# Communicable Disease Surveillance and Outbreak Response Guidelines

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## Ministry of Health and Medical Services

## Republic of Fiji

MINISTRY of HEALTH & MEDICAL SERVICES
Shaping Fiji's Health

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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AFR | Acute Fever and Rash |
| BAF | Biosecurity Authority of Fiji |
| CMO | Chief Medical Officer |
| CSF | Cerebrospinal Fluid |
| CSN | Clinical Services Network |
| DHI | Divisional Health Inspector |
| DLI | Dengue-like Illness |
| DMO | Divisional Medical Officer |
| DORT | Divisional Outbreak Response Team |
| DSHS | Deputy Secretary for Health Services |
| DSPH | Deputy Secretary for Public Health |
| EHO | Environmental Health Officers |
| ELISA | Enzyme Linked Immunosorbent Assay |
| EVD | Ebola Virus Disease |
| EWARS | Early Warning Alert and Response System |
| FCCDC | Fiji Centre for Communicable Disease Control |
| FNU | Fiji National University |
| FPBS | Fiji Pharmaceutical & Biomedical Services |
| HAV | Hepatitis A Virus |
| HBAS | Hospital-based Active Surveillance |
| HEADMAP | National Health Emergencies and Disaster Management Plan |

| | |
|---|---|
| HEV | Hepatitis E Virus |
| HIU | Health Information Unit |
| IHR | International Health Regulations |
| ILI | Influenza-like Illness |
| MAT | Microscopic Agglutination Test |
| MDR-TB | Multidrug Resistant Tuberculosis |
| MERS-CoV | Middle East Respiratory Syndrome Coronavirus |
| MHMS | Ministry of Health & Medical Services |
| MLO | Media Liaison Officer |
| MO | Medical Officer |
| MRSA | Multi-drug Resistant *Staphylococcus aureus* |
| NACD | National Advisor for Communicable Disease |
| NAEH | National Advisor for Environmental Health |
| NDMP | National Disaster Management Plan |
| NHEC | National Health Executive Committee |
| NGO | Non-Governmental Organisations |
| NNDSS | National Notifiable Disease Surveillance System National |
| NPHL | National Public Health Laboratory |
| NTCOPD | National Taskforce for Communicable Outbreak Prone Disease |
| PATIS | Patient Information System |
| PCR | Polymerase Chain Reaction |
| PHEIC | Public Health Emergency of International Concern Public |
| PHIS | Health Information System |
| PPHSN | Pacific Public Health Surveillance Network |
| PSHMS | Permanent Secretary for Health and Medical Services Pacific |
| PSSS | Syndromic Surveillance System |
| RCA | Root cause analysis |

| | |
|---|---|
| RDT | Rapid Diagnostic Test |
| RSV | Respiratory Syncytial Virus |
| SARI | Severe Acute Respiratory Infection |
| SARS | Severe Acute Respiratory Syndrome |
| SDHI | Subdivisional Health Inspector |
| SDMO | Subdivisional Medical Officer |
| SORT | Subdivisional Outbreak Response Team |
| SPC | Secretariat of the Pacific Community |
| TB | Tuberculosis |
| TVC | Technical Video Content |
| TWG | Technical Working Group |
| US CDC | US Centers for Disease Control and Prevention |
| VPD | Vaccine Preventable Diseases |
| VRE | Vancomycin-Resistant Entercocci |
| VRSA | Vancomycin-Resistant *Staphylococcus aureus* |
| VTM | Viral Transport Medium |
| XDR-TB | Extensively Drug-Resistant Tuberculosis |
| WHO | World Health Organization |
| ZIKV | Zika Virus |

# LIST OF APPENDICES

Appendices will be available on the Fiji MHMS Online Repository, and updated as necessary.

Appendix C: Disease specific Guidelines and Action Plans in Fiji

C.1 Chikungunya – Flow-charts for diagnosis and management

C.2 Dengue – Flow-charts for diagnosis and management from CDC

C.3 Ebola Virus Disease –
Preparedness and response plan (2014)
Flowchart for reporting and management of suspected cases
SOP for traveller from Ebola Virus Disease (EVD) countries

C.4 HIV – Care and Antiretroviral guidelines (2013)

C.5 Influenza – Action Plan

C.6 Leptospirosis – Clinical guidelines for diagnosis and management (2016)

C.7 Tuberculosis – Clinical guidelines (under review)

C.8 Typhoid – Clinical guidelines for diagnosis, management and prevention (2010)

C.9 Zika – Action Plan (2016)

Appendix D: Handbooks, reference materials, and standard operating procedures (SOPs)

D.1 EWARS – Response to Alerts

D.2 Food Safety Act & Food Safety Regulations

D.3 Fiji Antibiotic Guidelines

D.4 Hospital-based Active Surveillance guidelines

D.5 National Health Emergencies and Disaster Management Plan (HEADMAP)

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# Executive Summary

Public health surveillance is a critical tool in the prevention and control of disease. It is defined by the World Health Organisation as "…the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice". Essentially, this highlights that data collected and analyzed through surveillance should inform public health action. For communicable diseases, surveillance provides data on the epidemiology and burden of disease, which guides in monitoring and control. Communicable disease surveillance is also closely linked to outbreak response i.e. timely and accurate surveillance information is instrumental in the early detection and response to outbreaks. And timely response has the potential to mitigate the impact of an outbreak on Fiji's people.

This guideline provides a basis for surveillance and response, and is intended for use by health workers, and all others involved in the monitoring and control of communicable diseases. The guideline has been restructured from the last edition (2010). Section 1 provides general information on outbreak response. Section 2 focuses on disease surveillance, notification and response systems in Fiji. Sections 3 and 4 discuss specific syndromic surveillance conditions and outbreak prone diseases or syndromes, which have been adapted from the Pacific Public Health Surveillance Network's Pacific Outbreak Manual (March 2016). Additions to content, compared to the 2010 edition, include descriptions of each of Fiji's communicable disease surveillance systems, the roles and responsibilities of laboratories, new syndromes that are being monitored, and a larger list of outbreak prone diseases - including emerging diseases like chikungunya and Zika virus disease. Also included in this edition is information on who should be responsible for declaring an outbreak, and resource allocation and mobilisation once an outbreak has been declared. Since the last edition of the guideline was published, many new national guidelines, action plans, procedural documents, forms, and templates have been developed. These have been listed under appendices, and will be made available on the Ministry of Health and Medical Services website.

This guideline now supersedes the previous edition, published in 2010. We thank all who have contributed to the formulation of these new guidelines. The main contributors are listed on Page 5, and a list of workshop participants is included in the appendix.

# Section 1:

# General Principles of Outbreak Response

## 1.1. What is an outbreak?

An outbreak is an unexpected increase in the number of cases of a disease, when the number of actual cases is more than the number of expected cases in a specific population over a specific period of time.

The number of cases needed before an outbreak is declared depends on many factors, including:

- The disease
- The country or region
- The number of expected cases (baseline), taking into account the season, population size, and any changes in the surveillance or notification system

## 1.2. How are outbreaks detected?

Outbreaks can be detected through different ways, including:

- Surveillance systems, e.g.
    - National notifiable diseases surveillance systems
    - Indicator-based surveillance, e.g. syndromic surveillance and laboratory reports
    - Event-based surveillance, e.g. unusual events such as unexpected deaths
- Reporting by health professionals
- Informal reporting from other agencies and individuals

## 1.3. Thresholds for declaring an outbreak and/or activating a response

The thresholds for declaring an outbreak vary between diseases and syndromes. Thresholds for each disease should reflect the urgency of public health response, and should be reviewed if there are significant changes in disease incidence. Examples of thresholds include:

- When the total number of cases reaches a threshold
- When the number of linked cases or cluster of cases reaches a threshold. Linked cases are people who have been potentially exposed to the same infection source, e.g. household members, neighbours, attend the same school, work in the same place, drink from the same water source, or attended the same gathering
- When the number of expected cases during a time period is greater than a threshold, e.g. more than 2 standard deviations above the average for the past 5 years for that week or month

- When the incidence is greater than a threshold, e.g. > x cases/10,000 population/month

For diseases that are **uncommon but serious** (e.g. meningococcal infection), single cases are considered an "outbreak" and require immediate response. For diseases that are **endemic in Fiji** (e.g. dengue, leptospirosis and typhoid), the following guidelines should be used:

- An **OUTBREAK** will be declared if incidence rate is >2 standard deviations above the average for the last 5 non-outbreak years
- **ALERTS** will be issued if incidence rate is above average, and again if > 1 standard deviation above the average for the last 5 non-outbreak years
- Outbreaks and alerts should be based on incidence rather than case numbers, but surveillance reports should include both incidence and case numbers.
- Incidence for each epidemiological week and month should be reported for the whole country and for each Division and Subdivision. Divisional or Subdivisional-level thresholds could provide better and/or earlier indications of outbreaks compared to national-level thresholds. For example, a high incidence in one Division could be "hidden" when data from all Divisions are combined for analyses.
- For weekly incidence, the moving average for previous 4 weeks should be used
- Before declaring an outbreak, it is important to verify the surveillance data to ensure that the increase in cases is not due to some artefact, including data quality, reporting methods, or changes in case definitions, use of laboratory tests, or policies.

Some **thresholds recommended by the PPHSN** for immediate response:

1. Single cases

- Acute fever and rash
- Acute flaccid paralysis/polio
- Measles
- Rubella (German measles)
- Meningococcal disease
- Cholera
- Ciguatera fish poisoning

2. Cluster of cases (in terms of time, place, or person)

- 5 or more linked cases of watery diarrhoea
- 3 or more linked cases of bloody diarrhoea
- 2 or more linked cases of leptospirosis
- 5 or more linked cases of influenza-like illness (ILI)
- 2 or more linked cases of severe acute respiratory infection
- 2 or more linked cases of endemic hepatitis

3. Any serious event resulting in an unusually high number of cases with similar or severe symptoms, especially deaths.

The current thresholds used to define outbreaks of endemic diseases and syndromic surveillance conditions in Fiji are described in Sections 2 and 3 under each disease and syndrome.

## 1.4. Aims of outbreak response

Investigating and responding to an outbreak should aim to:

- Control and prevent disease
- Prevent further outbreaks from the immediate source and other similar sources
- Research and gain additional knowledge about disease transmission
- Identify new and emerging disease agents
- Evaluate disease surveillance systems and control programs
- Build capacity in outbreak response through training and development
- Consider public, political, economic or legal concerns
- Meet and satisfy international obligations where relevant

## 1.5. Steps in outbreak investigation and response

Outbreak investigation and response should be conducted in a systematic manner to ensure that the work is done thoroughly and efficiently, and provide accurate and timely information for public health action. During the heat of an investigation, following a systematic approach will also ensure that critical steps are not overlooked.

The following steps are provided as a guideline – they are not fixed, and are often initiated simultaneously. In some situations, control measures can and should be implemented immediately,

without waiting for the full investigation to be completed. For some diseases, results of laboratory investigations may take weeks, and the outbreak investigation team should not delay action while waiting for laboratory confirmation.

Many components of outbreak investigation and response are dynamic, including case definitions, line listings, descriptive epidemiology, and hypotheses, i.e. they might need to change as additional information become available.

**Step 1. Prepare for fieldwork ('Be Prepared')**

In our context, this is an important step to ensure that outbreak teams are well prepared with the relevant skills, knowledge and personnel to conduct an investigation well before an outbreak is identified. Also the team should have the capacity to effectively institute control measures while awaiting further assistance. This preparation can be at an institutional or administrative level e.g. medical subdivision level, and the range of activities can vary from setting up an outbreak response team, describing SOPs for team cohesion, regular staff training, outbreak exercises, attachments, formal certifications, to preparing an inventory of emergency equipment for such events.

Basically preparations can be grouped into 3 categories:

A. Investigation

- Appropriately skilled and trained personnel
- Equipment to carry out the investigation
- Literature review/references
- Sample questionnaires.
- Consult laboratory staff concerning proper laboratory material and collection, storage, and transportation techniques.

B. Administration

- Administrative procedures.
- Travel and other arrangements

C. Consultation

- Know your expected role in the field
- Know who your local contacts will be

- Know when and where you are to meet with local officials and contacts

**Step 2. Establish existence of an outbreak**

This may be obvious – many cases occurring within a short time period, or less obvious, where analysis of surveillance data is showing a higher observed rate of disease with that which is expected. However sometimes reports of outbreaks can be based on incorrect information or rumours. Also, an increase in cases of disease may be within normal variation and may not be an outbreak. Make sure that the reported cases really exist, that they have the same disease, and that the rise in cases is not a result of, for example, a reporting error or a laboratory mistake.

Once the outbreak has been confirmed that there is a likely increase in cases of a certain disease, the outbreak response team should be activated. Cases may be detected through disease surveillance, clinical diagnosis of disease or local laboratory testing. Talking with laboratory staff is important to ensure that the correct samples are collected and samples are stored and transported appropriately. Specialized testing may be required in a reference laboratory.

**Step 3. Verify the diagnosis**

Although this may be assumed, it is important to ensure that proper diagnosis has occurred and that laboratory or other diagnostic error is not the reason for the increase in diagnosed cases.

**Step 4. Define and identify cases**

A first step should be to develop a case definition. This maybe an existing surveillance case definition or a modified case definition for the purpose of deciding whether an individual should be classified as having the disease under investigation or not. This outbreak specific case definition defines a case in terms of time, place and person. Time information may include the period of time in which cases occurred. Place information usually includes a geographical location such as a town, or province but may be as small as an institution, a school class, or community function. Person information may include age, sex, ethnicity, and clinical characteristics such as symptoms (e.g. cough and fever). It is important that the team uses the same case definition; otherwise there will be much confusion about the number of cases.

With using the case definition, the next step is to identify cases and collect information. Demographic information such as age, sex, address and telephone numbers are useful. Interviewing cases about what may have caused their illness is important. Information to collect depends on the outbreak and may

include a travel history, vaccination history or detail about the food and drink consumed by the case. A questionnaire maybe developed to help the investigating team to ask the right questions.

A line list (Table 1) is then completed to summarise all the collected information about the cases or those might be cases in the outbreak. A line list allows rapid analysis of the data using an excel worksheet and usually include demographic, clinical information and other details of persons interviewed. A line list will usually include case name, address and contact details, date of onset of illness, date of exposure, symptoms, specimens taken and results of laboratory tests.

**Table 1. Example of line list generated during an outbreak investigation**

| | TIME | | PLACE | PERSON | | | | SIGNS AND SYMPTOMS | | | LAB |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Report Date | Onset Date | Village | First Name | Last Name | Sex | Age | Nausea | Vomiting | Jaundice | Positive |
| 1 | 6/12/16 | 4/12/16 | A | Kelepi | Fatani | M | 36 | Yes | Yes | Yes | Yes |
| 2 | 6/12/16 | 4/12/16 | B | Isileli | Koula | M | 68 | Yes | No | Yes | Yes |
| 3 | 5/12/16 | 2/12/16 | A | Sone | Tatafu | M | 37 | Yes | No | Yes | Yes |
| 4 | 7/12/16 | 5/12/16 | C | Lia | Nalatu | F | 22 | No | No | No | NA |
| 5 | 8/12/16 | 7/12/16 | C | Teo | Lopeti | M | 34 | Yes | Yes | No | No |
| 6 | 6/12/16 | 3/12/16 | B | Mele | Tuimo | F | 43 | No | No | Yes | Yes |

### Step 5. Perform descriptive epidemiology

After completing a line list, an epidemic curve, or "epicurve", should be created to describe the outbreak. The epidemic curve should be assessed for;

- The overall shape of the curve to assist in determining how the outbreak spread throughout the population
- Number of confirmed, clinical, and suspected cases
- Number of deaths associated with the disease or illness
- Demographic information e.g., age, gender, and job classification

For every outbreak it is always necessary to describe the cases by **Time, Place, and Person**.

The **TIME** refers to the date and time of onset of illness, but if that is not available, date of diagnosis or presentation is used. It is best to draw an epidemic curve that shows the number of cases by time of onset. The x-axis (bottom) shows a measure of time, for example hours, days, or months. The y-axis

(vertical) shows the count of cases for that measure of time. See Figure 1 for an example of an epidemic curve. Time is also used to describe when exposure to risk factors may have occurred.

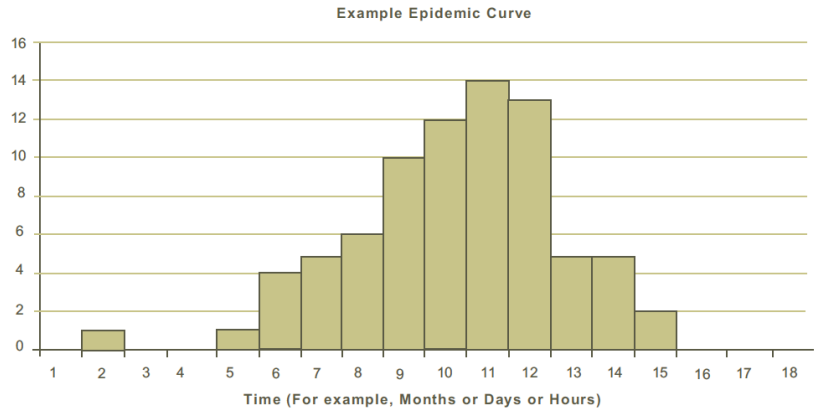


**Figure 1. Example of an epidemic curve**

**PLACE** refers to where the patients live or where they were mostly likely to have been infected (e.g. school, work, recreational area). Sometimes it's a good idea to put the cases on a map. This is called a spot map. Figure 2 shows an example of s spot map, showing the location of cases and other landmarks.

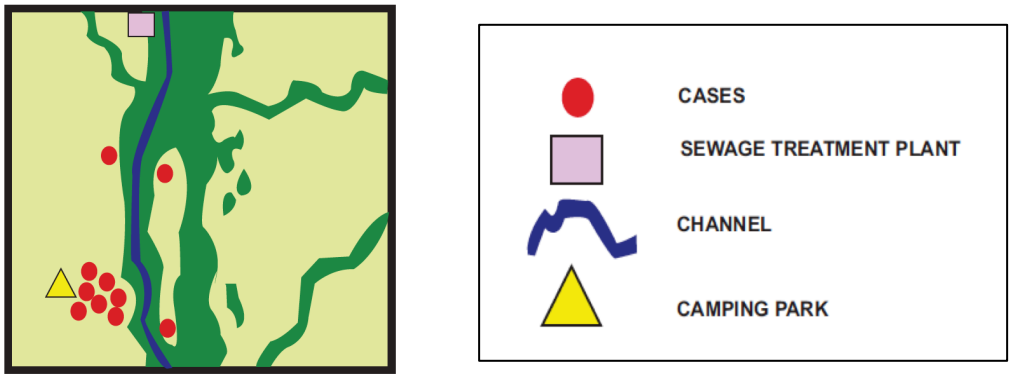


**Figure 2. Example of a spot map, showing residential locations of cases and landmarks**

**PERSON** refers to information about the cases, including age, sex, occupation, risk factors, etc which might provide clues to explain the outbreak.

### Step 6. Develop a hypothesis

The hypothesis is an educated guess about the source of the disease, mode of transmission, and/or exposures that caused the disease, based on available information. It guides the public health response to the outbreak. A good understanding about the mode of transmission of a disease and potential exposure pathways will help to generate a hypothesis. For many diseases, environmental factors also play an important role in driving disease transmission. For example, Figure 3 shows how population growth, urban development, degradation of natural environments, and higher rainfall can affect the risk of leptospirosis.

Some questions to consider in developing the hypothesis are:

- What does the epidemic curve suggest?
- What events occurred around that time?
- Do people living in a particular area have a higher attack rate?
- Are groups with particular age, sex, or other person characteristics, at greater risk than other groups with different person characteristics?

Implement control and prevention measures AS EARLY AS POSSIBLE. Control measures are often more general to begin with and become more specific as the cause of the outbreak is identified. This may include, but not limited to, the following:

- Vaccinations / Chemoprophylaxis
- Cancellation of gatherings
- Product recall
- Restaurant closures
- Vector control measures
- Sanitation measures / water purification
- Respiratory precautions
- Workplace health and safety
- Proper management of livestock

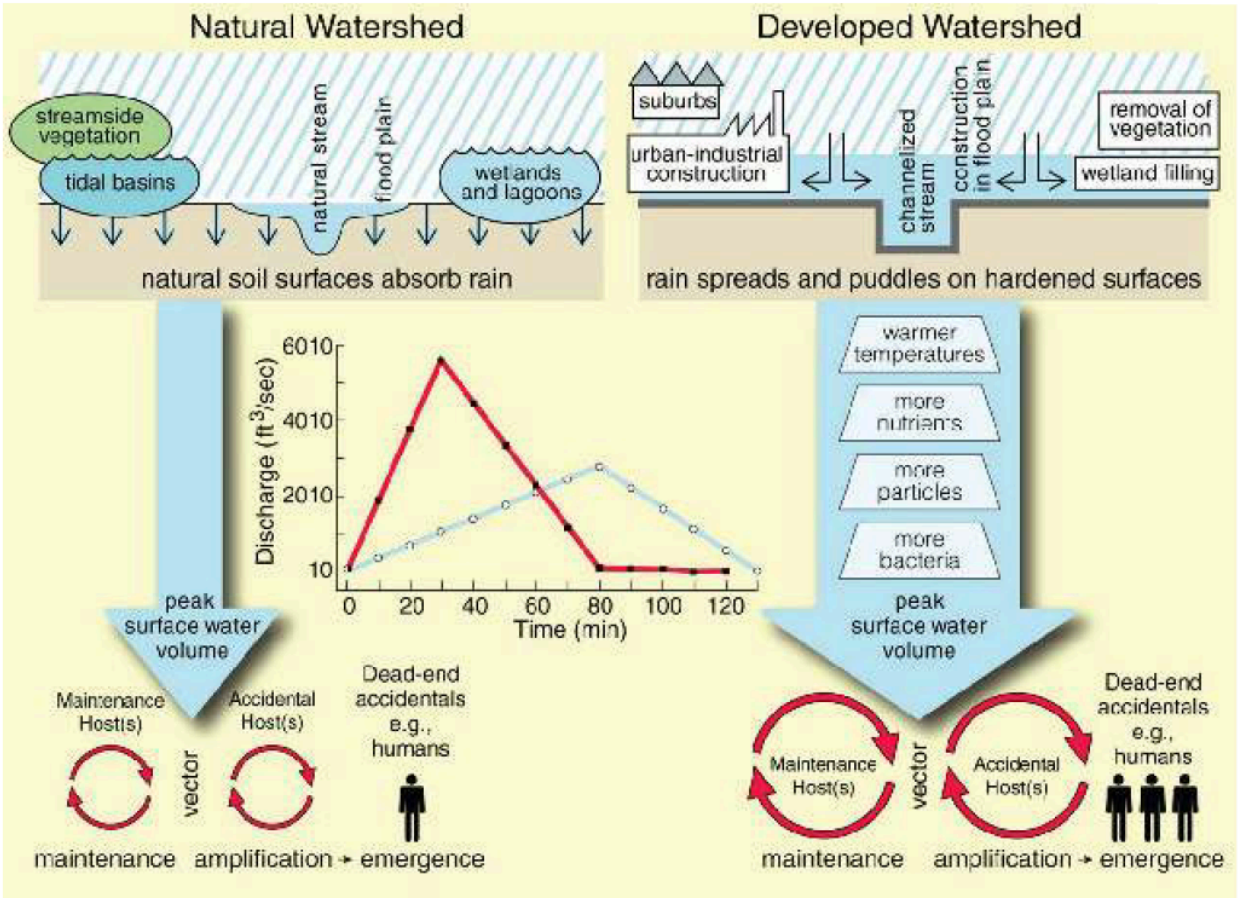


**Figure 3. The impact of environmental factors on leptospirosis transmission**

**Step 7. Evaluate the hypothesis**

There are methods to evaluate the credibility of the hypothesis that is not described in detail this in guideline. There are two basic approaches:

3.1 Comparison of the hypotheses with the established facts, and

3.2 Analytic epidemiology, which allows you to test your hypotheses.

The former refers to when the evidence is so strong that the hypothesis does not need to be tested. Strong clinical, laboratory, environmental, and/or epidemiologic evidence can support the hypotheses and the course of action to be taken. The second method, analytic epidemiology, is used when the cause is less clear and includes case-control studies, cohort studies, and cross-sectional studies.

**Step 8. As necessary, reconsider/refine hypothesis**

Where initial testing of your hypothesis does not provide sufficient clues to a possible or probable cause or source of risk, it may be necessary to undertake additional epidemiologic, laboratory or environmental studies. This may be done to look for less obvious links amongst cases or to consider new vehicles or modes of transmission.

**Step 9. Implementing control and prevention measures**

Control and prevention methods are usually aimed toward the source of the disease, but may also include interrupting transmission or limiting exposure. Control measures, which can be implemented early if the source of an outbreak is known the source of an outbreak, should be aimed at specific links in the chain of infection, the agent, the source, or the reservoir. For example, destroying contaminated foods, sterilizing contaminated water, destroying mosquito breeding sites, or requiring an infectious food handler to stay away from work until well. Interrupting transmission or exposure by wearing insect repellent and protective clothing. In some outbreaks, direct control measures can reduce susceptibility such as immunization. Once the cause of the outbreak has been identified, investigators should work to implement longer-term control measures to end the current outbreak and prevent future outbreaks. These control measures are more extensive than earlier control measures and should be evaluated to determine if they are effective.

**Step 10. Communicate findings**

Findings of the investigation should be communicated to local health authorities who are responsible for implementing control measures. In addition, a written report provides a legal record of the findings and contributes to public health awareness. It generally takes two forms: 1) a verbal briefing and 2) a written report. A verbal briefing should be presented in a scientifically objective fashion, and the investigator should be able to defend their conclusions and recommendations. A written report is critically important and follows the following basic format:

- Introduction
- Background
- Methods
- Results, e.g. epi-curve, analytical epidemiology
- Discussion
- Recommendations

The report provides a blueprint for action by presenting the recommendations. It also serves as a record of performance, a document for potential legal issues, and a reference if the health department encounters a similar situation in the future. Finally, a report that finds its way into the public health literature serves the broader purpose of contributing to the scientific knowledge base of epidemiology and public health. All identified outbreaks should be described in a written report and forwarded to the Divisional Medical Officer (DMO) with a copy to the National Adviser Communicable Disease (NACD) within a month after the outbreak is under control.

**Step 11. Ramping down the outbreak response**

Once an outbreak is over, it is important to ramp down the outbreak response so that activities and resource allocation be returned to routine levels. The surveillance team should advise everyone when incidence has dropped below outbreak thresholds, and provide a summary of the outbreak, including incidence, case numbers, and deaths. It is also important to communicate to the general public that an outbreak is over.

# Section 2:

# Disease Surveillance, Notification and Outbreak Response

## 2.1. Importance of disease surveillance

Surveillance is the continuous, systematic collection, analysis and interpretation of health related data, and is closely integrated with timely dissemination of information to those responsible for preventing and controlling disease. Reporting (used interchangeably with the term 'notification' here) of communicable disease supports surveillance at both a local and national level.

Data collection on diseases and conditions under surveillance should be considered as an essential step to prevent, protect against, control and facilitate public health responses to the spread of diseases. Wherever possible, surveillance information should be simple, complete, timely and useful so as to provide an evidence base to support effective public health action and response. Importantly, maintaining an effective routine surveillance system enables the early detection of outbreaks.

The establishment of baseline information for the diseases under surveillance is important in order to:

- Identify and describe a problem
- Determine geographic distribution of disease
- Describe the natural history of a disease
- Enable research
- Evaluate control measures
- Monitor change in infectious agents
- Detect changes in health practice
- Assist planning

## 2.2. Disease surveillance systems and reporting processes in Fiji

There are currently multiple communicable disease surveillance systems in Fiji, including:

- National Notifiable Disease Surveillance System (NNDSS)
- Influenza Surveillance
- Tuberculosis Surveillance
- Vaccine-preventable Disease (VPD) Surveillance
- HIV/AIDS Surveillance
- Hospital-based Active Surveillance (HBAS)

- Syndromic Surveillance, including the Early Warning Alert and Response System (EWARS)
- Event-based Surveillance
- Laboratory-based Disease Surveillance for leptospirosis, typhoid and dengue fever (LTD)
- Morbidity and Mortality Registers – Patient Information System (PATIS)
- Public Health Information System (PHIS)

Note that some diseases are monitored under NNDSS as well as diseases-specific or syndrome-specific systems. Each system has different reporting pathways, which are described below.

### 2.2.1. National Notifiable Diseases Surveillance System (NNDSS)

The NNDSS monitors a comprehensive list of diseases and syndromes (Table 2). The reporting of notifiable diseases has been in existence since 1938 by enactment of the Public Health Ordinance (Annual Report 1952 –Fiji). In accordance with the Public Health Act (Cap.111), **Medical Officers** are required to notify all diseases and conditions listed on the National Notifiable Disease Surveillance Schedule (Table 2). The notification pathways for NNDSS are shown in Figure 4.

**Laboratories** are required to notify laboratory-confirmed cases, as indicated in Table 2. Other health professionals including **nurses, nurse practitioners**, and **environmental health officers (health inspectors)** should also be aware of the list of diseases in the NNDSS schedule, and report any suspected or confirmed cases to a medical officer as soon as possible. Note that for most diseases, reporting by BOTH medical officers and laboratories are required.

The list is divided into **urgent** and **routine** conditions.

**For urgent conditions:**

- The notifying medical officer or laboratory should:
    - Notify DMO immediately by phone
    - Complete the NNDSS Reporting Form (Appendix B) within 24 hours and submit copies to the DMO, NACD and HIU and retain the original form as a record
- The DMO will report to the NACD and the DSPH
- The NACD (or designated Surveillance Officer) will review all urgent notifications and submit a monthly report to the DMOs and the Deputy Secretaries.

**For routine conditions:**

- The notifying medical officer or laboratory should:
    - Complete a NNDSS Reporting Form (Appendix B) within 7 days and submit copies to the DMO, NACD and HIU, and retain the original form as a record.
- The epidemiologist in charge of the Health Information Unit at the Fiji MHMS will review all routine notifications monthly, and submit reports to DMOs and the Deputy Secretaries.

During outbreaks, a line list of cases should also be submitted.

**Table 2. National Notifiable Diseases Surveillance Schedule**

| URGENT | | | ROUTINE | | |
|---|---|---|---|---|---|
| **Immediate notification by phone** | **Dr** | **Lab** | **Weekly notification by reporting form** | **Dr** | **Lab** |
| Acute flaccid paralysis | ✓ | | ARI under 5 years | ✓ | |
| Anthrax | ✓ | ✓ | Brucellosis (including Undulant fever) | ✓ | ✓ |
| Botulism | ✓ | ✓ | Chickenpox (Varicella) | ✓ | ✓ |
| Chikungunya | ✓ | ✓ | Dysentery (Amoebic) | ✓ | ✓ |
| Cholera | ✓ | ✓ | Dengue fever | ✓ | ✓ |
| Diphtheria | ✓ | ✓ | Encephalitis | ✓ | ✓ |
| Enteric fevers: | | | Ciguatera fish poisoning | ✓ | |
| (a) Typhoid | ✓ | ✓ | Hand, Foot and Mouth Disease (HFMD) | ✓ | |
| (b) Paratyphoid | ✓ | ✓ | Haemophilus influenzae B | ✓ | ✓ |
| Influenza | | ✓ | Hepatitis B & C | ✓ | ✓ |
| Measles | ✓ | ✓ | Influenza-like illness | ✓ | |
| Meningococcal disease | ✓ | ✓ | Invasive pneumococcal disease | ✓ | ✓ |
| Multi-drug resistant organisms: | | | Legionellosis | ✓ | ✓ |
| (a) MRSA | ✓ | ✓ | Leprosy | ✓ | ✓ |
| b) VRSA | ✓ | ✓ | Leptospirosis (Weil's disease) | ✓ | ✓ |
| (c) VRE | ✓ | ✓ | Malaria | ✓ | ✓ |
| (d) MDR-TB | ✓ | ✓ | Meningitis (non-meningococcal) | ✓ | ✓ |
| (e) XDR-TB | ✓ | ✓ | Mumps | ✓ | ✓ |
| Outbreaks/clusters of: | | | Pertussis | ✓ | ✓ |
| ▪ Cryptosporidiosis | ✓ | ✓ | Rheumatic fever | ✓ | |
| ▪ Dengue fever | ✓ | ✓ | Rubella – acute | ✓ | ✓ |
| ▪ Food poisoning | ✓ | ✓ | Rubella – congenital rubella syndrome | ✓ | ✓ |
| ▪ Giardiasis | ✓ | ✓ | Scabies | ✓ | |
| ▪ Shigellosis | ✓ | ✓ | Sexually-transmitted infections: | ✓ | ✓ |
| ▪ Hepatitis A & E | ✓ | ✓ | (a) Gonorrhoea | ✓ | ✓ |
| ▪ Ross River virus | ✓ | ✓ | (b) Syphilis | ✓ | ✓ |
| ▪ Leptospirosis | ✓ | ✓ | (c) Chlamydia | ✓ | ✓ |
| Plague | ✓ | ✓ | Tetanus | ✓ | ✓ |

| | | | | | |
|---|---|---|---|---|---|
| Poisoning arising from chemical contamination of the environment | ✓ | ✓ | Trachoma | ✓ | |
| Poliomyelitis | ✓ | ✓ | Tuberculosis: | | |
| Rabies | ✓ | ✓ | (a) Pulmonary | ✓ | ✓ |
| Severe acute respiratory infection (SARI) | ✓ | | (b) Non-pulmonary | ✓ | ✓ |
| Viral haemorrhagic fever | ✓ | ✓ | | | |
| Yellow fever | ✓ | ✓ | | | |
| Zika | ✓ | ✓ | | | |
| Any other emerging infectious diseases of public health importance notified by the Permanent Secretary for Health and Medical Services | ✓ | ✓ | | | |

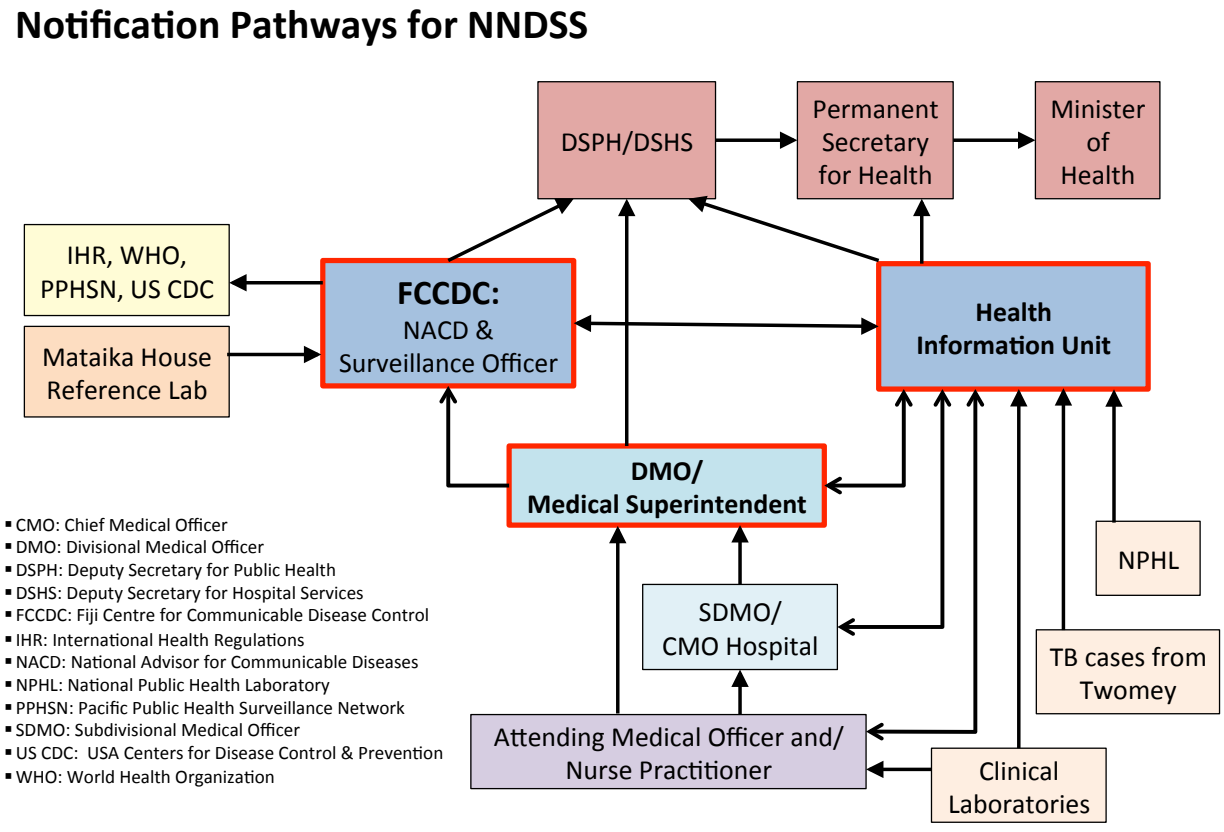


**Figure 4. Notification pathways for the National Notifiable Diseases Surveillance System (NNDSS)**

### 2.2.2. Influenza surveillance

Clinical cases of influenza-like illness (ILI) and laboratory-confirmed cases of influenza are reported weekly under the NNDSS, as shown in Figure 5. ILI is also reported in Syndromic Surveillance/ EWARS, discussed further in **2.2.6**. There are also select sentinel surveillance sites, where medical officers are trained in the collection of nasopharyngeal specimens for patients with ILI. These are sent weekly to the National Influenza Centre (NIC) at FCCDC for monitoring influenza strains circulating in Fiji.

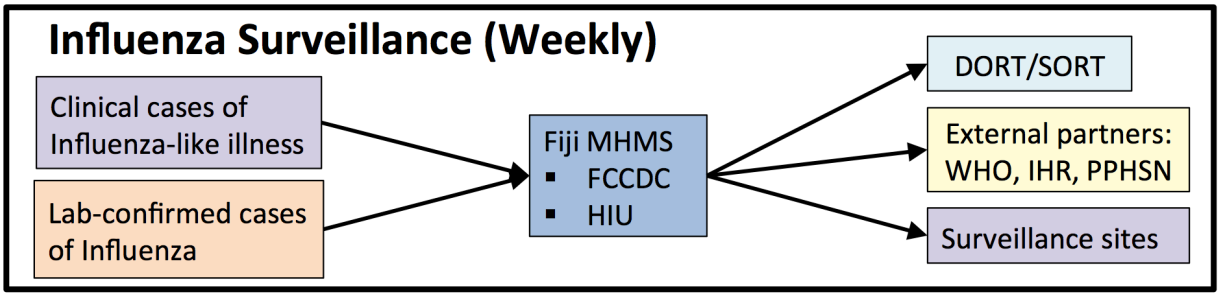


**Figure 5. Notification pathways for Influenza Surveillance System**

- DORT: Divisional Outbreak Response Team
- FCCDC: Fiji Centre for Communicable Disease Control
- HIU: Health Information Unit
- IHR: International Health Regulations
- PPHSN: Pacific Public Health Surveillance Network
- SORT: Subdivisional Outbreak Response Team
- WHO: World Health Organization

### 2.2.3. Tuberculosis Surveillance

All laboratory-confirmed cases of tuberculosis (TB) from the Twomey Tuberculosis Hospital in Suva should be reported under the TB surveillance system, as shown in Figure 6, and the NNDSS.

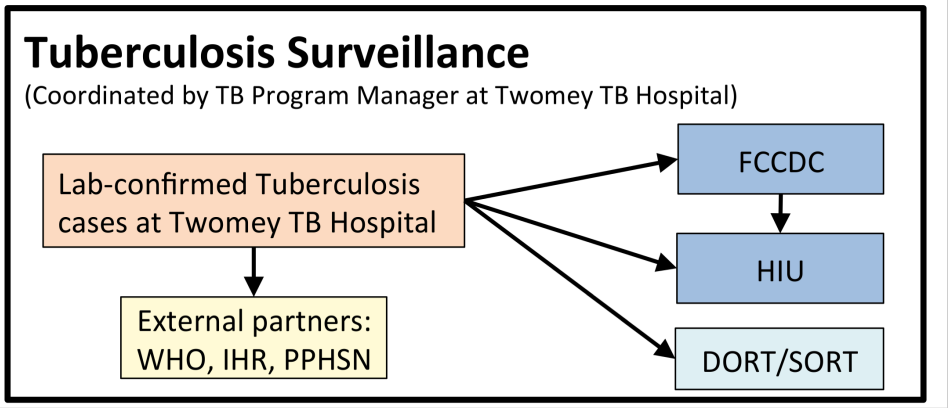


**Figure 6. Notification pathways for Tuberculosis Surveillance System**

The following have also been recommended for TB surveillance and control (new TB clinical guidelines under development):

- The TB Unit should come under the leadership of the NACD
- The TB Unit should follow the reporting system for NNDSS
- For the protection of the general public, the Public Health Act should be strengthened regarding the treatment of TB patients who are not willing to adhere to medical recommendations. The Public Health Act is currently under revision and it is strongly recommended that the revised Act and/or the regulations provide mechanisms to enforce treatment for non-compliant patients.

### 2.2.4. Vaccine Preventable Disease Surveillance

Clinical and laboratory-confirmed cases of Vaccine Preventable Diseases (VPD) are reported quarterly as shown in Figure 7, but some conditions highly infectious diseases that may cause serious morbidity and mortality (e.g. measles) require urgent reporting under NNDSS (Table 2.)

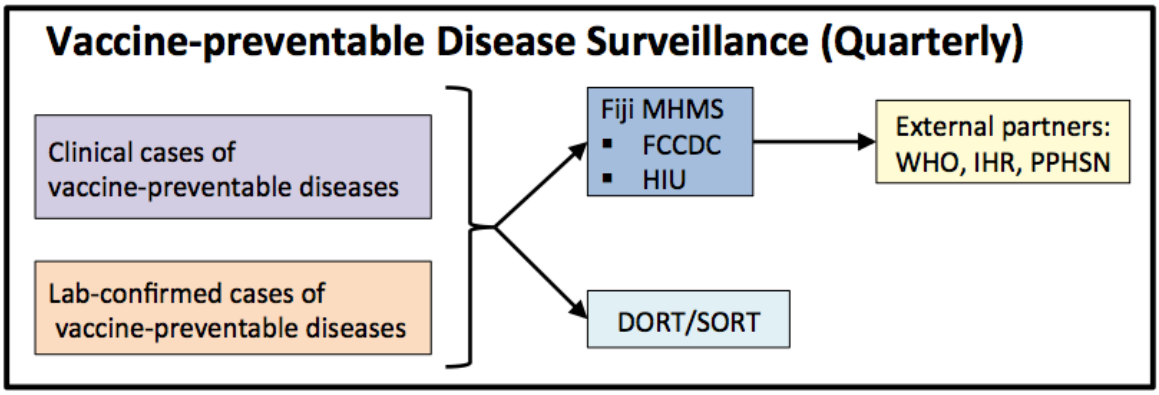


**Figure 7. Notification pathways for Vaccine-Preventable Disease Surveillance**

## 2.2.5. Hospital-based Active Surveillance (HBAS)

The Hospital Based Active Surveillance system monitors the following conditions at 21 sites in Fiji:

- Clinical cases of acute flaccid paralysis (for polio), neonatal tetanus, and acute fever and rash (for measles/rubella)
- Laboratory-confirmed cases of measles and rubella

This active surveillance system is important for the surveillance of diseases that should be prevented by our national immunisation program (VPD). And also include certain diseases (e.g. measles) that are highly infectious and cause serious morbidity and mortality, particularly in children. HBAS may be considered complementary to VPD surveillance in the NNDSS.

Reporting is conducted monthly as shown in Figure 8, but note that some conditions require urgent reporting through the NNDSS, e.g. measles (Table 2.)

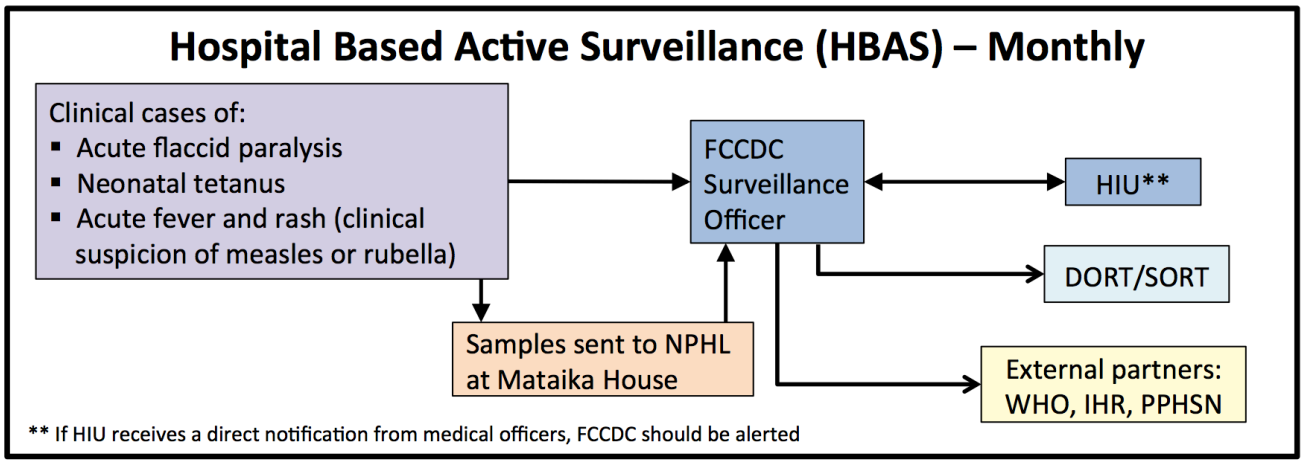


**Figure 8. Notification pathways for Hospital-Based Active Surveillance System (HBAS)**

## 2.2.6. Syndromic Surveillance: Early Warning Alert and Response System (EWARS)

Syndromic surveillance is intended for use as early warning for outbreaks of communicable disease. The weekly reporting of syndromes, rather than confirmed diseases, is key to timely alert of a potential outbreak, as often, in resource-limited settings, requiring laboratory confirmation results in delays in reporting and response. Once an alert is generated, through the surpassing of a predetermined syndrome

specific case number threshold, the SORT or DORT will respond to verify the alert through an outbreak investigation (following the steps outlined in **1.5**). There are currently 35 EWARS syndromic surveillance sites around Fiji, with an intention to expand further.

There are currently five core syndromic surveillance conditions:

- Acute fever and rash (AFR)
- Influenza-like illness (ILI)
- Prolonged fever
- Water diarrhoea
- Dengue-like illness (DLI)

An additional four syndromes have been monitored since the introduction of EWARS in April 2016:

- Bloody diarrhoea
- Acute jaundice syndrome
- Suspected meningitis
- Zika-like illness

Each syndrome is described in detail under Section 3 of this manual. The reporting pathways for syndromic surveillance are shown in Figure 9. Core syndromic surveillance conditions are also reported to PPHSN, contributing to the Pacific Syndromic Surveillance Report, which is updated weekly via the PacNET email listserv.

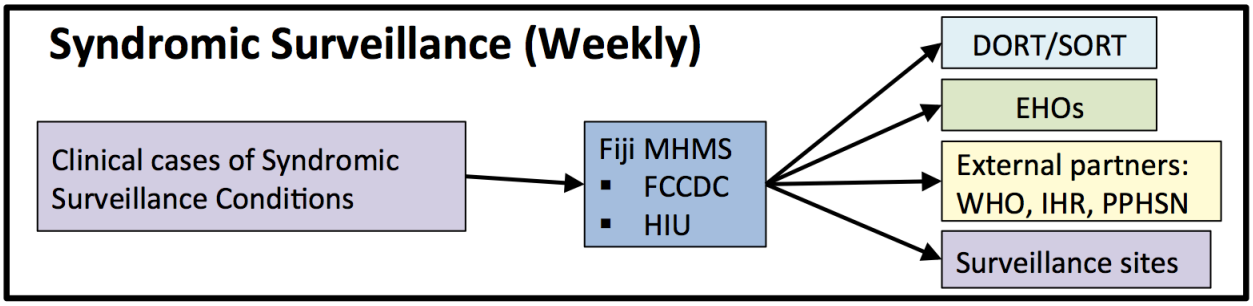


**Figure 9. Notification pathways for Syndromic Surveillance conditions**

## 2.2.7. Event-based Surveillance

The event-based surveillance system is intended to monitor unusual events, not only in humans, but also in birds, animals, and the environment. Events of interest include diseases in humans, clusters of

diseases, unusual patterns in diseases (e.g. more severe cases), unexpected deaths, high work/school absenteeism, die offs in birds or animals, contaminated food or water, and environmental hazards (e.g. chemical spills). The reporting pathways are shown in Figure 10.

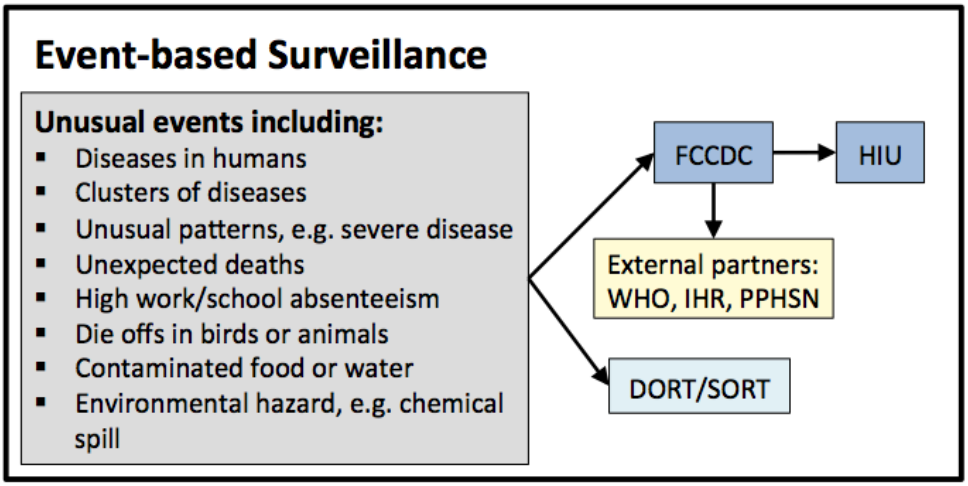


**Figure 10. Notification pathways for Event-based Surveillance System**

## 2.3. Notifying the World Health Organisation under the International Health Regulations

Under the International Health Regulations (IHR 2005), any suspected disease outbreak or other public health event that is considered to be of potential Public Health Emergency of International Concern (PHEIC) must be reported as soon as possible to the WHO. The National IHR Focal Point (NFP) is responsible for reporting to the WHO. Currently, the NACD is the NFP. For assistance on what may be considered as a potential PHEIC, and mandatory timelines for notification, see the IHR Decision Instrument in Appendix A.3.

## 2.4. Feedback and reporting of surveillance data

The key persons responsible for providing feedback and reports of surveillance data are the:

- **DMO** – responsible for monitoring all urgent notifications in their Division, and reports regularly to the NACD, Deputy Secretaries, HIU, and the reporting medical officers
- **FCCDC** (designated medical or surveillance officer) – responsible for producing monthly reports of all urgent NNDSS notifications, Syndromic Surveillance/EWARS, LTD, Influenza, HBAS, VPD, and outbreaks, including epidemiological analyses such as case numbers (by age, sex, and Division), disease incidence rate, epidemic curves, and outbreak thresholds.
- **Epidemiologist** in charge of the HIU at the Fiji MHMS – responsible for collating, analysing, and disseminating reports of routine NNDSS notifications.

## 2.5. Roles and responsibilities in surveillance, notification and reporting

Although the Public Health Act (Cap.111) specifies that Medical Officers are obligated to report notifiable diseases listed in the NNDSS, it is important that other health workers also take responsibilities for surveillance and notification, helping ensure that diseases are notified promptly and accurately. Table 3 summarises the roles and responsibilities for each health professional or team. If any clarifications are required, e.g. for unusual situations, please refer to the Divisional Medical Officer and Divisional Health Inspector.

**Table 3. Summary of roles & responsibilities for disease surveillance, notification and reporting**

| Responsible Officer/Team | Roles and Responsibilities |
|---|---|
| **Fiji Centre for Communicable Disease Control (FCCDC)** | ▪ Receive urgent notifications within 24 hours of suspected or confirmed cases of urgent notifiable diseases (NNDSS)<br>▪ Provide monthly reports on urgent notifications and outbreaks to the Fiji MHMS, including epidemiological analyses such as case numbers by (by age, sex, and Division), disease incidence, epidemic curves, and outbreak thresholds<br>▪ Provide technical advice and assistance as requested by Divisions and medical officers<br>▪ Conduct risk assessment of diseases of public health importance, determine seriousness of public health events and the likelihood of international spread<br>▪ Notify WHO of potential public health emergency of international concern (PHEIC) under IHR 2005<br>▪ Report syndromic surveillance data to PPHSN<br>▪ Liaise with external partners as required, including WHO, SPC, PPHSN, US CDC, NGOs, and researchers.<br>▪ Manage the Early Warning Alert and Response System (EWARS) including oversight of data collection, collation and feedback on indicator-based syndromic surveillance and event-based surveillance of communicable disease threats and their verification, risk assessment and investigation/response as required. |
| **Health Information Unit** | ▪ Receive all routine notifications from Medical Officers and Laboratories via the NNDSS Notification Form within 7 days of suspected or confirmed disease<br>▪ Collate, analyse and interpret NNDSS data for Fiji MHMS<br>▪ Monitor disease trends at the national level<br>▪ Provide technical advice and assistance as requested by medical officers<br>▪ Disseminate surveillance reports to medical officers and key stakeholders and upload reports onto the Fiji MHMS website |
| **Divisional Outbreak** | ▪ Respond to Divisional outbreaks (see Section 2.9) and submit outbreak |

| | |
|---|---|
| **Response Team (DORT)** | reports to NACD, DSPH, and PSHMS |
| **Divisional Medical Officer (DMO)** | ▪ Receive telephone report of all urgent notifications and notification forms within 24 hours.<br>▪ Receive notification forms of all routine notifications within 7 days<br>▪ Collect, collate and analyse surveillance data from the division provided by SDMO's, MO's, Manager Clinical Services, Laboratories, Risk Management Committees, etc.<br>▪ Consolidates divisional surveillance data and provide feedback to NACD, PSHMS, HIU and notifying medical officers<br>▪ Receive Syndromic Surveillance/EWARS data and ensure verification of alerts by Divisional/Subdivisional team<br>▪ Liaise with the PSHMS, divisional clinical health services, other stakeholders and FCCDC regarding any alerts or outbreak response activities |
| **Sub-Divisional Outbreak Response Team (SORT)** | ▪ Respond to Sub-Divisional outbreaks (see Section 2.9) and submit outbreak reports to DMOs |
| **Sub-Divisional Medical Officer (SDMO)** | ▪ Notify DMO & FCCDC on urgent notifiable diseases within 24 hours<br>▪ Notify DMO, HIU on routine notifiable diseases within 7 days<br>▪ Notify DMO of any notifiable disease events e.g. outbreaks in the area<br>▪ Collate & analyse subdivisional notifiable disease report and provide feedback to staff<br>▪ Receive Syndromic Surveillance/EWARS data and ensure verification of alerts by Subdivisional team |
| **Divisional and Sub-divisional Health inspectors (Environmental Health Officers)** | ▪ Syndromic surveillance/EWARS, verification of alerts. For example, to investigate an alert of a case with acute fever & rash (alert threshold = 1 case_<br>▪ Notify the respective Medical Officer (Medical Area) or SDMO of any public health or environmental health threats or emergencies |
| **Medical Superintendent** | ▪ Notify Directors, public health managers, clinicians, pharmacist, and laboratories of public health events or threats within the institution<br>▪ Notify the respective DMO of any urgent notifiable diseases or |

| | |
|---|---|
| | conditions for investigation |
| **Area Medical Officers / General Practitioners / Nurse Practitioners** | ▪ Notify DMO & FCCDC of Urgent notifiable conditions within 24 hrs.<br>▪ Notify DMO, HIU of Routine notifiable conditions within 7 days<br>▪ Collate weekly/monthly data for tabulation and analysis<br>▪ Report suspected disease outbreaks to DMO<br>▪ When an unusual death occurs, the clinical team should also conduct a root cause analysis (RCA) investigation |
| **Zone/District Nurse (Nursing Station)** | ▪ Syndromic surveillance/EWARS, verification of alerts. For example, to investigate an alert of a case with acute fever & rash (alert threshold = 1 case)<br>▪ Report on the Public Health Information System (PHIS) of an increased number of infectious disease cases or incidents in the area.<br>▪ Immediately notify the Medical Officer in charge of any suspected infectious diseases or events in the Zone/District. |
| **Laboratories** | ▪ Notify DMO & FCCDC of urgent notifiable conditions with 24 hrs<br>▪ Notify DMO, HIU of routine notifiable conditions within 7 days<br>▪ Notify Risk Management Committee & requesting doctor of any notifiable conditions<br>▪ Collate quarterly data for tabulation and analysis<br>▪ Report LTD data weekly to DMO and FCCDC |
| **Risk Management Committee** | ▪ Receive and summarize notification reports from laboratories<br>▪ Provide feedback to clinicians & manager of clinical services<br>▪ Activate alerts & investigations if warranted |
| **Border control and Biosecurity Authority of Fiji (BAF)** | ▪ Report infectious diseases listed in the NNDSS (Table 2), and other issues of public health concern |

## 2.6. Roles and responsibilities of laboratories

### 2.6.1. Clinical Laboratories

Clinical laboratories are located at each of the Divisional Hospitals (Colonial War Memorial Hospital in Suva, Labasa Hospital, and Lautoka Hospital) and Sub-Divisional Hospitals. Laboratory tests for tuberculosis are conducted at the Daulako Mycobacterium Reference Laboratory at the TB Hospital in Suva.

For some communicable disease, e.g. measles and rubella, diagnostic tests are only available at the National Public Health Laboratory at FCCDC (see below). For others, e.g. dengue and leptospirosis, rapid diagnostic tests (RDTs) are available at the clinical laboratories, but further testing such as ELISA immunoassays need to be referred to the NPHL. Please contact your laboratory for information on diagnostic tests available.

### 2.6.2. National Public Health laboratory

The Fiji Centre for Communicable Disease Control (FCCDC) National Public Health Laboratory (NPHL) is based at Mataika House, and provides services and testing for:

- Chikungunya ELISA
- Chlamydia NAAT
- Dengue ELISA
- HIV confirmation ELISA (will be decentralised to Divisional and Sub-Divisional Hospitals – quality control will continue at NPHL)
- HIV viral load
- Influenza RT-PCR (part of the WHO global network of National Influenza Centres)
- Leptospirosis ELISA
- Measles ELISA
- Rubella ELISA
- Rotavirus ELISA
- Water samples (environmental and drinking water)
- Other communicable diseases (contact NPHL staff)

The **NPHL Handbook** provides detailed information on:

- Specimen collection, labelling, storage and transport
- Turnaround time for each test
- Staff contact details
- Special information sheets for:
    - HIV DNA blood collection
    - Protocol for conditioning serum samples on filter papers
    - Nasopharyngeal specimen collection

Any changes to laboratory testing will be incorporated into NPHL and Clinical Handbooks and uploaded onto the electronic repository on the Fiji MHMS website.

The NPHL is also responsible for **sending specimens to overseas reference laboratories** for tests that are not performed in Fiji. The NPHL's Standard Operating Procedure for referral of outbreak prone disease samples provides a summary of the diagnostic tests available at each of the regional reference laboratories, contact information, and procedures for referring and shipping samples.

### 2.6.3. Laboratory Reporting of Notifiable Diseases

Please see Table 2 for the list of diseases that laboratories are required to notify.

Notifiable Diseases are classified as:

- **Urgent** – to be reported immediately by phone, and no more than 24 hours later
- **Routine** – to be reported weekly through standard notification forms

Divisional, Sub-Divisional, and private laboratories should report Notifiable Diseases to:

- Attending Medical Officer
- Health Information Unit (HIU)

The NPHL should report Notifiable Diseases to:

- Attending Medical Officer
- The requesting laboratory
- Surveillance officer at FCCDC
- Health Information Unit (HIU)

## 2.6.4. Strategies for managing laboratory supplies and workload during outbreaks

During outbreaks, it is not necessary to conduct laboratory diagnostic tests on all suspected cases. The following guidelines help to reduce the number of tests ordered, and the unnecessary drain on resources. In Fiji, this is particularly important during leptospirosis and typhoid outbreaks.

**Setting limits to laboratory testing of leptospirosis and typhoid during outbreaks:**

Once an outbreak of leptospirosis or typhoid has been declared, clinicians should make diagnoses based primarily on case definitions and clinical judgement, and limit the number of laboratory tests ordered because:

- Supplies of diagnostic tests are often limited and can be rapidly depleted,
- Laboratories have limited capacity and are unable to process all samples in a timely manner when inundated with requests, and
- In an outbreak situation, management of patients with suspected leptospirosis or dengue should be based on clinical judgement, regardless of the results of diagnostic tests. Please refer to the national clinical guidelines for leptospirosis and typhoid.

**Suggested strategies for limiting the use of leptospirosis RDT and ELISAs:**

- Recommendations on limiting the use of RDTs once an outbreak has been declared:
    - RDTs detect antibodies that do not appear until at least 5 days after the onset of illness. RDTs should therefore only be used in Divisional and Subdivisional laboratories if the onset of illness is ≥5 days.
- Recommendations on limiting the use of ELISA once an outbreak has been declared:
    - All RDT +ve samples should be referred to the NPHL at Mataika House for ELISA
    - For RDT –ve samples, only send 10% of samples from suspected cases should be sent to NPHL.
    - To ensure that the surveillance team is able to capture the TOTAL number of suspected cases, a line list of ALL suspected cases should be sent to the NPHL at Mataika House. The line list should indicate whether a sample has been sent for ELISA.
- ***Please note that the date of onset should be included on all request forms so that RDT and ELISA results can be appropriately interpreted

- ***If possible, a repeat sample should be collected from ELISA-positive patients after 2 weeks
- Positive RDT and ELISA for leptospirosis are considered as "probable" cases. Once there are >100 ELISA-positive samples during an outbreak, samples should be sent to international reference laboratories for confirmatory tests such as MAT and PCR. BOTH ELISA positive and negative samples collected during that time period should be sent.

**Suggested strategies for limiting the use of dengue RDTs and ELISAs:**

- Once a dengue outbreak has been declared, RDTs (NS1, IgM and IgG) should only be performed on 10% of suspected cases at Divisional and Subdivisional laboratories.
- All samples tested with RDTs should be sent to Mataika House for ELISA and NS1
- The following samples should be referred to an international reference laboratory for serotyping:
    - All NS1 Ag positive samples
    - 30% of IgM and NS1 negative samples
- Please refer to the new flowchart on **Laboratory Referral Protocol for Arbovirus Testing** for guidance on appropriate requests for laboratory tests

**Procurement of diagnostic kits and consumables required during an outbreak:**

Shipment of diagnostic kits and consumables from international supplies can take weeks or even months. To ensure that supplies are available in case of an outbreak, the following estimates should be considered.

- Routine supplies – these should be estimated from volumes used by Divisions and Subdivisions in previous years, and ordered routinely.
- Buffer supplies – these are in addition to routine supplies to ensure diagnostic tests are available at the beginning of an outbreak. Take into consideration how long it takes for new supplies to be shipped, e.g. if it usually takes 4 weeks for leptospirosis RDTs to be shipped, there should be sufficient buffer supplies to cover for the first month of an outbreak.
- Outbreak supplies - once an outbreak has been declared, emergency funds will be allocated from MHMS for procurement of additional supplies. Assistance from external partners (e.g. WHO) might be required for large outbreaks.
    - Request assistance from FCCDC and WHO to estimate outbreak supplies might be required

- NPHL to provide estimates of RDTs and ELISAs needed for dengue and leptospirosis outbreaks, and estimates of other supplies for typhoid outbreaks.
- With assistance from FPBS, a forecasted procurement and consumables list will be helpful in outbreak situations.
- Consider proactive measures, e.g. with assistance from NTCOPD and WHO, submit proposals to partner agencies on the forecasted requirements to further support laboratory needs.

## 2.7. Supplies

Fiji Pharmaceutical and Biomedical Services (FPBS) Centre is responsible for coordinating procurement, warehousing and distribution of supplies required for outbreak responses. Supplies include medicines, medical consumables and medical laboratory reagents and consumables. It is critical that a successful response to an outbreak in relations to supplies is dependent on effective planning management with the stakeholders the preparedness phase that will ensure undisrupted supplies.

## 2.8. Who is responsible for declaring an outbreak?

Declaring an outbreak has important implications. Once an outbreak has been officially declared, appropriate resources (both human and financial) will need to be mobilised at the subdivision, division, national, and international level through our development partners (e.g.WHO), to support the outbreak response. The outbreak response team(s) – DORT or SORT – will also upscale current response. And equally importantly, the general public will be made aware of the existence of a threat to public health and advised on actions and prevention measures that may assist in the control of the outbreak. Every effort must be employed to ensure early announcement of an outbreak to the public.

The person responsible for calling an outbreak will vary depending on the size of the outbreak and the resources required, as summarised in Table 4. However, existing MHMS hierarchies and reporting pathways must be followed. Ultimately, a decision on declaring an outbreak, and announcing to the public, will be based upon expert consultation through the DORTs, NTCOPD, with the NACD and other relevant National Advisors, and other local and international authorities as required. Also, responsibility for declaration may be delegated, but primarily resides with listed persons in Table 4.

**Table 4. Persons responsible for declaring an outbreak depending on scale of outbreak and resources required.**

| Scale of outbreak | Resources required | Person(s) responsible for declaring outbreak |
|---|---|---|
| Subdivisional or Divisional outbreak | Able to manage using existing resources | DMO* |
| Subdivisional or Divisional outbreak | Require additional resources from Fiji MHMS | DMO* |
| National outbreak | Able to manage using existing resources within Fiji MHMS | PSHMS |
| National outbreak | Require mobilisation of resources from other Ministries or other external sources of funding including international partners e.g. WHO, NGOs | Minister for Health and Medical Services |
| Outbreak of international concern | Able to manage using existing resources within Fiji | Minister for Health and Medical Services |
| Outbreak of international concern | Require assistance from external partners, e.g. WHO, NGOs | Minister for Health and Medical Services |

*Subject to existing MHMS reporting structures i.e. DMOs require PSHMS endorsement.

## 2.9. Resource allocation and mobilization once an outbreak has been declared

Once an outbreak has been declared, DORT and SORT teams may seek additional resources required for response measures from MHMS. To ensure timely response activities, approval for additional resources should be given as soon as possible, and no later than 5 working days from the declaration of an outbreak.

If an outbreak is classified as disaster, disaster funds can be accessed for outbreak response. Divisional/Central Board of Health can also be mobilised in outbreak situations.

## 2.10. Outbreak investigation and response processes

The **National Taskforce for the Control of Outbreak-Prone Diseases** (NTCOPD) provides strategic advice for the management of outbreaks.* The NTCOPD consists of the following members:

- National Advisor for Communicable Diseases (NACD)
- National Advisor for Environmental Health (NAEH)
- Technical working groups (TWG):
    - Surveillance
    - Prevention and Control
    - Communications
    - Clinical
- Other National Advisors as appropriate

DSPH is the chair and FCCDC is the secretariat with support from NACD. The Terms of Reference for NTCOPD outlines its membership and the technical working groups.

A **Divisional Outbreak Response Team (DORT)** or a **Sub-Divisional Outbreak Response Team (SORT)**, depending on the extent and severity of the outbreak, coordinates outbreak responses. A team is activated upon confirmation of an outbreak.

The DORT's terms of reference is determined by the Divisional office, including:

- To develop strategy to control the outbreak and allocate responsibility for taking action
- To review evidence and confirm or deny the existence of an outbreak.
- To prevent further cases by taking all necessary steps to ensure that the sources of the outbreak is controlled or the cause is removed
- To communicate findings to other divisions and stakeholders to prevent cases elsewhere.
- To prevent secondary spread of infections by controlling or isolating cases, and by identifying and managing contacts appropriately
- To provide an accurate and responsible source of information for other professionals, the media and most importantly the public
- To document the investigations and control measures
- To efficiently provide a report to the PSHMS

* The review of the NTCOPD in May 2018 resulted in revision to its Terms of Reference and a name change to the **Fiji Communicable Disease Committee (FCDC).** However, the core functions of the committee remain.

Team members may include:

- Divisional Medical Officer (chairperson)
- Sub-divisional Medical Officer (coordinator & epidemiologist)
- Surveillance Officers
- Public Health Nurses
- Infection Control Officers
- Medical officers
- Nurses
- Laboratory technicians
- Supplies coordinator, including FPBS
- Epidemiologist (co-opt)
- Medical officers from FCCDC (co-opt)
- Media and Communication Expertise (co-opt)
- Environmental Health Officers (EHO)
- Entomologist
- Rural Health Authorities EHO
- Urban Health Authorities (Town & City Councils)
- Other relevant stakeholders

The Outbreak Response Team (DORT or SORT) is responsible for planning, coordinating and carrying out the response in collaboration with other partners as appropriate, including:

- FCCDC, including the National Advisor for Communicable Diseases (NACD), surveillance officer, and medical officers
- National Taskforce for the Control of Outbreak Prone Diseases (NTCOPD)
- Epidemiologist at the Fiji MHMS
- National Advisor for Environmental Health (NAEH)
- Other National Advisors and National Health Executives as appropriate
- Other stakeholders

A summary of the outbreak response network in Fiji is shown in Figure 11.

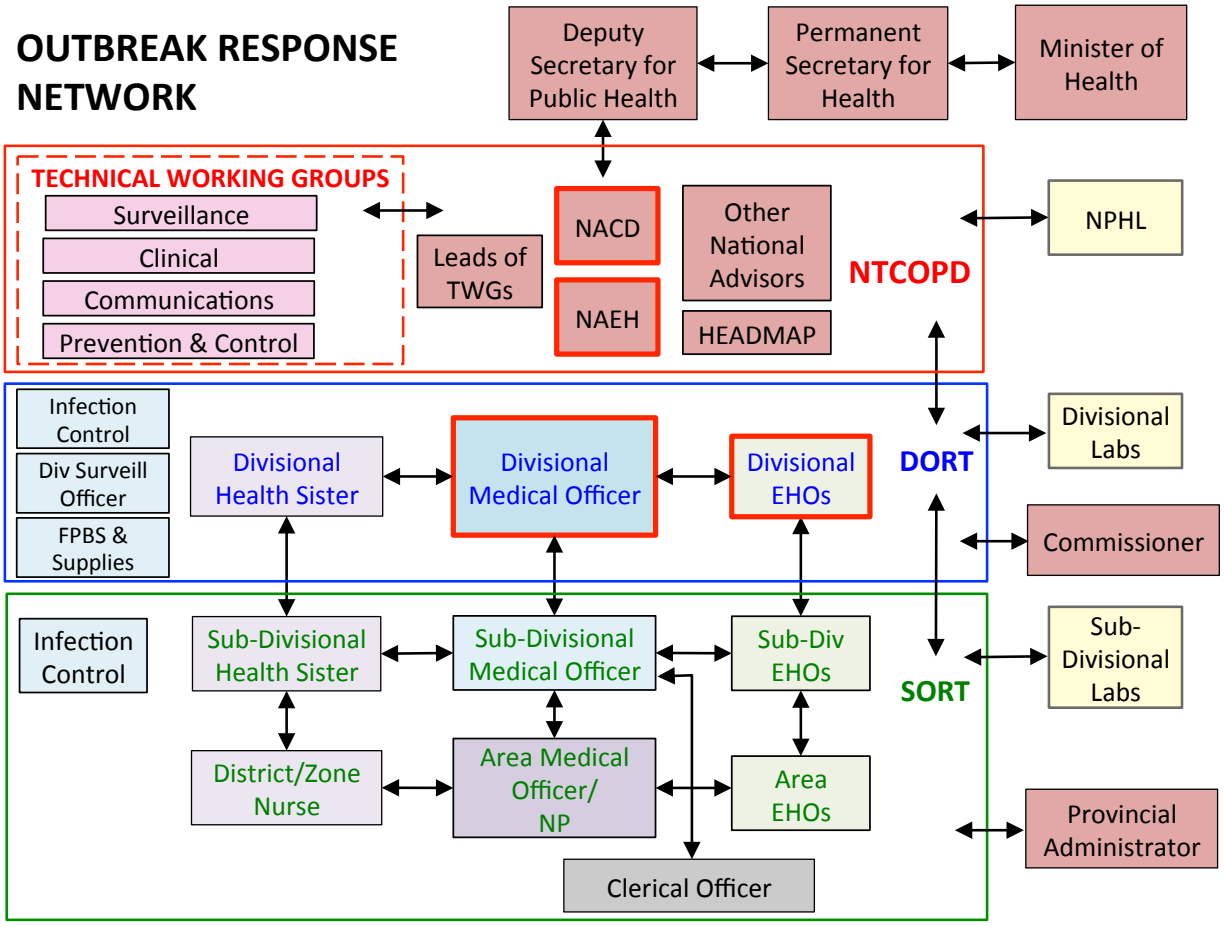


**Figure 11. Communicable outbreak response network in Fiji**

## 2.11. Roles and responsibilities in outbreak response

Table 5 provides a guide to the roles and responsibilities of different team members. The team leader (DMO/SDMO) will be responsible for delegating team members with specific tasks. Depending on the nature of the outbreak, an effective and timely response might involve tasks not listed in the table.

**Table 5. Summary of roles and responsibilities during outbreak response**

| Responsible Officer | Roles and Responsibilities |
|---|---|
| **NACD** | ▪ Assists in the coordination of national response when one or more Divisions is involved in the outbreak<br>▪ Provide support, technical advice and training to DORT and SORT to increase capacity to detect, respond and control outbreaks<br>▪ Liaise with NTCOPD Technical Working Groups, Epidemiologist at Fiji MHMS, NAEH, and other National Health Executives as appropriate<br>▪ Liaise with external partners as required, including WHO, SPC, PPHSN, US CDC, NGOs, and researchers. |
| **Divisional Medical Officer (DMO)** | ▪ The focal person to coordinate divisional outbreak investigations and control activities (particularly where more than 1 subdivision is affected)<br>▪ Liaise with DSPH, MHMS and FCCDC if the Division requires technical assistance in the field<br>▪ Lead the divisional outbreak response team (DORT), while the Deputy Secretary of Public Health oversees the overall response at national level<br>▪ Play a key role during outbreak investigations and is a point of liaison between the divisional health services, Ministry of Health (Public Health Division), Media and other stakeholders for rapid dissemination of information about an impending threat or outbreak.<br>▪ Activate the outbreak protocols and mobilise the outbreak response team to control activities |
| **Sub-Divisional Medical Officer (SDMO)** | ▪ Lead the Subdivisional Outbreak Response Team (SORT) and develop the team's capacity to detect and respond to outbreaks<br>▪ Coordinate outbreak investigation when it is localised to the subdivision |

| | |
|---|---|
| | and is manageable by the SORT. In the absence of capacity to undertake this role, the DMO will automatically take charge<br>▪ Investigate and respond to outbreaks if detected in more then one community/area within the medical subdivision |
| **Medical Superintendent** | ▪ Responsible for clinical issues associated with Divisional outbreaks<br>▪ Liaise with the DMOs and laboratories<br>▪ Determine and plan for surge capacity as a consequence of an epidemic or pandemic at national or Divisional level |
| **Medical Officer** | ▪ Assist the SDMO in investigating and responding to an outbreak in their medical area<br>▪ If outbreak is in another medical area, medical officers may be co-opted when the need arises<br>▪ Build team capacity to assess and report an outbreak immediately to SDMO/DMO<br>▪ When an unusual death occurs, the clinical team should also conduct a root cause analysis (RCA) investigation |
| **Divisional and Sub-divisional Health inspector (EHO)** | ▪ Conducts environmental assessment of outbreak area<br>▪ Implements and oversees control measures e.g. mosquitoes<br>▪ Spraying, water, sanitation<br>▪ Other responsibilities as identified in the PH Act |
| **Divisional and Sub-divisional Health Sister** | ▪ Assist teams in field investigation and clinical management of cases<br>▪ Communicate prevention awareness to community<br>▪ Assist, implement interventions/control measures<br>▪ Monitor and evaluate interventions |
| **Infection Prevention & Control Officer** | ▪ As part of the DORT and SORT teams, coordinate case investigations and reporting |
| **Divisional Surveillance Officer** | ▪ As part of the DORT, collate surveillance data and produce timely and up-to-date epidemiological reports |
| **Communication coordinator (Divisional Health Promotion** | ▪ Assists DMO with communication strategies including drafting press releases, logistic arrangements, public meetings, contact with local leaders, mobilizing communities and other stakeholders (schools, |

| | |
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| **Officer)** | Divisional Management Team, Sub-Divisional Management Teams, Provincial and Tikina Councils, Advisory Councils, Church organizations, other NGOs), distribution of any required communication materials, training of health workers. |
| **Risk Manager** | ▪ Assess and manage risks related to outbreaks<br>▪ Report to SORT or DORT |
| **Laboratories** | ▪ Supportive role in the SORT or DORT<br>▪ Provide technical advice to field teams on collection of clinical and environmental samples<br>▪ Provide appropriate field testing kits if available<br>▪ Conduct urgent tests in a timely manner |
| **Supplies Officer** | ▪ Coordinate procurement and distribution of supplies required in outbreak response, including laboratory supplies, diagnostic tests, and medications<br>▪ Liaise with laboratories, FPBS, and others as required |

**Longer-term strategies for outbreak investigation and reporting:**

- Case investigations to be conducted electronically, using standard case investigation forms that are accessible using smart phones or tablets. Electronic data collection will allow completed forms to be submitted immediately to a central database, and for data to be collated rapidly. Smart phones can also collect GPS coordinates during case investigations, and allow mapping of cases and detection of clusters.
- The electronic databases can be accessed in real time by multiple people or groups who are involved in the outbreak response, including NACD, NTCOPD, DORT, and SORT.

## 2.12. Risk communication during disease outbreaks

### Importance of effective communications in outbreak preparedness and response

Well-planned communication can enhance communicable disease outbreak preparation and can hasten containment of an outbreak, as well as help to mitigate an outbreak's social and economic impact. The objectives of communicable disease outbreak response are to i) take care of patients, ii) prevent further

cases, iii) end the outbreak quickly, and iv) prevent recurrence. Effective communication enhances, either directly or indirectly, each of these objectives, and should be considered an intervention in its own right.

**Planning and implementing communications during each phase of an outbreak**

Outbreak responses are planned according to recognizable phases – pre-outbreak, outbreak, post-outbreak and review and development. Outbreak communication should also be organized and coordinated with these phases: from preparedness, to eruption, to clean up and recovery into evaluation. The communications team should be proactive with planning (e.g. during high risk times such as after severe flooding), and seeking information (e.g. maintaining regular contact with the surveillance officer). Appendix B provides a step-by-step guide on how to plan and implement communication during each phase of an outbreak.

Both **internal and external stakeholders** should be included in communications:

- Internal stakeholders include the Minister for Health and Medical Services, PSHMS, Deputy Secretaries (DSPH and DSHS), NACD, FCCDC surveillance team, and other relevant groups within the Fiji Ministry of Health & Medical Services.
- External stakeholders include the general public, national media, and industry.

The stakeholders will depend on the disease, and the size, severity (e.g. deaths), and location of the outbreak. A checklist of potential stakeholders is included in Appendix B.

**Outbreak communication with the public and media should aim to**:

- Provide accurate, timely, and consistent information that is easily understood by laypersons.
- Harness public anxiety and the corresponding desire to take protective action in ways that promote desired behaviours and accelerate outbreak control.
- Encourage people who are alert to the symptoms of illness to seek early treatment.
- Inform symptomatic people what/where treatment is available
- Enhance awareness of protective behaviours that can help prevent further cases.
- Help to prevent crisis from developing.
- Lead to better decisions about how to handle risks.

- Help to ensure smoother implementation of responses to tackle outbreaks.
- Free up the technical response team to concentrate on rapid containment.
- Help to empower and reassure the public.
- Counter misinformation which may arise
- Over time, help to build trust in Government and in the information it provides.
- Hasten a return to normal conditions after an outbreak peaks.

**Outbreak communication should be based on well-grounded principles**:

- Build trust
- Announce early
- Be transparent
- Anticipate queries (from public and media)
- Respect public concerns
- Be inclusive
- Plan carefully in advance and evaluate your efforts

**Sources of information for the communications team**

- Surveillance Officer at Mataika House: data on the outbreak, number of cases, locations of outbreaks, etc.
- NTCOPD meetings for all technical working groups (or Secretariat to distribute Minutes of the meetings if unable to attend): data about outbreak-prone diseases, current outbreaks, progress of outbreaks
- Environmental health officers (health inspectors): prevention strategies, what has been done about the outbreak, and future activities
- DMOs (Divisional medical officers), SDMOs (Subdivisional medical officers), and clinicians: feedback about public misunderstanding, misinformation, rumours, and fears. The communications team should address these as soon as possible to prevent problems from escalating
- Other government ministries as applicable e.g. Ministry of Agriculture, Ministry of Tourism
- WHO and US CDC websites: general information about diseases, including symptoms, signs, complications, routes of transmission, and global situation

**Communicating with the media (radio, television, press conference)**

- The **Lead Media Liaison Officer (MLO)** at the Fiji MHMS is responsible for coordinating communications and release of information to the media.
- Only the following persons are **authorised to speak to the media** regarding communicable disease outbreaks:
    - Minister for Health and Medical Services
    - Permanent Secretary for Health and Medical Services (PSHMS)
    - National Advisor for Communicable Diseases (NACD)
    - Media Liaison Officer (MLO)

**Note: If you are approached by the media for information regarding communicable disease outbreaks, please refer to the one of the above persons.**

- Press releases are drafted by the MLO in consultation with the NACD and approved by the Minister for Health and Medical Services or PSHMS before they are released to the media. A template for media release is shown in Appendix B.
- The MLO is responsible for providing situational updates to the media, and determining the frequency of updates depending on the progress of the outbreak.
- Requests for communicable disease information from **international media** should be directed to the MLO who will consult with the NACD for a response which is then approved by the PS and/or Minister for Health and Medical Services.

**Channels for direct communications with the public include**

- Printed educational materials – brochures, posters, flyers, bookmarks
- Technical Video Content (TVC) e.g. television advertisements
- Radio
- Talkback radio spots
- Social media
    - MHMS website: http://www.health.gov.fj
    - Facebook: https://www.facebook.com/MoHFiji
- Public lectures

- Outreach activities: campaigns, road shows etc.

**Some general resources on risk communication**:

- WHO Outbreak Communication Guidelines
  http://www.who.int/csr/resources/publications/WHO_CDS_2005_28/en/

- WHO Outbreak Communication Planning Guide
  http://www.who.int/ihr/elibrary/WHOOutbreakCommsPlanngGuide.pdf

- Communications Training Program for WHO staff
  http://www.who.int/risk-communication/training/who-effective-communications-handbook-en.pdf?ua=1

- Pacific Outbreak Manual (Pacific Public Health Surveillance Network – PPHSN)
  http://www.pphsn.net/Publications/Pacific_Outbreak_Manual_Sept_2015.pdf

## 2.13. Post-outbreak activities and evaluation

Once transmission of disease has been interrupted with no new cases occurring and/or the known risk is considered to be no longer a threat, the Outbreak Response Team will be responsible for scaling down outbreak response.

During the post-outbreak period, it is important to:

- Conduct on-going surveillance for cases, environmental threats, or other exposure risks
- Advise all groups involved in outbreak response so that activities can return to routine levels and/or procedures. This includes DORT and SORT teams, laboratories, supplies, and pharmacy.
- Ensure effective and up-to-date communication to the public and stakeholders
- Produce a summary outbreak report, and provide it to the Deputy secretary of Public Health, FCCDC and key stakeholders
- Evaluate the outbreak response

The DORT or SORT should evaluate their response to the outbreak, in collaboration with FCCDC and NACD if required, considering the following questions:

- How effective was the response?
- How efficiently was the response conducted?
- Were policies, protocols and guidelines followed?
- Were policies, protocols and guidelines sufficient to support the response?
- What would we do differently to improve this response?
- Have we learned anything that should be shared with others, including things that could improve current protocols and guidelines?

The evaluation process should be seen an opportunities to train and teach others based on the experience of investigating and responding to the outbreak.

## 2.14. Links to other national plans

The scale of response required to mange and control an outbreak will vary and should be assessed on a case-by-case basis. Response to large-scale outbreaks with national and international

implications may require the mobilization of resources and activities beyond the scope of Divisional and National Health Services. At this point, it is possible that other emergency plans are activated or considered. Figure 12 below demonstrates linkages between the National Health Emergency and Disaster Management Plan (HEADMAP), the Fiji National Influenza Pandemic Plan and Communicable Disease Surveillance and Outbreak Response Guidelines. It is expected that all health workers are aware of the existence of complementary plans and that it is the responsibility of the Divisional Medical Officer, Medical Superintendent, and National Advisor for Communicable Diseases to liaise and discuss with the Deputy secretary Public Health on any implications for activation of such plans.

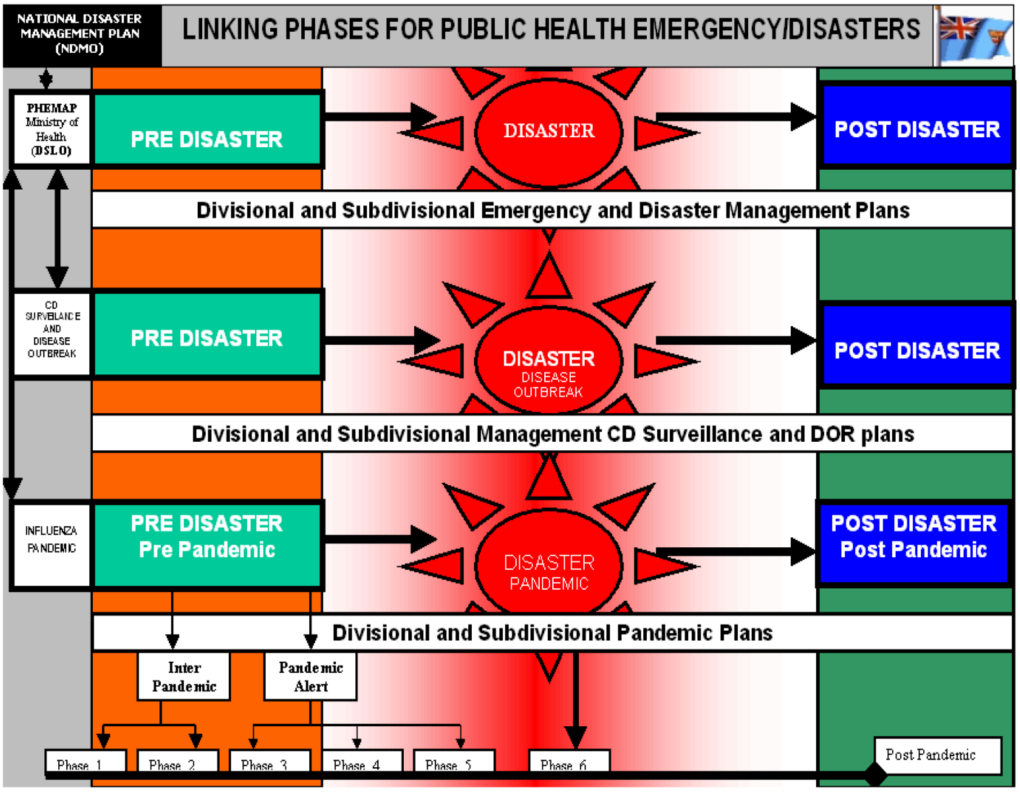


Figure 12**.** Links between National Disaster Management Plan (NDMO) and other **n**ational **p**lans **(Fiji HEADMAP 2013-2017)**

Figures 13 shows the Fiji National Disaster Management Structure, and Figure 14 outlines the National Health Emergency & Disaster Management Structure as defined in HEADMAP, including coordination at various levels of service within the Ministry of Health. These guidelines outline the separate roles and responsibilities for different units within this structure as they relate to communicable disease outbreaks.

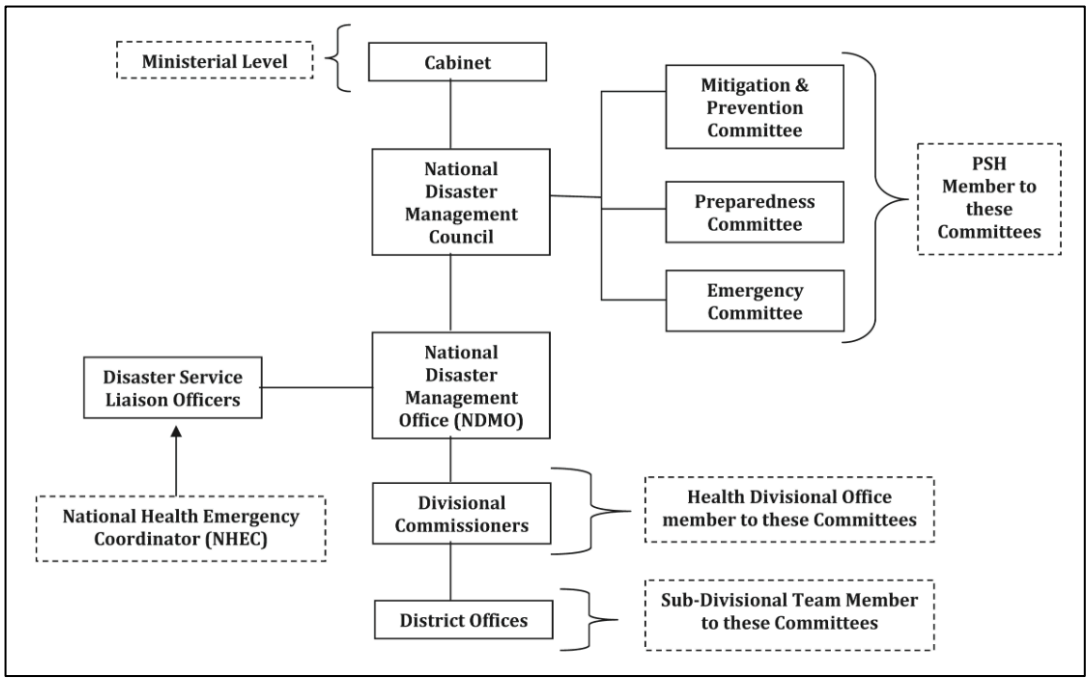


**Figure 13. Fiji National Disaster Management Structure (Fiji HEADMAP 2013-2017)**

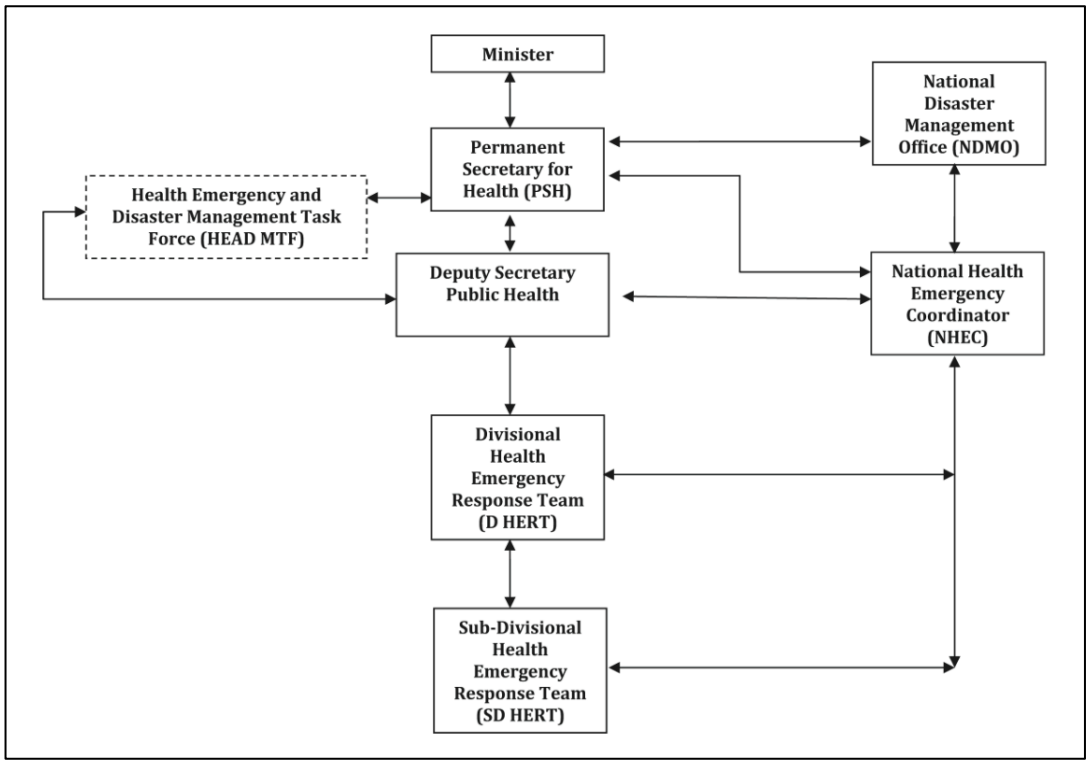


**Figure 14. National Health Emergency & Disaster Management Structure** (Fiji HEADMAP 2013-2017

## 2.15. Assistance from external partners

The NACD acts as the focal point for liaising with external partners, upon the mandate of the DSPH and PSHMS. External partners include the WHO, SPC, PPHSN, US CDC, NGOs, and researchers.

### 2.15.1. Operational and/or technical support

Support from external partners might be required when responding to disease outbreaks, particularly for:

- Very large outbreaks
- Novel pathogens and emerging infectious diseases
- Outbreaks associated with public health emergencies, e.g. after cyclones, severe flooding, tsunamis
- Implementing new systems, e.g. surveillance systems such as EWARS

Examples of **WHO support** for outbreak response includes:

- Providing technical advice
- Providing short-term external consultants for operational and/or technical support, e.g. development of action plans and clinical guidelines
- Assisting with procurement of supplies of laboratory diagnostic tests and medicines
- Supporting shipment of samples to overseas laboratories for confirmation of diagnosis if tests are not available in Fiji

### 2.15.2. Donations.

During an outbreak or public health emergency, external partners might offer donations such as:

- Emergency supplies, e.g. water, food, tents
- Medicines
- Medical supplies and consumables
- Cash

Detailed **Guidelines For Donation Of Medicines, Medical Supplies And Equipment** can be found here: http://www.health.gov.fj/wp-content/uploads/2014/05/Guidelines-for-Donations-of-Medicines-Medical-Supplies-and-Equipment.pdf

In order to expedite the use of donations during an outbreak or public health emergency:

- Approval for accepting donations should be granted within 5 working days from the confirmation of an outbreak
- Items on the pre-approved list (to be developed) can be accepted without official approval

## 2.16. Quarantine

The Quarantine Act of Fiji (Cap. 112) stipulates actions related to the arrival of suspected or infected persons, vessels, aircrafts or goods into Fiji. Sections relevant to outbreak response include procedures for infected or suspected vessel or aircraft, compulsory disease notifications by masters of vessels, measures to be undertaken when infectious disease ends fatally, measures for dealing with vessels arriving from malaria-endemic and infected areas, provisions relating to quarantinable diseases, measures applied to persons/vessels arriving from infected places, and measures for preventing the transmission of quarantinable or other infectious diseases (also need to refer to protocols, if available, from the environment health unit).

Currently, there are no specific policies or protocols for quarantining people who refuse treatment for infectious diseases such as tuberculosis. It is recommended that policies and protocols be developed for managing people who refuse treatment if their refusal poses a health risk to the general public.

The Quarantine Act is available from (http://www.paclii.org/fj/legis/consol_act/qa131/).

### 2.16.1. Quarantinable Diseases include:

- Plague
- Cholera
- Yellow Fever
- Typhus Fever
- Relapsing Fever
- Smallpox

Information on how to deal with each of the above diseases is detailed in Part VII of the Act.

### 2.16.2. Potential importation of infectious diseases

Part VIII of the Act details actions that may be taken for:

**Persons arriving from an infected place:** *"The Authority may take, after disembarkation, the measures which he considers appropriate to ensure the surveillance or observation of persons arriving on a vessel or aircraft coming from, or touching at, any place infected with a quarantinable disease, who are not protected, to the satisfaction of the Authority, by vaccination against such disease."*

**Person in contact with infected vessel:** *"Any person who without the permission of the Authority boards any infected or suspected vessel or aircraft or any vessel or aircraft which has come from, or touched at, any infected local area where a quarantinable or other infectious disease exists, or enters or lands at any quarantine station, may be detained under observation or subjected to surveillance for such a period as the Authority may deem necessary."*

**Persons arriving from an area infected with acute anterior poliomyelitis, measles, influenzae or whooping cough:** *"All persons arriving in Fiji by air from an area infected with acute anterior poliomyelitis, influenza, measles or whooping cough may at the discretion of the Authority be placed under surveillance or observation."*

### 2.16.3. Power to make regulations

In addition to the above regulations,
*"The Minister may make regulations, in respect of the whole or any part of Fiji, including the ports and coastal waters thereof, for preventing—*
*(a) danger to public health from ships or aircraft or persons or things therein, arriving at any place; and*
*(b) the spread of infection by means of any ship or aircraft, or by means of any person or thing."*

## 2.17. Electronic repository of documents

An electronic repository will be set up on the Fiji MHMS website for clinical guidelines, action plans, standard operating procedures (SOP), policies, procedures, forms, templates, references, and other relevant documents.

The purposes of the repository are to:

- Allow documents to be shared easily between all health workers
- Allow documents to be updated and disseminated more easily
- Provide a repository for documents so that they can be easily located in the future

The repository will be made available on the public domain (i.e. without the need to log in), so that they may be accessed easily. Other countries, especially other Pacific Islands, might also like to view

and utilise the documents. For areas without internet access, the SDMO will be responsible for disseminating new documents.

**Management of the Repository**

Documents will be added to the repository through the following steps:

1. Endorsement of new documents
    - For routine documents: the Technical Working Groups (TWG) will submit new documents to the NTCOPD, NHEC and PSHMS for endorsement.
    - For urgent documents: In emergency situations, or where there are only minor amendments to existing documents, the responsible TWG will submit the documents to the NTCOPD and then the PSHMS for endorsement.
2. Endorsed documents should be submitted to Health Policy and Planning at MHMS, who will act as a "library" for the documents and arrange for documents to be uploaded onto the repository by IT.
3. The MHMS's IT department will be responsible for:
    - Setting up a website for the repository, including appropriate layout and classifications
    - Uploading new documents
    - Assisting with accessibility in remote areas, e.g. setting up internet access
    - Include updates to the repository on the MHMS circular/newsletters

# Section 3:

# Syndromic Surveillance Conditions

This section is based on the recommendations in the **Pacific Outbreak Manual (March 2016)**, with modifications to make the guidelines more specific for Fiji.

The five core syndromic surveillance conditions in Fiji in 2016:

3.1 Acute fever and rash (AFR)
3.2 Influenza-like illness (ILI)
3.3 Prolonged fever
3.4 Water diarrhoea
3.5 Dengue-like illness (DLI)

In addition, four syndromes have been monitored by the new EWARS initiative from April 2016:

3.6 Bloody diarrhoea
3.7 Acute jaundice syndrome
3.8 Suspected meningitis
3.9 Zika-like illness

**URGENT CASES** should be reported by phone to:

- NACD
- DMO

## 3.1. ACUTE FEVER & RASH (AFR)

| | |
|---|---|
| **Public health priority** | URGENT |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | ONE |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Reasons for monitoring this syndrome** | Surveillance for acute fever and rash (AFR) was started to detect possible **measles** outbreaks at an early stage. There are many other causes of AFR that can be clinically difficult to distinguish from measles. It is therefore important to send a blood sample for measles serology as soon as possible. |
| **Case definition** | Acute fever ≥38$^{o}$C and *non-vesicular* rash |
| **Signs & symptoms** | Acute onset of fever ≥38$^{o}$C, and a non-vesicular rash (no blisters) that appears a few days after the fever.<br>Fever is defined as temperature ≥38$^{o}$C. If no thermometer is available, report of fever or chills by the patient is acceptable.<br>Note: chicken pox does NOT fit the case definition of AFR because the rash is vesicular (blisters) |
| **Pathogens & diseases that can cause this syndrome** | ▪ Measles – this is the most important diagnosis that we are looking for when doing syndromic surveillance for AFR<br>▪ Rubella (German measles)<br>▪ Dengue<br>▪ Leptospirosis<br>▪ Chikungunya<br>▪ Zika<br>▪ Drug reactions<br>▪ Meningococaemia<br>▪ Other viral rash, e.g. parvovirus B19, Coxsackie A, roseola |
| **Sources of infection (reservoir)** | Depends on cause |
| **Mode of** | Depends on cause. |

| | |
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| **transmission** | Assume that it's highly infectious until a diagnosis is made. |
| **Incubation period** | Depends on cause |
| **Period of infectiousness** | Depends on cause.<br>Assume that it's highly infectious until a diagnosis is made.<br>If mosquito-borne disease is suspected, advise patient to use mosquito-avoidance measures to reduce the risk of spread to others. |
| **Laboratory investigations** | Venous blood sample or filter paper sample (dried blood spot) for measles serology<br>If temp >38ºC, blood cultures should also be taken.<br>If dengue or leptospirosis suspected, and onset of illness is ≥5 days, rapid diagnostic tests (RDTs) should be used.<br>Collect paired sera if possible (2 weeks apart) – this is very helpful for confirming a diagnosis of many infectious diseases. |
| **Notification** | Report all cases URGENTLY BY PHONE |
| **Clinical management of case** | Depends on cause.<br>Isolate the patient until a diagnosis is made.<br>For management of fever, give paracetamol rather than aspirin if <18 years of age or if dengue is suspected. |
| **Management of contacts** | Depends on the cause.<br>Contacts with symptoms should be isolated until a diagnosis is made. |
| **Infection Control (Clinical/Hospital)** | Manage as a suspected measles case until result of laboratory testing for measles is negative, or until an alternative diagnosis is made. Give patient a mask to wear and keep away from other patients as much as possible (e.g. separate room if available).<br>Use STANDARD and AIRBORNE precautions (see Appendix A.1) |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases.<br>▪ **Cluster of cases**: investigation should be started without waiting for laboratory confirmation.<br><br>Case investigations should include information on:<br>▪ Age, sex, where they live<br>▪ Immunisation history<br>▪ Clinical details, including date of onset of symptoms<br>▪ Laboratory test results |

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| | ▪ Recent travel overseas, or contact with other cases or travellers<br>▪ Recently visited places, including schools, work places, shopping centres, clinics, hospitals, gatherings |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ PPHSN Acute Fever & Rash (AFR) Case Investigation Form: http://www.pphsn.net/surveillance/hbas/annexb2-afr_case_investigation_form.pdf<br>▪ PPHSN AFR Laboratory Request Form: http://www.pphsn.net/surveillance/hbas/annexc2-afr_laboratory_request_form.pdf<br>▪ Pacific Hospital Based Active Surveillance System http://www.pphsn.net/surveillance/HBAS.htm<br>▪ WHO Western Pacific Region. Measles Elimination Field Guide 2013: http://www.wpro.who.int/immunization/documents/measles_elimination_field_guide_2013/en/<br>▪ WHO. 2013. Pocket book of hospital care for children. 2nd edition: http://apps.who.int/iris/bitstream/10665/81170/1/9789241548373_eng.pdf |
| **Other comments** | |

## 3.2. INFLUENZA-LIKE ILLNESS (ILI)

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| **Public health priority** | ROUTINE<br>HIGH if new influenza virus circulating |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | Twice the number of cases seen in the previous 2 weeks OR a cluster of severe cases. A cluster is defined as 2 or more epidemiologically linked cases.<br>Consider using rolling average as per PSSS, e.g. >90% above all collated data to date. |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Reasons for monitoring this syndrome** | For early detection of influenza outbreaks and virological sampling of cases for detection of new viruses. New influenza viruses can cause more serious disease and large epidemics or pandemics. |
| **Case definition** | Fever ≥38°C AND cough AND onset within past 10 days (Pacific Outbreak Manual definition, modified in 2015 in in line with WHO surveillance standards) |
| **Signs & symptoms** | Fever ≥38°C, cough, sore throat, runny nose, sneezing, headache, muscle aches, lethargy. |
| **Pathogens & diseases that can cause this syndrome** | ▪ Influenza virus<br>▪ Parainfluenza virus<br>▪ Respiratory syncytial virus (RSV)<br>▪ Bacterial and fungal pneumonias<br>▪ Tuberculosis<br>▪ *Coxiella burnetii* (Q fever)<br>▪ *Middle Eastern Respiratory Syndrome Coronoavirus* (MERS)<br>▪ Many other viruses and bacteria that cause acute respiratory infections<br>▪ Inhaled toxins |
| **Sources of infection (reservoir)** | ▪ For Influenza: humans, birds, and other animals (e.g. pigs)<br>▪ Severe acute respiratory syndrome (SARS): "spillover" infections (pathogens crossing over from animals to humans) from multiple animal species |

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| **Mode of transmission** | ▪ Mainly person to person<br>▪ Less commonly from birds and other animals to humans |
| **Incubation period** | Variable depending on the cause.<br>Most common causes of ILI have an incubation period of 1-3 days. |
| **Period of infectiousness** | Variable depending on the cause. |
| **Laboratory investigations** | Swabs from nose or throat (nasopharyngeal swabs) for Influenza and RSV (see NPHL Handbook for instructions for collection, storage and transport of swabs).<br>For cases with pneumonia, sputum should also be collected for culture.<br>In an outbreak, swabs may only be required for the initial cases to confirm diagnosis and cause of the outbreak. |

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| **Notification** | ▪ **Single case**: Report routinely<br>▪ **Cluster of cases**: Report to DMO or SDMO urgently<br>▪ SARS: Report urgently to DMO or SDMO. Also **REQUIRED** to be reported to WHO under IHR 2005.<br>▪ New subtypes of human influenza: **REQUIRED** to be reported to WHO under IHR 2005 (Appendix A.3)<br>▪ If cases are linked to contact with sick animals, the Department of Agriculture should also be notified. |
| **Clinical management of case** | ▪ Advise the patient to stay at home and sleep in a separate room if possible<br>▪ If in hospital, isolate in a separate room if possible<br>▪ Consider antiviral treatment if at risk of severe disease and complications of influenza, e.g. the elderly and those with co-morbidities<br>▪ Consider antibiotic treatment if evidence of pneumonia |
| **Management of contacts** | ▪ Close contacts of cases should be provided with information regarding hand hygiene and respiratory hygiene (avoid cough and sneezes of sick persons)<br>▪ Advised to seek medical attention if develop severe symptoms |
| **Infection Control (Clinical/Hospital)** | STANDARD plus DROPLET precautions (see Appendix A.1) |
| **Public Health** | ▪ Social distancing – advise cases to stay at home and isolate themselves to reduce the |

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| **Response – Investigation, Prevention & Control** | risk of spreading the infection to others, and stay away from people who are sick<br>▪ Hand hygiene<br>▪ Respiratory hygiene – avoid cough/sneezing on others, cover nose and mouth when sneezing)<br>▪ Immunisation ('Flu vaccine') is the most effective prevention against influenza<br>▪ All clusters of severe disease should be investigated. Consider seeking advice from WHO.<br>▪ Health promotion messages regarding the above if there is an outbreak |
| **Fiji guidelines & protocols** | ▪ Influenza Action Plan<br>▪ National Public Health Laboratory Handbook – for instructions for collection, storage and transport of nasopharyngeal (nose and throat) swabs and endotracheal aspirates |
| **Additional resources** | ▪ Weekly surveillance report from PPHSN contains information on ILI reports from the region: http://www.pphsn.net/surveillance/Syndromic.htm<br>▪ WHO Influenza surveillance and monitoring website contains up-to-date information on the global situation: http://www.wpro.who.int/emerging_diseases/Influenza/en/index.html |
| **Other comments** | |

## 3.3. ACUTE WATERY DIARRHOEA

| | |
|---|---|
| **Public health priority** | HIGH |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | Twice the number of cases seen in the previous 2 weeks.<br>Consider using rolling average as per PSSS, e.g. >90% above all collated data to date. |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

| | |
|---|---|
| **Case definition** | 3 or more loose or watery stools in 24 hours (non-bloody)<br>*For bloody diarrhoea, please see Section 3.6, under syndromes monitored by EWARS. |
| **Signs & symptoms** | Diarrhoea, nausea, vomiting, abdominal cramps, malaise, fever. |
| **Pathogens & diseases that can cause this syndrome** | Multiple – see Table 6 below for a summary of pathogens, incubation periods, clinical features, sources, and modes of transmission. |
| **Sources of infection (reservoir)** | Multiple – see Table 6 below |
| **Mode of transmission** | Faecal-oral, ingestion of contaminated food and water, person to person.<br>See Table 6 below |
| **Incubation period** | Multiple – see Table 6 below |
| **Period of infectiousness** | Variable depending on cause. Usually infectious while a person has symptoms and for a few more days afterwards. Some pathogens might not cause symptoms, but still be infectious to other people. |
| **Laboratory investigations** | ▪ **Stool samples** should be sent if any of the following are present:<br>▪ Bloody diarrhoea (see Section 3.6)<br>▪ Fever ≥38$^{o}$C for >2 days<br>▪ Severe watery diarrhoea<br>▪ Severe dehydration (require IV fluids)<br>▪ Cluster of linked cases |

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| | **Stool sample collection**: 5-10grams (thumbnail quantity) of fresh stool in a plastic screen-top container. Sample should be sent to the laboratory immediately, preferably less than 2 hours after collection. If this is not possible, place the specimen in Cary-Blair medium and refrigerate until the specimen can be shipped.<br><br>▪ **Blood cultures** should be collected if fever ≥38$^{o}$C |
| **Notification** | ▪ **Single case**: Report routinely<br>▪ **Cluster of severe cases**: Report to DMO or SDMO urgently<br>▪ Use IHR Decision Instrument (Appendix A.3) to determine if reporting to WHO under IHR 2005 is required |

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| **Clinical management of case** | ▪ The most important thin is to assess and maintain hydration. Oral rehydration and electrolyte replacement is usually sufficient, but severe cases might require intravenous (IV) fluids.<br>▪ Young children are at especially high risk of dehydration and should be monitored closely.<br>▪ For oral rehydration, use commercially available sachets of oral rehydration salts (ORS) or feed regular food and fluids, e.g. soups.<br>▪ Antibiotics are always recommended for dysentery (bloody diarrhoea). See section 3.6.<br>▪ Antibiotics and anti-parasitic medications might also be recommended if pathogens are cultured from stool samples. |
| **Management of contacts** | ▪ Advise household contacts about hand hygiene, especially if caring for cases. E.g. washing hands carefully if ex<br>▪ posed to vomit or faeces of cases.<br>▪ Avoid sharing food or drinks with cases. |
| **Infection Control (Clinical/Hospital)** | ▪ STANDARD precautions. See Appendix A.1<br>▪ CONTACT precautions should also be used if patient is in nappies/diapers or incontinent. |
| **Public Health Response – Investigation,** | ▪ Investigation should be conducted if there are linked cases, e.g. ate the same food, ate at the same restaurant, drank from the same water supply, or attend the same school.<br>▪ Advise cases and care givers about hand hygiene, especially after going to the toilet, |

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| **Prevention & Control** | after changing nappies, and before handling food.<br>▪ Persons with diarrhoea should not prepare food for at least 24 hours after their symptoms have completely resolved, especially if they work in the food industry, e.g. a chef or kitchen hand.<br>▪ Provide safe drinking water<br>▪ Advise about safe food hygiene: keep food clean and covered, separate raw and cooked foods, make sure that foods (especially seafood) are thoroughly cooked, keep food at safe temperatures, use safe drinking water for cooking.<br>▪ Safe disposal of faeces or use of safe latrines |
| **Fiji guidelines & protocols** | ▪ Food Safety Act & Food Safety Regulations<br>▪ National Public Health Laboratory Handbook – for instructions for collection, storage and transport of stool samples for **Rotavirus**<br>▪ National Public Health Laboratory Handbook – for instructions for collection, storage and transport of **environmental water samples** |
| **Additional resources** | ▪ Weekly surveillance report from PPHSN contains information on diarrhoea from the region: http://www.pphsn.net/surveillance/Syndromic.htm |
| **Other comments** | |

**Table 6. Summary of pathogens that cause acute diarrhoea – incubation periods, clinical features, sources, and modes of transmission.** *(Source: Pacific Outbreak Manual, March 2016)*

| Agent | Incubation Period | Clinical Features | Reservoir | Transmission |
|---|---|---|---|---|
| *Staphylococcus aureus* toxin | 0.5–8 hours | Abdominal cramps, vomiting and diarrhoea | Humans | Person to food |
| *Bacillus cereus* toxin | 0.5–6 hours (vomiting) 6–24 hours (diarrhoea) | Malaise, vomiting and/or diarrhoea | Environment | Food |
| *Vibrio cholerae* | Few hours – 3 days | Watery diarrhoea | Humans, shellfish | Food, water |
| *Vibrio parahaemolyticus* | 4–30 hours | Nausea, vomiting, abdominal cramps and diarrhoea | Shellfish | Food |
| *Clostridium perfringens* toxin | 6–24 hours | Abdominal cramps, diarrhoea and nausea | Shellfish | Food |
| Norovirus | 24–48 hours | Nausea, vomiting, abdominal cramps, diarrhoea, fever | Humans, shellfish | Person to person, food |
| Rotavirus | 24–72 hours | Nausea and vomiting | Humans | Person to person |
| *Salmonella* | 6–72 hours | Headache, fever, abdominal cramps, diarrhoea and nausea | Poultry, eggs, animals | Food, animal to person |
| *Shigella* | 1–3 days | Bloody diarrhoea, abdominal cramps, fever | Humans | Person to person |
| *Campylobacter* | 1–10 days | Fever, nausea, abdominal cramps and diarrhoea | Poultry | Food, water |

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| | | (sometimes bloody) | | |
| *Cryptosporidium* | 1–12 days | Diarrhoea, abdominal cramps | Animals, humans | Water |
| *Escherichia coli (STEC/EHEC)* | 3–4 days | Diarrhoea (often bloody), abdominal cramps | Cattle, humans | Food, person to person |
| *Giardia lamblia* | 7–10 days | Abdominal cramps, diarrhoea | Humans, water | Person to person, water |

## 3.4. PROLONGED FEVER

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| **Public health priority** | HIGH |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | Twice the average number of cases seen in the previous 2 weeks.<br>Consider using rolling average as per PSSS, e.g. >90% above all collated data to date. |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Case definition** | Fever ≥38°C lasting 3 or more days |
| **Signs & symptoms** | Variable depending on the cause. See case definitions and clinical guidelines for the common diseases that cause prolonged fever |
| **Pathogens & diseases that can cause this syndrome** | ▪ Typhoid<br>▪ Leptospirosis<br>▪ Dengue<br>▪ Influenza<br>▪ Pneumonia<br>▪ Tuberculosis<br>▪ Septicaemia<br>▪ Rickettsial infections (e.g. scrub typhus, typhus)<br>▪ Systemic fungal infections<br>▪ Malaria is not endemic in Fiji, but should be considered if the patient has travelled to a malaria-endemic area or is a visitor from a malaria-endemic area, including Solomon Islands, Vanuatu, Papua New Guinea, India, and sub-Saharan Africa.<br>▪ Many other causes |
| **Sources of infection (reservoir)** | Variable depending on the cause. |
| **Mode of transmission** | Variable depending on the cause. |
| **Incubation period** | Variable depending on the cause. |

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| **Period of infectiousness** | Variable depending on the cause, but more likely to be infectious while patient has a fever. |
| **Laboratory investigations** | Variable depending on the cause. Investigations might include:<br>▪ Blood samples for serology and culture<br>▪ Rapid diagnostic tests for dengue and leptospirosis<br>▪ Stool samples if suspect typhoid or if gastrointestinal symptoms present |
| **Notification** | ▪ **Single case**: report routinely<br>▪ **Cluster of cases**: report urgently |
| **Clinical management of case** | Variable depending on the cause.<br>Paracetamol should be given for fever. Provide oral or IV rehydration as required.<br>Refer to clinical guidelines for specific diseases. National guidelines are available for leptospirosis, typhoid, dengue, and tuberculosis. |
| **Management of contacts** | ▪ If gastrointestinal symptoms, provide advice on household contacts about hand hygiene, especially if caring for cases. E.g. washing hands carefully if exposed to vomit or faeces of cases. Avoid sharing food or drinks with cases.<br>▪ If respiratory symptoms, provide advice on respiratory hygiene (avoid cough and sneezes of sick persons)<br>▪ Advised to seek medical attention if develop fever or similar symptoms to the case |
| **Infection Control (Clinical/Hospital)** | STANDARD precautions<br>Plus DROPLET precautions if respiratory infection |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single cases** of prolonged fever: focus on establishing a diagnosis and be alert for additional cases.<br>▪ **Clusters of cases** of prolonged fever: investigation should be started without waiting for laboratory confirmation.<br>▪ **Case investigations** should include information on:<br>  ▪ Age, sex, where they live<br>  ▪ Immunisation history<br>  ▪ Clinical details, including date of onset of symptoms<br>  ▪ Laboratory test results<br>  ▪ Contact with other cases<br>  ▪ Recent travel overseas, or contact with travellers<br>  ▪ School or work place<br>  ▪ Recently visited places, including schools, work places, shopping centres, |

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| | clinics, hospitals, gatherings<br>▪ Prevention and Control measures variable depending on diagnosis. |
| **Fiji guidelines & protocols** | ▪ Clinical Guidelines for Diagnosis and Management of Leptospirosis<br>▪ Clinical Guidelines for Diagnosis, Management and Prevention of Typhoid<br>▪ Flow charts for Diagnosis and Management of Dengue<br>▪ Clinical Guidelines for Tuberculosis (under review) |
| **Additional resources** | |
| **Other comments** | |

## 3.5. DENGUE-LIKE ILLNESS

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| **Public health priority** | HIGH<br>URGENT if a new serotype is suspected or cases of severe dengue are identified |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | Twice the average number of cases seen in the previous 3 weeks.<br>Consider using rolling average as per PSSS, e.g. >90% above all collated data to date. |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Case definition**<br>(as per EWARS) | Fever ≥38$^{o}$C for at least 2 days, AND two or more of the following:<br>▪ Nausea or vomiting<br>▪ Muscle or joint pain<br>▪ Severe headache or pain behind the eyes<br>▪ Rash<br>▪ Bleeding |
| **Signs & symptoms** | In addition to the signs and symptoms listed under the case definition, patients with severe dengue might also have:<br>▪ Abdominal pain or tenderness<br>▪ Persistent vomiting<br>▪ Mucosal bleeding<br>▪ Liver enlargement >2cm below costal margin<br>▪ Clinical evidence of fluid accumulation<br>▪ Low blood pressure<br>▪ Rapid or weak pulse<br>▪ Slow capillary refill<br>▪ Cold and clammy skin<br>▪ Low urine output<br>▪ Lethargy, restlessness<br>In patients <15 years old, dengue may present as a vague febrile illness with a |

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| | *maculopapular* (raised) rash. |
| **Pathogens & diseases that can cause this syndrome** | ▪ Dengue virus 1, 2, 3 and 4<br>▪ Zika<br>▪ Leptospirosis<br>▪ Chikungunya<br>▪ Many other causes |
| **Sources of infection (reservoir)** | ▪ For dengue, humans are the reservoirs.<br>▪ For the other diseases that might cause this syndrome, the reservoirs are variable depending on the cause. |
| **Mode of transmission** | ▪ Dengue is transmitted from human to human by bites of Aedes mosquitoes.<br>▪ For the other diseases that might cause this syndrome, the mode of transmission is variable depending on the cause. |
| **Incubation period** | ▪ For dengue: 3 to 14 days, usually 7-10 days.<br>▪ For the other diseases that might cause this syndrome, incubation period is variable depending on the cause. |
| **Period of infectiousness** | ▪ Dengue is not transmitted directly from person to person, but during the febrile stage of the illness, mosquitoes can bite the infected person and transmit the infection to others.<br>▪ For the other diseases that might cause this syndrome, period of infectiousness depends on the cause. |
| **Laboratory investigations** | ▪ For dengue, see Section 4.5 for recommended investigations.<br>▪ For the other diseases that might cause this syndrome, laboratory investigations will depend on the most likely differential diagnoses. See clinical guidelines for other diseases for recommended investigations. |
| **Notification** | ▪ **Dengue is a notifiable disease in Fiji: Routine notification by medical officers and laboratory**<br>▪ For other disease, please see list of National Notifiable Diseases<br>▪ Use the IHR Decision Instrument (Appendix A.3) to determine whether reporting to WHO under IHR 2005 is required. |
| **Clinical management of** | ▪ For dengue, see Section 4.5 and refer to Clinical Guidelines for dengue. |

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| **case** | |
| **Management of contacts** | ▪ Persons living in the same area as the patient should be advised about mosquito control measures (cleaning up breeding sites), and to use personal protective measures to reduce the risk of bites. |
| **Infection Control (Clinical/Hospital)** | ▪ STANDARD precautions, see Appendix A.1<br>▪ Mosquito avoidance measures to reduce the risk of mosquito bites and transmission of the infection to other |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases. Samples (blood sample or dried blood spot) should be sent to confirm or eliminate a diagnosis of dengue. If confirmation, an investigation should be started immediately to find other cases.<br>▪ **Clusters of cases**: investigation should be started without waiting for laboratory confirmation.<br>▪ For dengue, see Section 4.5 |
| **Fiji guidelines & protocols** | ▪ Flow charts, wall charts and pocket flip charts for dengue diagnosis and management from Fiji MHMS and CDC<br>▪ Dengue Strategic Plan |
| **Additional resources** | ▪ WHO Dengue Guidelines for Diagnosis, Treatment, Prevention and Control: http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf |
| **Other comments** | |

## 3.6. ACUTE BLOODY DIARRHOEA

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| **Public Health Priority** | HIGH |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | 3 cases in one location within a week, or twice the average number of cases seen in the previous 2 weeks |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Case definition** | Any episode of acute bloody diarrhoea |
| **Common causes** | ▪ *Shigella*<br>▪ *Campylobacter*<br>▪ *Escherichia coli* (STEC/EHEC)<br>▪ Amoebic dysentry |
| **Response recommendations** | ▪ Stool specimens should be sent for all cases of acute bloody diarrhoea.<br>▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases.<br>▪ **Cluster of cases**: Case investigations should be started without waiting for laboratory confirmation. Environmental investigations should be conducted if there are linked cases with common exposures, e.g. ate the same food, ate at the same restaurant, drank from the same water supply, or attend the same school. |
| **Other resources** | See Section 3.3 on Watery Diarrhoea and Table 6 for list of common pathogens. |

## 3.7. SUSPECTED MENINGITIS

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| **Public Health Priority** | URGENT |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | 1 case |

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| **Case definition** | Sudden onset of fever ≥38$^{o}$C, AND one or more of the following:<br>▪ Severe headache<br>▪ Neck stiffness<br>▪ Altered consciousness<br>▪ Rash – petechial or purpural |

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| **Common causes** | ▪ *Neisseria meningitides*<br>▪ Other bacteria, viruses, parasites, fungi |
| **Response recommendations** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases. Samples (blood cultures, lumbar puncture) should be sent to confirm or exclude diagnosis of meningococcal infection. If confirmed, cases should be investigated immediately to identify and manage contacts, and identify any additional cases.<br>▪ **Clusters of cases**: investigation should be started without waiting for laboratory confirmation. |
| **Other resources** | Refer to Fiji Antibiotic Guidelines for use of prophylactic antibiotics for contacts of confirmed cases of meningococcal infection. |

## 3.8. ACUTE JAUNDICE SYNDROME

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| **Public Health Priority** | HIGH |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | **3 cases** |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Case definition** | Jaundice (yellow eyes or dark urine) AND severe illness with or without fever |
| **Common causes** | ▪ Leptospirosis<br>▪ Hepatitis A & E<br>▪ Epstein-Barr Virus<br>▪ Non-infectious causes, e.g. obstructive jaundice, acute haemolysis, drugs, toxins. |
| **Response recommendations** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases.<br>▪ **Cluster of cases**: Case investigations should be started without waiting for laboratory confirmation. |
| **Other resources** | Fiji Clinical Diagnosis and Management Guidelines for Leptospirosis |

## 3.9. ZIKA-LIKE ILLNESS

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| **Public Health Priority** | HIGH |
| **Alert threshold: Number of cases required to trigger a notification and investigation** | **3 cases** |
| **Threshold for declaring an outbreak** | Incidence rate >2 standard deviations above the average for the last 5 non-outbreak years |

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| **Case definition** | Generalised maculopapular rash AND two or more of the following:<br>▪ Arthralgia or myalgia<br>▪ Red eyes or non-purulent conjunctivitis, pain behind the eyes<br>▪ Oedema of hands or feet<br>▪ Low grade fever (<38$^{o}$C) |
| **Common causes** | ▪ Zika<br>▪ Dengue, Chikungunya, other mosquito-borne viruses, e.g. Ross River virus |
| **Response recommendations** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases. Samples (blood sample, urine sample) should be sent to confirm or eliminate a diagnosis of Zika infection. If confirmation, an investigation should be started immediately to find other cases.<br>▪ **Clusters of cases**: investigation should be started without waiting for laboratory confirmation.<br>Advise cases to use mosquito-avoidance measures to reduce the risk of spread to others. |
| **Other resources** | See Section 4.13 on Zika, and the Fiji Zika Action Plan |

# Section 4:

# Other Outbreak-Prone Diseases & Syndromes

This section is based on the recommendations in the **Pacific Outbreak Manual (March 2016)**, with modifications to ensure the guidelines are relevant for Fiji.

4.1 Acute flaccid paralysis / polio
4.2 Chikungunya
4.3 Cholera
4.4 Ciguatera fish poisoning
4.5 Dengue
4.6 Hepatitis A and E (epidemic hepatitis)
4.7 Leptospirosis
4.8 Measles
4.9 Meningococcal disease
4.10 Rubella
4.11 Severe acute respiratory infection (SARI)
4.12 Typhoid
4.13 Zika
4.14 Emerging infectious diseases and novel pathogens

## 4.1. Acute Flaccid Paralysis

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| **Public health priority** | URGENT |
| **No. of cases required to trigger an investigation** | ONE |

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| **Case definitions** | ▪ **Suspected case definition**<br>All children under 15 years with acute flaccid paralysis (AFP), including those considered to have Guillain-Barre syndrome, or persons at any age diagnosed as suspect paralytic polio cases.<br>▪ **Confirmed case definition**<br>Any person in whom a poliovirus is isolated from an appropriate clinical specimen (e.g., stool, cerebrospinal fluid [CSF], or oropharyngeal secretions), with confirmatory typing and sequencing performed by a recognised reference laboratory. |
| **Signs & symptoms** | Nearly all (99%) polio infections are subclinical (have no symptoms) or give only a vague fever illness. Cases with paralysis may begin with fever, feeling bad, headache and nausea, followed by muscle pain or stiffness, and then partial or complete paralysis in one or more limbs. There are decreased or absent tendon reflexes in the affected limbs and no sensory loss. Onset is usually sudden and paralysis does not usually equally affect both sides of the body. Up to 10% of paralytic cases in an epidemic die, usually due to paralysis of the respiratory muscles. |
| **Pathogen(s):** | Poliovirus 1, 2 and 3 |
| **Sources of infection (reservoir)** | Humans, especially those with asymptomatic infections. Humans do not become long-term carriers. |
| **Mode of transmission** | Transmission is from person to person, mainly faecal-oral. |
| **Incubation period** | Usually 7–14 days, but can vary from 2 days to a month |
| **Period of infectiousness** | Polio virus can be found in the throat for about a week and in faeces for up to 6 weeks, but cases are most infectious a few days before and after the start of symptoms. |
| **Laboratory investigations** | ▪ Collect 5–10 g of fresh stool from the patient (a 'thumbnail' quantity).<br>▪ Use plastic screw-top container and place in the fridge, not freezer.<br>▪ Follow standard packing and shipping procedure. Maintaining the cold chain (0–8°C) |

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| | is essential. |
| **Notification** | ▪ Notify URGENTLY by PHONE<br>▪ Polio is required to be reported to WHO under IHR 2005 (See Appendix A.3) |
| **Clinical management of case** | Refer the patient immediately to hospital. Management is supportive only, but may require mechanical ventilation. |
| **Management of contacts** | Immunisation of close contacts of positive polio cases is recommended. |
| **Infection Control (Clinical/Hospital)** | STANDARD plus CONTACT precautions (see Appendix A.1) |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single case** of AFP should prompt an investigation, and a search for other cases in the area where the case lives. Contact WHO, SPC or CDC for guidance.<br>▪ Refer to the HBAS Information Folder and the Acute Flaccid Paralysis Case Investigation Form (see additional resources below). Collect information on:<br>• Age, sex and where they live;<br>• Place, time, source and type of any polio immunisations;<br>• Clinical details, including date of first symptoms, complications, and if the case has any disease that affects the immune system<br>• Laboratory test results;<br>• Travel history<br>• Contact with other cases, travellers, or persons at risk for polio<br>• Whether the case attends a school or other institution.<br><br>▪ **Immunisation** is the most effective method of prevention of polio.<br>▪ Where it is felt to be necessary by the national Expanded Programme on Immunisation (EPI) coordinator, after consultation with experts, or where poliovirus is isolated from an AFP case's stool, all children below five years of age on the affected island should receive 2 drops of oral polio vaccine (OPV), regardless of their immunisation status. Occasionally the national EPI coordinator will extend the age group for immunisation. If poliovirus is isolated, then a second round of OPV immunisation should be performed four weeks after the first round. |
| **Differential** | ▪ Paralytic polio |

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| **diagnoses** | ▪ Guillain-Barre syndrome<br>▪ Non-polio enteroviruses may rarely cause a paralytic illness<br>▪ Other (rare) infections, such as parasitic spinal infections<br>▪ Tumours<br>▪ Toxins<br>▪ Stroke |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ PPHSN Website: http://www.pphsn.net/surveillance/HBAS.htm<br>▪ PPHSN Acute Flaccid Paralysis Case Investigation Form: http://www.pphsn.net/surveillance/HBAS/AnnexB1-AFP_Case_Investigation_Form.pdf |
| **Other comments** | |

## 4.2. Chikungunya

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|---|---|
| **Public health priority** | HIGH |
| **No. Of cases required to trigger an investigation** | One confirmed case, if there is no known local transmission |

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| **Case definitions** | ▪ **Suspected case definition**<br>Acute onset of fever >38.5°C AND severe arthralgia/arthritis not explained by other medical conditions AND residing in or having visited epidemic areas, having reported transmission within 15 days prior to the onset of symptoms<br>▪ **Confirmed case definition**<br>Isolation of the virus or detection of chikungunya-specific antigen or antibodies in blood by an advanced laboratory test |
| **Signs & symptoms** | Fever, arthralgia (often in the hand, wrist and ankle joints), backache and headache; many patients also develop a short-lived *maculopapular* rash |
| **Pathogen(s):** | Chikungunya virus |
| **Sources of infection (reservoir)** | Humans serve as the chikungunya virus reservoir during epidemic periods. During inter-epidemic periods, a number of vertebrates have been implicated as reservoirs. These include rodents, birds, and other vertebrates. The exact nature of the reservoir status in the Pacific has not been documented. |
| **Mode of transmission** | Chikungunya virus is transmitted from one human to another by mosquitoes of the *Aedes* genus. These bite during the day, but mostly during the early morning and the evening. People with chikungunya should be cared for under bed nets so that a mosquito cannot bite them and then carry the infection to another person. |
| **Incubation period** | From 2–12 days, usually 4-8 days |
| **Period of infectiousness** | No evidence of direct person-to-person transmission. Humans are infectious to mosquitoes for about five days after onset of illness. |
| **Laboratory investigations** | A blood specimen should be collected in a red-top blood tube for testing of chikungunya antibodies or testing for chikungunya virus. This specimen should be refrigerated and standard packing and shipping procedure should be followed. Rapid tests are also available. |

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| | During a confirmed *epidemic*, it is not imperative that all cases have laboratory investigations. |
| **Notification** | ▪ Notify URGENTLY by PHONE<br>▪ Use the IHR Decision Instrument to determine whether reporting to WHO under IHR 2005 is required (See Appendix A.3). |
| **Clinical management of case** | Treatment is symptomatic and paracetamol is the drug of choice. Avoid aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs), as a common differential diagnosis is dengue fever. Mild forms of exercise and physiotherapy are recommended in recovering persons.<br>Refer cases with any of the following to a Divisional Hospital: pregnancy, low urine output, hypotension, bleeding disorders, confusion, evidence of meningism (neck stiffness + intolerance to bright light + headache), persistent fever of more than one week's duration, and extremes of age – persons above 60 years and infants (below one year of age). |
| **Management of contacts** | Persons living in the area where a patient is thought to have been infected should be told of the risk of being bitten by chikungunya-infected mosquitoes, and should be asked to do mosquito control including clean-up of mosquito breeding sites (things that collect water, such as coconut shells, tyres, cans) and employ measures for personal protection, such as mosquito repellent sprays and bed nets (see Appendix 7). |
| **Infection Control (Clinical/Hospital)** | STANDARD precautions, see Appendix A.1<br>Plus, a long-lasting insecticidal net should be placed over patients so that mosquitoes cannot bite them and then transmit the disease to others. |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases.<br>▪ **Cluster of cases**: Case investigations should be started without waiting for laboratory confirmation.<br>▪ Preventing mosquito bites is the best way to prevent infection.<br>▪ All suspected cases should be kept under mosquito nets during the febrile period.<br>▪ Communities in the affected areas should be educated about the mosquito control measures to be adopted in hospital premises and houses. |
| **Differential diagnoses** | ▪ Leptospirosis<br>▪ Dengue<br>▪ Zika |

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| | ▪ Malaria<br>▪ Meningitis<br>▪ Rheumatic fever |
| **Fiji guidelines & protocols** | |
| **Additional resources** | WHO Guidelines on Prevention and Control of Chikungunya Fever. 2009: http://www.wpro.who.int/mvp/topics/ntd/Chikungunya_WHO_SEARO.pdf<br>CDC Chikungunya – Clinical Evaluation and Diseases: http://www.cdc.gov/chikungunya/hc/clinicalevaluation.html |
| **Other comments** | |

## 4.3. Cholera

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| **Public health priority** | URGENT |
| **No. of cases required to trigger an investigation** | ONE |

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| **Case definitions** | ▪ **Suspected (clinical case definition)**<br>Severe dehydration or death from acute watery diarrhoea in a patient aged 5 years or more<br>▪ **Probable**<br>Clinically compatible illness and epidemiologically linked to a confirmed case<br>▪ **Confirmed**<br>Isolation of toxigenic (i.e., cholera toxin-producing) *Vibrio cholerae* O1 or O139 from stool or vomitus. Serologic evidence of recent infection is also highly suggestive. |
| **Signs & symptoms** | Most cases have no symptoms or have mild diarrhoea. In severe cases there is quick onset of a large amount of painless diarrhoea ('rice water' stools), occasional vomiting, rapid dehydration and shock. The death rate is high (20%–30%) without correct treatment. |
| **Pathogen(s):** | *Vibrio cholerae* |
| **Sources of infection (reservoir)** | Humans and occasionally shellfish; *Vibrio cholerae* is an environmental bug found in saltwater and salty water bodies at low numbers, with increases by humans during epidemics |
| **Mode of transmission** | Ingestion of contaminated food and water |
| **Incubation period** | Usually 2–3 days (occasionally from hours to 5 days) |
| **Period of infectiousness** | Usually only while diarrhoea lasts and for a few days after symptoms stop. Carrier state can occasionally persist for a several months. Tetracycline shortens the period of infectiousness. |
| **Laboratory investigations** | Laboratory test: Stool culture for *Vibrio cholera*<br>Stool sample: 5-10g of fresh stool (thumbnail size) in plastic screw-top container, send to laboratory immediately after collection |

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| **Notification** | ▪ NOTIFY URGENTLY by PHONE<br>▪ Cholera is an internationally notifiable disease and must be reported to WHO under IHR 2005 (Appendix A.3). Cholera is also notifiable to PPHSN. |
| **Clinical management of case** | Assess whether (and how severely) the patient is dehydrated. Immediate rehydration with oral rehydration solution (6 level teaspoons of sugar and . teaspoon of salt in 1 litre of safe water) or one packet of oral rehydration solution (ORS) mixed in 1 litre of safe water) is the most important treatment.<br>If dehydration is severe, intravenous fluids (Ringer's lactate/Hartmann's solution/normal saline) should be administered. Seek expert advice regarding volume, rate and need for potassium in intravenous fluids in severe dehydration. Antibiotics should be given to cases with severe dehydration only. |

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| **Management of contacts** | People at risk include household contacts, those who shared food or drinks with a case, or those who have been in contact with an infection source of a case.<br>Advise contacts to look out for signs and symptoms of cholera for 5 days after contact with a case or exposure to a source. Advise contacts to seek medical care immediately if symptoms develop.<br>To reduce the risk for further spread, contacts should be contacted daily for 5 days so that new cases are identified and managed early. |
| **Infection Control (Clinical/Hospital)** | Standard plus Contact precautions |
| **Public Health Response – Investigation, Prevention & Control** | ▪ Epidemiological and environmental investigation required – try to identify potential sources and exposures including:<br>  ▪ Contact with other people with diarrhoea<br>  ▪ Untreated water sources<br>  ▪ Eating seafood, particularly shellfish<br>  ▪ Travel to cholera-endemic areas<br>▪ Preventive measures for food and water-borne diseases<br>▪ Seek advice from NACD<br>▪ Advice from international agencies might be required, e.g. WHO, SPC, CDC.<br>▪ Mass immunisation for cholera under outbreak situations might be considered. |

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| **Differential diagnoses** | Other causes of diarrhoea can result in severe watery diarrhoea and dehydration, but are rarely as severe as cholera. See Table 6 on common causes of acute diarrhoea. |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ Cholera outbreak: assessing the outbreak response and improving preparedness: http://www.who.int/cholera/publications/OutbreakAssessment/en/<br>▪ WHO: First steps for managing an outbreak of acute diarrhoea: http://www.who.int/cholera/publications/firststeps/en/<br>▪ PPHSN. Outbreak preparedness and control: Cholera: http://www.pphsn.net/outbreak/Cholera.htm<br>▪ The Treatment of Diarrhoea. A manual for physicians and other senior health workers. WHO 2005: http://www.who.int/maternal_child_adolescent/documents/9241593180/en/ |
| **Other comments** | |

## 4.4. Ciguatera Fish Poisoning

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| **Public health priority** | HIGH |
| **No. of cases required to trigger an investigation** | ONE |

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| **Case definitions** | ▪ **Suspected case definition**<br>One or more of: nausea, vomiting or diarrhoea, **and** neurologic signs, within 24 hours of eating reef fish<br>▪ **Confirmed case definition**<br>Ciguatera diagnosis is usually based on the clinical and epidemiologic features. Though rarely done, it can be confirmed for a person with a clinically compatible illness after eating reef fish, by detection of ciguatoxin in consumed fish by an approved testing method. |
| **Signs & symptoms** | Nausea, vomiting and/or diarrhoea. Ciguatera poisoning has neurologic symptoms such as numbness and tingling, ataxia (unsteady movement and staggering walk) and temperature reversal (cold things feel burning hot on the skin). |
| **Pathogen(s):** | Ciguatera is caused by naturally occurring toxins in reef fish. |
| **Sources of infection (reservoir)** | Problems are encountered with many fish types, including barracuda, snapper, coral trout, Spanish mackerel, red emperor, wrasse, reef cod, sturgeon, trevally, kingfish, grouper and amberjack. |
| **Mode of transmission** | Food-borne |
| **Incubation period** | Less than 1 hour to 24 hours |
| **Period of infectiousness** | There is no convincing evidence of person-to-person transmission. It can only be transmitted by eating fish. |
| **Laboratory investigations** | There are no widely available tests for human ciguatera. Leftover fish can be tested for ciguatera toxin, but in most cases this is not necessary or practical. |
| **Notification** | ▪ Notifiable disease under the National Notifiable Disease Surveillance System (**NNDSS**)<br>▪ Report urgently by phone if there is a cluster of cases |

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| **Clinical management of case** | Ciguatera is treated supportively. Intravenous mannitol or other osmotic diuretics are sometimes used. Seek expert advice. |
| **Management of contacts:** | Further cases may occur in people who were exposed to the same meal as the case. Provide information about what to do if they develop symptoms. |
| **Infection Control (Clinical/Hospital)** | STANDARD precautions (see Appendix A.1). |

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| **Public Health Response – Investigation, Prevention & Control** | ▪ An **investigation** should be conducted if the same fish has been eaten by others, so that other potential cases can be found and any remaining fish discarded. Cases should be interviewed to identify possible links to specific foods and sources of infection, for example a restaurant or a shared fish meal. An environmental investigation should begin if a source is identified, and any leftover fish should be discarded.<br><br>▪ **Prevention**: Avoiding eating large fish from certain reef areas is the only way to prevent ciguatera fish poisoning. Check with local authorities to determine which fish in your area present the highest risk. The public should be informed of the risk of eating large fish, especially if there has been a recent case of ciguatera fish poisoning. |
| **Differential diagnoses** | ▪ Blowfish poisoning<br>▪ Neurotoxic shellfish poisoning<br>▪ Paralytic shellfish poisoning<br>▪ Botulism<br>▪ Organophosphate pesticide poisoning |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ Ciguatera Fish Poisoning: Treatment, Prevention and Management. 2008. Friedman, M.A. Mar. Drugs 6:456–479: www.mdpi.com/1660-3397/6/3/456/pdf<br>▪ WHO Ciguatera Poisoning: Questions and Answers: www.searo.who.int/entity/emergencies/documents/guidelines_for_health_emergency_ciguatera_qa.pdf<br>▪ Ciguatera Field Reference Guide: |

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| | http://www.spc.int/coastfish/index.php?option=com_content&Itemid=30&id=340 |
| **Other comments** | |

## 4.5. Dengue Fever

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| **Public health priority** | HIGH<br>URGENT if a new serotype is suspected or cases of severe dengue are identified |
| **No. of cases required to trigger an investigation** | Twice the average number of cases seen in the previous 3 weeks |
| **Threshold for declaring an outbreak** | An OUTBREAK is declared if the incidence rate >2 standard deviations above the average for the last 5 non-outbreak years. (See Section 1.3 on declaring alerts and outbreaks). |

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| **Case definitions** | ▪ **Suspected (clinical case definition):**<br>Acute fever ≥38°C for at least 2 days, AND two or more of the following:<br>• Anorexia and nausea<br>• Aches and pains<br>• Rash<br>• Low white blood cell count<br>• Warning signs<br>Warning signs include:<br>o Abdominal pain or tenderness<br>o Persistent vomiting<br>o Mucosal bleeding<br>o Liver enlargement >2cm below costal margin<br>o Clinical evidence of fluid accumulation<br>o Lethargy, restlessness<br>o Laboratory: increase in haematocrit, rapid decrease in platelet count<br>▪ **Confirmed case definition**<br>Isolation of dengue virus or detection of dengue-specific antigen or antibodies in tissue, blood, CSF or other body fluid by an advanced laboratory test |
| **Signs & symptoms** | In addition to the symptoms and signs described in the case definition: vomiting, pain behind the eyes, and bleeding (e.g. petechial, mucosal). In patients <15 years old, dengue may present as a vague febrile illness with a *maculopapular* (raised) rash. |

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| | In addition to the warning signs listed under the case definition, patients with severe dengue might have low blood pressure, rapid or weak pulse, slow capillary refill, cold and clammy skin, and low urine output. |
| **Pathogen(s):** | Dengue virus 1, 2, 3 and 4 |
| **Sources of infection (reservoir)** | Humans |
| **Mode of transmission** | Transmitted from human to human by bites of *Aedes* mosquitoes |
| **Incubation period** | 3 to 14 days, usually 7-10 days |
| **Period of infectiousness** | Not transmitted directly from person to person, but during the febrile stage of the illness, mosquitoes can bite the infected person and transmit the infection to others.<br>Mosquitoes remain infectious for life and are able to infect many other humans. |
| **Laboratory investigations** | ▪ Blood sample for dengue antibodies and NS-1 antigen<br>▪ Rapid diagnostic test (RDT) available across labs in Fiji<br>▪ ELISA/ NS1 Ag only available at NPHL at Mataika House<br>▪ If tests are negative on the first set of samples, repeat tests when more than 5 days from the onset of illness<br>▪ If NS1 Ag positive, dried blood spots (DBS) should to be sent to ILM for serotyping |
| **Notification** | ▪ Routine notification under NNDSS<br>▪ Use the IHR Decision Instrument (Appendix A.3) to determine if reporting to WHO under IHR 2005 is required |
| **Clinical management of case** | ▪ No specific treatment. Management consists of controlling symptoms and managing complications<br>▪ Manage fever with paracetamol (not aspirin or NSAIDs)<br>▪ Maintain hydration<br>▪ Early recognition and correct management is essential for preventing deaths<br>▪ Refer to WHO guidelines for diagnosis and treatment |
| **Management of contacts** | Advise to use mosquito-avoidance measures to reduce the risk of bites, and clean up potential mosquito breeding sites, e.g. stagnant water in car tyres, cans, flower pots and vases, coconut shells. |

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| **Infection Control (Clinical/Hospital)** | STANDARD precautions (Appendix A.1) |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single case**: focus on establishing a diagnosis and be alert for additional cases.<br>▪ **Clusters of cases**: investigation should be started without waiting for laboratory confirmation. Determine possible places of exposure so that control measures can be carried out and to identify further cases.<br>▪ Advise cases to use mosquito-avoidance measures to reduce the risk of spread to others.<br>▪ During outbreaks, implement vector control measures and communicate mosquito avoidance measures to the public<br>▪ Mosquito avoidance measures include insect repellents, mosquito nets, fly screens, and removing breeding sites around homes |
| **Differential diagnoses** | ▪ Leptospirosis<br>▪ Typhoid<br>▪ Chikungunya<br>▪ Zika<br>▪ Many other causes |
| **Fiji guidelines & protocols** | ▪ Flow charts, wall charts and pocket flip charts for dengue diagnosis and management from Fiji MHMS and CDC<br>▪ Dengue Strategic Plan/Action Plan |
| **Additional resources** | ▪ WHO Dengue Guidelines for Diagnosis, Treatment, Prevention and Control: http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf |
| **Other comments** | |

## 4.6. Hepatitis A & E (epidemic hepatitis)

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| **Public health priority** | URGENT |
| **No. of cases required to trigger an investigation** | 2 or more linked cases |

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| **Case definitions** | ▪ **Suspected case definition**<br>An *acute* illness with sudden onset of symptoms and either jaundice (yellow skin or eyes, or dark urine) or elevated liver enzymes<br>▪ **Confirmed case definition**<br>Positive immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) or hepatitis E virus (anti-HEV). |
| **Signs & symptoms** | The usual clinical presentation is *acute* fever, feeling unwell, loss of appetite, nausea and abdominal discomfort, followed a few days later by dark urine and jaundice. Symptoms usually last several weeks. |
| **Pathogen(s):** | Hepatitis A virus (HAV), hepatitis E virus (HEV) |
| **Sources of infection (reservoir)** | Humans |
| **Mode of transmission** | Hepatitis A and E are transmitted almost entirely by *faecal–oral* transmission. It may occur through contamination of food resulting from poor food handling practices, faecal contamination of drinking water or eating shellfish (for example oysters) from polluted waters. There is some evidence that hepatitis E may also be transmitted by animals, in particular pigs. |
| **Incubation period** | 15–50 days, usually 28–30 days |
| **Period of infectiousness** | From the last half of the incubation period to a few days after beginning of symptoms; usually no longer infectious after 1 week of jaundice |
| **Laboratory investigations** | A blood specimen should be collected in a red-top blood tube for *serologic testing* of hepatitis A virus antibody, hepatitis E antibody, hepatitis B panel, and possibly for hepatitis C testing. This specimen should be refrigerated and standard packing and shipping procedure should be followed. |
| **Notification** | ▪ Urgent notification under NNDS |

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| | ▪ Use the IHR Decision Instrument (see Appendix A.3) to determine whether reporting to WHO under IHR 2005 is required. |
| **Clinical management of case** | Supportive care only |
| **Management of contacts** | The following is a general list of persons considered to be contacts if exposed to infectious cases:<br>▪ All immediate family, household members and sexual partners<br>▪ All persons who ate uncooked food that was prepared by the case<br>▪ All persons who look after cases who are in nappies/diapers<br>Contacts should be advised to seek medical care if they develop jaundice. They should be given advice about hygiene, in particular hand washing with soap and water after using the toilet. |
| **Infection Control (Clinical/Hospital)** | STANDARD plus CONTACT precautions (see Appendix A.1) |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Investigation**: Information about exposures during the period 15 to 50 days before beginning of jaundice should be sought. This should include information about:<br>▪ Household and sexual contacts who have had an illness that seems like hepatitis;<br>▪ Restaurants where the case has eaten;<br>▪ Social gatherings where the case has eaten;<br>▪ All sources of drinking water;<br>▪ Eating of raw or partially cooked shellfish;<br>▪ Attendance or employment at child care centres by case or household contacts;<br>▪ Water exposure (for example swimming);<br>▪ Exposure to sewage, or failed sewage disposal systems; and<br>▪ A search for other cases, particularly in family members of children linked to school or child care environment.<br>▪ The case and caregivers should be informed about the infection and how it is transmitted. Education should include information about hygienic practices, particularly hand washing before preparing food and eating, and after going to the toilet.<br>▪ Cases should also be told not to prepare or handle food to be eaten by other people |

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| | during the infectious period.<br>▪ In some settings, emergency immunisation with hepatitis A vaccine may be needed. Immunoglobulin (a special type of blood transfusion) is used only for extremely high-risk contacts. Seek expert advice.<br>▪ **Prevention**: Important prevention strategies include providing safe water, messages on effective food hygiene, proper hand washing, safe disposal of stools, and safe latrines. |
| **Differential diagnoses** | ▪ Acute hepatitis B and C<br>▪ Leptospirosis<br>▪ Infectious mononucleosis (glandular fever)<br>▪ Toxins |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ WHO. Hepatitis A Fact sheet. http://www.who.int/mediacentre/factsheets/fs328/en/<br>▪ WHO. Waterborne Outbreaks of Hepatitis E: recognition, investigation and control: http://www.who.int/hepatitis/publications/HepE-manual/en/<br>▪ CDC. Hepatitis A Information for Health Professionals: http://www.cdc.gov/hepatitis/hav/<br>▪ CDC. Hepatitis E Information for Health Professionals: http://www.cdc.gov/hepatitis/HEV/ |
| **Other comments** | |

## 4.7. Leptospirosis

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| **Public health priority** | HIGH |
| **No. of cases required to trigger an investigation** | Two linked cases |
| **Threshold for declaring an outbreak** | Leptospirosis is endemic in Fiji. An OUTBREAK is declared if incidence rate >2 standard deviations above the average for the last 5 non-outbreak years. (See Section 1.3 on declaring alerts and outbreaks). |

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| **Case definitions** | ▪ **Suspected case if <u>ALL 3</u> of the following criteria fulfilled:**<br>1. Acute onset of fever (≥38°C), headache, and myalgia<br>2. At least one of the following clinical features:<br>• Conjunctival suffusion (red eyes)<br>• Jaundice (yellow eyes)<br>• Acute renal failure<br>• Haemoptysis or blood-stained sputum<br>• Other bleeding including gastrointestinal bleeding, epistaxis, petechiae<br>3. At least one epidemiological risk factor in past 3 weeks:<br>• Occupation: farmer, abattoir worker, outdoor worker, cleaning streams, exposure to sewage & garbage<br>• Contact with animals<br>• Contact with floodwaters or during post-flood period<br>• Contact with other freshwater (rivers, lakes, waterfalls), soil or mud<br>• Living conditions: live in rural area or village, no metered water at home<br>• Live or work in current hotspot area, e.g. recent clusters or outbreaks<br>• Link to a recent leptospirosis case, e.g. household member, co-worker<br><br>▪ **Probable case is a suspected case with at least one of the following:**<br>• Positive *Leptospira* Rapid Diagnostic Test<br>• Positive *Leptospira* ELISA IgM<br><br>▪ **Confirmed case* is a suspected case with at least one of the following:** |

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| | • Positive *Leptospira* PCR<br>• Microscopic Agglutination Test (MAT) – single sample with titre of ≥1:400), or 4-fold rise in titres between samples taken 14 to 60 days apart<br>• Identification of leptospires in tissues<br>**(*Note that confirmatory tests are currently not available in Fiji)** |

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| **Signs & symptoms** | Clinical presentations range from mild non-specific febrile illnesses to severe life threatening complications, and can be difficult to distinguish from other infections. Leptospirosis causes a biphasic illness with an early bacteraemic phase lasting 7 to 10 days, followed by a late phase associated with immunologically mediated organ damage, severe complications and high mortality rates.<br>▪ ***Early phase***: acute onset of fever, myalgia, headache. Calf tenderness and conjunctival suffusion are characteristic of leptospirosis but are not always present. Other symptoms include anorexia, nausea, vomiting, abdominal pain, dizziness, lethargy, malaise, arthralgia, eye pain, and photophobia. Rashes include macular, papular and urticariform rashes, mostly on the trunk or pre-tibial areas. Symptoms in the early phase are non-specific and often difficult to distinguish from other illnesses.<br>▪ ***Late phase*:** Acute lung injury (including pulmonary haemorrhage), acute renal failure, liver inflammation, haemorrhagic manifestations, myocarditis, and neurological complications. |
| **Pathogen(s):** | *Leptospira* bacteria – currently over 250 known serovars |
| **Sources of infection (reservoir)** | Mammals, including rodents, livestock, domestic pets, and wildlife. |
| **Mode of transmission** | Humans become infected through contact with urine of infected animals. This could occur through direct contact with animals (e.g. farmers and abattoir workers) or contact with an environment that has been contaminated with animal urine (e.g. freshwater, flood waters, soil, and mud). Infection is more likely if skin is broken or damaged. |
| **Incubation period** | 5 to 14 days (range 1 to 30 days) |
| **Period of infectiousness** | Human to human transmission is extremely rare, but cases might be linked because of exposure to a common source. |

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| **Laboratory investigations** | There are 2 *Leptospira* diagnostic tests available in Fiji in 2016:<br>▪ *Leptospira* Rapid Diagnostic Test (SD *Leptospira* IgM)<br>▪ *Leptospira* ELISA IgM (Panbio)<br>A positive result to the above tests is considered a PROBABLE diagnosis<br>Laboratory tests for confirmation of leptospirosis are not currently available in Fiji, and include PCR, MAT, isolation of *Leptospires* by culture or in tissues.<br>See clinical guidelines for detailed description of general laboratory tests and findings. |
| **Notification** | Leptospirosis is a Notifiable Disease in Fiji.<br>▪ **Single cases** of leptospirosis should be notified weekly using routine procedures.<br>▪ **Clusters of linked cases** should be reported urgently by telephone to the respective Divisional Medical Officer.<br>▪ Laboratories are required to report cases with positive leptospirosis diagnostic tests. |
| **Clinical management of case** | If a patient fits the definition for a suspected case, treatment should be started immediately. Treatment should not be delayed if leptospirosis diagnostic tests are not available, or while waiting for laboratory results. All patients who fit the criteria for suspected leptospirosis should be given **antibiotics**. First choice antibiotics include Amoxycillin, Doxycycline, and crystalline penicillin (IV). See **Fiji Clinical Guidelines for Diagnosis and Management of Leptospirosis (2016)** for detailed information on antibiotics and management of complications. |

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| **Management of contacts** | Human to human transmission is extremely rare. Contacts should be advised to take precautions to reduce exposure to potential infection sources, and seek medical advice if they develop a fever or feel unwell. |
| **Infection Control (Clinical/Hospital)** | Standard precautions |
| **Public Health Response – Investigation, Prevention & Control** | ▪ Case investigations should be conducted on all probable and confirmed cases. Two or more linked cases should be investigated urgently to identify any common sources of infection. Use standardised leptospirosis case investigation form (Appendix B).<br>▪ Infection occurs through contact with animals or contact with an environment that has been contaminated by animal urine. Avoid touching rodents and mongoose, and |

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| | keep livestock away from homes. Wash hands carefully after touching animals or working with animals, or working outdoors.<br>▪ Outbreaks of leptospirosis are most common during the wet season, particularly after heavy rainfall, flooding, or cyclones. During high-risk times, communities should be advised to avoid contact with floodwaters or swimming in rivers and streams. If possible, gloves and boots should be worn during post-flooding clean up. |
| **Differential diagnoses** | ▪ Dengue<br>▪ Typhoid<br>▪ Influenza<br>▪ Meningitis<br>▪ Acute hepatitis<br>▪ Many other infectious diseases. |
| **Fiji guidelines & protocols** | ▪ Fiji Clinical Guidelines for Diagnosis and Management of Leptospirosis (2016)<br>▪ Fiji Leptospirosis National Strategic Plan<br>▪ Leptospirosis Case Investigation Form. |
| **Additional resources** | ▪ WHO. 2003. Human leptospirosis: guidance for diagnosis, surveillance and control: http://apps.who.int/iris/bitstream/10665/42667/1/WHO_CDS_CSR_EPH_2002.23.pdf<br>▪ CDC: Leptospirosis www.cdc.gov/leptospirosis/index.html |
| **Other comments** | |

## 4.8. Measles

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| **Public health priority** | URGENT |
| **No. of cases required to trigger an investigation** | ONE |

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| **Case definitions** | ▪ **Suspected case:**<br>1. Fever ≥38°C, ***and*** maculopapular (raised, red, non-blistering) rash, ***and*** either cough or runny nose or conjunctivitis. **OR**<br>2. Any person in whom a clinician suspects measles infection<br>▪ **Confirmed case:**<br>Culture of measles virus from a clinical specimen; OR detection of measles by PCR; OR significant rise in serum measles antibodies in paired sera; OR positive serological test for measles IgM antibodies |
| **Signs & symptoms** | Acute onset of fever ≥38°C, cough, red eyes, and runny nose. A generalised maculopapular rash develops 3 to 7 days after the onset of illness, usually starting on the face and head. Malnourished children are more likely to develop a severe illness. |
| **Pathogen(s):** | Measles virus |
| **Sources of infection** | Humans |
| **Mode of transmission** | Airborne transmission via breathing, coughing, and sneezing, or by contact with bodily secretions. |
| **Incubation period** | 7 to 18 days, usually ~10 days |
| **Period of infectiousness** | From just before the onset of symptoms, until 4 days after the appearance of the rash. During this time, cases should be advised to:<br>▪ Stay home (unless isolated in hospital)<br>▪ Not participate in any group activities, including school, child care, work, or social gatherings<br>▪ Avoid contact with people who are not immune, especially pregnant women and infants <1 year old who have not yet been vaccinated for measles<br>**Measles is one of the most contagious diseases.** |
| **Laboratory** | Venous blood sample for Measles IgM (ELISA) – only available at NPHL at Mataika |

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| **investigations** | House. Dried Blood Spots on filter paper can also be used.<br>During an outbreak, it is only necessary to send specimens for the first 5 cases – discuss with NACD.<br>See NPHL Handbook for details on specimen collection, storage, and transport. |
| **Notification** | Report all cases URGENTLY BY PHONE.<br>Use the IHR Decision Instrument (see Appendix A.3) to determine whether reporting to WHO under IHR 2005 is required. |
| **Clinical management of case** | Measles is highly infectious until four days after appearance of rash and patients should be isolated. Any child hospitalised with fever and rash should be isolated on admission. Paracetamol rather than aspirin should be used for fever in patients under 18 years of age. A serious complication of measles is blindness in patients who are vitamin A deficient. Consideration should be given to providing a vitamin A supplement in patients at risk of vitamin A deficiency, including those patients who are malnourished. |
| **Management of contacts** | Anyone who has been in the same room as a case during the period of infectiousness is considered a contact.<br>▪ Unimmunised contacts should be immunised ASAP<br>▪ Keep unimmunised contacts out of school, childcare or work for 18 days after their last contact with the infectious case.<br>▪ Ask contacts to be alert for acute fever and rash and advise those who develop symptoms to call ahead, if possible, before seeking medical advice (so as to avoid common waiting areas in health centres or hospitals and spreading the infection). |
| **Infection Control (Clinical/Hospital)** | STANDARD, CONTACT, AND AIRBORNE precautions should all be used if measles is suspected or confirmed. See Appendix A.1. |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single cases**: focus on establishing a diagnosis and be alert for additional cases. Actively search for other cases that were in contact with the case – this should continue for at least 2 incubation periods (about 1 month).<br>▪ **Clusters of cases**: case investigations should be started without waiting for laboratory confirmation.<br>▪ **Case investigations** should include information on:<br>  ▪ Age, sex, where they live<br>  ▪ Immunisation history<br>  ▪ Clinical details, including date of onset of symptoms<br>  ▪ Laboratory test results |

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| | ▪ Recent travel overseas, or contact with other cases or travellers<br>▪ Recently visited places, including schools, work places, shopping centres, clinics, hospitals, gatherings<br>▪ **Notify hospitals and health care facilities** about cases and outbreaks, so that they can be on alert for new cases and report them promptly.<br>▪ High immunisation coverage is the best way of preventing measles outbreaks. **Promote catch-up immunisation** for unimmunised children in the affected area.<br>▪ **Mass immunisation** might be considered in an affected area – to be determined by NACD. |
| **Differential diagnoses** | ▪ Rubella<br>▪ Scarlet fever<br>▪ Glandular fever (infectious mononucleosis)<br>▪ Dengue, Chikungunya, Zika |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ PPHSN Acute Fever & Rash (AFR) Case Investigation Form: http://www.pphsn.net/surveillance/hbas/annexb2-afr_case_investigation_form.pdf<br>▪ PPHSN AFR Laboratory Request Form: http://www.pphsn.net/surveillance/hbas/annexc2-afr_laboratory_request_form.pdf<br>▪ Pacific Hospital Based Active Surveillance System http://www.pphsn.net/surveillance/HBAS.htm<br>▪ WHO Western Pacific Region. Measles Elimination Field Guide 2013: http://www.wpro.who.int/immunization/documents/measles_elimination_field_guide_2013/en/<br>▪ WHO. 2013. Pocket book of hospital care for children. 2nd edition: http://apps.who.int/iris/bitstream/10665/81170/1/9789241548373_eng.pdf<br>▪ CDC site on Measles: http://www.cdc.gov/vaccines/pubs/surv-manual/chpt07-measles.html |
| **Other comments** | |

## 4.9. Meningococcal Disease

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| **Public health priority** | URGENT |
| **No. of cases required to trigger an investigation** | ONE |
| **Threshold for declaring an outbreak** | ≥ 3 confirmed or probable cases of meningococcal disease of the same serogroup in ≤3 months in the same geographical area, resulting in primary disease attack rate of ≥10 cases/100,000 persons. |

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| **Case definitions** | ▪ **Suspected case definition**<br>Sudden fever ≥38$^{o}$C AND<br>One or more of the following symptoms: drowsiness, irritability or fussiness, intense headache, leg pain, vomiting, a stiff neck, sensitivity to bright lights and a reduced level of consciousness<br>OR<br>A skin rash that spreads rapidly and begins as reddish/purplish spots (petechial or purpuric rash) that does not fade when pressed under the bottom of a glass (the tumbler test).<br>▪ **Probable case definition**<br>A clinically compatible illness AND close contact with a laboratory confirmed case within the previous 60 days.<br>▪ **Confirmed case definition**<br>Culture of meningococcus from a normally sterile body site. This includes blood or cerebrospinal fluid (CSF) or less commonly, joint, pleural (around the lungs), or pericardial (around the heart) fluid, or fluid from the *purpuric* lesions of the rash. DNA detection by PCR from a sterile site also confirms infection but is not widely available. |
| **Signs & symptoms** | *Acute* fever with neurological signs/symptoms is concerning because it may be associated with bacterial meningitis, including meningococcus infection.<br>Invasive meningococcal disease typically presents with fever, vomiting, headache, muscle and joint pain and drowsiness. Symptoms may appear quickly and progress rapidly. Patients may present shocked. Infants with meningitis frequently present with |

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| | non-specific symptoms such as fever, irritability, lethargy, poor feeding, vomiting and diarrhoea, and the fontanelle may be full. Findings suggestive of meningococcal infection include confusion, leg pain, light sensitivity (photophobia which occurs > 12 hours after symptom onset), rash (occurs > 12 hours) and neck pain/ stiffness (occurs >12 hours). Early warning sign of meningococcal disease include leg pains and cold hands and feet, despite having a fever. Development of coma and shock may be rapid.<br>A *petechial* or *purpuric* rash is present in most, but not all, patients with invasive meningococcal disease but occur late (12-36 hours after symptom onset). A blanching rash does not exclude meningococcus. In the early stages of the disease, the rash may not be present or may be different. If present, it may be only a few tiny red/purple spots located in a place such as the groin or feet.<br>The death rate may be more than 50% without treatment and is still 5%–10% with rapid and appropriate antibiotic and supportive treatment. |
| **Pathogen(s):** | *Neisseria meningitidis* bacteria, also referred to as 'meningococcus'. The groups that cause disease are A, B, C, W135, X and Y. |
| **Sources of infection (reservoir)** | Humans. Meningococcal bacteria are carried in the nose and throat of people without symptoms (*carrier*s). |
| **Mode of transmission** | Respiratory droplets. Transmission usually occurs between very close contacts, in other words, household or kissing contacts. |
| **Incubation period** | 3–4 days (ranging from 2 to 10 days) |
| **Period of infectiousness** | Patients are considered contagious until 24 hours after starting the correct intravenous antibiotics.<br>*Carriage* of meningococcus is common; about 10% of the population carry the meningococcus bacteria in their nose and throat at any point in time. |
| **Laboratory investigations** | If possible, **blood cultures** should be collected in all cases of suspected meningococcal disease before starting antibiotics. If possible, patients with symptoms of meningitis should have a lumbar puncture (spinal tap) to obtain CSF as soon as possible, if it is safe to do so. CSF should be *cultured* for meningococcus and other bacterial causes of meningitis. Antibiotics should not be delayed while waiting for lumbar puncture.<br>Specimens should also be sent for identification of serogroup, in order to guide control measures at the community level (e.g. if it is a vaccine-preventable serogroup). |
| **Notification** | ▪ Report all cases URGENTLY BY PHONE. |

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| | ▪ Use the IHR Decision Instrument (see Appendix A.3) to determine whether reporting to WHO under IHR 2005 is required. |
| **Clinical management of case** | Meningococcal disease can be fatal and should always be viewed as a medical emergency. Admission to a hospital or health centre is necessary. If possible, patients should be isolated until 24 hours after antibiotics have started. If isolation is not possible, droplet precautions should be used until 24 hours after antibiotics have been started.<br>**Treatment:**<br>▪ IV antibiotics should be given as soon as meningococcal disease is suspected (if IV access cannot be obtained within 15 minutes, IM administration is warranted)<br>▪ If possible collect blood cultures prior to antibiotic administration<br>▪ Ceftriaxone IV/IM or Cefotaxime IV is the first choice antibiotic (to also cover *Streptococcus pneumoniae* and *Haemophilus influenzae* type b in unimmunised children). If unavailable, use penicillin IV/IM.<br>▪ Other investigations should not delay antibiotic therapy.<br>Some antibiotics, including penicillin, do not reliably clear nasopharyngeal carriage of meningococci so appropriate clearance antibiotics must also be used (see national standard treatment guidelines).<br>Pre-admission treatment for all ages is an immediate dose of IV/IM benzylpenicillin for suspected meningococcal infections<br>▪ Adults and children aged ≥10 years 1.2 g<br>▪ Children aged 1 - 9 years 600 mg<br>▪ Children aged under 1 year 300 mg |
| **Management of contacts:** | ▪ The contacts most at risk of meningococcal disease are other members of the household of a case of invasive meningococcal disease. The risk is greatest during the first week after the case is detected and falls rapidly thereafter.<br>▪ The focus of contact tracing is to identify close contacts and give them preventive antibiotics. All close contacts, including household contacts, children and staff in childcare centres, children sharing rooms, boarding schools and intimate (kissing) partners in the 7 days before onset of the case's symptoms, should be identified and given information about the signs and symptoms of meningococcal disease. Other close contacts include passengers seated immediately adjacent to the case during long distance travel (>8 hours duration) by aeroplane, train, bus or other vehicle.<br>▪ Contacts should be told to seek medical care if they develop symptoms. |

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| | ▪ Rifampicin should be given to all close contacts who were in contact with the case within 7 days of onset to remove the bacteria in their nose and throat.<br>▪ Rifampicin will not treat the infection in a person who may already be developing the disease. It is to stop the carriage and possible further spread of the bacteria. If a contact who has received Rifampicin develops symptoms of meningitis or septicaemia they will still require treatment with intravenous antibiotics.<br>▪ Rifampicin should not be given in pregnancy. Substitute ceftriaxone 250 mg (age >12 year) intramuscularly as a single dose.<br>▪ Conduct surveillance for secondary cases among close contacts for 48 hours by contacting them once a day and asking if they have symptoms. |
| **Infection Control (Clinical/Hospital)** | STANDARD and DROPLET precautions (see Appendix A.1)<br>Droplet precautions should be strictly applied for at least 24 hours after starting intravenous treatment with antibiotics. |
| **Public Health Response – Investigation, Prevention & Control** | ▪ Investigation of single cases of meningococcal disease should start immediately to find other cases and manage contacts (see below). Information should be collected on:<br>  ▪ The patient's age, sex and where they live;<br>  ▪ Clinical details, including date of first symptoms<br>  ▪ Lab test results<br>  ▪ Close contacts<br>  ▪ Whether or not the case attends a school or other group setting<br>▪ **Prevention**<br>  ▪ Overcrowding of young people and children in schools, barracks and colleges should be avoided.<br>  ▪ Meningococcal vaccine is available in some countries for prevention and in outbreak control of some serogroups of meningococcus. |
| **Differential diagnoses** | ▪ *Streptococcus pneumoniae* meningitis<br>▪ *Haemophilus influenzae* b meningitis (where immunisation rates are low)<br>▪ Viral meningitis ('aseptic meningitis') – caused by a variety of viruses<br>▪ Fungal meningitis<br>▪ Mycobacterium tuberculosis meningitis<br>▪ Certain drugs and toxins |

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| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ Invasive Meningococcal Disease CDNA National Guidelines for Public Health Units (Australia) http://www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-IMD.htm<br>▪ Guidance for public health management of meningococcal disease in the UK. Health Protection Agency Meningococcus and Haemophilus Forum. Updated March 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/322008/Guidance_for_management_of_meningococcal_disease_pdf.pdf |
| **Other comments** | |

## 4.10. Rubella

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| **Public health priority** | HIGH |
| **No. of cases required to trigger an investigation** | ONE |

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| **Case definitions** | ▪ **Suspected case:**<br>1. Fever (≥38°C), ***and*** maculopapular (non-blistering) rash ***and*** either joint pain or swelling, enlarged lymph glands, or red eyes*,<br>**OR**<br>2. Any person in whom a clinician suspects rubella infection.<br>* If a person has fever and maculopapular (non-blistering) rash and red eyes, they also meet the case definition of measles; in this situation, measles should be urgently ruled out (with laboratory testing) before a diagnosis of rubella is made.<br>▪ **Confirmed case:**<br>Culture of rubella virus from a clinical specimen; OR rubella positive by PCR; OR significant rise in rubella IgG antibodies in paired sera; OR positive serologic test for rubella IgM antibodies. |
| **Signs & symptoms** | Fever and generalised maculopapular rash are the most common symptoms. Young children usually have few or no other symptoms. Teenagers and adults may also have headache, runny nose, and conjunctivitis. Swollen glands (lymph nodes) in the neck are |

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| | common, and occur 5 to 10 days before the rash.<br>'Congenital rubella syndrome' is a serious condition in babies whose mothers were infected during early pregnancy, especially in the first 12 weeks. Problems include cataracts, congenital heart disease, hearing impairment, and developmental delay. |
| **Pathogen(s):** | Rubella virus |
| **Sources of infection** | Humans |
| **Mode of transmission** | Airborne transmission via breathing, coughing, and sneezing. |
| **Incubation period** | Usually 14 to 17 days. Range 14 to 21 days. |
| **Period of infectiousness** | For about 1 week before and at least 4 days after the appearance of rash.<br>**Rubella is highly infectious.** |
| **Laboratory investigations** | Venous blood sample for Rubella IgM (ELISA), only available at Mataika House.<br>During an outbreak, it is only necessary to send specimens for the first 5 cases. |
| **Notification** | ▪ Report all cases URGENTLY BY PHONE.<br>▪ Use the IHR Decision Instrument (see Appendix A.3) to determine whether reporting to WHO under IHR 2005 is required. |
| **Clinical management of case** | Rubella is highly infectious until four days after appearance of rash and patients should be isolated. Any child hospitalised with fever & rash should be isolated on admission. Paracetamol rather than aspirin should be used for fever in patients < 18 years of age. |
| **Management of contacts:** | Anyone who has been in the same room as a case during the period of infectiousness is considered a contact.<br>▪ Unimmunised contacts should be immunised ASAP<br>▪ Keep unimmunised contacts out of school, childcare or work for 18 days after their last contact with the infectious case.<br>Ask contacts to be alert for acute fever and rash and advise those who develop symptoms to call ahead, if possible, before seeking medical advice (so as to avoid common waiting areas in health centres or hospitals and spreading the infection). |
| **Infection Control (Clinical/Hospital)** | STANDARD and DROPLET precautions (see Appendix A.1) |
| **Public Health** | ▪ **Single cases**: focus on establishing a diagnosis and be alert for additional cases. |

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| **Response – Investigation, Prevention & Control** | Actively search for other cases that were in contact with the case – this should continue for at least 2 incubation periods (about 1 month).<br>▪ **Clusters of cases**: case investigations should be started without waiting for laboratory confirmation.<br>▪ **Case investigations** should include information on:<br>  ▪ Age, sex, where they live<br>  ▪ Immunisation history<br>  ▪ Clinical details, including date of onset of symptoms<br>  ▪ Laboratory test results<br>  ▪ Recent travel overseas, or contact with other cases or travellers<br>  ▪ Recently visited places, including schools, work places, shopping centres, clinics, hospitals, gatherings<br>▪ **Notify hospitals and health care facilities** about cases and outbreaks, so that they can be on alert for new cases and report them promptly.<br>▪ High immunisation coverage is the best way of preventing measles outbreaks. **Promote catch-up immunisation** for unimmunised children in the affected area. **Mass immunisation** might be considered in an affected. |
| **Differential diagnoses** | ▪ Rubella<br>▪ Scarlet fever<br>▪ Glandular fever (infectious mononucleosis)<br>▪ Dengue, Chikungunya, Zika |
| **Fiji guidelines & protocols** | |
| **Additional resources** | ▪ PPHSN Acute Fever & Rash (AFR) Case Investigation Form http://www.pphsn.net/surveillance/HBAS/AnnexB2-AFR_Case_Investigation_Form.pdf<br>▪ PPHSN Laboratory Request Form http://www.pphsn.net/surveillance/HBAS/AnnexC2-AFR_Laboratory_Request_Form.pdf<br>▪ Pacific Hospital Based Active Surveillance System – Information Folder http://www.pphsn.net/surveillance/HBAS/Pacific_HBAS_Information_Folder-July2005.pdf<br>▪ Rubella in Pregnancy. Society of Obstetricians and Gynaecologists of Canada: http://sogc.org/guidelines/rubella-in-pregnancy/ |

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| | ▪ WHO Rubella site: http://www.who.int/topics/rubella/en/<br>▪ CDC site on Rubella: http://www.cdc.gov/vaccines/pubs/surv-manual/chpt14-rubella.html<br>▪ CDC site on Congenital Rubella Syndrome: http://www.cdc.gov/vaccines/pubs/surv-manual/chpt15-crs.html |
| **Other comments** | |

## 4.11. Severe Acute Respiratory Infection (SARI)

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| **Public health priority** | HIGH, if cluster of new cases or a new influenza virus circulating |
| **No. of cases required to trigger an investigation** | Two linked cases |

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| **Case definitions** | An acute respiratory infection with:<br>▪ History of fever* or measured fever of ≥ 38 C°;<br>▪ AND cough;<br>▪ AND with onset within the last 10 days;<br>▪ AND requires hospitalization.<br>Note: the case definition for SARI was modified in September 2015 in line with WHO surveillance standards. |
| **Signs & symptoms** | In addition to meeting the case definition, people with SARI may also have sore throat, runny nose, headache, muscle aches, sneezing, chest pain and pleurisy (chest pain when inhaling). |
| **Pathogen(s):** | ▪ Influenza viruses<br>▪ Respiratory syncytial virus (RSV)<br>▪ Pneumococcus (Streptococcus pneumonia) and other causes of bacterial pneumonia<br>▪ SARS-associated coronaviruses |
| **Sources of infection (reservoir)** | Humans, animals and birds (for influenza) |
| **Mode of transmission** | Mainly person-to-person transmission. Less commonly from mammals, such as pigs, and birds to humans. |

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| **Incubation period** | The most common causes of severe acute respiratory illness have an incubation period of 1–3 days. It may be longer depending on the cause. |
| **Period of infectiousness** | Variable depending on cause of infection |
| **Laboratory investigations** | ▪ Swabs from the back of the nose or throat (nasopharyngeal) should be collected and tested for influenza (and RSV where available) by a variety of methods, including immunofluorescence microscopy, polymerase chain reaction, and viral culture. If specimens must be sent to a reference laboratory, nasopharyngeal swabs should be placed in 95%–100% ethanol for shipping; alternatively, if dry ice is available, swabs can be placed in viral transport medium (VTM), immediately deep-frozen on dry ice, and shipped.<br>▪ Rapid tests for a variety of influenza viruses are also available but may not be very accurate.<br>▪ Sputum cultures should be obtained for any cases with pneumonia and cultured – consult WHO, SPC or CDC for assistance. |
| **Notification** | ▪ Report URGENTLY by PHONE<br>▪ Contact an animal health authority immediately if disease is linked to exposure to sick animals.<br>▪ Human influenza caused by a new subtype is **required** to be reported to WHO under the IHR 2005 (see Appendix A.3) |
| **Clinical management of case** | Patients with suspected pneumonia should be treated with antibiotics according to the local treatment protocols. Isolate the case from others if possible. |
| **Management of contacts** | *Secondary cases* may occur in close contacts of cases. Provide information about preventing infection, symptoms and what to do if they develop symptoms. |
| **Infection Control (Clinical/Hospital)** | STANDARD plus DROPLET precautions (see Appendix A.1) |
| **Public Health Response – Investigation, Prevention & Control** | Investigation of clusters of severe disease is recommended. WHO will also have specific outbreak investigation recommendations if there is a new influenza strain infection circulating. Seek advice from WHO.<br>Cases should be isolated from others to avoid spreading disease. They should be educated about hand hygiene, respiratory hygiene (not coughing/sneezing on others and avoiding |

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| | other peoples' coughs/sneezes) and social distancing.<br>Immunisation is the most effective measure against seasonal influenza and pneumococcus. |
| **Differential diagnoses** | ▪ Bacterial pneumonia (for example caused by *Streptococcus pneumoniae*)<br>▪ Influenza viruses<br>▪ Respiratory syncytial virus (RSV), especially in very young children<br>▪ Tuberculosis<br>▪ SARS viruses<br>▪ Inhaled toxins |
| **Fiji guidelines & protocols** | |
| **Additional resources** | |
| **Other comments** | |

## 4.12. Typhoid fever

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| **Public health priority** | URGENT |
| **No. of cases required to trigger an investigation** | ONE |
| **Threshold for declaring an outbreak** | Typhoid is endemic in Fiji. An OUTBREAK is declared if the incidence rate >2 standard deviations above the average for the last 5 non-outbreak years. (See Section 1.3 on declaring alerts and outbreaks). |

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| **Case definitions** | ▪ **Suspected case:**<br>1. Fever (≥38°C) of unknown origin lasting 3 days or longer, and at least one of the following: severe headache, or abdominal pain, or diarrhoea, or constipation.<br>**OR**<br>2. During typhoid outbreaks, anyone with fever (≥38°C) of unknown origin in an area where there is an ongoing outbreak of typhoid, or who is in any other way linked to an active case of typhoid fever.<br>**OR**<br>3. Any person in whom a clinician suspects typhoid.<br><br>▪ **Confirmed case:**<br>Any suspected case with a blood or stool culture positive for *Salmonella* Typhi.<br><br>▪ **Asymptomatic carrier:**<br>Any person who sheds *Salmonella* Typhi in stool or urine without having symptoms. |
| **Signs & symptoms** | Clinical presentations range from mild gastroenteritis and low-grade fever to severe life threatening complications, and can be difficult to distinguish from other infections.<br>**Most common symptoms** are prolonged fever (lasting several days), severe headache, weakness, abdominal pain, loss of appetite, nausea, and vomiting.<br>Less common symptoms include bradycardia, enlarged liver and/or spleen, dry cough, rose spots (rash on the trunk), mental dullness or confusion, mild deafness, parotitis, myocarditis, encephalitis, meningitis, chronic osteomyelitis, and suppurative arthritis. |

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| | **Most common causes of death** are intestinal haemorrhage or perforation (in about 1% of cases), which are more likely to occur in untreated cases.<br>The incidence of typhoid is Fiji is amongst the highest in the world. The majority of cases are reported in iTaukei, but outbreaks have also occurred in the Indo-Fijian population. |
| **Pathogen(s):** | *Salmonella* enterica serovar Typhi (*Salmonella* Typhi)<br>(*Salmonella* Paratyphi is the cause of paratyphoid, which produces a similar but milder illness) |
| **Sources of infection (reservoir)** | Humans, including asymptomatic carriers |
| **Mode of transmission** | Ingestion of food and water contaminated by stool or urine of cases or asymptomatic carriers. For example:<br>▪ River and streams may become contaminated by sewage during flooding and public health emergencies, or if people upstream use it as their toilet.<br>▪ Raw fruits and vegetables fertilised by human manure<br>▪ Raw contaminated milk and milk products<br>▪ Possibly kava, if prepared with unsafe water or unclean hands<br>▪ Flies could carry bacteria from open latrines to food that was not covered<br>▪ Food handlers who are asymptomatic carriers pose a high risk<br>Infection could also occur through direct contact with cases or asymptomatic carriers. |
| **Incubation period** | Usually 7 to 14 days; range from 3 to 60 days. |
| **Period of infectiousness** | Stools of typhoid patients are infectious while the person has symptoms. Up to 5% of infected people become carriers, who can shed bacteria in their stool for weeks or months. People are more likely to become carriers if they were not treated with antibiotics, or if the full course of antibiotics was not completed. |
| **Laboratory investigations** | **See Typhoid Clinical Guidelines for detailed information on collection and transport of samples.**<br>Laboratory diagnostic tests for typhoid have a low sensitivity, i.e. false-negative results. Patients with suspected typhoid should therefore be treated with antibiotics regardless of the results of laboratory tests.<br>**Blood cultures**: Best done in the 1st week of illness. 5-10mL of blood should be used for 1 or 2 culture bottles. Collect blood samples before starting antibiotics, and transport |

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| | promptly to the laboratory.<br>**Urine and stool cultures**: Can be done after the 1st week of illness, but less sensitive than blood culture. Stool samples should be processed within 2 hours of collection, or stored and transported at 4°C. Stool culture is also used to monitor carrier status, but often produce false-negatives because carriers only shed intermittently.<br>See Typhoid Clinical Guidelines for detailed description of general laboratory tests and findings. |
| **Notification** | ▪ Report all cases URGENTLY BY PHONE.<br>▪ Use the IHR Decision Instrument (see Appendix A.3) to determine whether reporting to WHO under IHR 2005 is required. |
| **Clinical management of case** | Untreated cases are associated with high case-fatality, up to 10-20%. Prompt treatment with antibiotics can reduce this to <1%. Children <5 years old are at highest risk of severe complications and death.<br>All suspected cases should therefore be treated with antibiotics, and the entire course should be completed even if laboratory tests are negative. Ciprofloxacin is the antibiotic of choice in Fiji for all ages, and should be given twice daily for 5 days. Depending on the antibiotic used, 15-20% may experience a relapse within 1 to 6 weeks. Paracetamol should be used to manage fever in patients under 18 years of age.<br>See Fiji Clinical Guidelines for Typhoid for detailed information on treatment. |
| **Management of contacts:** | Contacts should be advised about hand hygiene, safe drinking water, and proper food hygiene. If an infection source is suspected, e.g. contaminated river, contacts should also be advised to avoid contact with the source.<br>Contacts should be advised to seek medical care ASAP if they develop a fever or feel unwell.<br>Healthy household contacts should have stool cultures (3 samples with at least 24 hours between samples) – if positive, they should be treated with Ciprofloxacin for 28 days.<br>Antibiotic prophylaxis for healthy contacts is not recommended. |
| **Infection Control (Clinical/Hospital)** | STANDARD precautions. If the patient is in nappies/diapers, add CONTACT precautions. See Appendix A.1. |
| **Public Health Response –** | **See Typhoid Clinical Guidelines for detailed information on management of typhoid outbreaks, case investigation, environmental investigation, and control** |

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| **Investigation, Prevention & Control** | **measures.**<br>▪ Case investigations should be conducted on all probable and confirmed cases. Two or more linked cases should be investigated urgently to identify any common sources of infection.<br>▪ Food handlers should be tested for carrier status. If positive, they should be excluded from work until they have been treated with antibiotics and stool samples x3 are clear.<br>▪ Prevention strategies include:<br>  ▪ Hand hygiene<br>  ▪ Safe drinking water<br>  ▪ Food hygiene – uncooked foods (especially shellfish) are high-risk, cooked food should be eaten while hot or properly stored.<br>  ▪ Adequate sanitation and safe disposal of human waste<br>  ▪ Mothers should breastfeed their Infants. If the child is not breastfed, ensure that all milk and drinking water are boiled, and wash hands before preparing milk and food for the child<br>  ▪ Vaccination. The parenteral typhoid vaccine (polysaccharide Vi) is available in Fiji, and can be used from age 2 years. Booster doses are recommended every 3 years. If the vaccine is to be considered as a control measure, expert advice should be sought from the NACD. |
| **Differential diagnoses** | ▪ Leptospirosis<br>▪ Dengue<br>▪ Paratyphoid<br>▪ Influenza<br>▪ Meningitis<br>▪ Many other infectious diseases |
| **Fiji guidelines & protocols** | ▪ Fiji Guidelines for the Diagnosis, Management and Prevention of Typhoid Fever (2010) |
| **Additional resources** | ▪ WHO. The Diagnosis, Treatment and Prevention of Typhoid Fever: http://www.who.int/rpc/TFGuideWHO.pdf |
| **Other comments** | |

## 4.13. Zika virus disease

Zika is an emerging virus that has not yet been fully characterized. On 1 February 2016, clusters of microcephaly cases and other neurological disorders related to Zika virus were declared a Public Health Emergency of International Concern (PHEIC) under the International Health Regulations 2005. The most updated information about Zika virus and related complications is available at http://www.who.int/topics/zika/en/

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| **Public health priority** | HIGH |
| **No. of cases required to trigger an investigation** | One confirmed case, if there is no known outbreak already under investigation |

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| **Case definitions** | ▪ **Suspected Case definition:** A person presenting with rash and/or fever ≥38°C and at least one of the following signs or symptoms:<br>▪ Arthralgia or<br>▪ Arthritis or<br>▪ Conjunctivitis (non-purulent/hyperaemic)<br>Note: Although fever may be present, most cases present with normal temperatures or with low-grade fever <38 C.<br><br>▪ **Probable case definition**: A suspected case with presence of IgM antibody against Zika virus and an epidemiological link.<br>▪ **Confirmed Case definition:** A person with laboratory confirmation of recent Zika virus infection:<br>▪ Presence of Zika virus RNA or antigen in serum or other samples (e.g. saliva, tissues, urine, whole blood); or<br>▪ IgM antibody against ZIKV positive and PRNT90 for ZIKV with titre ≥20 and ZIKV PRNT90 titre ratio ≥ 4 compared to other flaviviruses; and exclusion of other flaviviruses |
| **Signs & symptoms** | Cases usually develop a rash (typically maculopapular), often with low-grade fever, non-purulent conjunctivitis, headache, arthralgia, myalgia, oedema (hands and feet), and less frequently, retro-orbital pain, anorexia, vomiting, diarrhoea and abdominal pain. Zika virus disease is usually mild.<br>There have been reports of serious neurological disorders related to Zika virus outbreaks. |

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| | Microcephaly and other foetal malformations, in the presence of Zika virus, have been reported from a number of countries.<br>In the context of Zika virus circulation a number of countries have also reported an increase in incidence in Guillain-Barré syndrome (GBS), an ascending flaccid paralysis that can lead to respiratory failure and death. Although the link between Zika virus and these neurological conditions has not been proven, there is mounting evidence that Zika virus is the cause. |
| **Pathogen(s):** | Zika virus |
| **Sources of infection (reservoir)** | The exact nature of the reservoir of Zika virus in the Pacific has not been documented.<br>In Africa and Asia, studies have detected evidence of past infection with Zika virus in various animals including non-human primates, zebra, elephants, water buffalo and rodents. |

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| **Mode of transmission** | Zika virus is transmitted by the bite of infected mosquitoes of the Aedes genus. They bite during the whole day, but mostly during the early morning and evening. People with Zika infection should be cared for under bed nets so that a mosquito cannot bite them and then carry the infection to another person. Non-mosquito transmission is possible, including by sexual intercourse and blood transfusion. |
| **Incubation period** | The exact incubation period has not been definitively determined but is likely to be similar to other flaviruses such as dengue (2-14 days). |
| **Period of infectiousness** | The infectious period has not been established but is believed to be short. It is likely that humans are infectious to mosquitoes for up to 5 days after onset of illness. There are number of reports of sexually transmitted Zika infection and transmission through transfused blood products has been reported.<br>During 5 days after onset of illness, suspected cases should not donate blood. It is advisable to use condoms or avoid sexual intercourse for several weeks.<br>Pregnant women:<br>▪ Should be advised not travel to areas of ongoing Zika virus outbreaks.<br>▪ Whose sexual partners live in or travel to areas with Zika virus outbreaks should ensure safe sexual practices or abstain from sex for the duration of their pregnancy |
| **Laboratory** | Serological tests, such as enzyme-linked immunosorbent assays (ELISA), may confirm |

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| **investigations** | the presence of IgM and IgG anti-Zika antibodies. Detection of an increase in antibodies in paired sera is recommended. IgM antibody levels should be detectable between days 5-6 after illness onset. Serological cross-reactions with other flaviviruses such as dengue may occur and IgM results should be interpreted with caution in areas where multiple flaviviruses are circulating.<br><br>Practically, the current diagnostic tool for confirmation is RT-PCR to detect Zika virus RNA in body fluids, specifically serum, saliva, and urine. In summary:<br><br>▪ Serum: the standard biological sample used in most reference laboratories for detection of Zika virus RNA<br>▪ Urine: limited studies indicates an enlarged window of detection compared to serum with Zika virus RNA being detected >7 days post symptom onset<br><br>Unless serum samples are collected very early in illness course, false-negative results are likely. Not all reference laboratories will test all biological sample types, so verify with your specific laboratory before collection and shipment.<br><br>▪ Serum can also be collected to test for Zika virus RNA or antibodies. These samples require storage and shipping under freezing conditions and standard packing and shipping procedure should be followed. The filter paper method (Dried Blood Spot) may have lower sensitivity than other collection methods and is not currently recommended for Zika virus detection.<br>▪ Urine collection - Mid-Stream Urine (MSU) samples to be collected in sterile MSU specimen bottle and send to lab. Specimen (in MSU bottle) to be stored at 2-8°C while awaiting transfer to FCCDC lab. Urine Storage- put 2 dry swabs in cup of urine until fully soaked, place soaked swabs in sterile bottle (red cap) and let it completely dry before closing cap. Label specimen bottle with patient details, place in biohazard bag and seal. Store sample at 2-8°C.<br><br>  |

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| **Notification** | **Reporting**<br>▪ Urgent NOTIFICATION by PHONE<br>▪ Use IHR Decision Instrument (see Appendix A.3) to determine whether reporting to WHO under the IHR 2005 is required |
| **Clinical management of case** | Treatment is symptomatic and paracetamol is the drug of choice. Avoid aspirin and NSAIDs as a common differential diagnosis is dengue fever. Mild forms of exercise and physiotherapy are recommended in recovering persons.<br>Refer cases to a healthcare centre or hospital, with the ability to provide a higher level of care, with any of the following: low urine output, hypotension, bleeding disorders, confusion, persistent fever of more than one week's duration, or any neurologic symptom<br>During a confirmed *epidemic*, it is not necessary to test all cases.<br>Communities in the affected areas should be educated about the mosquito control measures to be adopted in hospital premises and houses. |
| **Management of contacts:** | Persons living in the area where a patient is thought to have been infected should be told of the risk of being bitten by Zika-infected mosquitoes, and should be asked to do mosquito control including clean-up of mosquito breeding sites (things that collect water, such as coconut shells, tyres, cans) and provided with information about personal protection, such as mosquito repellent sprays and bed nets. |
| **Infection Control (Clinical/Hospital)** | ▪ STANDARD Precautions (Appendix A.1)<br>▪ Plus a long lasting insecticidal net should be placed over patients so that mosquitoes cannot bite patients and then transmit the disease to other people. |
| **Public Health Response – Investigation, Prevention & Control** | ▪ **Single cases**: focus on establishing a diagnosis and be alert for additional cases. Actively search for other cases that were in contact with the case – this should continue for at least 2 incubation periods (about 1 month).<br>▪ **Clusters of cases**: case investigations should be started without waiting for laboratory confirmation.<br>▪ Cases should be interviewed to identify where the possible site of mosquito exposure occurred so that control measures can be carried out to prevent further infections and to identify further cases.<br>▪ Preventing mosquito bites is the best way to prevent infection. |

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| **Differential diagnoses** | ▪ Chikungunya<br>▪ Leptospirosis<br>▪ Dengue<br>▪ Malaria<br>▪ Meningitis<br>▪ Rheumatic Fever<br>▪ Measles |
| **Fiji guidelines & protocols** | Zika Action Plan |
| **Additional resources** | A Zika application, or App, has been developed with useful up-to-date information.<br>▪ iOS https://itunes.apple.com/en/app/who-zikaapp/id1090088404?mt=8<br>▪ Android https://play.google.com/store/apps/details?id=com.universaldoctor.zika |
| **Other comments** | |

## 4.14. Emerging infectious diseases and novel pathogens

An emerging infectious disease is one that has appeared in a population for the first time, or that may have existed previously but is rapidly increasing in incidence or geographic range.

Recent examples include Severe Acute Respiratory Syndrome (SARS), Ebola virus disease (EVD), Middle East respiratory syndrome coronavirus (MERS-CoV), Nipah virus, chikungunya, and Zika.

Clinical management and public health response will vary depending on the disease. For emerging infectious diseases and pathogens, information often change rapidly as the outbreak progresses and we learn more about disease transmission, diagnostics, clinical assessment, and management. It is therefore important to keep up to date with information and recommendations from international public health authorities.

A risk assessment should be undertaken to determine the level of response required. The assessment should take into account the level of threat to Fiji and the Pacific region, including the likelihood of importation, potential risk of local transmission, severity of clinical illness, and public health impact of an outbreak.

Please see the WHO Emerging Diseases website for up to date information:
http://www.who.int/topics/emerging_diseases/en/

**Reporting to IHR:** Under the International Health Regulations (IHR 2005), any suspected disease outbreak considered to be a potential Public Health Emergency of International Concern (PHEIC) is required to be reported as soon as possible to the World Health Organization (WHO). The National IHR Focal Point (NFP) is responsible for notifying the WHO. Currently the NACD is the NFP.

For assistance on what may be considered as a potential PHEIC, and mandatory timelines, for notification, see the IHR Decision Instrument in Appendix A.3.