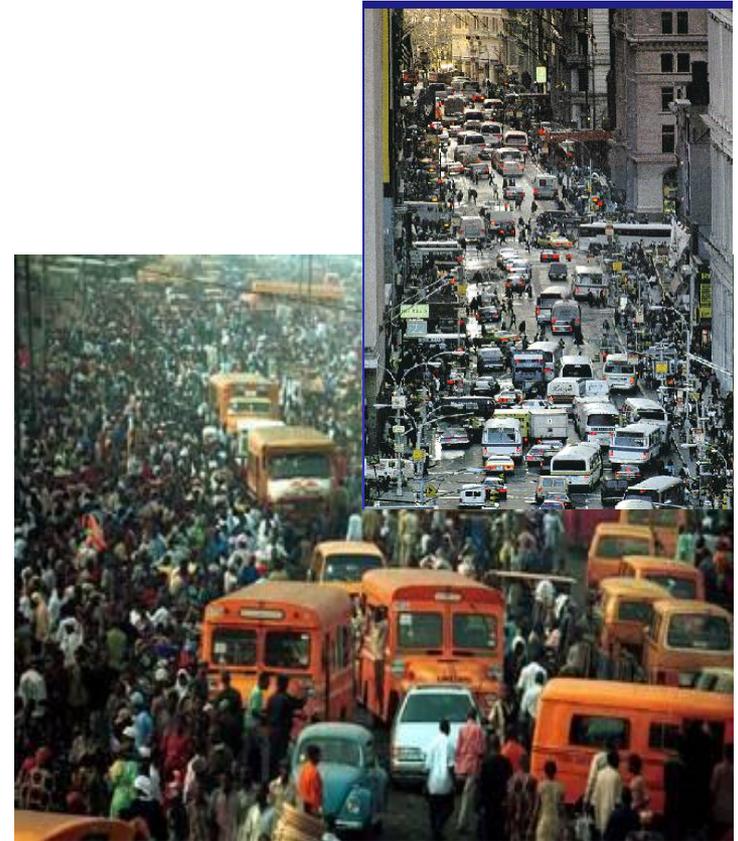
Microbes adapt...

Antimicrobial resistance

Crossover from one
species to another to man

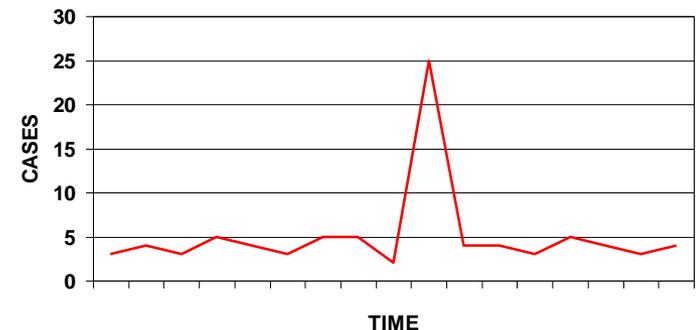
Global Warming, environmental degradation

Threatening International Public Health Security ...



Surveillance can...

- Estimate the magnitude of a problem
- Determine geographic distribution of illness
- Detect epidemics/outbreaks
- Generate hypotheses, stimulate research
- Evaluate control measures
- Monitor changes in infectious agents
- Detect changes in health practices



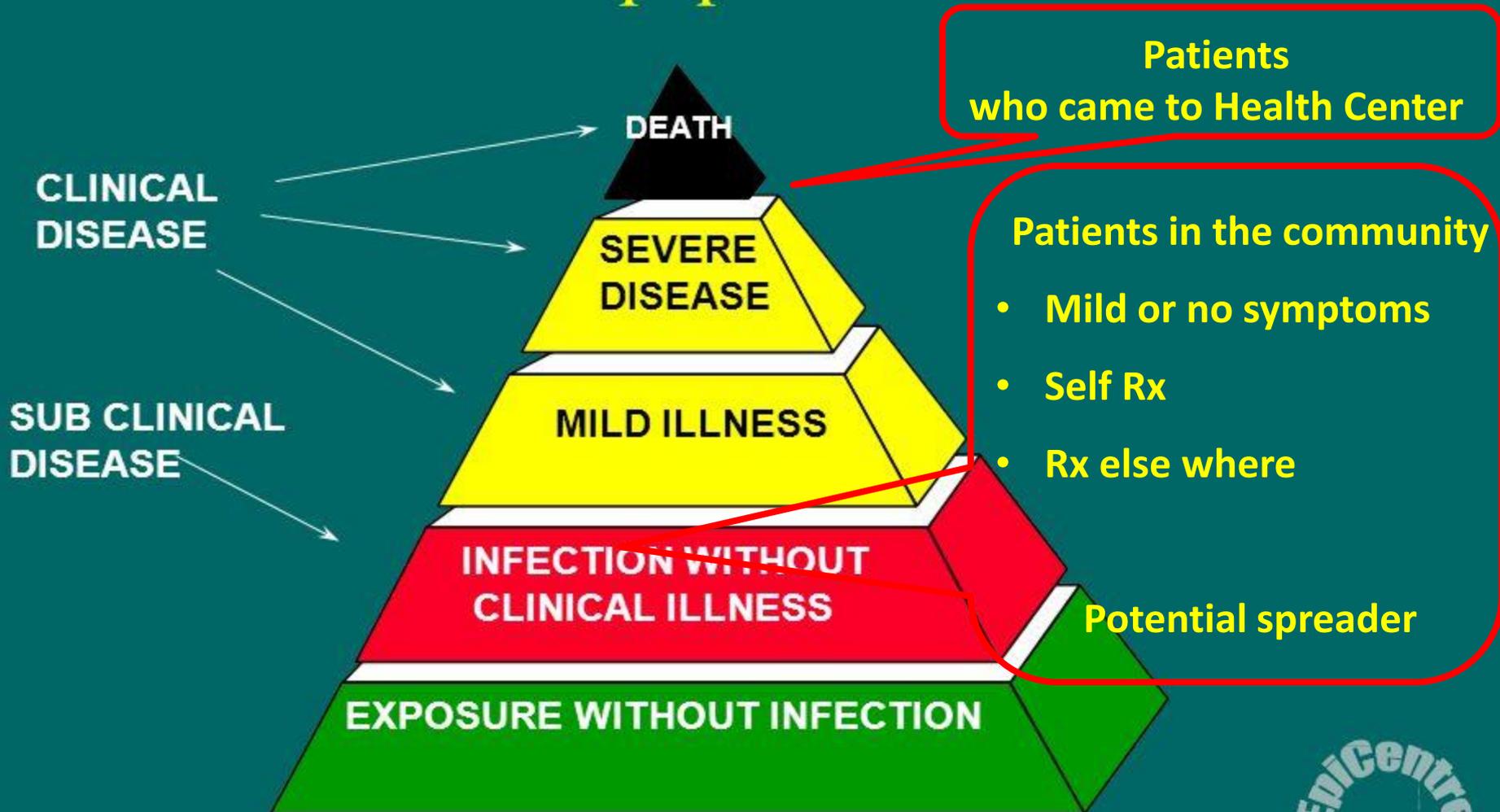
Purpose of Surveillance

- **Assess public health status (monitor trends, detect outbreaks)**
 - prevent and control disease
- **Define public health priorities**
 - plan considering impact of hazard, exposure, disease
- **Evaluate public health programmes**
 - make decisions regarding interventions
- **Stimulate research**
 - generate hypotheses, initiate research

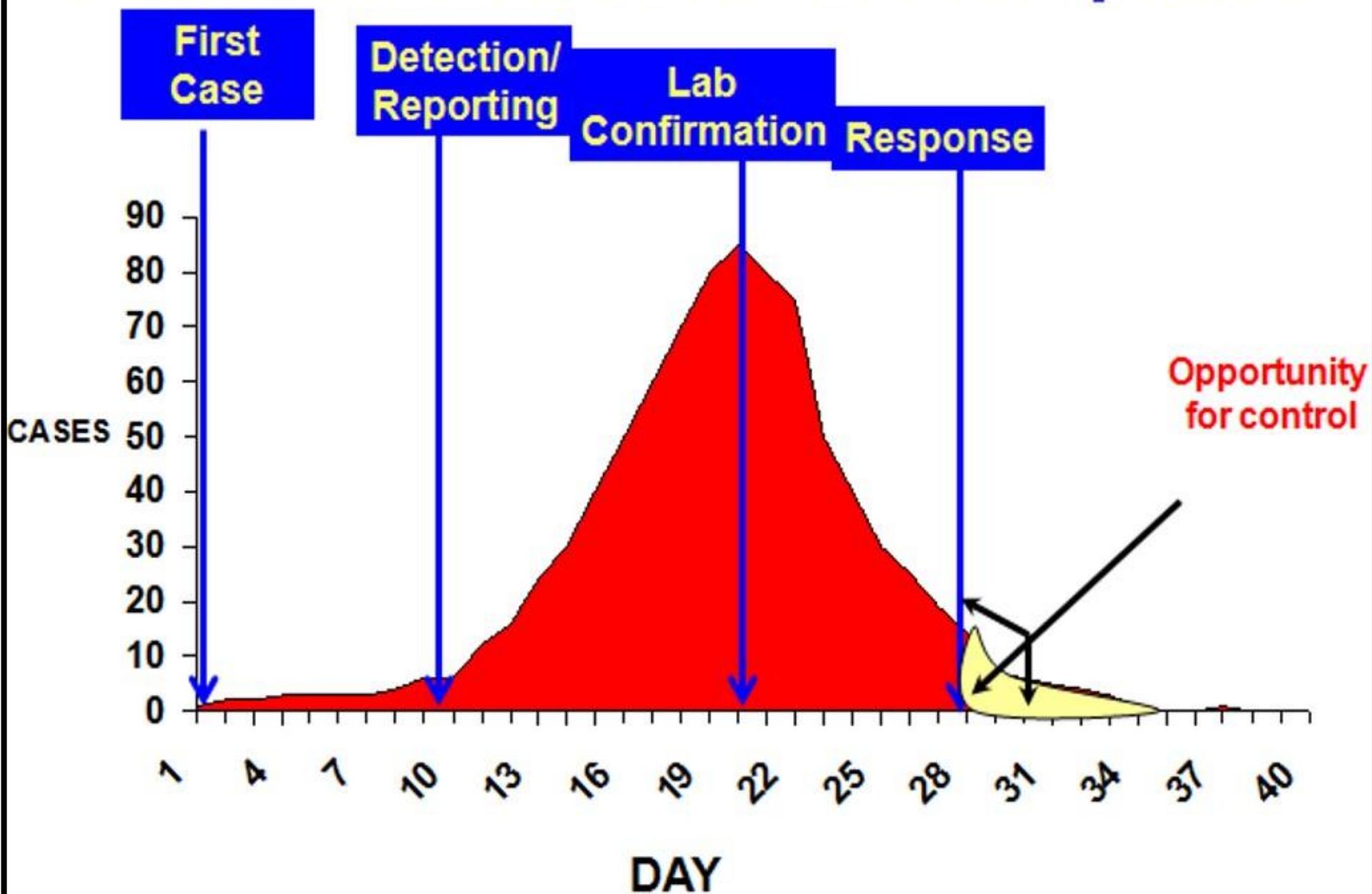


Tip of Iceberg

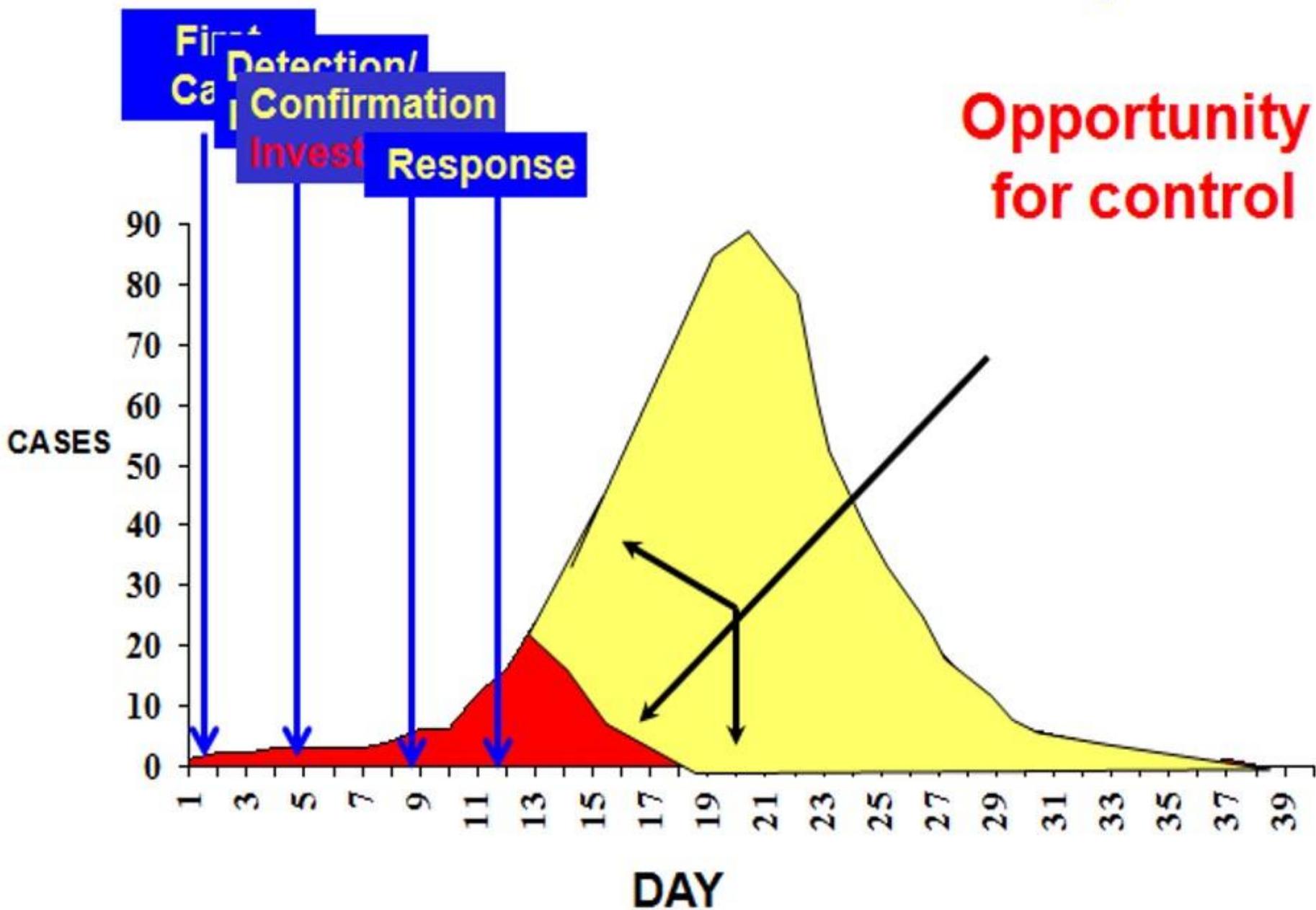
“Iceberg” concept of infectious disease in populations



Outbreak Detection and Response



Outbreak Detection and Response



Historical perspective (1)

First use for Public Health Action

William Farr (1807 – 1883)

- Superintendent, statistical department, General Register Office, England and Wales
- Collected, analysed, interpreted vital statistics
- Plotted rise and fall of epidemics of infectious diseases, identifying associations
- Disseminated information in weekly, quarterly, and annual reports, medical journals, public press

Historical perspective (2)

Recognition by World Health Organization

21st World Health Assembly (1968)

- Systematic collection of pertinent data
- Orderly consolidation and evaluation of these data
- Prompt dissemination of the results to those who need to know

"Information for action"

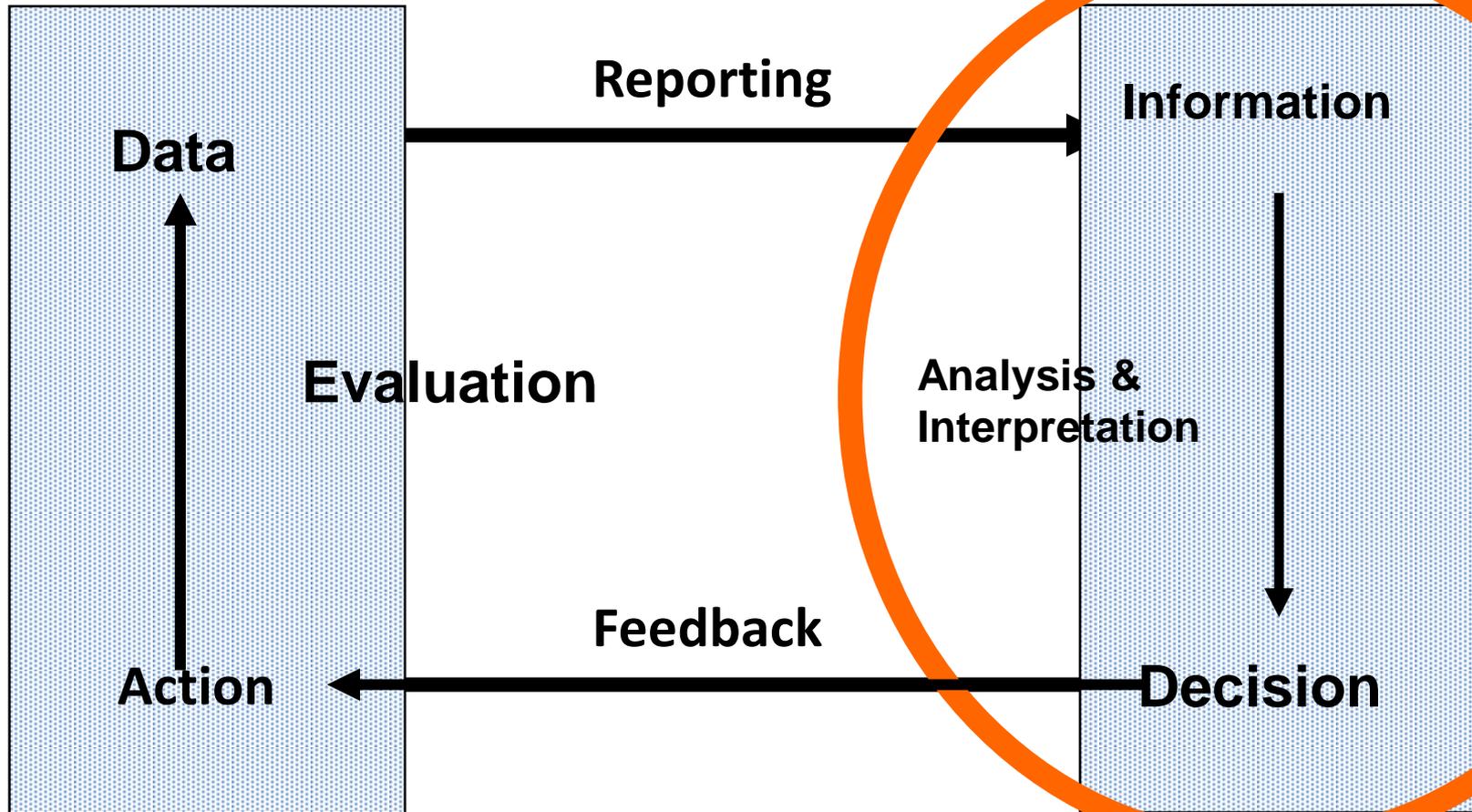
Elements of public health surveillance

- Collection of data
- Compilation of data
- Analysis & interpretation
- Dissemination and feedback
- Link to public health action

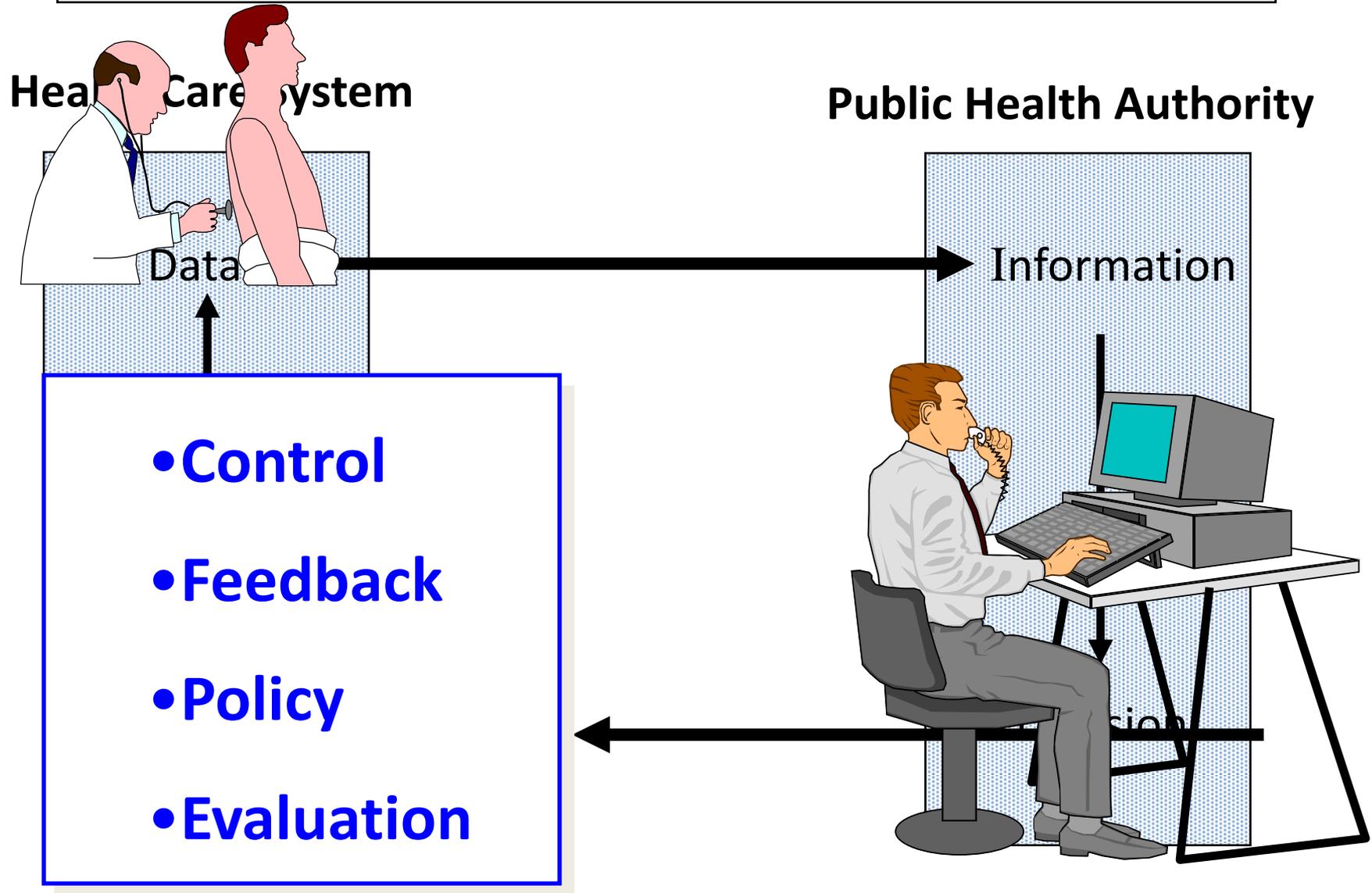
Public Health Surveillance cycle

Health Care System

Public Health Authority

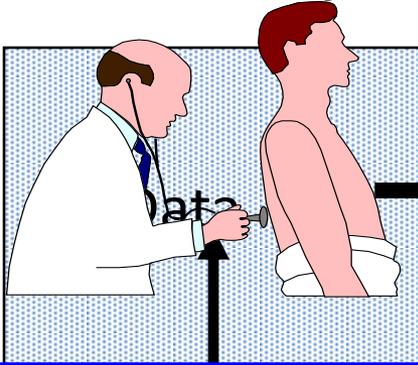


Surveillance: Action (1)



Surveillance: Action (2)

Health Care System



Public Health Authority

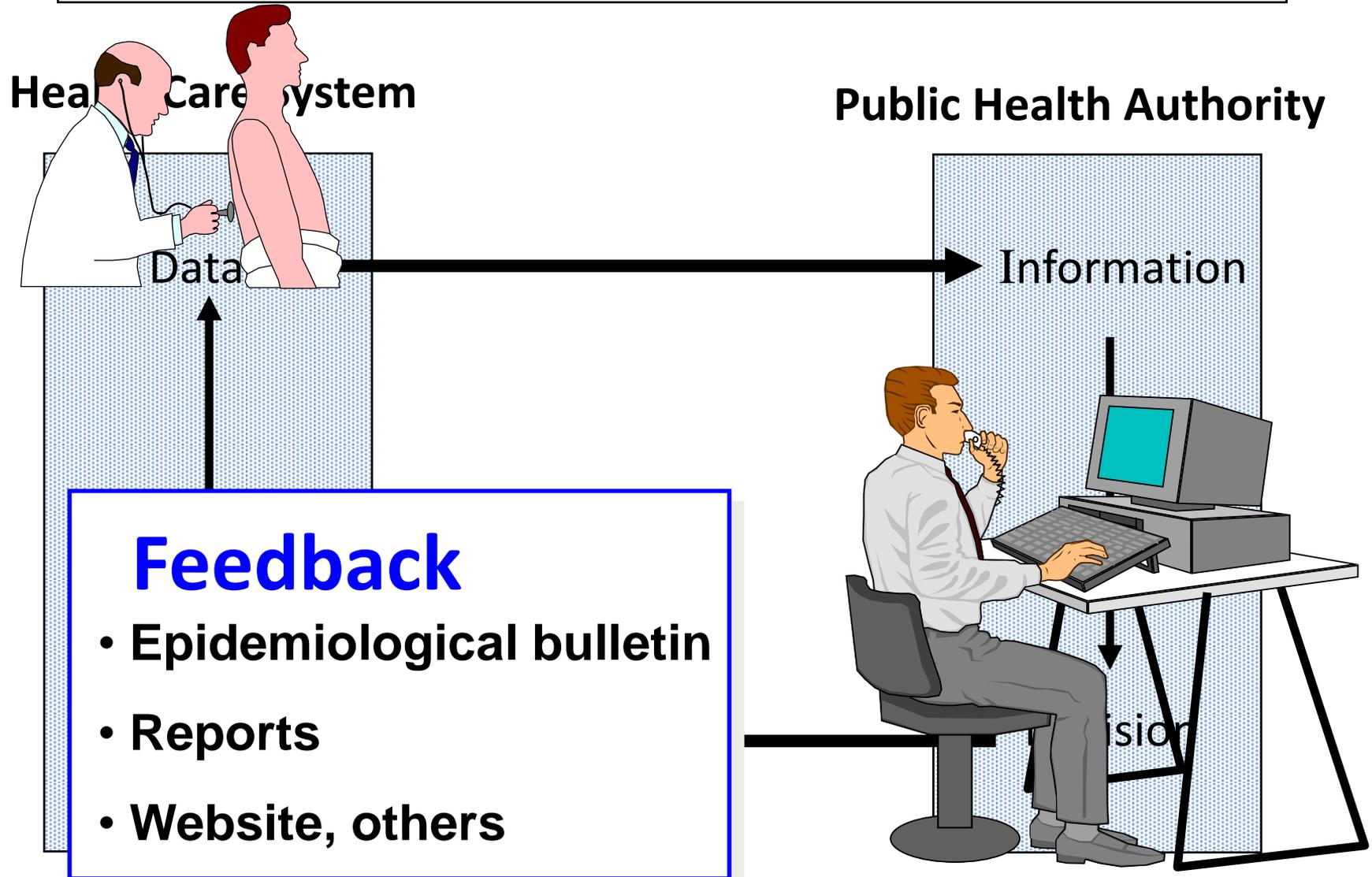


Control

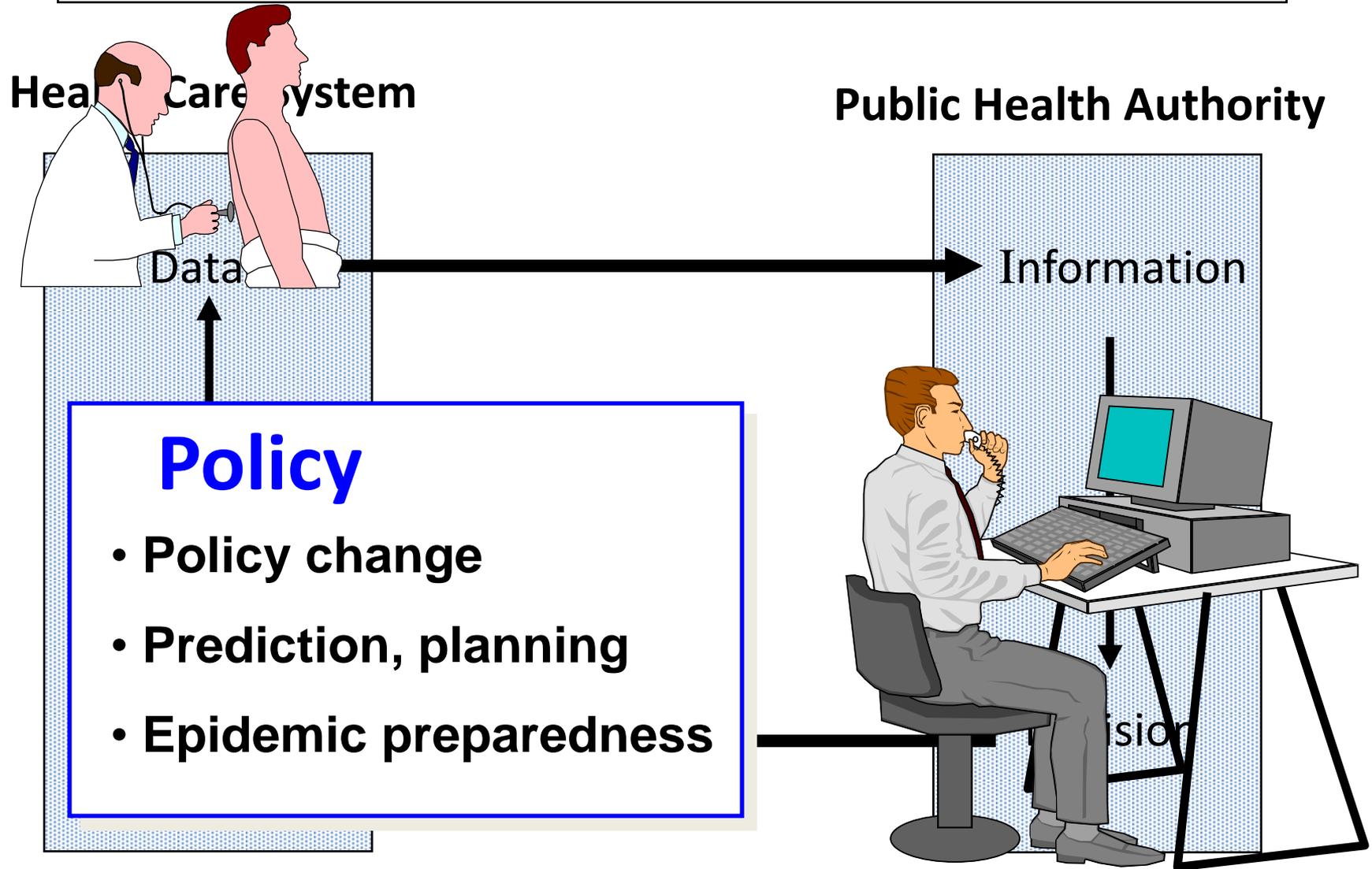
- Rapid response
- Case management
- Prevention (e.g. immunization)



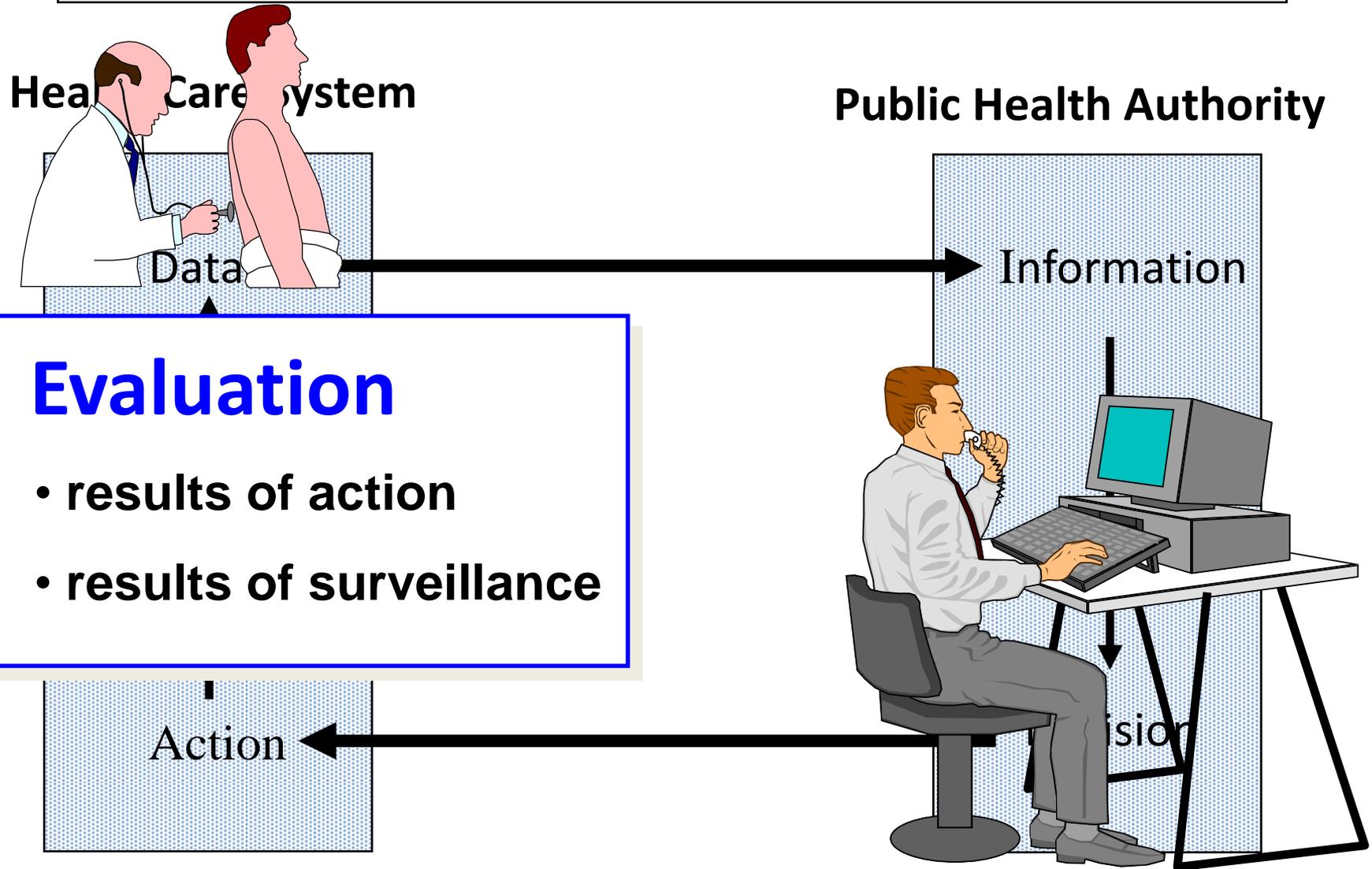
Surveillance: Action (3)



Surveillance: Action (4)



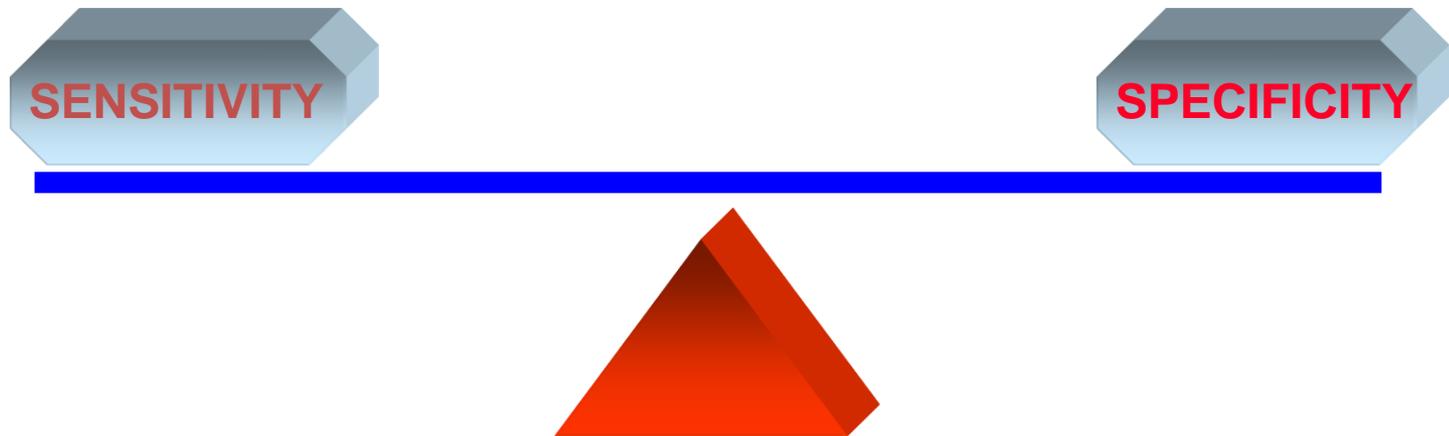
Surveillance: Action (5)



Prerequisite for effective public health surveillance

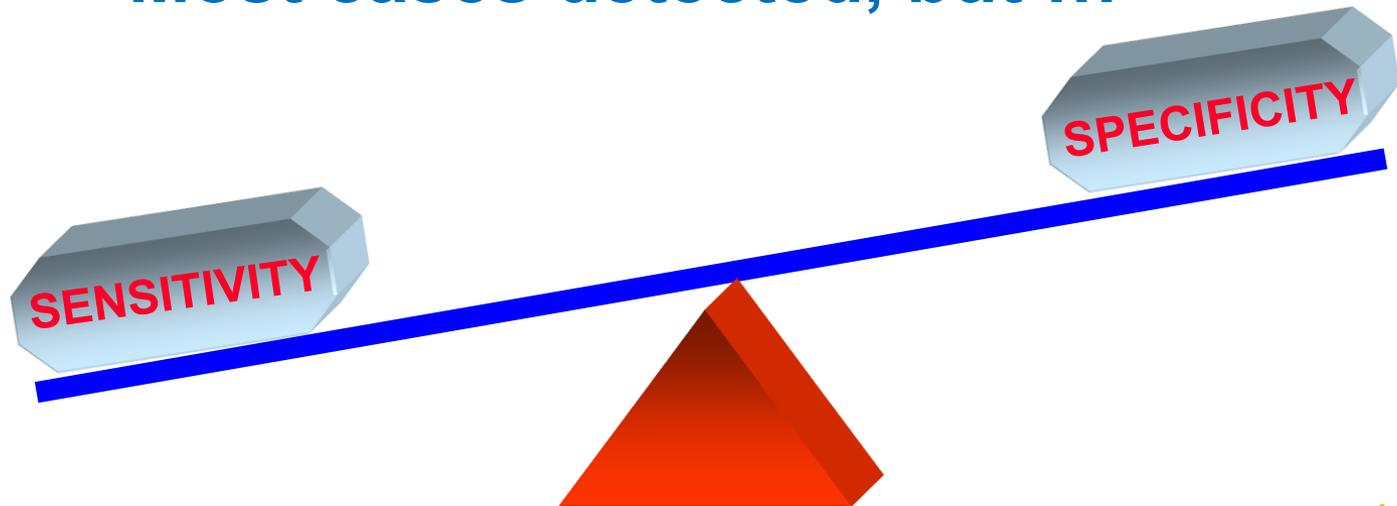
1. Formulation of standard case definition of the health event and should keep in view the objectives and logistics of the surveillance system
2. Sets out appropriate method for data collection, analysis, interpretation and feedback of information
3. Allocates resources efficiently and effectively
4. Ensuring regularity of the reports
5. Action on the reports

Sensitivity versus specificity



Sensitive case definition

Most cases detected, but ...

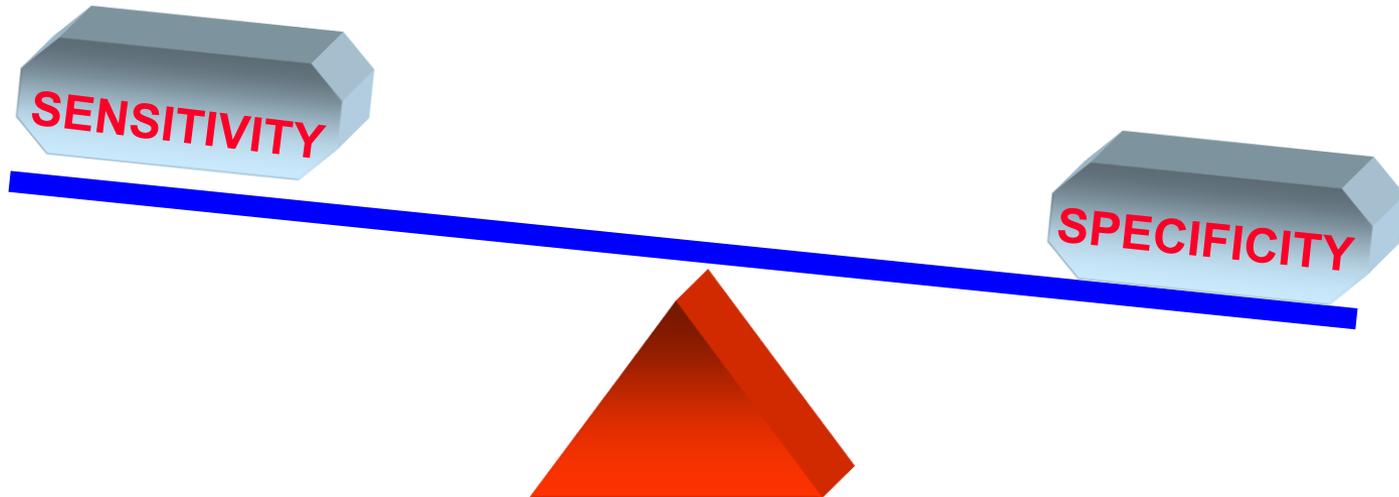


Many false positives
Many specimens to be tested
Low% of specimen tested +ve



Specific case definition

Cases missed, but ...



Few false positives
Fewer specimens to be tested
High% specimens tested +ve

Danger of under-report

CHOLERA: Clinical case definition

- In an area where the disease is not known to be present: severe dehydration or death from acute watery diarrhea in a patient aged 5 years or more or
- In an area where there is a cholera epidemic: acute watery diarrhea, with or without vomiting in a patient aged 5 years or more

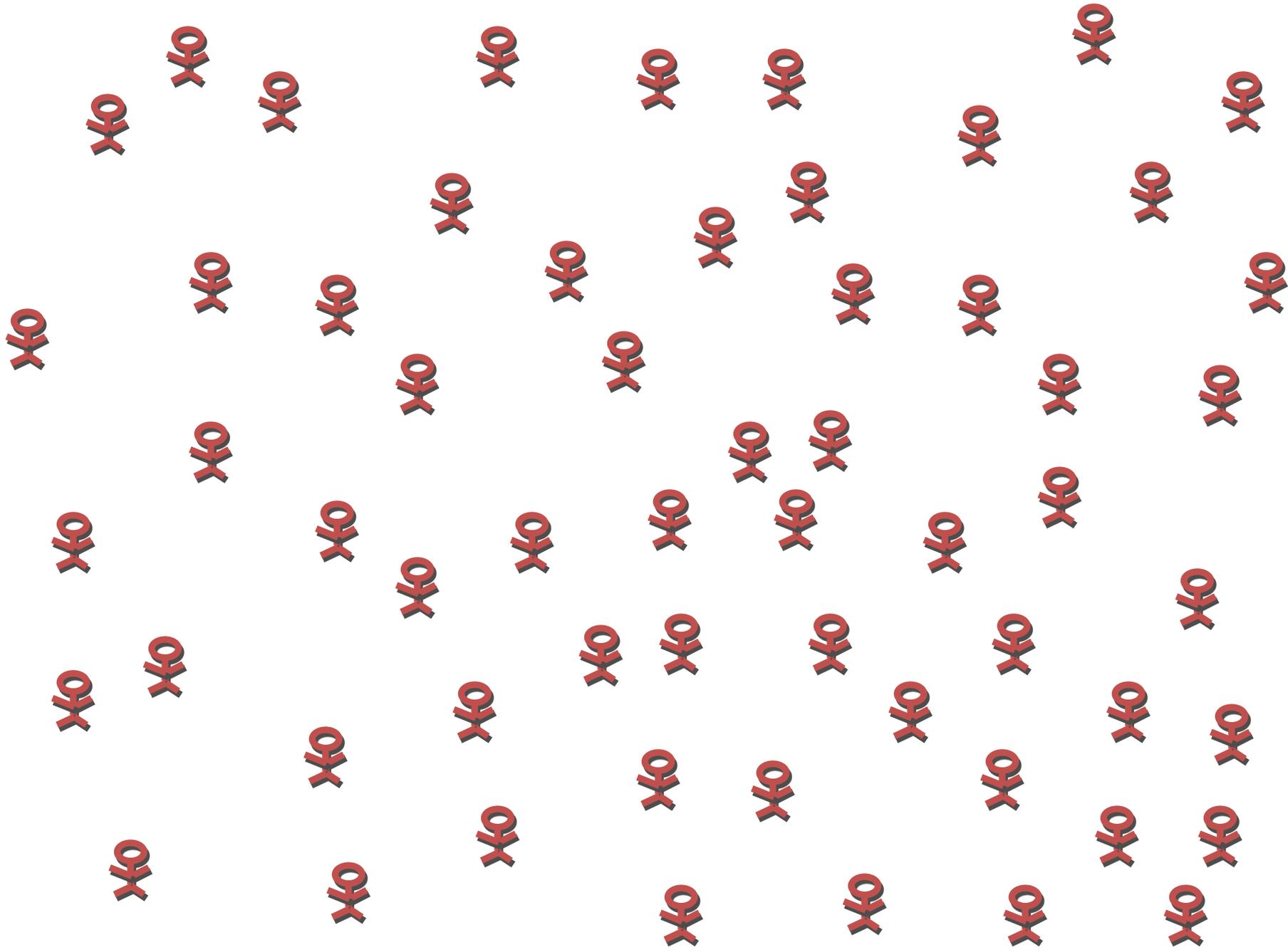
Acute Flaccid Paralysis

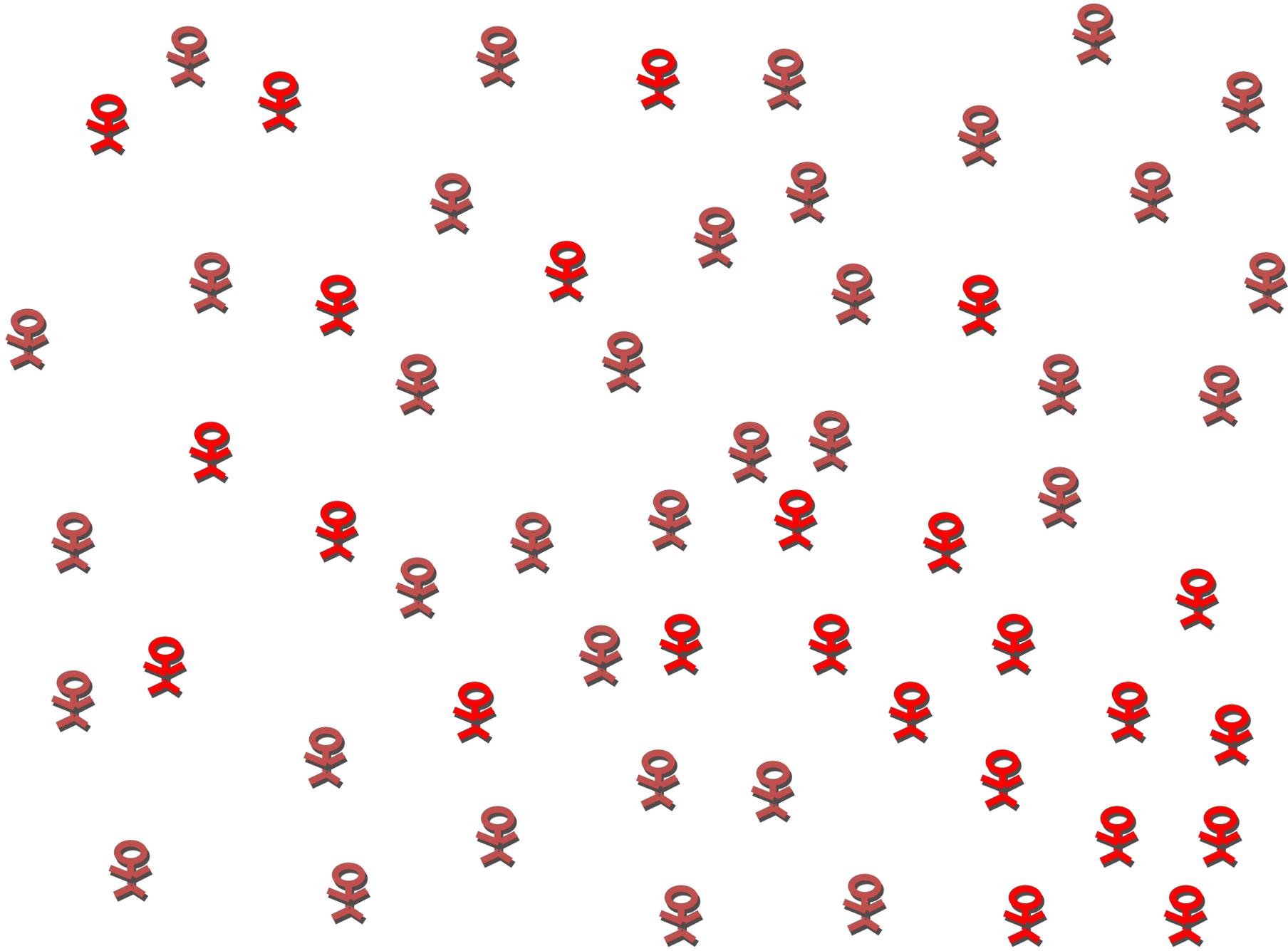
Any patient under 15 years of age with acute, flaccid paralysis;

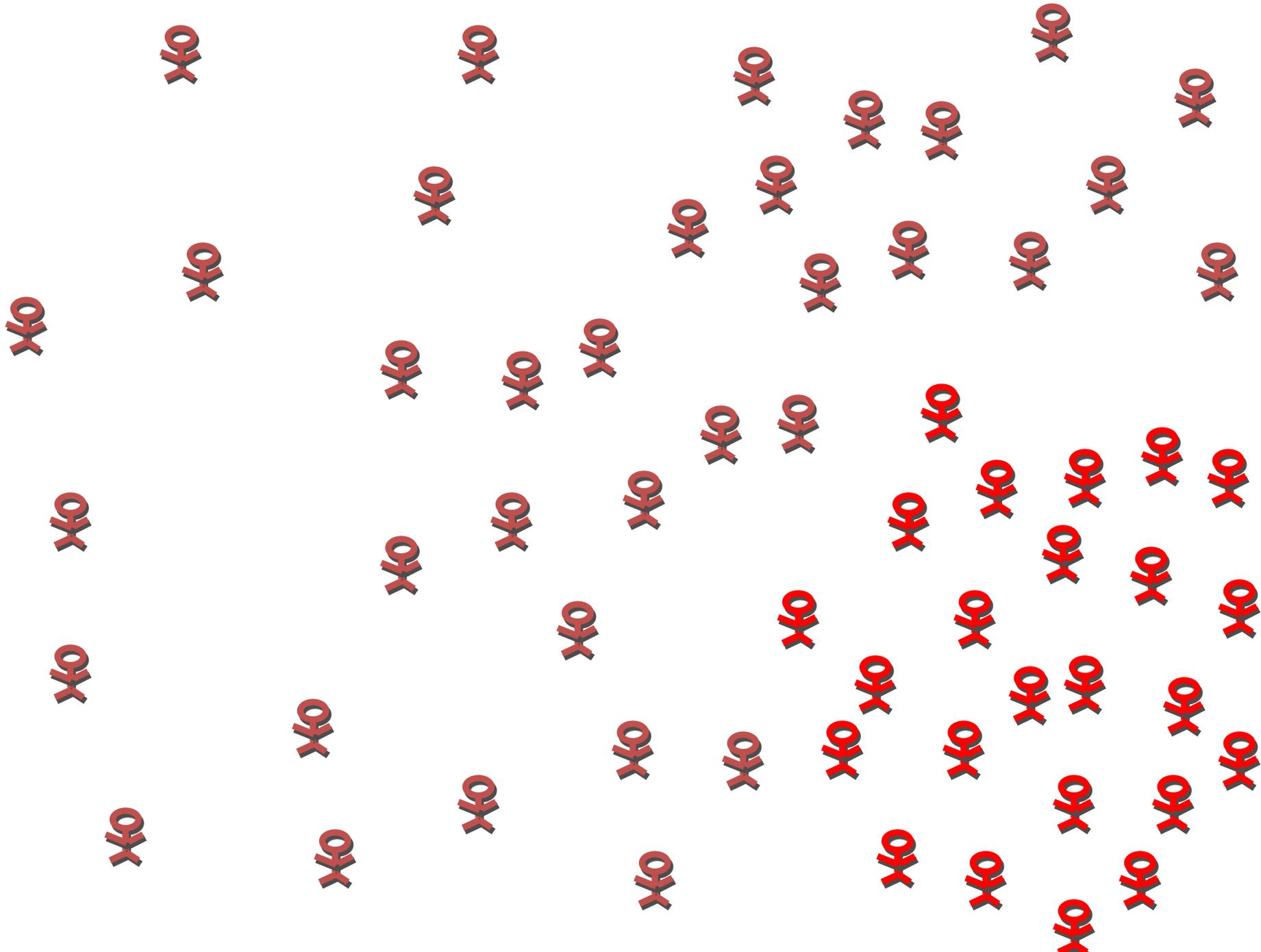
or

any person in whom a clinician suspects polio.

- **who** get the diseases
- **how many** get them
- **where** they get them
- **when** they get them
- **why** they get them







Handwritten text in various colors (yellow, blue, purple, red) arranged in a circular pattern, possibly representing a logo or decorative element. The text consists of the characters 'XO' repeated multiple times.

Cases

Time

1 2 3 4 5

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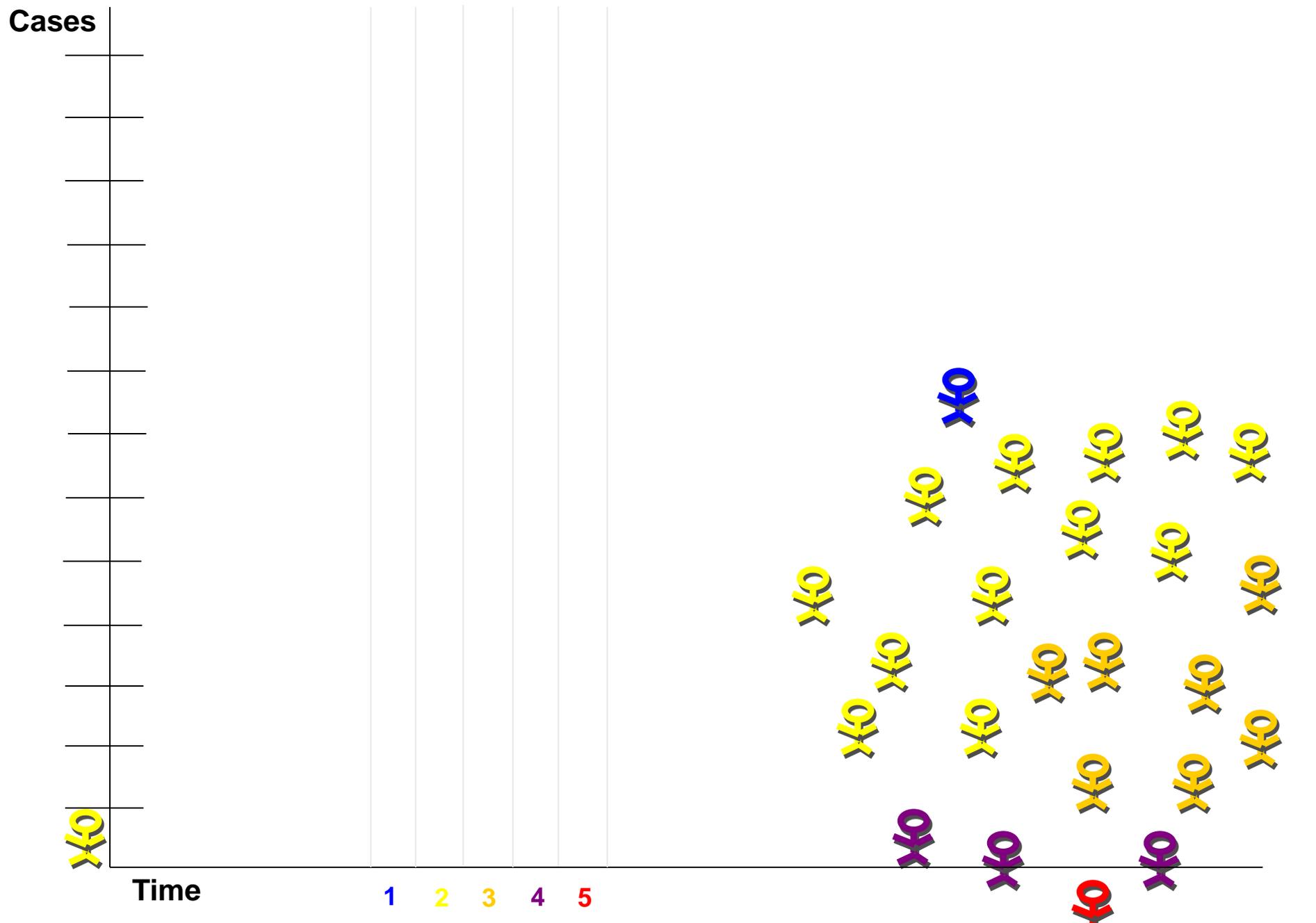
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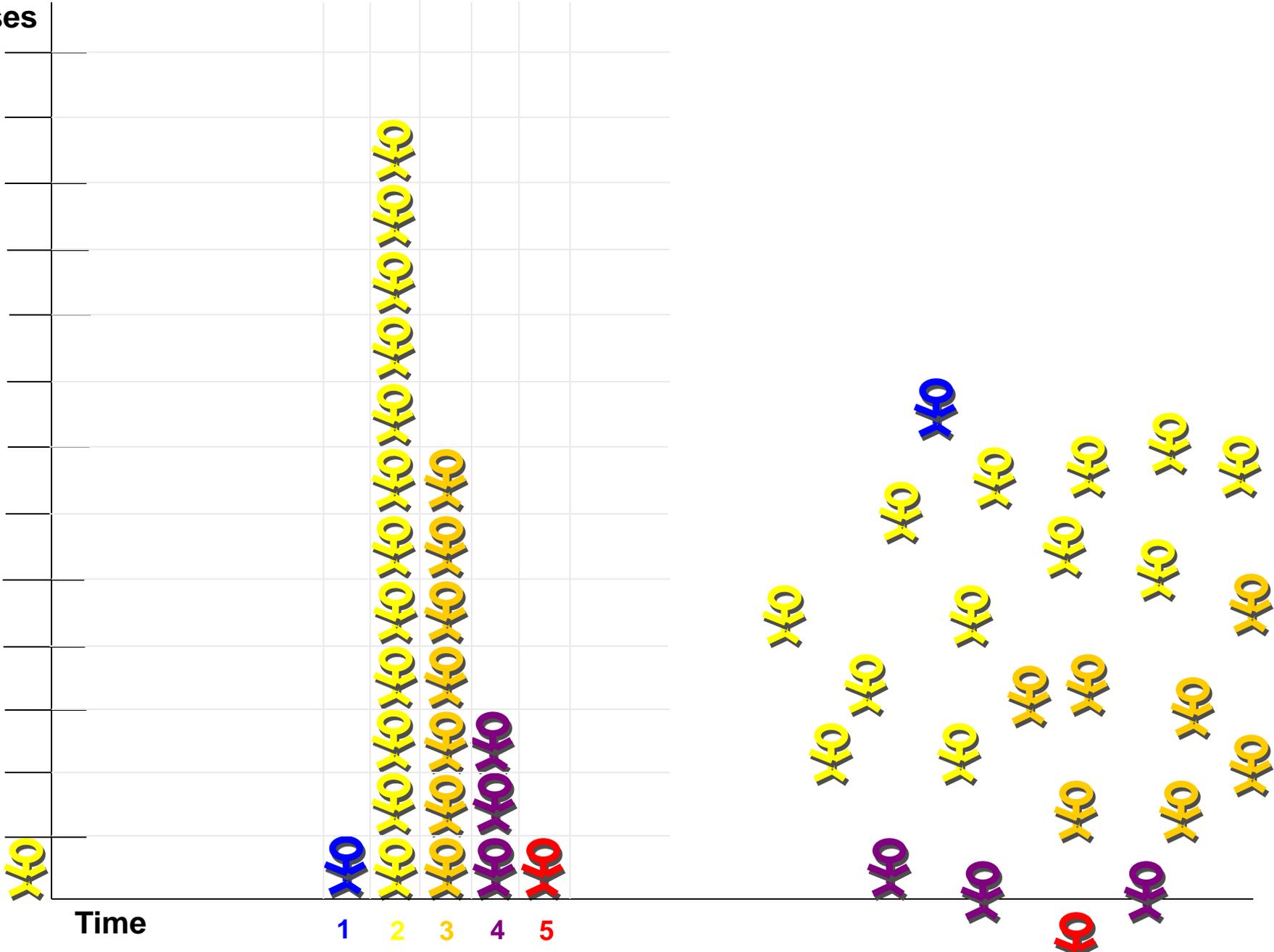
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Cases



Cases

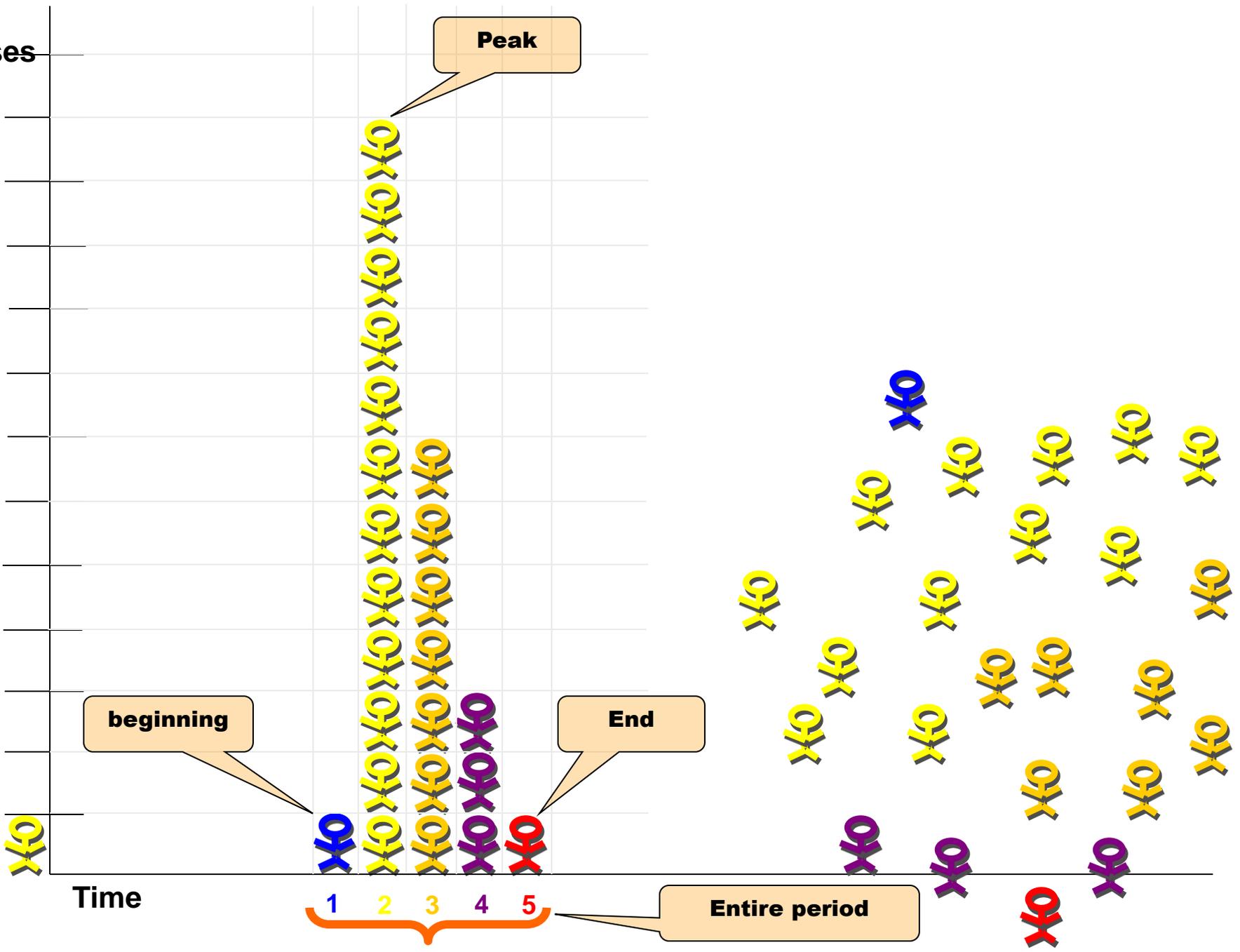
Time

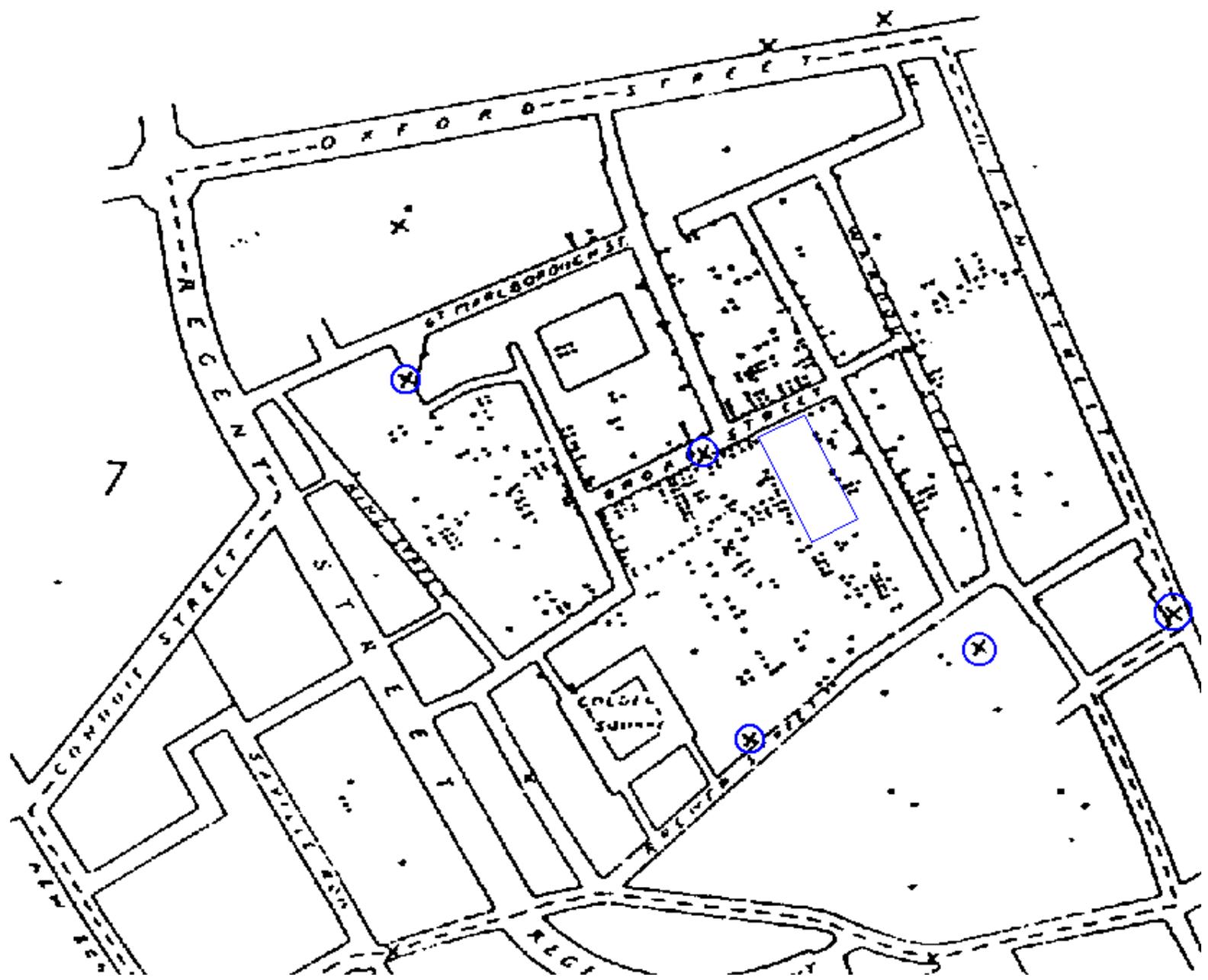
Peak

beginning

End

Entire period





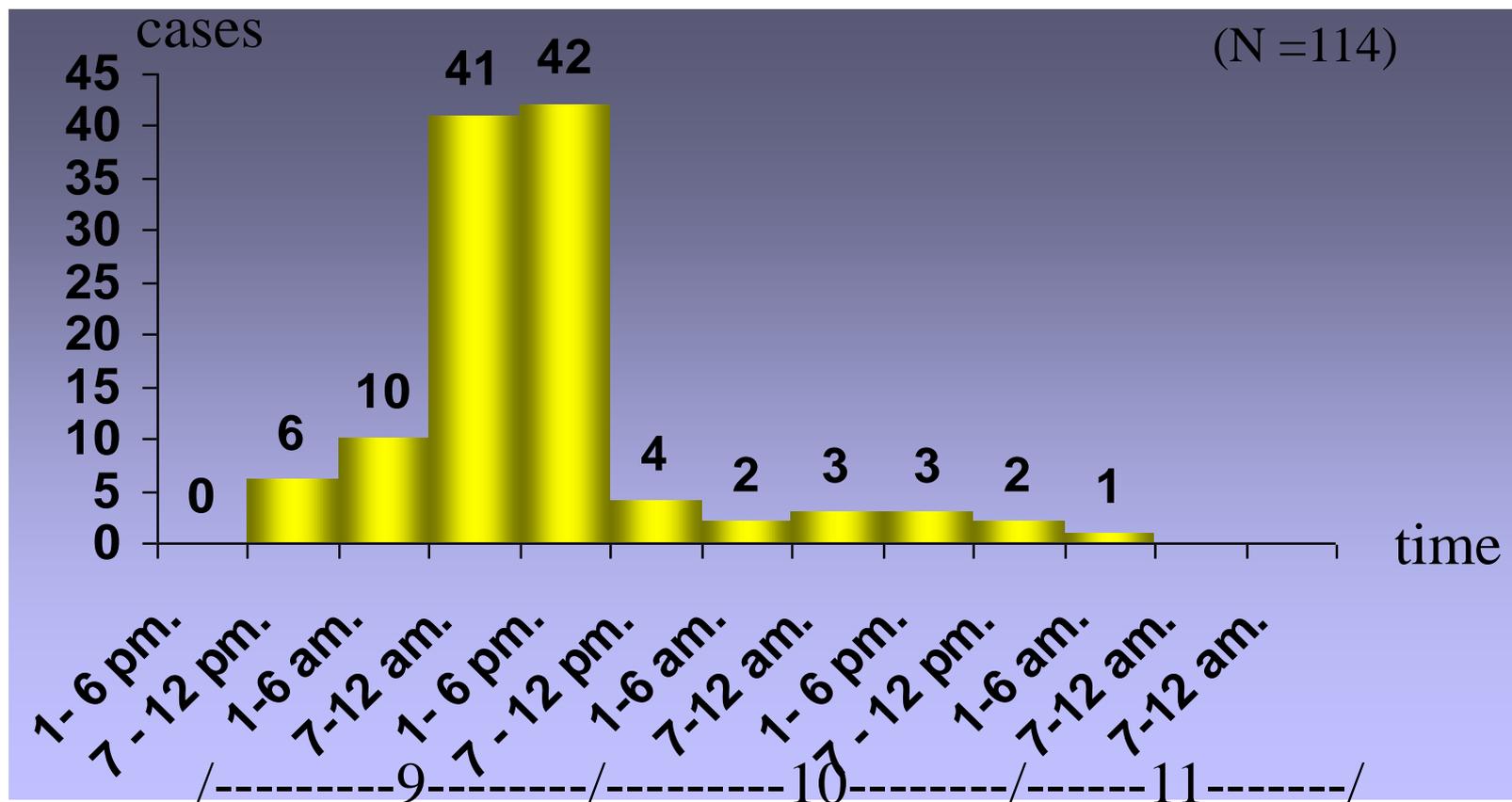
For effective disease surveillance system

- what information to gather
- how often to compile and analyse the data
- how often and to whom to report
- what proforma or formats to use
- what action to take

Selected Source of Data

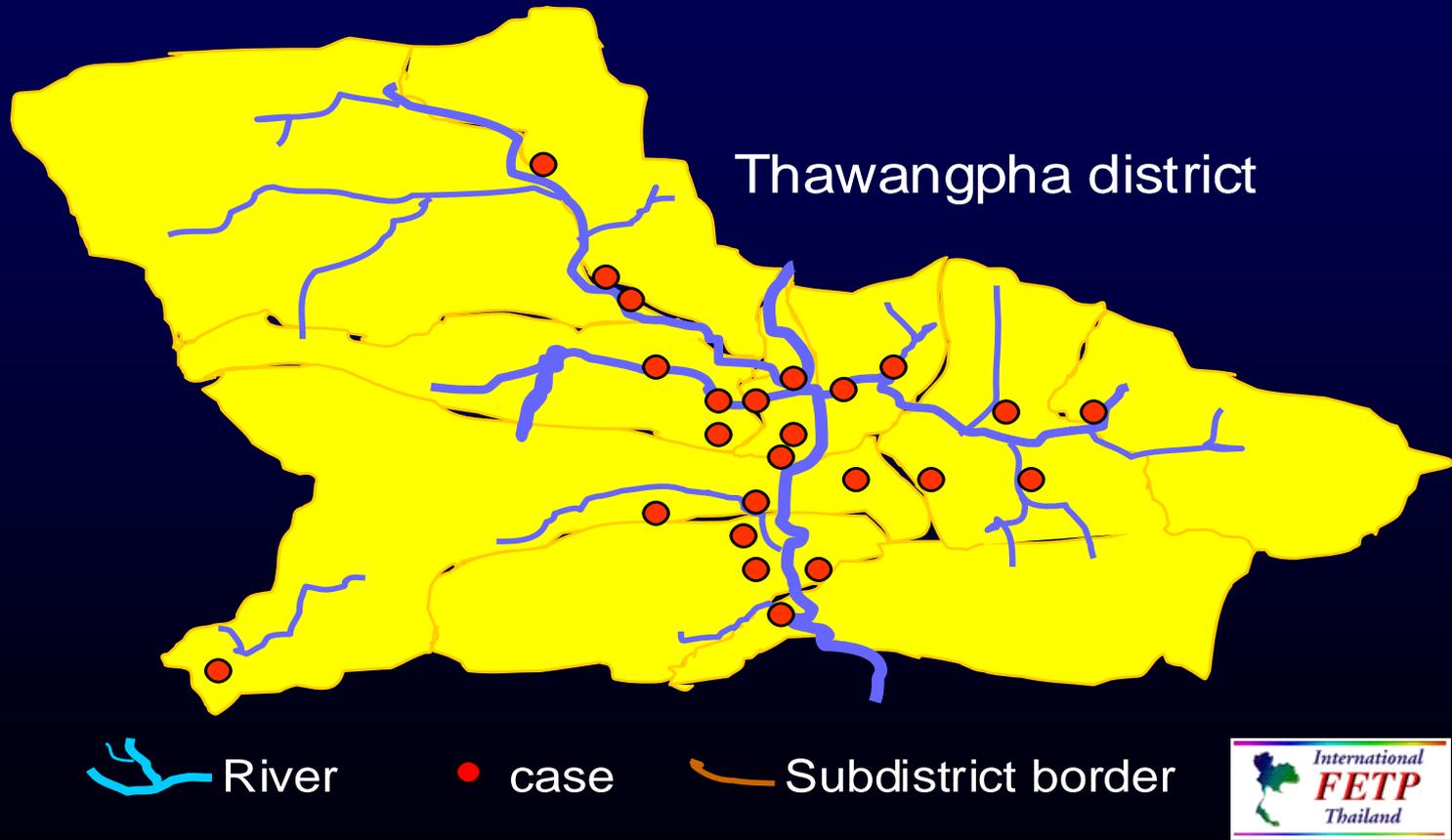
- Health facilities records
- Laboratories
- Vital records (Birth / death)
- Notifiable diseases
- Surveys
- Animals / vectors
- Environmental monitoring systems
- Census
- Police records
- Other data sources

Number of cases at the boarding school, 9 - 11 February 1998

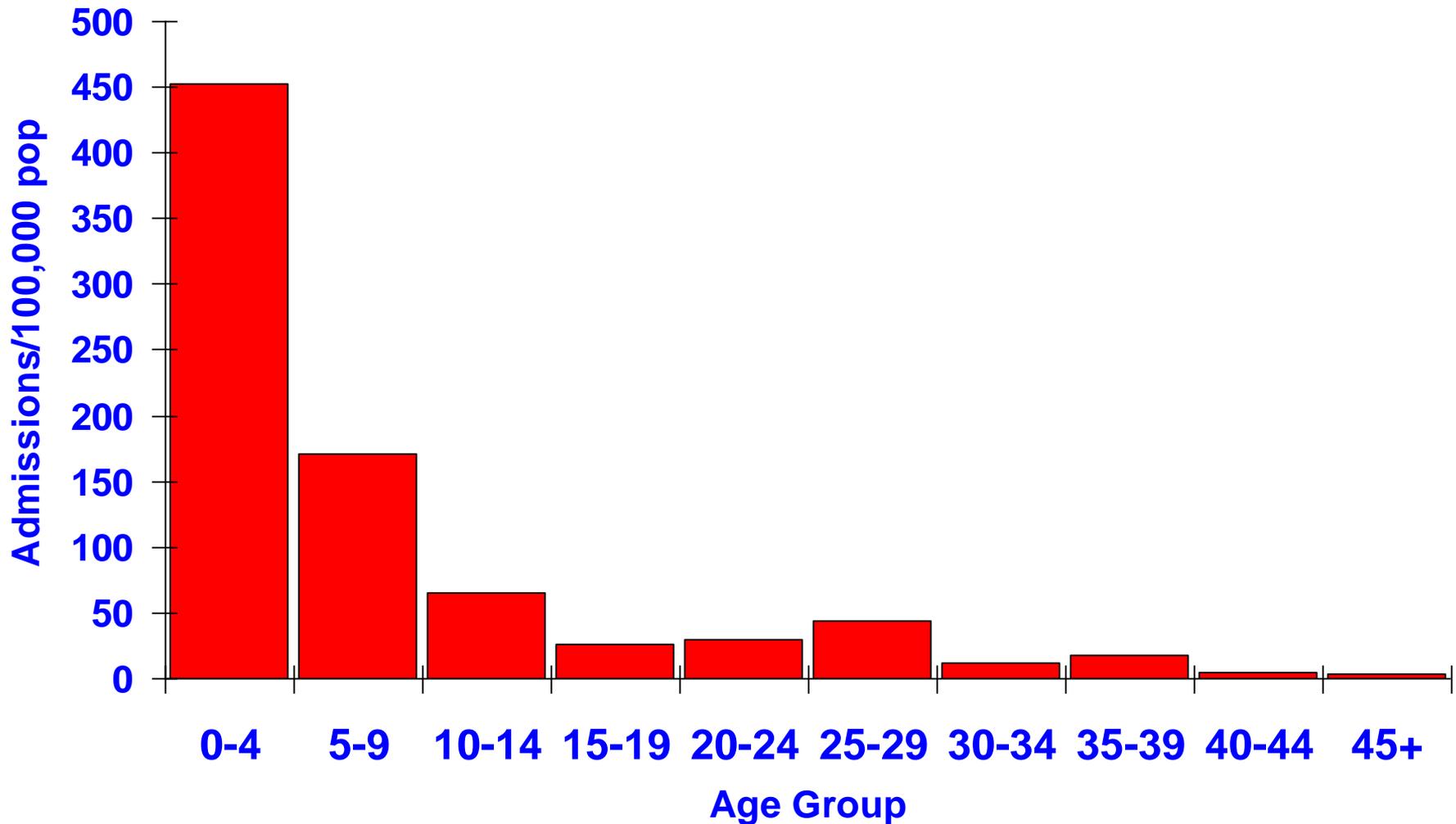


Tangkanakul W. Food poisoning outbreak from an illegal fishball factory , INCLLEN xvi, Bangkok 1999

Spot map of facial palsy cases in Thawangpha district, Thailand, 1 Jan - 22 Sep 1999

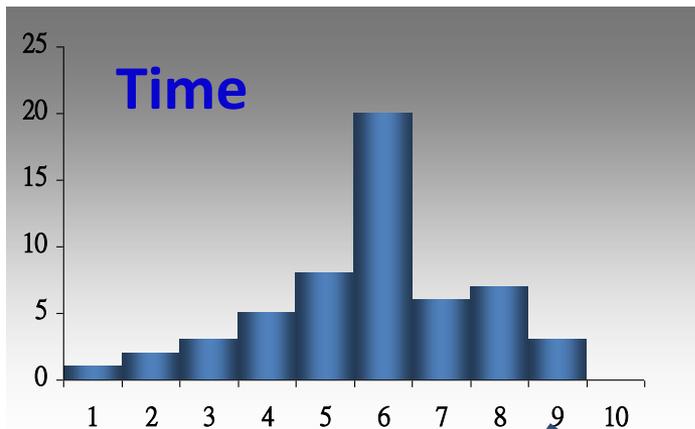


Admissions per 100,000 population for viral meningitis by age group. Cyprus, 5 July - 5 November 1996

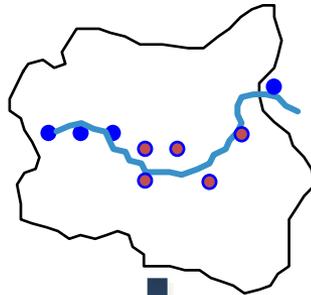


Cases

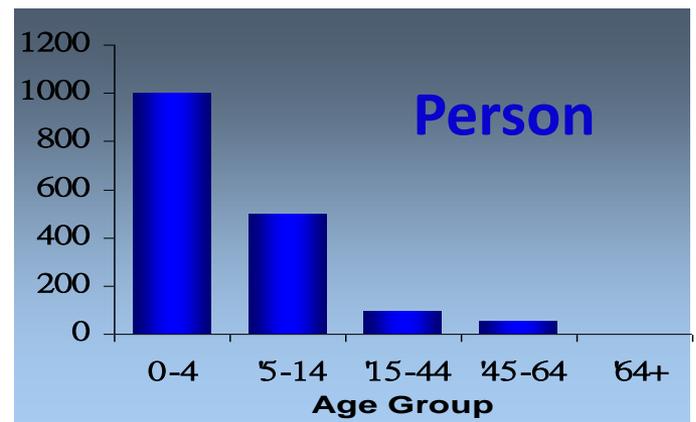
Time



Place



Person



Evaluate information

Pathogen?

Source?

Transmission?

Develop hypotheses from gathered information

Approaches to surveillance

- Active versus passive surveillance
- Notifiable disease reporting
- Laboratory based surveillance
- Case and outbreak investigation
- Vector surveillance
- Sentinel surveillance
- Registries
- Surveys
- Special studies
- Rapid Health Assessment
- Record linkages

Passive vs. Active Surveillance

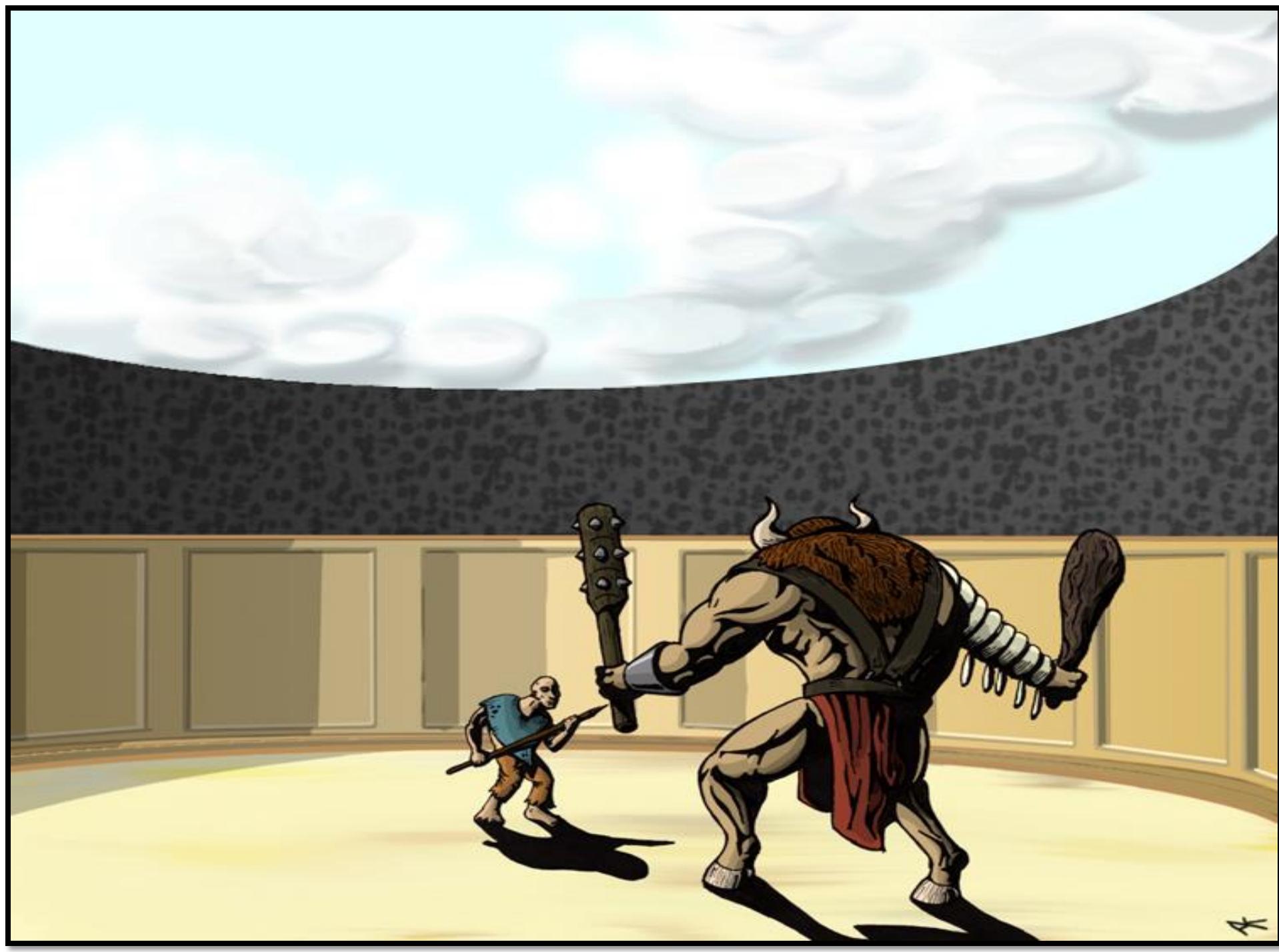
Epidemiological surveillance- basic ingredients

- ✓ A good network of motivated people
- ✓ Clear case definition and reporting mechanism
- ✓ Efficient communication system
- ✓ Basic but sound epidemiology
- ✓ Use of computer technology
- ✓ Rapid response
- ✓ Laboratory support
- ✓ Feedback

Uses of public health surveillance

- ✓ Monitoring trends of health event
- ✓ Estimating magnitude of health problem
- ✓ Epidemic detection and prediction
- ✓ Monitor progress towards a control objective
- ✓ Monitor programme performance
- ✓ Estimate future disease impact
- ✓ Evaluating an intervention
- ✓ Understand characteristics of health events
- ✓ Facilitate planning

The frequency of the occurrence of the epidemics is an indication of the inadequacy of the surveillance system





Myanmar FETP – Our Strength for the Country

Changing Mindset & Attitude

Do good Job with Good Practices

“Save Lives”



Thank you