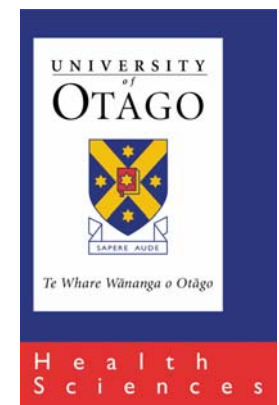


Public Health Surveillance: Making it 'fit for purpose'

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Outline

- What is public health surveillance?
- Two main purposes and types of public health surveillance
- Features of event-based & policy-based surveillance
- Critical quality attributes of two types of surveillance
- Making surveillance fit for purpose

Public health surveillance

Public health surveillance is...

"the ongoing, systematic collection, analysis, interpretation and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health"

From: Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems: recommendations from the guidelines working group. MMWR 2002; 50: 1-36.

Definition of public health surveillance

Defining features

- **Includes collection, analysis, & dissemination of information**
vs. management information (system)
- **Ongoing**
vs. research information
- **Linked to public health action**
vs. health information (system)

Two main purposes & types of public health surveillance

A Event-based – Provide information to support control measures

1. Identify events that require specific responses

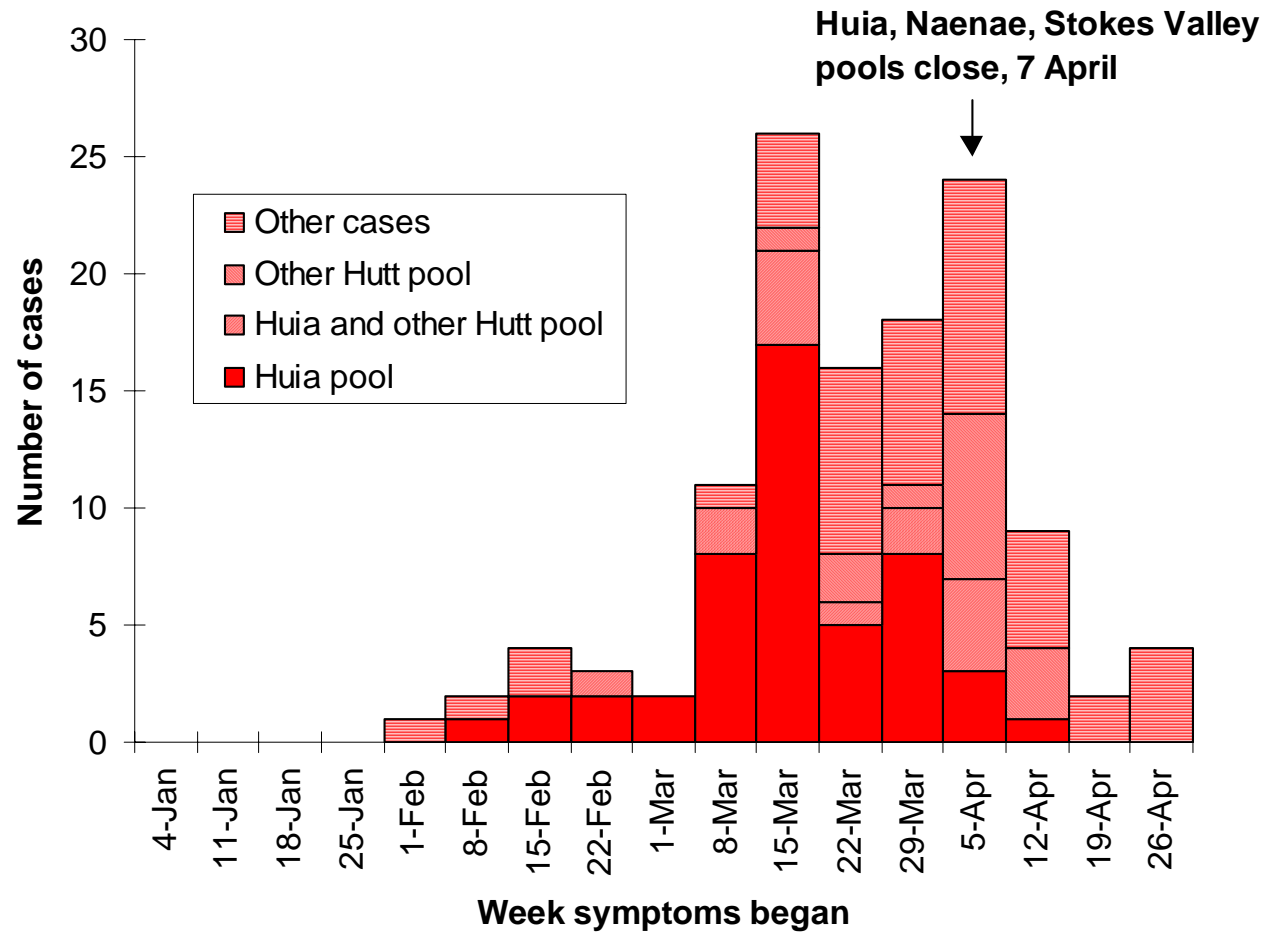
B Policy-based - Provide information to support prevention strategies

2. Monitor incidence & distribution
3. Identify emerging & reemerging hazards
4. Assess impact & set priorities
5. Identify risk factors to improve prevention
6. Evaluate interventions
7. Generate & evaluate hypotheses
8. Fulfil statutory & international requirements

Event-based surveillance

- **Disease & health status eg**
 - Notifiable diseases (many) eg TB
 - Antenatal HIV screening
 - National immunisation register
- **Hazards eg**
 - Imported food surveillance
 - Mosquito surveillance at points of entry
 - Tsunami surveillance

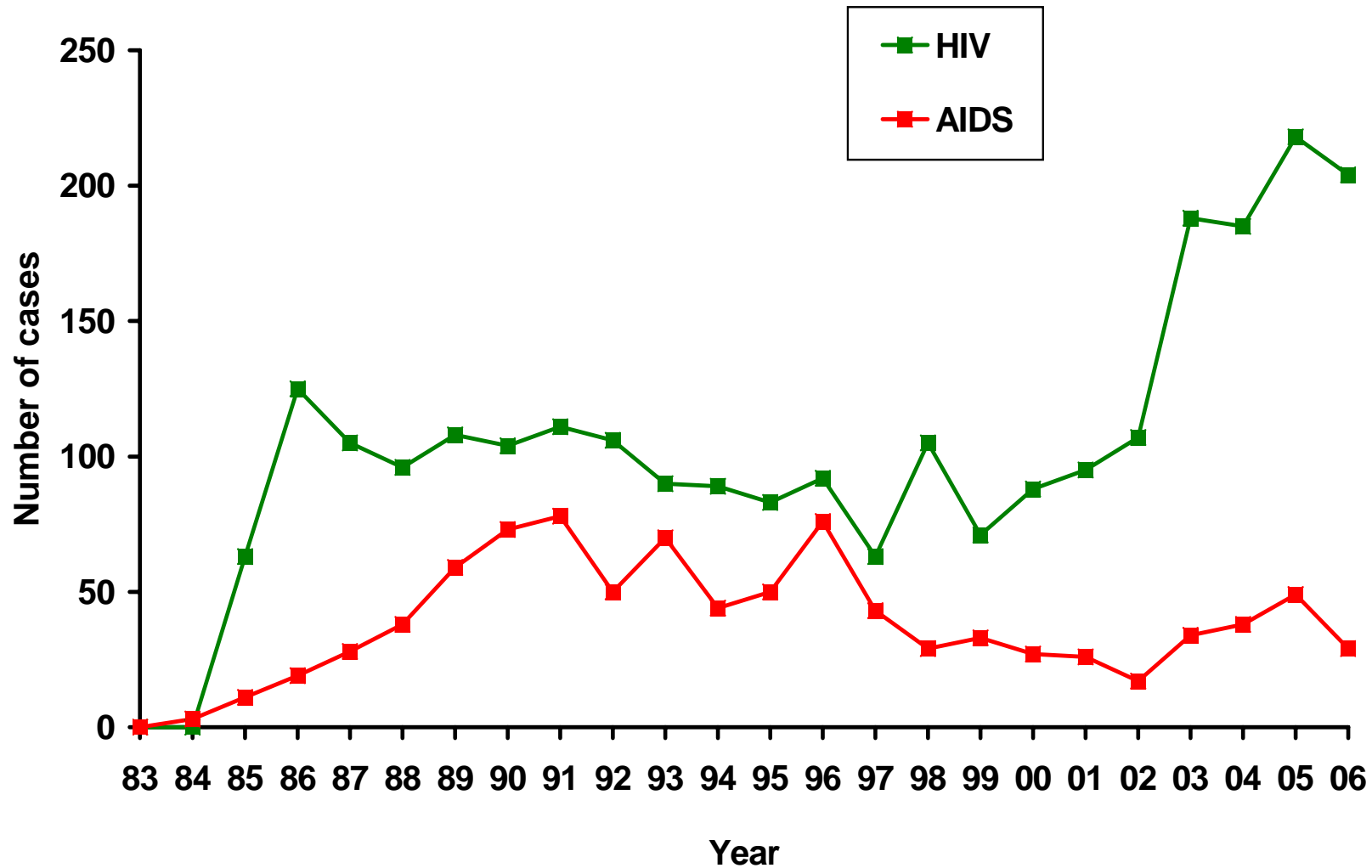
Example - Cryptosporidiosis linked to swimming pool, 1998



Policy-based surveillance

- **Disease & health status eg**
 - Influenza sentinel surveillance
 - Serological survey
- **Hazards eg**
 - Antibiotic resistance surveillance
 - Total diet survey
 - Climate change monitoring

Example - Emergence of HIV/AIDS, 1984-2006



Features of two main types of surveillance

Event-based surveillance

- Effectiveness depends on identifying all events for control
- System design features: Universal, continuous, prospective surveillance
- Surveillance method: Usually dedicated primary data collection system
- Legislation: Usually needed to allow sharing of confidential information
- Eg Enteric disease cases in high risk settings and individual outbreaks

Features of two main types of surveillance

Policy-based surveillance

- Effectiveness depends on accurate description of event to support evidence-based response
- System design features: Sentinel, intermittent, retrospective sampling often adequate
- System method: Uses secondary data or specialised surveys
- Legislation: Not usually required. Ethical review generally adequate
- Eg Annual analysis and reporting of OBs

Quality attributes of a surveillance system

Attributes of a public health surveillance system

- Usefulness
- Simplicity
- Flexibility
- Data quality (completeness, validity)
- Acceptability
- Sensitivity
- Positive predictive value (incl. specificity)
- Representativeness
- Timeliness
- Stability (reliability, availability)

Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems: recommendations from the guidelines working group. MMWR 2002; 50: 1-36.

Critical quality attributes of two types of surveillance

Event-based surveillance

- Sensitivity
- Timeliness
- Stability

Policy-based surveillance

- Representativeness
- Data quality (completeness, validity)

Problem with surveillance data quality

Mis-match between system purpose and system type

Using event-based surveillance for policy-based purposes

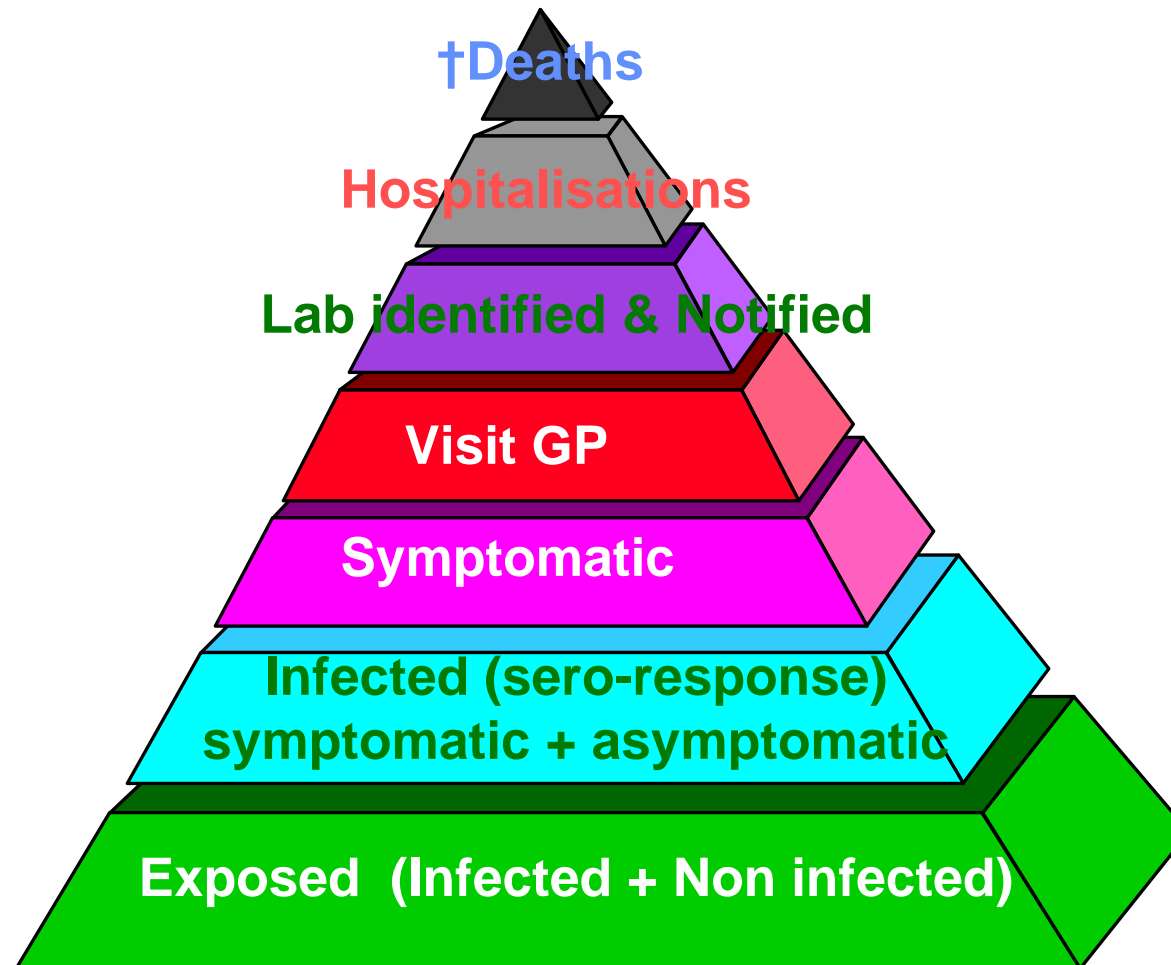
- Problem if event-based surveillance has low sensitivity
- Eg Using campylobacteriosis notifications to measure regional differences in disease risk

Using policy-based surveillance for event-based purposes

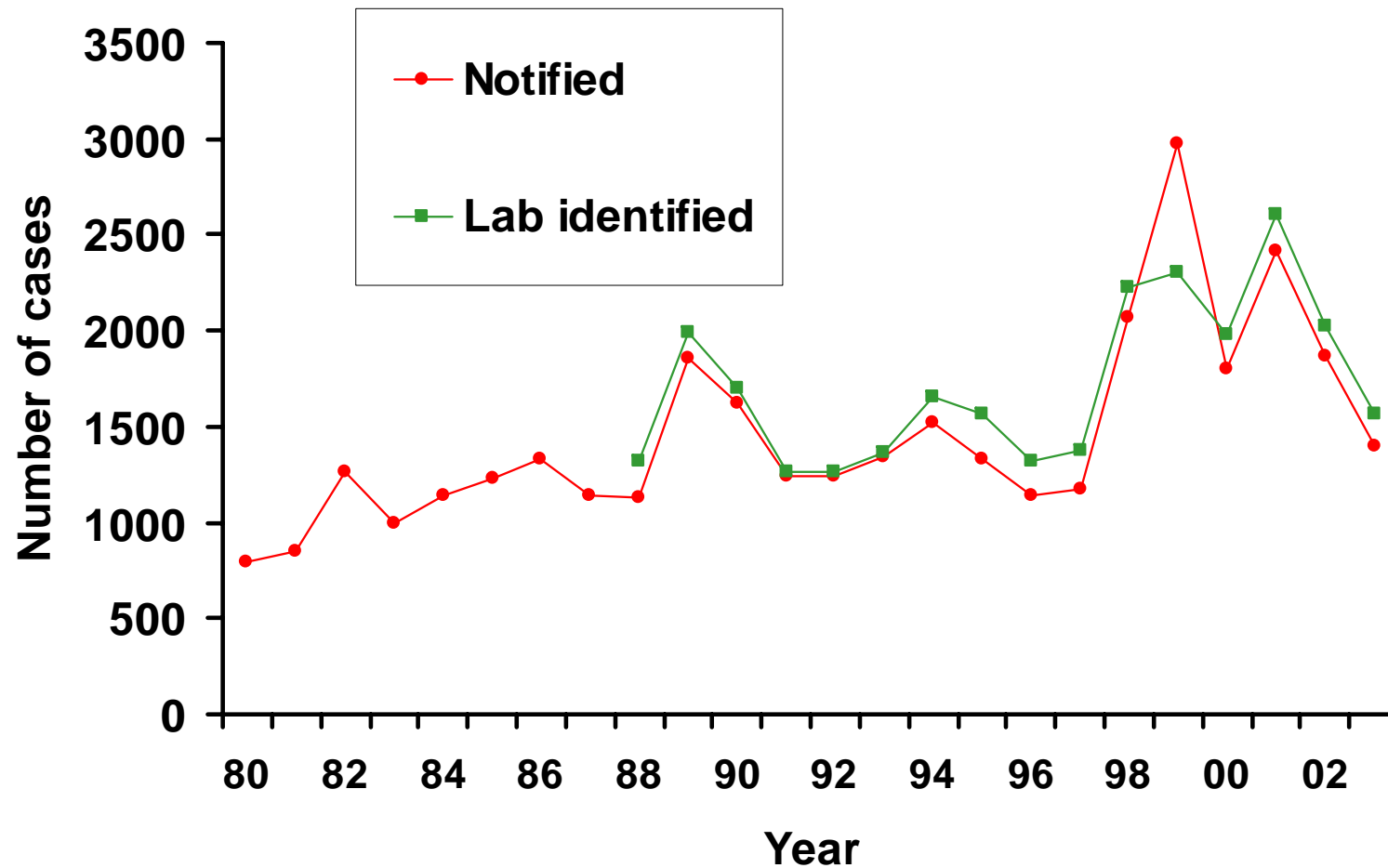
- Problem if event-based control is needed
- Eg Using sexual health clinic reporting data to manage syphilis outbreak

Limitations of event-based surveillance data

The gastroenteritis surveillance pyramid

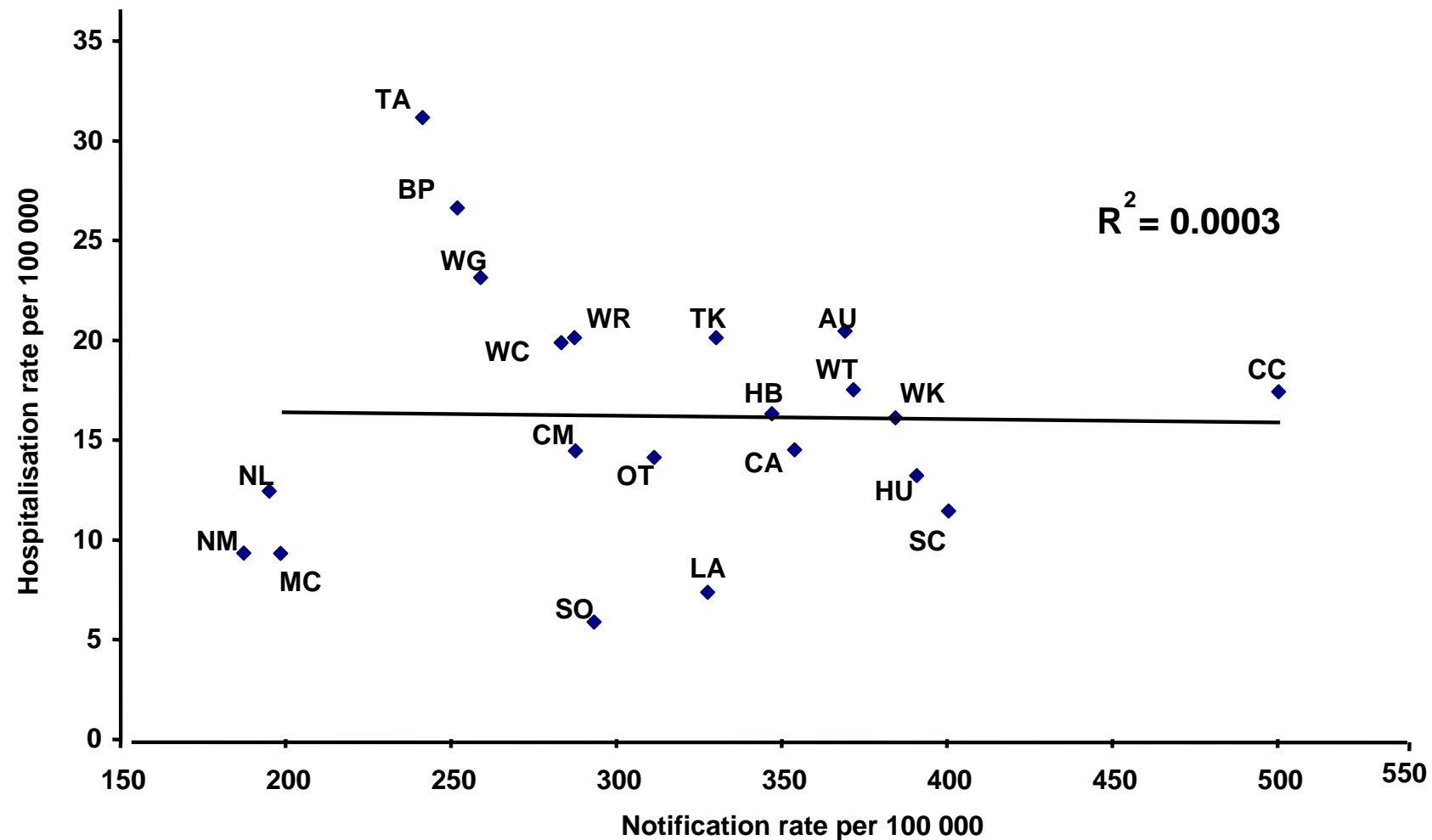


Salmonellosis, notifications and lab-identified cases, 1980-2003



Limitations of event-based surveillance data

Campylobacteriosis, average annual notification & hospitalisation rates, by DHB, 2001-03



Making surveillance fit for purpose

Event-based surveillance

Improving sensitivity

- Multiple surveillance data sources
- More sensitive case-definitions & testing methods
eg syndromic surveillance, rapid tests

Improving timeliness

- Greater use of electronic & automated systems
- Shift focus to earliest detection point
- Move 'upstream' to hazards
- Improved dissemination and access
- Supporting event management

Making surveillance fit for purpose

Event-based surveillance

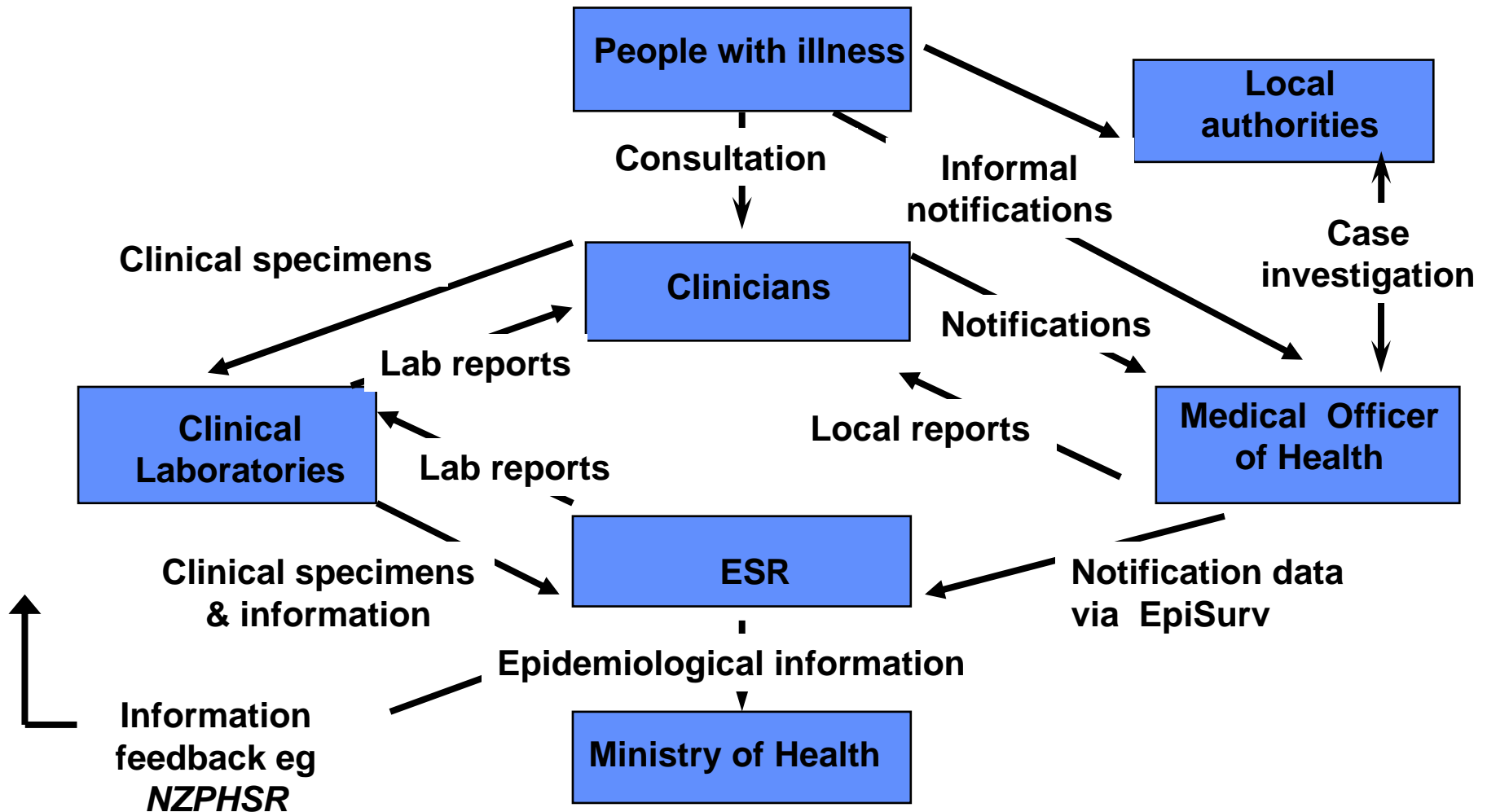
Improving sensitivity & timeliness of OB detection and investigation

- Integration of clinical & lab typing data
- Integration of case and hazard data, esp using GIS
- Aberration detection

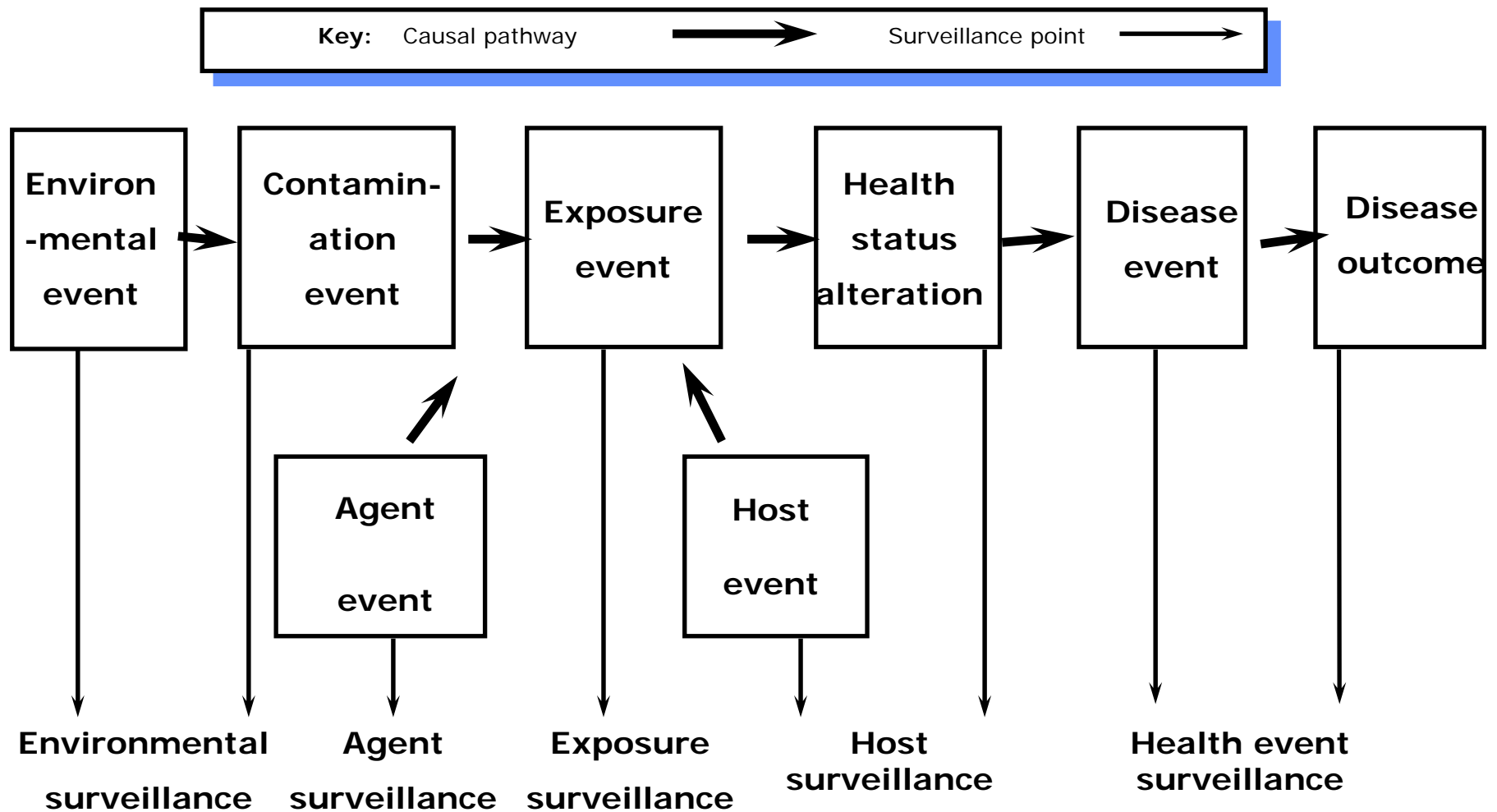
Improving stability

- Dedicated agencies
- Specialised primary systems

Using multiple surveillance data sources



Moving surveillance to 'upstream' hazards



Making surveillance fit for purpose

Policy-based surveillance

Improving representativeness

- High quality intermittent surveys
- Integrating data from >1 system (eg capture-recapture)
- Techniques to adjust for gaps in event-based surveillance data
- High quality sentinel surveillance

Improving data quality (completeness, validity)

- Integration from multiple disease & hazard surveillance systems
- Validation studies

Summary

Making surveillance fit for purpose

1. Distinguish main purpose of surveillance & design system accordingly
2. Event-based surveillance – Data integration & use of 'upstream' hazards
3. Policy-based surveillance – Good quality sentinel surveillance, intermittent surveys with high response rates, Data integration
4. Consider quality attributes – Attempt to measure performance & recognise limitations