

Principles of Surveillance

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Tools of Control of Communicable Diseases

- isolation
- treatment
- disinfection & barriers
- quarantine & surveillance
- vaccination
- prophylaxis

‘Close observation of individuals suspected of incubating serious infectious diseases in order to detect initial symptoms of disease in time to institute treatment and isolation’

Definition

Surveillance

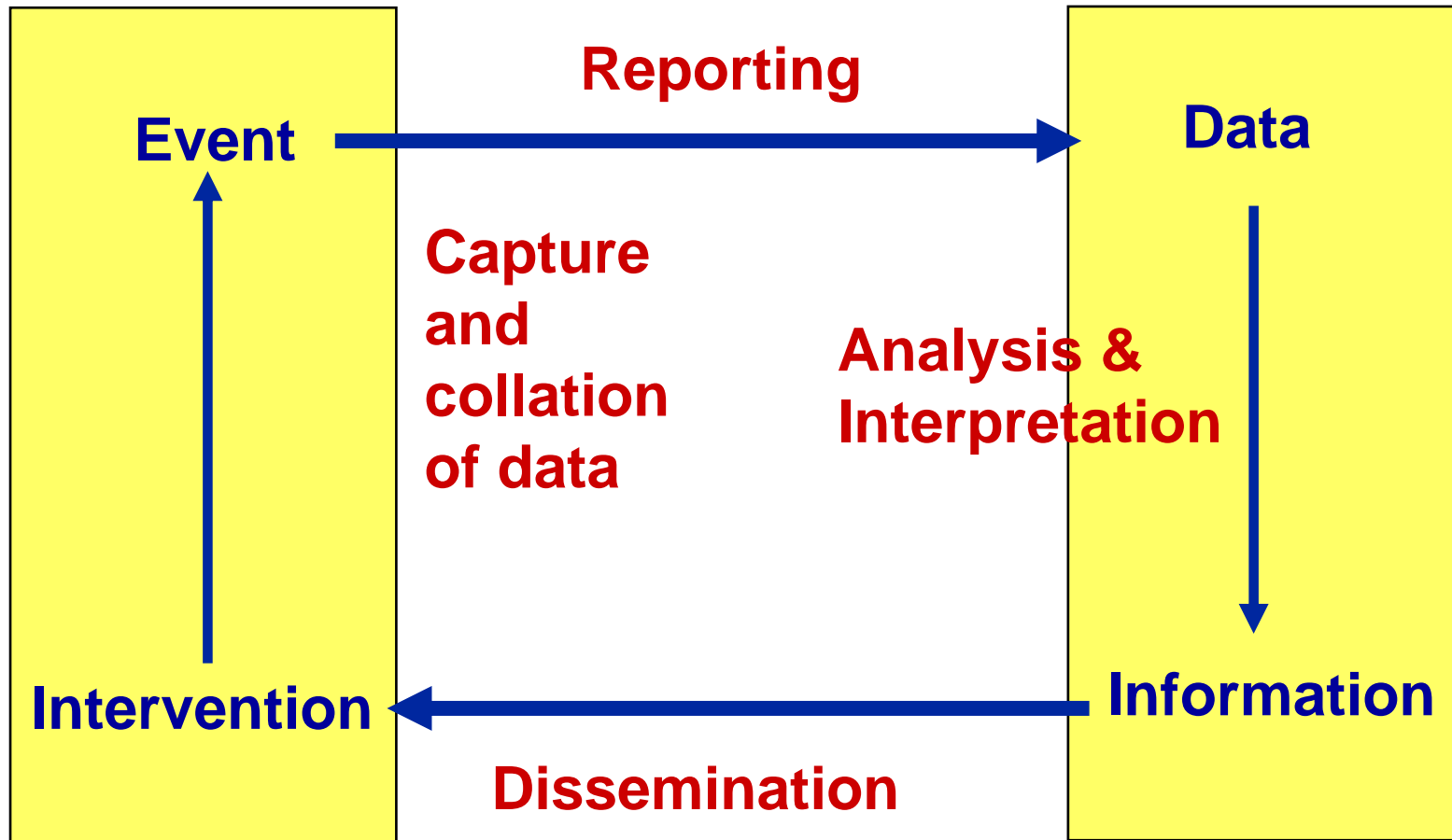
The ongoing collection, validation, analysis and interpretation of health and disease data that are needed to inform key stakeholders in order to permit them to take action by planning and implementing more effective, evidence-based public health policies and strategies relevant to the prevention and control of disease or disease outbreaks.

Information for Action

Processes

Health Care System

Public Health Authority

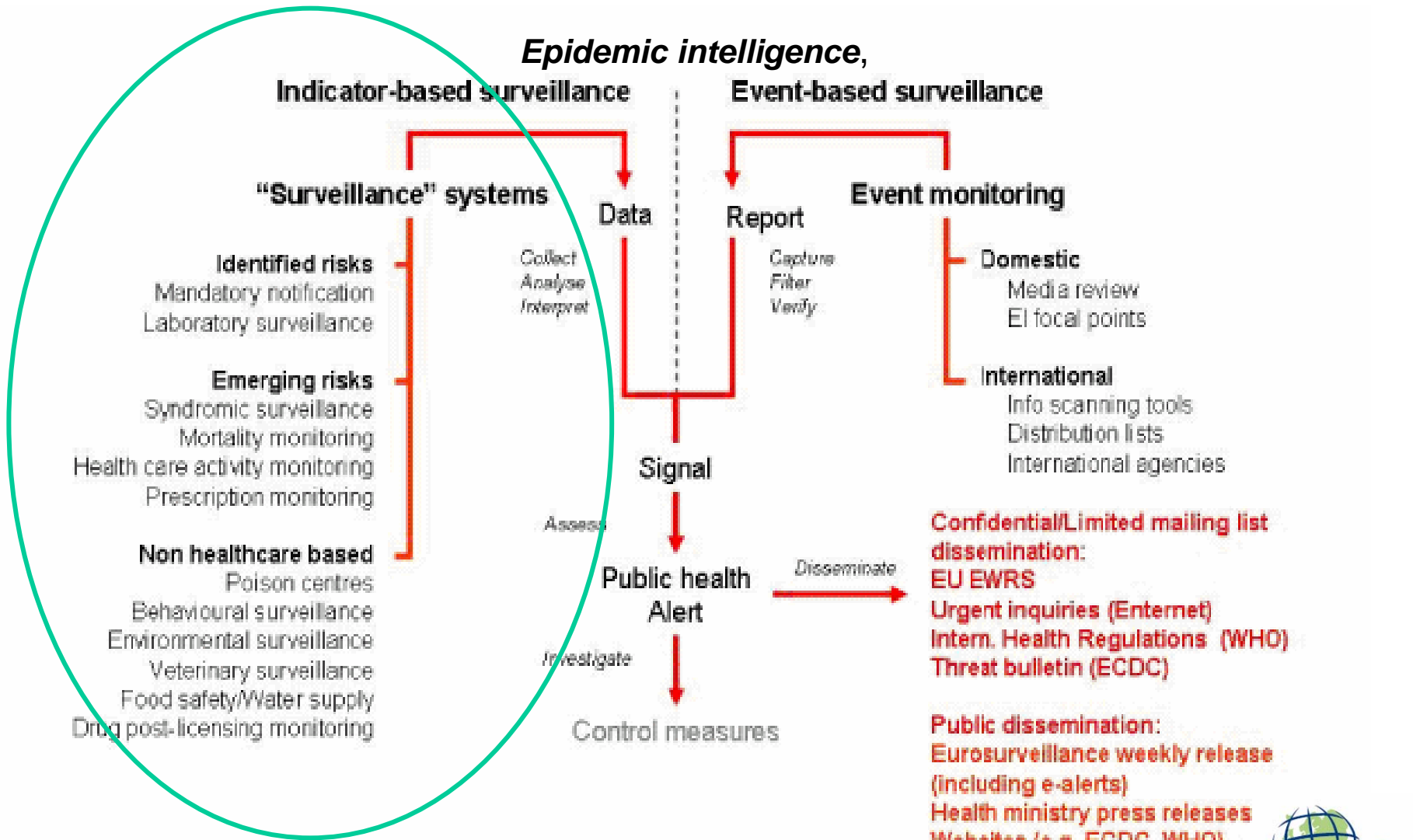


Aims of surveillance

To contribute to reducing the incidence and prevalence of communicable diseases by providing relevant data, information and reports to ensure informed decision making for actions that will result in their timely prevention and control by:

- monitoring trends in communicable diseases over time and by person and place;
- detecting infectious disease outbreaks with respect to source, time, person, population and place;
- detecting emerging infections and other new threats to human health.

The type of Surveillance



Basic surveillance

basic picture of diseases under scrutiny; core set of indicators that can be compared across time, place and person; minimum amount of data; ongoing collection.

Enhanced surveillance

Priority diseases require more detailed monitoring; more detailed variables often including source, risk factors and/or exposure; more data for the additional production of information; subject to continuing review.

Surveillance System

Key principles

- 1. Understand the problem**
- 2. Identify opportunities for prevention & control**
 - interventions
 - target audience/stakeholders
- 3. Set objectives**
 - Public health: reductions in mortality or morbidity
 - Service: actions by stakeholders
- 4. Specify attributes to meet objectives**
 - Population which is under surveillance in terms of demographics
 - The legal or mandatory basis for the system
 - The health event(s) to be monitored
 - Representativeness of data to be captured

Public Health importance / rationale

- burden of disease (incidence / prevalence)
- severity, mortality
- epidemic potential, threat
- costs, socio-economic impact
- preventability / opportunities for control
- public concern and news-worthiness
- intervention programme in place

Feasibility

- Costs to providers and public health service
- Availability of data
- Comparability
- Confidentiality:

Identify opportunities for prevention & control

Stakeholders

- Public Health professionals
- Government / Politicians
- Clinicians / Microbiologists / Control of Infection staff
- Environmental Health professionals
- Health service managers
- Health educators / teachers
- NGOs
- Public

General objectives?

- To estimate the prevalence of hepatitis C
- To detect outbreaks of measles

Specific, measurable, action-oriented & timed

- To assess the prevalence of hepatitis C in France **in order to** allow planning of specific health care needs for the coming 20 years
- To detect early time and place clustering of measles cases **in order to** ensure timely control of outbreaks

Objectives

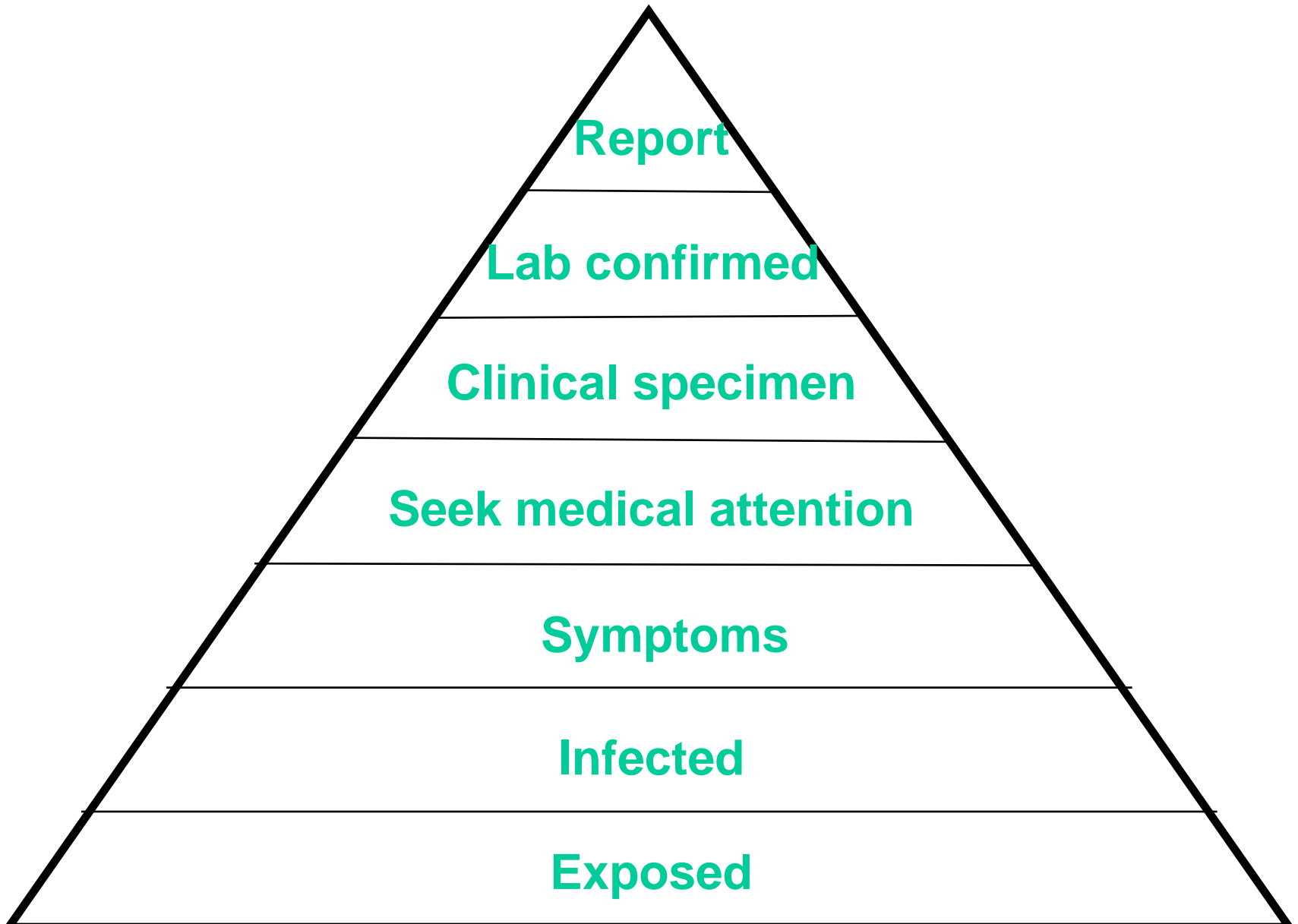
SMART

- Specific
- Measurable
- Acceptable and Action oriented
- Realistic
- Time related

Specify attributes

- **Numerators – health events**
 - number of cases
 - number of resistant strains
- **Denominators – population**
 - Different denominators for the different health events
 - Resident population
 - live births (Congenital Rubella Syndrome)
 - bacterial isolates (Antimicrobial resistance)

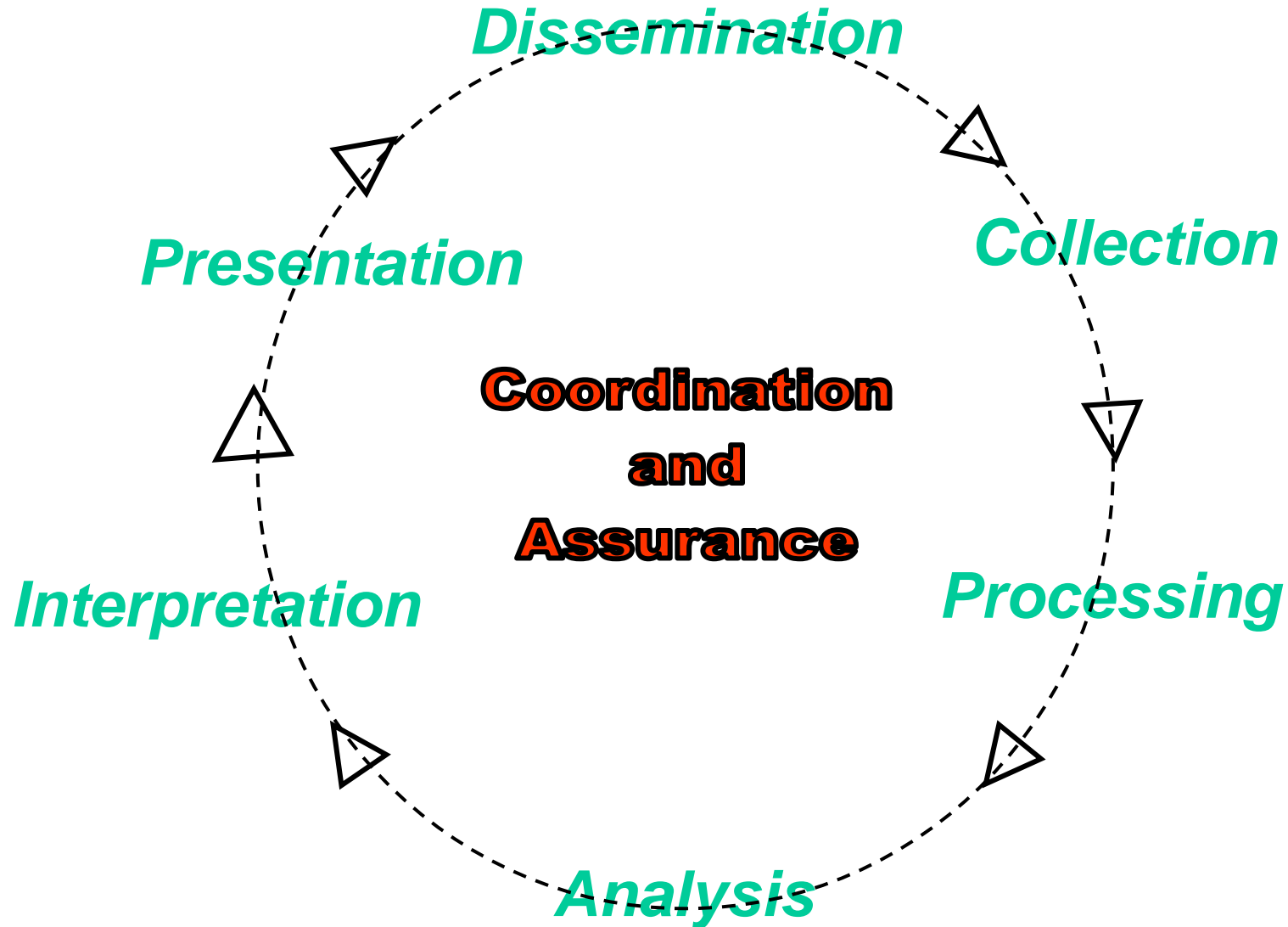
Source of data?



Design of the system

- Sentinel vs. comprehensive
- Aggregated vs. individual data
- Active vs. passive
- Statutory vs. voluntary
- Confidential vs. anonymous

Key processes



EpiNorth Surveillance – key processes

1. Collection

- data set: case, demographics, risk factors, administrative
- data sources: may be more than one
- data transfer

2. Processing data

- Software and hardware requirements;
- Collation of data by institution;
- Input of data into databases and subsequent storage

3. Analysis

- Statistics – basic, advanced, packages

- **Case Definition**

- Confirmed – Positive laboratory result
- Probable – Clinical + epidemiological link to confirmed case
- Possible - Clinical symptoms and signs

- **Demographics**

- Person, place and time

- **Risk Factors**

- Exposures
- Behaviours

- **Health service**

- Laboratories: frontline diagnostic, reference
- Clinical services: notifications, hospital episode data, disease registries
- Screening programmes (antenatal, blood donors)
- Vaccination programmes
- Pharmacy data

- **Environment**

- water
- food
- air

- **Population statistics**

- deaths
- denominators

- **Veterinary**

- animals (livestock, domestic, wild)
- food

- **Existing infrastructure**
- **Methods**
 - Electronic
 - web-based
 - paper
 - telephone
- **Frequency**
 - Daily, weekly

- **Analysis**

- descriptive (time, place, person)
- analytical
- time series
- outbreak detection – clustering, Observed vs Expected
- molecular epidemiology
- geographical information systems (GIS)

4. Interpretation

- limitations of data
- public health significance

5. Presentation:

- Reporting
- Audiences

6. Dissemination

- Electronic;
- Publishing;
- Updating

- **Artefactual**
 - System and data characteristics and changes
 - Chance, bias, truth
- **Contextual considerations**
 - findings from other systems
 - literature
 - Observational data
- **Need for further investigation:**
 - Epidemiological
 - Laboratory

Presentation

- develop outputs (reports) in consultation with users
- “need to know” and timing
- appropriate level of detail for action
- proper use of tables, graphs and figures
- regular review of usefulness
- avoid information overload

- **Alerts**

- local and national
- Europe: EWRS,
- International IHR

- **Reports**

- Bulletins
- Annual statements
- Scientific journals

- **Public**

- media

- Accuracy
 - Timeliness
 - Sensitivity
 - Specificity
 - Completeness of information
 - Representativeness
 - Acceptability
-
- Regular evaluation of the system

Evaluation of surveillance system

Did the system do what it set out to do?

i.e. meet specified objectives:

- **Contribute to achieving public health goals?**
- **Meet the needs of stakeholders to improve policy, services, public understanding?**

Surveillance vs research

- Surveillance
 - Applies existing knowledge to guide health authorities in the use of known control control measures
 - Directly relevant to monitoring and control needs
- Research
 - Pursues new knowledge from which better control measures will result
 - Systematic investigation, testing and evaluation, designed to develop or contribute to knowledge

Thank you!