

# **Manual for Public Health Surveillance in New Zealand**

Institute of Environmental Science and Research Ltd.

**ISBN 1-877166-00-6**

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## **Preface**

The Manual for Public Health Surveillance in New Zealand is intended as a reference for users of the surveillance system and as an aid in learning about the system.

The manual consists of three distinct sections:

### **Section A Introduction to surveillance and the New Zealand system**

This section is an introduction to the concept of surveillance, the system of public health surveillance used in New Zealand, the evaluation of surveillance systems and the quality assurance programme for EpiSurv.

### **Section B EpiSurv user documentation**

Section B is a users' guide to EpiSurv, the computer system used to collect notifiable disease surveillance information in New Zealand.

### **Section C Instructions for completing case report forms**

Section C describes the surveillance case report forms used with EpiSurv. Detailed instructions on how to complete these forms are given, to ensure that high quality surveillance information is obtained. Copies of the forms are included in this section. Further information can be obtained from:

EpiSurv Support  
Population and Environmental Health Group  
ESR  
P O Box 50 348  
PORIRUA

Phone: (04) 914 0700 Fax: (04) 914 0770  
E-mail: [episurv.support@esr.cri.nz](mailto:episurv.support@esr.cri.nz)

This edition of the Manual for Public Health Surveillance in New Zealand was revised in September 2005

# **SECTION A:**

## **Introduction to surveillance and the New Zealand system**



## Section A Introduction to surveillance and the New Zealand system

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# 1 Introduction to surveillance

## 1.1 Definition of surveillance

There are several definitions of surveillance. The following one is used by the Centers for Disease Control and the Council of State and Territorial Epidemiologists in the United States:

"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 dissemination of these data to those who need to know. The final link in the surveillance chain is the application of these data to prevention and control".<sup>1</sup>

Another popular definition is that surveillance provides "**information for action**", emphasising the importance of the link between surveillance and prevention and control activities.

## 1.2 The objectives of disease surveillance

Surveillance systems are distinguished from health information systems by their direct application to epidemiological investigation, and disease prevention and control actions. To support these actions, each surveillance system will need to achieve at least some of the following objectives<sup>2</sup>:

to identify cases of disease that require immediate public health control measures e.g. cases of meningococcal disease whose close contacts require rifampicin

to monitor disease incidence and distribution, and alert health workers to changes in disease activity in their area, e.g. influenza surveillance

to identify outbreaks and support their effective management, e.g. surveillance of salmonellosis to detect common source outbreaks

to assess disease impact and help set priorities for prevention and control activities, e.g. surveillance of trends in acute rheumatic fever (ARF) and chronic rheumatic heart disease (CRHD)

to identify risk factors for disease to support development of effective prevention measures, e.g. surveillance of malaria to detect high risk countries for disease exposure

to evaluate prevention and control activities, e.g. monitoring the decline in *Haemophilus influenzae* type b disease in response to Hib immunisation

to identify and predict emerging hazards, e.g. surveillance for Creutzfeldt-Jacob disease (CJD) and its new variant form

to monitor changes in disease agents through laboratory testing, e.g. detection of multi-drug resistant tuberculosis

to generate and evaluate hypotheses about disease occurrence, e.g. measuring the association between VTEC/STEC infection and exposure to suspected sources of infection

to fulfil statutory and international reporting requirements, e.g. surveillance of yellow fever, cholera and plague

Surveillance is more than counting the numbers of cases of disease. An effective surveillance system describes the occurrence of disease in the community along the important dimensions of time, place and person. The person dimension is particularly important for targeting prevention strategies. This dimension includes demographic data about the person with a disease (age, sex, ethnicity), information on the presence of risk factors for the disease and information on protective factors such as vaccination. It is also useful to know the outcome of the disease in terms of hospitalisation and death, in order to assess the severity of the disease and its costs to society.

There is an increasing emphasis on collecting information on case and contact management so that the effectiveness of these control activities, and the resources used, can be monitored and possible improvements in policy and practice identified.

## 2 The New Zealand Public Health Surveillance System

The Institute of Environmental Science and Research Ltd (ESR) is contracted by the Ministry of Health to operate national surveillance systems for communicable diseases and related health events. The following notes provide a general overview of the communicable disease surveillance system.

### 2.1 Health events under surveillance

The communicable diseases under surveillance in New Zealand are summarised in Table 1<sup>2</sup>.

Case definitions for the notifiable diseases are listed in the instructions for completion of the surveillance case report forms in Section C. A two-level system is used for most diseases:

a probable case definition, which is based on application of well defined clinical criteria

a confirmed case definition, which is highly specific to the disease in question and usually requires laboratory testing

For a small number of diseases, particularly where precise initial diagnosis is difficult, a surveillance case definition has also been defined. This definition is usually simple and highly sensitive, and uses clinical criteria. Examples of diseases with additional surveillance case definitions are pertussis and TSP.

**Table 1: Communicable diseases and their surveillance sources**

Disease	Clinician surveillance <sup>1</sup>	Laboratory surveillance <sup>2</sup>
<b>Vaccine preventable diseases</b>		
Diphtheria	notifiable <sup>3</sup>	ESR lab <sup>4</sup>
<i>H. influenzae</i> type b disease	notifiable	ESR lab
Influenza	sentinel surveillance <sup>5</sup>	CLBS <sup>6</sup>
Measles	notifiable	CLBS
Mumps	notifiable	CLBS
Pertussis	notifiable	
Poliomyelitis	notifiable	ESR lab
Rubella, all forms	notifiable	CLBS
Tetanus	notifiable	-

(Table 1 continues next page).

Disease	Clinician surveillance <sup>1</sup>	Laboratory surveillance <sup>2</sup>
<b>Bloodborne and sexually transmitted diseases</b>		
AIDS	notifiable <sup>7</sup>	-
Chlamydial disease	clinic-based surveillance <sup>8</sup>	Limited laboratory surveillance
Creutzfeldt-Jakob disease	notifiable	
Gonorrhoea	clinic-based surveillance	Limited laboratory surveillance
Hepatitis B	notifiable	
Hepatitis C	notifiable	
HIV infection	-	CLBS
Syphilis	clinic-based surveillance	-
<b>Foodborne diseases</b>		
Botulism	notifiable <sup>9</sup>	-
Campylobacteriosis	notifiable	-
Cholera	notifiable	ESR lab
Cryptosporidiosis	notifiable	-
<i>Enterobacter sakazakii</i> invasive disease	notifiable	-
Gastroenteritis (acute) in a person in a high-risk environment	notifiable <sup>9</sup>	-
Gastroenteritis (acute) in two or more related cases	notifiable <sup>9</sup>	-
Giardiasis	notifiable	-
Hepatitis A	notifiable	
Listeriosis	notifiable	ESR lab
Meningoencephalitis - primary amoebic	notifiable	-
Salmonellosis	notifiable	ESR lab
Shigellosis	notifiable	ESR lab
Toxic shellfish poisoning	notifiable <sup>9,10</sup>	
Typhoid and paratyphoid	notifiable	ESR lab
Verotoxigenic or Shiga toxin producing <i>Escherichia coli</i> (VTEC/STEC infection)	notifiable <sup>9</sup>	ESR lab
Yersiniosis	notifiable	-
<b>Vectorborne diseases</b>		
Arboviral diseases, including dengue fever, Ross River fever	notifiable	ESR lab
Malaria	notifiable	-
Rickettsial disease e.g. typhus	notifiable	-
Yellow fever	notifiable	-

(Table 1 continues next page).

<b>Disease</b>	<b>Clinician surveillance<sup>1</sup></b>	<b>Laboratory surveillance<sup>2</sup></b>
<b>Zoonoses</b>		
Anthrax	notifiable	-
Brucellosis	notifiable	-
Cysticercosis	notifiable	-
Highly pathogenic avian influenza	notifiable	-
Hydatid disease	notifiable	-
Plague	notifiable	-
Rabies	notifiable	
Leptospirosis	notifiable	CLBS
Taeniasis	notifiable	ESR lab
Trichinosis	notifiable	-
Viral haemorrhagic fevers e.g. Lassa fever, Marburg disease	notifiable	ESR + overseas laboratories
<b>Other infectious diseases</b>		
Highly pathogenic avian influenza (HPAI)	notifiable	-
Hepatitis (viral) NOS e.g. hepatitis D, hepatitis E	notifiable	-
Leprosy	notifiable	-
Legionellosis	notifiable	ESR lab
Meningococcal disease	notifiable	ESR lab
Rheumatic fever	notifiable	-
Severe Acute Respiratory Syndrome (SARS)	notifiable	-
Tuberculosis	notifiable	CLBS

(Table 1 continues next page).

<b>Disease</b>	<b>Clinician surveillance<sup>1</sup></b>	<b>Laboratory surveillance<sup>2</sup></b>
<b>Non-infectious notifiable diseases</b>		
Decompression sickness	notifiable	-
Lead absorption equal to or in excess of 15 µg/dl	notifiable	-
Poisoning arising from chemical contamination of the environment	notifiable	-

### Notes on communicable diseases and their surveillance sources (Table 1)

Clinician surveillance refers to systems based on reporting by medical practitioners.

Laboratory surveillance refers to systems based on reporting by laboratories.

Diseases are notifiable by medical practitioners to the Medical Officer of Health under the Health Act 1956 (tuberculosis is notifiable under the Tuberculosis Act 1948).

ESR lab refers to laboratory surveillance based on clinical specimens (isolates and serologic specimens) that are referred to and tested by ESR laboratories.

Sentinel surveillance of influenza is based on a non-representative sample of general practitioners throughout New Zealand who participate in influenza surveillance from May to September. This system collects data on the number of patients meeting a clinical case definition for influenza. Participants also forward throat swabs from a proportion of these patients to assist laboratory surveillance of influenza.

CLBS (clinical laboratory-based surveillance) refers to surveillance based on data supplied by clinical laboratories (including hospital medical laboratories, community medical laboratories and laboratories at ESR). ESR collates these data.

AIDS notifications use an anonymous code instead of the person's name.

Clinic-based surveillance of STIs is based on anonymous reporting by specific sexual health, youth health and family planning clinics throughout New Zealand. Clinics report the number of patients seen each month who meet clinical and laboratory criteria for certain STIs.

These diseases are notifiable as causes of gastroenteritis.

Toxic shellfish poisoning (TSP) includes paralytic, neurotoxic, diarrhoeic, and amnesic shellfish poisoning.

## 2.2 Types of surveillance systems

### 2.2.1 Main communicable disease surveillance systems

- Notifiable disease system - this is the best known surveillance system and covers about 50 diseases at present. This system is a form of clinician surveillance because it is based on reporting by medical practitioners. Making a disease notifiable confers special status. Reporting by medical practitioners is mandatory, thus overriding some restrictions contained in the Privacy Act.
- Sentinel surveillance - this is appropriate for diseases that are very common and where representative rather than complete surveillance data are required. This approach is used for influenza.
- Clinic-based surveillance - currently used for some non-notifiable diseases where a large proportion of cases are diagnosed at a relatively small number of well-defined sites. The main examples are the STIs, which are diagnosed at specific sexual health, family planning or youth/student health clinics.
- Clinical laboratory-based surveillance (CLBS) - uses data provided by laboratories on positive test results. Communicable diseases are particularly suited to laboratory-based surveillance. Most require a laboratory test to confirm the diagnosis. In addition, testing is usually highly specific for a particular disease. Such testing is also carried out at a relatively small number of sites (approximately 70) compared with the thousands of sites where diagnoses are made. Laboratory-based surveillance includes data generated at ESR for diseases where every specimen is tested at national laboratories, e.g., *Haemophilus influenzae* disease.
- Hospitalisations – provide additional data for diseases with more serious outcomes, e.g. rheumatic fever. It also provides historic data on diseases that were not previously well covered by other surveillance systems e.g., measles and mumps.

### 2.2.2 Related surveillance systems

Several specialised surveillance systems overlap with the main communicable disease surveillance systems:

- Immunisation coverage surveillance - this measures the proportion of the population protected against communicable diseases by vaccination. Examples of such systems are the use of immunisation benefit claim data and special coverage surveys.
- Outbreak surveillance - a method for systematically recording outbreak characteristics and investigation. Outbreak investigation summaries are recorded on EpiSurv, and can be linked to individual cases via an outbreak reference number.

- Arbovirus surveillance - includes systems for surveillance of arbovirus vectors (e.g. periodic mosquito surveys) and human cases of arboviral disease (all arboviral diseases are notifiable, including Ross River virus infection and dengue fever).
- Antimicrobial resistance surveillance - a form of CLBS for gathering laboratory data on the antimicrobial susceptibilities of key organisms, e.g. MRSA, pneumococci. This system is being integrated with the notification system for tuberculosis surveillance.

## **2.3 The communicable disease surveillance system**

### **2.3.1 Components of the communicable disease surveillance system**

Surveillance activities are split between two levels:

At the local level, public health units are concerned with surveillance and control of disease in their region.

At the national level, operation of the system is co-ordinated by ESR on behalf of the Ministry of Health. ESR collates data provided by local public health units and by laboratory-based surveillance activities.

The main end user of data at the national level is the Ministry of Health, but other national agencies such as the New Zealand Food Safety Authority (NZFSA), the Ministry of Agriculture and Forestry (MAF) and Occupational Safety and Health (OSH) Service of the Department of Labour, New Zealand may use the data on an ad hoc basis.

### **2.3.2 Population under surveillance**

For most communicable diseases, the surveillance system aims to identify all cases occurring in the total New Zealand population. Exceptions are influenza, where surveillance is based on about 90 sentinel general practices, and STIs, where data are only collected on those attending specific sexual health, family planning or youth/student health clinics.

### 2.3.3 Sources of surveillance information

Surveillance information is provided by the following sources:

Medical practitioners - a schedule to the Health Act 1956 lists about 50 diseases and conditions which are legally notifiable by medical practitioners to the Medical Officer of Health in their district. In addition, a network of general practices participates in influenza surveillance

Members of the public - reports of illness (informal notifications) are often received, especially for potential food and waterborne illnesses, including possible cases of TSP

Clinical laboratories - general and specialised clinical laboratories provide anonymised data on several diseases, notably HIV infection, viral diseases and tuberculosis

ESR laboratories - ESR provides national reference testing of several diseases (see Table 1). As part of this process the laboratories record data on the incidence of these diseases

Sexual health, family planning and youth/student health clinics - these clinics provide aggregate data on the number of new patients diagnosed each month with specific STIs

### 2.3.4 Type of information collected

The surveillance system aims to collect a minimum dataset of information on all episodes of illness. Information is collected under the following headings:

Disease name

Reporting authority - officer responsible for the case

Notifier identification - name, phone number and date reported

Case identification - name, address and phone number

Case demography - location, date of birth/age, sex, ethnicity, occupation

Basis of diagnosis - clinical and laboratory criteria

Clinical course and outcome - date of onset, hospitalisation, death

Outbreak details

Risk factors

Source

Protective factors

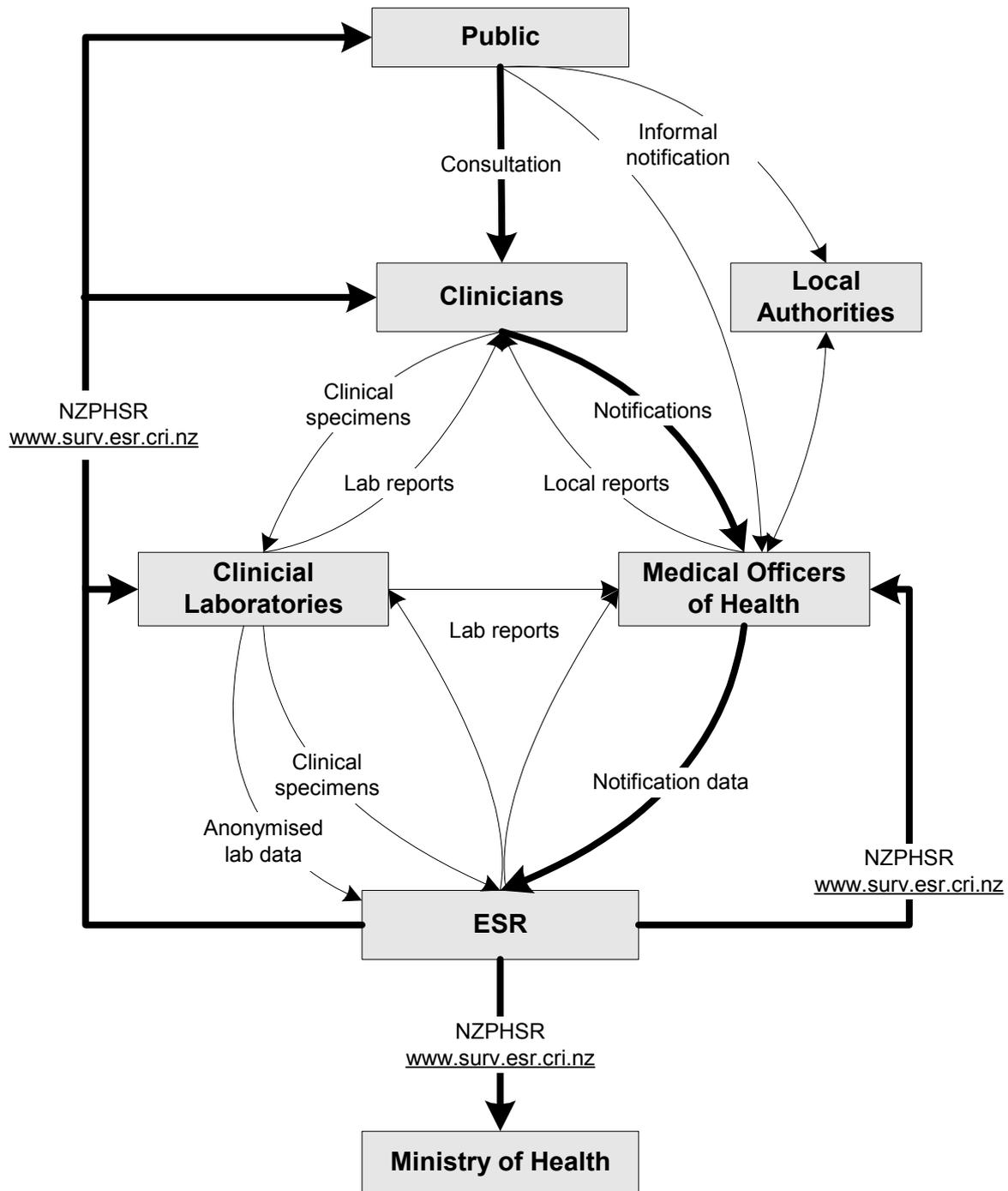
Management of cases and contacts

The information collected in the following modules is common to all forms: disease name, reporting authority, notifier identification, case identification, case demography, clinical course and outcome, and outbreak details. The information collected in the other modules, namely: basis of diagnosis, risk factors, protective factors and case/contact management, varies according to the disease being reported.

### 2.3.5 Reporting process and information transfer, storage and analysis

The reporting processes and information flows for the main elements of the surveillance system are illustrated in Figure 1.

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



— Denotes processes covered by this manual.  
 NZPHSR New Zealand Public Health Surveillance Report

Notifiable diseases are reported by medical practitioners to their local public health unit (PHU) by telephone, fax or post. Data are recorded by PHU staff onto a case report form and then transferred to a computerised local database (EpiSurv). Each week data are transferred from PHUs to ESR Kenepuru Science Centre and imported into a data warehouse.

Clinical laboratories report data via various electronic systems.

Reporting by ESR laboratories is by direct entry onto the specimen management database, ESRLab. Where possible notifiable disease data are integrated with laboratory records held by ESR.

Data are analysed by staff of the Population & Environmental Health Group at ESR.

### **2.3.6 Feedback & dissemination of information**

Surveillance information sourced from EpiSurv is disseminated in several forms:

#### *Routine Surveillance Reports*

- Weekly summary of notifiable diseases
- Monthly summary of notifiable diseases
- Annual summary of notifiable diseases
- Annual summary of outbreaks

#### *New Zealand Public Health Surveillance Report (NZPHSR)*

NZPHSR is a quarterly report that presents integrated notification and laboratory information targeted in design and delivery for health professionals working in general practice, hospitals, laboratories and other public health services.

#### *Websites*

All reports are available on the ESR surveillance website [www.surv.esr.cri.nz](http://www.surv.esr.cri.nz).

#### *Ad Hoc Requests*

ESR provides surveillance data on request. Send an e-mail request with specific requirements to [survqueries@esr.cri.nz](mailto:survqueries@esr.cri.nz).

## 3 Evaluating and Improving Surveillance Systems

### 3.1 Criteria for evaluating a surveillance system

The Centers for Disease Control and Prevention (CDC) in Atlanta has produced guidelines for the evaluation of surveillance systems<sup>3</sup>. The suggested evaluation criteria include:

**Public health importance of the health event under surveillance.** Resources are limited, so it is necessary to select the most important events to be placed under surveillance in order to achieve the greatest public good. The public health importance of health events can be assessed by measuring such characteristics as:

- frequency of the health event
- severity of the health event
- disparities or inequities associated with the health event
- costs associated with the health event
- preventability
- potential clinical course in the absence of an intervention (e.g. vaccination)
- public interest

**Purpose and operation of the surveillance system.** The purpose (why the system exists) and objectives (how the data are used for public health action) of the system, establish a frame of reference for evaluating specific components.

**Resources used to operate the surveillance system** including funding source(s), personnel requirements and other resources.

**Usefulness** in terms of contributing to prevention and control of adverse health events. Usefulness can be assessed by reviewing how well the system meets its objectives (refer section 1.2 ‘The objectives of disease surveillance’). Usefulness may be affected by all the attributes of the system listed below.

**Attributes of the system in terms of its performance:**

- Simplicity - in terms of both structure and ease of operation
- Flexibility - adaptability to changing information needs or operating conditions, e.g. placing new diseases under surveillance
- Data quality – reflects the completeness and validity of the data recorded in the system
- Acceptability - willingness of individuals and organisations to participate in surveillance
- Sensitivity - the proportion of all cases detected and the ability to detect epidemics
- Predictive value positive (PVP) - proportion of reported cases that actually have the disease under surveillance
- Representativeness - whether the system accurately describes the occurrence of the disease in terms of the time, person and place aspects
- Timeliness - the speed or delay between steps in the surveillance system
- Stability – refers to the reliability and availability of the surveillance system

### **3.2 Evaluation of communicable disease surveillance systems**

Everyone who is involved in surveillance has a role to play in evaluating and improving the performance of the surveillance system. For example, those who receive notifications can look for ways of encouraging notifications and ensuring that the information is collected as indicated in the instructions in Section C of this manual. In addition, comments are welcome on aspects of the design of the system, as well as its operation.

A blank table for evaluating a system is provided in the Appendix to encourage all those involved in surveillance to think about the ways in which surveillance could be improved.

### 3.3 Quality Assurance Programme for EpiSurv

EpiSurv functions as a surveillance system by favouring early reporting of cases over complete reporting. The system allows entry of incomplete data that can be updated as more information becomes available. To ensure that data is completed or corrected ESR runs validation checks regularly and requests PHU staff to update and correct data. A list of the current data checks is shown in Appendix B.

ESR in conjunction with the Ministry of Health (MoH) and Public Health Units have identified and agreed that the QA programme for EpiSurv includes the areas documented below.

#### 3.3.1 Provision of data

The current agreed timeframes for the provision of data from PHU (Public Health Units) and dissemination of reports of the data are as follows.

**PHU** - Data downloads should be undertaken on a daily basis unless there have been no new cases or amendments to existing cases. The downloads should be sent to ESR by 10am on the next working day.

**ESR** - Reports will be issued within the following time frames after the data is available.

Weekly reports	–	4 working days
Monthly reports	–	30 days
Annual reports	–	120 days

These are subject to change as systems are updated and improved.

#### 3.3.2 Training and support

ESR maintains a manual for PHUs covering the use of EpiSurv for the collection of notifiable disease data.

ESR provides training annually for PHU staff entering data into EpiSurv. Training to cover changes to EpiSurv and feedback on quality issues.

PHUs send at least one staff member who is frequently, directly involved with EpiSurv to the annual (EpiSurv) training session at ESR. All PHU staff members entering EpiSurv data must familiarise themselves with changes to the EpiSurv manual.

Prior to entering EpiSurv data for the first time PHU staff should

attend an EpiSurv training session provided by ESR or an experienced PHU staff member and

familiarise themselves with the EpiSurv manual.

Public Health Services and ESR to maintain records of attendance of staff at training courses. ESR maintains a helpdesk function to assist PHUs in the resolution of EpiSurv technical issues.

ESR staff visit each public health office at least once every two years to provide individual training in EpiSurv procedures and to assist with local data and process issues. These visits also help ESR to gain an understanding of local office situations and their impact on efficiency and quality of EpiSurv data processes.

### **3.3.3 Monitoring of data quality**

ESR produces a data quality report each year covering completeness, timeliness and accuracy for agreed data elements (see Appendix C) and data provision processes. Report to be distributed to all PHUs. Minimum data set to be reviewed annually and modified as considered necessary to improve data quality.

ESR and PHUs implement and maintain internal processes to detect potential errors in disease notifications data and notify appropriate staff to investigate and correct the errors. A list of the quality checks regularly undertaken by ESR to be published annually.

ESR conducts a client satisfaction survey on a regular basis (currently every 2 years).

### **3.3.4 Accreditation programmes**

ESR maintains membership of an appropriate accreditation programme for the processing of health surveillance data.

PHUs maintain membership of an appropriate accreditation programme for the management of health records, in particular maintaining security and confidentiality of records.

### **3.3.5 Audit**

Quality assurance audits against this plan will be carried out annually by ESR and reported to the MoH and PHUs.

## References

- 1 Centers for Disease Control. Comprehensive Plan for Epidemiologic Surveillance. Atlanta: Centers for Disease Control, 1986.
- 2 Baker M, Roberts A. A new schedule of notifiable disease for New Zealand. NZ Public Health Rep 1996; 3: 33-7.
- 3 Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems. MMWR 2001; Vol 50: No. RR-13.

## Appendix A Framework for surveillance system evaluation

Activity/attribute	Current performance	Possible improvements
Identifying and managing cases		
Identifying and managing contacts		
Monitoring disease incidence and distribution		
Identifying and managing outbreaks/epidemics		
Identifying risk factors		
Monitoring disease impact		
Evaluating prevention and control activities		
Identifying and predicting emerging hazards		
Identifying and evaluating hypotheses about disease occurrence		

Activity/attribute	Current performance	Possible improvements
Monitoring changes in disease agent (e.g. organism antibiotic sensitivities)		
Simplicity		
Flexibility		
Data quality		
Acceptability		
Sensitivity		
Predictive value positive		
Representativeness		
Timeliness		
Stability		

## Appendix B Current EpiSurv Regular Data Checks

### *Weekly*

- 1 Blank DHB or Meshblock (auto print faxes)
- 2 Missing Meningococcal Disease (only) Information (auto print faxes / send emails)
  - 32 fields checked (18 of those in tMen)
- 3 Incorrect Case Report Form (E-mail)
  - For example Pertussis case reported on Generic Case Report Form

### *Monthly*

- 1 Key Blank Data (Auto print faxes)
  - No Case Id
  - No disease name
  - No ethnicity
  - No report date
  - No TLA
- 2 Duplicate Names (Auto print Faxes only as confidential info)
  - Same PHU
  - Different PHU
  - Ignored if more than three months apart
- 3 Incorrect Dates (auto print faxes / send emails)
  - Report Date exactly the same as Date of Birth
  - Report Date earlier than the Onset Date
  - Year of Onset Date inconsistent with year of the Case Id
  - Date case was last saved earlier than the Date Hospitalised
  - Date Hospitalised is earlier than the Onset Date
  - Year of Date Hospitalised is inconsistent with year of the Case Id
  - Year of Report Date is inconsistent with year of the Case Id
  - Date case was last saved earlier than Date Died
  - Onset Date after Date Died
  - Year of the Date Died inconsistent with the year of Case Id
  - Report Date later than today's date
  - Date of Birth later than report date
  - Date of Birth over 105 years before today
  - Onset date earlier than Date of Birth
  - Report Date later than date first entered
- 4 Incorrect Geocode Results (Auto print faxes)
- 5 Missing cases as identified by laboratory results (manual emails / phone calls)

## Appendix C Current EpiSurv Data Quality Measures

The following items are currently reported annually in the Data Quality Report for EpiSurv

- Timeliness of disease reporting and data entry by disease
- Timeliness of reporting and data entry by PHU
  
- Percentage of cases with age recorded
- Percentage of cases with date of birth recorded
- Percentage of cases with ethnicity recorded
- Percentage of cases with sex recorded
- Percentage of enteric cases with NHI recorded
- Percentage of non-enteric cases with NHI recorded
- Percentage of cases with occupation recorded
- Percentage of cases with status as “Confirmed”, “Probable” or “Suspect”
  
- Geocoding accuracy by PHU