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SYNDROMIC NOTIFICATION AND LABORATORY INVESTIGATION MANUAL

Coordinated by:

Communicable Disease Surveillance Section,
Disease Control Division
MINISTRY OF HEALTH MALAYSIA

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EDITORIAL BOARD

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FOREWORD

Communicable disease surveillance undergirds communicable disease control. A functional and integrated surveillance provides information for action on communicable disease.

Communicable disease surveillance is the ongoing systematic collection, analysis and interpretation of outcome specific data for use in the planning, implementation and evaluation of communicable disease control and prevention.

The current mandatory notification of certain priority communicable diseases has been useful in communicable disease surveillance but is inadequate in the event of new imerging infectious diseases. The difficulty of identifying unknown aetiological agents is part of the reason for delays between the occurrence and recognition of new infectious diseases. A more systematic approach for the early detection of unknown infectious agents and notification is needed.

Hence, a workshop was organised on 27 to 29 October 2002 in Penang to customise the WHO Guidelines for collection of clinical specimens during field investigation of outbreaks to establish protocols for use as investigation tools for unexplained deaths, critical illnesses or outbreaks due to possible infectious diseases in Malaysia. The workshop participants comprised clinicians, microbiologists, epidemiologists and public health specialists.

This manual details the syndromic approach to infectious diseases notification and laboratory investigation which complements other existing specific disease notification and is useful for rapid response to newly emerging and reemerging diseases and bioterrorist attacks.

TAN SRI DATU DR MOHAMAD TAHA BIN ARIF
Director-General Of Health

ABBREVIATIONS

A & E	Accident and Emergency
ASAP	As soon as possible
BAL	Brochio-alveolar lavage
CSF	Cerebrospinal fluid
ED	Emergency Department
EDTA	Ethylene Di-amine Tetra Acetate
ELISA	Enzyme-link Immunosorbent Assay
HCW	Health Care Worker
HFMD	Hand-Foot and Mouth Disease
HPE	Histopathological examination
ID	Infectious Disease
IDRC	Infectious Diseases Research Centre
IF	Immunofluorescent test
IMR	Institute for Medical Research
MOH	Ministry of Health
NPHL	National Public Health Laboratory
PCR	Polymerase chain reaction
PHL	Public Health Laboratory
PVA	Polyvinyl isopropyl alcohol
VTM	Viral transport media
WHO	World Health Organisation

1.0 SYNDROMIC APPROACH

1.1 What is a syndrome?

A syndrome is a symptom complex in which the symptoms and / or signs co-exist more frequently than would be expected by chance.

1.2 What is syndromic notification?

Syndromic notification is the notification of a "health event" under surveillance in which the case definition is based on a syndrome, not on a specific disease. For example: acute haemorrhagic fever syndrome and acute respiratory syndrome.

Syndromic notification is already being practiced in Malaysia e.g.

- National Acute Flaccid Paralysis Surveillance.
- National Acute Gastroenteritis Surveillance.
- National Conjunctivitis Surveillance.
- Sentinel Hand-Foot and Mouth Disease (HFMD) Surveillance.
- National Acute Respiratory Infection Surveillance.

1.3 Objectives of syndromic notification

1. To facilitate and expedite notification and response using clinical syndromes to define and capture all diseases that could potentially cause outbreaks
2. To alert attention to a problem at the earliest possible time and to promote rapid investigation and containment of the outbreak (when the causal organism is identified, the specific disease should be reported)
3. To complement other existing specific disease notification and is especially useful for rapid response to newly emerging and reemerging diseases and the deliberate release of biological agents.

1.4 Advantages of syndromic notification

1. The physician reports what he sees.
2. Stable definitions of clinical syndromes are available.
3. It facilitates timely notification.
4. It enables rapid response to the disease outbreak without being delayed by laboratory confirmation.
5. It fills in gaps in existing surveillance systems e.g. provide reporting of disease outbreaks of unknown origin.

1.5 Criteria for infections that require syndromic notification.

1. High potential for spread and rapid transmission in the community.
2. Unexpectedly high case fatality rates.
3. Newly recognised syndromes.
4. High political or media profile.
5. Potential for imposition of trade and travel restrictions by other countries.
6. Proximity to international borders, airports and ports.
7. Unusual and unexpected events.
8. Occurring in high density and urban areas.
9. Significant possibility of vector and zoonotic transmission.

1.6 Laboratory investigations

1. The attending doctor in the hospital should take the appropriate specimens to establish the aetiological agent causing the syndrome following the protocols in this manual. The nature of the illness will dictate the specimen of choice.

2. When in doubt consult the Infectious Disease (ID) Specialist / Physician / Pathologist (Microbiology) appointed for this purpose in the hospital concerned.

3. Where a field investigation of an outbreak is deemed necessary the Rapid Response Team should follow the protocols in this manual with regards to the appropriate specimens to be collected. If necessary they should consult the ID Specialist / Physician / Pathologist (Microbiology).

4. For further information regarding the collection and transport of specimens contact

   i. For bacteriological and mycological specimens:

Bacteriology Unit, Infectious Diseases Research Centre (IDRC)	03-40402361
National Public Health Laboratory (NPHL)	03-61565109 / 03-61402209
Ipoh Public Health Laboratory (Ipoh PHL)	05-5287833
Johor Bahru Public Health Laboratory (JB PHL)	07-2387179

   ii. For virological specimens:

Virology Unit, IDRC	03-40402346
NPHL	03-61565109 / 03-61402209

   iii. For parasitological specimens:

Parasitology Unit, IDRC	03-40402437

2.0 NOTIFICATION PROCEDURE

1. When a doctor encounters a patient that satisfies the definition of any of the six syndromes in this manual, the doctor should complete the Syndromic Notification Form (*KKM-syndsurv/2003.2*).

2. The completed form should be sent to the nearest District Health Office (DHO) within 24 hours.

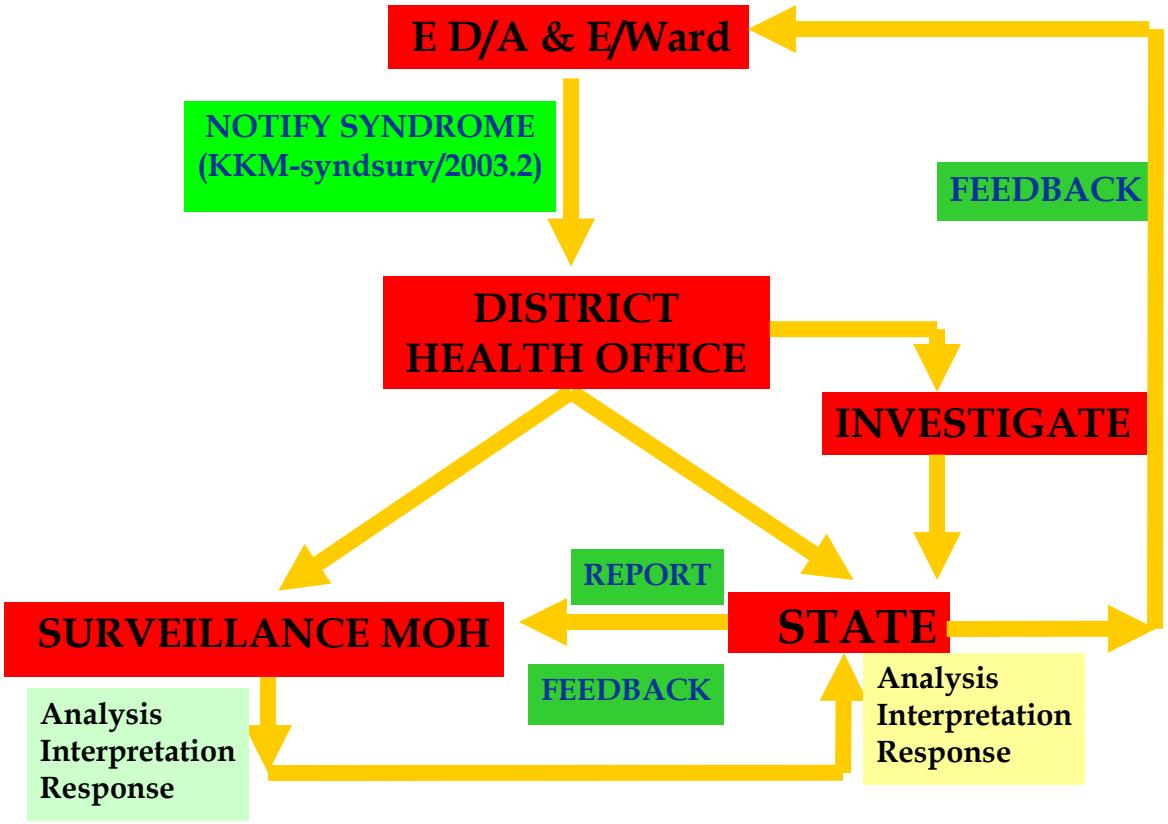
3. DHO then should sent the notification form to
   i. State Health Office
   ii. Surveillance Section of Disease Control Division, Ministry of Health (MOH)
   e-mail: survelan@dph.gov.my
   fax no. : 03-88886271

4. DHO should conduct case investigation. The investigation format as in the appendix 5. Investigation should be done if:

   i. there are two or more cases of similar syndrome and they are epidemiologically link, whether by place of living or working; OR
   ii. the case died or in bad condition and highly suspected of infectious origin; and / or has a direct link with any infectious disease event.

5. In cases where a definitive diagnosis is confirmed (e.g. diagnosis already made by the referring hospital or where rapid confirmatory test is available) the specific disease should be notified under the mandatory notification system if it warranted notification.

2.1 Notification Flow



ED – Emergency Department
E/Ward – Emergency Ward
A & E – Accident & Emergency Department
MOH – Ministry of Health

3.0 SYNDROME DEFINITION

3.1 Acute neurological syndrome

A. Definition:

Acute neurological dysfunction with one or more of the following:

- deterioration of mental function
- stupor/coma
- acute paralysis
- convulsion
- signs of meningeal irritation e.g. neck stiffness, positive Kernig's sign/Brudzinski's sign
- involuntary movements e.g. myoclonus, tremors
- other neurological symptoms e.g. headache, visual disturbances, vomiting

AND

severe illness (see glossary for definition)

AND

absence of predisposing factors (see glossary for definition).

B. Possible diseases / pathogens:

Poliomyelitis, Guillain Barre syndrome, enteroviral meningitis (e.g. EV 71, Echovirus), Dengue, Nipah encephalitis, Japanese encephalitis, West Nile encephalitis, tick-borne virus encephalitis, meningococcal meningitis, mycoplasma, cerebral malaria, toxoplasma encephalitis, rabies, rickettsia, chemical agent / toxin.

C. Specimens required include: faeces, blood / serum, CSF, throat swab

D. Laboratory tests:

1. Faeces : viral culture.
2. Blood /serum - blood film for malaria, blood culture and sensitivity, serology and toxicology studies
3. CSF: microscopic examination, cytology, biochemistry studies, culture and sensitivity, polymerase chain reaction (PCR), antigen detection and serology.
4. Throat swab / washing / gargle : viral culture, bacterial culture and sensitivity.
5. Post-mortem specimen (tissue and body fluids): culture, PCR, antigen detection, serology, HPE.

3.2 Acute respiratory syndrome

A. Definition:

Acute onset of cough or respiratory distress (e.g. tachypnoea, chest recession, dyspnea, cyanosis)

AND

severe illness (see glossary for definition).

AND

absence of known predisposing factors (see glossary for definition).

B. Possible diseases/pathogens:

Respiratory syncytial virus, influenza, parainfluenza, adenovirus, cytomegalovirus, hantavirus pulmonary syndrome, diphtheria, pertussis, streptococcus, mycoplasma, chlamydia, legionella, respiratory anthrax, pneumonic plague, tularemia, chemical agent / toxin, SARS coronavirus, melioidosis, leptospirosis.

C. Specimens required to include:

1. Throat swab / gargle.
2. Nasopharyngeal swab.
3. Sputum.
4. Bronchoalveolar lavage/tracheal aspirate.
5. Pleural fluid.
6. Blood /serum.
7. Urine.

D. Laboratory tests may include:

1. Throat swab/ gargle: microscopy, culture and antigen detection.
2. Nasopharyngeal swab / aspirate: microscopy, culture and antigen detection.
3. Sputum: culture and antigen detection.
4. Bronchoalveolar lavage/ tracheal aspirate: culture and antigen detection.
5. Pleural fluid: culture and antigen detection.
6. Blood / serum: culture & sensitivity / serology and toxicology.
7. Urine: antigen detection (for legionella).

3.3 Acute dermatological syndrome

A. Definition:
Acute febrile illness with rash (rash can be erythematous, macular / papular and vesicular / pustular) **OR** other skin manifestations e.g. pruritus, desquamation, pigmentation
AND
absence of known predisposing factors.

B. Possible diseases / pathogens:
Chickenpox, smallpox,enterovirus HFMD, measles, rubella, herpes simplex virus, monkey pox, chikungunya parvovirus B19, typhus, cutaneous anthrax, chemical agents/ toxin.

C. Specimens required may include:
1. Vesicular fluid
2. Crust / swab at base of ulcer
3. Pus
4. Skin scraping / biopsy
5. Blood / Serum

D. Laboratory tests include:
1. Vesicular fluid: viral culture, antigen detection, electron microscopy.
2. Crust / swab at base of ulcer: microscopic examination , viral and bacterial culture, antigen detection
3. Pus: microscopic examination, bacterial culture and sensitivity, antigen detection
4. Skin scraping / biopsy: microscopic examination, culture, antigen detection, HPE
5. Blood/serum – culture / serology, toxicology study

Note: Photographs of the skin lesion (preferably serial) are very useful and should be taken where possible.

3.4 Acute haemorrhagic syndrome

A. Definition:

Acute onset of fever of less than 3 weeks duration

AND

any two of the following:

- Haemorrhagic or purpuric rash
- Epistaxis
- Haematemesis
- Haemoptysis
- Blood in stool
- Other haemorrhagic symptoms

AND

absence of known predisposing factors

B. Possible diseases / pathogens:

Dengue haemorrhagic fever and shock syndrome, haemorrhagic fever with renal syndrome (Hantavirus), malaria, relapsing fever (Borreliosis), yellow fever, other viral haemorrhagic fevers (Ebola, Marburg, Lassa fever, Rift Valley, Tick-borne flaviviruses etc.)

C. Specimens required include:

Blood, blood smear: thin and thick smear, serum, post-mortem tissue specimens: biopsies of liver and spleen and cerebrospinal fluid.

D. Laboratory tests:

- Blood smear: Thick and thin blood smear for demonstration of parasites
- Blood for viral culture
- Serum: Bacterial and viral antigen detection, antibody levels and viral genome detection.
- Cerebrospinal fluid: viral culture, viral antigen detection, antibody levels and viral genome detection.
- Post-mortem tissue specimens (biopsies of liver and spleen): Antigen detection, genome detection and histopathological examination.

3.5 Acute jaundice syndrome

A. Definition:
Acute onset of jaundice **AND** severe illness **AND** absence of known predisposing factors e.g. drugs

B. Possible diseases / pathogens:
Hepatitis A-E, malaria, yellow fever, leptospirosis and other spirochaetal diseases.

C. Specimens required include:
Serum, blood smear, blood culture, urine, post-mortem liver biopsy.

D. Laboratory tests:
1. Serum: antigen detection, antibody levels, serotyping, genome detection.
2. Blood smear: thick and thin smear for demonstration of parasites.
3. Blood culture: leptospiral and virus isolation and identification
4. Urine: leptospiral antigen detection
5. Post-mortem liver biopsy: culture, antigen detection, HPE, genome analysis.

3.6 Acute diarrhoeal syndrome

A. Definition:
Acute onset of diarrhoea **AND** severe illness **AND** absence of known predisposing factors e.g. drugs

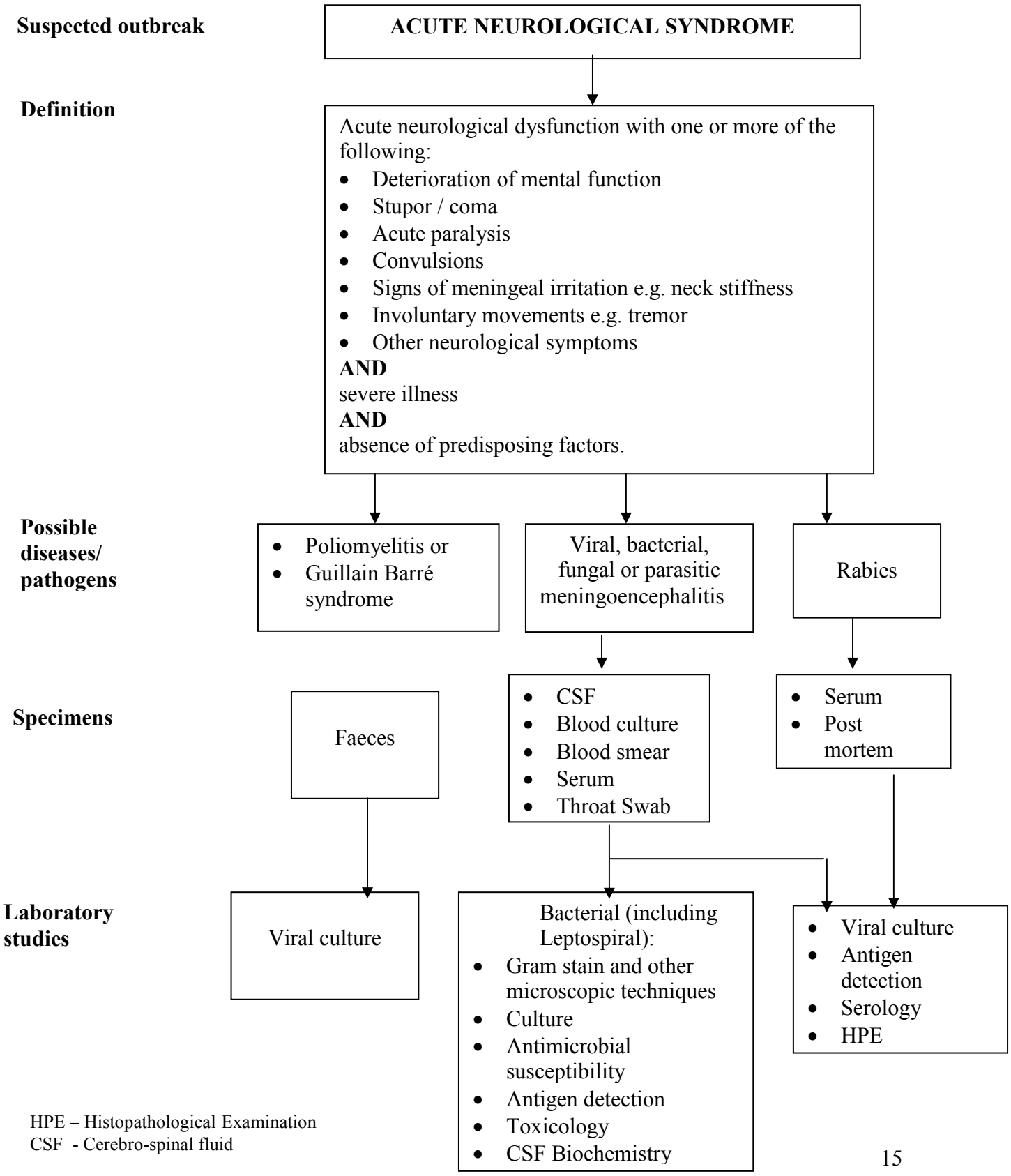
B. Possible diseases / pathogens:
Patient can present with watery diarrhoea or dysentery. The possible causes of watery diarrhoea are viral-gastroenteritis, cholera, enterotoxigenic *E. coli*, giardiasis and *Cyptosporidium*

The possible causes of dysentery are shigellosis, salmonellosis, campylobacteriosis, amoebic dysentery, enterohaemorrhagic E. coli, Clostridium difficile, Ebola and other haemorrhagic fevers

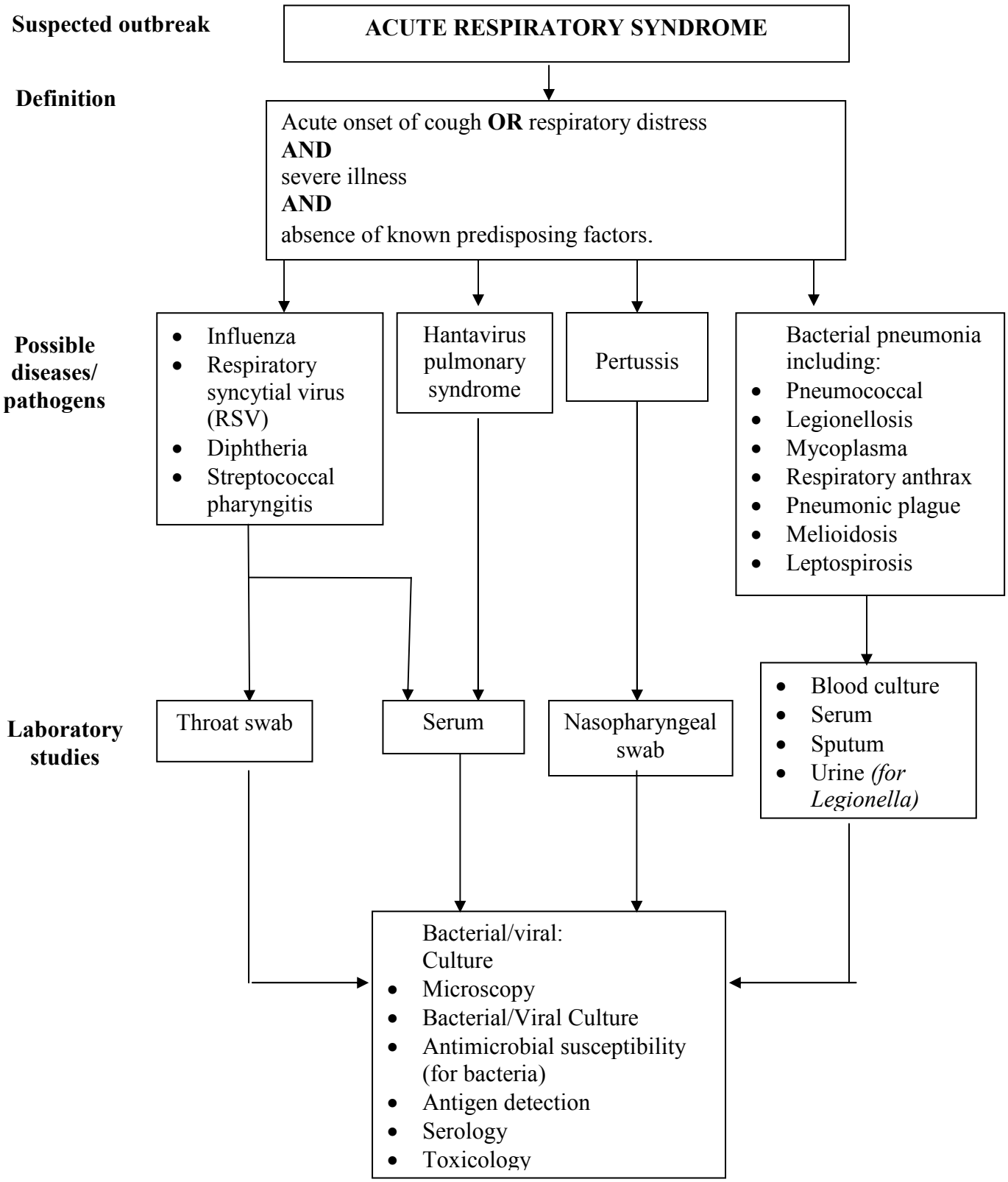
C. Specimens required include: Faeces

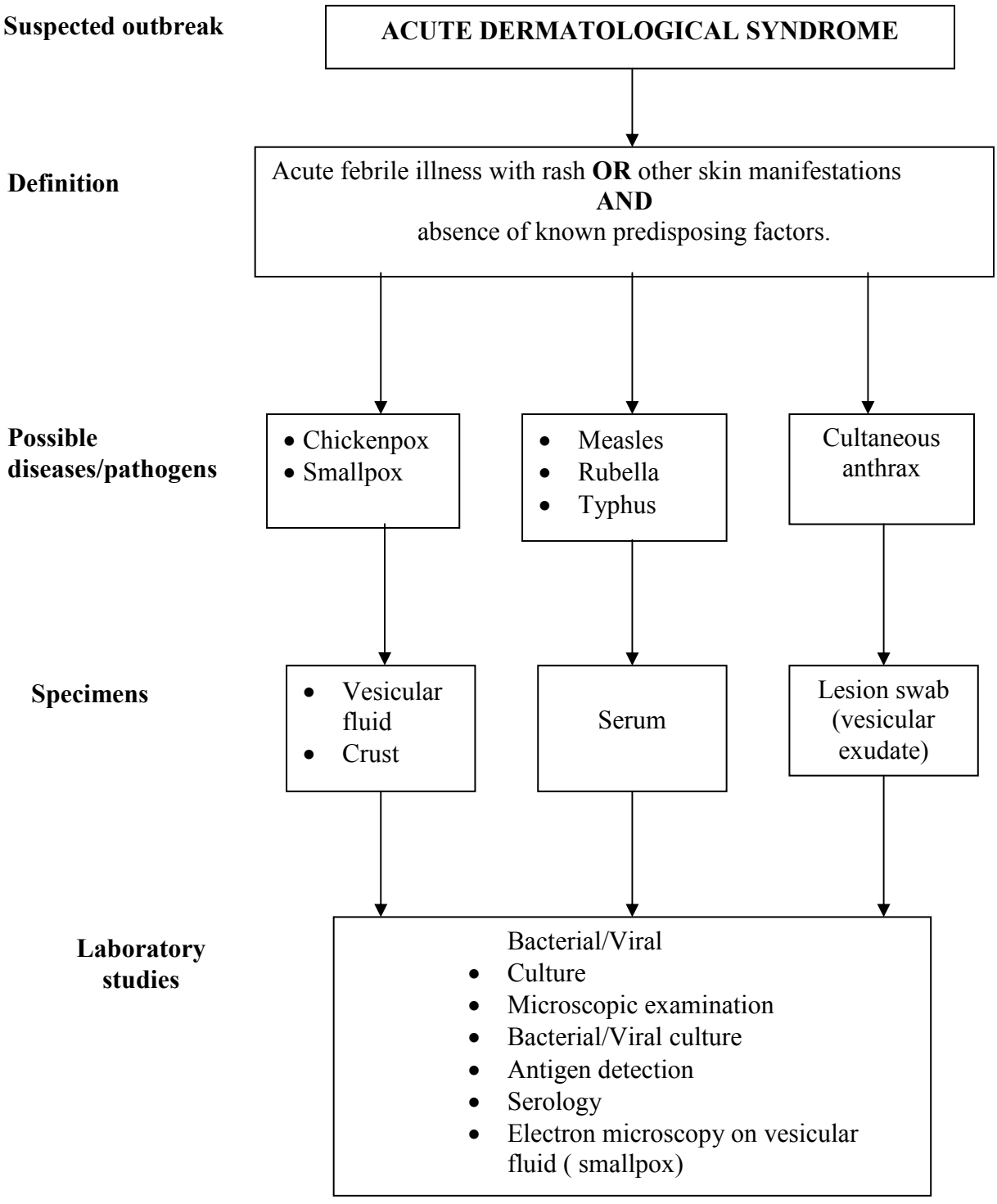
D. Laboratory tests:
1. Macro- and micro-scopic examination for parasites
2. Faecal leukocytes count, culture and antimicrobial, susceptibility test for bacteria. Proceed to serotyping whenever applicable.
3. Toxin detection in faeces for certain bacteria e.g. *Bacillus cereus.*
4. Antigen detection and culture for virus; and proceed to genome identification.

4.0 ALGORITHM FOR SYNDROMIC APPROACH



HPE – Histopathological Examination
CSF - Cerebro-spinal fluid


Suspected outbreak
ACUTE RESPIRATORY SYNDROME
Definition
Acute onset of cough OR respiratory distress
AND
severe illness
AND
absence of known predisposing factors.
Possible diseases/ pathogens
Influenza
Respiratory syncytial virus (RSV)
Diphtheria
Streptococcal pharyngitis
Hantavirus pulmonary syndrome
Pertussis
Bacterial pneumonia including:
Pneumococcal
Legionellosis
Mycoplasma
Respiratory anthrax
Pneumonic plague
Melioidosis
Leptospirosis
Laboratory studies
Throat swab
Serum
Nasopharyngeal swab
Blood culture
Serum
Sputum
Urine (for Legionella)
Bacterial/viral:
Culture
Microscopy
Bacterial/Viral Culture
Antimicrobial susceptibility (for bacteria)
Antigen detection
Serology
Toxicology


Suspected outbreak
ACUTE DERMATOLOGICAL SYNDROME
Definition
Acute febrile illness with rash OR other skin manifestations
AND
absence of known predisposing factors.
Possible diseases/pathogens
Chickenpox
Smallpox
Measles
Rubella
Typhus
Cultaneous anthrax
Specimens
Vesicular fluid
Crust
Serum
Lesion swab (vesicular exudate)
Laboratory studies
Bacterial/Viral
Culture
Microscopic examination
Bacterial/Viral culture
Antigen detection
Serology
Electron microscopy on vesicular fluid (smallpox)

Suspected outbreak

ACUTE HAEMORRHAGIC FEVER SYNDROME

Definition

Acute onset of fever of less than 3 weeks duration
AND
any two of the following:

- Haemorrhagic or purpuric rash
- Epistaxis
- Haematemesis
- Haemoptysis
- Blood in stool
- Other haemorrhagic symptom

AND
absence of known predisposing factors

Possible diseases/pathogens

- Dengue haemorrhagic fever and shock syndrome
- Haemorrhagic fever with renal syndrome (Hantavirus)
- Malaria
- Relapsing fever (Borreliosis)
- Yellow fever
- Other viral haemorrhagic fevers (Ebola, Marburg, Lassa fever, Rift valley, Tick-borne flaviviruses etc.)

Specimens

- Blood
- Blood smear: Thin and thick smear
- Serum
- Post-mortem tissue specimens:
  -Biopsies of liver and spleen
  -Cerebrospinal fluid

Laboratory studies

Parasitic:

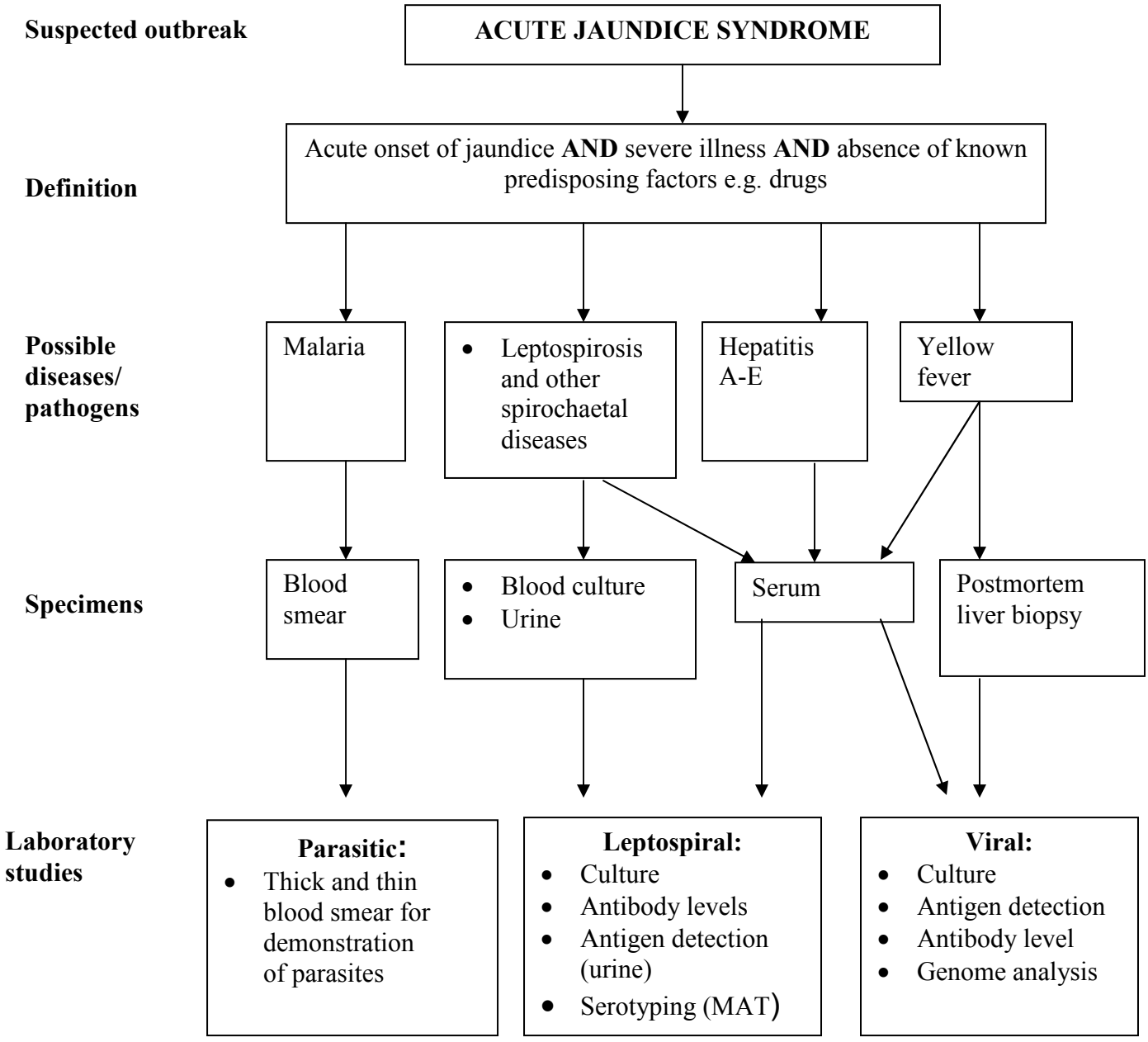
- Thick and thin blood smear for demonstration of parasites

Bacterial:

- Antigen detection
- Antibody levels

Viral:

- Culture
- Antigen detection
- Antibody levels
- Genome detection


Suspected outbreak
ACUTE JAUNDICE SYNDROME
Definition
Acute onset of jaundice AND severe illness AND absence of known predisposing factors e.g. drugs
Possible diseases/ pathogens
Malaria
Leptospirosis and other spirochaetal diseases
Hepatitis A-E
Yellow fever
Specimens
Blood smear
Blood culture
Urine
Serum
Postmortem liver biopsy
Laboratory studies
Parasitic:
Thick and thin blood smear for demonstration of parasites
Leptospiral:
Culture
Antibody levels
Antigen detection (urine)
Serotyping (MAT)
Viral:
Culture
Antigen detection
Antibody level
Genome analysis

Suspected outbreak

ACUTE DIARHOEAL SYNDROME

Definition

Acute onset of diarrhoea
AND
severe illness
AND
absence of known predisposing factors

Possible diseases/pathogens

Watery
- Viral-gastroenteritis
- Cholera
- Enterotoxigenic *E. coli*
- Giardiasis
- *Cyptosporidium*

Dysentry
- Shigellosis
- Salmonellosis
- Campylobactreriosis
- Amoebic dysentery
- Enterohaemorrhagic *E. coli*
- *Clostridium difficile*
- Ebola and other haemorrhagis fevers.

Specimens

Faeces

Laboratory studies

Parasitic:
Macro- and micro-scopic examination

Bacterial:
- Faecal leukocytes
- Culture
- Antimicrobial; susceptibility
- Serotyping
- Toxin

Viral:
- Culture
- Antigen detection
- Genome detection

Note: Ebola and other haemorrhagic fever may initially present as bloody diarrhoea. If such an aetiology is suspected, refer to "Acute Haemorrhagic Fever Syndrome" for appropriate specimen collection guidelines.

5.0 COLLECTION AND HANDLING PROTOCOL FOR SPECIFIC SPECIMENS

5.1 CEREBROSPINAL FLUID (CSF) SPECIMEN COLLECTION

The specimen must be taken by a medical doctor experienced in the procedure. CSF is used in the diagnosis of viral, bacterial, parasitic and fungal meningitis/encephalitis.

Materials for collection

Standard lumbar puncture tray is needed.

Method of collection

As only experienced personnel should be involved in the collection of CSF samples, the method is not described in this document. CSF is collected directly into separate screw-cap tubes. If the samples cannot be promptly transported, separate tubes should be collected for bacterial and viral processing (refer summary table).

Handling and transport

In general, specimens should be delivered to the laboratory and processed as soon as possible.

- CSF specimens for bacteriology are transported at ambient temperature, generally without transport medium. They must never be refrigerated as many of the relevant pathogens do not survive well at low temperatures**.**
- CSF specimens for virology do not need transport medium. They may be transported at 4 to 8 ^{o}C for up to 48 hours or at –70 ^{o}C / dry ice for longer periods.

5.2 RESPIRATORY TRACT SPECIMEN COLLECTION

Specimens are collected from the upper or lower respiratory tract, depending on the site of infection. Upper respiratory tract pathogens (viral and bacterial) are found in throat and nasopharyngeal secretions. Lower respiratory tract pathogens are found in sputum specimens. For organisms such as *Legionella*, culture is difficult, and diagnosis is best based on the detection of antigen excreted in the urine.

In patients with stridor or when acute epiglottitis is suspected, no attempt should be made to take throat or pharyngeal specimens and neck X rays, since these procedures may precipitate respiratory obstruction. However the aetiological agent may be isolated from blood culture

5.2.1 Protection for Health Care Workers

When taking respiratory specimen, HCW should exercise droplet and contact precaution. HCW should wear a surgical or N95 mask as appropriate. If the procedure involves a high risk of splashing of contamination by the clinical specimens, the HCW should wear appropriate eye protection.

Materials for collection

- Transport media – bacterial and viral
- Cotton swabs
- Tongue depressor
- Flexible wire calcium alginate tipped swab (for suspected pertussis)
- Nasal speculum (for suspected pertussis – not essential)
- Suction apparatus or 20-50 ml syringe
- Sterile screw-cap tubes, and wide-mouthed clean sterile jars (minimum volume 25 ml).

5.2.2 Upper respiratory tract specimens

Method of collecting a throat swab

1. Hold the tongue down with the depressor. Use a strong light source to locate areas of inflammation and exudate in the posterior pharynx and the tonsillar region of the throat behind the uvula.

2. Rub the area back and forth with a cotton swab. Withdraw the swab without touching cheeks, teeth or gums and insert into a screw-cap tube containing transport medium.

3. Break off the top part of the stick without touching the tube and tighten the screw cap firmly.

4. Label the specimen containers.

5. Complete the laboratory request form.

Method of collecting pernasal and post-nasal swabs (for suspected pertussis)

1. Seat the patient comfortably, tilt the head back and insert the nasal speculum.

2. Insert a flexible calcium alginate swab through the speculum parallel to the floor of nose without pointing upwards. Alternately, bend the wire and insert it into the throat and move the swab upwards into the nasopharyngeal space.

3. Rotate the swab on the nasopharyngeal membrane a few times, remove it carefully and insert it into a screw-cap tube containing transport medium.

4. Label the specimen tube.

5.2.3 Lower respiratory tract specimens

Method of collecting sputum

1. Instruct patient to take a deep breath and cough up sputum directly into a wide-mouthed sterile container. Avoid saliva or post-nasal discharge. Minimum volume should be about 1 ml.

2. If no sputum, induce cough by hypertonic saline nebulisation.

3. Label the specimen containers.

4. Complete the laboratory request form.

5.2.4 Bronchoalveolar / tracheal lavage

Method is not documented here as these procedures are only performed by experienced personnel.

Handling and transport

- All respiratory specimens except sputum are transported in appropriate bacterial / viral media.
- Transport as quickly as possible to the laboratory to reduce overgrowth by commensal oral flora.
- For transit periods up to 24 hours, transport bacterial specimens at ambient temperature and viruses at 4 to 8 °C in appropriate media.

5.3 COLLECTING SPECIMENS OF SKIN LESIONS

For most dermatological conditions, diagnosis may be established on the basis of clinical history and physical examination. Important characteristics to be noted on physical examination include the nature of the skin lesions (erythematous, macular, papular, maculopapular, vesicular, bullous, petechial, purpuric, etc.) and the anatomic distribution of spread (central, peripheral, diffuse, etc.).

In cases of indeterminate diagnoses, unusual presentations, and some rare conditions, collection of specimens from rashes and/or skin lesions may be necessary. In the case of vesicular rashes, specimens for microscopy and culture are taken directly from vesicles. In other exanthemata (macular and/or papular), the diagnosis may be more readily established from alternative specimens (e.g. blood cultures, serology). In suspected cutaneous anthrax or bubonic plague, specimens from the skin lesions (eschars and buboes respectively) and blood cultures should be taken.

Materials for collection

- Sterile saline
- Sterile swabs and appropriate transport media
- Sterile screw-cap vials
- Sterile lancets or needles (for piercing of vesicles)
- Syringe with wide-bore needle (for aspiration of abscesses/buboes)
- Wide-mouthed screw-cap containers (for biopsy specimens)
- Glass slides and slide boxes.

Method of collection

Vesicular or vesiculo-pustular rash (for diagnosis of viral infections)

1. Pierce roof of fluid-containing vesicle with sterile lancet.

2. Swab fluid with sterile swab. Try to get a good amount of fluid onto the swab.

3. Take a clean labeled microscope slide and make a smear with the swab in the central area of the slide of approximately the size of a 5 sen coin.. Make 2 slides if possible. The slides should be left to dry in air.

4. Place swab directly into virus transport medium.

5. Label the bottles or tubes containing swabs in transport media.

6. When glass slides have dried, place carefully into a plastic slide box.

7. Do not refrigerate or freeze the slides during storage or transport. Keep in the closed container at room temperature.

Crusting stage

1. Gently ease off crust with a lancet, scalpel or a pair of disposable forceps.

2. Take 5-10 crusts; place them in a plastic screw-cap vial. Make sure the lid is tightly closed.

3. Label the specimen containers.

4. Discard forceps, lancets, and scalpels into sharps disposal container. Do not re-use forceps on specimens from another patient.

NOTE: If cutaneous anthrax is suspected, the vesicular fluid under the eschar is a better diagnostic specimen than a piece of the crust.

Aspiration of abscesses

- Disinfect the skin overlying the abscess / bubo with 70% isopropyl alcohol.
- Aspirate the fluid from the abscess with a sterile needle and syringe.
- Transfer the aspirate aseptically into a sterile tube.

Skin biopsy

Skin biopsies are generally not appropriate specimens for field outbreak investigations. When necessary, skin biopsy should be done by trained personnel.

Handling and transport

Specimens for bacteriological analysis should be transported in Stuart's or Amies transport medium. Swabs for suspected viral pathogens should be transported in virus transport medium. Other specimens should be handled as described in the relevant section.

If processing takes longer than 2 hours, bacteriology specimens can be maintained at ambient temperature for 24 hours. Specimens for virus isolation may be refrigerated at 4 to 8°C, and transported to the laboratory as rapidly as possible. In some instances, the outbreak investigation team may bring liquid nitrogen or carbon dioxide ice for specimen preservation.

5.4 BLOOD SPECIMEN COLLECTION

- Blood can be used for isolation of pathogens when inoculated into culture medium or separated into serum for the detection of genetic material (e.g. using PCR), specific antibodies, antigens, toxins (e.g. by ELISA).
- Blood specimens for culture should be taken before antimicrobial agents are administered to the patient.
- Serum is preferable to whole blood for diagnosis of viral infections. However for molecular diagnosis, blood collected in an EDTA bottle may be required while clotted blood may be needed for viral haemorrhagic fever diagnosis.
- When specific antibodies are being assayed, it is often helpful to collect paired sera, i.e. an acute sample at the onset of illness and a convalescent sample, one to four weeks later.

- Blood can also be collected by finger prick for the preparation of slides for microscopy or for absorption onto special filter paper discs for analysis.

5.4.1 Venous blood sample

Containers

1) Blood culture bottles
2) EDTA bottle

Method of collection

1) If withdrawing with conventional disposable syringes, withdraw whole blood
   - 5-10 ml from adults
   - 2-5 ml from children
   - 0.5 – 2 ml from infants
2) If withdrawing with vacuum systems, withdraw the desired amount of blood directly into each EDTA and culture bottle.
3) Using aseptic technique, transfer the specimen to the relevant containers. Secure cap tightly.

Handling and transport

- Blood culture bottles and blood collected in EDTA tubes should be transported upright and secured in a screw cap container or in a rack in a transport box.
- Cushion or suspend bottles during transport over rough terrain to prevent lysis of red cells. They should have enough absorbent paper around them to soak up all the liquid in case of a spill.
- If the specimen reaches the laboratory within 24 hours, most bacterial pathogens can be recovered from blood cultures transported at ambient temperature.

5.4.2 Serum

Materials

1) Sterile disposable transfer pipettes
2) Sterile screw-cap 5 ml tubes – 2 per sample

Method of separation of serum from blood

1) Draw 10 ml of venous blood and transfer to a screw cap tube without anti-coagulant. Alternatively, blood may collected directly into a proprietary collection and transport tube (e.g., vacutainer, etc.)
2) Let the specimen clot for 30 minutes at ambient temperature, then place in a cool box to retract at 4 to 8 ^{o}C for a minimum of 1-2 hours (it may be stored at this

temperature for 48-72 hours). If a centrifuge is not available, allow 4-6 hours for clot retraction to occur.

3) Separate the serum aseptically from the clot using the sterile disposable transfer pipette. Carefully remove the clear yellow serum whilst taking care to keep the tip as far as possible from the clot. Avoid agitating the blood tube during the removal process. Transfer equally to 2 plastic screw cap tubes. Secure the caps tightly.

4) If a centrifuge is available, spin the specimen at low speed (1000g for 10 minutes) to remove residual blood cells. If viral haemorrhagic fever is strongly suspected, samples should only be processed in properly equipped, specialized laboratories. Discuss with the laboratory whether a separation gel tube would be acceptable and whether clotted blood is required.

Handling and transport

- If serum will be required for testing, separation from blood should take place as soon as possible, preferably within 24 hours at ambient temperature.
- If a specimen will not reach a laboratory for processing within 24 hours, serum should, if at all possible, be separated from blood prior to transportation.
- Serum may be stored at 4 to 8 ^{o}C for up to 10 days.
- If testing is delayed for a longer period, serum samples should be frozen at –20^{o}C.
- If separation on site is not possible, or is inadvisable for safety reasons, the blood sample should be stored at 4 to 8 ^{o}C and be sent to a nearest center as soon as possible. Protect such unseparated samples from excessive vibration while transporting. **WHOLE BLOOD SAMPLES SHOULD NOT BE FROZEN.**

5.4.3 Capillary blood sample

Materials for collection

1) Disposable sterile lancets
2) Glass slides, cover slips and slide box
3) Filter paper
4) Fixatives such as methanol

Method of collection

1) Disinfect finger or thumb for adults, thumb for children, or side of heel for infants by swabbing with 70 % isopropyl alcohol and prick with a sterile lancet. Wipe away the first drop of blood.

2) Discard used lancets directly into the sharps disposal containers.
3) Collect blood directly onto labeled glass slides and/or filter paper.

Method of preparation of blood films

Blood films should be made by trained personnel. If this is not possible, they can be spread from heparinised or EDTA blood specimens sent to the laboratory.

Thick films for microscopy

1. Label the slide with patient identification number and name.

2. Disinfect and prick site with lancet as described above.

3. Touch one or more large drops of blood onto the center of the slide making sure that the slide does not touch the skin.

4. Spread the blood in a circle about 1 cm in diameter using the corner of another glass slide.

5. Air dry the film in a horizontal position. Do not dry the film by heating over a flame or other heat source.

Thin films for microscopy

1. Label the slide with patient identification number and name.

2. Touch another drop of blood to the glass slide about 2 cm from one end making sure that the slide does not touch the skin.

3. Place the slide horizontally on a flat surface.

4. Hold the side of a second clean glass slide (the spreader) on to the center of the specimen slide and move it back until it touches the drop and the blood spreads along its base.

5. At an angle of about 45°, move the spreader firmly and steadily across the specimen slide and air dry the film quickly. Do not dry over a flame or other heat source.

6. Fix the dried film by dipping the glass slide in methanol or other fixative for a few seconds and air dry.

Handling and transport

- Air dried and/or fixed films are transported at ambient temperature preferably within 24 hours of specimen collection. They must not be refrigerated. Thick and thin films are usually kept in separate slide boxes.

5.5 FAECAL SPECIMEN COLLECTION

- Stool specimens are most useful for microbiological diagnosis if collected soon after diarrhoea (for viruses < 48 hours, for bacteria < 4 days), and preferably before the initiation of antimicrobial agent therapy.
- If required, two or three specimens may be collected on separate days. Stool is the preferred specimen for culture of bacterial, viral and parasitic diarrhoeal pathogens.
- Rectal swabs showing faeces may also be used from infants. In general, rectal swabs are not recommended for the diagnosis of viruses.

Materials for collection

1) Clean, dry leak-proof screw cap containers and tape.

2) Appropriate bacterial transport media for transport of rectal swab from infants.

3) Parasitology transport pack: 10 % formalin in water, polyvinyl isopropyl alcohol (PVA)

Method of stool collection

1. Collect freshly passed stool, 5 ml liquid (a teaspoonful) or 5 gm solid (peanut sized), in a container.

2. Label the container.

Method of rectal swab collection from infants

1) Moisten a swab in sterile saline.

2) Insert the swab tip just pass the anal sphincter and rotate gently.

3) Withdraw the swab and examine to ensure that the cotton tip is stained with faeces.

4) Place the swab in a sterile tube/container with the appropriate bacterial and/or viral transport medium.

5) Break off the top part of the stick without touching the tube and tighten the screw cap firmly.

6) Label the specimen tube.

Handling and transport

- Stool specimens should be transported at 4 to 8 ^{o} C. Bacterial yields may fall significantly if specimens are not processed within 1 to 2 days of collection. *Shigella* are particularly sensitive to elevated temperatures.
- Specimens to be examined for parasites should be mixed with 10% formalin or PVA, 3 parts stool to 1 part preservative. Transport at ambient temperature in containers and sealed in plastic bags.

5.6 URINE SPECIMEN COLLECTION

Materials for collection

1) Sterile plastic cup with lid (50 ml or more)
2) Clean, screw-top specimen transport containers ("universal" containers are often used)
3) Gauze pads.
4) Soap and clean water (or normal saline) if possible.

Method of collection

1) To reduce the contamination, it may be necessary to wash the external genitalia with soap and clear water. If soap and clean water are not available, the area may be rinsed with normal saline. Dry the area thoroughly with gauze pads before collecting the urine.

2) Give the patient clear instructions to pass urine for a few seconds, and then to hold the cup in the urine stream for a few seconds to catch a mid-stream urine sample. This should decrease the risk of contamination from organisms present in the urethra.

3) To decrease the risk of contamination from skin organisms, the patient should be directed to avoid touching the inside or rim of the plastic cup with the skin of the hands, legs or external genitalia. Tighten the cap firmly when finished.

4) Urine collection bags may be necessary for infants. For boys, clean-catch specimens may be also collected. If used, transfer urine from the urine bag to

specimen containers as soon as possible to prevent contamination with skin bacteria. Use a disposable transfer pipette to transfer the urine.

5) Label the specimen container.

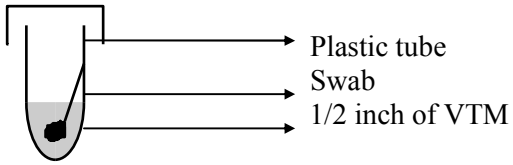
Handling and transport

- Transport to the laboratory within 2 to 3 hours of collection. If this is not possible do not freeze but keep the specimen refrigerated at 4 to 8 ^{o} C. Keeping the specimen refrigerated will decrease the risk of contaminating organisms.
- Ensure that the containers are leak-proof and tightly sealed.

6.0 PROTOCOL FOR COLLECTION, STORAGE, PACKAGE AND DISPATCH OF SPECIMENS WITH SUSPECTED UNKNOWN VIRUS INFECTION

Samples required

- Blood in EDTA (5 mls) (paired samples)	- Plain sterile plastic tube - Do not add VTM, Do not freeze, keep at 4^0C
- Throat swab (from tonsillar area) - Vesicle swab*	place in sterile plastic tube containing **1/2 inch of VTM** (viral transport medium) [refer to figure below]
- Stool (at least 10 gm) OR	- place in sterile container **} Do not add VTM Do not freeze, keep at 4^0C**
Rectal swab (must see stool on swab)	- place in sterile plastic tube containing **1/2 inch of VTM**



- CSF (at least 1ml)*- plain sterile plastic tube

*when clinically indicated

Sample required from patients with lung involvement:

Broncho-Alvedar Lavage (BAL) / Tracheal aspirate
- place in sterile plastic tube container (keep cold in ice and ship as soon as possible)

Samples required from fatal cases:

Collect all specimens mentioned above, in addition collect:

Cardiac tissue
Liver tissue
Lung tissue
Brain stem tissue

→ place in sterile plastic tube container (keep cold and ship as soon as possible)

All samples must be sent in ice. Please provide full clinical details including name of the doctor filling the form and patient's I/C in **IMR 135 or hospital form of Pathology Request Form.**

SAMPLES AND FORM TO BE SENT TO:

Bahagian Virologi (Makmal Virus Kultur)
Institut Penyelidikan Perubatan
Jalan Pahang, 50588 Kuala Lumpur
Tel: 03-40402345 / 346 / 347
Fax: 03-26936323

OR

National Public Health Laboratory
Sungai Buloh, Selangor.
Tel: 03-61565109 / 61402209 / 61402213
Fax: 03-61402249

6.1 PACKING FOR SAMPLES FROM PATIENTS WITH SUSPECTED EXOTIC VIRUS INFECTION

Containers and packing:

Samples should be packaged in three layers (see to diagram**):**

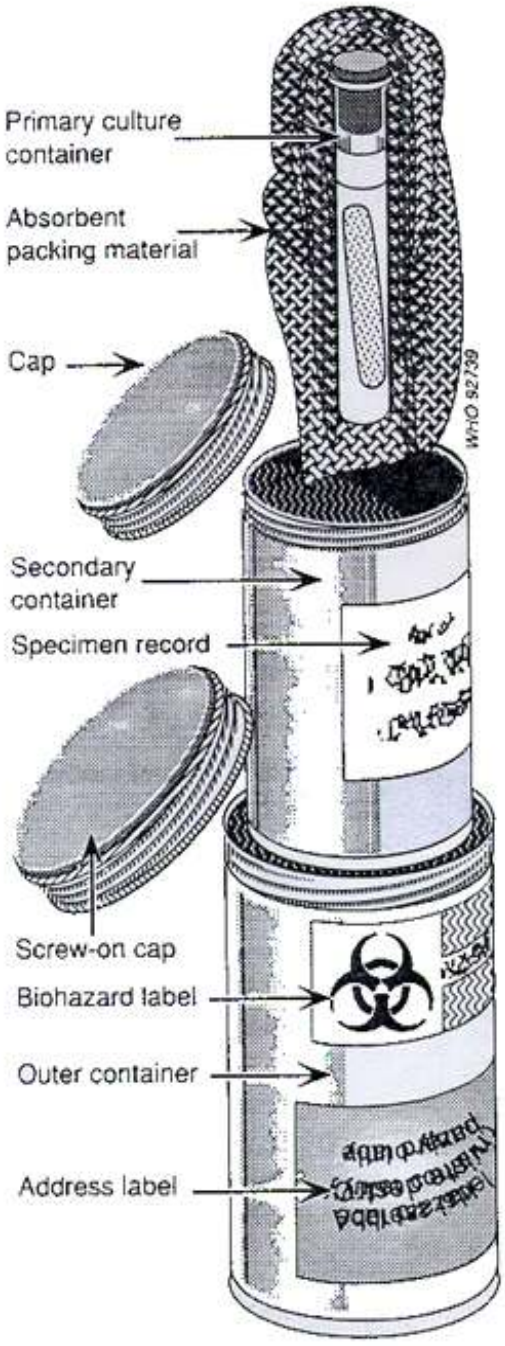
(1) a primary watertight non breakable container containing the sample
- it must be firmly capped and the cap should then be sealed with parafilm, adhesive cloth or zinc oxide tape (not cellulose tape)
- the container must then be cocooned in absorbent material
- several primary containers may be packed in one secondary container

(2) a secondary watertight non breakable container enclosing enough absorptive material between it and the primary container to absorb all of the fluid in the specimen in case of leakage
- it must be firmly capped and sealed in the same way as the primary container
- the secondary container must then be packed firmly with absorbent material into the outer container
- several secondary containers may be packed in one outer container

(3) an outer container which is intended to protect the secondary package from outside influence, such as physical damage and water, during transportation
- absorbent, shockproof packing between the secondary and outer containers
- the lid is again sealed with tape

PACKING INFECTIOUS SUBSTANCES FOR THE POST

Figure 1: Packing infectious substance for the post



APPENDIX 1

SUMMARY FOR COLLECTING AND HANDLING SPECIMENS

SPECIMEN	CONTAINER	AMOUNT	STORAGE & TRANSPORT	PRECAUTION
CSF	Plain sterile bottle	Minimum – 0.5 ml each in 3 different bottles	Transport in sealed container as soon as possible (ASAP) **Virus** – 4 to 8 ^{0}C If >48 hr, -70 ^{0}C. **Bacteria/fungus** – Ambient temperature. If >24 hr, keep at 37 ^{0}C (incubator). **Parasite**- Ambient temperature. If >24 hrs, keep in polyvinyl alcohol preservative **Biochemical examination –** Ambient temperature	For bacterial culture - Do not refrigerate CSF sample
Throat swab	Cotton bud in transport medium. Virus- VTM Bacteria- Stuart/Amies	Swab must be fully immerse in the transport medium	Transport in sealed container as soon as possible (ASAP) **Virus** - 4 to 8 ^{0}C **Bacteria** - Ambient temperature	Patient with stridor or suspect acute epiglotitis - do not do throat swab

SPECIMEN	CONTAINER	AMOUNT	STORAGE & TRANSPORT	PRECAUTION
Pernasal / nasopharyngeal swab	Cotton bud in transport medium. Calcium alginate swab in transport medium (for pertussis).	Swab must be fully immerse in the transport medium	**Virus** - 4 to 8 ^{0}C **Bacteria** - Ambient temperature	
Nasopharyngeal aspirate	Plain sterile bottle	Sufficient amount depending on number of tests requested	**Virus** - 4 to 8 ^{0}C **Bacteria** – Ambient temperature. If >24 hrs - 4 to 8 ^{0}C	
Throat gargle	Plain sterile bottle	Sufficient amount depending on number of tests requested	**Virus** - 4 to 8 ^{0}C **Bacteria** – Ambient temperature If >24 hrs - 4 to 8 ^{0}C	
Sputum	Plain sterile container	Sufficient amount depending on number of tests requested	Transport in sealed container as soon as possible (ASAP) **Virus** - 4 to 8 ^{0}C **Bacteria** – Ambient temperature If >24 hrs - 4 to 8 ^{0}C	

SPECIMEN	CONTAINER	AMOUNT	STORAGE & TRANSPORT	PRECAUTION
Bronchial – aveolar lavage (BAL)	Plain sterile bottle	Sufficient amount depending on number of tests requested	**Virus** - 4 to 8 ^{0}C **Bacteria** – Ambient temperature If >24 hrs - 4 to 8 ^{0}C	
Tracheal aspirate	Plain sterile bottle	Sufficient amount depending on number of tests requested	**Virus** - 4 to 8 ^{0}C **Bacteria** - Ambient temperature If >24 hrs - 4 to 8 ^{0}C	
Pleural fluid	Plain sterile bottle	Sufficient amount depending on number of tests requested	**Virus** - 4 to 8 ^{0}C **Bacteria** - Ambient temperature If >24 hrs - 4 to 8 ^{0}C	
Vesicle fluid	Cotton swab - VTM for viral culture	Swab must be fully immerse in the transport medium	**Virus** - 4 to 8 ^{0}C	
Crust / swab base of eschar	Virus – in VTM Bacteria- in Stuart/Amies transport medium	Swab must be fully immerse in the transport medium	**Virus** - 4 to 8 ^{0}C **Bacteria** – Ambient temperature	

SPECIMEN	CONTAINER	AMOUNT	STORAGE & TRANSPORT	PRECAUTION
Abscess: - Needle aspirate - Drained abscess - Swab	Sterile leak-proof container Swab in Amies transport media		Transport ASAP at ambient temperature If more than 24 hrs, refrigerated at 4 to 8 ^{0}C	
Skin scraping/ biopsy	For culture - sterile leak-proof container HPE- 10% Formalin		**Virus** - 4 to 8 ^{0}C **Bacteria** – Ambient temperature. If >24 hr, store in refrigerator (4 to 8 ^{0}C) Skin scraping : Transport to the laboratory in a cardboard mailer.	
Whole blood	Blood culture bottle Blood collected in EDTA bottle	5 to 10 ml from adults 2 to 5 ml from children 0.5 to 2 ml from infants Do not exceed the specimen level mark on the container	Transport upright in a rack in a transport box. Ambient temperature if able to reach the lab within 24 hours. 4 to 8 ^{o}C. DO NOT FREEZE	
Blood smear	2 clean glass slides	Thick and thin blood smear	Transport in plastic slide box	

SPECIMEN	CONTAINER	AMOUNT	STORAGE & TRANSPORT	PRECAUTION
Serum	Sterile screw-cap 5 ml tubes	Adults : 5 to 10 ml Children : 3 to 5 ml Infant : 1 to 2 ml	4 to 8 ^{o}C for up to 10 days –20 ^{o}C up to 2 years - 70 ^{o}C for more than 2 years	
Faeces	Clean, dry leak-proof screw cap containers Appropriate bacteriology transport media Virus transport media Parasitology transport pack: 10 % formalin in water, polyvinyl isopropyl alcohol (PVA)	 5 ml liquid (a teaspoonful) or 5 g solid (peanut sized) 5 to 10 ml	at 4 to 8 ^{o}C 3 part stool to 1 part preservative. Transport at ambient temperature in containers sealed in plastic bags.	For bacterial isolation, need to process within 1 to 2 days of collection
Urine	Sterile plastic cup with lid (50 ml or more) Clean, screw-top specimen transport containers		Transport to the laboratory within 2 to 3 hours of collection or store. at 4 to 8 ^{o}C	

APPENDIX 2

DIRECTORY OF LABORATORY SERVICES

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Acute haemorrhagic syndrome	Microscopic examination	Blood smear: Thick and thin	State hospitals and district hospital with microbiologists.
	Virus isolation	Blood, CSF	IMR (Virology Division)
	Bacterial and viral antigen detection	Serum, tissue, CSF	State hospitals and district hospital with microbiologists.
	Viral genome detection	Serum, tissue, CSF	IMR (Virology Division), NPHL.
	Antibody levels	Serum, CSF	State hospitals
Acute jaundice syndrome	Antigen detection, antibody levels,	Serum, tissue	State hospitals
	Microscopic examination	Blood smear: Thick and thin smear	State hospitals and district hospital with microbiologists.
	Bacterial isolation	Blood, tissue	State hospitals
	Viral isolation	Blood, tissue	IMR (Virology Division) NPHL
	Virus serotyping, genome detection	Serum, tissue	IMR (Virology Division)
Acute neurological syndrome	Bacterial isolation, identification and susceptibility testing	Throat swab/washing/gargle, tissue and other body fluids	State hospitals and district hospital with microbiologists and Public Health Laboratories

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Acute neurological syndrome	Virus isolation	Faeces, throat swab / washing / gargle, tissue and other body fluids	IMR (Virology Division) NPHL
	Serology	Serum	State hospitals and district hospital with microbiologists, IMR (Virology division).
Acute respiratory syndrome	Bacterial isolation, identification and susceptibility testing	Blood culture, throat swab/ gargle, sputum, nasopharyngeal swab / aspirate, bronchoalveolar lavage / tracheal aspirate, pleural fluid	State hospitals and district hospital with microbiologists.
Acute respiratory syndrome	Virus isolation, antigen testing	Throat swab / gargle, nasopharyngeal swab / aspirate, bronchoalveolar lavage / tracheal aspirate, pleural fluid	IMR (Virology Division) NPHL
Adenovirus	Isolation	Throat swab, stool	Virology division(IMR)
Amoebic dysentery	Microscopy	Stool	State hospitals and district hospital with microbiologists
	Antigen detection		State hospital, Parasitology division (IMR)
Anthrax	Microscopic examination of clinical specimen	Blood, sputum, skin or ulcer tissue	State hospitals and district hospital with microbiologists

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Anthrax	Isolation and identification	Blood, sputum, skin or ulcer tissue	BSL 3 laboratories (VRI, IMR)
Bacterial culture identification	Identification of pure isolates determined to be of clinical significance	Pure, actively growing culture on suitable agar slant	IMR (Bacteriology division)
Bacterial typing, Pulsed Field Gel Electrophoresis	To determine if isolates from different sources are the same	Pure isolates on agar slants	IMR (Bacteriology division)
Bordetella pertussis and other bordetellae	Isolation	Sputum, nasopharyngeal aspirate	State hospitals and district hospital with microbiologists
Bordetella pertussis and other bordetellae	Identification susceptibility testing of *Bordetella* isolates	Pure culture	State hospitals
	Antigen detection (IF)	Nasopharyngeal swab	State hospitals
	Bordetella pertussis serology	Serum	State hospitals, Public Health Laboratories
	Characterisation of *Bordetella* isolates	Pure culture	IMR (bacteriology division),Public Health Laboratories
Brucellosis	Culture and susceptibility testing	Blood, bone marrow, abscess, liver or spleen biopsy	State hospitals and district hospital with microbiologists. Primary specimens for isolation and identification are acceptable with prior consultation

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Chlamydia pneumoniae	Antigen detection	Brocho- alveolar lavage Bracho-alvedar	State hospitals
	Serology	Serum	State hospitals
Corynebacterium diptheriae	Isolation and identification	Swab from inflamed areas of the membranes in throat and nasopharynx, skin lesion and materials removed from wounds by swab or aspiration	State hospitals and district hospital with microbiologists
	In-vitro toxin testing	Pure culture	National PHL
Clostridium perfringes	Culture and susceptibility testing	Stool	State hospitals
Enteric pathogens (*Salmonella*, *Shigella*, *Yersinia*, *E. coli* 0157:H7, *Campylobacter*, *Vibrio*, *Aeromonas*, *Pleisomonas*	Culture, identification and susceptibility testing	Stool, rectal swab	State hospitals and district hospital with microbiologists
Enterovirus infections(Coxsackieviruses, echoviruses, poliovirus)	Antigen detection (IF)	Stool, throat swab, CSF, vesicle fluid and tissue	State hospitals
	Isolation and strain typing		IMR (Virology Division)

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Enterovirus infections(Coxsackieviruses, echoviruses, poliovirus)	Genome detection	Stool, throat swab, CSF, vesicle fluid and tissue	IMR(Virology Division)
Exanthematous viral infections	EIA for mumps, measles and rubella	Serum	State hospitals and Public Health Laboratories
	IFA	Vesicular fluid, lesion swab	State hospitals and Public Health Laboratories
Haemophilus ducreyi	Isolation, identification and susceptibility testing	Genital ulcer swab, aspirated pus	State hospitals and district hospital with microbiologists, Public Health Laboratories
HIV	Screening and confirmation	Serum	State hospitals and district hospital with microbiologists, Public Health Laboratories
Influenzae virus/ parainfluenza virus Influenzae virus/ parainfluenza virus	Antigen test	Throat swab, nasopharyngeal swab, bronchial wash or other respiratory specimen	State hospitals, Public Health Laboratories. Note: Need to confirm positives with conventional virus isolation and subtyping by Virology Division, IMR. Specimens tested negative are not reported until conventional culture results are r
	Isolation and typing of influenza virus by shell vials	Throat swab, nasopharyngeal swab, bronchial wash or other respiratory specimen	State hospitals. Note: Specimens tested negative are not reported until conventional culture results are reported.
	Isolation and typing by conventional culture	Throat swab, nasopharyngeal swab, bronchial wash or other respiratory specimen	Virology Division, IMR

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Legionellosis	Isolation and identification of *Legionella pneumophila* serogroup 1	Lung tissue, pleural fluid, transtracheal aspirate and lower respiratory secretions	State hospitals, Public Health Laboratories
	Speciation and serogrouping of other legionella	Pure culture	Bacteriology Division, IMR
	Isolation, identification and susceptibility testing	Blood and CSF (1st 10 days of illness), urine (2nd week - 30 days)	State hospitals, Public Health Laboratories
Leptospirosis	Antigen detection	Urine	State hospitals, Public Health Laboratories
	EIA - screening	Serum	State hospitals, Public Health Laboratories
	MAT- confirmatory		Bacteriology Division, IMR
Meningococcal disease	Bacterial culture, identification, susceptibility testing and antigen testing	CSF, blood	State hospitals and district hospital with microbiologists.
Neisseria gonorhoea	Culture and susceptibility testing	Endocervical swab, urethral swab, eye swab in Amies transport media. Preferably swab from suspected site of infection is streaked on to selective media e.g. Thayer Martin	State hospitals and district hospital with microbiologists and Public Health Laboratories

DISEASE/PATHOGEN	SERVICE	SPECIMEN REQUIRED	TESTING LABORATORY
Neisseria gonorhoea	Strain typing	Pure culture	IMR (Bacteriology Division)
Tuberculosis	Isolation only	Sputum, blood, CSF, gastric lavage, skin lesion material, tissue, stool, urine	State hospitals and district hospital with microbiologists
	Isolation, genus identification and susceptibility testing	Sputum, blood, CSF, gastric lavage, skin lesion material, tissue, stool, urine	State hospitals with automated Tb culture system and Public Health Laboratories
	Species identification and susceptibility testing (gold standard method of testing)	Pure, actively growing culture on LJ agar slant	Institute Of Respiratory Medicine, HKL and National Public Health Laboratory
	Molecular strain typing (RFLP)	Pure culture	National PHL
Rickettsial diseases	Indirect Immunoperoxidase	Serum	State hospitals
Streptococcal infections	Isolation, identification and susceptibility testing	Blood, pus, throat swab	State hospitals and district hospital with microbiologists and Public Health Laboratories
	Strain typing	Pure culture	IMR (Bacteriology Division)
Syphilis	Serology	Serum, CSF	State hospitals and district hospital with microbiologists.
Viral gastroenteritis	Serology (latex agglutination, EIA)	Stool	State hospitals
	Electron microscopic examination	Stool	IMR(Virology Division)

Appendix 3

KKM-syndssurv /2003.2

SYNDROMIC NOTIFICATON FORM
DISEASE CONTROL DIVISION
MINISTRY OF HEALTH MALAYSIA
TEL: 03-88834327 FAX: 03-88836271

Reporting A & E / Hospital: ……
Tel. No.: …… Fax No: …….. E-mail : ……

Patient's Name : ……
Patient's Address: ……..
……..
IC No.: …… R/N No: ……..(if applicable)
Age: …… Sex: Male / Female Ethnicity: M / C / I / Other
Please state:……
Admission: ICU / Ward ……/ Mortuary. Date of adm: …… / ….. / ……

Please tick the relevant box for the syndrome reported:

	CLINICAL SYNDROMES	DATE OF ONSET [dd/mm/yr]
☐	Acute dermatological syndrome	
☐	Acute neurological syndrome	
☐	Acute respiratory syndrome	
☐	Acute haemorrhagic syndrome	
☐	Acute jaundice syndrome	
☐	Acute diarrhoeal syndrome	

Working diagnosis: …….

Has the patient been in a foreign country in the last three weeks?

☐ Yes

If yes please state the country (s): ……
……

☐ No

Name of Reporting Officer: ……. Signature: …….

Designation: …….. Date: ……

Note: ***Please f****ax this form within 24 hours to District Health Office. Thank you.*
(see overleaf for instructions for completing this form and the definitions of the syndromes)

Overleaf

SYNDROMES DEFINITION:

Acute haemorrhagic syndrome

Acute onset of fever of less than 3 weeks duration **AND**
any two of the following:

- Haemorrhagic or purpuric rash
- Epistaxis
- Haematemesis
- Haemoptysis
- Blood in stool
- Other haemorrhagic symptom

AND
absence of known predisposing factors

Acute Respiratory Syndrome

Acute onset of cough or respiratory distress (e.g. tachypnoea, chest recession, dyspnea, cyanosis)
AND
severe illness (see glossary for definition).
AND
absence of known predisposing factors (see glossary for definition).

Acute neurological syndrome

Acute neurological dysfunction with one or more of the following :

- deterioration of mental function
- stupor/coma
- acute paralysis
- convulsion
- signs of meningeal irritation e.g. neck stiffness, positive Kernig's sign/Brudzinski's sign
- involuntary movements e.g myoclonus, tremors
- other neurological symptoms eg headache, visual disturbances, vomiting

AND
severe illness (see glossary for definition)
AND
absence of predisposing factors (see glossary for definition).

Acute dermatological syndrome

Acute febrile illness with rash (rash can be erythematous, macular/papular and vesicular/pustular) OR other skin manifestations e.g. pruritus, desquamation, pigmentation
AND
absence of known predisposing factors.

Acute jaundice syndrome

Acute onset of jaundice **AND** severe illness **AND** absence of known predisposing factors e.g. drugs

Acute diarrhoeal syndrome

Acute onset of diarrhoeal **AND** severe illness **AND** absence of known predisposing factors.

State Health Department Fax number:

STATE HEALTH DEPT	FAX NUMBER	STATE HEALTH DEPT	FAX NUMBER
Perlis	04-9760764	Negeri Sembilan	06-7638543
Kedah	04-7306421	Melaka	06-2839233
Pulau Pinang	04-2613508	Johor	07-2232603
Perak	05-2557646	Pahang	09-5135528
Selangor	03-55186004 / 5 / 6	Kelantan	09-7441333
Wilayah Persekutuan KL	03-26940702	Terengganu	09-6235001
Sabah	088-217716	Sarawak	082-424959

Appendix 4

GLOSSARY

1. ACUTE.

Acute is defined as a period of 3 weeks or less.

2. SEVERE ILLNESS.

Severe illness are illnesses characterised by at least one of the following:

- hospital admission,
- major organ failure,
- altered state of conciousness,
- circulatory collapse
- death.

3. ABSENCE OF KNOWN PREDISPOSING FACTORS.

Absence of known predisposing factors is the absence of known underlying diseases or other factors eg. drugs which can explain the occurrence of the syndrome.

Appendix 5

INVESTIGATION FORMAT

FORMAT PENYIASATAN BAGI KES SINDROMIK AKUT

Maklumat Pesakit

Nama: _____

No. K/P atau Passport: _____

No. Telefon Untuk Dihubungi : _____

Warganegara: Malaysia / bukan Malaysia (nyatakan): _____

Jika bukan Malaysia, lama tempoh telah berada di Malaysia

_____hari/ bulan / tahun

Alamat semasa: _____

_____

_____

Tarikh Lahir: ☐☐/☐☐/☐☐☐☐

Hari Bulan Tahun

Pekerjaan: _____

Alamat Tempat Kerja: _____

_____

Status Pesakit Diwad (tanda yang berkaitan)

Adakah pesakit dimasukan kewad

i. Tidak (dirawat sebagai pesakit luar) ☐

ii. Masuk wad: Tarikh masuk: _____ ☐

RN : _____

Wad umum ☐

Wad pengasingan ☐

ICU ☐

Dibawa kehospital, telah mati ☐

Mati (tarikh): _____

Perkembangan diwad _____

_____

_____

Diagnosa _____

Gejala berkaitan (Tanda, jika ada)

	Tarikh mula			Tarikh mula
Demam ☐	_____	Ruam	☐	_____
Chills/rigor ☐	_____			

Gejala pernafasan

Batuk tak berkahak	☐	Batuk berkahak	☐	*pleuritic chest pain* ☐
Hidung tersumbat	☐	Selsema	☐	

Lain-lain, sila nyatakan _____

Gejala neurologi

Deterioration of mental function	☐	*stupor*	☐	*convulsion* / sawan ☐
Lemah anggota	☐	*acute paralysis*	☐	deria sentuhan berkurang (*sensation)* ☐

Lain-lain, sila nyatakan _____

Gejala Kardiovaskular

sakit dada sebelah kiri	☐	Sukar bernafas	☐

Lain-lain, sila nyatakan _____

Pendarahan

Hidung berdarah	☐	Muntah darah	☐
Gusi berdarah	☐	*Petechiae* (Ruam)	☐

Lain-lain, sila nyatakan _____

Gejala gastroentrelogi

Muntah	☐	Sakit perut	☐
Cirit birit	☐	Sembelit	☐

Lain-lain, sila nyatakan _____

Gejala genitourinari

Kerap kencing	☐	Tak tahan (*urgency)*	☐
Kencing sakit	☐	Kencing berdarah	☐

Lain-lain, sila nyatakan _____

Gejala musculoskeletal

Sakit sendi	☐	Sakit otot	☐

Lain-lain, sila nyatakan _____

Lain-lain gejala, sila nyatakan

_____

_____

(Tandakan yang perlu)

Sejarah perubatan lalu

Diabetis	☐	Menghidap kanser, rawatan kemoterapi	☐
Tuberculosis	☐	Rawatan aspirin (jangka panjang)	☐
HIV	☐	Rawatan steroid (jangka panjang)	☐
Kegagalan buah pinggang	☐	Pemindahan darah baru-baru ini nyatakan tarikh _____	☐

Mengambil sebarang rawatan, sila nyatakan:

_____

_____

Sejarah sosial

Pernah merokok? Pernah menyalahgunakan dadah (atau yang seumpamanya)?

Ya ☐ Tidak ☐ Ya ☐ Tidak ☐

Sejarah perjalanan keluar negeri atau dalam negeri(dalam tempoh sebulan lalu).

Tempat	Tarikh perjalanan	Tarikh kembali

Hobi, jika ada, nyatakan : _____

_____

Adakah pernah terlibat dalam aktiviti luar seperti berkhemah, berenang, laluan hutan dan sebagainya dalam tempoh sebualn sebelum sakit.

Ya ☐ Tidak ☐

Jika ya, di mana _____ dan bila _____ (tarikh)

Sejarah sentuhan dengan binatang Ya ☐ Tidak ☐

Jika "Ya", nyatakan jenis : _____

_____

Status Pelalian

Lengkap mengikut umur ☐ Tidak lengkap ☐

Pemeriksaan fizikal semasa kemasukan wad;

Tekanan darah _____ Suhu _____

Kadar nadi _____ *Jaundice* _____
(Kuning)

Penemuan fizikal yang berkaitan _____

Penyiasatan

Makmal (Isi yang berkaitan)

Spesimen	Keputusan
Najis	
Darah	
Serum	
CSF	
Calitat tekak	
Kahak	
Urin	
Biopsi tisu nyatakan:	
Lain-lain nyatakan:	

Radiologi (Isi yang berkaitan)

Jenis	Keputusan
A. X Ray	
Dada	
Lain-lain nyatakan:	
B. CT Scan (with/out contrast) Otak	

Paru-paru Lain-lain nyatakan: **C. MRI** Otak Paru-paru Lain-lain nyatakan:	

Status semasa keluar wad

Sihat ☐
Mati ☐
Komplikasi ☐
Nyatakan: _____

Jika pesakit mati, adakan otopsi dibuat

Ya ☐
Keputusan _____

Tidak ☐
Menunggu ☐

Nama dan tandatangan Pegawai Penyiasat:

Jawatan : _____

Tarikh : _____

Hospital : _____

LAWATAN KERUMAH

Tarikh: _____ Minggu EPID: _____

Alamat Semasa _____

_____

Daerah _____ Negeri _____

Senarai ahlirumah atau konteks:

No	Nama	Tanda Pengenalan	Umur	Status Immunisasi (jika berkaitan)

Bekalan Air JBA ☐ Telaga ☐ *Gravity Feed* ☐

Lain-lain, sila nyatakan _____

Kebersihan Sekeliling Baik Memuaskan ☐ Tidak memuaskan ☐

Jenis Rumah _____

Haiwan ternakan berhampiran rumah

Ada ☐ Tiada ☐

Jika ada, nyatakan

_____

Haiwan peliharaan (pet/s) dirumah

Ada ☐ Tiada ☐

Jika ada, nyatakan

_____

Tempat ternakan dikawasan berhampiran.

Ada ☐ Tiada ☐

Jika ada, jarak dari rumah

_____meter / km

Jika ada, jenis binatang yang diternak,

Unggas ☐ Khinzir ☐ Lembu ☐

Lain-Lain, nyatakan

_____

Pernahkan sesiapa ahlirumah bekerja atau melawat tempat ternakan?

Ya ☐ Tidak ☐

Adakah terdapat rumah sembelih berhampiran rumah?

Ada ☐ Tiada ☐

Status kesihatan ahli keluarga atau konteks.

Adakah sesiapa mempunyai tanda berikut: (Tanda yang berkaitan)

Demam		Ya ☐		Tidak ☐		Tak pasti	☐
Sakit tekak		Ya ☐		Tidak ☐		Tak pasti	☐
Batuk		Ya ☐		Tidak ☐		Tak pasti	☐
Hidung tersumbat		Ya ☐		Tidak ☐		Tak pasti	☐
Sawan (*convulsion*)		Ya ☐		Tidak ☐		Tak pasti	☐
Sakit otot		Ya ☐		Tidak ☐		Tak pasti	☐
Acute paralysis		Ya ☐		Tidak ☐		Tak pasti	☐
Kuning (*jaundice*)		Ya ☐		Tidak ☐		Tak pasti	☐
Sakit sendi		Ya ☐		Tidak ☐		Tak pasti	☐
Chills/rigor		Ya ☐		Tidak ☐		Tak pasti	☐
Muntah-Muntah		Ya ☐		Tidak ☐		Tak pasti	☐
Cirit-birit		Ya ☐		Tidak ☐		Tak pasti	☐
Ruam		Ya ☐		Tidak ☐		Tak pasti	☐
Hidung berdarah		Ya ☐		Tidak ☐		Tak pasti	☐
Muntah darah		Ya		Tidak ☐		Tak pasti	☐
Najis berdarah		Ya ☐		Tidak ☐		Tak pasti	☐
Ruam maculopapular		Ya		Tidak ☐		Tak pasti	☐
Vesicular lesion		Ya ☐		Tidak ☐		Tak pasti	☐
Kelenjar limf besar		Ya ☐		Tidak ☐		Tak pasti	☐
Tandan lain, nyatakan							

Adakah sesiapa di kalangan jiran pernah dimasukkan ke hospital dalam tempoh seminggu lepas?								
		Ya ☐		Tidak ☐				
Jika ya, apakah diagnosa penyakitnya								
Keadaan pesakit								
Sesiapa ahli keluarga atau konteks pernah terlibat dalam aktiviti luar seperti berkhemah, berenang, laluan hutan dan sebagainya.								
		Ya ☐		Tidak ☐				
Pernahkah sesiapa ahlirumah atau konteks melawat daerah / negeri atau negara yang dilanda wabak sesuatu penyakit dalam tempoh 1 bulan sebelum jatuh sakit?								
		Ya ☐		Tidak ☐				
	Namakan daerah / negeri / negara berkaitan							
Adakah berlaku kematian tanpa sebab diketahui di kawasan berhampiran?								
		Ya ☐		Tidak ☐				

Kesimpulan dari lawatan kerumah

_____

_____

_____

_____

_____

Disemak oleh Peg. Kesihatan Daerah / PPKP Kanan

Nama dan tandatangan

Jawatan:

Tarikh:

Daerah:

Negeri:

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Autograph

Autograph

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