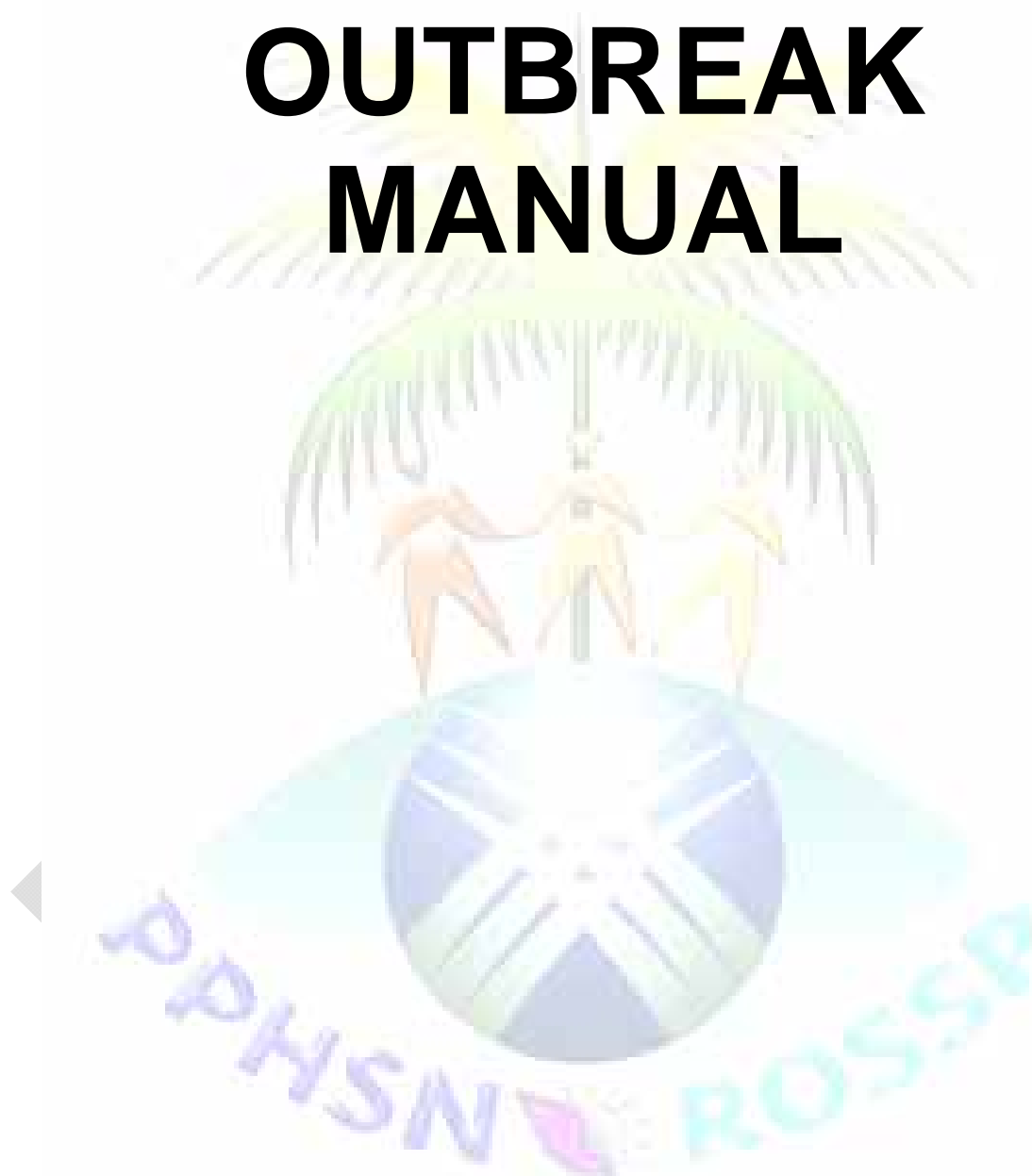


PACIFIC OUTBREAK MANUAL



VERSION 1.0



PACIFIC OUTBREAK MANUAL

Table of Contents

Introduction	3
Section 1: General guideline for response to outbreaks	5
What is an outbreak?	5
Responding to a Report of a Disease Outbreak	5
Risk Communication	7
Reporting Responsibility: Public Health Emergency of International Concern	10
Conditions Requiring Immediate Response	10
Section 2: Response Guidelines for Core Syndromic Surveillance Conditions	11
Acute Fever and Rash	11
Influenza-Like Illness (ILI)	13
Severe Acute Respiratory Infection (pneumonia)	16
Diarrhoea	18
Prolonged Fever	21
Section 3: Response Guidelines for Additional Outbreak-Prone Syndromes and Specific Diseases	23
Acute Flaccid Paralysis (AFP) / Polio	23
Ciguatera Fish Poisoning	26
Cholera	28
Dengue	31
Epidemic Hepatitis	34
Leptospirosis	37
Malaria	39
Measles	42
Meningococcal Disease	45
Pertussis (Whooping Cough)	48
Rubella (German Measles)	51
Tuberculosis	54
Typhoid Fever	59
Appendix 1: Decision Instrument for the Assessment and Notification of Events that may be a Public Health Emergency of International Concern	62
Appendix 2: Principles of Infection Control	63
Appendix 3: Additional Resources	66
Appendix 4: Glossary	67

Introduction

It is important to recognize infectious disease outbreaks, so that control measures can be taken to stop them. Some diseases that cause outbreaks can cause serious illness and deaths if they are not rapidly brought under control. An effective surveillance system can provide early warning of disease outbreaks. Responding effectively will reduce the spread and impact of the disease.

Purpose of the Manual

This manual is meant to be a practical guide for healthcare workers in the Pacific for the management of important infectious diseases. Expert advice should always be sought if an outbreak is detected.

Individual countries and territories are encouraged to adapt this manual to local conditions (for example by including local testing protocols, forms, etc.). It is also suggested that a country's or territory's "Notifiable Diseases" list be attached to this document, with instructions on the local requirements for notification of these diseases.

The clinical management guidelines given in this manual are not intended to be complete or to substitute for sound clinical judgment. Always consult additional resources if needed. Specific guidelines are referred to where applicable and additional resources are listed in Appendix 3.

Structure of the Manual

The manual is divided into three Sections plus Appendices.

Section 1 provides general information on responding to disease outbreaks as well as guidelines on the urgency of response.

Section 2 contains guidelines for core syndromic surveillance conditions. *Syndromic surveillance* is based on reporting of clinical syndromes, such as "diarrhoea" or "fever and rash" rather than laboratory-confirmed specific diseases, such as salmonellosis or measles.

Section 3 contains disease specific guidelines.

For each condition, the following headings are usually given:

- **Name of syndrome / disease**
- **Public health priority**
 - Urgent: Diseases marked as Urgent must be notified and investigated with 24 hours
 - High: Diseases marked as High must be investigated within 2 working days
 - Routine: Diseases marked as Routine must be investigated Within 3 working days
- **Case definition** (defines what should be counted as a case and what should not, for surveillance purposes only)
- **Number of cases required to trigger a notification and investigation**
- **Description of clinical signs and symptoms**
- **Infectious cause(s)** (where there is a specific known or likely cause)
- **Sources of infection (reservoir)**
- **How the disease is spread**
- **Incubation period**
- **Period of infectiousness**
- **Clinical management**

RESPONSE:

- **Infection control**
- **Reporting**
- **Investigation**
- **Specimens** (method for collecting samples for testing)
- **Public health management of cases**
- **Management of contacts**
- **Prevention**
- **Other diseases with similar signs and symptoms**
- **Additional resources** (clinical management, additional response guidance, etc.)

The Appendices contains the IHR Decision Instrument, infection control guidelines and a list of additional resources. They also contain definitions of terms that may not be familiar to you. The terms you will find in the glossary are in italics in the text.

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Section 1: General guideline for response to outbreaks

What is an outbreak?

An outbreak is an unexpected increase in the number of cases of an illness. The number of cases needed to call it an outbreak is different for different diseases. Some diseases require urgent action on the suspicion of one case (such as *acute* flaccid paralysis) while others require an increase above a certain threshold level before further investigation is needed (such as influenza-like illness). Whether something is an outbreak also depends on the number of cases that are normally seen in a population. For example, a large country will always have some cases of respiratory infection at any time. So it is necessary to have a "baseline"; to know how many cases of a disease are normally seen in an area.

Outbreaks can be detected through routine surveillance, through reporting by health professionals or through reports from other agencies and individuals. All reports of disease outbreaks should be taken seriously and promptly investigated.

Responding to a Report of a Disease Outbreak

The first steps in a response to any outbreak should always consist of the following:

- ✓ Confirm the outbreak
- ✓ Try to establish a diagnosis (though a specific diagnosis is not needed to conduct an outbreak investigation)
- ✓ Make a case definition
- ✓ Identify cases and obtain information.
- ✓ Start a line-listing
- ✓ Describe data collected by time, place, person
- ✓ Apply control measures
- ✓ Communicate results with the community and other professionals

These steps do not always occur exactly in this order. For example, applying control measures should begin as soon as possible (often, more general measures until the investigation suggests more specific measures to take); communication should also be an ongoing process.

Confirming an outbreak is an important first step in the investigation since 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 it has been confirmed that there is a likely increase in cases of a certain disease, an investigation (and control) team should be formed. In most countries this is the EpiNet team. Make-up of the team will vary according to the outbreak although the team could include:

- Epidemiologist or infectious disease control officer
- Medical Officer with outbreak investigation and control experience
- Nursing staff with outbreak investigation and control experience
- Laboratory staff member
- Environmental Health Officer
- Animal health staff (if needed)

Cases may be detected through syndromic 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.

After the initial investigation, a **case definition** for that particular outbreak can be developed. This is used to identify further cases and figure out the scale of the outbreak. 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 everyone uses the same case definition, otherwise there will be much confusion about the number of cases.

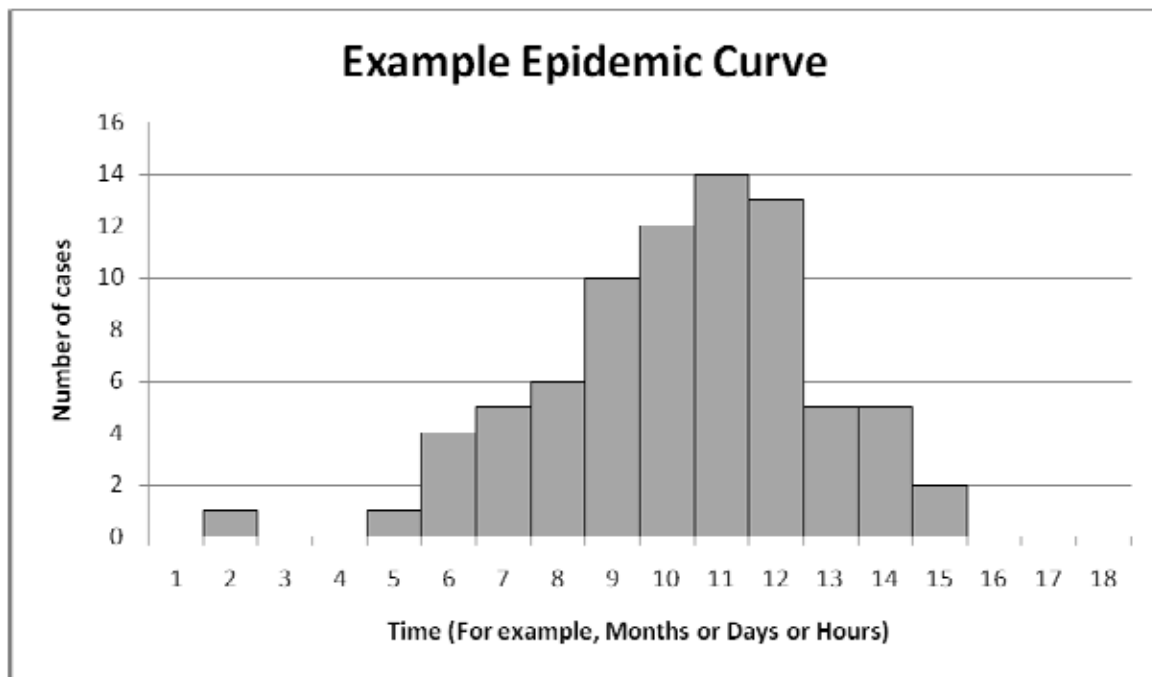
Using the case definition the next step is to **identify cases and collect information**. Demographic information such as age, sex, address and telephone numbers are useful. Interviewing cases about what may have caused their illness is important. Information to collect depends on the outbreak and may include a travel history, vaccination history or detail about the food and drink consumed by the case. Epidemiologists can assist with developing questionnaires and asking the right questions.

Recording all cases on a **line list** provides a summary of information about cases possibly involved in the outbreak and allows rapid analysis of the data. A line list will usually include case name, address and contact details, date of beginning of disease and may also include date of exposure, symptoms, specimens taken and results of laboratory tests. The most common way to make a line list is in Excel but it can be done on paper.

Example of a Line List

Case #	First Name	Last Name	Report Date	Demo-graphic			Signs and Symptoms			Lab Positive
				Sex	Age	Onset Date	Nausea	Vomiting	Jaundice	
1	Kelepi	Fatani	06/12/2010	M	36	04/12/2010	Yes	Yes	Yes	Yes
2	Isileli	Koula	06/12/2010	M	68	04/12/2010	Yes	No	Yes	Yes
3	Sone	Tatafu	05/12/2010	M	37	02/12/2010	Yes	No	Yes	Yes
4	Lia	Nalatu	07/12/2010	F	22	05/12/2010	No	No	No	NA
5	Teo	Lopeti	08/12/2010	M	34	07/12/2010	Yes	Yes	No	Yes
6	Mele	Tuimo	06/12/2010	F	43	03/12/2010	No	No	Yes	Yes

When you have the list of cases (line list) you can start to describe the outbreak. This is often called descriptive epidemiology. For every outbreak it is always necessary to describe the cases by **Time, Place, and Person**. Time means date and time of onset of illness, but if that is not available, date of diagnosis or presentation may be used. It is best to draw an epidemic curve, which 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 the picture for an example. Time is also used to describe when exposure to risk factors may have occurred.



Place means where the patients live or where they have become infected. Sometimes it's a good idea to put the cases on a map.

Person refers to information about the patients, such as sex, age group, profession and so on. All this information will help find clues that explain the outbreak.

Collecting and describing the data as described above is often all you need to identify the necessary **control measures**. Control measures are often more general to begin with and become more specific as the cause of the outbreak is identified. Some possible control measures include removing suspected food from sale, closing a restaurant, vaccinating affected communities, mosquito control measures or educating the community about hygiene such as hand-washing. The number of cases of illness should decrease once control measures are in place. Continued surveillance to identify a decrease in the number of cases is used to **evaluate** your control measures. Often it is obvious early on in an outbreak what the control measures are, if so they should begin immediately.

Risk Communication

Introduction

Outbreaks and unexplained deaths may cause uncertainty, confusion, and panic. Rapid and effective communication is the best way to control uncertainty and inform the public. Effective communication is a tool we use to save lives and reduce illness. Every single public health intervention during an outbreak will succeed or fail based on the way you communicate.

Effective communication can:

- Help slow, stop or prevent outbreaks
- Maintain and build public trust in health authorities
- Help people overcome fear and anxiety
- Help people make informed decisions on how to protect themselves
- Reduce economic, social and political impact

Basics of communication

Communication should always:

- Be honest

- Be easily understood
- Be factually correct
- Acknowledge uncertainty
- Acknowledge concerns
- Avoid excessive reassurance
- If in doubt, prepare people for the worst

A spokesperson should be nominated early in the outbreak. This person should be a health professional who is respected and well known. Other prominent community people may also be nominated as additional spokespeople, however it is essential that the information provided is consistent.

Building Trust

Gaining and maintaining TRUST is the key principle of outbreak communication. Without this trust, the public will not believe, or act on, the health information that you give them.

Trust is built by the following steps...

1) Announcing early

Let everyone know what is going on as soon as possible. Tell the public of a real or potential health risk. It does not matter if authorities do not have all the answers. Late announcement will break down trust in the public health authorities' ability to manage the outbreak.

2) Don't hide anything

Keep the public up-to-date. Even if there is nothing new to say – authorities need to keep reinforcing key messages so people stay safe. Aim for total honesty. Promise and deliver regular briefings. Keep detailed records of decision-making meetings, and communicate not only decisions, but how you made those decisions.

3) Listening

Plan to tell the truth fast and then listen. One-way communication (from authorities to the public) has been replaced by DIALOGUE. Trust cannot be maintained if we do not know what people are hearing, thinking and feeling. We must listen, to understand the public's objections, to identify points of confusion, and to respond to the public's concerns whether we believe they are rational or not.

4) Planning

Communication during an outbreak is very challenging. You should not wait until there is already an outbreak to start thinking about how to communicate with the public and other stakeholders (like other government agencies).

Dealing with rumours

Rumours can be very damaging to efforts to control an outbreak. They may give people the wrong information about how to protect themselves, or they may create distrust of public health officials (for example if there is a rumour that the government is lying to the public). Rumours spread quickly and they must be dealt with quickly.

The best way to control rumours is to prevent them by providing early and honest information. However, once rumours occur, do not ignore them. Do not ignore or make fun of people who believe a rumour.

Do not waste time trying to argue with the rumours. Instead, just tell the public that you are aware of the rumours, and then provide them with the truth.

Challenges to communication

- Needing to communicate without yet having all the answers
- Being uncomfortable with delivering bad news
- Rumours
- Fear that the media will misrepresent bad or uncertain news

- Concern the public cannot handle bad news or will panic
- Communication breakdown among different agencies
- Bad decisions resulting from poor communications
- Situation changing rapidly

Common mistakes

- Waiting until you have all the answers before starting communication
- Over-reassurance – “everything is under control”
- Withholding bad news
- Not telling people what to expect
- Assuming that just providing facts is enough
- Believing that if you ignore the problem, it will go away
- Not listening to the public
- Not admitting mistakes
- ... Not being human

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Reporting Responsibility: Public Health Emergency of International Concern

Under the International Health Regulations (IHR 2005), any suspected disease outbreak which is 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. Confirmation of the details of the outbreak is not necessary.

For assistance on what may count as a potential PHEIC, see the IHR Decision Instrument in Appendix 1. You may also informally talk to a staff member of WHO for assistance.

Conditions Requiring Immediate Response

The following list is a guideline. Certain places which experience endemic levels of one of the diseases below may need to adjust their response threshold to suit local conditions (for example, if there are 10 cases of dengue every month, a response may not be needed until 15 cases are detected in a single month).

- **Any serious event resulting in an unusually high number of cases with similar or severe symptoms.**

Single cases

- Acute Fever with Rash
- Acute Flaccid Paralysis / Polio
- Measles
- Rubella (German Measles)
- Meningococcal Disease
- Typhoid Fever
- Cholera
- Dengue (in areas where there normally is no dengue fever one case should lead to an immediate response)
- Ciguatera Fish Poisoning

Clusters of cases (these numbers are provided as examples; they should be adapted to the local situation and the number of cases normally seen in an area)

- **5 or more linked cases of Diarrhoea**
 - **3 or more linked cases if diarrhoea is bloody (in other words dysentery)**
- **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 Epidemic Hepatitis**
- **2 or more linked cases of Leptospirosis**

Depending on the condition, linked cases are considered to be cases from the same family, area, institution (for example school) or gathering or with some similar exposure.

Section 2: Response Guidelines for Core Syndromic Surveillance Conditions

Acute Fever and Rash

Surveillance for acute fever and rash was started to detect possible measles outbreaks at an early stage. You cannot know for sure if a patient with acute fever and rash has measles or another illness (see below for a list). This is why a blood sample needs to be taken as soon as possible and sent to a laboratory to test for measles antibodies.

Public Health Priority

Urgent

Case definition

Person of any age that presents with *acute* fever illness with *acute non-vesicular* rash

Number of cases required to trigger a notification and investigation: One

Description of signs and symptoms

Fever and a rash that is non-vesicular (not blisters) that appears some days later.

Infectious cause(s)

- Measles virus (this is the most important reason why we look for cases of acute fever and rash)

Other diseases that may cause acute fever and rash see below for a list.

Sources of infection (reservoir)

Disease specific.

How the disease is spread

How the disease is spread is disease specific but all cases of *acute* fever with rash should be assumed to be highly infectious- unless you know the cause and it is not easy to spread.

Incubation period

Disease specific

Period of infectiousness

Assume the patient is highly infectious and placed in isolation until a diagnosis is made. For patients with suspected dengue a long lasting insecticidal net (LLIN) should be used

Clinical management

Isolate the case from others. Paracetamol rather than aspirin should be used for fever in patients under 18 years of age. Specific treatment will depend on the cause.

RESPONSE PROCEDURE

Infection control

All cases of acute fever and rash should be managed as suspected measles until laboratory testing for measles is negative or another diagnosis is made. This means they should be assumed to be highly infectious and isolated in hospital using STANDARD and AIRBORNE precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- Ensure that the hospital HBAS (WHO Hospital Based Active Surveillance) coordinator is informed.
- Begin a line-listing for suspected outbreaks

Investigation

Investigation of clusters should occur before establishing a diagnosis. In single cases, priority should be given to figuring out a diagnosis and searching for additional cases.

Specimens

Blood samples should be collected and tested to confirm a diagnosis. If fever of 38 °C/100.4°F is present, blood *culture* should be performed. Rapid tests should be used if available e.g., for dengue or leptospirosis.

Public health management of cases

Refer to the HBAS Information Folder and the Acute Fever and Rash Case Investigation Form.

Information should be collected on:

- The case's age, sex and where they live
- Place, time, source and type of immunizations
- Clinical details, including date of beginning of symptoms
- Lab test results
- Contact with other cases or travellers and travel history
- Whether the case attends a school or other group setting.

Management of contacts

Contact management will depend on the diagnosis but contacts with symptoms should be isolated until a diagnosis is made.

Prevention

Refer to disease specific guidelines.

Other important diseases that may cause these symptoms (not a complete list)

- Measles
- Rubella
- Other viral rashes, such as parvovirus B19, coxsackie A, roseola
- Dengue
- Leptospirosis
- Drug reaction
- Meningococemia
- Scarlet fever
- Chemical poisoning

Additional resources

- Draft PPHSN Reference Guide: Acute Fever and Rash Surveillance for Measles and Rubella Elimination <http://www.spc.int/phs/PPHSN/Outbreak/AFR.htm>

Influenza-Like Illness (ILI)

Influenza-like illness surveillance is recommended so that new viruses are detected quickly. New influenza viruses are able to cause large pandemics and more serious disease than the viruses that circulate every year.

Public health priority

Routine

Case definition

Sudden onset of fever, with either cough or sore throat.

Number of linked cases required to trigger a notification and investigation: depends on the local situation

The number of linked cases which trigger a notification may depend on the situation. For example: regular *syndromic* surveillance for ILI can provide valuable information on the usual number of cases of disease. Staff experienced with syndromic surveillance for ILI will be able to identify an increase above this normal level and trigger a notification. Where no ILI has been detected for some months, an early notification of 2 or 3 linked cases can provide early warning of an outbreak about to happen. A small number of severe or unusual cases or cases associated with sick animals or birds should trigger an immediate notification and investigation.

Description of signs and symptoms

Fever with one or more of: cough, sore throat, runny nose, headache, muscles aches, sneezing.

Infectious cause(s)

- Influenza virus
- Parainfluenza virus
- Many other viruses and bacteria

Sources of infection (reservoir)

- Humans, animals and birds (for influenza)
- Several suspected animals (for SARS)

How the disease is spread

Mainly person to person transmission. Less commonly from mammals, such as pigs, and birds to humans.

Incubation period

The most common causes of ILI have an incubation period of 1-3 days. This may be longer depending on the cause.

Period of infectiousness

Variable depending on cause of infection.

Clinical management

Isolate the case from others at home by having them sleep in a separate room or in a room by themselves in hospital if possible. Antiviral treatment is recommended for people at risk of severe disease if influenza is suspected.

RESPONSE PROCEDURE

Infection control

STANDARD plus DROPLET precautions (see Appendix 2)

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a cluster of cases.
- Contact an Animal Health authority immediately if disease is linked to exposure to sick animals
- Begin a line-listing of cases
- SARS is REQUIRED to be reported to the WHO under the IHR 2005
- Human influenza caused by a new subtype is REQUIRED to be reported to the WHO under the IHR 2005 (see Appendix 1)

Investigation

Investigation of clusters of severe disease is recommended. Seek advice from WHO.

Specimens

Swabs from the back of the nose or throat 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, 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.

Rapid tests for influenza viruses are also available but may not be very accurate.

Sputum cultures should be obtained for any cases with pneumonia and cultured according to suspected cause(s) – consult WHO for assistance.

Public health management of cases

Cases should be advised to isolate themselves from others to avoid spreading disease. Cases should be educated about hand hygiene, respiratory hygiene (not coughing/sneezing on others and avoiding other peoples' coughs/sneezes) and social distancing.

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.

Prevention

- Vaccination is the most effective measure against influenza
- Practice good hand hygiene
- Practice good respiratory hygiene
- Stay away from people who are obviously sick

Other important diseases that may cause these symptoms (not a complete list)

- Influenza viruses
- SARS viruses

- Respiratory syncytial virus (RSV)
- Parainfluenza viruses
- Other respiratory viruses
- *Streptococcus pneumoniae* and other bacterial pneumonias
- Fungal pneumonias
- Tuberculosis
- *Coxiella burnetii* (Q fever)
- Inhaled toxins

Additional resources

While ILI is a common illness in PICTs caused by influenza viruses and a broad range of other viruses and causes, there is a need to remain aware of unusual causes as possible causes. See Severe Acute Respiratory Disease for further information.

DRAFT

Severe Acute Respiratory Infection (pneumonia)

Public health priority

High

Case definition

Cough and fever, with EITHER:

- fast breathing OR
- evidence of pneumonia on chest x-ray

Number of linked cases required to trigger a notification and investigation: Two

Description of signs and symptoms

Fever with fast breathing and one or more of: cough, sore throat, runny nose, headache, muscles aches, sneezing, chest pain, pleurisy (chest pain when inhaling).

Infectious cause(s)

- Influenza viruses
- SARS-associated coronaviruses
- RSV
- Pneumococcus (*Streptococcus pneumoniae*) and other causes of bacterial pneumonia

Sources of infection (reservoir)

- Humans, animals and birds (for influenza)
- Several suspected animals (for SARS)

How the disease is spread

Mainly person to person transmission. Less commonly from mammals, such as pigs, and birds to humans.

Incubation period

The most common causes of severe acute respiratory illness have an incubation period of 1-3 days. This may be longer depending on the cause.

Period of infectiousness

Variable depending on cause of infection.

Clinical management

Patients with suspected pneumonia should be treated with antibiotics. When the exact bacterial cause is unknown, use an antibiotic that covers many different bacteria (for example doxycycline, amoxicillin, or co-trimoxazole).

Isolate the case from others at home by having them sleep in a separate room or in a room by themselves in hospital if possible.

RESPONSE PROCEDURE

Infection control

STANDARD plus DROPLET precautions (see Appendix 2)

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a cluster of cases
- Contact an Animal Health authority immediately if disease is linked to exposure to sick animals
- Begin a line-listing of cases
- SARS is REQUIRED to be reported to the WHO under the IHR 2005
- Human influenza caused by a new subtype is REQUIRED to be reported to the WHO under the IHR 2005 (see Appendix 1)

Investigation

Investigation of clusters of severe disease is recommended. Seek advice from WHO.

Specimens

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.

Rapid tests for a variety of influenza viruses are also available but may not be very accurate.

Sputum cultures should be obtained for any cases with pneumonia and cultured according to suspected cause(s) – consult WHO for assistance.

Public health management of cases

Cases should be advised to isolate themselves from others to avoid spreading disease. Cases should be educated about hand hygiene, respiratory hygiene (not coughing/sneezing on others and avoiding other peoples' coughs/sneezes) and social distancing.

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.

Prevention

- Vaccination is the most effective measure against influenza and pneumococcus
- Practice good hand hygiene
- Practice good respiratory hygiene
- Stay away from people who are obviously sick

Other important diseases that may cause these symptoms (not a complete list)

- Bacterial pneumonia (for example caused by *Streptococcus pneumoniae*)
- Influenza viruses
- Respiratory syncytial virus (RSV), especially in very young children
- Tuberculosis
- SARS viruses
- Inhaled toxins

Diarrhoea

Public health priority

High

Case definition

Three or more loose or watery stools in 24 hours.

Number of linked cases required to trigger a notification and investigation:

The number of linked cases which trigger a notification may vary according to the circumstances and will depend on the size of the population and how often this condition is seen/reported. The threshold may be set at 5 or more cases of diarrhoea, within a certain area, for example a village), in a week, or among a specific group. If diarrhoea contains visible blood (“dysentery”), 3 or more linked cases should trigger an investigation.

Table of potential causes and their characteristics

Agent	Incubation Period	Clinical Features	Reservoir	Transmission
<i>Staphylococcus aureus</i> toxin	0.5 – 8 hours	Abdominal cramps, vomiting and diarrhoea	Humans	Person to food
<i>Bacillus cereus</i> toxin	0.5 - 6 hours (vomiting) 6 - 24 hours (diarrhoea)	Malaise, vomiting and/or diarrhoea	Environment	Food
<i>Vibrio cholera</i>	Few hours - 3 days	Watery diarrhoea	Humans, shellfish	Food, water
<i>Vibrio parahaemolyticus</i>	4 – 30 hours	Nausea, vomiting, abdominal cramps and diarrhoea	Shellfish	Food
<i>Clostridium perfringens</i> toxin	6 - 24 hours	Abdominal cramps, diarrhoea and nausea	Soil, GI tract	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
<i>Salmonella</i>	6 – 72 hours	Headache, fever, abdominal cramps, diarrhoea and nausea	Poultry, eggs, animals	Food, animal to person
<i>Shigella</i>	1 - 3 days	Bloody diarrhoea, abdominal cramps, fever	Humans	Person to person
<i>Campylobacter</i>	1 - 10 days	Fever, nausea, abdominal cramps and diarrhoea (sometimes bloody)	Poultry	Food, water
<i>Cryptosporidium</i>	1 - 12 days	Diarrhoea, abdominal cramps	Animals, humans	Water
<i>Escherichia coli</i> (STEC/EHEC)	3 - 4 days	Diarrhoea (often bloody), abdominal cramps	Cattle, humans	Food, person to person
<i>Giardia lamblia</i>	7 - 10 days	Abdominal cramps, diarrhoea	Humans, water	Person to person, water

Period of infectiousness

Usually only while a person has symptoms or for a short time after symptoms stop. Some diseases can be spread without a person having symptoms.

Clinical management

Assess whether (and how severely) the patient is dehydrated. Oral rehydration is usually all that is needed however intravenous fluids may be needed in cases of severe dehydration. Children in particular are at high risk of severe dehydration from diarrhoea.

Antibiotics (amoxicillin, cotrimoxazole, nalixidic acid or ciprofloxacin for 5 days) are always recommended for dysentery (bloody diarrhoea). For other causes of diarrhoea, rehydration is the only treatment required. For normal diarrhoea, antibiotics are only given if the patient is very severely ill or if the laboratory finds an organism requiring antibiotic or anti-parasitic therapy.

RESPONSE PROCEDURE

Infection Control

STANDARD Precautions. Where patient is in nappies/diapers or incontinent, add CONTACT Precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) on the same day.
- Begin a line-listing of cases.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

An environmental investigation should begin if common exposures between cases are identified. For example, cases all ate the same food, cases all drank from the same water supply or cases all attend the same school.

Specimens

Stool specimens should be requested in patients with a history of bloody diarrhoea, fever for more than 2 days, severe watery diarrhoea or severe dehydration, or if a cluster is identified. Collect 5-10 grams (a "thumb nail" quantity) of fresh stool in a plastic screw-top container and immediately send to the laboratory. Delays should be limited, preferably to less than 2 hours. Otherwise place the specimen in Cary-Blair medium and refrigerate until the specimen can be shipped. See Appendix 2.

Blood should be collected for *culture* if the patient has a fever $>38^{\circ}\text{C}/100.5^{\circ}\text{F}$.

Public health management of cases

Cases should be interviewed to identify links to specific foods, water supply and possible sources of infection for example a restaurant, school. An environmental investigation should begin if a possible source is identified.

Arrange for the collection of stool specimens.

The case should be informed about the kind of the infection and the method of transmission. Tell the case about the importance of hand washing, particularly after going to the toilet, changing nappies/diapers and before handling food. A person with diarrhoea should not prepare food for other people.

Management of contacts

Secondary cases may occur in household members who are exposed to the faeces or vomit of cases. Provide information about hand washing and what to do if they develop symptoms.

Prevention

- Providing safe water
- Hand-washing
- Safe disposal of stool
- Safe latrines

Clinics should give clear messages on effective food hygiene, like the 'Five keys to food safety'

- Keep clean
- Separate raw and cooked food
- Cook thoroughly
- Keep food at safe temperatures
- Use safe water

Other important diseases that may cause these symptoms (not a complete list)

See table

DRAFT

Prolonged Fever

Public health priority

High

Case definition

Any fever lasting 3 or more days (note particularly the similarities to influenza, leptospirosis, dengue and typhoid fever).

Number of cases required to trigger a notification and investigation: One

Infectious cause(s)

- *Salmonella* Typhi.
- *Leptospira* bacteria
- Dengue virus
- Malaria
- Other bacteria or virus

Sources of infection (reservoir)

Depends on the cause.

How the disease is spread

Depends on the cause.

Incubation period

Depends on the cause.

Period of infectiousness

Patients are more likely to be infectious while they have fever although the exact period of infectiousness will depend of the cause of fever.

Clinical management

If it is possible that the patient has typhoid fever or leptospirosis, then antibiotics should be given immediately. For typhoid the best antibiotic is ciprofloxacin, but amoxicillin or other antibiotics may also work. For leptospirosis, most antibiotics are effective, including amoxicillin.

Patients should be given paracetamol for fever. Oral rehydration is usually enough to manage dehydration but patients should be managed in a hospital if they have signs of severe dehydration.

RESPONSE PROCEDURE

Infection control

STANDARD precautions (see Appendix 2). If a respiratory germ is suspected, DROPLET precautions should also be used.

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.

- Ensure the hospital HBAS coordinator is informed.
- Begin a line-listing for suspected outbreaks

Investigation

Investigation of clusters should occur before establishing a diagnosis. In single cases, priority should be given to figuring out a diagnosis and searching for additional cases.

Specimens

Blood samples should be collected and tested to confirm a diagnosis. Blood *culture* should be performed. Rapid tests should be used if available for dengue. Stool specimens should be collected on suspected typhoid cases.

Public health management of cases

Information should be collected on:

- The case's age, sex and where they live
- Clinical details, including date of first symptom
- Lab test results
- Contact with other cases or travellers and travel history
- Whether the case attends a school or other institution.

Management of contacts

Secondary cases may occur in household members who are exposed to the faeces or vomit of cases or exposed to the same source. Provide information about hand-washing, symptoms to look out for and what to do if they develop symptoms.

Prevention

Refer to specific diseases guidelines.

Other important diseases that may cause these symptoms (not a complete list)

- Typhoid
- Dengue
- Leptospirosis
- Pneumonia
- Secondary bacterial infections
- Malaria
- Many other causes

Section 3: Response Guidelines for Additional Outbreak-Prone Syndromes and Specific Diseases

Acute Flaccid Paralysis (AFP) / Polio

Public health priority
Urgent

Suspected Case definition

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.

Confirmed Case definition

Any person in whom a poliovirus is isolated from an appropriate clinical specimen (e.g., stool, CSF, or oropharyngeal secretions), with confirmatory typing and sequencing performed by a recognized reference laboratory.

Number of cases required to trigger a notification and investigation: One

Description of signs and symptoms

99% of polio infections have no symptoms or 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.

Infectious cause(s)

Poliovirus 1, 2 and 3.

Sources of infection (reservoir)

Humans, particularly those who have no symptoms. There is no long-term *carrier* state.

How the disease is spread

Transmission is from person to person, mainly faecal-oral.

Incubation period

Usually 7-14 days, but can vary from two days to a month.

Period of infectiousness

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.

Clinical management

Refer the patient immediately to hospital. Management is supportive only, but may require mechanical ventilation.

RESPONSE PROCEDURE

Infection control

STANDARD plus CONTACT Precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case
- Ensure the hospital HBAS (Hospital Based Active Surveillance) coordinator is informed
- Begin a line-listing for suspected outbreaks.

Polio is REQUIRED to be reported to WHO under the IHR 2005 (see Appendix 1)

Investigation

Identification of a single case of AFP should prompt an investigation. A thorough search for other cases in the area where the case lives is recommended.

Specimens

- 5 – 10 g of fresh stool from the patient (a “thumb nail” quantity).
- Use plastic screw-top container and place in the fridge, not freezer.
- Follow standard packing and shipping procedure. Maintaining the Cold Chain (0 - 8°C) is essential.

Public health management of cases

Refer to the HBAS Information Folder and the Acute Flaccid Paralysis Case Investigation Form.

Information should be collected on:

- The case's age, sex and where they live
- Place, time, source and type of any polio immunizations
- Clinical details, including date of first symptoms, complications, and if the case has any disease that affects their immune system
- Laboratory test results
- Contact with other cases or travellers, travel history and persons at risk for polio
- Whether the case attends a school or other institution

Management of contacts

Immunization of close contacts is recommended.

Where felt to be necessary by the National EPI Co-ordinator or where poliovirus is isolated from an AFP case's stool, all children below five years of age in the affected island should receive two drops of oral polio vaccine (OPV), regardless of their immunisation status. Occasionally the National EPI Co-ordinator 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.

Prevention

Immunization is the most effective method of prevention of polio.

Differential diagnosis (not a complete list)

- Paralytic polio
- Guillain-Barre syndrome
- Non polio enteroviruses may rarely cause a paralytic illness.
- Other (rare) infections, such as parasitic spinal infections

- Tumors
- Toxins
- Stroke

Additional resources

PPHSN Website <http://www.spc.int/phs/PPHSN/Surveillance/HBAS.htm>

DRAFT

Ciguatera Fish Poisoning

Public health priority

High

Suspected Case definition

One or more of nausea, vomiting or diarrhoea **and** neurologic signs, within 24 hours of eating reef fish.

Confirmed Case definition

Ciguatera diagnosis is usually based on the clinical and epidemiologic features. Though rarely done, it can be confirmed for person with a clinically compatible illness after eating reef fish, by detection of ciguatoxin in consumed fish by an approved testing method.

Number of cases required to trigger a notification and investigation: One (because others may be at risk for eating the same fish).

Description of signs and 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 taste hot).

Infectious cause(s)

Ciguatera is caused by naturally occurring toxins in reef fish.

Sources of infection (reservoir)

Large predatory reef fish, such as barracuda, snapper, grouper, coral trout and amberjack.

How the disease is spread

Foodborne

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.

Clinical management

Ciguatera is treated supportively and with intravenous mannitol or other osmotic diuretics.

RESPONSE PROCEDURE

Infection control

STANDARD Precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a cluster of cases.

- Start a line listing

Investigation

An environmental investigation should begin if the same fish has been eaten by other cases, so that other patients can be found and any remaining fish discarded.

Specimens

There are no widely available tests for human ciguatera testing. Leftover fish can be tested for ciguatera toxin, but in most cases this is not necessary or practical.

Public health management of cases

Cases should be interviewed to identify possible links to specific foods and sources of infection, for example a restaurant, a shared fish meal. An environmental investigation should begin if a source is identified, and any leftover fish should be discarded.

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.

Prevention

- Avoiding the eating of large predatory 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 are the highest risk.
- Public communication to inform people of the risk.

Differential diagnosis (not a complete list)

- Blowfish poisoning
- Neurotoxic shellfish poisoning
- Paralytic shellfish poisoning
- Botulism
- Organophosphate pesticide poisoning

Additional resources

Ciguatera Fish Poisoning: Treatment, Prevention and Management Friedman MA. *Mar. Drugs* 2008, 6, 456-479; <http://www.mdpi.com/1660-3397/6/3/456/pdf>

Ciguatera Field Reference Guide

<http://www.spc.int/coastfish/Reports/Ciguatera/Ciguatera.htm>

Cholera

Public health priority

Urgent

Suspected Case definition

Severe dehydration or death from *acute* watery diarrhoea in a patient aged 5 years or more.

Confirmed Case definition

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.

Number of cases required to trigger a notification and investigation: One

Description of signs and 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.

Infectious cause(s)

Vibrio cholerae

Sources of infection (reservoir)

Humans and occasionally shellfish. *V. cholerae* is an environmental bug found in saltwater and salty water bodies at low numbers, with increases by humans during epidemics.

How the disease is spread

Drinking contaminated water, or eating food from unsafe water or contaminated by a person with cholera. For example shellfish or fruits and vegetables washed with contaminated 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, but occasionally for a couple of months.

Clinical management

Assess whether (and how severely) the patient is dehydrated. Immediate rehydration with oral rehydration solution (8 teaspoons of sugar and ½ teaspoon of salt in 1 litre of safe water or one packet of ORS mixed in clean water) is the most important treatment. If dehydration is severe, intravenous fluids should be administered (Ringers lactate/Hartmann's solution/Normal saline). Antibiotics should be given to cases with severe dehydration only.

RESPONSE PROCEDURE

Infection control

STANDARD plus CONTACT Precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health or equal authority on the same day.
- Begin a line listing of cases
- Cholera is ALWAYS required to be reported to WHO under the IHR 2005.

Investigation

An epidemiological and environmental investigation should begin if cholera is identified in an area not known to have cholera. Seek advice from the Director of Health and other agencies such as WHO and SPC.

Specimens

5-10 g of fresh stool (about a thumb-nail size) in a plastic screw-top container should immediately be sent to the laboratory for stool culture of *Vibrio cholerae*.

Public health management of cases

Cases should be interviewed about their exposures including;

- Contact with other people with diarrhoea
- Water sources
- Eating of seafood, particularly shellfish
- Travel to a cholera-affected area

The case should be told not to work and to avoid food preparation and caring for others while a person has symptoms.

The case should be told about the type of the infection and how it is transmitted. Highlight the importance of hygienic practices, particularly hand washing after going to the toilet. A case should not prepare or handle food for others.

Management of contacts

People at risk of infection are those who live with someone with cholera, shared food or drink with someone with cholera, or those who have eaten/drank from a contaminated food/water source. Tell contacts of the chance of infection and tell them to watch for signs or symptoms of cholera for 5 days after exposure to sick person or a contaminated source. Contacts should be told to seek medical care if symptoms develop.

Contacts should be contacted every day for 5 days to identify new cases early and to reduce spread.

Prevention

- Providing safe water
- Hand-washing
- Safe disposal of stool
- Safe latrines
- Vaccination

Clinics should give clear messages on effective food hygiene, like the 'Five keys to food safety'

- Keep clean
- Separate raw and cooked food
- Cook thoroughly
- Keep food at safe temperatures
- Use safe water

There is a cholera vaccine but its use in outbreak situations is still under investigation.

Differential diagnosis (not a complete list)

Occasionally, other diarrheal disease may present with lots of watery diarrhoea, but it is rarely as severe as cholera.

Additional resources

Cholera outbreak: assessing the response and improving the preparedness
http://whqlibdoc.who.int/hq/2004/WHO_CDS_CPE_ZFk_2004.4_eng.pdf

WHO Ciguatera Poisoning: Questions and Answers

http://www.searo.who.int/LinkFiles/List_of_Guidelines_for_Health_Emergency_Ciguatera_Q_A.pdf

PPHSN. Outbreak preparedness and control: Cholera. Available at:

<http://www.spc.int/phs/pphsn/Outbreak/Cholera.htm>

Diarrhoea treatment guidelines including new recommendations for the use of ORS and zinc supplementation for clinic-based healthcare workers USAID, UNICEF, WHO 2005

http://www.who.int/child_adolescent_health/documents/a85500/en/index.html

The Treatment of Diarrhoea. A manual for physicians and other senior health workers. WHO 2005 <http://whqlibdoc.who.int/publications/2005/9241593180.pdf>

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Dengue

Public health priority

High

Urgent: if a new serotype is suspected or case/s of severe dengue are identified.

Suspected Case definition

An *acute* fever illness that lasts 2 -7 days with **two or more** of the following:

- headache,
- Pain in or behind the eyes,
- muscle aches,
- joint aches,
- rash,
- low white blood cell count
- evidence of bleeding (for example: positive tourniquet test, ; bruising; nose bleeds; gum bleeding; blood in vomit, urine, or stool; or vaginal bleeding)

Confirmed Case definition

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.

Number of linked cases required to trigger an investigation: Two

Description of signs and symptoms

An *acute* fever illness of 2-7 days duration symptoms as described in the case definition. Infants and person under 15 years may have a vague fever illness with a maculopapular (raised spots) rash.

Dengue with **warning signs** such as abdominal pain or tenderness, persistent vomiting, fluid buildup, bleeding from mucous membranes, lethargy or restlessness, requires strict observation and medical treatment.

Severe dengue is characterized by:

- low blood pressure
- rapid or weak pulse
- slow capillary refill
- cold, clammy skin
- no urine output
- signs of bleeding.

Infectious cause(s)

Dengue virus. There are four types of dengue virus (numbered 1 through 4), which all cause dengue fever.

Sources of infection (reservoir)

Humans. Dengue 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.

How the disease is spread

By the bite of mosquitoes. People with dengue fever 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 3-14 days, usually 7-10 days.

Period of infectiousness

Not directly transmitted person-to-person but a person can infect a mosquito while they have a fever, usually 3-5 days. Mosquitoes remain infectious for life and are able to infect other humans.

Clinical management

There is no specific treatment for dengue. Clinical management includes managing fever with paracetamol and enough fluid replacement. Refer to WHO Dengue Guidelines for diagnosis, treatment, prevention and control.

RESPONSE

Infection Control

STANDARD Precautions; plus, a long lasting insecticidal net should be placed over patients so that mosquitoes cannot bite them and then transmit the disease to others.

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- Begin a line-listing of cases.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

Investigation of clusters should start before making a diagnosis. In single cases, priority should be given to figuring out a diagnosis and searching for additional cases.

Specimens

A red-top blood tube should be collected for testing of dengue antibodies or testing for dengue "NS-1 antigen." This specimen should be refrigerated and standard packing and shipping procedure should be followed. Rapid tests are also available.

Public health management of cases

Cases should be interviewed to identify possible place of exposure so that control measures can be carried out and to identify further cases.

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 dengue-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 personal protection, such as mosquito sprays and bed nets.

Prevention

Preventing mosquito bites is the best way to prevent infection.

Differential diagnosis (not a complete list)

- Leptospirosis

- Typhoid fever

Many other infectious and non-infectious causes

Additional resources

WHO Dengue Guidelines for Diagnosis, Treatment, Prevention and Control

http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf

PPHSN guidelines. Dengue Fever and Dengue Haemorrhagic Fever Clinical Management Guidelines

<http://www.spc.int/phs/ENGLISH/Publications/InformACTION/IA9pphsnguidelines.pdf>

DRAFT

Epidemic Hepatitis

Public health priority

Urgent

Suspected Case definition

An *acute* illness with sudden beginning of symptoms and either jaundice (yellow skin or eyes, or dark urine) or elevated liver enzymes on laboratory testing.

Confirmed Case definition

Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) or hepatitis E virus (anti-HEV) positive. Other less common methods are available.

Number of cases required to trigger a report and investigation: 2 or more cases linked by person, place and time.

Description of signs and symptoms

The usual clinical presentation is *acute* fever, feeling bad, loss of appetite, nausea and abdominal discomfort followed a few days later by dark urine and jaundice. Symptoms usually last several weeks.

Infectious cause(s)

Hepatitis A virus (HAV), Hepatitis E virus (HEV)

Sources of infection (reservoir)

Humans.

How the disease is spread

Hepatitis A/E are transmitted almost entirely by faecal-oral transmission. It may occur through contamination of food by 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.

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.

Clinical management

Supportive care only.

RESPONSE PROCEDURE

Infection control

STANDARD plus CONTACT Precautions (see Appendix 2).

Reporting

- The Director of Public Health (or equal authority) should be contacted immediately to report a cluster of cases.

- Begin a line-listing of cases.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

Information about exposures during the period 15 to 50 days before beginning of jaundice should be sought. This should include information about:

- Household and sexual contacts who have had an illness that seems like hepatitis
- Restaurants where the case has eaten
- Social gatherings where the case has eaten
- All sources of drinking water
- Eating of raw or partially cooked shellfish
- Attendance or employment at child care centres by case or household contacts
- Water exposure (for example swimming)
- Exposure to sewage, or failed sewage disposal systems.
- Search for other cases particularly in family members of children linked to school or child care environment.

Specimens

A red-top blood tube should be collected for serologic testing of hepatitis A virus antibody, hepatitis E antibody, hepatitis B panel, and possibly hepatitis C testing. This specimen should be refrigerated and standard packing and shipping procedure should be followed.

Public health management of cases

The case or care-giver should be informed about the type of infection and how it's transmitted. Education should include information about hygienic practices, particularly hand-washing before preparing food and eating, and after going to the toilet.

Cases should also be told not to prepare or handle food to be eaten by other people during the infectious period.

Management of contacts

The following is a general list of persons considered to be contacts if exposed to infectious cases:

- All immediate family, household members and sexual partners
- All persons who ate uncooked food that was prepared by the case
- All persons who look after cases who are in nappies/diapers.

Contacts should be advised to seek medical care if they develop jaundice. Advice about hygiene should be given, in particular hand washing with soap and water after using the toilet. In some settings, emergency immunization with hepatitis A vaccine may be needed. Immunoglobulin (a special type of blood transfusion) is used only for extremely high-risk contacts.

Prevention

- Providing safe water
- Hand-washing
- Safe disposal of stool
- Safe latrines

Clinics should give clear messages on effective food hygiene, like the 'Five keys to food safety'

- Keep clean
- Separate raw and cooked food
- Cook thoroughly
- Keep food at safe temperatures
- Use safe water

Differential diagnosis (not a complete list)

- Acute hepatitis B
- Acute hepatitis C
- Hepatitis D
- Leptospirosis
- Infectious mononucleosis (glandular fever)
- Toxins

Additional resources

WHO. Hepatitis A. WHO/CDS/CSR/EDC/2000.7. Available at:

http://www.who.int/csr/disease/hepatitis/HepatitisA_whocdscsredc2000_7.pdf

DRAFT

Leptospirosis

Public health priority

High

Suspected Case definition

An *acute* fever illness with headache AND muscle aches, associated with ANY of the following symptoms/signs:

- Swelling or blood in the whites of the eyes
- No urine or very little urine-making
- Jaundice
- Cough, coughing up blood and breathlessness
- Bleeding (from the intestines; lung bleeding is famous in some areas)
- Severe headache
- Irregular heart beat or heart failure
- Skin rash.

Confirmed Case definition

Isolation of *Leptospira* bacterial from a clinical specimen; OR Demonstration of *Leptospira* bacteria in a clinical specimen by immunofluorescence OR confirmatory testing from a Reference Laboratory.

Number of linked cases required to trigger an investigation: Two

Description of signs and symptoms

Leptospirosis cases usually present with fever, headache, severe muscle aches and red eyes.

Infectious cause(s)

Leptospira bacteria

Sources of infection (reservoir)

Leptospirosis occurs in wild and domestic animals, mainly rats, dogs and pigs.

How the disease is spread

Mainly through contact of broken skin with water or soil contaminated with the urine of infected animals. (Infections may occur in people exposed to flood water/puddles/waterfalls.)

Incubation period

From 4-19 days, usually 10 days.

Period of infectiousness

Only rarely transmitted from person to person.

Clinical management

Management of fever with paracetamol and enough fluid replacement (oral or intravenous) are recommended for any patient with fever. Antibiotics (such as doxycycline, benzylpenicillin, amoxicillin, ampicillin or erythromycin) are recommended for all patients.

RESPONSE

Infection Control

STANDARD Precautions

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- Begin a line-listing of cases.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

Where a common source is found from a number of cases of leptospirosis, an environmental investigation should begin.

Specimens

A red-top blood tube should be collected for testing for antibodies. This specimen should be refrigerated and standard packing and shipping procedure should be followed. Two blood samples collected 10-14 days apart are recommended to detect antibody rise. Testing in Reference Laboratories can detect specific varieties of leptospirosis. Rapid tests for are also available.

PCR testing is being developed but is currently not widely available

Public health management of cases

Cases should be interviewed to identify possible environmental exposures so that control measures can be carried out and to find further cases.

Management of contacts

- Persons who may have been exposed to the same environmental source as the patient should be told to seek medical advice if they get sick.
- Antibiotics (doxycycline or arithromycin) may be given to people exposed but not sick though its benefit is not certain.

Prevention

Protective clothing (for example boots, gloves) should be worn, particularly if the skin is broken, when in contact with possibly infected soil or water (for example when working in a pig pen).

Differential diagnosis (not a complete list)

- Dengue
- Influenza
- Typhoid fever
- Meningitis
- Acute hepatitis

Additional resources

Human leptospirosis: guidance for diagnosis, surveillance and control. Geneva, World Health Organization/ International Leptospirosis Society, 2003 (ISBN 92 4 154589 5; http://whqlibdoc.who.int/hq/2003/WHO_CDS_CSR_EPH_2002.23.pdf).

Malaria

Public health priority

High

Suspected Case definition

Fever for 3 or more days in a patient living in, or returning within 12 months from, an area where malaria is endemic (regularly found).

Confirmed Case definition

Detection of malaria parasites in thick or thin blood smears; OR, Detection of parasite DNA in a blood sample using PCR.

Number of linked cases required to trigger an investigation: One (for places where malaria is not endemic); to many (depending on the threshold, for endemic areas). In the Pacific, only Papua New Guinea, the Solomon Islands and Vanuatu are considered endemic for malaria.

Description of signs and symptoms

The most serious malarial infection, *falciparum* malaria, may present in many ways, including one or more of the following: fever, chills, sweats, loss of appetite, nausea, fatigue, headache, muscle and joint pain, cough and diarrhoea. Anaemia and/or enlarged spleen often develop after some days. If not treated well the disease may progress to severe malaria, which may include: *acute* brain damage (cerebral malaria), severe anaemia, jaundice, kidney failure (black-water fever), low blood sugar, trouble breathing, and shock. Severe malaria is a possible cause of coma and other neurologic symptoms in any traveller recently returned from a tropical area. Prompt treatment of *falciparum* malaria is essential, even in mild cases, since permanent injury may rapidly appear; death rates among untreated children and non-immune adults can reach 10%–40% or higher.

The other human malarias, *vivax*, *malariae* and *ovale*, are not usually life-threatening. Illness may begin with vague symptoms and a slowly rising fever lasting several days, followed by a shaking chill and rapidly rising temperature, usually accompanied by headache and nausea and ending in a great deal of sweating. After a fever-free period, the cycle of chills, fever and sweating recurs daily, every other day or every third day. An untreated attack may last from a week to a month or longer and be combined with extreme fatigue, anaemia and enlarged spleen. Repeated attacks may occur.

Infectious cause(s)

Four types of parasites - *P. falciparum*; *P. vivax*; *P. ovale*; and *P. malariae*. In the Pacific, only *P. falciparum* and *P. vivax* are known to exist.

Sources of infection (reservoir)

Humans

How the disease is spread

By the bite of infected *Anopheles* mosquitoes. Most *Anopheles* mosquitoes feed at night. People with malaria should be cared for under mosquito nets so that a mosquito cannot bite them and then carry the infection to another person.

Incubation period

9-14 days for *P. falciparum*. 12-18 days for *P. vivax* and *P. ovale*; and 18-40 days for *P. malariae*.

Period of infectiousness

Not directly transmitted person-to-person. Humans may infect mosquitoes as long as infectious parasites are in the blood; this varies with parasite species and with response to treatment. Untreated or incorrectly treated patients may be a source of mosquito infection for several years in *malariae*, up to 5 years in *vivax*, and generally not more than 1 year in *falciparum* malaria; the mosquito remains infectious for life.

Clinical management

Once a diagnosis of malaria is made, the patient should be treated early with a safe and effective (one that works even if there is resistance to some drugs in the area) antimalarial medicine. Effective treatment should be started within 24 hours after symptoms start, to avoid becoming severe malaria which is very deadly. Refer to WHO Guidelines for the Treatment of Malaria at

<http://www.who.int/malaria/publications/atoz/9789241547925/en/index.html>

RESPONSE**Infection Control**

STANDARD Precautions; plus, a MOSQUITO NET should be placed over patients so that mosquitoes cannot bite them and then transmit the disease to others (see Appendix).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- Begin a line-listing of cases.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

Investigation of clusters should occur even before a diagnosis is confirmed. In single cases, priority should be given to figuring out a diagnosis and searching for additional cases.

Specimens

Blood should be collected from the patient for a blood smear and microscopy. Rapid tests are also available.

Public health management of cases

Cases should be interviewed to identify possible place of exposure so that control measures can be carried out and to identify further cases.

Management of contacts

Persons living in the area where a patient was infected should be told of the risk of being bitten by mosquitoes with malaria. Tell them about ways to prevent mosquito bites.

Prevention

Because most *Anopheles* mosquitoes feed at night, the most important prevention is the use of (long-lasting-insecticide-treated) bed nets at night in malaria areas. Other key measures include mosquito control, and regular preventive treatment of malaria in pregnant women. (For a more in-depth discussion of malaria-control strategies, see Additional resources).

Differential diagnosis (not a complete list)

- Dengue virus
- Leptospirosis
- Typhoid fever
- Viral and bacterial meningitis
- Hepatitis
- Influenza
- Tuberculosis
- Many other infectious and non-infectious causes.

Additional resources

WHO Guidelines for the Treatment of Malaria

<http://www.who.int/malaria/publications/atoz/9789241547925/en/index.html>

DRAFT

Measles

Public health priority

Urgent

Suspected Case definition

1. Any person with fever, **and** *maculopapular* (raised red, non-blistering) rash **and** either cough or runny nose or conjunctivitis (i.e. red eyes)

Or

2. Any person in whom a clinician suspects measles infection.

Confirmed Case definition

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 serologic test for measles IgM antibodies.

Number of cases required to trigger a notification and investigation: One

Description of signs and symptoms

Measles is a highly contagious disease caused by the measles virus, starting with a high fever, cough, red eyes and runny nose. On the 3rd to 7th day a whole-body non-blistering *maculopapular* rash starting on the head appears. Malnourished children may develop severe disease.

Infectious cause

Measles virus

Sources of infection (reservoir)

Humans

How the disease is spread

Airborne through sneezing, coughing or talking/singing, or by contact with secretions. Measles is one the most contagious diseases.

Incubation period

Usually 10 days, range 7-18 days.

Period of infectiousness

From just before the first symptoms of any kind start, until to 4 days after the appearance of rash.

Clinical management

A patient should be considered highly infectious until 4 days after appearance of rash and should be isolated as for TB. Any child hospitalized 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. Cases should be given a vitamin A supplement.

RESPONSE PROCEDURE

Infection control

STANDARD, CONTACT and AIRBORNE precautions are to be used for suspected and confirmed measles (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case
- Ensure the Hospital Based Active Surveillance (HBAS) coordinator is informed.
- Begin a line-listing for suspected outbreaks
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required.

Investigation

Actively searching for other cases who were in contact with the case should continue for at least 2 incubation periods (about 1 month).

Specimens

Blood must be collected on all suspect cases and tested for measles antibodies. PCR for measles can be performed on blood, swabs from the back of the nose or from urine.

Public health management of cases

Refer to the Hospital Based Active Surveillance Information Folder and the Acute Fever and Rash Case Investigation Form.

- Laboratory diagnosis should be attempted in the first cases found.
- Cases should not participate in group activities (including school/preschool/child care/work) from beginning of symptoms to 4 days after beginning of rash and should stay home (unless isolated in hospital). Cases should avoid contact with people who are not immune, in particular pregnant women.
- Ask hospitals and health centres to notify new cases promptly.
- During an outbreak it is usually only necessary to send specimens from the first 5 cases of fever and rash.

Management of contacts

- Contacts are considered to be anyone who shared a room with the case.
- Unvaccinated contacts should be vaccinated
- Keep unimmunised contacts out of school for 18 days after their last contact with the infectious case
- Ask contacts to be alert for signs and symptoms of 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).

Where felt to be necessary by the national Expanded Programme on Immunisation (EPI) Co-ordinator measles immunisation may be given in an affected area. A single dose of measles vaccine will be given to a target age-group whether they have been immunized or not.

Any measles outbreak should be used as a chance to promote catch-up vaccination of unimmunised children in the affected area.

Prevention

High vaccination rates in the community prevent outbreaks of measles.

Differential diagnosis (not a complete list)

Rubella

Scarlet fever
Infectious mononucleosis (glandular fever)
Dengue

Additional resources

PPHSN. Outbreak preparedness and control: Measles. Available at:
<http://www.spc.int/phs/pphsn/Outbreak/measles.htm>

DRAFT

Meningococcal Disease

Note: "Meningococcus" is another name for the *Neisseria meningitidis* bacterium

Public health priority

Urgent

Suspected Case definition

Meningococcal meningitis - sudden beginning of fever and one or more of: neck stiffness, drowsiness, confusion, irritation OR rash that does not go pale under pressure.

Meningococcal septicaemia – Fever (or history of fever) AND low blood pressure AND a rash that does not go pale under pressure.

Confirmed Case definition

Culture of meningococcus from a normally sterile body site. This includes blood or cerebrospinal fluid, or, less commonly, joint, pleural (around the lungs), or pericardial (around the heart) fluid, OR from *purpuric* lesions. DNA detection by PCR from a sterile site also confirms meningococcus but is not widely available.

Number of cases required to trigger a notification and investigation: One

Description of signs and symptoms

Acute fever with neurological signs/symptoms is concerning because it may be associated with meningococcus infection

Meningococcal meningitis is an *acute* disease with fever, nausea, vomiting, intense headache and stiff neck. Often there is a *petechial* or *purpuric* rash. Development of coma and shock may be rapid.

Meningococcal septicaemia is more likely to end in death than meningitis and usually has a quickly developing rash that does not go pale under pressure. In the early stages of the disease, the rash may not be present or may be different. If there it may be only of a few tiny red/purple spots located in a place such as the groin or feet.

The death rate may be more than 50% without treatment.

Infectious cause(s)

Neisseria meningitidis bacteria. The groups that cause disease are A, B, C, W135, X & Y.

Sources of infection (reservoir)

Humans. Meningococcal bacteria are carried in the nose and throat of people without symptoms (in other words, *carriers*).

How the disease is spread

Respiratory droplets. Transmission usually occurs between very close contacts, in other words, household or kissing contacts.

Incubation period

3-4 days (ranging from 2-10 days).

Period of infectiousness

Patients are considered contagious until 24 hours after starting the correct intravenous antibiotics.

Meningococcus is common; about 10% of the population carry meningococcus in their nose and throat.

Clinical management

Meningococcal disease can be fatal and should always be viewed as a medical emergency. Admission to a hospital or health centre is necessary. Patients should be isolated until at least 24 hours after antibiotics have started.

Antibiotic therapy should begin immediately when meningococcal disease is suspected. Antibiotics include penicillin, ampicillin, chloramphenicol, and ceftriaxone. In outbreaks, intramuscular chloramphenicol is the drug of choice in areas with limited health facilities because a single dose has been shown to work.

RESPONSE

Infection Control

STANDARD and DROPLET Precautions (see Appendix 2).

The Droplet Precautions should be strictly applied for at least 24 hours after starting intravenous treatment with antibiotics.

Reporting

- The national Director of Public Health (or equal authority) should be contacted immediately to report any case meeting the case definition.
- Begin a line-listing of cases
- Use IHR Decision Instrument (See Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Specimens

If possible, blood *cultures* should be collected in all cases of suspected meningococcal disease. If possible, patients with symptoms of meningitis should have a lumbar puncture (spinal tap) to obtain CSF as soon as possible. CSF should be *cultured* for meningococcus and other bacterial causes of meningitis. Antibiotics should not be delayed while waiting for lumbar puncture.

Investigation

Investigation of single cases of meningococcal disease should start straight away to find other cases and manage contacts (see below).

Public health management of cases

Information should be collected on:

- The case's age, sex and where they live
- Clinical details, including date of first symptoms
- Lab test results
- Close contacts
- Whether the case attends a school or other group setting.

Management of contacts

- All close contacts, including children sharing rooms, boarding schools and intimate partners, should be identified and given information about the signs and symptoms of

meningococcal disease. Contacts should be told to seek medical care if they develop symptoms.

- The antibiotic rifampicin may be given to all close contacts that were in contact with the case within 7 days of onset to remove the bacteria in their nose and throat. (Note: these antibiotics do not treat the infection in a person who is already developing the disease)
- Conduct surveillance for secondary cases among close contacts for 48 hours by contacting them once a day and asking if they have symptoms.

Prevention

- Overcrowding of young people and children in schools, barracks and colleges should be avoided.
- Meningococcal vaccine is available in some countries.

Differential diagnosis (not a complete list)

- *Streptococcus pneumoniae* meningitis
- *Haemophilus influenzae* B meningitis (where immunization rates are low)
- Viral meningitis (“aseptic meningitis”) – caused by a variety of causes
- Fungal meningitis
- *Mycobacterium tuberculosis* meningitis
- Certain drugs and toxins

Additional resources

Guidelines for the early clinical and public health management of meningococcal disease in Australia (2007). Available at:

<http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-other-mening-2007.htm>

Pertussis (Whooping Cough)

Public health priority

High

Suspected Case definition

Cough illness lasting ≥ 2 weeks, with at least one of the following symptoms:

- fits of coughing, OR
- "whoop" when breathing in, OR
- vomiting after coughing fits.

Confirmed Case definition

Culture of *Bordetella pertussis* bacteria from a clinical specimen; OR, PCR positive for pertussis; OR, a coughing illness in a person with a link by time, person, place to a lab-confirmed case.

Number of linked cases required to trigger an investigation: Two

Description of signs and symptoms

The first coughing stage has a slow beginning with an irritating cough that gradually becomes coughing fits, usually within 1–2 weeks, and lasts for 1–2 months or longer. Coughing fits are characterized by repeated violent cough; each fit has many coughs without breathing in and can be followed by a classic crowing or high-pitched 'whoop' when they breathe in. Coughing fits are often followed by vomiting. Infants under 6 months, vaccinated children, teenagers and adults often do not have the typical whoop or cough fits. The final stage is a "recovery" stage.

The number of deaths in vaccinated populations is low. Most deaths occur in infants under 6 months, often in those too young to have completed primary immunization. In non-immunized populations, especially those with starvation and many gastrointestinal and respiratory infections, pertussis is among the most deadly diseases of infants and young children. Complications include pneumonia, collapsed lung, fits, brain swelling, weight loss, hernias and death; pneumonia is the most common cause of death.

Cases occurring in immunized persons suggest declining immunity.

Infectious cause(s)

A bacterium called *Bordetella pertussis*.

Sources of infection (reservoir)

Humans only.

How the disease is spread

Transmission is by the respiratory droplets of an infected person. Pertussis is incredibly contagious: almost all unimmunized contacts may become infected.

Incubation period

Average 9–10 days (range 6–20 days).

Period of infectiousness

Very infectious in the early coughing stage and at the beginning of the coughing fits stage (first 2 weeks). Infectiousness gradually decreases and is gone in about 3 weeks, even though the patients still has a cough. When treated with the right antibiotics, patients are no longer infectious after 5 days of treatment.

Clinical management

Antibiotics for 7 days will shorten the time the case is infectious, but will not reduce symptoms except if given very early.

RESPONSE

Infection Control

STANDARD plus DROPLET Precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- Begin a line-listing of cases.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

Investigation of clusters should start even before a diagnosis is made. In single cases, priority should be given to figuring out a diagnosis and searching for additional cases. Obtaining information on vaccination history is key for management of contacts.

Specimens

Swabs from the back of the nose or throat (*nasopharynx*) should be collected during the coughing and early coughing fit stages, and placed on Cary-Blair media for shipment to a reference laboratory for *culture* or PCR testing.

Two blood samples may be obtained for serologic diagnosis - one when the patient is sick and one when they are better - but they are not as good as respiratory specimens.

Public health management of cases

In the first 3 weeks that they are coughing, pertussis patients can pass the illness to others. They are not infectious after 5 days of treatment with antibiotics. Patients should take antibiotics for at least 7 days, even when they feel better. Patients with suspected pertussis who do not receive antibiotics should keep away from others for 3 weeks from the start of the cough or till the cough stops. It is extremely important that they stay away from infants who have not been vaccinated for pertussis.

Management of contacts

Consider giving close contacts antibiotics e.g., a 7-day treatment of erythromycin, clarithromycin or azithromycin. This is very important in households where there is an infant <1 year old or a pregnant woman in the last 3 weeks of pregnancy (to prevent the newborn from infection).

Children living in the same house as the case may be excluded from schools, day care centers and public gatherings for 21 days after last exposure if they are not fully immunized. Once cases and contacts have received 5 days of a minimum 7-day treatment with the right antibiotics, they do not need to be excluded.

All contacts must have their immunization status reviewed and brought up to date (note that this will not prevent them from getting sick in the current outbreak).

Prevention

Immunization is the basis of pertussis control. In an outbreak setting, a faster vaccination schedule may be considered for people who are not fully immunized who have not yet been exposed. For advice, consult WHO, SPC or CDC.

Differential diagnosis (not a complete list)

- Bacterial (particularly *Mycoplasma*) pneumonia
- Respiratory syncytial virus (RSV) infection
- Other infectious causes of upper respiratory disease

Additional resources

CDC. Recommended Antimicrobial Causes for the Treatment and Postexposure Prophylaxis of Pertussis. 2005 CDC Guidelines. <http://www.cdc.gov/Mmwr/PDF/rr/rr5414.pdf>.

CDC. Guidelines for the Control of Pertussis Outbreaks. <http://www.cdc.gov/vaccines/Pubs/pertussis-guide/guide.htm>.

DRAFT

Rubella (German Measles)

Public health priority

High

Suspected Case definition

1. Any person with fever, **and** maculopapular (non-blistering) rash **and** either joint pain or swelling, enlarged lymph glands, or red eyes*

Or

2. Any person in whom a clinician suspects rubella infection.

* If a person has fever and maculopapular (non-blistering) rash and red eyes, they also meet the case definition of measles; in this case, measles should be ruled out (for example with laboratory testing) before a diagnosis of rubella can be made.

Confirmed Case definition

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.

Number of cases required to trigger a notification and investigation: One

Description of signs and symptoms

The usual clinical presentation of rubella is a mild fever illness with a maculopapular (non-blistering) rash everywhere. Children usually present with few or no other symptoms, but teenagers and adults may have early symptoms of low fever, headache, feeling bad, mild runny nose and conjunctivitis (red eyes). Swollen neck glands are common and occur before the rash by 5 to 10 days.

A disease called 'congenital rubella syndrome' occurs in almost all children born to mothers who are not immunized and get rubella while they are pregnant.

Infectious cause(s)

Rubella virus

Sources of infection (reservoir)

Humans

How the disease is spread

Contact with mucus from the nose or throat. Droplet spread.

Incubation period

Usually 14-17 days, range 14-21 days.

Period of infectiousness

For about 1 week before at least 4 days after the appearance of rash. Rubella is a highly infectious disease.

Clinical management

A patient should be considered highly infectious until 4 days after appearance of rash and should be isolated. Any child hospitalised with fever and rash should be isolated on admission.

Paracetamol rather than aspirin should be used for fever under 18 years of age. Cases should be given vitamin A supplementation.

RESPONSE PROCEDURE

Infection control

STANDARD and DROPLET precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- Ensure the Hospital Based Active Surveillance (HBAS) coordinator is informed.
- Begin a line-listing for suspected outbreaks
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required.

Investigation

Active searching for other cases should continue for at least 2 incubation periods.

Specimens

Blood must be collected on suspect cases and tested for rubella antibodies.

Public health management of cases

Refer to the Hospital Based Active Surveillance Information Folder and the Acute Fever with Rash Case Investigation Form.

- Laboratory tests should be requested for the first cases.
- Ask hospitals and health centres to notify new cases promptly.
- During an outbreak it is usually only necessary to send specimens from the first 5 cases of fever and rash.
- Cases should not attend group settings (including school/preschool/child care/work) from beginning of symptoms to 7 days after rash beginning and should stay home (unless isolated in hospital). Cases should avoid contact with susceptible persons, in particular pregnant women.

Management of contacts

- Contacts are considered to be anyone who shared a room with the case. Unvaccinated contacts should be vaccinated
- Exclude unimmunised contacts from school or other group settings.
- Ask contacts to be alert for signs and symptoms of 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).
- Particular attention should be made to the detection of rubella in pregnant contacts.

Any rubella outbreak should be used as an opportunity to promote catch-up vaccination of unimmunised children on the affected island.

Prevention

High vaccination rates in the community prevent outbreaks of rubella.

Differential diagnosis (not a complete list)

Measles

Dengue

Additional resources

Rubella in Pregnancy Society of Obstetricians and Gynaecologists of Canada
<http://www.sogc.org/guidelines/documents/guiJOGC203CPG0802.pdf>

DRAFT

Tuberculosis

Public health priority

High

Suspected Case definition

Cough lasting ≥ 2 weeks; OR, Two or more of the following symptoms, without another diagnosis:

- Coughing up blood
- Difficulty breathing
- Fevers/chills
- Night sweats
- Extreme tiredness or weakness
- Loss of appetite
- Unexplained weight loss.

Confirmed Case definition

Culture of *Mycobacterium tuberculosis* bacteria from a clinical specimen; OR, Detection of *M.tuberculosis* by PCR.

Number of linked cases required to trigger an investigation: One

Description of signs and symptoms

If untreated, about 65% of patients with tuberculosis die within 5 years, most of these within 2 years.

The classification of TB for treatment purposes is based mainly on whether there are bacteria in the sputum. If the sputum smear is positive for tuberculosis bacteria, the patient is highly infectious.

Fatigue, fever, night sweats and weight loss may occur early or late in the disease. Symptoms of cough, chest pain, bloody sputum and hoarseness are found in advanced stages. X-ray of the chest shows typical changes in the lungs.

TB in the lung occurs more commonly (70%) than TB in areas of the body outside the lung (30%). Children and people with poor immune systems, such as people with HIV infection, have a higher risk of TB outside the lung, but lung disease remains the most common type worldwide. TB disease may affect any organ or tissue.

Infectious cause(s)

Mycobacterium tuberculosis and related bacteria.

Sources of infection (reservoir)

Humans are the primary sources of infection for *M. tuberculosis*. Other animals, particularly cattle, are occasionally responsible for human tuberculosis.

How the disease is spread

Transmission is by AIRBORNE spread usually through coughing, singing or sneezing by a patient with lung or throat disease. Patients with smear-positive, advanced lung disease are the most contagious.

M. bovis tuberculosis may also be transmitted by ingestion of raw milk.

Incubation period

As short as 2 weeks, but tuberculosis usually becomes *latent* and can emerge at any time later in life (5% chance in first 2 years, 5% lifetime chance thereafter).

Period of infectiousness

The period of infectiousness of TB is ongoing in the absence of treatment.

- The infectious period for outbreak investigations is usually considered to begin 3 months prior to first symptoms, positive sputum, or chest x-ray evidence of TB. If patient has no symptoms and has negative sputum and x-ray, the Infectious Period begins 1 month prior to diagnosis.
- The Infectious Period is ended after 2 weeks of correct treatment, AND the patient has fewer bacteria as shown by sputum results.

Children under 5 with TB are generally not considered infectious.
TB outside the lung or throat is generally not considered infectious.

Clinical management

Treatment of tuberculosis is a complex topic and requires a number of drugs. Antibiotic-resistance should be managed with advice from experts in TB clinical case management. It is often best to wait until a proper sputum specimen can be collected before starting drug therapy, so drug-susceptibility testing is most accurate.

TB treatment is further complicated by HIV/TB co-infection in some areas.

RESPONSE

Infection Control

Immediate AIRBORNE Precautions (see Appendix 2) when a patient is *suspected* of having tuberculosis (DO NOT WAIT FOR A POSITIVE SPUTUM!). A patient can then be removed from isolation after evidence of three negative sputum samples.

Sputum must be collected in a disposable container, with a lid that can be closed tightly. Laboratory specimens should be well sealed with no contamination of the outside of the container and transported immediately to the laboratory in a sealed bag.

See also "Public health management of cases."

Reporting

- Report to TB manager within 48 hours of diagnosis.
- Contact the Director of Public Health (or equal authority) within 1 day to report a suspected case of multi-drug resistant TB.
- Begin a line-listing of cases if a cluster of cases is suspected.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

After every TB diagnosis, it is important to look for other cases among contacts. Finding and treating new infections are crucial to prevent further cases. This is particularly critical for cases of drug-resistant disease.

Specimens

The main method of diagnosis of TB is sputum smear and *culture*. Patients should be taught how to provide a good sample (i.e. instruct the patient to breathe in deeply 2-3 times, cough deeply from the chest and spit into the sputum container, rather than just spitting). Sputum can be stained locally by the acid-fast method but ALL sputum of suspected TB patients should be referred to a reference laboratory for *culture*. Children under 5 years of age cannot produce enough sputum so bronchial aspirate is needed.

TB in other sites in the body requires advanced sampling techniques - seek expert advice.

Public health management of cases

When a patient with suspected infectious TB is admitted to the hospital the patient must be isolated in a single room, ideally in a negative pressure room if available. If there is no negative pressure room, the patient should be put in room by themselves with the windows open.

AIRBORNE precautions must be taken. A P2 (N95) mask should be worn by all health care workers and all visitors entering the room. Infectious patients need to wear a surgical mask when leaving their rooms to walk in the hospital grounds or during transport.

It is better if children do not visit infectious cases.

People with infectious TB must be isolated from people with weak immune systems until they are no longer infectious. Staff members with weak immune systems should not work on wards where there are cases of infectious TB.

There are no restrictions on the movement of patients with non-respiratory TB, or those on treatment with negative sputum smears.

The basis of effective TB treatment is the DOTS strategy (Directly Observed Therapy – Short Course), where all cases are physically observed to take (swallow, inject) their TB medications every time. For additional information about TB case management, refer to Additional Resources.

Management of contacts

The closer the contact and the longer the duration of exposure, the higher the risk is for being infected. Close contacts are persons who share the same air space in a household or other small environment for a long period (days or weeks, not minutes or hours) with a person with lung or throat TB disease. A suspect TB patient is a person who is being investigated for TB disease, whether or not antituberculosis treatment has been started.

In addition to close contacts, the following persons are also at higher risk for exposure to and sickness from infection. Persons listed below who are also close contacts should be top priority.

- Healthcare workers
- Age < 5 years
- Age > 50 years
- Conditions that weaken the immune system
 - AIDS
 - Diabetes
 - Drugs that weaken the immune system (for example steroids)
 - Some cancers

All contacts of TB cases within the infectious period of the case (see below) should be screened for tuberculosis. This should include questioning about whether they have symptoms of tuberculosis and whether they have been vaccinated against TB. People with symptoms should have full screening for TB including skin testing, chest examination and CXR. Those patients who have no symptoms should have skin testing to look for disease. All skin tests should be repeated 8-12 weeks after the initial test.

Contacts with symptoms suggesting TB should be referred to Public Health for registration so the TB policy can be begun for them individually.

All contacts with *Latent* TB Infection (LTBI; positive skin test with no active disease) should be treated where possible. Priority should be assigned to

- Children under 5 years of age
- Contacts with HIV infection
- Contacts with a skin test that has become positive
- Contacts of patients with positive sputum AFB smear results and cavities on chest x-ray.
- Other contacts with risk factors for progression to TB disease (see below)

Persons at high risk of progression from LTBI to TB disease include:

- New infection in the past 2 years
- Infants and children under age 5 years
- Persons older than 50 years
- Persons with weak immune systems

Calculation of the Infectious Period

Contacts are only at risk for getting tuberculosis from an infectious case if they are exposed to the case during the Infectious Period. A person who is exposed to the case before they developed TB, or after the disease is no longer infectious, is not a contact.

The Infectious Period for lung or throat TB begins three months before symptom beginning or evidence of cavity on x-ray, whichever is first. For cases without symptoms, and no evidence of TB on sputum smear and x-ray, the infectious period begins 1 month before diagnosis.

The Infectious Period for TB ends when:

- Patient has been receiving enough treatment for at least 2 weeks AND
- Patient has shown some laboratory evidence of reduction in bacteria.

Note that non-lung / non-throat TB is not generally considered infectious (for example cervical lymph node TB).

Prevention

The primary prevention for TB is proper identification of cases and their contacts, followed by appropriate treatment and infection control. Other society measures such as reducing crowding, improving nutrition, and so on, also greatly reduce TB transmission rates.

There is a vaccine for TB, called *Bacillus Calmette-Guérin* (BCG). It is used mainly because it prevents more serious forms of TB (e.g. meningitis) in children. It has no role in TB outbreak control.

Differential diagnosis (not a complete list)

- Bacterial pneumonia
- Pulmonary abscess

- Cancers (especially lung, lymphoma)
- Sarcoidosis
- Histoplasmosis
- Multiple other infectious and non-infectious conditions

Additional resources

WHO. Treatment of Tuberculosis: Guidelines for National Programmes. Available at http://whqlibdoc.who.int/publications/2010/9789241547833_eng.pdf.

WHO. Guidelines for the Programmatic Management of Drug-Resistant Tuberculosis. Available at: http://whqlibdoc.who.int/publications/2008/9789241547581_eng.pdf.

CDC. Guidelines for Preventing the *How the disease is spread* of Mycobacterium tuberculosis in Health-Care Settings, 2005. Available at: <http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf>. (see also associated Errata, <http://www.cdc.gov/tb/publications/reportsarticles/mmwr/Errata09-25-06.pdf>; and FAQs, <http://www.cdc.gov/tb/publications/guidelines/AdditionalFAQs.pdf>.)

CDC. Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis. Available at: <http://www.cdc.gov/mmwr/pdf/rr/rr5415.pdf>.

DRAFT

Typhoid Fever

This is a serious illness. It can lead to death in up to 20% of patients, if they are not treated with antibiotics. Antibiotics such as ciprofloxacin are very effective and usually save the life of a patient if they are given early enough.

Public health priority

Urgent

Suspected Case definition

Fever for 3 or more days, plus one or more of the following: feeling bad, severe headache, dry cough, loss of appetite, abdominal pain, constipation, diarrhoea, or rose spots on the trunk.

Confirmed Case definition

Isolation of *Salmonella* Typhi bacteria from blood, stool, or other clinical specimen. Serologic evidence (antibodies) is not enough to confirm the diagnosis.

Number of cases required to trigger a notification and investigation: One

Description of signs and symptoms

Typhoid fever may vary from a mild illness with low fever and feeling bad, to a severe illness with continuous fever, diarrhoea or constipation, anorexia, severe headache.

Typhoid fever is very difficult to diagnose. Different patients can have a very different illness. The most constant symptom is the long-lasting high fever.

It is therefore very important to confirm the illness in a laboratory (blood or stool *culture*). Unfortunately, blood and stool *culture* are also not perfect and may be positive in less than half of typhoid fever patients.

Infectious cause(s)

Salmonella Typhi.

A similar (though often milder) disease, paratyphoid fever, is caused by *Salmonella* Paratyphi

Sources of infection (reservoir)

Humans are the only reservoir for *Salmonella* Typhi. People can be *carriers* for years, meaning that they are infectious but do not have symptoms.

How the disease is spread

Transmission through food and water polluted by the faeces of patients and *carriers*. Contaminated shellfish, raw vegetables or fruit, and milk have all caused outbreaks. Food-handlers that are typhoid *carriers* pose a major risk. Flies can also transmit bacteria from faeces onto food.

Incubation period

From 3-60 days, usually 8-14 days.

Period of infectiousness

The patient's stool is infectious while the person has symptoms. Up to 5% of infected people become long-term *carriers*.

Clinical management

All suspected cases of typhoid should be hospitalised. Check if the patient is dehydrated and give enough oral or intravenous fluid replacement to fix any dehydration. Paracetamol should be used to manage fever in patients under 18 years of age. Antibiotics (ciprofloxacin, chloramphenicol, ampicillin, or trimethoprim-sulfamethoxazole) are required for all patients. Antibiotic choice may need to change once the laboratory has completed antibiotic sensitivity analysis.

Ciprofloxacin is the most effective antibiotic for typhoid fever. It should be given for at least 5 days, even if the patient is already feeling better. Other antibiotics do not work as fast, and should be given for at least 21 days, because they do not reach as well into areas such as the gall bladder, where the typhoid bacteria are hiding.

RESPONSE

Infection Control

STANDARD Precautions and where patient is in nappies/diapers or incontinent, add CONTACT Precautions (see Appendix 2).

Reporting

- Contact the Director of Public Health (or equal authority) immediately to report a suspected case.
- If 2 or more cases begin a line-listing.
- Use IHR Decision Instrument (see Appendix 1) to determine whether reporting to WHO under the IHR 2005 is required

Investigation

Where a common source is identified from a number of cases of typhoid fever an environmental investigation should begin. Single cases may need an investigation for the presence of a long-term *carrier* in a close contact, as resources allow.

Where there is evidence of a point source outbreak involving food or water:

- Begin case finding and conduct investigation to determine exposure
- Test food handlers
- Ban and test suspect food/water
- Look for possible environmental sources such as overflowing sewage.

Specimens

Stool and blood *cultures* should be performed to confirm the diagnosis.

Public health management of cases

- Cases should be interviewed to identify possible links to specific foods, water supply and potential sources of infection for example a restaurant or school. An environmental investigation should begin if a source is identified.
- Arrange for the collection of stool specimens to make sure antibiotics have gotten rid of the bacteria. Three stool specimens should be collected 1 month apart, at least 48 hours after antibiotics have ceased. All 3 specimens need to be tested because bacteria are not continuously shed in the stool.
- The patient should be told about the type of infection and the method of transmission. Emphasize the importance of hand washing, particularly after going to the toilet, changing nappies/diapers, before eating and preparing food.

- *Carriers of Salmonella Typhi* who are food handlers should be excluded from work until they are treated and no more typhoid bacteria are found in their stool.

Management of contacts

- Close contacts should be told about the symptoms of typhoid fever and be advised to go to the health center if they develop symptoms.
- Where mass-consumed food or drink is contaminated, complete a list of possible foods (including milk and water supply) and ban all suspected foods that are still available. Ask about the origin, preparation and storage of suspected food and collect stool specimens from food handlers if needed.
- Antibiotic prophylaxis is not recommended.

Prevention

- Providing safe water
- Hand-washing
- Safe disposal of stool
- Clean latrines/toilets

Clinics should give clear messages on effective food hygiene, like the 'Five keys to food safety'

- Keep clean
- Separate raw and cooked food
- Cook thoroughly
- Keep food at safe temperatures
- Use safe water

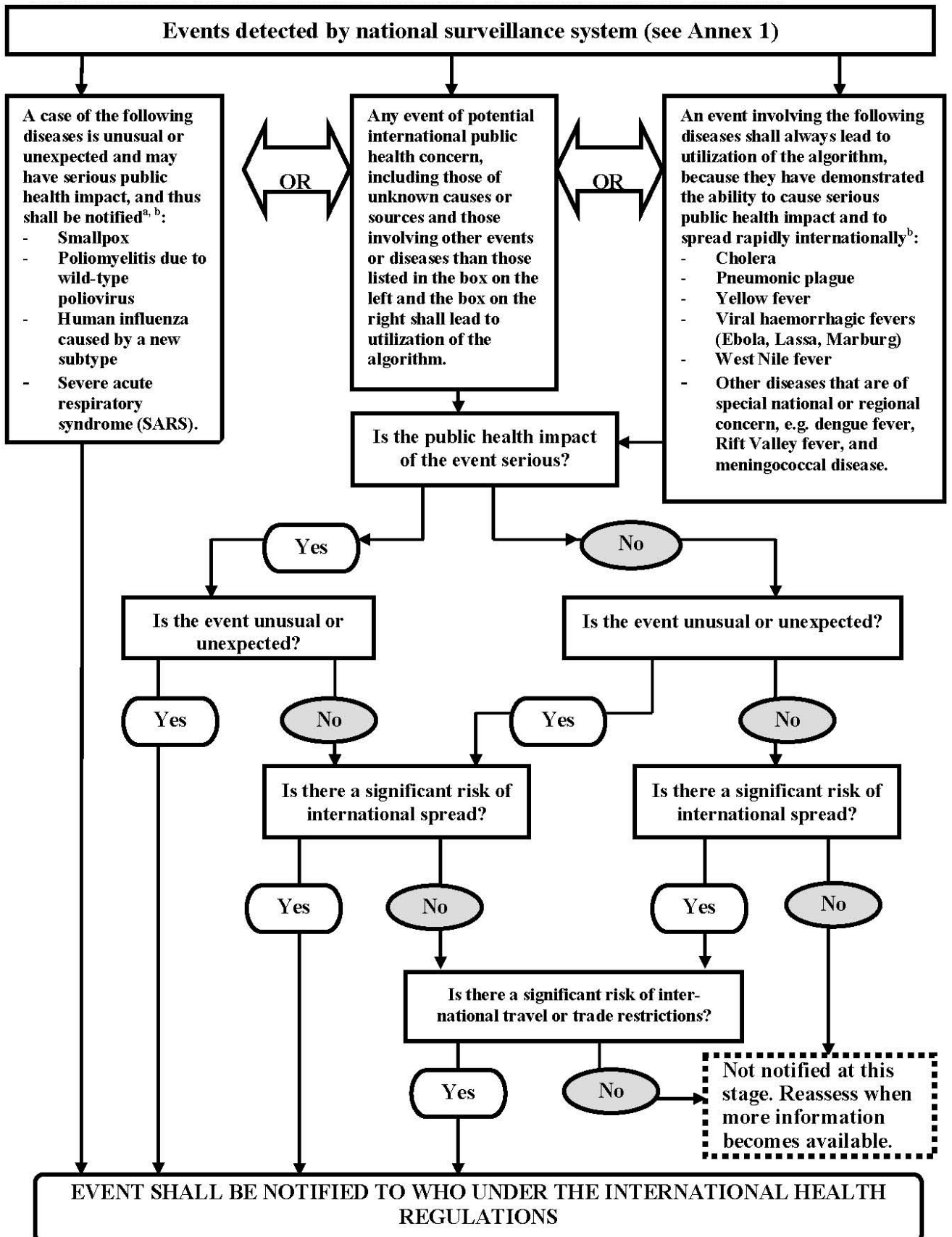
Differential diagnosis (not a complete list)

- Dengue
- Leptospirosis
- Paratyphoid fever

Additional resources

Background document: the diagnosis, treatment and prevention of typhoid fever.
http://whqlibdoc.who.int/hq/2003/WHO_V&B_03.07.pdf

Appendix 1: Decision Instrument for the Assessment and Notification of Events that may be a Public Health Emergency of International Concern



Appendix 2: Principles of Infection Control

See also PPHSN Infection Control Guidelines

Standard Precautions

(All body fluids, except sweat, are regarded as potentially infectious).

Hand-washing

- Wash hands after touching blood, body fluids, secretions and contaminated items, whether or not gloves are worn.
- Wash hands immediately after gloves are removed, between patient contacts and when working on different areas of the same patient to prevent cross-contamination of different body sites.
- Use a plain (non-antimicrobial) soap for routine hand washing.

Gloves

- Wear gloves (clean, non-sterile) when touching blood, body fluids, secretions, excretions, contaminated items, mucous membranes and non-intact skin. Change gloves between tasks on the same patient after contact with material that may have a high concentration of micro-organisms. Remove gloves promptly after use without touching non-contaminated surfaces and before going to another patient and wash hands immediately.

Mask

- Wear mask during procedures that are likely to create splashes or sprays of blood, body fluids, secretions and excretions.

Gown (or plastic apron)

- Wear a gown (clean, non-sterile) or plastic apron during procedures that are likely to create splashes or sprays of blood, body fluids, secretions and excretions. Remove as promptly as possible and wash hands immediately.

Patient-Care Equipment

- If equipment is soiled with blood, body fluids, secretions and excretions, prevent skin and mucous membrane exposures, contamination of clothing, and transfer of micro-organisms to other patients and environments. Ensure that reusable equipment is not used for the care of another patient until it has been cleaned or disinfected. Ensure that single-use items are discarded properly and not reused.

Environmental Control

- Simple cleaning of environmental surfaces is enough unless there has been significant soiling by potentially infectious body fluids. If this is the case, disinfection is required.

Linen

- When soiled with blood, body fluids, secretions and excretions, handle, transport and process in a method that prevents skin and mucous membrane exposure and contamination of clothing, so that transfer of micro-organisms to other patients and environments is prevented.

Occupational Health and Blood-borne Germs

- Take care to prevent injuries when using needles, scalpels and other sharp instruments or devices; when handling sharp instruments after procedures; when cleaning used instruments; and when disposing of used needles. Never recap used needles, or use any other technique that involves directing the point of the needles from disposable syringes by hand, and do not bend, break or otherwise manipulate used needles by hand. Place used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers, which are located as close as practical to the area where the items are used.
- Use mouthpieces, resuscitation bags or other ventilation devices as an alternative to mouth-to-mouth resuscitation methods where the need for resuscitation is expected.

Contact Precautions

Use with Standard Precautions.

Patient Placement

- Place the patient in private room. When a private room is not available, place the patient in a room with a patient(s) who has active infection with the same micro-organism but with no other infection.

Gloves and Hand-washing

- Wear gloves when entering the room. Change gloves after having contact with infectious material that may contain high concentrations of micro-organisms (faecal material and wound drainage). Remove gloves before leaving the patient's environment and wash hands immediately with an antimicrobial soap or waterless antiseptic. Afterwards ensure that hands do not touch potentially contaminated environments, to avoid transfer of micro-organisms to other patients or environments.

Gown (or plastic apron)

- Wear a gown (or plastic apron) (a clean, non-sterile gown is enough) on entering the room, when you anticipate that your clothing will have substantial contact with the patient or environment. Remove the gown before leaving the patient's environment. After removal, ensure that clothing does not contact potentially contaminated surfaces.

Patient Transport

- Limit the movement and transport of the patient from the room to essential purposes and prevent soiling of the environment.

Patient-Care Equipment

- When possible, dedicate the use of non-critical patient-care equipment to a single patient (or cohort with the same infection). If equipment is shared, then thoroughly clean and disinfect.

Droplet Precautions

Use with Standard Precautions

Patient Placement

- Ideally, place the patient in a private room. Keep the room doors closed and the patient in the room. When a private room is not available, place the patient in a room with patients who have active infection with the same micro-organism, but with no other infection.

Respiratory Protection

- A person who is not immune should not enter the room of patients known or suspected to have the disease, if other immune care-givers (staff that have been vaccinated against the disease) are available. A standard surgical/medical mask should be worn.

Patient Transport

- Limit the movement and transport of the patient from the room to essential purposes only and then place a mask on the patient.

Airborne precautions

Use with Standard precautions

Patient Placement:

- Place the patient in a negative-pressure isolation room. If no negative-pressure room is available, a private room with good external ventilation (open windows) may be used; keep people away from the window.
- Keep the room doors closed and the patient in the room.
- When a private room is not available, place the patient in a room with patients who have active infection with the same micro-organism, but with no other infection (this should be considered a last resort)

Respiratory Protection:

- For measles and varicella (chickenpox): A susceptible person should not enter the room of patients known or suspected to have the disease. Patient should be cared for by immune care-givers (staff that have been vaccinated against the disease or previously infected) are available. Any susceptible persons who must enter the room should wear a correctly-worn respirator at all times (for example N95).
- For tuberculosis: All staff member, visitors or caregivers who must enter the room should wear a correctly-worn respirator at all times (for example N95).

Patient Transport:

- Limit the movement and transport of the patient from the room to essential purposes only and then place a respirator (for example N95 mask) on the patient.

Appendix 3: Additional Resources

The references here are provided for information only. Neither SPC nor WHO specifically endorse any of the products listed here.

Control of Infectious Diseases Manual 19th edition, An Official Report of the American Public Health Association. David L. Heymann, Editor. 2008: American Public Health Association.

Hospital Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing *How the disease is spread* of Infectious Causes in Healthcare Settings. Available at: <http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf>.

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 7th Edition. Gerald L. Mandell, MD, MACP, John E. Bennett, MD, MACP, and Raphael Dolin, MD. 2010: Elsevier Books.

Manson's Tropical Diseases, 22nd Edition. Gordon Cook, Alimuddin Zumla. 2008: Saunders Books.

Sanford Guide to Antimicrobial Therapy, 2010. David N. Gilbert, Robert C. Moellering, George M. Eliopoulos. 2010: Sanford.

WHO Recommended Strategies for the Prevention and Control of Infectious Diseases. Geneva: WHO; 2001.

Appendix 4: Glossary

Acute

Starting suddenly. Opposite of “Chronic.”

Carrier (Carriage)

A carrier is a person who shows no symptoms of disease but is able to infect others. Carriage is the condition of being a carrier.

Case Definition

The signs and symptoms that are typical of a disease or condition, and help you decide who has that disease or condition and who does not.

Cluster

A group of patients with the same disease or condition, in the same time and place. The number of patients that make up a cluster depends on the disease.

Complication

A severe result of a disease.

Confirmatory testing

Laboratory testing, usually done at a “Reference laboratory,” that proves the cause of the disease.

Contact

A person who has been exposed to an infectious case patient, during the period when that person was infectious.

Culture

Growth of germs in the laboratory

Demographics

The characteristics of a population. In epidemiology usually age, sex, place of residence etc.

Differential diagnosis

A list of diseases that may cause similar signs and symptoms.

Disinfection

Using a cleaning method that kills germs. This includes disinfectants and autoclaving (steam disinfection)

Endemic

A disease is said to be “endemic” if it is normally expected to be found, in a particular group of people at a particular time.

Epidemic

An increase in cases of a disease in a particular group of people at a particular time, beyond what would normally be expected (endemic). A single case can be an epidemic if the disease is not normally found in the population.

Event-based surveillance

Surveillance for diseases by looking for or hearing about unusual events in the community (like unexplained deaths in one village) rather than counting cases of particular diseases at a health care facility.

Faecal-oral transmission

Spread of a disease (germ) by tiny amounts of infected stool getting swallowed by another person, for example through food, water, or hands that are contaminated after a patient goes to the bathroom.

Fever

38 °C/100.5°F or higher. If no thermometer is available, fever or chills reported by the patient is also acceptable (It is important to differentiate self-reported fever from feeling hot because of the weather).

Fast breathing

1-2 months old	60 or more breaths/minute
2 -12 months	50 or more breaths/minute
1 to 5 years	40 or more breaths/minute
6 to 12 years	30 or more breaths/minute
13 years to adult	20 or more breaths/minute

Guillain-Barre syndrome

An *acute* neurologic (nerve-related) disorder in which patients experience numbness, tingling or pain and paralysis, usually starting at the ends of the arms and legs and working its way up.

IgM (IgM antibodies)

Antibodies that show that a patient has been infected with a germ relatively recently

Immunofluorescence microscopy

A laboratory technique in which a microscope is used to look at laboratory samples for germs that have been stained with certain dyes that light up when the germ is present in the sample.

Incidence

The number of *new* cases of disease at any given point in time in a certain place (see also "Prevalence")

Incubation period

The period of time between exposure to infection and the beginning of symptoms.

Infectious cause

Any cause that can cause infection, it may be a virus, bacteria, fungus, protozoan or worm

Infectious disease (communicable disease)

A disease that is caused by germs that can be spread to a person from the environment, animals or other people.

Latent

In an inactive or hidden phase.

Linked by person, place and time:

Multiple cases are linked by person, place and time when all of the following criteria are met:

- The patients had something in common with each other prior to the beginning of illness. For example they may have had direct contact (for example by touching or being in the same room) or had the same exposure (for example they ate the same food).
- The patients were in the same place (which can be defined very narrowly or broadly, depending on the situation) during the expected time of infection
- The timing of the multiple patients' exposure (or disease) is close enough to one another to be plausibly related. The exact length of time that is "close enough" will depend on the situation.

Lymphadenopathy

Enlargement of the lymph nodes.

Maculopapular

Skin rash where there is colour change (macule) which is raised (papule) above the normal surface of the skin, without blisters (as opposed to "Vesicular")

Nasopharynx (Nasopharyngeal)

The nasopharynx is the part of your body where your nasal passages meet your throat. It is reached through the nose when collecting nasopharyngeal swabs.

Outbreak

See "Epidemic"

Period of Infectiousness

Time in which an infected person can spread an infection to another person

Petechiae (Petechial)

Tiny red or purple blood spots on the skin that do not blanch (lighten in colour) under pressure.

Polymerase chain reaction (PCR)

A laboratory technique in which a patient's sample is analysed for germs by looking for DNA or RNA from the germs

Prevalence

The total number of cases of disease at any given point in time in a certain place (see also "Incidence")

Prodromal

Symptoms indicating the beginning of disease.

Prophylaxis

Treatment of a patient who is infected with a germ but has not yet developed any symptoms, to prevent them from getting sick.

Purpura (Purpuric)

Red or purple spots that do not lighten under pressure. Larger than petechiae.

Reference laboratory

A laboratory that has the tools and skills needed to prove the diagnosis of an infectious disease.

Reservoir

The place in nature where a germ comes from.

Rule out

To decide that a certain germ is *not* the cause of disease in a patient

Septicaemia

Bacterial blood poisoning

Serotype

A group of bacteria or viruses classified together.

Susceptible

When a person is able to get sick from infection with a certain germ (the opposite of resistant).

Surveillance

The collection of information about the amount of disease in the community so that you can take action to control it.

Syndromic

Refers to diagnosis based on a group of symptoms (like fever and cough) rather than a specific germ (like influenza).

Threshold

The minimum number of cases of disease, above which you need to take action. For example, if there are normally 5-8 cases of a disease in one week, you may set a threshold of 10 cases, to be the number which triggers an investigation.

Transmission

Refers to how a germ is transferred or spread

Vesicular

Describing a rash that has (usually clear) fluid-filled blisters

Viral transport medium (VTM)

A yellowish or pinkish liquid, usually in small tubes, used by the laboratory to preserve viruses so that they can be shipped to a reference laboratory