Clostridium difficile infection (CDI) – issues around surveillance and notifiability

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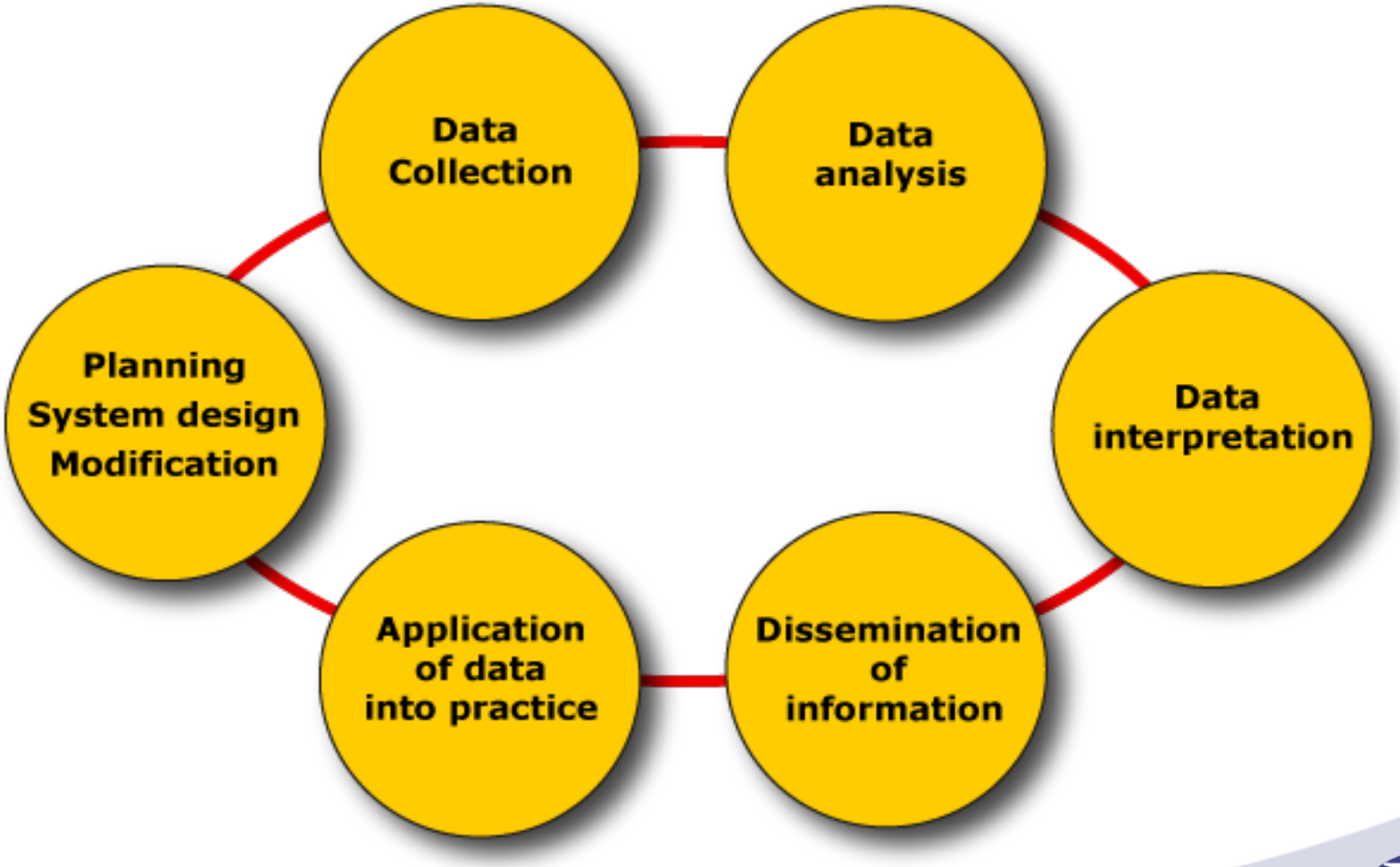
protecting people and their environment through science

Surveillance

The continuous monitoring of the occurrence and distribution of diseases and other health-related conditions and their determinants, for their effective control and prevention.

Adrian Sleigh in Essential Epidemiology 2005

Components of Surveillance



Health Act 1956

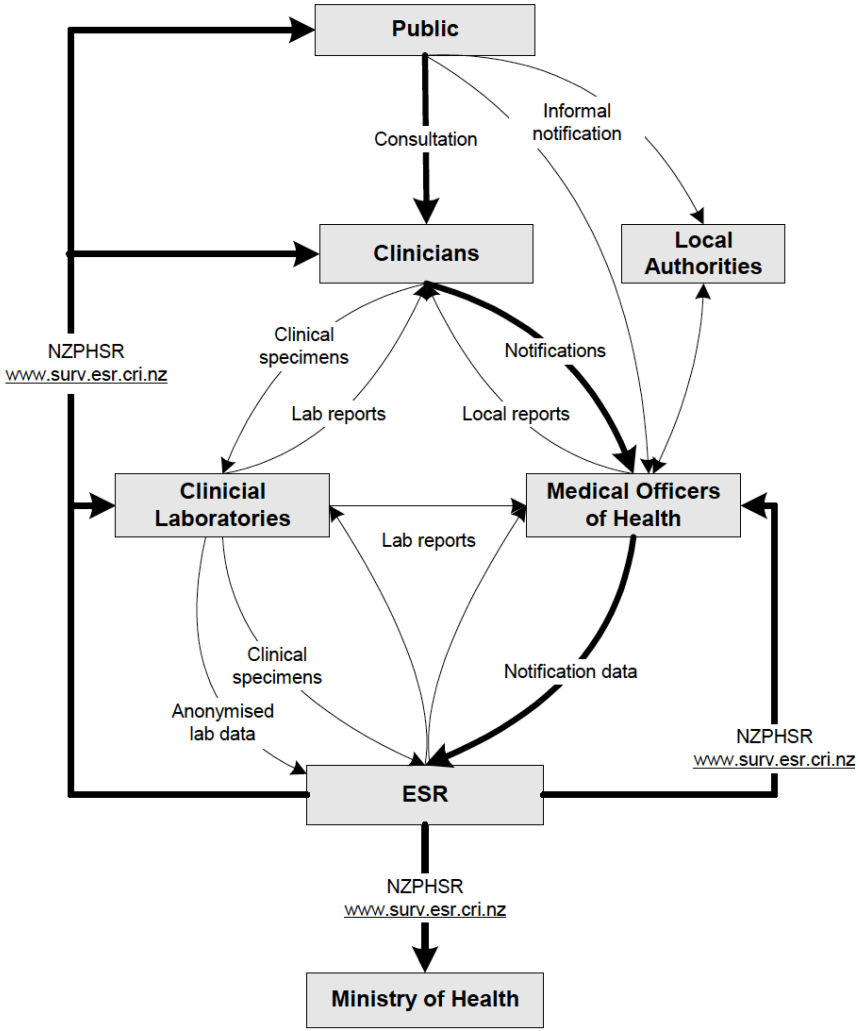
First Schedule

as 1 January 2013

Acquired Immunodeficiency Syndrome
Acute gastroenteritis
Anthrax
Arboviral diseases
Brucellosis
Campylobacteriosis
Cholera
Creutzfeldt Jakob Disease and other spongiform encephalopathies
Cronobacter species
Cryptosporidiosis
Diphtheria
Giardiasis
Haemophilus influenzae b
Hepatitis (viral) not otherwise specified
Hepatitis A
Hepatitis B
Hepatitis C
Highly Pathogenic Avian Influenza (including HPAI subtype H5N1)
Hydatid disease
Invasive pneumococcal disease
Legionellosis
Leprosy
Leptospirosis
Listeriosis
Malaria
Measles
Meningoencephalitis—primary amoebic
Mumps
Neisseria meningitidis invasive disease
Non-seasonal influenza (capable of being transmitted between human beings)
Pertussis
Plague
Poliomyelitis
Q fever
Rabies and other lyssaviruses
Rheumatic fever
Rickettsial diseases
Rubella
Salmonellosis
Severe Acute Respiratory Syndrome
Shigellosis
Tetanus
Typhoid and paratyphoid fever
Verotoxin-producing or shiga toxin-producing *Escherichia coli*
Viral heamorrhagic fevers
Yellow fever
Yersiniosis

Information flows

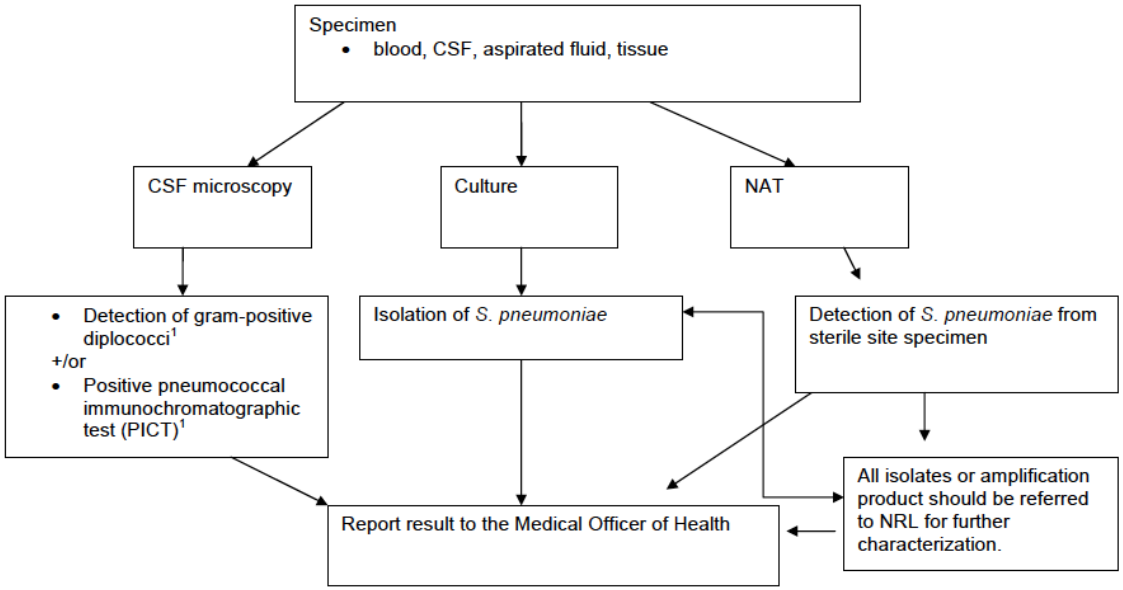
Figure 1 **The communicable disease surveillance system -major components and information flows**



Manual for Public Health Surveillance in New Zealand – Part A 2006

Direct laboratory notification

***Streptococcus pneumoniae* invasive disease (Invasive Pneumococcal Disease)**



Notes

1. Arrange for NAT testing on CSF if cultures sterile so that pneumococcal disease can be confirmed. Rarely, other gram-positive cocci such as beta-hemolytic streptococci and *S. suis* may cause meningitis, although a PICT should be negative in these cases.

Information required for IPD

Invasive pneumococcal disease EpiSurv No. _____

Risk Factors

Premature <37 weeks gestation (if case is <1 year of age)* ○ Yes ○ No ○ Unknown

Congenital or chromosomal abnormality (*includes Down's syndrome*)* ○ Yes ○ No ○ Unknown

Chronic lung disease or Cystic Fibrosis* ○ Yes ○ No ○ Unknown

Anatomical or functional asplenia* ○ Yes ○ No ○ Unknown

Immunocompromised* ○ Yes ○ No ○ Unknown

Includes HIV/AIDS, lymphoma, organ transplant, multiple myeloma, nephrotic syndrome, chronic drug therapy (e.g. chemotherapy or >20 mg/d prednisolone in last year), dysgammaglobulinaemia and sickle cell anaemia.

Chronic illness* ○ Yes ○ No ○ Unknown

Includes CSF leak, intracranial shunts, diabetes, cardiac disease (angina, MI, heart failure, coronary bypass), pulmonary disease (asthma, bronchitis, emphysema), chronic liver disease, renal impairment and alcohol related.

Cochlear implants* ○ Yes ○ No ○ Unknown

Current smoker* ○ Yes ○ No ○ Unknown

Smoking in the household (if case is <5 years of age)* ○ Yes ○ No ○ Unknown

Attends childcare (if case is <5 years of age)* ○ Yes ○ No ○ Unknown

Attends childcare (regular attendance >4 hours per week) in a grouped childcare setting outside the home.

Resident in long term or other chronic care facility* ○ Yes ○ No ○ Unknown

Other risk factors including illness that requires regular medical review (specify)*

_____

Protective Factors

At any time prior to onset, had the case been immunised with the pneumococcal polysaccharide or pneumococcal conjugate vaccine?* ○ Yes ○ No ○ Unknown

If yes, specify vaccination details*

Source of information* ○ Patient/caregiver recall ○ Documented

Dose 1:* ○ Polysaccharide ○ Conjugate ○ Unknown

Date given* _____ Or age when first dose was given ____ ○ Weeks ○ Months ○ Years

Dose 2:* ○ Polysaccharide ○ Conjugate ○ Not given ○ Unknown

Date given* _____ Or age when second dose was given ____ ○ Weeks ○ Months ○ Years

Dose 3:* ○ Polysaccharide ○ Conjugate ○ Not given ○ Unknown

Date given* _____ Or age when third dose was given ____ ○ Weeks ○ Months ○ Years

Dose 4:* ○ Polysaccharide ○ Conjugate ○ Not given ○ Unknown

Date given* _____ Or age when fourth dose was given ____ ○ Weeks ○ Months ○ Years

Dose 5:* ○ Polysaccharide ○ Conjugate ○ Not given ○ Unknown

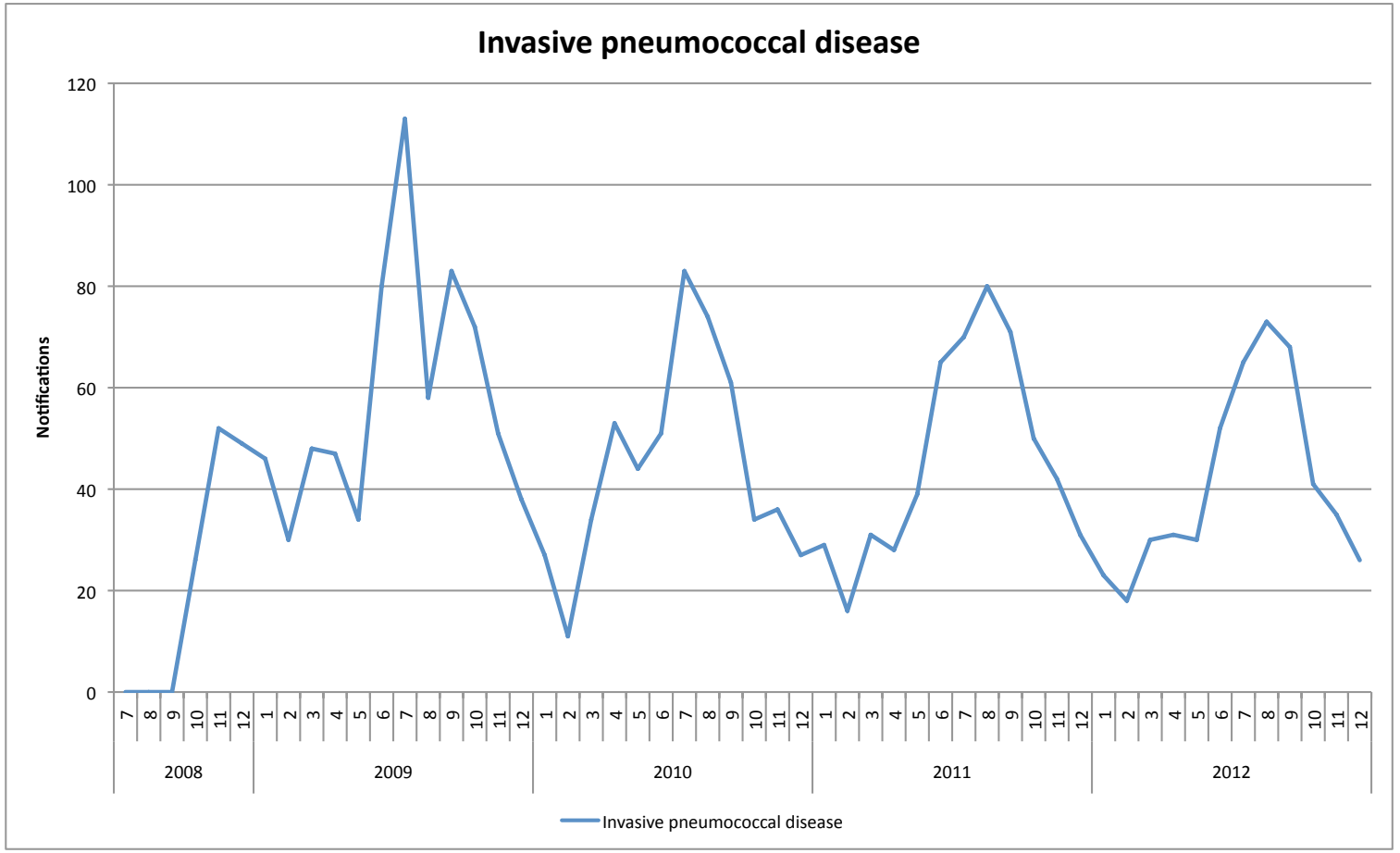
Date given* _____ Or age when fifth dose was given ____ ○ Weeks ○ Months ○ Years

NIR Vaccination Status (to be completed by ESR)

○ Fully vaccinated for age ○ Partially vaccinated for age ○ Not vaccinated ○ Not applicable

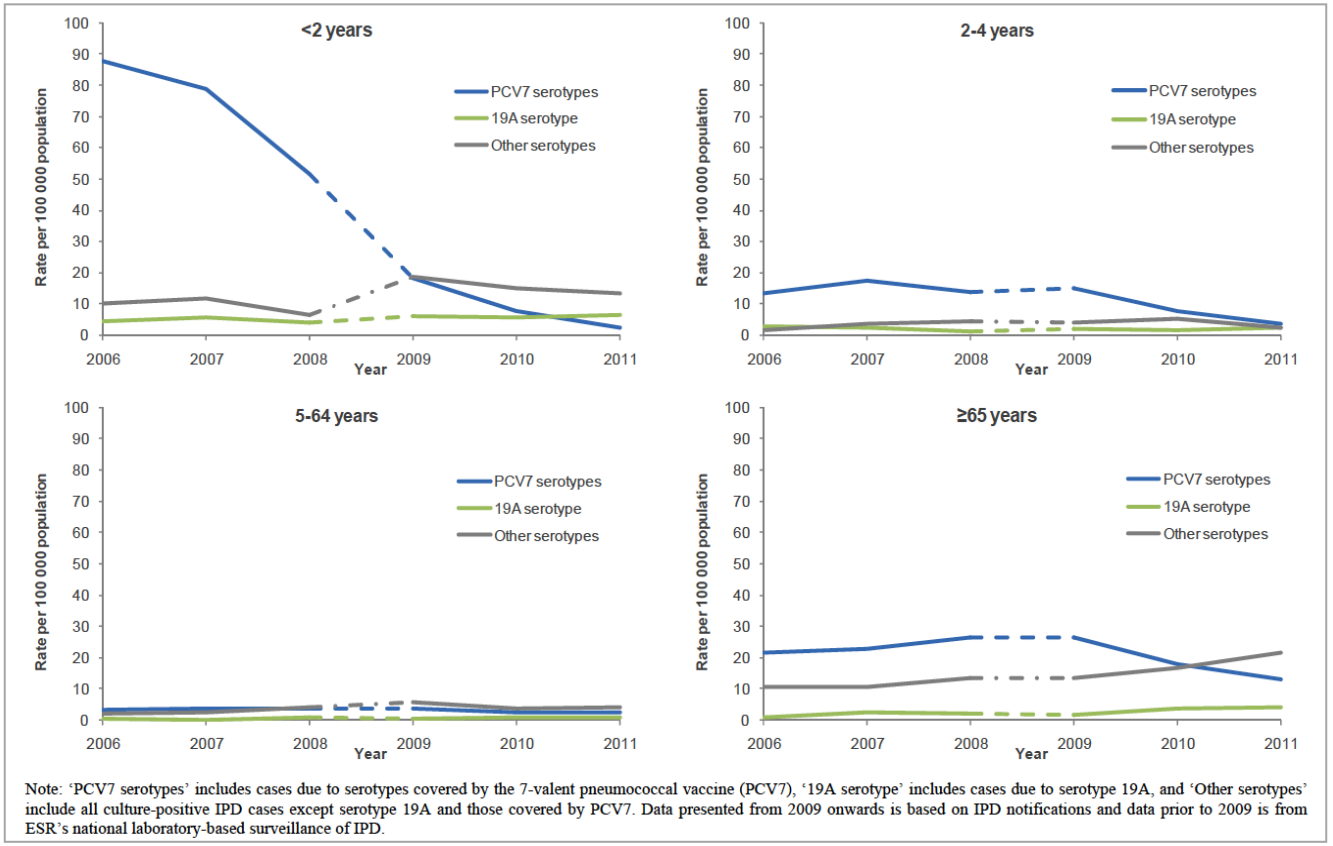
Date status updated _____ NIR Reference _____

Notifications



Effect of vaccination

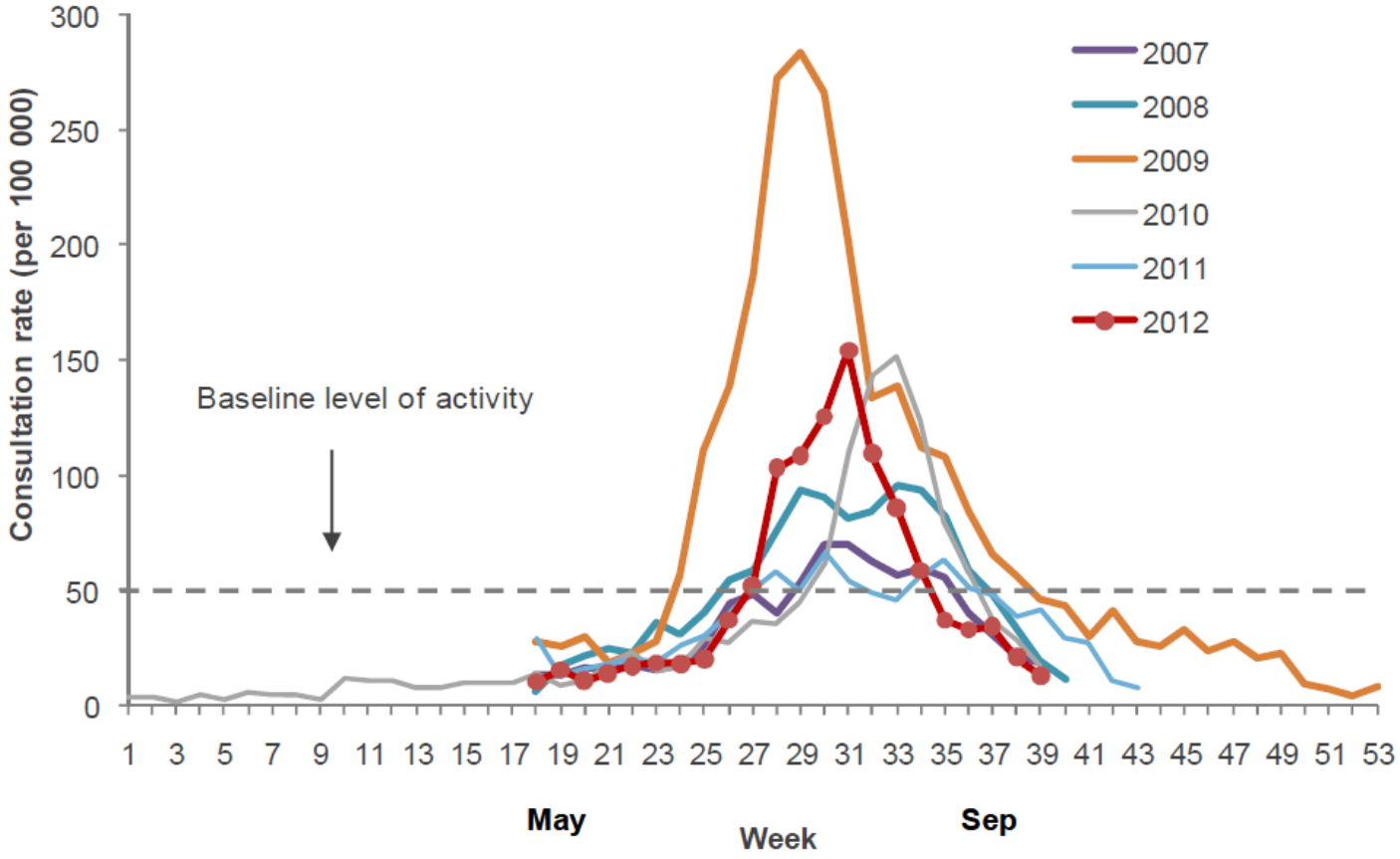
Figure 5. Rate per 100 000 of invasive pneumococcal disease due to PCV7, 19A and other serotypes by age group and year, 2006–2011



Note: 'PCV7 serotypes' includes cases due to serotypes covered by the 7-valent pneumococcal vaccine (PCV7), '19A serotype' includes cases due to serotype 19A, and 'Other serotypes' include all culture-positive IPD cases except serotype 19A and those covered by PCV7. Data presented from 2009 onwards is based on IPD notifications and data prior to 2009 is from ESR's national laboratory-based surveillance of IPD.

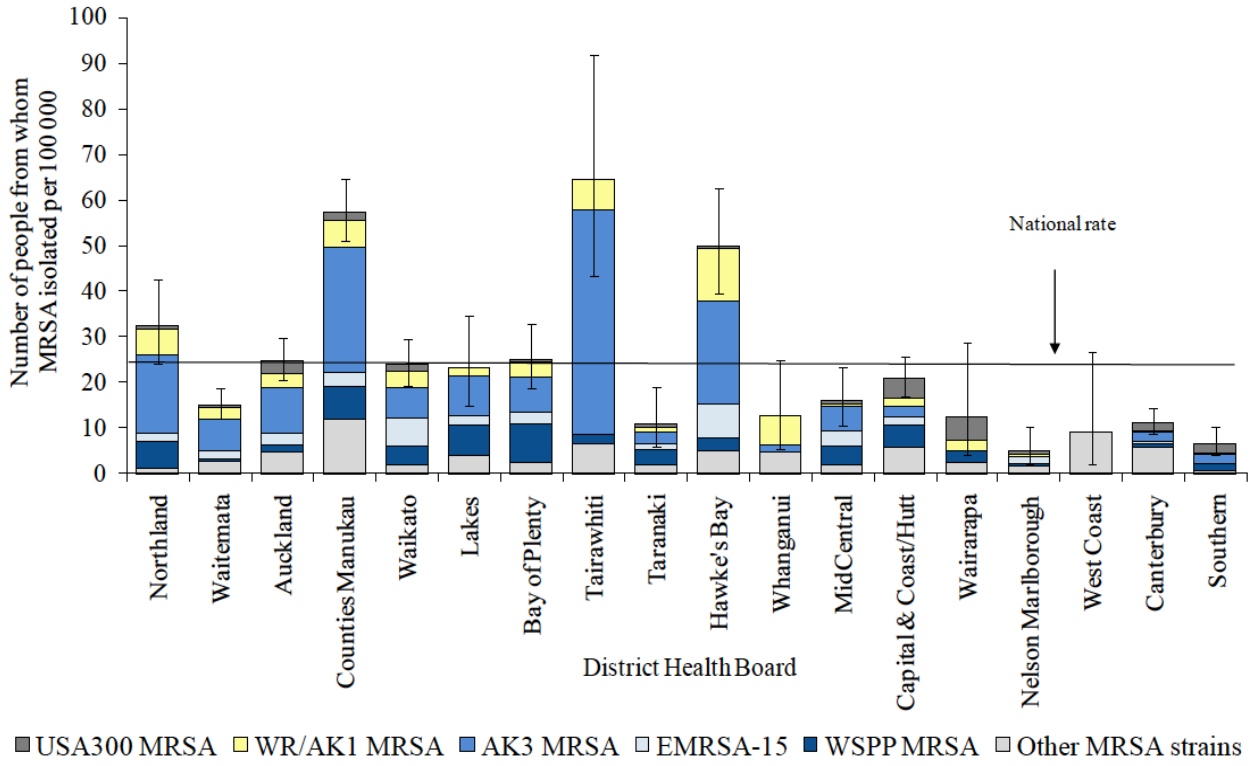
Influenza surveillance

Figure 2: Weekly consultation rates for influenza-like illness in New Zealand, 2010, 2011 and 2012



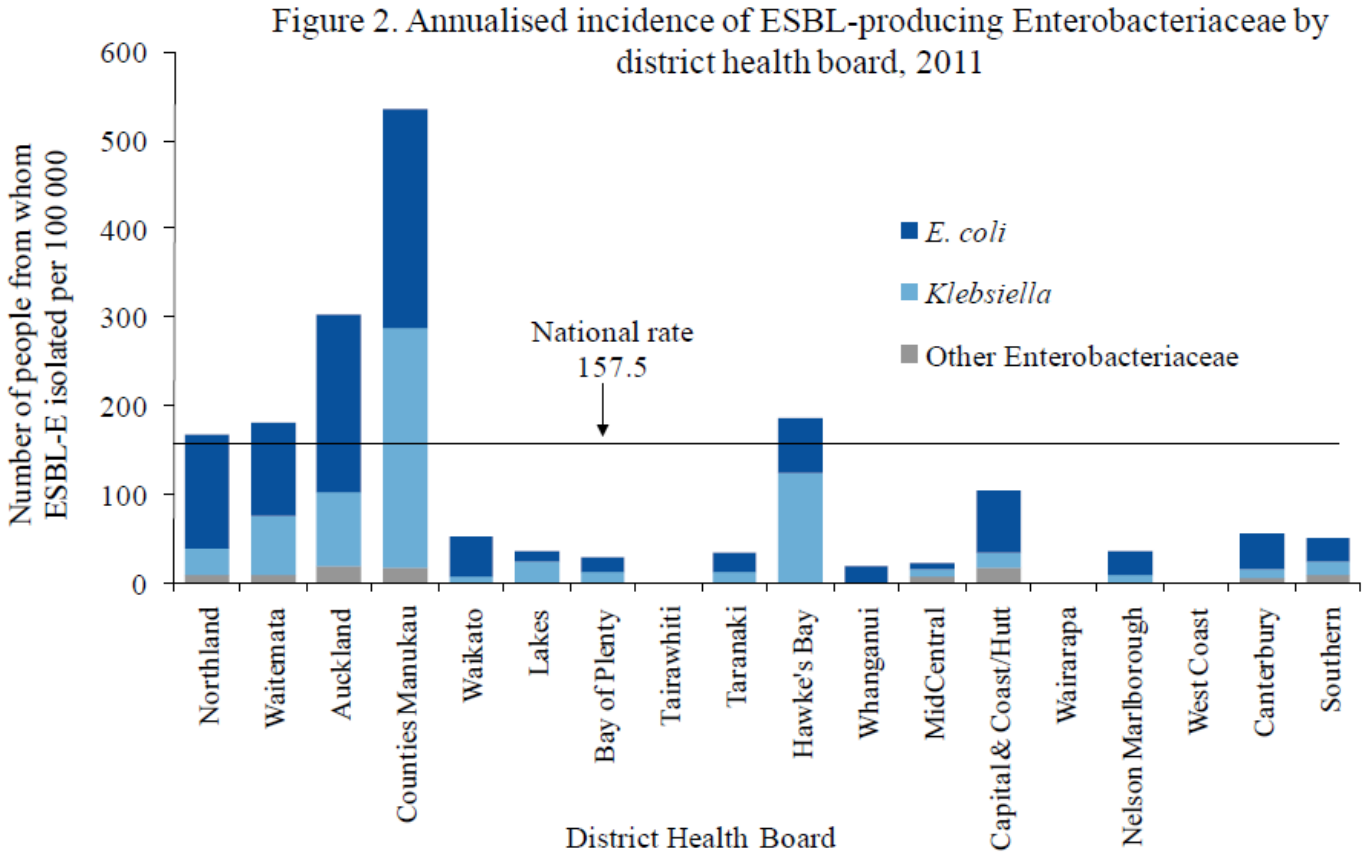
MRSA surveillance

Figure 2. MRSA point-prevalence rates by district health board, 2011



Annual survey of methicillin-resistant *Staphylococcus aureus* (MRSA) *2011*

ESBL surveillance



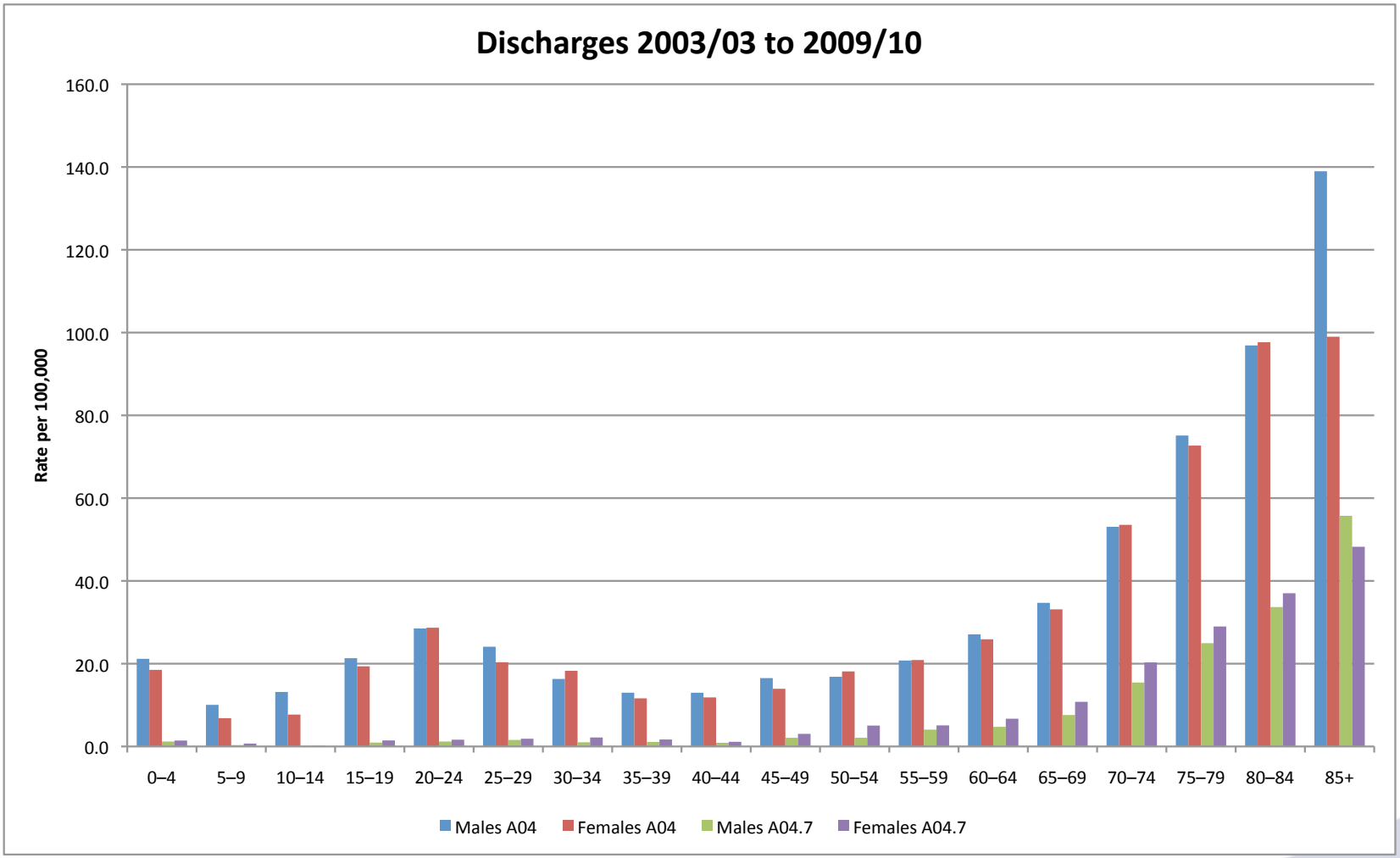
Annual survey of extended-spectrum β-lactamase (ESBL)-producing enterbacteriaceae *2011*

Place of surveillance

Surveillance

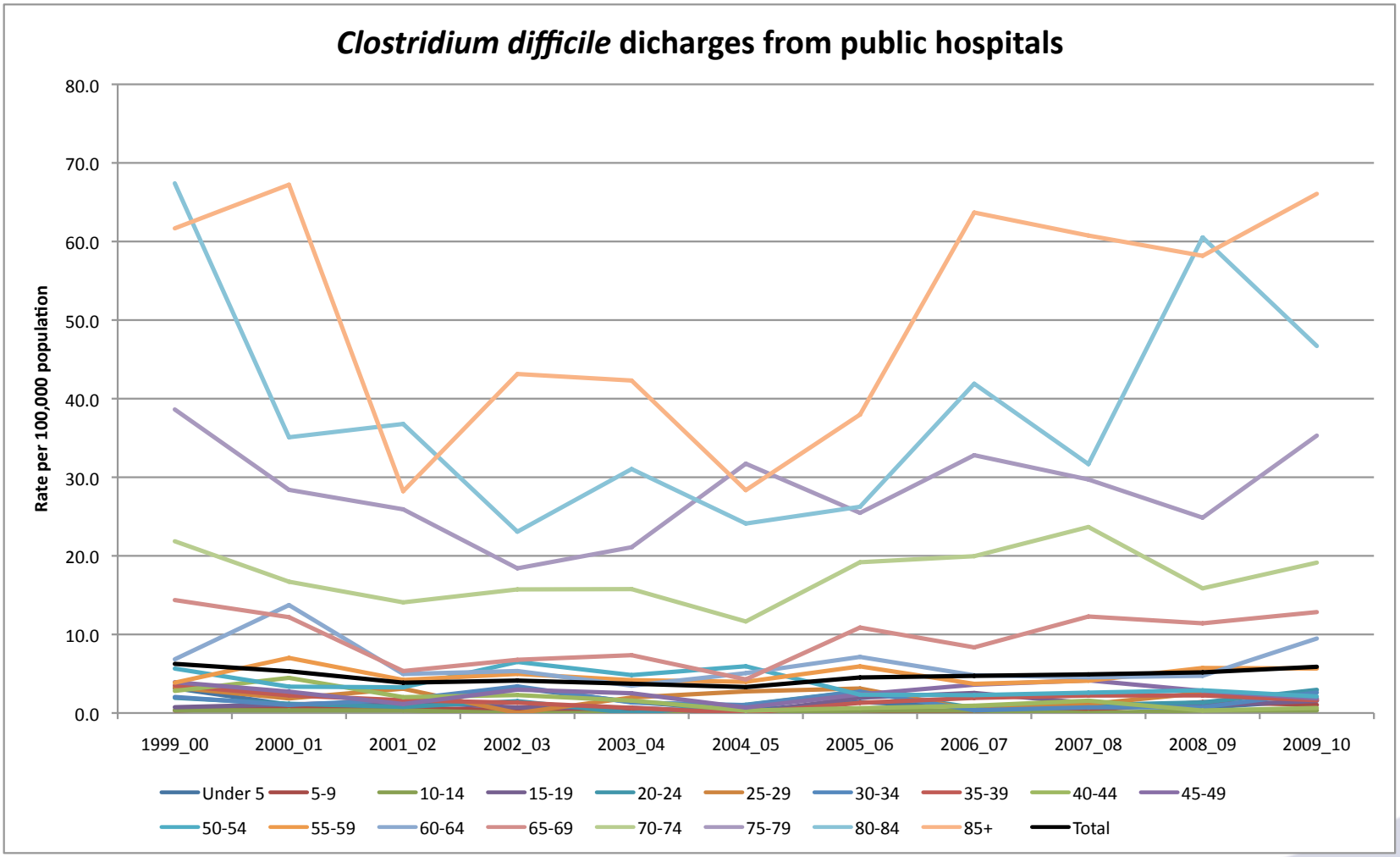
- **Information for action**
  - ***Health care facilities***
  - ***Community***
  - ***Wider society – including animal health***

Hospitalisation from *C difficile*



Data from Hospital Morbidity Data and Ministry of Health – Chris Lewis)

Age specific rates



Principal discharge diagnosis (A04.7) from Ministry of Health

Options for surveillance

Options	Outcome	Requirements
Maintain status quo	Irregular surveillance of prevalence	Nil
Formalise the present biennial voluntary surveillance	Record of changing prevalence patterns and ribotypes	Formal arrangements and funding
Enhanced annual voluntary surveillance	Targeted surveillance	More funding
Laboratory notification	Identification of risk factors in cases	Enhanced hospital infection epidemiology

Report of the

Controller and Auditor-General

Tumuaki o te Mana Arotake

Management of Hospital-acquired Infection

Volume Two of Two

June 2003

Infection Control Committee

Does the Committee have a member in this staff category?	Yes	No
Infection Control Practitioner(s)*	20	0
Doctor(s)	20	1
Microbiology (i.e. laboratory) representative	20	1
Medical Officer of Health	17	4
Director of Nursing	13	8
Risk or Quality Improvement Manager*	12	8
Occupational Health Nurse(s)*	12	8
Pharmacist	11	10
Medical Director	10	11
Services manager(s)	10	11
Representative from other hospitals covered by Committee	7	14
Hospital General Manager or representative	6	15
Community representative	5	16
Maori Health representative*	2	18

* In each case one respondent did not answer this part of the question.

Auditor-General's Report *Management of Hospital-acquired Infection* (2003)

Infection Control team

5.58 Most infection control teams considered that the Medical Officer of Health should ideally have a key role in infection control within the hospital service, and agreed that the Officer should[118]:

- be a member of the infection control committee;
- work with the infection control team in managing outbreaks;
- provide epidemiological[119] advice;
- ensure that relevant hospital staff understand the infection risks in the community and the different approaches to controlling them; and
- contribute to the flow of information between the hospital service and public health officials.

… The Medical Officer of Health is a member of the Infection Control Team and is actively included in infection control policies and issues …

Auditor-General's Report *Management of Hospital-acquired Infection* (2003)

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 61 / No. 9
March 9, 2012

Key Points

- *Clostridium difficile* infections (CDIs) increased several fold in the past decade and became more serious, but are nonetheless preventable.
- Of all CDIs, 94% are related to health-care exposures and are potentially preventable by reducing unnecessary antibiotic use and interrupting patient-to-patient transmission of *C. difficile*.
- CDIs were reduced by 20% over approximately 21 months by 71 hospitals participating in prevention programs focused primarily on infection control strategies (e.g. early reliable detection, isolation, and enhanced environmental cleaning).
- Of all health-care–associated CDIs, 75% have their onset outside of hospitals, and 52% of the CDIs treated in hospitals are present on admission; these infections are a potential source for intrahospital transmission.
- More must be done to prevent CDIs by various stakeholders working together to expand prevention strategies, including a greater focus on antibiotic stewardship and extending prevention strategies in settings across the continuum of health-care delivery.

Questions

- **What is the extent of CDI in New Zealand**
  - ***How is the epidemiology changing***
- **Is CDI a serious population health issue**
  - ***(or is it a component of hospital acquired infection)***
- **Is laboratory notification required**
  - ***Who would do the investigations***
- **What is the benefit of investigating individual cases**
  - ***What is the opportunity cost of investigating cases***
- **Any alternative approaches**

In summary

- **Vigilance**
  - *Awareness of issue in clinicians (hospital / community)*
  - *Surveillance*
  - *Case definitions*
  - *Testing methods*
- **Diligence**
  - *Infection prevention and Control techniques*
  - *Antibiotic stewardship*
  - *One Health*

- **The surveillance and control of priority communicable diseases remains a fundamental public health task. Surveillance, particularly through disease notification, is important not just because of the information it provides on broad trends in these diseases, but more importantly because it is the trigger for actions to control outbreaks, and hence protect the health of our communities. Surveillance and response systems also require the participation of individuals and organisations both across the health sector and in other sectors.**

Ministry of Health Healthcare-Associated Infection Governance Group, October 2012