Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

CDNA NATIONAL GUIDELINES FOR PUBLIC HEALTH UNITS

Revision history			
Version	**Date**	**Revised by**	**Changes**
1.0	15 Oct 2014	Developed by MERS-CoV SoNG working group	Original
1.1	24 July 2015	MERS-CoV SoNG Working Group	Presenting sypmptoms; contact management and case definitions updated to address revised evidence following outbreak in Republic of South Korea. Further minor update approved by AHPPC Chair 7 September 2015 to include WHO recommendations on the testing of asymptomatic close contacts in the context of a hospital outbreak.

The Series of National Guidelines ('the Guidelines') have been developed by the Communicable Diseases Network Australia (CDNA) and noted by the Australian Health Protection Principal Committee (AHPPC). Their purpose is to provide nationally consistent guidance to public health units (PHUs) in responding to a notifiable disease event.

These guidelines capture the knowledge of experienced professionals, and provide guidance on best practice based upon the best available evidence at the time of completion.

Readers should not rely solely on the information contained within these guidelines. Guideline information is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a health professional. Clinical judgement and discretion may be required in the interpretation and application of these guidelines.

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Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

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1. Summary

Public health priority
Urgent.

Advice should be sought, where applicable, from the relevant state or territory central communicable diseases agency on the process for reporting of suspected, probable and confirmed MERS-CoV cases. MERS-CoV infection is a nationally notifiable disease.

Case management
Isolate suspected, probable and confirmed cases in a single room with negative pressure air-handling and an ensuite bathroom (if available) and use standard and transmission-based precautions (contact and airborne).

Contact management
Close contacts of probable and confirmed cases are subject to some work and travel restrictions and should be actively monitored for development of fever and respiratory symptoms in the 14 days following the last contact, while casual contacts are subject to self-monitoring only.

2. The disease

Infectious agents
The Middle East respiratory syndrome coronavirus (MERS-CoV).

Coronaviruses are a large and diverse family of viruses that include viruses that are known to cause illness in humans (including the common cold) and animals.

Reservoir
It is likely that the virus has come from an animal source. MERS-CoV has been detected in camels in several Middle East countries with human cases of MERS-CoV infection. Additionally, serological evidence of camel exposure to MERS-CoV or a closely related virus has been found in camels over a wide area of northern Africa and the Middle East. It is suspected, but not confirmed, that infected camels may be the source of the virus for some human cases. There are also limited reports of MERS-CoV being detected in bats.

More information is needed to identify the possible role that camels, bats, and other animals may play in the transmission of MERS-CoV. MERS-CoV is genetically distinct from SARS-CoV, and appears to behave differently, being less transmissible but with a higher mortality rate. However, the full spectrum of illness remains unclear.

Mode of transmission
The mode or modes of transmission of MERS-CoV are not fully known.

There have been some cases with a strong history of exposure to camels or camel products (e.g. milk), including at least one cluster where the camels also tested positive. However, there have been many sporadic cases with no history of prior exposure to camels or other animals.

There have been multiple clusters of cases in which human-to-human transmission has occurred. These clusters have been observed in health-care facilities, among family members and between co-workers. However, the mechanism by which transmission occurred in these instances, whether respiratory (e.g. coughing, sneezing) or direct physical contact with the patient or via fomites after contamination of the environment by the patient, is unknown.

Infection control recommendations for managing suspected, probable and confirmed cases are consistent with those recommended for SARS-CoV and pandemic influenza. As further information becomes available, these recommendations will be re-evaluated and updated as needed.

Incubation period
From 2 to 14 days; most commonly 5 days.

Infectious period
The duration of infectivity for MERS-CoV infection is unknown. Standard precautions should be applied throughout any admission; additional isolation precautions should be continued until at least 24 hours after the resolution of symptoms.

Given that little information is currently available on viral shedding and the potential for transmission of MERS-CoV, testing to detect the virus may be necessary to inform decision-making on infectiousness. Patient information (e.g. age, immune status and medication) should also be considered.

Clinical presentation and outcome
Clinical presentation ranges from asymptomatic to severe pneumonia with acute respiratory distress syndrome and multi-organ failure. Nearly all symptomatic patients have presented with fever. Respiratory symptoms are common and gastrointestinal symptoms are less commonly reported.

Typically, the disease starts with fever and cough. Other common symptoms are myalgia and chills. Sore throat, arthralgia, dyspnoea, nausea, vomiting and diarrhoea are less commonly present. In the 2015 South Korean outbreak pneumonia was present in a minority of patients at initial presentation, but it is unclear whether early testing of contacts with, at the time, milder clinical manifestations of MERS-CoV infection may have influenced the reported spectrum of illness.

Patients who develop pneumonia or pneumonitis often require mechanical ventilation and other organ support. The case fatality rate for confirmed cases is estimated at 30-40 percent, but this may decrease when the spectrum of disease is better understood, as suggested by lower case fatality observed in the South Korean outbreak.

Persons at increased risk of disease
The age distribution of reported cases is skewed heavily to the middle-aged and elderly. Cases who are elderly, immunocompromised or with co-morbidities have an increased case fatality rate[1].

Disease occurrence and public health significance
As of June 2015 there have been no confirmed MERS-CoV cases reported in Australia.

Countries that have reported cases in the Middle East include Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (KSA), United Arab Emirates (UAE) and Yemen, with Saudi Arabia and UAE being most affected.

Persons who acquired MERS-CoV in Middle Eastern countries have exported the infection to many other countries, which has resulted in health facility outbreaks in France, the United Kingdom, and most notably South Korea. For a full list of countries where MERS-CoV cases have been detected see the World Health Organization (WHO) coronavirus infection website [1].

WHO expects that additional cases of MERS-CoV infection will be reported from the Middle East, and that it is likely that cases will continue to be exported to other countries by tourists, travellers, guest workers or pilgrims who might acquire infection following exposure to human cases (possibly in a health care setting), or possibly from camels or other unknown animal sources (for example, while visiting farms or markets).

Until more is understood about the mode of transmission and risk factors for infection, it is expected that sporadic cases will continue to occur, with potential for limited transmission within households and healthcare settings.

3. Routine prevention activities

It is recommended that people with significant medical conditions such as diabetes, renal disease and chronic lung disease who are intending to travel to the Middle East – including those undertaking the Hajj or Umrah - consult a doctor prior to travel.

People travelling in countries affected by MERS-CoV should maintain good hygiene practices, avoid contact with animals, especially camels, and refrain from consuming unpasteurised milk or undercooked meat.

Travellers to the Middle East and travel organisations should be advised of general travel health precautions which will lower the risk of infection in general, including respiratory viruses and traveller's diarrhoea. Specific emphasis should be placed on:

- hand hygiene and respiratory hygiene
- adhering to good food-safety practices,
- maintaining good personal hygiene.

Travel advice for Australians is available at the Australian Department of Health MERS-CoV web page [2]. Travellers should check if there are any travel restrictions in place prior to travel.

4. Surveillance objectives

- To rapidly identify, isolate and treat cases, and prevent transmission to their contacts
- To identify and provide information to contacts and ensure that they are isolated rapidly should symptoms occur

- To describe the epidemiology of MERS-CoV infection in Australia, including identifying risk factors for transmission.

5. Data management

Probable and confirmed cases of MERS-CoV infection should be entered onto the notifiable diseases database within one working day of notification/report. Data for suspected cases should be maintained according to jurisdictional protocols.

6. Communications

Where applicable, public health units should immediately notify the central state/territory communicable diseases agency of suspected, probable and confirmed cases once notifications/reports are received. Provide the case's age, sex, place of residence, indigenous status, date of onset, travel history, laboratory results, clinical status, likely place of acquisition, and follow-up action taken.

State/territory communicable disease agencies should immediately notify probable and confirmed MERS-CoV cases to the National Incident Room.

7. Case definition

The criteria for a suspected case of MERS-CoV are to be used to direct testing and initial infection control and public health actions. Suspected cases will ultimately be reclassified as either having a diagnosis of MERS-CoV excluded, or meeting the criteria for a probable or confirmed case. The criteria for probable and confirmed cases of MERS-CoV define those cases that are to be reported to the National Notifiable Diseases Surveillance System.

Suspected case[1]
Knowledge and understanding of MERS-CoV infection continues to expand. The following criteria are based on case series reported from recent outbreaks and represent combinations of symptoms and epidemiological criteria in which MERS-CoV testing is strongly recommended.

Atypical presentations occur, and clinical and public health judgement should also be used to determine the need for testing in patients who do not meet the criteria below.

<u>Testing and initial infection control and public health actions for MERS-CoV should be undertaken for persons with:</u>

A. Fever AND pneumonia or pneumonitis or acute respiratory distress syndrome (ARDS) AND

    - history of travel from or residence in affected countries in the Middle East[2] within 14 days before symptom onset, OR

[1] Check for updates on the Australian Department of Health MERS-CoV website (http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-mers-cov.htm).

- contact[3] (within the incubation period of 14 days) with a symptomatic traveller who developed fever and acute respiratory illness of unknown aetiology within 14 days after travelling from affected countries in the Middle East, OR
- contact (within the incubation period of 14 days) with a symptomatic traveller who developed fever and acute respiratory illness of unknown aetiology within 14 days after travelling from a region with a known MERS-CoV outbreak at that time[4],

OR

B. Fever AND symptoms of respiratory illness (e.g., cough, shortness of breath) AND
   - being in a healthcare facility (as a patient, worker, or visitor) in a country or territory in which recent healthcare-associated cases of MERS have been identified[4] within 14 days before symptom onset, OR
   - being in contact with camels or raw camel products within affected countries in the Middle East within 14 days before symptom onset.

OR

C. Fever OR acute symptoms compatible with MERS-CoV AND onset within 14 days after contact with a probable or confirmed MERS-CoV case while the case was ill.

OR

D. Testing and initial infection control and public health actions for MERS-CoV should also be considered, in consultation with the public health unit, where there is a cluster of patients with severe acute respiratory illness of unknown aetiology following routine microbiological investigation, particularly where the cluster includes health care workers.

[2] Affected countries in the Middle East include Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (KSA), United Arab Emirates (UAE) and Yemen
[3] See section 11: Definition of contact
[4] See the World Health Organization (WHO) coronavirus infection website [1] for list of countries currently experiencing a MERS outbreak

Probable case

- A person with an acute respiratory infection with clinical, radiological, or histopathological evidence of pulmonary parenchymal disease (e.g. pneumonia or pneumonitis or Acute Respiratory Distress Syndrome (ARDS)); AND
  No possibility of laboratory confirmation for MERS-CoV because the patient or samples are not available for testing; AND
  Close contact with a laboratory-confirmed case (see the Contact Management section below for guidance on identifying close contacts).

Confirmed case

- A confirmed case requires laboratory definitive evidence of infection with MERS-CoV.

Laboratory definitive evidence

- Detection of MERS coronavirus by polymerase chain reaction (PCR) in a public health reference laboratory using the testing algorithm described in Appendix 3 and summarised below.

Notes:

(1) Transiting through an international airport (<24 hours stay, remaining within the airport) in the Middle East is not considered to be risk factor for infection.

(2) Laboratory definitive evidence. To consider a case as laboratory-confirmed, one of the following conditions must be met:
   - A positive PCR result for at least two different specific targets on the MERS-CoV genome.
   - One positive PCR result for a specific target on the MERS-CoV genome and an additional different PCR product sequenced, confirming identity to known sequences of MERS-CoV.

See the Laboratory testing section and Appendix 3 for additional MERS-CoV laboratory testing information.

8. Laboratory testing

Patients to be considered for MERS-CoV testing are described under the suspected case definition (above). Where applicable, consult with your state/territory communicable diseases agency to seek advice on which laboratories can provide MERS-CoV testing; appropriate specimen type, collection and transport; and also to facilitate contact management if indicated.

Transmission-based contact and airborne precautions must be used when collecting respiratory specimens [3]. These include:

- Contact precautions, including close attention to hand hygiene
- Airborne transmission precautions, including routine use of a P2 mask/respirator, disposable gown, gloves, and eye protection
- Collection in a room with negative pressure air-handling where available.

Routine tests for acute pneumonia/pneumonitis should be performed where indicated, including bacterial cultures, acute and convalescent serology, urinary antigen testing and tests for respiratory viruses, according to local protocols.

Serology, if available, may be useful in cases where MERS-CoV is strongly suspected but non-confirmed with PCR but requires paired acute and convalescent sera – seek expert clinical microbiology advice. Serology is also useful to estimate secondary infection rates in asymptomatic cases following exposure to MERS-CoV.

See Appendix 3 for additional MERS-CoV laboratory testing information.

9. Case management

Response times
On the same day as notification of a suspected, probable or confirmed case, begin follow up investigation and, where applicable, notify your central state or territory communicable diseases agency.

Response procedure
Case investigation
The response to a notification will normally be carried out in collaboration with the clinicians managing the case, and be guided by the MERS-CoV public health unit checklist (Appendix 2) and the MERS-CoV Investigation Form (Appendix 4).

Regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done
- Seek the treating doctor's permission to contact the case or relevant care-giver
- Determine if the diagnosis has been discussed with the case or relevant care-giver before beginning the interview
- Review case and contact management
- Ensure appropriate infection control guidelines are followed in caring for the case
- Identify the likely source of infection.

Note: If interviews with suspected cases are conducted face-to-face, the person conducting the interview must have a thorough understanding of infection control practices and be competent in using appropriate PPE.

Wherever possible, cases should be managed in hospital. If clinically indicated, cases may be managed at home only if it can be ensured that the case and household contacts are counselled about risk and that appropriate infection control measures are in place.

Case treatment
In the absence of pathogen-specific interventions, patient management largely depends on supportive treatment, and vigilance for and treatment of complications.

Further advice on clinical management is available from WHO [4].

Education
Provide MERS-CoV Fact Sheets (Appendix 1) to cases and their close contacts. Ensure that they are aware of the signs and symptoms of MERS-CoV, the requirements of isolation, contact details of the PHU and the infection control practices that can prevent the transmission of MERS-CoV.

Isolation and restriction
Cases must be isolated in an appropriate health facility, unless alternative arrangements are recommended on expert advice. Healthcare workers and others who come into contact with suspected, probable and confirmed cases must be protected according to recommended infection control guidelines. Visitors should be restricted to close family members.

A risk assessment should be undertaken for suspected cases who initially test negative for MERS-CoV. If there is no alternative diagnosis and a high index of suspicion remains that such cases may have MERS-CoV infection, consider continued isolation and use of the recommended infection control precautions, pending further testing (see Laboratory testing section and Appendix 3) and re-assessment.

Given the severity of reported infections, the evidence of limited person-to-person transmission, and gaps in knowledge of transmission pathways, the recommendations on isolation and PPE for management of suspected, probable and confirmed cases take a deliberately cautious approach.

Infection control measures should be those applicable to control the transmission of pathogens that can be spread by the airborne route. These measures are detailed in the *Interim infection prevention and control advice for acute care hospitals relating to suspected Middle Eastern respiratory syndrome coronavirus (MERS-CoV) infections,* (http://www.health.gov.au/mers-coronavirus) [3].

In summary, transmission-based precautions for suspected, probable and confirmed cases should include:

- Placement of cases in a negative pressure room with an ensuite bathroom, if available, or in a single room from which the air does not circulate to other areas
- Airborne transmission precautions, including routine use of a P2 respirator (or N95 mask), long sleeved disposable gown, gloves, and eye protection when entering a patient care area
- Contact precautions, including close attention to hand hygiene
- If transfer of the confirmed or probable case outside the negative pressure room is necessary, ask the patient to wear a single use "surgical" face mask while they are being transferred and to follow respiratory hygiene and cough etiquette.

Active case finding

Contacts (see *Contact management* section) should be identified and advised to immediately seek medical advice should they develop symptoms. Contacts or caregivers should be advised to inform the public health agency if they develop symptoms.

10. Environmental evaluation

Where local transmission of MERS-CoV is thought possible, a thorough review of contributing environmental factors should be done. This should include a review of infection control procedures, and opportunities for exposure to respiratory or faecal contamination.

If a case has had occupational exposure to animals it may be appropriate to consult with animal health authorities.

11. Contact management

As there remain gaps in the understanding of infectivity of MERS-CoV cases and transmission modes the definition of contacts is based on observations of people

infected in large outbreaks, particularly the outbreak in South Korea. The definition of contacts and recommended control measures are subject to review as more information on MERS-CoV becomes available.

Identification of contacts
All persons categorised as a contact (see definitions of "close contacts" and "casual contacts" following) of probable and confirmed cases should be followed-up, and monitored for the development of symptoms for 14 days after the last exposure to the case (i.e. the maximum incubation period).

Contacts of suspected cases should also be considered for contact management if there is likely to be a delay in confirming or excluding MERS CoV infection in the suspected case, such as delayed testing.

Close Contact definition
A close contact is defined as requiring greater than 15 minutes face-to-face contact with a symptomatic probable or confirmed case in any setting, or the sharing of a closed space with a symptomatic probable or confirmed case for a prolonged period (e.g. more than 2 hours).

Hence, close contacts may include:

- A healthcare worker or family member providing direct patient care to, or who were within close vicinity of an aerosol generating procedure performed on, or a laboratory worker who performed tests on specimens from, a confirmed or probable case, without recommended infection control precautions, including not using full personal protective equipment (PPE).

- OR, a healthcare worker, patient or visitor who shared the same closed space for a prolonged time (e.g. more than 2 hours), and without recommended infection control precautions, including not using full personal protective equipment (PPE).

- OR, people who resided in the same household or household-like setting (e.g. dormitory room in a boarding school).

Contact tracing by public health units should prioritise identifying close contacts particularly healthcare workers, and other close contacts who may be at higher risk of severe disease, including the elderly and those with significant co-morbidities.

- Casual contact definition
- Casual contact is defined as any person having less than 15 minutes face-to-face contact with a symptomatic probable or confirmed case in any setting, or sharing a closed space with a symptomatic probable or confirmed case for less than 2 hours. This will include healthcare workers, other patients, or visitors who were in the same closed healthcare space as a case, but for shorter periods than those required for a close contact. Other closed settings might include schools or offices.

Note that healthcare workers and other contacts who have taken recommended infection control precautions, including the use of full PPE, while caring for a symptomatic probable or confirmed MERS-CoV case are not considered to be close contacts. However, these people should be advised to self-monitor and if they

develop symptoms consistent with MERS-CoV infection they should isolate themselves and notify their public health unit or staff health unit so they can be tested and managed as a suspected MERS-CoV case (see recommendations below under *Management of symptomatic contacts*).

Other casual contacts may include:

- Extended family groups e.g. in an Aboriginal community.
- Aircraft passengers who were seated in the same row as the case, or in the two rows in front or two rows behind a symptomatic probable or confirmed MERS-CoV case. It is noted that to date no instances of transmission on airlines have been identified. Contact tracing of people who may have had close contact on long bus or train trips should also be attempted where possible, using similar seating/proximity criteria.
- All crew-members on an aircraft who worked in the same cabin area as a symptomatic probable or confirmed case of MERS-CoV. If a crew member is the symptomatic MERS-CoV case, contact tracing efforts should concentrate on passengers seated in the area where the crew member was working during the flight and all of the other members of the crew.

Where resources permit, more active contact tracing may be extended to other persons who have had casual contact (as defined above), particularly in school, office, or other closed settings. In these circumstances, the size of the room/space and degree of separation of the case from others should be considered in identifying contacts.

Contact assessment
All persons identified as having had contact with a symptomatic probable or confirmed case should be assessed to see if they should be classified as a close or casual contact and have demographic and epidemiological data collected. Information on contacts should be managed according to jurisdictional requirements.

Identification and assessment of the contacts of suspected cases may be deferred pending the results of initial laboratory testing. However, contact tracing should be considered if MERS-CoV infection remains high on the list of differential diagnoses, even if initial laboratory results are negative or are pending.

Contact testing
Routine laboratory screening for MERS-CoV infection is not recommended for asymptomatic contacts. One exception is in the setting of a hospital outbreak, where WHO recommends RT-PCR testing of nose/throat swabs of asymptomatic close contacts be considered, if feasible. RT-PCR-positive asymptomatic close contacts in this setting should be isolated, monitored closely for symptoms and only released from isolation following two negative RT-PCR tests separated by 24 hours.[2]

Serological testing of contacts may be useful if available, in order to help determine the secondary infection-attack rate and the proportion of infections that are asymptomatic. Contacts who agree to be tested should be advised that serological

[2] WHO recommends that if feasible, and in the context of a hospital outbreak, all close contacts of a confirmed case of MERS should be tested for the presence of the virus. See: http://apps.who.int/iris/bitstream/10665/180973/1/WHO_MERS_IPC_15.2_eng.pdf?ua=1 .

testing will not be done immediately and is not being conducted for contact management purposes.

Consent should be sought from household and healthcare worker close contacts for the collection of the following samples:

- A baseline serum sample, ideally within 7 days of exposure, to be stored and tested in parallel with a convalescent sample.
- A convalescent serum sample at least 21 days after the baseline sample was collected. If more than 21 days have passed since the last exposure, only a single serum sample is required.

The collection of nasopharyngeal (NP) swabs from asymptomatic contacts for MERS-CoV PCR is not recommended. There is little information available currently to reliably inform the timing of testing or the interpretation of negative test results in this setting.

Serial PCR testing of NP swabs from asymptomatic close contacts to detect MERS-CoV viral shedding may be conducted as part of ethics-approved research studies.

Prophylaxis
No specific chemoprophylaxis is available for contacts.

Education
Contacts should be counselled about their risk and the symptoms of MERS-CoV and provided with a MERS-CoV Fact Sheet (Appendix 1). They should be advised to self-isolate if they develop symptoms, and to immediately notify their public health unit and, if appropriate, their facility infection control unit (i.e. for healthcare workers).

Quarantine and restriction
Close contacts
Home quarantine of asymptomatic close contacts is not routinely recommended, but people identified as close contacts are advised to monitor their health for 14 days after the last possible contact with a symptomatic probable or confirmed MERS-CoV case.

Public health units should conduct active daily monitoring of close contacts for symptoms for 14 days after the last possible contact with a symptomatic probable or confirmed MERS-CoV case.

Close contacts should also be advised to immediately telephone the public health unit to arrange medical assessment if they develop symptoms such as fever, respiratory symptoms (including coughing and shortness of breath), headache, muscle pain or diarrhoea.

Less frequent active follow-up together with passive surveillance may be necessary if there are large numbers of close contacts to monitor.

Close contacts should also be advised to not travel internationally for 14 days after the last close contact with a probable or confirmed case of MERS-CoV, and any travel within Australia during this period should be subject to discussion with public health authorities.

Close contacts should be excluded from schools and sensitive occupations or settings such as health care, aged care, or child care during the 14 days after last unprotected contact with a case.

Casual contacts

Casual contacts should monitor their health for 14 days and report any symptoms immediately to the local public health unit. There are no restrictions on movements; however casual contacts should be advised to contact the public health unit if they develop symptoms.

Healthcare worker close contacts

Healthcare worker close contacts (i.e. persons exposed while unprotected, as described in the Contact definition section) should not undertake work in a healthcare setting for 14 days following the last possible contact with the case. Home quarantine is not routinely recommended during this period if these individuals remain asymptomatic, but some restrictions may be recommended based on a risk assessment of the particular circumstances.

Depending on arrangements in the jurisdiction, public health units may assist infection control units of health facilities to identify and monitor healthcare worker close contacts.

It is recognised that clinical work restrictions on healthcare worker close contacts may place strain on individuals and on health services. This underlines the importance of ensuring healthcare workers implement appropriate infection control precautions when assessing and managing suspected, probable and confirmed MERS-CoV cases.

These recommendations are based on reports from large health facility-based MERS-CoV outbreaks in the Middle East and South Korea which have involved nosocomial transmission of MERS-CoV to both patients and healthcare workers. CDNA will continue to monitor the emerging evidence around MERS-CoV transmission risks in healthcare settings and revise these recommendations as needed.

Management of symptomatic contacts

If fever, respiratory symptoms, or other symptoms consistent with MERS-CoV infection develop within the first 14 days following the last contact, the individual should be immediately isolated and managed as per the current recommendations for suspected MERS-CoV cases, with urgent testing for MERS-CoV infection undertaken in an environment which minimises the risk of exposure to others.

Ill contacts who are being evaluated for MERS-CoV infection can be appropriately isolated and managed at home, unless their condition is severe enough to require hospitalisation.

Symptomatic contacts who test negative for MERS-CoV by PCR will still need to be monitored for 14 days after their last contact with a probable or confirmed MERS-CoV case and may require re-testing. There have been a number of reports of MERS-CoV cases who initially tested negative for MERS-CoV by PCR.

12. Special situations

Outbreaks in healthcare facilities
If one or more probable or confirmed MERS-CoV cases are identified in a healthcare facility, an outbreak management team should be convened, including a senior facility manager, an infection control practitioner and appropriate clinical staff, in consultation with PHU staff as required. Control measures may include:

- active case finding, assessment and care
- isolation and/or cohorting
- work restriction for healthcare workers who have had close contact (i.e. unprotected exposure) with a confirmed or probable case
- distribution of fact sheets and other information
- epidemiological studies to determine risks for infection.

Outbreaks in residential care facilities or other residential institutions (e.g. prisons or boarding schools)
There have been few if any reports of MERS-CoV outbreaks in institutions other than in healthcare facilities, and transmission within households appears to be uncommon. Nevertheless, it is assumed that fellow residents in an institution will be at greater risk of infection if there has been a confirmed case living at the institution while infectious.

If one or more probable or confirmed MERS-CoV cases are identified in a residential care facility or institution, an outbreak management team should be convened, in consultation with PHU staff.

13. References and additional sources of information

References:

[1] World Health Organization (WHO). Coronavirus infections. (http://www.who.int/csr/disease/coronavirus_infections/en/)

[2] Australian Department of Health. MERS coronavirus web page. (http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-mers-cov.htm).

[3]Interim infection prevention and control advice for acute care hospitals relating to suspected Middle Eastern respiratory syndrome coronavirus (MERS-CoV) infections (http://www.health.gov.au/internet/main/publishing.nsf/Content/18EA5D58FA62A556CA257BF0001A8E1F/$File/interim-infection-prevention.pdf)

[4] World Health Organization (WHO). *Interim Guidance Document - Clinical management of severe acute respiratory infections when novel coronavirus is suspected*. (http://www.who.int/csr/disease/coronavirus_infections/InterimGuidance_ClinicalManagement_NovelCoronavirus_11Feb13u.pdf).

Additional resources:
WHO FAQs on MERS-CoV: (http://www.who.int/csr/disease/coronavirus_infections/faq/en/)

WHO MERS-CoV summary and literature updates:
(http://www.who.int/csr/disease/coronavirus_infections/archive_updates/en/)

WHO Update on MERS-CoV transmission from animals to humans, and interim recommendations for at-risk groups (13 June 2014):
(http://www.who.int/csr/disease/coronavirus_infections/MERS_CoV_RA_20140613.pdf)

WHO updated travel advice on MERS-CoV for Pilgrimages (3 June 2014):
(http://www.who.int/ith/updates/20140603/en/)

US CDC Middle East respiratory syndrome website:
(http://www.cdc.gov/coronavirus/mers/index.html)

ECDC Coronavirus website (http://ecdc.europa.eu/en/healthtopics/coronavirus-infections/Pages/index.aspx)

Public Health England Middle East respiratory syndrome coronavirus website:
(http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/MERSCoV/)

14. Appendices

Appendix 1. MERS-CoV Factsheet
Appendix 2. MERS-CoV PHU checklist
Appendix 3. MERS-CoV laboratory testing information
Appendix 4. MERS-CoV case investigation form

15. Jurisdiction specific issues

Links to Australian state and territory public health legislation, and the Commonwealth Quarantine Act and amendments are available at:
http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-state-legislation-links.htm

Appendix 1: Middle East Respiratory Syndrome (MERS) Factsheet

What is Middle East Respiratory Syndrome (MERS)?
Middle East Respiratory Syndrome (MERS) is a viral illness caused by a novel coronavirus, Middle East respiratory Syndrome Coronavirus (MERS-CoV) that was first identified in Saudi Arabia in 2012. Coronaviruses are a large family of viruses that cause diseases ranging from the common cold to Severe Acute Respiratory Syndrome (SARS).

All recognised cases of MERS-CoV infection (people who have the disease) have to date lived in or travelled to countries in the Middle East, or have had close contact, such as caring for or living with, people who acquired the infection in the Middle East. However, there is no evidence of sustained spread of the disease within the community.

There is a risk of MERS-CoV in the following Middle Eastern countries:

- Jordan, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates (UAE), Yemen, Lebanon and Iran.

People who caught the infection in the Middle East have travelled to a number of countries outside the Middle East and subsequently developed the disease. There have been no cases identified in Australia to date.

It is a very serious disease, and about 30% of people with MERS-CoV infection have died from the infection or related complications.

What are the symptoms?

- Most confirmed cases have had a rapid onset of serious respiratory illness, with fever, cough, and shortness of breath, leading to pneumonia.
- A variety of other symptoms have been reported in some cases, including muscle pain, diarrhoea, vomiting and nausea.
- An increasing number of infections are being identified in people with only mild symptoms or no symptoms (asymptomatic) who were tested because they were close contacts of seriously-ill cases.

How is it spread?
It is not yet understood exactly how people are becoming infected. In some cases there appears to have been spread from an infected person to another person in close contact. This has been seen among family members, and other patients and health care workers in hospitals caring for people with MERS-CoV infection. However, the virus does not seem to spread easily from person-to-person.

The original source of the virus is likely to be animals and MERS-CoV has been found in camels in some Middle Eastern countries where cases are occurring. Similar viruses have also been reported in bats. However, contact with camels and other animals does not appear to explain most of the human cases that are occurring. More information is needed to determine the roles that camels, bats and other animals may play in the spread of MERS-CoV.

Who is at risk?
People who are living in or travelling to affected areas of the Middle East or who have had contact with other cases may be at risk of catching the disease. People with underlying illnesses that make them more vulnerable to respiratory disease, including those with diabetes, chronic lung disease, pre-existing kidney disease, or those who have suppressed immune systems, may be at a higher risk.

How is it prevented?
There is no vaccine to prevent MERS-CoV infection. People who are travelling to affected countries should practice normal hygiene measures. Wash your hands often, and use a hand sanitiser if soap and water is not available.

It is currently recommended to minimise contact with animals in affected countries. When visiting a farm good hygiene measures should be practised, such as regular hand washing before and after touching animals, avoiding contact with sick animals, and following good food hygiene practices, including avoiding drinking raw milk, camel urine or eating food that may be contaminated with animal products unless the food is properly washed, peeled, or cooked.

People at high risk of severe disease due to MERS-CoV should consider taking additional precautions while travelling in the Middle East, such as avoiding visiting farms or market environments where camels are present.

What should I do if I become unwell after travel in the Middle East?
If you become ill or feel unwell while travelling in the Middle East, you should not wait until you arrive back in Australia to seek medical assistance. Instead you should see a doctor or go to the local emergency department.

If you have returned from travel to the Middle East within the last fourteen days and develop a fever, cough and other symptoms, you should see your doctor or go to the emergency department to work out why you are ill. It is important that you mention your symptoms and which countries you have visited in the Middle East when you first arrive at the medical practice or hospital emergency department.

You may be asked or required to wear a mask and be separated from others to prevent further spread of infection.

How is it diagnosed?
MERS-CoV is diagnosed by finding genetic material from the virus in respiratory samples such as swabs from the back of the throat and fluid from the lungs. Testing for MERS-CoV is done in public health laboratories.

How is it treated?
There is currently no specific treatment for people who are sick with MERS, but general supportive medical care can be life-saving.

What is the public health response?
The World Health Organization (WHO) is working with affected countries to minimise the risk of spread and find out more about the disease.

There have been no confirmed cases in Australia, but special procedures to prevent the spread of MERS-CoV would be put in place in the event of any suspected or confirmed cases. These would include:

- Asking the sick person to wear a surgical mask
- Health-care workers seeing patients and laboratory staff handling specimens would follow special safety guidelines, including wearing protective equipment.
- Doctors and laboratories would inform state/ territory health departments of suspected cases.
- Public Health authorities would follow up any case to identify their contacts so as to help prevent spread of the disease. Close contacts of people diagnosed or suspected of having

MERS-CoV infection would be given information about the risk of infection, and would be tested for the disease if necessary.

Public health unit staff will investigate all cases to find out how the infection occurred, identify other people at risk of infection, implement control measures and provide other advice.

Further information

- World Health Organization (WHO) MERS-CoV updates (www.who.int/csr/disease/coronavirus_infections/en/)
- Australian Department of Health – MERS coronavirus website (http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-mers-cov.htm)
- Centers for Disease Control and Prevention (USA) (http://www.cdc.gov/coronavirus/mers/)
- Australian Department of Foreign Affairs and Trade provides information for travellers on the Smartraveller website (www.smartraveller.gov.au/)

Appendix 2: PHU MERS-CoV checklist

Using the MERS-CoV Investigation form, contact the patient's doctor to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done
- Find out if the case or relevant care-giver has been told what the diagnosis is before beginning the interview
- Seek the doctor's permission to contact the case or relevant care-giver
- Review case management including infection control measures being used in caring for the case

Interview the case or care-giver to complete exposure and contact history and other details

- Complete the exposure history and other sections of the MERS-CoV Investigation Form.
- Identify close contacts according to the contact definition.

Follow-up patient's contacts to:

- Assess risk of MERS-CoV transmission and classify as close or casual contacts
- Determine current symptoms, if any, and advise on active daily monitoring of symptoms by public health unit (close contacts) or passive surveillance (casual contacts)
- Explain symptoms and need to immediately report any new symptoms
- Explain to healthcare, aged care, and childcare worker close contacts the need for work restrictions during the potential incubation period after exposure
- Explain to school student close contacts (or their carers) the need for exclusion during the potential incubation period after exposure
- Provide a MERS-CoV Disease Factsheet
- Arrange serological testing if available and appropriate.

Notify central jurisdictional communicable disease control agency

Central communicable disease control agency to notify Commonwealth Department of Health, Office of Health Protection

Consider need for media release and designate a media spokesperson.

Appendix 3: MERS-CoV Laboratory testing information

Samples suitable for testing

Respiratory samples - Upper respiratory tract

1. Nasopharyngeal swab and/or oropharyngeal swab
    - nasopharyngeal: insert a swab into each nostril parallel to the palate, leave the swab in place for a few seconds to absorb secretions
    - oropharyngeal: swab the tonsilar beds, avoiding the tongue
    - place swabs back into the accompanying transport media

2. Nasal wash/aspirates
    - collect 2-3 mL into a sterile, leak-proof, screw-top dry sterile container

Respiratory samples – Lower respiratory tract

1. Bronchoalveolar lavage, tracheal aspirate, pleural fluid
    - collect 2-3 mL into a sterile, leak-proof, screw-top sputum collection cup or dry sterile container

2. Sputum
    - patient should rinse his/her mouth with water before collection
    - expectorate deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container

There is now increasing evidence that lower respiratory tract specimens contain the highest viral loads, therefore, lower respiratory tract specimens should be collected where possible. Repeat testing (especially of lower respiratory tract specimens) in compatible cases should be performed if initial results are negative.

Serology
Serum should be collected during the acute phase of the illness (preferably within the first 7 days of symptom onset), stored, and tested in parallel with a convalescent serum collected 3 or more weeks after acute sample collection. If no acute sample was collected, a single serum sample collected 14 or more days after symptom onset may be tested.

Immunofluorescence and neutralization serology tests are used. Similar to NAT, a two stage approach using a screening followed by a confirmatory test can be employed. For screening purposes, an enzyme-immunosorbent assay (ELISA) against recombinant N protein can be used, followed by confirmatory testing using a whole virus indirect fluorescent antibody (IFA) test or microneutralization. Given that all serological tests developed so far have only been validated against a small number of convalescent sera from MERS-CoV cases, positive serological test results in the absence of nucleic acid testing (NAT) or sequencing are considered probable cases only.

Stool
2 – 5 grams of stool (formed or liquid) is collected in a sterile, leak-proof, screw-top dry sterile container.

Handling of specimens in the laboratory
Laboratory staff should handle specimens under PC2 conditions in accordance with AS/NZS 2243.3:2010 Safety in Laboratories Part 3: Microbiological Safety and Containment. Specimens should be transported in accordance with current regulatory requirements.

MERS-CoV testing
NAT using reverse-transcriptase polymerase chain reaction (RT-PCR) is the method of choice for detection of MERS-CoV. Currently, four targets are used for testing:-

- upstream region of the E protein (upE) gene
- open reading frames (ORF) 1a (ORF1a)
- ORF1b
- MERS-CoV specific nucleocapsid (N) protein gene

An algorithm using a screening assay, followed by confirmatory testing is recommended. For screening purposes, assays targeting the upE gene are appropriate. Confirmatory testing can be performed using an assay targeting the ORF1a (comparable sensitivity to upE gene), ORF1b (which is less sensitive than ORF1a or upE) or N gene. It is recommended that positive screening tests be reported to communicable diseases agencies whilst awaiting confirmatory testing.

Where available, RdRp gene (for the broad detection of β-coronavirus clade C) and/or N gene sequencing may also be considered for MERS-CoV confirmation. As the primers for the RdRp sequencing assay is highly conserved, it is not recommended that this assay be used alone for MERS-CoV confirmation, as false positive results may occur from cross-reactions with other β-coronaviruses. Further information about laboratory testing is available at:

- Institute of Virology, Bonn (http://www.virology-bonn.de/index.php?id=40)
- The US Food and Drug Administration (http://www.fda.gov/downloads/MedicalDevices/Safety/EmergencySituations/UCM355572.pdf).

Testing algorithms may also need to be revised pending further information about the virus, and the number of specimens received in the laboratory for testing.

Viral culture is generally not performed for routine diagnosis, and should only be attempted in laboratories with appropriate experience and containment facilities. MERS-CoV replication has been previously observed on Vero and LLC-MK2 cells within 5 days of inoculation

Appendix 4: MERS-CoV Case Investigation Form

Note: This is an example form incorporating most of the fields contained in the NetEpi (database) form that has been prepared for national reporting. Central disease control agencies in individual jurisdictions should be consulted regarding their specific data collection requirements.

1	Interview	Was the person interviewed? ☐ Yes ☐ No ☐ Not applicable - If Yes, date of interview: / / (dd/mm/yyyy) - If No, specify reason not interviewed (and if someone else was interviewed):
2	Case status	☐ Confirmed ☐ Probable ☐ Suspected ☐ Excluded Notification date: / / Received date: / / Notifier:
3	Patient contact details	Family name: Given names: Residential address: Phone number (home): Phone number (work): Phone number (mobile):
4	Address type	☐ Household ☐ Aged-care facility ☐ Educational Institution ☐ Assisted ☐ Military Barracks ☐ Prison ☐ Other ☐ Unknown If Other, please specify:
5	Gender	☐ Male ☐ Female ☐ Unknown
6	Date of birth	Date of birth: / / (dd/mm/yyyy)
7	Country of birth	Country of birth: If not born in Australia, date of first arrival in Australia: / / (dd/mm/yyyy) *Note: if only year known, enter 01/01/[year]*
8	Indigenous Status	o Aboriginal origin o Torres Strait Islander origin o Both Aboriginal and Torres Strait Islander origin o Not Aboriginal and Torres Strait Islander origin o Not Stated / Unknown
9	Onset date of first symptoms	Did the person have symptoms? ☐ Yes ☐ No ☐ Unknown - If Yes, onset date: / / (dd/mm/yyyy)

		- Duration of symptoms:			(days)
10	Symptoms and clinical notes	Acute respiratory distress syndrome	☐ Yes	☐ No	☐ Unknown
		Arthralgia	☐ Yes	☐ No	☐ Unknown
		Conjunctivitis	☐ Yes	☐ No	☐ Unknown
		Cough	☐ Yes	☐ No	☐ Unknown
		Diarrhoea	☐ Yes	☐ No	☐ Unknown
		Fatigue	☐ Yes	☐ No	☐ Unknown
		Fever	☐ Yes	☐ No	☐ Unknown
		- Highest temperature:	(^{0}Celsius)		
		- Fever onset date: / /			(dd/mm/yyyy)
		- Feverish by self-report?	☐ Yes	☐ No	☐ Unknown
		Chills or rigors	☐ Yes	☐ No	☐ Unknown
		Headache	☐ Yes	☐ No	☐ Unknown
		Malaise	☐ Yes	☐ No	☐ Unknown
		Myalgia	☐ Yes	☐ No	☐ Unknown
		Nausea	☐ Yes	☐ No	☐ Unknown
		Pneumonia	☐ Yes	☐ No	☐ Unknown
		Pneumonitis	☐ Yes	☐ No	☐ Unknown
		Rhinorrhoea	☐ Yes	☐ No	☐ Unknown
		Shortness of breath	☐ Yes	☐ No	☐ Unknown
		Sore throat	☐ Yes	☐ No	☐ Unknown
		Vomiting	☐ Yes	☐ No	☐ Unknown
		Other symptoms	☐ Yes	☐ No	☐ Unknown
		- If Yes, specify symptoms:			
		Clinical notes:			
11	Hospitalisation and treatment details	Was the person hospitalised?	☐ Yes	☐ No	☐ Unknown
		- Name of hospital:			
		- Hospital phone number:			
		- Date admitted: / /	(dd/mm/yyyy)		
		- Date discharged: / /	(dd/mm/yyyy)		
		Admitted to ICU/HDU?	☐ Yes	☐ No	☐ Unknown
		- Number of days in ICU/HDU:			(days)
		Oxygen therapy required?	☐ Yes	☐ No	☐ Unknown
		Intubation required?	☐ Yes	☐ No	☐ Unknown
		Mechanical ventilation required?	☐ Yes	☐ No	☐ Unknown

		Hospital medical record/chart number:
12	Admitting doctor details	Is admitting doctor same as treating doctor? ☐ Yes ☐ No ☐ Unknown - If Yes, enter details in the Treating Doctor section below. - If No, record Admitting Doctor's name: - Phone number / pager
13	Outcome of illness	What was the outcome of the case? ☐ Alive ☐ Died - If Died, date of death: / / (dd/mm/yyyy) - Cause of death due to MERS-CoV infection? ☐ Yes ☐ No ☐ Unknown - If death due to other cause, specify:
14	Occupation (during period of interest)	During the period of interest, did the person work in any of the following high risk occupations (settings)? ☐ Healthcare ☐ Aged-care facility ☐ Educational facility ☐ Assisted Living ☐ Military institution ☒ Correctional facility ☐ No high risk occupation ☐ Other ☐ Unknown - If Other, specify: - If No high risk occupation – Skip to next question Date last attended this work: / / (dd/mm/yyyy) Was the infection acquired in the workplace? ☐ Yes ☐ No ☐ Unknown Description of occupation: Employer/facility name Employer/facility street address Employer/facility suburb/ town Employer/facility state Employer/facility postcode Employer/facility phone number Employer/facility fax number Contact name Contact email address
15	Contact with a known or possible case (during period of interest)	Did the case have contact with a known or possible MERS-CoV case? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Date of last contact: / / (dd/mm/yyyy)
16	Treating Doctor details	**Enter the Treating Doctor's details.** Name: Practice name (if any): Street address: Suburb / town: State: Postcode: Phone number: Fax number: Email address:

		Case's medical record/chart number:
17	Pre-existing conditions and medical history	Cardiac disease (not simple hypertension) ☐ Yes ☐ No ☐ Unknown Chronic lung disease ☐ Yes ☐ No ☐ Unknown Diabetes ☐ Yes ☐ No ☐ Unknown Haemoglobinopathy ☐ Yes ☐ No ☐ Unknown Immunosuppressive condition ☐ Yes ☐ No ☐ Unknown Liver disease ☐ Yes ☐ No ☐ Unknown Metabolic disease ☐ Yes ☐ No ☐ Unknown Neurological disorder ☐ Yes ☐ No ☐ Unknown Obesity ☐ Yes ☐ No ☐ Unknown Renal disease ☐ Yes ☐ No ☐ Unknown - If Yes, are they on dialysis? ☐ Yes ☐ No ☐ Unknown Other medical condition? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Is the person currently pregnant or was she pregnant during the illness? ☐ Yes ☐ No ☐ Unknown If Yes, number of weeks gestation at onset of symptoms:(weeks) - Pre-existing medications and conditions notes: Are they a current smoker? ☐ Yes ☐ No ☐ Unknown If Yes, number of pack years: (pack/yrs.) - Do they drink alcohol? ☐ Yes ☐ No ☐ Unknown If Yes, average number of standard drinks per week: (SD/week)
18	Travel in the Middle East and contact with other cases * Check the current case definition for a list of affected countries.	During the period of interest, did the case travel to the Middle East? * ☐ Yes ☐ No ☐ Unknown *Note: Transiting through an international airport (<24 hours stay, remaining within the Airport) in the Middle East is not considered to be risk factor for infection.* **If NO → Proceed directly to Question 22: Human Exposures** Did they participate in any Pilgrimages or festivals whilst in the Middle East during the 14 days prior to onset? (e.g. the Hajj or Umrah) ☐ Yes ☐ No ☐ Unknown - If Yes, give details of what, when and where:
19	Locations visited during incubation period (during period of interest)	During the period of interest, did they visit any of the following venues or locations in the Middle East*? ☐ Hospital ☐ Other health facility ☐ Farm ☐ Swamp marsh ☐ Zoo/petting zoo ☐ Camping ☐ Abattoir ☐ Hunting

		☐ Animal market ☐ Stockyards ☐ River/lake ☐ Agricultural show
20	Animal exposures (during period of interest)	*Consider any contact with live or dead animals that they have had including visiting places where animals are kept, even if they didn't have direct contact with them.* Did they have contact with camels? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Did they have contact with domestic (including household pets) or wild animals? ☐ Yes ☐ No ☐ Unknown - If Yes, were any of these animals sick or dead? ☐ Yes ☐ No ☐ Unknown o If Yes, specify: Were they aware of any other animal/excreta (e.g. bats, rodents, stray cats/dog, foxes, reptiles, etc.) ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Did they visit a market selling live animals? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Did they visit any other venue at which live animals were present (e.g. farm, race course, zoo or falconry events)? ☐ Yes ☐ No ☐ Unknown - If Yes, specify:
21	Food exposures (during period of interest)	During the period of interest, where did they normally get their food? (Specify kinds of food and locations) Did they get their food from any other locations, or did they eat any new types of food? ☐ Yes ☐ No ☐ Unknown - If Yes, describe: Have they eaten any foods or drunk any beverages that they think could have been unsafe or caused them to become ill? ☐ Yes ☐ No ☐ Unknown - If Yes, describe: Did they eat any of the following: Camel meat, camel milk or camel urine? ☐ Yes ☐ No ☐ Unknown Raw fruits or vegetables? ☐ Yes ☐ No ☐ Unknown Uncooked meat or eggs ☐ Yes ☐ No ☐ Unknown Raw/unpasteurised milk or milk products? ☐ Yes ☐ No ☐ Unknown Dried fruits or nuts ☐ Yes ☐ No ☐ Unknown Did they slaughter an animal or handle raw meat (e.g. in preparation for a meal or religious offering)? ☐ Yes ☐ No ☐ Unknown - If Yes, describe: Did they take any traditional medicines or use any home remedies? ☐ Yes ☐ No ☐ Unknown

		- If Yes, give details:
22	Human exposures *Contact with people who were ill during the period of interest* ***Note: not restricted to Middle East contacts***	During the period of interest, did they have contact with anyone who might have had a contagious illness while they were still sick? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: Have they had contact with persons who are in close contact with animals because of their work? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: Have they had contact with a person who had a respiratory illness/diarrhoea/vomiting? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: Did they visit or care for any sick person? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: - If Yes, did they have any contact with the sick person's bodily fluids, such as urine, blood, sputum or faeces? ☐ Yes ☐ No ☐ Unknown o If Yes, give details:
23	Healthcare and hospital presentation *These questions should be answered about healthcare and hospital presentation in the 14 days prior to onset* *Includes Australian and overseas presentations*	Did the case present to hospital? ☐ Yes ☐ No ☐ Unknown - If Yes, date of presentation to hospital: / / (dd/mm/yyyy) - Was the hospital presentation for MERS related symptoms? ☐ Yes ☐ No ☐ Unknown o If No, give details of what, when and where: Did the case visit any other healthcare facilities during the period of interest? ☐ Yes ☐ No ☐ Unknown - If Yes, give date of presentation: / / (dd/mm/yyyy) Was the healthcare visit for MERS-CoV symptoms? ☐ Yes ☐ No ☐ Unknown - If No, give details of what, when and where:
24	Case Found by	☐ Clinical Presentation ☐ Contact tracing/epidemiological investigation ☐ Screening ☐ Clinical and epidemiology ☐ Other: Specify:

Australian Government
Department of Health

NNDSS Core Dataset

Dataset Field Specifications – version 10

Noted by CDNA :
Ratified by NSC : 18 March 2016

Revision history

Version	Date	Revised by	Changes
1	7 Nov 2000	-------	Data matrix developed by s47F
2	20 Jun 2001	JDS	Format change from matrix to specifications document
3	27 Aug 2001	JDS	Revised following data managers' face-to-face meeting on 22 August 2001. Changes to: confirmation status, organism code, organism name and serogroup/subtype fields.
4	Jan 2002	Surveillance & Epidemiology Section	Revision history table added.
5	Feb 2002	Surveillance & Epidemiology Section	Notification received date changed to compulsory field
6	May 2002	Alison Milton	Corrected incorrect data type specification of Integer for Disease code and Resident Postcode fields.
7	July 2002	Paul Roche	Revisions after 1 July 2002 data managers t/conference • Add an option '3' for 'suspected case' to the 'confirmation status' field • Add alternate options for recording resident postcode not available = 9999 or x999 (where x is the postcode prefix), in the "Resident postcode' field.
8	Dec 2005	Surveillance Section	Revisions of data field descriptions to reflect current practice and addition of 2 new fields accepted by NSC.
9	Jan 2008	SP&SS	Addition of revised vaccination data fields as endorsed by NSC. Vaccination status, Vaccination Validation, Vaccine doses and Date of last Vaccination are still valid for notifications while S&T change their data bases
9.1	March 2008	CDNA	Endorsed by CDNA with minor changes to 'vaccine type' data field and clarification of user guide to 'place of acquisition' data field
9.2	August 2008	NSC	Changes as put forward at NSC
9.3	November 2009	NSC	Updates to Vaccine Type as guided by NSC and NCIRS.
9.3.1	Jan 2010		Error identified with 1011 vaccine code

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9.3.2	June 2010	SAC	Error identified with 3204 vaccine code Added 4 – Clinical and Epidemiology to Case Found By Added 9 – Not Done to laboratory diagnosis method. New vaccines to vaccine type
10	October 2015	Data manager	• Clarification of the 'place of acquisition' data domain and user guide elements and inclusion of an attachment with the diseases that require place of acquisition information. • Addition of 5 = Antenatal screening in the data domain of 'case found by' field and additional information in the user guide. • Addition of 'hospitalised' field • Addition of 'maternal vaccination' fields • Addition of 'state typing other' field • Revised alternate codes for 'vaccine type' • Removed vaccine codes from 'vaccine type' and included as an attachment. • Removed repeated 'vaccine type', 'vaccination date' and 'vaccination validation' fields 2-5. • Purification of the data recorded in aliases. • Format changes to standardise across all data specifications. • Update description of the died field • Removed organism code • Revised order of fields.

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Field Summary Index

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Field		Page	Details
23.	HOSPITALISED	10	Hospitalisation due to the notifiable disease/condition.
24.	VACCINE TYPE X	11	Type of vaccine for this dose.
25.	VACCINATION DATE X	11	Date of this vaccination.
26.	VACCINATION VALIDATION X	11	How the vaccination information was validated.
27.	MATERNAL VACCINE TYPE	12	Vaccine code for the antenatal vaccine received by the case's mother during her pregnancy with the notified case.
28.	MATERNAL VACCINATION DATE	12	The date the antenatal vaccine was administered to the case's mother during her pregnancy.
29.	MATERNAL VACCINATION VALIDATION	12	How the vaccination information was validated.
30.	MATERNAL GESTATIONAL AGE OF INFANT	12	Gestational age in weeks of the case at the time of the mother's vaccination.
31.	VACCINATION STATUS	13	The vaccination status for the case with the notifiable disease.
32.	VACCINATION VALIDATION	13	Was the vaccination information obtained validated?
33.	VACCINE DOSES	13	The number of doses of vaccine received by the case with the notifiable disease.
34.	DATE OF LAST VACCINATION	14	Date of the last dose of vaccine received by the case for the notifiable disease.

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1. STATE

NNDSS field:	**STATE**
Aliases:	
Details:	The State or Territory which sends the notification.
Data type:	NUMERIC, INTEGER
Data domain:	1 = NSW, 2 = VIC, 3 = QLD, 4 = SA, 5 = WA, 6 = TAS, 7 = NT, 8 = ACT
User guide:	**Mandatory field** that can alternatively be supplied as a Tag within the Dispatch Header file e.g.: [HEADER-START] ... JURISDICTION-ID=1 ... [HEADER-END]

2. NOTIFICATION ID

NNDSS Field:	**NOTIFICATION_ID**
Aliases:	ID
Details:	A notification identifier that is unique within the specified State or Territory.
Data type:	ALPHANUMERIC TEXT (Maximum 35 characters)
Data domain:	Any sequence of alphanumeric characters.
User guide:	**Mandatory field**

3. DISEASE CODE

NNDSS Field:	**DISEASE_CODE**
Aliases:	DISEASE
Details:	A code representing a communicable disease of the notified case, refer Attachment A.
Data type:	ALPHANUMERIC TEXT (3 Digits with leading zeros)
Data domain:	NNDSS Disease Codes (eg. 004, 005, 035...)
User guide:	**Mandatory field**

4. ORGANISM NAME

NNDSS Field:	**ORGANISM_NAME**
Aliases:	
Details:	A full textual name of the causative organism for the notifiable disease.
Data type:	ALPHANUMERIC TEXT (100 Characters maximum)
Data domain:	A consistent, descriptive naming standard for organism name as defined by the National Surveillance Committee
User guide:	

5. SEROGROUP SUBTYPE

NNDSS Field:	**SEROGROUP_SUBTYPE**
Aliases:	
Details:	A full textual name of the causative organism for the notifiable disease.
Data type:	ALPHANUMERIC TEXT (50 Characters maximum)
Data domain:	A consistent name of the serogroup or subtype as defined by the National Surveillance Committee.
User guide:	

6. TYPING OTHER

NNDSS Field:	**TYPING_OTHER**
Aliases:	STATE_TYPING_OTHER
Details:	Additional typing information of the causative organism for the notifiable disease.
Data type:	ALPHANUMERIC TEXT (50 Characters maximum)
Data domain:	
User guide:	

7. CONFIRMATION STATUS

NNDSS Field:	**CONFIRMATION_STATUS**
Aliases:	CONF
Details:	The confirmation status of the disease as defined by the CDNA case definitions.
Data type:	NUMERIC, INTEGER , required field
Data domain:	**1** = confirmed **2** = probable
User guide:	**Mandatory field**

8. LABORATORY DIAGNOSIS METHOD

NNDSS Field:	**LAB_DIAGNOSIS_METHOD**
Aliases:	LABORATORY_DIAGNOSIS_METHOD
Details:	The diagnostic method/s used to identify and confirm the notification.
Data type:	REPEATING ALPHANUMERIC TEXT (Maximum total length 255 characters) delimited with vertical bar character "|".
Data domain:	A textual description or numeric code for the diagnostic methods. Only eight possible methods will be accepted:-

Culture	Or	01
Serology	Or	02
Microscopy	Or	03
Histopathology	Or	04
Nucleic acid testing	Or	05
Antigen detection	Or	06
Other	Or	07
Unknown	Or	08
Not Done	Or	09

Example:
Serology\|Microscopy\|Culture or 02\|03\|01

User guide:	For positive results only.

9. RESIDENT POSTCODE

NNDSS Field:	**RESIDENT_POSTCODE**
Aliases:	RESPCODE
Details:	The permanent residential Australian postcode of the individual.
Data type:	ALPHANUMERIC TEXT (4 Digits with leading zeros)
Data domain:	Standard Australian postcode (4 Characters) **8888** = Not applicable (eg: overseas resident) **x999** = Unknown postcode where State or Territory of residence is known (eg: 3999 is unknown postcode in Victoria where x = the State or Territory postcode prefix) **NULL/blank** = No resident postcode available
User guide:	Codes to be used where postcode is unknown and State or Territory of residence is known: ACT unknown = 2699 NSW unknown = 2999 NT unknown = 0899 Qld unknown = 0989 (internal code) Tas unknown = 7999 SA unknown = 5999 Vic unknown = 3999 WA unknown = 6999 * Refer to cross border notification protocol for definition of usual residence

10. RESIDENT LOCATION

NNDSS Field:	**RESIDENT_LOCATION**
Aliases:	RESLOCN
Details:	The permanent residential location of the case.
Data type:	ALPHANUMERIC (50 Characters maximum)
Data domain:	This field may be a community name, a town name or suburb. NAME = <Free form name of resident location>
User guide:	

11. TRUE ONSET DATE

NNDSS Field:	**TRUE_ONSET_DATE**
Aliases:	
Details:	The earliest date the case exhibited symptoms.
Data type:	DATE (DD/MM/YYYY)
Data domain:	A valid full century date. Where unknown, leave field blank.
User guide:	If supplied, onset dates must not be after notification dates, prior to birth dates, or in the future.

12. SPECIMEN DATE

NNDSS Field:	**SPECIMEN_DATE**
Aliases:	SPECDATE
Details:	Date when the first laboratory specimen was taken.
Data type:	DATE (DD/MM/YYYY)
Data domain:	A valid full century date. Where unknown, leave field blank.
User guide:	If supplied, the specimen date must not be after notification dates or in the future.

13. NOTIFICATION DATE

NNDSS Field:	**NOTIFICATION_DATE**
Aliases:	
Details:	Date when health professional signed the notification form or the laboratory issued the results.
Data type:	DATE (DD/MM/YYYY)
Data domain:	A valid full century date. Where unknown, leave field blank
User guide:	If supplied, the notification date must not be before onset or specimen dates, or in the future

14. NOTIFICATION RECEIVED DATE

NNDSS Field:	**NOTIFICATION_RECEIVE_DATE**
Aliases:	NOTNDATE
Details:	The date the notification of the disease was received by the communicable diseases section of the health authority.
Data type:	DATE (DD/MM/YYYY)
Data domain:	A valid full century date.
User guide:	**Mandatory field**

DIAGNOSIS DATE

This is a derived field in NNDSS and is used for reporting purposes only.

The **DIAGNOSIS DATE** will be the **TRUE ONSET DATE** if known, otherwise it will be earliest of the **SPECIMEN DATE**, the **NOTIFICATION DATE** or the **NOTIFICATION RECEIVED DATE**.

Exception
If the disease code is 016 (Leprosy), 034 (Tuberculosis), 052 (Hepatitis B (unspecified)), 053 (Hepatitis C (unspecified)) or 067 (Syphilis – more than 2 years or unknown duration) then the **DIAGNOSIS DATE** will be the **NOTIFICATION RECEIVED DATE**.

15. DATE OF BIRTH

NNDSS Field:	**DATE_OF_BIRTH**
Aliases:	DOB
Details:	The date of birth of the case.
Data type:	DATE (DD/MM/YYYY)
Data domain:	A valid full century date. Where unknown, leave field blank.
User guide:	

16. AGE AT ONSET

NNDSS Field:	**AGE_AT_ONSET**
Aliases:	AGE
Details:	The age of the case as reported to the health authority or the calculated age at onset, using date of birth.
Data type:	NUMERIC, INTEGER (>=0<=130)
Data domain:	A valid age in years
User guide:	

17. SEX

NNDSS Field:	**SEX**
Aliases:	
Details:	A single character field indicating the current sex of the individual.
Data type:	NUMERIC, INTEGER
Data domain:	**1** = Male **2** = Female **3** = Indeterminate **9** = Not stated / inadequately described **NULL/blank** = No information provided
User guide:	

18. INDIGENOUS STATUS

NNDSS Field:	**INDIGENOUS_STATUS**
Aliases:	INDGSTAT
Details:	A single character field indicating the indigenous status of the individual. An Aboriginal or Torres Strait Islander is determined by descent, self-identification, and community acceptance.
Data type:	NUMERIC, INTEGER
Data domain:	**1** = Indigenous – (Aboriginal but not Torres Strait Islander origin) [Historical Default Aboriginal Classification) **2** = Indigenous – (Torres Strait Islander but not Aboriginal origin) **3** = Indigenous – (Aboriginal and Torres Strait Islander Origin) **4** = Not indigenous – (not Aboriginal or Torres Strait Islander origin) **9** = Not stated **NULL/blank** = No information provided
User guide:	

19. DIED

NNDSS Field:	**DIED**
Aliases:	
Details:	Patient died of the notifiable disease/condition or it was a contributing factor.
Data type:	NUMERIC, INTEGER
Data domain:	**1** = Yes **2** = No **9** = Unknown **NULL/blank** = No information provided
User guide:	

20. OUTBREAK REFERENCE

NNDSS Field:	**OUTBREAK_REF**
Aliases:	
Details:	A reference to a known disease outbreak that has been or is under investigation.
Data type:	ALPHNUMERIC TEXT (35 Characters maximum)
Data domain:	
User guide:	This reference is defined within the jurisdiction recording the outbreak.

21. CASE FOUND BY

NNDSS Field:	**CASE_FOUND_BY**
Aliases:	
Details:	How the case was identified.
Data type:	NUMERIC, INTEGER
Data domain:	**1** = Clinical presentation **2** = contact tracing/epidemiological investigation **3** = Screening (excluding antenatal) **4** = Clinical and epidemiology **5** = Antenatal screening **9** = Unknown **NULL/blank** = No information provided
User guide:	

22. PLACE OF ACQUISITION

NNDSS Field:	**PLACE_OF_ACQUISITION**
Aliases:	
Details:	Where the disease is known to have been acquired, either locally or overseas.
Data type:	ALPHANUMERIC TEXT – maximum of 8
Data domain:	Two part code (XXXXYYYY), four-digit country code (XXXX) as specified in the Australian Bureau of Statistics (ABS) Standard Australian Classification of Countries (SACC) (ABS Cat. No. 1269.0) and four-digit standard Australian postcode (YYYY).
User guide:	Only required for certain diseases, see Appendix B for applicable diseases.

Acquisition	XXXX Country Code	YYYY Postcode
Overseas, country known	Use valid SACC	8888
Overseas, country unknown	0004	8888
Australia, postcode known	1101	2902
Australia, State or Territory known postcode unknown*	1101	2999
Australia, postcode unknown	1101	9999
No information/not followed up	0003	8888

NULL/blank = Place of acquisition is not applicable or the information is not yet available/confirmed

* See resident postcode field for further guidance where state is known but postcode is unknown.

23. HOSPITALISED

NNDSS Field:	**HOSPITALISED**
Aliases:	
Details:	Hospitalised due to the notifiable disease/condition.
Data type:	NUMERIC, INTEGER
Data domain:	**1** = Yes **2** = No **9** = Unknown **NULL/blank** = No information provided
User guide:	Includes cases admitted to an Emergency department for 24hrs

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24. VACCINE TYPE

NNDSS Field:	**VACCINE_TYPE_X**
Aliases:	
Details:	A single four-digit code for the vaccine received.
Data type:	ALPHANUMERIC TEXT; 4
Data domain:	Please see Appendix C for a complete list of the valid vaccine codes to be used. Alternative codes **0000** = No vaccine given **8888** = Followed up – information not available **9999** = Not followed up – information not sought **NULL/Blank** – Where a vaccination is not applicable or the information is not yet available/confirmed These alternative codes are only to be used in the VACCINE_TYPE_1 field. (NNDSS will reject these values if used in the other VACCINE_TYPE_(2 to 5) fields).
User guide:	This is a repeating field, from 1 to 5 representing an alphanumeric code for each vaccine received (up to 5 doses), with 'x' representing the vaccine administered order. **There should be no default value assigned to this field.**

25. VACCINATION DATE

NNDSS Field:	**VACCINATION_DATE_X**
Aliases:	VACCINE_DATE_X
Details:	The date the first vaccine dose was administered.
Data type:	DATE (DD/MM/YYYY)
Data domain:	A valid full century date.
User guide:	This is a repeating field, from 1 to 5 representing the date of each vaccine received (up to 5 doses), with 'x' representing the vaccine administered order. **Not required** if an alternative vaccine code is used in the VACCINE_TYPE_1 field **Mandatory** if a valid vaccine code is recorded in the VACCINE_TYPE_x field If only a year is known record as 01/01/YYYY If only a month and year is known record as 01/MM/YYYY **There should be no default value assigned to this field.**

26. VACCINATION VALIDATION

NNDSS Field:	**VACCINATION_VALIDATION_X**
Aliases:	VACCINE_ VALIDATION_X
Details:	How the vaccination information was validated.
Data type:	NUMERIC, INTEGER; 1
Data domain:	**1** = Vaccine information validated (includes written confirmation through ACIR or a State / Territory immunisation register; verbal advice from a health provider; or sighting of a health record) **2** = Self, other or parental recall only **9** = Information not collected
User guide:	This is a repeating field, from 1 to 5 representing the validation of each vaccine received (up to 5 doses), with 'x' representing the vaccine administered order. **Not required** if an alternative vaccine code is used in the VACCINE_TYPE_1 field **Mandatory** if a valid vaccine code is recorded in the VACCINE_TYPE_x field **There should be no default value assigned to this field.**

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27. MATERNAL VACCINE TYPE

NNDSS Field	**MATERNAL_VACCINE_TYPE**
Aliases:	
Details	A single four-digit code for the antenatal vaccine received by the case's mother during her pregnancy with the notified case.
Data type	ALPHANUMERIC TEXT; 4
Data domain	Please see Appendix C for a complete list of the valid vaccine codes to be used. Alternative codes **0000** = No vaccine given **8888** = Followed up – information not available **9999** = Not followed up – information not sought **NULL/Blank** – Where this field is not applicable
User guide	To only be used in conjunction with cases of pertussis in infants less than 6 months of age. **NULL/Blank should be used as the default value assigned to this field.**

28. MATERNAL VACCINATION DATE

NNDSS Field	**MATERNAL_VACCINATION_DATE**
Aliases:	
Details	The date the antenatal vaccine was administered to the case's mother during her pregnancy.
Data type	DATE (DD/MM/YYYY)
Data domain	A valid full century date.
User guide	Only to be used in conjunction with the MATERNAL_VACCINE_TYPE field; **Not required** if an alternative code is used in the MATERNAL_VACCINE_TYPE field **Mandatory** if a valid vaccine code is recorded in the MATERNAL_VACCINE_TYPE field

29. MATERNAL VACCINATION VALIDATION

NNDSS Field	**MATERNAL_VACCINATION_VALID**
Aliases:	
Details	How the vaccination information was validated.
Data type	NUMERIC, INTEGER; 1
Data domain	**1** = Vaccine information validated (includes written confirmation through an immunisation register; verbal advice from a health provider; or sighting of a health record) **2** = Self **9** = Information not collected
User guide	Only to be used in conjunction with the MATERNAL_VACCINE_TYPE and MATERNAL_VACCINATION_DATE fields; **Not required** if an alternative code is used in the MATERNAL_VACCINE_TYPE field **Mandatory** if a valid vaccine code is recorded in the MATERNAL_VACCINE_TYPE field

30. GESTATIONAL AGE AT MATERNAL VACCINATION

NNDSS Field	**MATERNAL_GESTATIONAL_AGE**
Aliases:	GESTATIONAL_AGE_MATERNAL
Details	Gestational age in weeks of the case at the time of the mother's vaccination.
Data type	NUMERIC, INTEGER; 2
Data domain	WW (weeks) – between 1 and 43
User guide	Only to be used in conjunction with the MATERNAL_VACCINE_TYPE field; Provide gestational age of the infant in completed weeks

The following fields were used prior to the new vaccination data fields being implemented in jurisdictional databases.

31. VACCINATION STATUS

NNDSS Field:	**VACCINATION_STATUS**
Aliases:	
Details:	The vaccination status for the individual for the notified disease. Vaccine preventable diseases for which information needs to be collected include: Diphtheria (all ages), Hepatitis A (Indigenous only in NT, Qld, Sa, WA and DOB >31/12/2000), Hepatitis B (Indigenous, specific ethnic groups, or DOB>01/05/2000), Hib (DOB >31/12/1987), Influenza (age> 65 years) Invasive pneumococcal disease (Indigenous or DOB >31/12/2004 or age >65 years), Measles (DOB>31/12/1969), Meningococcal disease (DOB >31/12/1984), Mumps (DOB>31/12/1980), Pertussis (DOB> 31/12/1984 or age< = 20 years), Polio (all ages), Q fever (all ages) Rubella (DOB > 31/12/1987 and females 15 to 45 years), Tetanus (all ages) "Not applicable" should be used when the individual has not reached the age of the first scheduled vaccination, or when the vaccination history is not required for persons above a certain age as described above. Fully vaccinated for age means that the individual has completed all of the vaccinations required for their age.
Data type:	NUMERIC, INTEGER
Data domain:	1 = Fully vaccinated for age for this disease 2 = Partially vaccinated for age for this disease 3 = Not vaccinated for this disease 8 = Not applicable 9 = Unknown blank/missing/null = No data provided
User guide:	

32. VACCINATION VALIDATION

NNDSS Field:	**VACCINE_VALIDATION**
Aliases:	VACCINATION_ VALIDATION
Details:	Was the vaccination information obtained validated?
Data type:	NUMERIC, INTEGER
Data domain:	1 = Vaccine information validated (written conformation through ACIR, State / Territory register, health record) 2 = Not validated (self or parental recall only) 8 = Not applicable. 9 = Information not collected Blank/missing/null = No data provided
User guide:	

33. VACCINE DOSES

NNDSS Field:	**DOSES_OF_VACCINE**
Aliases:	VACCINE_DOSES

Details:	The number of doses of vaccine received by the individual for the notified disease.
Data type:	NUMERIC, INTEGER (> = 0< = 15)
Data domain:	Count of doses
User guide:	

34. DATE OF LAST VACCINATION

NNDSS Field:	**DATE_OF_LAST_VACCINATION**
Aliases:	
Details:	Date of the last vaccination for the notifiable disease
Data type:	DATE, DD/MM/YYYY
Data domain:	
User guide:	If day is unknown use first of the month; if month is unknown use January

Communicable Diseases Network Australia
Jurisdictional Executive Group
Extra Ordinary Meeting Agenda

Monday, 20 January 2020
1200 – 1300 (AEDT)
Teleconference (Level 1, Conference Room 2, Scarborough House)

Dial in details: Participants will dial 1800 087 367. Participants will be answered with two rapid beeps and should then enter the PIN 272181# **(these are the JEG only dial in details)**

1.	**Meeting Open**		
1.1.	Welcome, attendance and apologies	Chair	Note
1.2.	Conflict of Interest and Confidentiality Declaration	Chair	Declare
2.	**Strategic Discussion**		
2.1.	Viral pneumonia in Wuhan, China	Chair / Members	Discuss
3.	**Other Business**		
3.1.	Other business	Chair	Discuss

*For technical issues with the teleconference connection, please **contact Message Stick Help Desk on 1800 047 250**. Advise the operator you are a member of CDNA and need to be connected to the teleconference.*

Communicable Diseases Network Australia Committee Meeting
Jurisdictional Executive Group

Meeting Date: 20 January 2020

Item Number: 1.1
Sponsor: Secretariat
Speaker: Chair

Attendance and Apologies

Recommendations

That Members:

1. **NOTE** the attendees and apologies

Attendance	
s47F	Queensland, CDNA Chair
	Public Health Laboratory Network
	South Australia
	Western Australia (proxy)
	Australian Capital Territory
	Northern Territory
	Principal Medical Advisor, Australian Government Department of Health (proxy)
s47E(c), s47F	Australian Government Representative, Department of Health
s47F	New South Wales
	Victoria
Apologies	
s47F	Western Australia
	Tasmania (proxy)
Observers / Presenters / Secretariat	
s47E(c), s47F	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
s47F	CDNA Secretariat

Communicable Diseases Network Australia Committee Meeting
Jurisdictional Executive Group

Meeting Date: 20 January 2020

Item Number: 1.2
Sponsor: Secretariat
Speaker: Chair

Conflict of Interest and Confidentiality Declaration

Recommendations

That Members:

1. **Declare** any conflicts of interest, whether real or perceived, that they may have in relation to the business of the Communicable Diseases Network Australia (CDNA) Jurisdictional Executive Group (JEG).

Summary of issues for discussion

CDNA members are required to disclose at the beginning of each meeting any conflict of interest, actual or potential, relating to issues under discussion at that meeting. The Chair may require the member to absent themselves from the meeting if the conflict of interest cannot be otherwise managed.

Members are also required to disclose to the Chair any conflict of interest, actual or potential, relating to their membership of CDNA more broadly, immediately upon that conflict arising.

Background

Conflict of Interest

"Conflict of interest" includes any situation where a member or the member's partner, family member, or close family friend has a direct financial or other interest which influences or may appear to influence proper consideration or decision making by the Committee on a matter or proposed matter.

Confidentiality

All CDNA committee meeting agendas, papers, minutes and discussions are confidential to jurisdictional governments (including the Australian Government). Members of CDNA, as a standing committee under AHPPC and their specialised sub-committees and working groups, including non-jurisdictional members and observers, will be asked to observe confidentiality requirements. Committee papers should be regarded as *For Official Government Use Only* and can only be released outside governments on the authority of the Chair of CDNA.

Contact information

Branch/Jurisdiction/Standing Committee:	Secretariat
Contact person:	Secretariat
Phone:	02 6289 s47E(c), s47F
Email:	s47E(d) @health.gov.au
Cleared by:	Dr Marcelle Noja
Date:	20 January 2020

Communicable Diseases Network Australia Committee Meeting
Jurisdictional Executive Group

Meeting Date: 20 January 2020

Item Number: 2.1
Sponsor: Chair
Speaker: Members

Viral Pneumonia in Wuhan, China

Recommendations

That CDNA Members:

1. **Discuss** the outbreak of viral pneumonia in Wuhan, China.

Purpose of Paper

To discuss the outbreak of viral pneumonia in Wuhan, China.

Background

Please refer to the attachments to aid the discussion.

Aboriginal and Torres Strait Islander health impact statement

Nil.

Attachments

Attachment A: s22 [redacted]

Attachment B: s22 [redacted]

Attachment C: Series of National Guidelines – Middle East Respiratory Syndrome Coronavirus

Attachment D: Case Definition – Middle East Respiratory Syndrome Coronavirus

Attachment E: Laboratory Case Definition – Middle East Respiratory Syndrome Coronavirus

Attachment F: s22 [redacted]

Contact information

Branch/Jurisdiction/Standing Committee:	CDNA Secretariat
Contact person:	CDNA Secretariat
Phone:	(02) 6289 s47E(c), s47F
Email:	s47E(d) @health.gov.au
Cleared by:	Dr Marcelle Noja
Date:	20 January 2020

Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

CDNA NATIONAL GUIDELINES FOR PUBLIC HEALTH UNITS

Revision history			
Version	**Date**	**Revised by**	**Changes**
1.0	15 Oct 2014	Developed by MERS-CoV SoNG working group	Original
1.1	24 July 2015	MERS-CoV SoNG Working Group	Presenting sypmptoms; contact management and case definitions updated to address revised evidence following outbreak in Republic of South Korea. Further minor update approved by AHPPC Chair 7 September 2015 to include WHO recommendations on the testing of asymptomatic close contacts in the context of a hospital outbreak.

The Series of National Guidelines ('the Guidelines') have been developed by the Communicable Diseases Network Australia (CDNA) and noted by the Australian Health Protection Principal Committee (AHPPC). Their purpose is to provide nationally consistent guidance to public health units (PHUs) in responding to a notifiable disease event.

These guidelines capture the knowledge of experienced professionals, and provide guidance on best practice based upon the best available evidence at the time of completion.

Readers should not rely solely on the information contained within these guidelines. Guideline information is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a health professional. Clinical judgement and discretion may be required in the interpretation and application of these guidelines.

The membership of the CDNA and the AHPPC, and the Commonwealth of Australia as represented by the Department of Health ('the Commonwealth'), do not warrant or represent that the information contained in the Guidelines is accurate, current or complete. The CDNA, the AHPPC and the Commonwealth do not accept any legal liability or responsibility for any loss, damages, costs or expenses incurred by the use of, or reliance on, or interpretation of, the information contained in the guidelines.

Endorsed by CDNA: 24 July 2015
Noted by AHPPC: 14 August 2015
Released by Health: 7 September 2015

Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

CDNA NATIONAL GUIDELINES FOR PUBLIC HEALTH UNITS

1. Summary

Public health priority
Urgent.

Advice should be sought, where applicable, from the relevant state or territory central communicable diseases agency on the process for reporting of suspected, probable and confirmed MERS-CoV cases. MERS-CoV infection is a nationally notifiable disease.

Case management
Isolate suspected, probable and confirmed cases in a single room with negative pressure air-handling and an ensuite bathroom (if available) and use standard and transmission-based precautions (contact and airborne).

Contact management
Close contacts of probable and confirmed cases are subject to some work and travel restrictions and should be actively monitored for development of fever and respiratory symptoms in the 14 days following the last contact, while casual contacts are subject to self-monitoring only.

2. The disease

Infectious agents
The Middle East respiratory syndrome coronavirus (MERS-CoV).

Coronaviruses are a large and diverse family of viruses that include viruses that are known to cause illness in humans (including the common cold) and animals.

Reservoir
It is likely that the virus has come from an animal source. MERS-CoV has been detected in camels in several Middle East countries with human cases of MERS-CoV infection. Additionally, serological evidence of camel exposure to MERS-CoV or a closely related virus has been found in camels over a wide area of northern Africa and the Middle East. It is suspected, but not confirmed, that infected camels may be the source of the virus for some human cases. There are also limited reports of MERS-CoV being detected in bats.

More information is needed to identify the possible role that camels, bats, and other animals may play in the transmission of MERS-CoV. MERS-CoV is genetically distinct from SARS-CoV, and appears to behave differently, being less transmissible but with a higher mortality rate. However, the full spectrum of illness remains unclear.

Mode of transmission
The mode or modes of transmission of MERS-CoV are not fully known.

There have been some cases with a strong history of exposure to camels or camel products (e.g. milk), including at least one cluster where the camels also tested positive. However, there have been many sporadic cases with no history of prior exposure to camels or other animals.

There have been multiple clusters of cases in which human-to-human transmission has occurred. These clusters have been observed in health-care facilities, among family members and between co-workers. However, the mechanism by which transmission occurred in these instances, whether respiratory (e.g. coughing, sneezing) or direct physical contact with the patient or via fomites after contamination of the environment by the patient, is unknown.

Infection control recommendations for managing suspected, probable and confirmed cases are consistent with those recommended for SARS-CoV and pandemic influenza. As further information becomes available, these recommendations will be re-evaluated and updated as needed.

Incubation period
From 2 to 14 days; most commonly 5 days.

Infectious period
The duration of infectivity for MERS-CoV infection is unknown. Standard precautions should be applied throughout any admission; additional isolation precautions should be continued until at least 24 hours after the resolution of symptoms.

Given that little information is currently available on viral shedding and the potential for transmission of MERS-CoV, testing to detect the virus may be necessary to inform decision-making on infectiousness. Patient information (e.g. age, immune status and medication) should also be considered.

Clinical presentation and outcome
Clinical presentation ranges from asymptomatic to severe pneumonia with acute respiratory distress syndrome and multi-organ failure. Nearly all symptomatic patients have presented with fever. Respiratory symptoms are common and gastrointestinal symptoms are less commonly reported.

Typically, the disease starts with fever and cough. Other common symptoms are myalgia and chills. Sore throat, arthralgia, dyspnoea, nausea, vomiting and diarrhoea are less commonly present. In the 2015 South Korean outbreak pneumonia was present in a minority of patients at initial presentation, but it is unclear whether early testing of contacts with, at the time, milder clinical manifestations of MERS-CoV infection may have influenced the reported spectrum of illness.

Patients who develop pneumonia or pneumonitis often require mechanical ventilation and other organ support. The case fatality rate for confirmed cases is estimated at 30-40 percent, but this may decrease when the spectrum of disease is better understood, as suggested by lower case fatality observed in the South Korean outbreak.

Persons at increased risk of disease
The age distribution of reported cases is skewed heavily to the middle-aged and elderly. Cases who are elderly, immunocompromised or with co-morbidities have an increased case fatality rate[1].

Disease occurrence and public health significance
As of June 2015 there have been no confirmed MERS-CoV cases reported in Australia.

Countries that have reported cases in the Middle East include Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (KSA), United Arab Emirates (UAE) and Yemen, with Saudi Arabia and UAE being most affected.

Persons who acquired MERS-CoV in Middle Eastern countries have exported the infection to many other countries, which has resulted in health facility outbreaks in France, the United Kingdom, and most notably South Korea. For a full list of countries where MERS-CoV cases have been detected see the World Health Organization (WHO) coronavirus infection website [1].

WHO expects that additional cases of MERS-CoV infection will be reported from the Middle East, and that it is likely that cases will continue to be exported to other countries by tourists, travellers, guest workers or pilgrims who might acquire infection following exposure to human cases (possibly in a health care setting), or possibly from camels or other unknown animal sources (for example, while visiting farms or markets).

Until more is understood about the mode of transmission and risk factors for infection, it is expected that sporadic cases will continue to occur, with potential for limited transmission within households and healthcare settings.

3. Routine prevention activities

It is recommended that people with significant medical conditions such as diabetes, renal disease and chronic lung disease who are intending to travel to the Middle East – including those undertaking the Hajj or Umrah - consult a doctor prior to travel.

People travelling in countries affected by MERS-CoV should maintain good hygiene practices, avoid contact with animals, especially camels, and refrain from consuming unpasteurised milk or undercooked meat.

Travellers to the Middle East and travel organisations should be advised of general travel health precautions which will lower the risk of infection in general, including respiratory viruses and traveller's diarrhoea. Specific emphasis should be placed on:

- hand hygiene and respiratory hygiene
- adhering to good food-safety practices,
- maintaining good personal hygiene.

Travel advice for Australians is available at the Australian Department of Health MERS-CoV web page [2]. Travellers should check if there are any travel restrictions in place prior to travel.

4. Surveillance objectives

- To rapidly identify, isolate and treat cases, and prevent transmission to their contacts
- To identify and provide information to contacts and ensure that they are isolated rapidly should symptoms occur

- To describe the epidemiology of MERS-CoV infection in Australia, including identifying risk factors for transmission.

5. Data management

Probable and confirmed cases of MERS-CoV infection should be entered onto the notifiable diseases database within one working day of notification/report. Data for suspected cases should be maintained according to jurisdictional protocols.

6. Communications

Where applicable, public health units should immediately notify the central state/territory communicable diseases agency of suspected, probable and confirmed cases once notifications/reports are received. Provide the case's age, sex, place of residence, indigenous status, date of onset, travel history, laboratory results, clinical status, likely place of acquisition, and follow-up action taken.

State/territory communicable disease agencies should immediately notify probable and confirmed MERS-CoV cases to the National Incident Room.

7. Case definition

The criteria for a suspected case of MERS-CoV are to be used to direct testing and initial infection control and public health actions. Suspected cases will ultimately be reclassified as either having a diagnosis of MERS-CoV excluded, or meeting the criteria for a probable or confirmed case. The criteria for probable and confirmed cases of MERS-CoV define those cases that are to be reported to the National Notifiable Diseases Surveillance System.

Suspected case[1]
Knowledge and understanding of MERS-CoV infection continues to expand. The following criteria are based on case series reported from recent outbreaks and represent combinations of symptoms and epidemiological criteria in which MERS-CoV testing is strongly recommended.

Atypical presentations occur, and clinical and public health judgement should also be used to determine the need for testing in patients who do not meet the criteria below.

Testing and initial infection control and public health actions for MERS-CoV should be undertaken for persons with:

A. Fever AND pneumonia or pneumonitis or acute respiratory distress syndrome (ARDS) AND

    - history of travel from or residence in affected countries in the Middle East[2] within 14 days before symptom onset, OR

[1] Check for updates on the Australian Department of Health MERS-CoV website (http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-mers-cov.htm).

- contact[3] (within the incubation period of 14 days) with a symptomatic traveller who developed fever and acute respiratory illness of unknown aetiology within 14 days after travelling from affected countries in the Middle East, OR

- contact (within the incubation period of 14 days) with a symptomatic traveller who developed fever and acute respiratory illness of unknown aetiology within 14 days after travelling from a region with a known MERS-CoV outbreak at that time[4],

OR

B. Fever AND symptoms of respiratory illness (e.g., cough, shortness of breath) AND

- being in a healthcare facility (as a patient, worker, or visitor) in a country or territory in which recent healthcare-associated cases of MERS have been identified[4] within 14 days before symptom onset, OR

- being in contact with camels or raw camel products within affected countries in the Middle East within 14 days before symptom onset.

OR

C. Fever OR acute symptoms compatible with MERS-CoV AND onset within 14 days after contact with a probable or confirmed MERS-CoV case while the case was ill.

OR

D. Testing and initial infection control and public health actions for MERS-CoV should also be considered, in consultation with the public health unit, where there is a cluster of patients with severe acute respiratory illness of unknown aetiology following routine microbiological investigation, particularly where the cluster includes health care workers.

[2] Affected countries in the Middle East include Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (KSA), United Arab Emirates (UAE) and Yemen
[3] See section 11: Definition of contact
[4] See the World Health Organization (WHO) coronavirus infection website [1] for list of countries currently experiencing a MERS outbreak

Probable case

- A person with an acute respiratory infection with clinical, radiological, or histopathological evidence of pulmonary parenchymal disease (e.g. pneumonia or pneumonitis or Acute Respiratory Distress Syndrome (ARDS)); AND

  No possibility of laboratory confirmation for MERS-CoV because the patient or samples are not available for testing; AND
  Close contact with a laboratory-confirmed case (see the Contact Management section below for guidance on identifying close contacts).

Confirmed case

- A confirmed case requires laboratory definitive evidence of infection with MERS-CoV.

Laboratory definitive evidence

- Detection of MERS coronavirus by polymerase chain reaction (PCR) in a public health reference laboratory using the testing algorithm described in Appendix 3 and summarised below.

Notes:

(1) Transiting through an international airport (<24 hours stay, remaining within the airport) in the Middle East is not considered to be risk factor for infection.

(2) Laboratory definitive evidence. To consider a case as laboratory-confirmed, one of the following conditions must be met:
   - A positive PCR result for at least two different specific targets on the MERS-CoV genome.
   - One positive PCR result for a specific target on the MERS-CoV genome and an additional different PCR product sequenced, confirming identity to known sequences of MERS-CoV.

See the Laboratory testing section and Appendix 3 for additional MERS-CoV laboratory testing information.

8. Laboratory testing

Patients to be considered for MERS-CoV testing are described under the suspected case definition (above). Where applicable, consult with your state/territory communicable diseases agency to seek advice on which laboratories can provide MERS-CoV testing; appropriate specimen type, collection and transport; and also to facilitate contact management if indicated.

Transmission-based contact and airborne precautions must be used when collecting respiratory specimens [3]. These include:

- Contact precautions, including close attention to hand hygiene
- Airborne transmission precautions, including routine use of a P2 mask/respirator, disposable gown, gloves, and eye protection
- Collection in a room with negative pressure air-handling where available.

Routine tests for acute pneumonia/pneumonitis should be performed where indicated, including bacterial cultures, acute and convalescent serology, urinary antigen testing and tests for respiratory viruses, according to local protocols.

Serology, if available, may be useful in cases where MERS-CoV is strongly suspected but non-confirmed with PCR but requires paired acute and convalescent sera – seek expert clinical microbiology advice. Serology is also useful to estimate secondary infection rates in asymptomatic cases following exposure to MERS-CoV.

See Appendix 3 for additional MERS-CoV laboratory testing information.

9. Case management

Response times
On the same day as notification of a suspected, probable or confirmed case, begin follow up investigation and, where applicable, notify your central state or territory communicable diseases agency.

Response procedure
Case investigation
The response to a notification will normally be carried out in collaboration with the clinicians managing the case, and be guided by the MERS-CoV public health unit checklist (Appendix 2) and the MERS-CoV Investigation Form (Appendix 4).

Regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done
- Seek the treating doctor's permission to contact the case or relevant care-giver
- Determine if the diagnosis has been discussed with the case or relevant care-giver before beginning the interview
- Review case and contact management
- Ensure appropriate infection control guidelines are followed in caring for the case
- Identify the likely source of infection.

Note: If interviews with suspected cases are conducted face-to-face, the person conducting the interview must have a thorough understanding of infection control practices and be competent in using appropriate PPE.

Wherever possible, cases should be managed in hospital. If clinically indicated, cases may be managed at home only if it can be ensured that the case and household contacts are counselled about risk and that appropriate infection control measures are in place.

Case treatment
In the absence of pathogen-specific interventions, patient management largely depends on supportive treatment, and vigilance for and treatment of complications.

Further advice on clinical management is available from WHO [4].

Education
Provide MERS-CoV Fact Sheets (Appendix 1) to cases and their close contacts. Ensure that they are aware of the signs and symptoms of MERS-CoV, the requirements of isolation, contact details of the PHU and the infection control practices that can prevent the transmission of MERS-CoV.

Isolation and restriction
Cases must be isolated in an appropriate health facility, unless alternative arrangements are recommended on expert advice. Healthcare workers and others who come into contact with suspected, probable and confirmed cases must be protected according to recommended infection control guidelines. Visitors should be restricted to close family members.

A risk assessment should be undertaken for suspected cases who initially test negative for MERS-CoV. If there is no alternative diagnosis and a high index of suspicion remains that such cases may have MERS-CoV infection, consider continued isolation and use of the recommended infection control precautions, pending further testing (see Laboratory testing section and Appendix 3) and re-assessment.

Given the severity of reported infections, the evidence of limited person-to-person transmission, and gaps in knowledge of transmission pathways, the recommendations on isolation and PPE for management of suspected, probable and confirmed cases take a deliberately cautious approach.

Infection control measures should be those applicable to control the transmission of pathogens that can be spread by the airborne route. These measures are detailed in the *Interim infection prevention and control advice for acute care hospitals relating to suspected Middle Eastern respiratory syndrome coronavirus (MERS-CoV) infections*, (http://www.health.gov.au/mers-coronavirus) [3].

In summary, transmission-based precautions for suspected, probable and confirmed cases should include:

- Placement of cases in a negative pressure room with an ensuite bathroom, if available, or in a single room from which the air does not circulate to other areas
- Airborne transmission precautions, including routine use of a P2 respirator (or N95 mask), long sleeved disposable gown, gloves, and eye protection when entering a patient care area
- Contact precautions, including close attention to hand hygiene
- If transfer of the confirmed or probable case outside the negative pressure room is necessary, ask the patient to wear a single use “surgical” face mask while they are being transferred and to follow respiratory hygiene and cough etiquette.

Active case finding

Contacts (see *Contact management* section) should be identified and advised to immediately seek medical advice should they develop symptoms. Contacts or caregivers should be advised to inform the public health agency if they develop symptoms.

10. Environmental evaluation

Where local transmission of MERS-CoV is thought possible, a thorough review of contributing environmental factors should be done. This should include a review of infection control procedures, and opportunities for exposure to respiratory or faecal contamination.

If a case has had occupational exposure to animals it may be appropriate to consult with animal health authorities.

11. Contact management

As there remain gaps in the understanding of infectivity of MERS-CoV cases and transmission modes the definition of contacts is based on observations of people

infected in large outbreaks, particularly the outbreak in South Korea. The definition of contacts and recommended control measures are subject to review as more information on MERS-CoV becomes available.

Identification of contacts

All persons categorised as a contact (see definitions of “close contacts” and “casual contacts” following) of probable and confirmed cases should be followed-up, and monitored for the development of symptoms for 14 days after the last exposure to the case (i.e. the maximum incubation period).

Contacts of suspected cases should also be considered for contact management if there is likely to be a delay in confirming or excluding MERS CoV infection in the suspected case, such as delayed testing.

Close Contact definition

A close contact is defined as requiring greater than 15 minutes face-to-face contact with a symptomatic probable or confirmed case in any setting, or the sharing of a closed space with a symptomatic probable or confirmed case for a prolonged period (e.g. more than 2 hours).

Hence, close contacts may include:

- A healthcare worker or family member providing direct patient care to, or who were within close vicinity of an aerosol generating procedure performed on, or a laboratory worker who performed tests on specimens from, a confirmed or probable case, without recommended infection control precautions, including not using full personal protective equipment (PPE).

- OR, a healthcare worker, patient or visitor who shared the same closed space for a prolonged time (e.g. more than 2 hours), and without recommended infection control precautions, including not using full personal protective equipment (PPE).

- OR, people who resided in the same household or household-like setting (e.g. dormitory room in a boarding school).

Contact tracing by public health units should prioritise identifying close contacts particularly healthcare workers, and other close contacts who may be at higher risk of severe disease, including the elderly and those with significant co-morbidities.

- Casual contact definition
- Casual contact is defined as any person having less than 15 minutes face-to-face contact with a symptomatic probable or confirmed case in any setting, or sharing a closed space with a symptomatic probable or confirmed case for less than 2 hours. This will include healthcare workers, other patients, or visitors who were in the same closed healthcare space as a case, but for shorter periods than those required for a close contact. Other closed settings might include schools or offices.

Note that healthcare workers and other contacts who have taken recommended infection control precautions, including the use of full PPE, while caring for a symptomatic probable or confirmed MERS-CoV case are not considered to be close contacts. However, these people should be advised to self-monitor and if they

develop symptoms consistent with MERS-CoV infection they should isolate themselves and notify their public health unit or staff health unit so they can be tested and managed as a suspected MERS-CoV case (see recommendations below under *Management of symptomatic contacts*).

Other casual contacts may include:

- Extended family groups e.g. in an Aboriginal community.
- Aircraft passengers who were seated in the same row as the case, or in the two rows in front or two rows behind a symptomatic probable or confirmed MERS-CoV case. It is noted that to date no instances of transmission on airlines have been identified. Contact tracing of people who may have had close contact on long bus or train trips should also be attempted where possible, using similar seating/proximity criteria.
- All crew-members on an aircraft who worked in the same cabin area as a symptomatic probable or confirmed case of MERS-CoV. If a crew member is the symptomatic MERS-CoV case, contact tracing efforts should concentrate on passengers seated in the area where the crew member was working during the flight and all of the other members of the crew.

Where resources permit, more active contact tracing may be extended to other persons who have had casual contact (as defined above), particularly in school, office, or other closed settings. In these circumstances, the size of the room/space and degree of separation of the case from others should be considered in identifying contacts.

Contact assessment

All persons identified as having had contact with a symptomatic probable or confirmed case should be assessed to see if they should be classified as a close or casual contact and have demographic and epidemiological data collected. Information on contacts should be managed according to jurisdictional requirements.

Identification and assessment of the contacts of suspected cases may be deferred pending the results of initial laboratory testing. However, contact tracing should be considered if MERS-CoV infection remains high on the list of differential diagnoses, even if initial laboratory results are negative or are pending.

Contact testing

Routine laboratory screening for MERS-CoV infection is not recommended for asymptomatic contacts. One exception is in the setting of a hospital outbreak, where WHO recommends RT-PCR testing of nose/throat swabs of asymptomatic close contacts be considered, if feasible. RT-PCR-positive asymptomatic close contacts in this setting should be isolated, monitored closely for symptoms and only released from isolation following two negative RT-PCR tests separated by 24 hours.[2]

Serological testing of contacts may be useful if available, in order to help determine the secondary infection-attack rate and the proportion of infections that are asymptomatic. Contacts who agree to be tested should be advised that serological

[2] WHO recommends that if feasible, and in the context of a hospital outbreak, all close contacts of a confirmed case of MERS should be tested for the presence of the virus. See: http://apps.who.int/iris/bitstream/10665/180973/1/WHO_MERS_IPC_15.2_eng.pdf?ua=1 .

testing will not be done immediately and is not being conducted for contact management purposes.

Consent should be sought from household and healthcare worker close contacts for the collection of the following samples:

- A baseline serum sample, ideally within 7 days of exposure, to be stored and tested in parallel with a convalescent sample.
- A convalescent serum sample at least 21 days after the baseline sample was collected. If more than 21 days have passed since the last exposure, only a single serum sample is required.

The collection of nasopharyngeal (NP) swabs from asymptomatic contacts for MERS-CoV PCR is not recommended. There is little information available currently to reliably inform the timing of testing or the interpretation of negative test results in this setting.

Serial PCR testing of NP swabs from asymptomatic close contacts to detect MERS-CoV viral shedding may be conducted as part of ethics-approved research studies.

Prophylaxis
No specific chemoprophylaxis is available for contacts.

Education
Contacts should be counselled about their risk and the symptoms of MERS-CoV and provided with a MERS-CoV Fact Sheet (Appendix 1). They should be advised to self-isolate if they develop symptoms, and to immediately notify their public health unit and, if appropriate, their facility infection control unit (i.e. for healthcare workers).

Quarantine and restriction
Close contacts
Home quarantine of asymptomatic close contacts is not routinely recommended, but people identified as close contacts are advised to monitor their health for 14 days after the last possible contact with a symptomatic probable or confirmed MERS-CoV case.

Public health units should conduct active daily monitoring of close contacts for symptoms for 14 days after the last possible contact with a symptomatic probable or confirmed MERS-CoV case.

Close contacts should also be advised to immediately telephone the public health unit to arrange medical assessment if they develop symptoms such as fever, respiratory symptoms (including coughing and shortness of breath), headache, muscle pain or diarrhoea.

Less frequent active follow-up together with passive surveillance may be necessary if there are large numbers of close contacts to monitor.

Close contacts should also be advised to not travel internationally for 14 days after the last close contact with a probable or confirmed case of MERS-CoV, and any travel within Australia during this period should be subject to discussion with public health authorities.

Close contacts should be excluded from schools and sensitive occupations or settings such as health care, aged care, or child care during the 14 days after last unprotected contact with a case.

Casual contacts

Casual contacts should monitor their health for 14 days and report any symptoms immediately to the local public health unit. There are no restrictions on movements; however casual contacts should be advised to contact the public health unit if they develop symptoms.

Healthcare worker close contacts

Healthcare worker close contacts (i.e. persons exposed while unprotected, as described in the Contact definition section) should not undertake work in a healthcare setting for 14 days following the last possible contact with the case. Home quarantine is not routinely recommended during this period if these individuals remain asymptomatic, but some restrictions may be recommended based on a risk assessment of the particular circumstances.

Depending on arrangements in the jurisdiction, public health units may assist infection control units of health facilities to identify and monitor healthcare worker close contacts.

It is recognised that clinical work restrictions on healthcare worker close contacts may place strain on individuals and on health services. This underlines the importance of ensuring healthcare workers implement appropriate infection control precautions when assessing and managing suspected, probable and confirmed MERS-CoV cases.

These recommendations are based on reports from large health facility-based MERS-CoV outbreaks in the Middle East and South Korea which have involved nosocomial transmission of MERS-CoV to both patients and healthcare workers. CDNA will continue to monitor the emerging evidence around MERS-CoV transmission risks in healthcare settings and revise these recommendations as needed.

Management of symptomatic contacts

If fever, respiratory symptoms, or other symptoms consistent with MERS-CoV infection develop within the first 14 days following the last contact, the individual should be immediately isolated and managed as per the current recommendations for suspected MERS-CoV cases, with urgent testing for MERS-CoV infection undertaken in an environment which minimises the risk of exposure to others.

Ill contacts who are being evaluated for MERS-CoV infection can be appropriately isolated and managed at home, unless their condition is severe enough to require hospitalisation.

Symptomatic contacts who test negative for MERS-CoV by PCR will still need to be monitored for 14 days after their last contact with a probable or confirmed MERS-CoV case and may require re-testing. There have been a number of reports of MERS-CoV cases who initially tested negative for MERS-CoV by PCR.

12. Special situations

Outbreaks in healthcare facilities
If one or more probable or confirmed MERS-CoV cases are identified in a healthcare facility, an outbreak management team should be convened, including a senior facility manager, an infection control practitioner and appropriate clinical staff, in consultation with PHU staff as required. Control measures may include:

- active case finding, assessment and care
- isolation and/or cohorting
- work restriction for healthcare workers who have had close contact (i.e. unprotected exposure) with a confirmed or probable case
- distribution of fact sheets and other information
- epidemiological studies to determine risks for infection.

Outbreaks in residential care facilities or other residential institutions (e.g. prisons or boarding schools)
There have been few if any reports of MERS-CoV outbreaks in institutions other than in healthcare facilities, and transmission within households appears to be uncommon. Nevertheless, it is assumed that fellow residents in an institution will be at greater risk of infection if there has been a confirmed case living at the institution while infectious.

If one or more probable or confirmed MERS-CoV cases are identified in a residential care facility or institution, an outbreak management team should be convened, in consultation with PHU staff.

13. References and additional sources of information

References:

[1] World Health Organization (WHO). Coronavirus infections. (http://www.who.int/csr/disease/coronavirus_infections/en/)

[2] Australian Department of Health. MERS coronavirus web page. (http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-mers-cov.htm).

[3]Interim infection prevention and control advice for acute care hospitals relating to suspected Middle Eastern respiratory syndrome coronavirus (MERS-CoV) infections (http://www.health.gov.au/internet/main/publishing.nsf/Content/18EA5D58FA62A556CA257BF0001A8E1F/$File/interim-infection-prevention.pdf)

[4] World Health Organization (WHO). *Interim Guidance Document - Clinical management of severe acute respiratory infections when novel coronavirus is suspected*. (http://www.who.int/csr/disease/coronavirus_infections/InterimGuidance_ClinicalManagement_NovelCoronavirus_11Feb13u.pdf).

Additional resources:
WHO FAQs on MERS-CoV: (http://www.who.int/csr/disease/coronavirus_infections/faq/en/)

WHO MERS-CoV summary and literature updates:
(http://www.who.int/csr/disease/coronavirus_infections/archive_updates/en/)

WHO Update on MERS-CoV transmission from animals to humans, and interim recommendations for at-risk groups (13 June 2014):
(http://www.who.int/csr/disease/coronavirus_infections/MERS_CoV_RA_20140613.pdf)

WHO updated travel advice on MERS-CoV for Pilgrimages (3 June 2014):
(http://www.who.int/ith/updates/20140603/en/)

US CDC Middle East respiratory syndrome website:
(http://www.cdc.gov/coronavirus/mers/index.html)

ECDC Coronavirus website (http://ecdc.europa.eu/en/healthtopics/coronavirus-infections/Pages/index.aspx)

Public Health England Middle East respiratory syndrome coronavirus website:
(http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/MERSCoV/)

14. Appendices

Appendix 1. MERS-CoV Factsheet
Appendix 2. MERS-CoV PHU checklist
Appendix 3. MERS-CoV laboratory testing information
Appendix 4. MERS-CoV case investigation form

15. Jurisdiction specific issues

Links to Australian state and territory public health legislation, and the Commonwealth Quarantine Act and amendments are available at:
http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-state-legislation-links.htm

Appendix 1: Middle East Respiratory Syndrome (MERS) Factsheet

What is Middle East Respiratory Syndrome (MERS)?

Middle East Respiratory Syndrome (MERS) is a viral illness caused by a novel coronavirus, Middle East respiratory Syndrome Coronavirus (MERS-CoV) that was first identified in Saudi Arabia in 2012. Coronaviruses are a large family of viruses that cause diseases ranging from the common cold to Severe Acute Respiratory Syndrome (SARS).

All recognised cases of MERS-CoV infection (people who have the disease) have to date lived in or travelled to countries in the Middle East, or have had close contact, such as caring for or living with, people who acquired the infection in the Middle East. However, there is no evidence of sustained spread of the disease within the community.

There is a risk of MERS-CoV in the following Middle Eastern countries:

- Jordan, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates (UAE), Yemen, Lebanon and Iran.

People who caught the infection in the Middle East have travelled to a number of countries outside the Middle East and subsequently developed the disease. There have been no cases identified in Australia to date.

It is a very serious disease, and about 30% of people with MERS-CoV infection have died from the infection or related complications.

What are the symptoms?

- Most confirmed cases have had a rapid onset of serious respiratory illness, with fever, cough, and shortness of breath, leading to pneumonia.
- A variety of other symptoms have been reported in some cases, including muscle pain, diarrhoea, vomiting and nausea.
- An increasing number of infections are being identified in people with only mild symptoms or no symptoms (asymptomatic) who were tested because they were close contacts of seriously-ill cases.

How is it spread?

It is not yet understood exactly how people are becoming infected. In some cases there appears to have been spread from an infected person to another person in close contact. This has been seen among family members, and other patients and health care workers in hospitals caring for people with MERS-CoV infection. However, the virus does not seem to spread easily from person-to-person.

The original source of the virus is likely to be animals and MERS-CoV has been found in camels in some Middle Eastern countries where cases are occurring. Similar viruses have also been reported in bats. However, contact with camels and other animals does not appear to explain most of the human cases that are occurring. More information is needed to determine the roles that camels, bats and other animals may play in the spread of MERS-CoV.

Who is at risk?

People who are living in or travelling to affected areas of the Middle East or who have had contact with other cases may be at risk of catching the disease. People with underlying illnesses that make them more vulnerable to respiratory disease, including those with diabetes, chronic lung disease, pre-existing kidney disease, or those who have suppressed immune systems, may be at a higher risk.

How is it prevented?
There is no vaccine to prevent MERS-CoV infection. People who are travelling to affected countries should practice normal hygiene measures. Wash your hands often, and use a hand sanitiser if soap and water is not available.

It is currently recommended to minimise contact with animals in affected countries. When visiting a farm good hygiene measures should be practised, such as regular hand washing before and after touching animals, avoiding contact with sick animals, and following good food hygiene practices, including avoiding drinking raw milk, camel urine or eating food that may be contaminated with animal products unless the food is properly washed, peeled, or cooked.

People at high risk of severe disease due to MERS-CoV should consider taking additional precautions while travelling in the Middle East, such as avoiding visiting farms or market environments where camels are present.

What should I do if I become unwell after travel in the Middle East?
If you become ill or feel unwell while travelling in the Middle East, you should not wait until you arrive back in Australia to seek medical assistance. Instead you should see a doctor or go to the local emergency department.

If you have returned from travel to the Middle East within the last fourteen days and develop a fever, cough and other symptoms, you should see your doctor or go to the emergency department to work out why you are ill. It is important that you mention your symptoms and which countries you have visited in the Middle East when you first arrive at the medical practice or hospital emergency department.

You may be asked or required to wear a mask and be separated from others to prevent further spread of infection.

How is it diagnosed?
MERS-CoV is diagnosed by finding genetic material from the virus in respiratory samples such as swabs from the back of the throat and fluid from the lungs. Testing for MERS-CoV is done in public health laboratories.

How is it treated?
There is currently no specific treatment for people who are sick with MERS, but general supportive medical care can be life-saving.

What is the public health response?
The World Health Organization (WHO) is working with affected countries to minimise the risk of spread and find out more about the disease.

There have been no confirmed cases in Australia, but special procedures to prevent the spread of MERS-CoV would be put in place in the event of any suspected or confirmed cases. These would include:

- Asking the sick person to wear a surgical mask
- Health-care workers seeing patients and laboratory staff handling specimens would follow special safety guidelines, including wearing protective equipment.
- Doctors and laboratories would inform state/ territory health departments of suspected cases.
- Public Health authorities would follow up any case to identify their contacts so as to help prevent spread of the disease. Close contacts of people diagnosed or suspected of having

MERS-CoV infection would be given information about the risk of infection, and would be tested for the disease if necessary.

Public health unit staff will investigate all cases to find out how the infection occurred, identify other people at risk of infection, implement control measures and provide other advice.

Further information

- World Health Organization (WHO) MERS-CoV updates (www.who.int/csr/disease/coronavirus_infections/en/)
- Australian Department of Health – MERS coronavirus website (http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-mers-cov.htm)
- Centers for Disease Control and Prevention (USA) (http://www.cdc.gov/coronavirus/mers/)
- Australian Department of Foreign Affairs and Trade provides information for travellers on the Smartraveller website (www.smartraveller.gov.au/)

Appendix 2: PHU MERS-CoV checklist

Using the MERS-CoV Investigation form, contact the patient's doctor to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done
- Find out if the case or relevant care-giver has been told what the diagnosis is before beginning the interview
- Seek the doctor's permission to contact the case or relevant care-giver
- Review case management including infection control measures being used in caring for the case

Interview the case or care-giver to complete exposure and contact history and other details

- Complete the exposure history and other sections of the MERS-CoV Investigation Form.
- Identify close contacts according to the contact definition.

Follow-up patient's contacts to:

- Assess risk of MERS-CoV transmission and classify as close or casual contacts
- Determine current symptoms, if any, and advise on active daily monitoring of symptoms by public health unit (close contacts) or passive surveillance (casual contacts)
- Explain symptoms and need to immediately report any new symptoms
- Explain to healthcare, aged care, and childcare worker close contacts the need for work restrictions during the potential incubation period after exposure
- Explain to school student close contacts (or their carers) the need for exclusion during the potential incubation period after exposure
- Provide a MERS-CoV Disease Factsheet
- Arrange serological testing if available and appropriate.

Notify central jurisdictional communicable disease control agency

Central communicable disease control agency to notify Commonwealth Department of Health, Office of Health Protection

Consider need for media release and designate a media spokesperson.

Appendix 3: MERS-CoV Laboratory testing information

Samples suitable for testing

Respiratory samples - Upper respiratory tract

1. Nasopharyngeal swab and/or oropharyngeal swab
    - nasopharyngeal: insert a swab into each nostril parallel to the palate, leave the swab in place for a few seconds to absorb secretions
    - oropharyngeal: swab the tonsilar beds, avoiding the tongue
    - place swabs back into the accompanying transport media

2. Nasal wash/aspirates
    - collect 2-3 mL into a sterile, leak-proof, screw-top dry sterile container

Respiratory samples – Lower respiratory tract

1. Bronchoalveolar lavage, tracheal aspirate, pleural fluid
    - collect 2-3 mL into a sterile, leak-proof, screw-top sputum collection cup or dry sterile container

2. Sputum
    - patient should rinse his/her mouth with water before collection
    - expectorate deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container

There is now increasing evidence that lower respiratory tract specimens contain the highest viral loads, therefore, lower respiratory tract specimens should be collected where possible. Repeat testing (especially of lower respiratory tract specimens) in compatible cases should be performed if initial results are negative.

Serology
Serum should be collected during the acute phase of the illness (preferably within the first 7 days of symptom onset), stored, and tested in parallel with a convalescent serum collected 3 or more weeks after acute sample collection. If no acute sample was collected, a single serum sample collected 14 or more days after symptom onset may be tested.

Immunofluorescence and neutralization serology tests are used. Similar to NAT, a two stage approach using a screening followed by a confirmatory test can be employed. For screening purposes, an enzyme-immunosorbent assay (ELISA) against recombinant N protein can be used, followed by confirmatory testing using a whole virus indirect fluorescent antibody (IFA) test or microneutralization. Given that all serological tests developed so far have only been validated against a small number of convalescent sera from MERS-CoV cases, positive serological test results in the absence of nucleic acid testing (NAT) or sequencing are considered probable cases only.

Stool
2 – 5 grams of stool (formed or liquid) is collected in a sterile, leak-proof, screw-top dry sterile container.

Handling of specimens in the laboratory
Laboratory staff should handle specimens under PC2 conditions in accordance with AS/NZS 2243.3:2010 Safety in Laboratories Part 3: Microbiological Safety and Containment. Specimens should be transported in accordance with current regulatory requirements.

MERS-CoV testing
NAT using reverse-transcriptase polymerase chain reaction (RT-PCR) is the method of choice for detection of MERS-CoV. Currently, four targets are used for testing:-

- upstream region of the E protein (upE) gene
- open reading frames (ORF) 1a (ORF1a)
- ORF1b
- MERS-CoV specific nucleocapsid (N) protein gene

An algorithm using a screening assay, followed by confirmatory testing is recommended. For screening purposes, assays targeting the upE gene are appropriate. Confirmatory testing can be performed using an assay targeting the ORF1a (comparable sensitivity to upE gene), ORF1b (which is less sensitive than ORF1a or upE) or N gene. It is recommended that positive screening tests be reported to communicable diseases agencies whilst awaiting confirmatory testing.

Where available, RdRp gene (for the broad detection of β-coronavirus clade C) and/or N gene sequencing may also be considered for MERS-CoV confirmation. As the primers for the RdRp sequencing assay is highly conserved, it is not recommended that this assay be used alone for MERS-CoV confirmation, as false positive results may occur from cross-reactions with other β-coronaviruses. Further information about laboratory testing is available at:

- Institute of Virology, Bonn (http://www.virology-bonn.de/index.php?id=40)
- The US Food and Drug Administration (http://www.fda.gov/downloads/MedicalDevices/Safety/EmergencySituations/UCM355572.pdf).

Testing algorithms may also need to be revised pending further information about the virus, and the number of specimens received in the laboratory for testing.

Viral culture is generally not performed for routine diagnosis, and should only be attempted in laboratories with appropriate experience and containment facilities. MERS-CoV replication has been previously observed on Vero and LLC-MK2 cells within 5 days of inoculation

Appendix 4: MERS-CoV Case Investigation Form

Note: This is an example form incorporating most of the fields contained in the NetEpi (database) form that has been prepared for national reporting. Central disease control agencies in individual jurisdictions should be consulted regarding their specific data collection requirements.

1	Interview	Was the person interviewed? ☐ Yes ☐ No ☐ Not applicable - If Yes, date of interview: / / (dd/mm/yyyy) - If No, specify reason not interviewed (and if someone else was interviewed):
2	Case status	☐ Confirmed ☐ Probable ☐ Suspected ☐ Excluded Notification date: / / Received date: / / Notifier:
3	Patient contact details	Family name: Given names: Residential address: Phone number (home): Phone number (work): Phone number (mobile):
4	Address type	☐ Household ☐ Aged-care facility ☐ Educational Institution ☐ Assisted ☐ Military Barracks ☐ Prison ☐ Other ☐ Unknown If Other, please specify:
5	Gender	☐ Male ☐ Female ☐ Unknown
6	Date of birth	Date of birth: / / (dd/mm/yyyy)
7	Country of birth	Country of birth: If not born in Australia, date of first arrival in Australia: / / (dd/mm/yyyy) *Note: if only year known, enter 01/01/[year]*
8	Indigenous Status	o Aboriginal origin o Torres Strait Islander origin o Both Aboriginal and Torres Strait Islander origin o Not Aboriginal and Torres Strait Islander origin o Not Stated / Unknown
9	Onset date of first symptoms	Did the person have symptoms? ☐ Yes ☐ No ☐ Unknown - If Yes, onset date: / / (dd/mm/yyyy)

		- Duration of symptoms:			(days)
10	Symptoms and clinical notes	Acute respiratory distress syndrome	☐ Yes	☐ No	☐ Unknown
		Arthralgia	☐ Yes	☐ No	☐ Unknown
		Conjunctivitis	☐ Yes	☐ No	☐ Unknown
		Cough	☐ Yes	☐ No	☐ Unknown
		Diarrhoea	☐ Yes	☐ No	☐ Unknown
		Fatigue	☐ Yes	☐ No	☐ Unknown
		Fever	☐ Yes	☐ No	☐ Unknown
		- Highest temperature:	(^{0}Celsius)		
		- Fever onset date: / /			(dd/mm/yyyy)
		- Feverish by self-report?	☐ Yes	☐ No	☐ Unknown
		Chills or rigors	☐ Yes	☐ No	☐ Unknown
		Headache	☐ Yes	☐ No	☐ Unknown
		Malaise	☐ Yes	☐ No	☐ Unknown
		Myalgia	☐ Yes	☐ No	☐ Unknown
		Nausea	☐ Yes	☐ No	☐ Unknown
		Pneumonia	☐ Yes	☐ No	☐ Unknown
		Pneumonitis	☐ Yes	☐ No	☐ Unknown
		Rhinorrhoea	☐ Yes	☐ No	☐ Unknown
		Shortness of breath	☐ Yes	☐ No	☐ Unknown
		Sore throat	☐ Yes	☐ No	☐ Unknown
		Vomiting	☐ Yes	☐ No	☐ Unknown
		Other symptoms	☐ Yes	☐ No	☐ Unknown
		- If Yes, specify symptoms:			
		Clinical notes:			
11	Hospitalisation and treatment details	Was the person hospitalised? ☐ Yes	☐ No	☐ Unknown	
		- Name of hospital:			
		- Hospital phone number:			
		- Date admitted: / /	(dd/mm/yyyy)		
		- Date discharged: / /	(dd/mm/yyyy)		
		Admitted to ICU/HDU?	☐ Yes	☐ No	☐ Unknown
		- Number of days in ICU/HDU:			(days)
		Oxygen therapy required?	☐ Yes	☐ No	☐ Unknown
		Intubation required?	☐ Yes	☐ No	☐ Unknown
		Mechanical ventilation required?	☐ Yes	☐ No	☐ Unknown

		Hospital medical record/chart number:
12	Admitting doctor details	Is admitting doctor same as treating doctor? ☐ Yes ☐ No ☐ Unknown - If Yes, enter details in the Treating Doctor section below. - If No, record Admitting Doctor's name: - Phone number / pager
13	Outcome of illness	What was the outcome of the case? ☐ Alive ☐ Died - If Died, date of death: / / (dd/mm/yyyy) - Cause of death due to MERS-CoV infection? ☐ Yes ☐ No ☐ Unknown - If death due to other cause, specify:
14	Occupation (during period of interest)	During the period of interest, did the person work in any of the following high risk occupations (settings)? ☐ Healthcare ☐ Aged-care facility ☐ Educational facility ☐ Assisted Living ☐ Military institution ☒ Correctional facility ☐ No high risk occupation ☐ Other ☐ Unknown - If Other, specify: - If No high risk occupation – Skip to next question Date last attended this work: / / (dd/mm/yyyy) Was the infection acquired in the workplace? ☐ Yes ☐ No ☐ Unknown Description of occupation: Employer/facility name Employer/facility street address Employer/facility suburb/ town Employer/facility state Employer/facility postcode Employer/facility phone number Employer/facility fax number Contact name Contact email address
15	Contact with a known or possible case (during period of interest)	Did the case have contact with a known or possible MERS-CoV case? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Date of last contact: / / (dd/mm/yyyy)
16	Treating Doctor details	**Enter the Treating Doctor's details.** Name: Practice name (if any): Street address: Suburb / town: State: Postcode: Phone number: Fax number: Email address:

		Case's medical record/chart number:
17	Pre-existing conditions and medical history	Cardiac disease (not simple hypertension) ☐ Yes ☐ No ☐ Unknown Chronic lung disease ☐ Yes ☐ No ☐ Unknown Diabetes ☐ Yes ☐ No ☐ Unknown Haemoglobinopathy ☐ Yes ☐ No ☐ Unknown Immunosuppressive condition ☐ Yes ☐ No ☐ Unknown Liver disease ☐ Yes ☐ No ☐ Unknown Metabolic disease ☐ Yes ☐ No ☐ Unknown Neurological disorder ☐ Yes ☐ No ☐ Unknown Obesity ☐ Yes ☐ No ☐ Unknown Renal disease ☐ Yes ☐ No ☐ Unknown - If Yes, are they on dialysis? ☐ Yes ☐ No ☐ Unknown Other medical condition? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Is the person currently pregnant or was she pregnant during the illness? ☐ Yes ☐ No ☐ Unknown If Yes, number of weeks gestation at onset of symptoms:(weeks) - Pre-existing medications and conditions notes: Are they a current smoker? ☐ Yes ☐ No ☐ Unknown If Yes, number of pack years: (pack/yrs.) - Do they drink alcohol? ☐ Yes ☐ No ☐ Unknown If Yes, average number of standard drinks per week: (SD/week)
18	Travel in the Middle East and contact with other cases * Check the current case definition for a list of affected countries.	During the period of interest, did the case travel to the Middle East? * ☐ Yes ☐ No ☐ Unknown *Note: Transiting through an international airport (<24 hours stay, remaining within the Airport) in the Middle East is not considered to be risk factor for infection.* **If NO → Proceed directly to Question 22: Human Exposures** Did they participate in any Pilgrimages or festivals whilst in the Middle East during the 14 days prior to onset? (e.g. the Hajj or Umrah) ☐ Yes ☐ No ☐ Unknown - If Yes, give details of what, when and where:
19	Locations visited during incubation period (during period of interest)	During the period of interest, did they visit any of the following venues or locations in the Middle East*? ☐ Hospital ☐ Other health facility ☐ Farm ☐ Swamp marsh ☐ Zoo/petting zoo ☐ Camping ☐ Abattoir ☐ Hunting

		☐ Animal market ☐ Stockyards ☐ River/lake ☐ Agricultural show
20	Animal exposures (during period of interest)	*Consider any contact with live or dead animals that they have had including visiting places where animals are kept, even if they didn't have direct contact with them.* Did they have contact with camels? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Did they have contact with domestic (including household pets) or wild animals? ☐ Yes ☐ No ☐ Unknown - If Yes, were any of these animals sick or dead? ☐ Yes ☐ No ☐ Unknown o If Yes, specify: Were they aware of any other animal/excreta (e.g. bats, rodents, stray cats/dog, foxes, reptiles, etc.) ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Did they visit a market selling live animals? ☐ Yes ☐ No ☐ Unknown - If Yes, specify: Did they visit any other venue at which live animals were present (e.g. farm, race course, zoo or falconry events)? ☐ Yes ☐ No ☐ Unknown - If Yes, specify:
21	Food exposures (during period of interest)	During the period of interest, where did they normally get their food? (Specify kinds of food and locations) Did they get their food from any other locations, or did they eat any new types of food? ☐ Yes ☐ No ☐ Unknown - If Yes, describe: Have they eaten any foods or drunk any beverages that they think could have been unsafe or caused them to become ill? ☐ Yes ☐ No ☐ Unknown - If Yes, describe: Did they eat any of the following: Camel meat, camel milk or camel urine? ☐ Yes ☐ No ☐ Unknown Raw fruits or vegetables? ☐ Yes ☐ No ☐ Unknown Uncooked meat or eggs ☐ Yes ☐ No ☐ Unknown Raw/unpasteurised milk or milk products? ☐ Yes ☐ No ☐ Unknown Dried fruits or nuts ☐ Yes ☐ No ☐ Unknown Did they slaughter an animal or handle raw meat (e.g. in preparation for a meal or religious offering)? ☐ Yes ☐ No ☐ Unknown - If Yes, describe: Did they take any traditional medicines or use any home remedies? ☐ Yes ☐ No ☐ Unknown

		- If Yes, give details:
22	Human exposures *Contact with people who were ill during the period of interest* ***Note: not restricted to Middle East contacts***	During the period of interest, did they have contact with anyone who might have had a contagious illness while they were still sick? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: Have they had contact with persons who are in close contact with animals because of their work? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: Have they had contact with a person who had a respiratory illness/diarrhoea/vomiting? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: Did they visit or care for any sick person? ☐ Yes ☐ No ☐ Unknown - If Yes, give details: - If Yes, did they have any contact with the sick person's bodily fluids, such as urine, blood, sputum or faeces? ☐ Yes ☐ No ☐ Unknown o If Yes, give details:
23	Healthcare and hospital presentation *These questions should be answered about healthcare and hospital presentation in the 14 days prior to onset* *Includes Australian and overseas presentations*	Did the case present to hospital? ☐ Yes ☐ No ☐ Unknown - If Yes, date of presentation to hospital: / / (dd/mm/yyyy) - Was the hospital presentation for MERS related symptoms? ☐ Yes ☐ No ☐ Unknown o If No, give details of what, when and where: Did the case visit any other healthcare facilities during the period of interest? ☐ Yes ☐ No ☐ Unknown - If Yes, give date of presentation: / / (dd/mm/yyyy) Was the healthcare visit for MERS-CoV symptoms? ☐ Yes ☐ No ☐ Unknown - If No, give details of what, when and where:
24	Case Found by	☐ Clinical Presentation ☐ Contact tracing/epidemiological investigation ☐ Screening ☐ Clinical and epidemiology ☐ Other: Specify:

New surveillance case definition

The following new case definition has been developed by the Case Definitions Working Group and endorsed by the Communicable Diseases Network Australia. The implementation date is 1 July 2016.

Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

Reporting

Confirmed and **probable cases** should be notified

Confirmed case

A confirmed case requires **laboratory definitive evidence**

Laboratory definitive evidence

Detection of MERS-CoV coronavirus by polymerase chain reaction (PCR) in a public health reference laboratory using the testing algorithm described in the national guideline (SoNG) and summarised below.[1]

Probable case

A probable case requires **clinical evidence** AND **epidemiological evidence**

Clinical evidence

An acute respiratory infection with clinical, radiological, or histopathological evidence of pulmonary parenchymal disease (e.g. pneumonia or pneumonitis or acute respiratory distress syndrome).

AND

No possibility of laboratory confirmation for MERS-CoV because the patient or samples are not available for testing.

Epidemiological evidence

Close contact with a laboratory-confirmed case

1. To consider a case as laboratory-confirmed, one of the following conditions must be met:
   - A positive PCR result for at least two different specific targets on the MERS-CoV genome.
   - One positive PCR result for a specific target on the MERS-CoV genome and an additional different PCR product sequenced, confirming identity to known sequences of MERS-CoV.

Australian Government
Department of Health

The Department of Health

Middle East Respiratory Syndrome coronavirus (MERS-CoV) Laboratory Case Definition (LCD)

The Public Health Laboratory Network have developed a standard case definition for the diagnosis of diseases which are notifiable in Australia. This page contains the laboratory case definition for MERS-CoV.

Page last updated: 28 November 2014

Version:
Authorisation: PHLN
Consensus Date:

1 PHLN Summary Laboratory Definition

1.1 Condition:

Middle East Respiratory Syndrome coronavirus (MERS-CoV)

1.1.1 WHO laboratory-confirmed criteria

A positive PCR result for at least two different specific targets on the MERS-CoV genome
OR
One positive PCR result for a specific target on the MERS-CoV genome and an additional different PCR product sequenced, confirming relateness to known sequences of MERS-CoV.

A case with a positive PCR result for a single specific target without further testing, but with a history of potential exposure and consistent clinical signs, is considered a probable case.

At present, positive serology (MERS-CoV-specific antibodies) results in the absence of PCR testing or sequencing are considered probable cases of MERS-CoV infection if they meet the clinical case definition.

2 The disease

2.1 Infectious agent

Coronaviruses are a large and diverse family of viruses that include viruses that are known to cause illness in humans and animals. Four human coronaviruses (hCoV) are known causes of respiratory infections of mild to moderate severity. These include the betacoronaviruses hCoV-OC43 and hCoV-HKU1, and the alphacoronaviruses hCoV-229E and hCoV-NL63. Severe acute respiratory syndrome coronavirus (SARS-CoV) and MERS-CoV are betacoronaviruses that can cause severe respiratory infection. MERS-CoV is genetically distinct from SARS-CoV.

2.2 Reservoir

It is likely that the MERS-CoV has come from an animal source. MERS-CoV has been found in camels in Qatar and a bat in Saudi Arabia. Sera from camels in a few other countries (but not Australia) have also tested positive for antibodies to MERS-CoV, indicating they were previously infected with MERS-CoV or a closely related virus. However, it is not known if camels are the source of the virus for human infections. More information is needed to identify the possible role that camels, bats, and other animals may play in MERS-CoV transmission.

2.3 Mode of transmission

The mode or modes of transmission of MERS-CoV are not fully known.

There have been some cases with a strong history of exposure to camels, including at least one cluster where the camels also tested seropositive, but there have been many sporadic cases with no history of prior exposure to camels or other animals. Analysis of genetic sequence data suggests multiple independent introductions into human populations, rather than from a single zoonotic event.

Although there have been multiple clusters of cases in which human-to-human transmission has occurred, sustained human-to-human transmission has not been observed. Clusters of human-to-human transmission have been observed in healthcare facilities, among family members and between co-workers. However, the mechanism by which transmission occurred in all of these cases, whether respiratory (e.g. coughing, sneezing) or direct physical contact with the patient or contamination of the environment by the patient, is unknown.

Infection control recommendations for managing suspect, probable and confirmed cases are consistent with those recommended for SARS-CoV. As information becomes available, these recommendations will be re-evaluated and updated as needed.

2.4 Incubation period

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From 2 to 14 days, with a median of ~5 days.

2.5 Infectious period

The duration of infectivity following MERS-CoV infection is unknown. Standard precautions should always be applied; additional isolation precautions should be used during the duration of symptomatic illness and continued for at least 24 hours after the resolution of symptoms.

Given that little information is currently available on viral shedding and the potential for transmission of MERS-CoV, testing for viral shedding should assist the decision making when readily available. Individual patient factors (e.g. age, immune status, other co-morbidities) should also be considered in situations where there is concern that a patient may be shedding the virus for prolonged periods.

2.6 Clinical presentation and outcome

Clinical presentation ranges from asymptomatic to severe pneumonia with acute respiratory distress syndrome and multi-organ failure. Nearly all symptomatic patients have presented with respiratory symptoms and one third of patients have had gastrointestinal symptoms.

Typically, the disease starts with fever and cough, chills, sore throat, myalgia and arthralgia, followed by dyspnoea, and rapidly progresses to pneumonia, often requiring mechanical ventilation and other organ support.

The case fatality rate for confirmed cases is ~30% but this may decrease as mild or asymptomatic cases are identified during contact tracing of known cases.

2.7 Persons at increased risk of disease

Cases who are elderly, immunocompromised or with co-morbidities have an increased mortality rate.

2.8 Disease occurrence and public health significance

There have been no confirmed MERS-CoV cases reported in Australia to date. MERS-CoV is also not a national notifiable disease at present, but is notifiable in some States such as Western Australia.

As of 17th July 2014, 834 laboratory-confirmed cases of human infection with MERS-CoV have been reported to WHO, including at least 288 related deaths. MERS-CoV updates can be found at the WHO website(http://www.who.int/csr/disease/coronavirus_infections/en/).

At the time of writing, the affected countries in the Middle East include Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (KSA), United Arab Emirates (UAE) and Yemen; in Africa: Algeria, Egypt and Tunisia; in Europe: France, Germany, Greece, Italy, the Netherlands and the United Kingdom; in Asia: Malaysia and Philippines; and in North America: the United States of America (USA).

WHO expects that additional cases of MERS-CoV infection will be reported from the Middle East, and that it is likely that cases will continue to be exported to other countries by tourists, travellers, guest workers or pilgrims who might acquire infection following exposure to an animal (for example, while visiting farms or markets) or human source (possibly in a health care setting). Until more is understood about mode of transmission and risk factors for infection, cases resulting from zoonotic transmission are likely to continue to occur, and may seed limited community transmission within household and possibly significant hospital-associated outbreaks.

3 Clinical case definitions

3.1 Confirmed case

- A confirmed case requires laboratory definitive evidence of infection with MERS-CoV

3.2 Probable case

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- A person with an acute respiratory infection with clinical, radiological, or histopathological evidence of pulmonary parenchymal disease (e.g. pneumonia or Acute Respiratory Distress Syndrome (ARDS)); AND
- Either no possibility of laboratory confirmation for MERS-CoV because the patient or samples are not available for testing; or results of laboratory testing awaited AND
- Close contact with a laboratory-confirmed case (see the Contact Management section below for guidance on identifying close contacts).

Notes:

- Transiting through an international airport (<24 hours stay, remaining within the airport) in the Middle East is not considered to be risk factor for infection.
- Countries in the Middle East and immediate surrounding areas may be defined as:
- Bahrain, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian territories, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.
- Laboratory definitive evidence: to consider a case as laboratory-confirmed, one of the following conditions must be met: (WHO MERS-CoV testing algorithm)
- A positive MERS-CoV PCR result (note that WHO currently recommend PCR for at least two different specific targets on the MERS-CoV genome, or alternatively one positive PCR result for a specific target on the MERS-CoV genome and an additional different PCR product sequenced, confirming relatedness to known sequences of MERS-CoV. While this is endorsed as good practice for Australia to provide confirmation of initial cases it is not considered practical as an ongoing routine diagnostic approach.

3.3 Suspect case/Patient under investigation

MERS-CoV testing should be considered for:

- Individuals with pneumonia or pneumonitis and history of travel to, or residence in, the Middle East, in the 14 days before illness onset; OR
- Individuals with pneumonia or pneumonitis and history of contact with those mentioned above in the 14 days before illness onset.
- Healthcare workers with pneumonia or pneumonitis, who have been caring for patients with severe acute respiratory infections, particularly patients requiring intensive care, without regard to place of residence or history of travel, where another cause has not been confirmed.

Note: Also consider in laboratory workers who have handled clinical specimens from confirmed MERS-CoV cases without adequate infection control precautions.

Refer to the CDNA surveillance case definitions website(http://www.health.gov.au/casedefinitions) for updated case definitions.

4 Laboratory testing

4.1 Testing guidelines

Patients to be considered for MERS-CoV testing are described under the Suspect case/Patient under investigation case definition (above).

Transmission-based contact and airborne precautions must be used when collecting respiratory specimens. These are described in NHMRC: Australian Guidelines for the Prevention and Control of Infection in Healthcare – 2010 (particularly section B2.4), and include:

- Contact precautions, including close attention to hand hygiene
- Airborne transmission precautions, including routine use of a P2 respirator, disposable gown, gloves, and eye protection when entering a patient care area
- A requirement for negative pressure air-handling
- Place clearly labeled specimens for transport in a biohazard specimen bag (leak-proof specimen bags that have a separate sealable pocket for the specimen) with a clearly written request form
- Deliver all specimens by hand, do not use pneumatic-tube specimen transport systems
- Notify the receiving laboratory as soon as possible that a specimen is being transported.

See Appendix 1 for requirements for specimen handling and transport to the laboratory.

4.2 Samples suitable for testing

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4.2.1 Respiratory samples

Upper respiratory tract samples
Nasopharyngeal swab and/or oropharyngeal swab

- nasopharyngeal: insert a swab into each nostril parallel to the palate, leave the swab in place for a few seconds to absorb secretions
- oropharyngeal: swab the tonsilar beds, avoiding the tongue
- place swabs back into the accompanying transport media

Nasal wash/aspirates

- collect 2-3 mL into a sterile, leak-proof, screw-top dry sterile container

Lower respiratory tract samples
Bronchoalveolar lavage, tracheal aspirate, pleural fluid

- collect 2-3 mL into a sterile, leak-proof, screw-top sputum collection cup or dry sterile container

Sputum

- patient should rinse his/her mouth with water before collection
- expectorate deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container

There is now increasing evidence that lower respiratory tract specimens such as contain the highest viral loads, therefore, lower respiratory tract specimens should be collected where possible. Repeat testing (especially of lower respiratory tract specimens) in compatible cases should be performed if initial results are negative.

4.2.2 Serology

Serum should be collected during the acute phase of the illness (preferably within the first 7 of symptom onset), stored, and tested in parallel with a convalescent serum collected 3 or more weeks after acute sample collection.

If no acute sample was collected, a single serum sample collected 14 or more days after symptom onset may be tested.

At the time of writing, limited indirect fluorescent antobody (IFA) serology is available but only specificity can be established without access to significant numbers of positive sera. Only a single MERS-CoV positive sample has been available for validation purposes thus far. Hence serology should be used sparingly as an adjunct to detection of virus in acute cases. Serology may be useful in cases where MERS-CoV is strongly suspected but non-confirmed with nucleic acid testing (NAT). Collection of paired acute and convalescent sera is recommended. Positive serological test results in the absence of NAT or sequencing are considered probable cases only.

In some other countries neutralization serology tests are used for confirmation purposes. Similar to NAT, a two stage approach using a screening followed by a confirmatory test can be employed. In the absence of positive sera with which to establish, calibrate and control such an assay this approach is not possible in Australia. For screening purposes, an enzyme-immunosorbent assay (ELISA) against recombinant N protein can be used.

4.2.3 Stool

2 – 5 grams of stool (formed or liquid) is collected in a sterile, leak-proof, screw-top dry sterile container.

4.3 Testing of other pathogens

Routine tests for acute pneumonia/pneumonitis should be performed where indicated, including bacterial cultures, acute and convalescent serology, urinary antigen testing and tests for influenza and other respiratory viruses.

4.4 Handling of specimens in the laboratory

Laboratory staff should handle specimens under PC2 and PC3 conditions in accordance with AS/NZS 2243.3:2010 Safety in Laboratories Part 3: Microbiological Safety and Containment. Specimens should be transported in accordance with current regulatory requirements (see Appendix 1 and 2).

4.5 MERS-CoV testing

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NAT using reverse-transcriptase polymerase chain reaction (RT-PCR) is the method of choice for detection of MERS-CoV. Currently, four targets may be used for testing:-

- upstream region of the E protein (upE) gene
- open reading frame (ORF) 1a (ORF1a)
- ORF1b
- MERS-CoV specific nucleocapsid (N) protein gene

An algorithm using a screening assay, followed by confirmatory testing is recommended for certainty of diagnosis of the initial cases. For screening purposes, assays targeting the upE gene are appropriate. Confirmatory testing can be performed using an assay targeting the ORF1a (comparable sensitivity to upE gene), ORF1b (which is less sensitive than ORF1a or upE) or N gene. It is recommended that positive screening tests be reported to communicable diseases agencies whilst awaiting confirmatory testing.

Where available, RdRp gene (for the broad detection of b-coronavirus clade C) and/or N gene sequencing may also be considered for MERS-CoV confirmation. As the primers for the RdRp sequencing assay are highly conserved, it is not recommended that this assay be used alone for MERS-CoV confirmation, as false positive results may occur from cross-reactions with other b-coronaviruses. Further information about laboratory testing is available at (http://www.virology-bonn.de/index.php?id=40) and (http://www.fda.gov/downloads/MedicalDevices/Safety/EmergencySituations/UCM355572.pdf). Testing algorithms may also need to be revised pending further information about the virus, and the number of specimens received in the laboratory for testing.

Viral culture is generally not performed for routine diagnosis, and should only be attempted in laboratories with appropriate experience and containment facilities. MERS-CoV replication has been previously observed on Vero and LLC-MK2 cells within 5 days of inoculation.

4.6 Quality assurance

In 2013, the RCPA Quality Assurance Programs conducted two novel coronavirus (MERS-CoV) surveys under the RCPAQAP Biocsecurity module. As clinical samples, live or inactivated virus, were not available for testing, each survey contained three simulated specimens generated using recombinant plasmids.

The first survey contained varying concentrations of MERS-CoV E, RdRp, N, ORF1a and ORF1b RNA transcripts, whilst the second survey included MERS-CoV and hCoV-NL63 RNA transcripts. Seven laboratories participated in the survey, using in-house developed NAT and commercial assays. In survey 1, 6 of 7 laboratories were able to detect MERS-CoV. In survey 2, 6 of 7 laboratories were able to detect MERS-CoV, but 4 of 6 laboratories (one laboratory using a commercial assay was not able to detect MERS-CoV or hCoV-NL63) falsely detected MERS-CoV in samples containing hCoV-NL63 transcripts.

Although both surveys were conducted using RNA transcripts generated using recombinant plasmids, they highlighted that cross-reactivity and/or cross-contamination during NAT may be an issue for laboratories testing MERS-CoV.

Appendix 1. Suitable specimens and transport requirements (modified from WHO Laboratory testing for Middle East Respiratory Syndrome Coronavirus [available at: (http://who.int/csr/disease/coronavirus_infections/MERS_Lab_recos_16_Sept_2013.pdf?ua=1)])

Specimen type	Transport medium	Transport to laboratory	Dangerous goods shipping category
Sputum	No	4^{O}C (if a delay in testing of > 48 hours, consider freezing and shipping with dry ice)	Biological substance, Category B

Bronchoalveolar lavage	No	4°C (if a delay in testing of > 48 hours, consider freezing and shipping with dry ice)	Biological substance, Category B
Tracheal aspirate	No	4°C (if a delay in testing of > 48 hours, consider freezing and shipping with dry ice)	Biological substance, Category B
Nasopharyngeal aspirate	No	4°C (if a delay in testing of > 48 hours, consider freezing and shipping with dry ice)	Biological substance, Category B
Combined nasopharyngeal/oropharyngeal swabs	Viral transport media	4°C (if a delay in testing of > 48 hours, consider freezing and shipping with dry ice)	Biological substance, Category B
Tissue from biopsy or autopsy including lung	Viral transport media	4°C (if a delay in testing of > 48 hours, consider freezing and shipping with dry ice)	Biological substance, Category B
Serum for serological testing	No	4°C or frozen and shipped on dry ice	Biological substance, Category B

Category B packaging preparation includes: manufacturer's instructions followed, good quality packaging, primary receptacles sealed and leakproof, primary receptacle closures secured with secondary means (optional), multiple fragile primaries wrapped individually, sufficient absorbent inside each secondary, secondary packaging properly sealed and leakproof, primary or secondary receptacle 95 kPa pressure compliant, itemized list of contents between secondary and outer packaging, rigid outer packaging, at least one surface of outer packaging is 100 mm x 100 mm

Figure 1. Packing and labelling of Category B infectious substance

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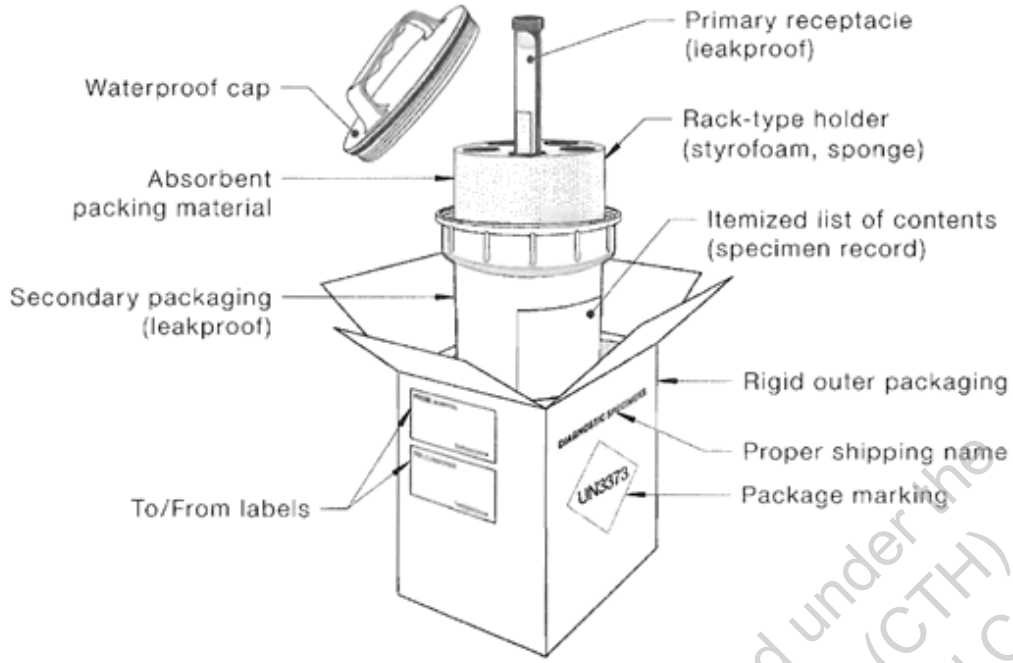

Appendix 2. Guidelines for laboratory staff working with MERS-CoV (modified from CDC Interim laboratory biosafety guidelines for handling and processing specimens associated with Middle East Respiratory Syndrome Coronavirus – version 2
(http://www.cdc.gov/coronavirus/mers/guidelines-lab-biosafety.html)

Activities involving manipulation of potentially infected specimens should be performed in a PC2 facility in a Class 2 biosafety cabinet using PC2 work practice:

- aliquoting and/or diluting specimens
- performing diagnostic tests that do not involve propogation of viral agents in vitro or in vivo
- nucleic acid extraction procedures involving potentially infected specimens

Activities that must be performed in a PC3 facility using PC3 work practices:

- MERS-CoV propagation in cell culture
- initial characterization of viral agents recovered in cultures of MERS-CoV specimens

5 References

- The WHO MERS-CoV Research Group. State of knowledge and data gaps of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in humans. PLoS Current Outbreaks 2013; doi: 10.1371/currents.outbreaks.0 bf719e352e7478f8ad85fa30127ddb8 (http://currents.plos.org/outbreaks/article/state-of-knowledge-and-data-gaps-of-middle-east-respiratory-syndrome-coronavirus-mers-cov-in-humans-2/)
  .
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- Corman VM, Muller MA, Costabel U, et al. Assays for laboratory confirmation of novel coronavirus (hCoV-EMC) infections. Euro Surveill 2012; 17:pii=20334 (http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20334).
- Zaki AM, van Boheemen S, Bestebroer TM, et al. Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. N Engl J Med 2012; 367: 1814-1820.
- CDC. Interim laboratory biosafety guidelines for handling and processing specimens associated with Middle East Respiratory Syndrome Coronavirus – version 2 (http://www.cdc.gov/coronavirus/mers/guidelines-lab-biosafety.html).

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Communicable Diseases Network Australia Committee Meeting
Jurisdictional Executive Group

Meeting Date: 20 January 2020

Item Number: 3.1
Sponsor: Secretariat
Speaker: Chair

Other Business and Next Meeting

Recommendations

That Members:

1. **Note** and **Discuss** the additional items raised as other business; and
2. **Note** the next Communicable Diseases Network Australia (CDNA) Jurisdictional Executive Group (JEG) meeting is a teleconference on 5 February 2020.

Purpose of Paper

To provide an opportunity for members to raise other business not addressed in the meeting and to confirm the date for the next meeting.

Contact information

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Cleared by:	Dr Marcelle Noja
Date:	20 January 2020

CDNA Extra Ordinary Teleconference Summary Notes
20 January 2020

Attendance	
s47F	Queensland, CDNA Chair
	Australian Capital Territory (proxy)
	South Australia
	Tasmania (proxy)
	Western Australia (proxy)
	Northern Territory
s47E(c), s47F	Australian Government Representative, Department of Health
s47F	New South Wales
	Victoria
Apologies	
s47F	Western Australia
	Australian Capital Territory
	Tasmania
Observers / Presenters / Secretariat	
s47F	Public Health Laboratory Network
	Northern Territory
s47E(c), s47F	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Medical Advisor, Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
	Australian Government Department of Health
s47F	New South Wales
s47E(c), s47F	Australian Government Department of Health
	Australian Government Department of Health
s47F	CDNA Secretariat

1. WELCOME

1.1 Attendance and Apologies

The Chair opened the meeting at 12.00pm and welcomed members to the Communicable Diseases Network Australia (CDNA) Jurisdictional Executive Group (JEG) extra ordinary meeting.

Actions

- Nil.

1.2 Conflict of Interest and Confidentiality Declaration

The Chair requested members declare any conflicts of interest, whether real or perceived, that they may have in relation to the business of CDNA. No conflicts were declared.

The Chair requested members note the confidentiality declaration. Members noted the confidentiality requirements in relation to the business of CDNA.

Actions

- Nil.

2. Strategic Discussion

The discussion opened with members being advised that the Centers for Disease Control and Prevention (CDC) had issued an update stating that the United States had implemented border control measures in response to the novel coronavirus outbreak in Wuhan, China.

Members noted that there have been three cases of novel coronavirus diagnosed outside of Wuhan, with no epidemiological links to the seafood market from which it originated.

s47F asked what the Commonwealth has done in response to the outbreak. s47E(c), s47F advised members that an Incident Management Team has been stood up in the Office of Health Protection.

Jurisdictional Update

Jurisdiction	Update
NSW	s47F advised members of the following: • Sydney has three direct flights to Wuhan. • Two suspected cases reported, both cleared of novel coronavirus. • Initial advice was provided to GPs and clinics, to aid in diagnosis. • Looking closely at the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) Series of National Guidelines (SoNGs) for guidance.
VIC	s47F advised members of the following: • Chief Health Officer (CHO) alert was issued last week. • No suspected cases reported as yet.
SA	s47F advised members of the following: • Public health alert has been issued. • One potential case that turned out to be influenza.
TAS	s47F advised members of the following: • Tasmania has contacted clinicians and laboratories with information following the prior extra ordinary meeting. • Some community concern, but not much response this week.
WA	s47F advised members of the following:

	• WA issued an alert two weeks ago. • Currently having discussions with labs about testing. • No suspected cases.
NT	s47F advised members of the following: • NT have issued an alert after the last extra ordinary meeting. • Shared knowledge from the Commonwealth situation reports, particularly with laboratories and infection control people in hospitals. • No suspected cases.
QLD	s47F advised members of the following: • Issued alert last week. • Received notification of two suspected cases on 10 January 2020. Both cases had been to Wuhan, though one case had had no contact with the seafood market. Both presented with flu-like illness. • One case was detected coming through Singapore with a fever, but nothing more was done except for advising the case to seek medical attention if they got worse. Samples went to the Victorian Infectious Disease Reference Laboratory (VIDRL), but came back negative. All further samples came back negative, including for more common viruses. • Second case tested positive for influenza.
VIDRL / PHLN	s47F advised members of the following: • NSW, VIC and QLD have testing capacity for coronavirus. • Every second night a teleconference is convened by the World Health Organization (WHO) to share information regarding laboratory aspects. Nothing has come out of these meetings that is not on ProMED. These teleconferences are scheduled to continue. • China released the virus sequence last week, which has enabled the team to map cases against that sequence. A broad coronavirus assay will pick up the Wuhan virus. • Currently using SARS as a provisional positive control. • Primers have been made available on the WHO website, which should pick up anything. • s47F has worked on a draft laboratory guideline, outlining what samples should be taken and what procedures should be conducted in the labs. The Public Health Laboratory Network (PHLN) have reviewed, and the advice seems consistent with CDC advice**.** s47F agreed to circulate draft laboratory guidelines to all CDNA JEG members, noting that this is not an official PHLN document. • SA enquired whether s47F document is consistent with WHO. s47F advised that he hasn't seen the WHO guidelines, but he is happy to take this on notice and check.
Commonwealth	s47E(c), s47F advised members of the following: • An Incident Management Team has been stood up, and the National Incident Room will be activated shortly. • The lack of information from WHO has been noted; most of what is being reported in the media hasn't been confirmed by WHO. • Risk assessment has commenced, and will be finished soon. • The Commonwealth is working with VIDRL and have confirmed that we can test for the Wuhan virus in Australia.

	• Increased media over the weekend and today (20 January 2020), which was likely triggered by the CDC announcement that they will do screening at three main airports. The Commonwealth has answered this media, and the Chief Medical Officer (CMO) put out a statement on 19 January 2020 addressing this. • Currently looking at potential border measures. Have spoken to the Department of Agriculture about what's feasible. • Currently looking at collecting more information about flights coming into Australia that have originated in Wuhan. • The Australian Health Protection Principal Committee (AHPPC) are holding a meeting this afternoon (20 January 2020). s47E(c), s47F advised members of the following: As at 19 January 2020, media are reporting: • 198 cases of novel coronavirus and three deaths. • Since 17 January 2020, approximately 136 new cases have been identified in patients with previously unexplained pneumonia. • Of these new cases, all are adults aged 25-89 years. Approximately 50% are male (78) and 75 female. • Of the 198 confirmed cases, 28 have recovered or been discharged, 126 have mild illness, 35 are listed as severe and nine are in critical condition. • There are 817 close contacts being monitored. • Four cases have been reported outside of Wuhan, China. Two in Thailand, one in Japan and one in Shenzhen, China. All cases reported travelled to Wuhan, China. Clinical presentation/symptoms • Symptoms reported include: fever, difficulty breathing, non-specific upper respiratory tract infection symptoms such as cough and sore throat and chest radiographs showing bilateral pneumonic infiltrations. Transmission • WHO is reporting evidence of limited human-to-human transmission, given some cases have reported no exposure to the Huanan seafood wholesale market. • There is no clear evidence of sustained transmission and there is not enough information to fully assess the extent of transmission.

Case Definition and SoNG

Members agreed to formalise a case definition and SoNG, similar to MERS, and to form a working group to progress this work as quickly as possible. s47F advised that NSW have commenced work on modifying the MERS SoNG for the novel coronavirus, noting that key points to discuss are timing, inclusion of fever, testing for other respiratory viruses and the management of patients. s47F advised that he was happy to share this work with CDNA JEG members. s47F s47F advised that they would be happy to take part in this working group, with s47E(c), s47F, the Commonwealth Technical Writer for SoNGs, to take the lead.

Listed Human Disease (LHD)

Members discussed the need to make the novel coronavirus a Listed Human Disease (LHD). s47E(c), s47F advised that the Commonwealth currently rely on the travelling with illness checklist, but this would only be effective if the novel coronavirus was made an LHD.

s47E(c), s47F advised members that the current checklist is geared towards MERS and avian flu, as the questions are surrounding contact with camels, birds and poultry. The only way the checklist can be updated to include more relevant questions to the novel coronavirus, is if it was made an LHD. s47F asked if it was easy to un-list a disease. s47E(c), s47F advised that while this has not been done before, in theory, it should be quite simple. s47F noted that novel influenza viruses of pandemic potential are listed as an LHD; it would be good to have the same for novel coronaviruses. s47E(c), s47F commented that this could be possible, but legal advice would have to be sought.

Members agreed to recommend the novel coronavirus be listed as an LHD, and noted that the next step would be to consult with the CHO's at the upcoming AHPPC meeting on 20 January 2020.

Communicable Disease Incident of National Significance (CDINS)

Members discussed the need to go through the process of declaring the novel coronavirus a CDINS. s47E(c), s47F took members through the triggers for a CDINS. All members agreed to recommend to the CMO that the novel coronavirus be made a CDINS.

Border Measures

Members discussed border measures that are currently in place. s47E(c), s47F advised members that the U.S. are currently taking the temperatures of every person returning from Wuhan on a direct flight.

The Commonwealth has spoken to the Department of Agriculture about issuing a handout to all passengers on direct flights from Wuhan to Sydney, noting that this would have to be provided in a variety of languages. To reach those passengers on connecting flights, digital banners will be put in place, advising that if patients get sick they should consult their GP and inform them of all travel history. CDNA JEG members were supportive of the current border measures in place, and agreed that this approach should be provided to AHPPC this afternoon (20 January 2020). It was recommended that more information should be gathered surrounding the effectiveness of screening for fever in other countries versus the pick-up rates.

CDNA JEG will consider other border control measures as more information about the current outbreak becomes available.

Members agreed that another extra ordinary teleconference would likely need to be held again shortly, to discuss the latest developments of the novel coronavirus outbreak in Wuhan.

Actions

- s47F to circulate draft laboratory guidelines to all CDNA JEG members, once endorsed by PHLN.
- s47F to share his work on modifying the MERS SoNG for the novel coronavirus.
- s47F to nominate members to take part in the novel coronavirus working group, with s47E(c), s47F to take the lead.
- Discussions around adding the novel coronavirus as an LHD to be had at AHPPC on 20 January 2020.

- CDNA JEG to recommend making the novel coronavirus a CDINS to the CMO.
- AHPPC to be advised of the current border control approach in Australia.
- CDNA Secretariat to organise a follow up meeting pending discussion with the Chair.

The Chair closed the meeting at 1.25pm.

Novel Coronavirus 2019 (2019-nCoV)

CDNA National Guidelines for Public Health Units

This document summarises interim recommendations for surveillance, infection control, laboratory testing and contact management for 2019-nCoV. It is the first national guidance issued for the Wuhan novel coronavirus (2019-nCoV) and will be further developed into CDNA National Guidelines for Public Health Units 2019-nCoV (2019-nCoV SoNG).

It has been adapted from CDNA National Guidelines for Public Health Units MERS-CoV, utilising current CDC and WHO guidance, and is

based on the current knowledge of the situation in Wuhan, China and experiences with SARS-CoV and MERS-CoV.

CDNA will update these recommendations as required as new information becomes available on the situation.

The Series of National Guidelines ('the Guidelines') have been developed by the Communicable Diseases Network Australia (CDNA) and noted by the Australian Health Protection Principal Committee (AHPPC). Their purpose is to provide nationally consistent guidance to public health units (PHUs) in responding to a notifiable disease event.

These guidelines capture the knowledge of experienced professionals, and provide guidance on best practice based upon the best available evidence at the time of completion.

Readers should not rely solely on the information contained within these guidelines. Guideline information is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a health professional. Clinical judgement and discretion may be required in the interpretation and application of these guidelines.

The membership of the CDNA and the AHPPC, and the Commonwealth of Australia as represented by the Department of Health ('the Commonwealth'), do not warrant or represent that the information contained in the Guidelines is accurate, current or complete. The CDNA, the AHPPC and the Commonwealth do not accept any legal liability or responsibility for any loss, damages, costs or expenses incurred by the use of, or reliance on, or interpretation of, the information contained in the guidelines.

1. Case definition

Suspect case

If the patient satisfies epidemiological and clinical criteria, they are classified as a suspect case.

Epidemiological criteria

- Travel to Wuhan City (Hubei Province, China) in the 14 days before the onset of illness

OR

- Close contact (see Contact definition below) with a case of 2019-nCoV.

Clinical criteria

- Fever or history of fever (>=38C) and acute respiratory infection (sudden onset of respiratory infection with at least one of: shortness of breath, cough or sore throat). Note this is subject to change with emerging clinical information.

OR

- Severe acute respiratory infection requiring admission to hospital with clinical or radiological evidence of pneumonia or acute respiratory distress syndrome (i.e. even if no evidence of fever).

Confirmed case

A person who tests positive to a specific 2019-nCoV PCR test (when available) or has the virus identified by electron microscopy or viral culture, at a reference laboratory.

The case definition may have been updated since the publication of this guideline. Please check the case definitions webpage on the Australian Department of Health's website (www.health.gov.au/internet/main/publishing.nsf/Content/cdna-casedefinitions.htm) for the latest version.

2. Laboratory testing

Patients to be considered for Wuhan-CoV (also known as 2019-nCoV) testing are described under the suspected case definition (above). Where applicable, consult with your state/territory communicable diseases agency to seek advice on which laboratories can provide Wuhan-CoV testing; appropriate specimen type, collection and transport; and also to facilitate contact management if indicated.

Transmission-based contact and airborne precautions must be used when collecting respiratory specimens [3]. These include:

- Contact precautions, including close attention to hand hygiene
- Airborne transmission precautions, including routine use of a P2 mask/respirator, disposable gown gloves, and eye protection
- Collection in a room with negative pressure air-handling where available.

Routine tests for acute pneumonia/pneumonitis should be performed where indicated, including bacterial cultures, acute and convalescent serology, urinary antigen testing and nucleic acid tests for respiratory viruses, according to local protocols.

Serology for Wuhan-CoV is not yet available. Collection of serum for storage by the Wuhan-CoV testing laboratory is recommended to facilitate retrospective testing, if this is relevant, once Serology tests become available.

Commented [MJ1]: For CDNA consideration: Case or suspect case? 14 days?

Commented [MJ2]: Change caveat?

Commented [MJ3]: For CDNA consideration—'be precautionary and use P2 masks where available' or 'Use a P2 mask vs Use a P2 mask if available (to be decided)'

Use of P2 masks in other parts of doc also to be considered.

See Appendix X for additional Wuhan-CoV laboratory testing information.

Case management

Response times

On the same day as notification of a suspected, probable or confirmed case, begin follow up investigation and, where applicable, notify your central state or territory communicable diseases agency.

PHU staff should be available to contribute to the expert assessment of patients under investigation as possible cases on request from hospital clinicians or general practitioners.

Response procedure

Case investigation

The response to a notification will normally be carried out in collaboration with the clinicians managing the case, and be guided by the 2019-nCoV public health unit checklist (Appendix 2) and the 2019-nCoV Investigation Form (Appendix 4).

Regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done
- Seek the treating doctor's permission to contact the case or relevant care-giver
- Determine if the diagnosis has been discussed with the case or relevant care-giver before beginning the interview
- Review case and contact management
- Ensure appropriate infection control guidelines are followed in caring for the case
- Identify the likely source of infection.

Note: If interviews with suspected cases are conducted face-to-face, the person conducting the interview must have a thorough understanding of infection control practices and be competent in using appropriate PPE.

Wherever possible, cases should be managed in hospital. If clinically indicated, cases may be managed at home only if it can be ensured that the case and household contacts are counselled about risk and that appropriate infection control measures are in place.

Case treatment

In the absence of pathogen-specific interventions, patient management largely depends on supportive treatment, and vigilance for and treatment of complications.

Further advice on clinical management is available from WHO: https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf?sfvrsn=bc7da517_2

Education

Provide 2019-nCoV factsheet to cases and their close contacts.

Ensure that they are aware of the signs and symptoms of 2019-nCoV, the requirements of isolation, contact details of the PHU and the infection control practices that can prevent the transmission of 2019-nCoV.

Isolation and restriction

Cases must be isolated in an appropriate health facility, unless alternative arrangements are recommended on expert advice. Healthcare workers and others who come into contact with suspected, probable and confirmed cases must be protected according to recommended infection control guidelines. Visitors should be restricted to close family members.

A risk assessment should be undertaken for suspected cases who initially test negative for 2019-nCoV. If there is no alternative diagnosis and a high index of suspicion remains that such cases may have 2019-nCoV infection, consideration should be given to continued isolation and use of the recommended infection control precautions, pending further testing (see Laboratory testing section and Appendix 3) and re-assessment.

Given the severity of reported infections, the evidence of limited person-to-person transmission, and gaps in knowledge of transmission pathways, the recommendations on isolation and PPE for management of suspected, probable and confirmed cases take a deliberately cautious approach.

Infection control measures should be those applicable to control the transmission of pathogens that can be spread by the airborne route. These measures are detailed in the Interim infection prevention and control advice for acute care hospitals relating to suspected Middle Eastern respiratory syndrome coronavirus (MERs-CoV) infections and can be applied to circumstances with suspected cases of 2019-nCoV.

In summary, transmission-based precautions for suspected, probable and confirmed cases should include:

- Placement of cases in a negative pressure room with an ensuite bathroom, if available, or in a single room from which the air does not circulate to other areas.
- Airborne transmission precautions, including routine use of a P2 respirator (or N95 mask), long sleeved disposable gown, gloves, and eye protection when entering a patient care area.
- Contact precautions, including close attention to hand hygiene.
- If transfer of the confirmed or probable case outside the negative pressure room is necessary, asking the patient to wear a "surgical" face mask while they are being transferred and to follow respiratory hygiene and cough etiquette.

Commented [MJ4]: For CDNA consideration—'be precautionary and use P2 masks where available' or 'Use a P2 mask vs Use a P2 mask if available (to be decided)'

Use of P2 masks in other parts of doc also to be considered.

Active case finding

Contacts (see Contact management section) should be identified and advised to immediately seek medical advice should they develop symptoms. Contacts or caregivers should be asked to also inform the public health agency if they develop symptoms.

Environmental evaluation

Commented [MJ5]: Note: need to include info around whether or not rooms need to be cleaned after disease presence such as in cases of measles. Where to include'

Where local transmission of 2019-nCoV is thought possible, a thorough review of contributing environmental factors should be done. This should include a review of infection control procedures, and opportunities for exposure to respiratory or faecal contamination.

If a case has had occupational exposure to animals it may be appropriate to consult with animal health authorities.

Contact management

As there remain gaps in the understanding of infectivity of 2019-nCoV cases and transmission modes, the definition of contacts and their public health management is based on observations from similar serious coronaviruses – SARS-CoV and MERS-CoV. Distinction is made between close contacts and casual contacts.

Identification of contacts

All persons categorised as a contact (see definitions of “close contacts” and “casual contacts” following) of probable and confirmed cases should be followed-up, and monitored for the development of symptoms for 14 days after the last exposure to the case (i.e. the maximum incubation period).

Contacts of suspected cases should also be considered for contact management if there is likely to be a delay in confirming or excluding 2019-nCoV infection in the suspected case, such as delayed testing.

Close contact definition

A close contact is defined as requiring greater than 15 minutes face-to-face contact with a symptomatic probable or confirmed case in any setting, or the sharing of a closed space with a symptomatic probable or confirmed case for a prolonged period (e.g. more than 2 hours).

For the purposes of surveillance, a close contact includes a person meeting any of the following criteria:

- living in the same household or household-like setting (e.g. in a boarding school or hostel)
- direct contact with the body fluids or laboratory specimens of a case without recommended PPE.
- a person who spent 2 hours or longer in the same room (such as a GP or ED waiting room)
- a person in the same hospital room when an aerosol generating procedure is undertaken on the case, without recommended PPE
- face-to-face contact for more than 15 minutes with the case in any other setting not listed above.

Contact needs to have occurred within the period extending from the day of onset of symptoms in the case until the case is classified as no longer infectious by the treating team (usually 24 hours after the resolution of symptoms).

Casual contact definition

Casual contact is defined as any person having less than 15 minutes face-to-face contact with a symptomatic probable or confirmed case in any setting, or sharing a closed space with a symptomatic probable or confirmed case for less than 2 hours. This will include healthcare workers, other patients, or visitors who were in the same closed healthcare space as a case, but for shorter periods than those required for a close contact. Other closed settings might include schools or offices.

Note that healthcare workers and other contacts who have taken recommended infection control precautions, including the use of full PPE, while caring for a symptomatic probable or confirmed 2019-nCoV case are not considered to be close contacts. However, these people should be advised to self-monitor and if they develop symptoms consistent with 2019-nCoV infection they should isolate themselves and notify their public health unit or staff health unit so they can be tested and managed as a suspected 2019-nCoV case (see recommendations below under Management of symptomatic contacts).

Other casual contacts may include:

- Extended family groups, e.g. in an Aboriginal community.
- aircraft passengers who were seated in the same row as the case, or in the two rows in front or two rows behind a symptomatic probable or confirmed 2019-nCoV case. Contact tracing of people who may have had close contact on long bus or train trips should also be attempted where possible, using similar seating/proximity criteria.
- All crew-members on an aircraft who worked in the same cabin area as a symptomatic probable or confirmed case of 2019-nCoV. If a crew member is the symptomatic 2019-nCoV case, contact tracing efforts should concentrate on passengers seated in the area where the crew member was working during the flight and all of the other members of the crew.

Where resources permit, more active contact tracing may be extended to other persons who have had casual contact (as defined above), particularly in school, office, or other closed settings. In these circumstances, the size of the room/space and degree of separation of the case from others should be considered in identifying contacts.

Contact assessment

All persons identified as having had contact with a symptomatic probable or confirmed case should be assessed to see if they should be classified as a close contact and have demographic and epidemiological data collected. Information on close contacts should be managed according to jurisdictional requirements.

Identification and assessment of the contacts of suspected cases may be deferred pending the results of initial laboratory testing.

Close contact testing

Routine laboratory screening for 2019-nCoV infection is not recommended for asymptomatic contacts.

Prophylaxis

No specific chemoprophylaxis is available for contacts.

Education

Close contacts should be counselled about their risk and the symptoms of 2019-nCoV and provided with a 2019-nCoV Factsheet. They should be advised to self-isolate if they develop symptoms, and to immediately notify their public health unit and, if appropriate, their facility infection control unit (i.e. for healthcare workers).

Isolation and restriction

Close contacts

Home quarantine of asymptomatic contacts is not routinely recommended, but people identified as close contacts are advised to monitor their health for 14 days after the last possible contact with a symptomatic probable or confirmed 2019-nCoV case.

Public health units should conduct active daily monitoring of close contacts for symptoms for 14 days after the last possible contact with a symptomatic probable or confirmed 2019-nCoV case.

Close contacts should be advised to immediately telephone the public health unit to arrange medical attention if they develop symptoms such as fever, respiratory symptoms (including coughing and shortness of breath), headache, muscle pain or diarrhoea.

Less frequent active follow-up together with passive surveillance may be necessary if there are large numbers of close contacts to monitor.

Close contacts should also be advised to not travel internationally for 14 days after the last close contact with a probable or confirmed case of 2019-nCoV, and any travel within Australia during this period should be subject to discussion with the public health unit.

Close contacts should be excluded from schools and sensitive occupations or settings such as health care, aged care, or child care during the 14 days after last unprotected contact with a case.

Casual contacts

Casual contacts should monitor their health for 14 days and report any symptoms immediately to the local public health unit. There are no restrictions on movements; however casual contacts should be advised to isolate themselves and contact the public health unit if they develop symptoms.

Healthcare worker close contacts

Healthcare worker close contacts (i.e. persons exposed while unprotected, as described in the Contact definition section) should not undertake work in a healthcare setting for 14 days following the last possible contact with the case. Home quarantine is not routinely recommended during this period if these individuals remain asymptomatic, but some restrictions may be recommended based on a risk assessment of the particular circumstances.

Commented [MJ6]: For consideration by CDNA— Not undertaking work for 14 days for healthcare workers/childcare workers may not be feasible.

Public health units may assist infection control units of health facilities to identify and monitor healthcare worker close contacts.

It is recognized that clinical work restrictions on healthcare worker close contacts may place strain on individuals and on health services. This underlines the importance of ensuring healthcare workers implement appropriate infection control precautions when assessing and managing suspected, probable and confirmed 2019-nCoV cases.

CDNA will continue to monitor the emerging evidence around 2019-nCoV transmission risks in healthcare settings and revise these recommendations as needed.

Management of symptomatic contacts

If fever, respiratory symptoms or other symptoms consistent with 2019-nCoV infection develop within the first 14 days following the last contact, the individual should be immediately isolated and managed as per the current recommendations for suspected 2019-nCoV cases, with urgent testing for 2019-nCoV infection undertaken in an environment which minimises the exposure of others.

Ill contacts who are being evaluated for 2019-nCoV infection can be appropriately isolated and managed at home, unless their condition is severe enough to require hospitalisation.

Symptomatic contacts who test negative for 2019-nCoV by PCR will still need to be monitored for 14 days after their last contact with a probable or confirmed 2019-nCoV case and may require re-testing.

Appendix X Wuhan-CoV Laboratory testing information

Laboratory testing for Wuhan-CoV is likely to evolve rapidly with the accumulation of clinical data, and as reagents and protocols are refined.

The aim of testing is to exclude common respiratory viruses using local hospital and community nucleic acid testing capacity, and to simultaneously refer onward to a reference laboratory with capacity to test for Wuhan-Cov. As co-infection is possible, initial testing protocols should include testing for Wuhan-CoV in patients with epidemiological risk, even where another infection is shown to be present. As more information accumulates regarding the risk of dual respiratory viral infections this may be reviewed.

Samples for testing

Commented [MJ7]: For CDNA consideration:
Split "samples for testing" by clinical severity
Upper respiratory samples + serum for less severe cases --> able to be done in community
Lower respiratory --> for more severe cases, probably done in ED

(i) upper respiratory tract samples
(ii) lower respiratory tract sample if the lower tract is involved
(iii) Serum (to be stored pending serology availability)

Upper respiratory tract samples

1. Nasopharyngeal swab and/or oropharyngeal swab, Dacron or Rayon, flocked preferred
   - nasopharyngeal: insert a swab into each nostril parallel to the palate, leave the swab in place for a few seconds to absorb secretions
   - oropharyngeal: swab the tonsilar beds, avoiding the tongue
   - place swabs back into the accompanying transport media
2. Nasal wash/aspirates
   - collect 2-3 mL into a sterile, leak-proof, screw-top dry sterile container

Lower respiratory tract samples

1. Bronchoalveolar lavage, tracheal aspirate, pleural fluid
   - collect 2-3 mL into a sterile, leak-proof, screw-top sputum collection cup or dry sterile container
2. Sputum
   - patient should rinse his/her mouth with water before collection
   - expectorate deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container

Given that for SARS-CoV and MERS-CoV there is evidence that lower respiratory tract specimens contain the highest viral loads, it is therefore advised that lower respiratory tract specimens should be collected where possible for Wuhan-CoV testing. Repeat testing (especially of lower respiratory tract specimens) in compatible cases should be performed if initial results are negative and there is a high index of clinical suspicion.

Serology

Serum should be collected during the acute phase of the illness (preferably within the first 7 days of symptom onset), stored, and when serology testing becomes available tested in parallel with a convalescent serum collected 3 or more weeks after acute sample collection. If no acute sample was collected, a single serum sample collected 14 or more days after symptom onset may be tested.

Commented [MJ8]: For CDNA consideration

Handling of specimens in the laboratory

Virology

Laboratory staff should handle specimens under PC2 conditions in accordance with AS/NZS

2243.3:2010 Safety in Laboratories Part 3: Microbiological Safety and Containment. Specimens should be transported in accordance with current regulatory requirements as diagnostic samples for testing.

Clinical Pathology

Standard precautions should be used for non-viral pathology testing.

Respiratory Virus Diagnostic Testing

Nucleic acid testing of the upper respiratory tract sample is done for influenza and other common respiratory viruses using standard protocols and methods of the hospital or community laboratory.

Standard protocols of the testing laboratory for respiratory sample processing should be used. This is expected to consist of PC2 laboratory practices, and use of a Class II Biosafety cabinet for processes potentially generating aerosols. Attempted viral culture, which would require higher levels of biocontainment would not routinely be attempted.

The residue (original swab and remaining eluate) of the upper tract sample is forwarded together with the lower tract sample and the serum to the reference laboratory with Wuhan-CoV testing capacity requesting 'Wuhan Coronavirus' testing.

As stated above, clinician liaison with jurisdictional public health officers is essential to coordinate referral & testing.

As above, standard protocols should be used for sample packaging and transport as diagnostic samples for testing.

Wuhan-CoV specific testing

NAT using reverse-transcriptase polymerase chain reaction (RT-PCR) is the method of choice for detection of Wuhan-CoV. Diagnostic capability for the Wuhan Coronavirus is expected to evolve rapidly, hence will be described here only in broad terms. Protocols will be available from the WHO

in January 2020, and include PCR followed by specific probe detection of amplicons. The intial PCR detects Wuhan-CoV and SARS-CoV, but not commonly circulating coronaviruses usually detected by commercial assays (eg NL63, 229 strains).

Several Australasian Public Health Laboratory Network (PHLN) reference laboratories currently offer PCR assays capable of detecting a wide range of coronaviruses, including zoonotic and novel pathogens. A number of these have been mapped against the promulgated nucleic acid sequence of the Wuhan-CoV, and are expected to detect it on that basis. Nucleic acid sequencing of amplicons from positive tests is used to identify the coronavirus in this approach.

Specific PCR primer sets to detect the Wuhan-CoV are becoming available, however the majority, including those available through WHO will also detect other zoonotic coronaviruses such as SARS coronavirus.

The Wuhan-CoV is yet to be internationally available for use as a test positive control. Synthetic positive control material in the form of nucleic acid templates is becoming available through WHO/ European Viral Archive (EVAg). SARS-CoV may be used as an interim positive control for testing by PHLN member laboratories as an interim measure.

Testing algorithms are likely to be revised pending further information about the virus, and the number of specimens received in the laboratory for testing.

Viral culture should not be performed for routine diagnosis, and should only be attempted in reference laboratories with appropriate experience and containment facilities.

No Quality Assurance Program (QAP) is currently available internationally specific to the Wuhan-CoV, although QAPs are available in Australia for respiratory viruses including non-Wuhan CoV coronaviruses. The RCPAQAP with Commonwealth support will introduce a Wuhan-CoV specific QAP to supplement previously available SARS-CoV, MERS-CoV and other coronaviruses, during 2020.

Novel Coronavirus 2019 (2019-nCoV)
CDNA National Guidelines for Public Health Units

Revision history			
Version	**Date**	**Revised by**	**Changes**
1.0	23 January 2020	Communicable Diseases Network Australia	Developed by the 2019-nCoV Working Group

This document summarises interim recommendations for surveillance, infection control, laboratory testing and contact management for 2019-nCoV. It is the first national guidance issued for the Wuhan novel coronavirus (2019-nCoV) and will be further developed into CDNA National Guidelines for Public Health Units 2019-nCoV (2019-nCoV SoNG).

It has been adapted from CDNA National Guidelines for Public Health Units MERS-CoV, utilising current CDC and WHO guidance, and is based on the current knowledge of the situation in Wuhan, China and experiences with SARS-CoV and MERS-CoV.

CDNA will review and update these recommendations as required as new information becomes available on the situation.

This document is to be used in the first instance whilst a Series of National Guidelines ('the Guidelines') is being developed by the Communicable Diseases Network Australia (CDNA).

These interim guidelines capture the knowledge of experienced professionals, and provide guidance on best practice based upon the best available evidence at the time of completion.

Readers should not rely solely on the information contained within these guidelines. Guideline information is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a health professional. Clinical judgement and discretion may be required in the interpretation and application of these guidelines.

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1. Case definition

Suspect case

As the full clinical spectrum of illness is not known, clinical and public health judgement should also be used to determine the need for testing in patients who do not meet the clinical criteria below.

If the patient satisfies epidemiological and clinical criteria, they are classified as a suspect case.

Epidemiological criteria

- Travel to Wuhan City (Hubei Province, China) in the 14 days before the onset of illness.

OR

Travel to an area* with evidence of sustained human-to-human transmission, or a declared outbreak, within 14 days before onset of illness.

OR

- Close contact (see Contact definition below) in 14 days before illness onset with a case of 2019-nCoV.

Clinical criteria

- Fever or history of fever (>=38C) and acute respiratory infection (sudden onset of respiratory infection with at least one of: shortness of breath, cough or sore throat).

OR

- Severe acute respiratory infection requiring admission to hospital with clinical or radiological evidence of pneumonia or acute respiratory distress syndrome (i.e. even if no evidence of fever).

Confirmed case

A person who tests positive to a specific 2019-nCoV PCR test (when available) or has the virus identified by electron microscopy or viral culture, at a reference laboratory.

The case definition may have been updated since the publication of this guideline. Please check the case definitions webpage on the Australian Department of Health's website (www.health.gov.au/internet/main/publishing.nsf/Content/cdna-casedefinitions.htm) for the latest version.

2. Laboratory testing

Patients to be considered for 2019-nCoV testing are described under the suspected case definition (above). Where applicable, consult with your state/territory communicable diseases agency to seek advice on which laboratories can provide 2019-nCoV testing; appropriate specimen type, collection and transport; and also to facilitate contact management if indicated.

Transmission-based contact and airborne precautions must be used **when collecting respiratory specimens.** These include:

- Contact precautions, including close attention to hand hygiene.
- Airborne transmission precautions, including routine use of a P2/N95 mask/respirator, disposable gown, gloves, and eye protection.
- Collection in a single room with the door closed, or if in a hospital in a negative pressure room where available.
- If transfer of the confirmed case outside the negative pressure room is necessary, asking the patient to wear a “surgical” face mask while they are being transferred and to follow respiratory hygiene and cough etiquette.

Routine tests for acute pneumonia/pneumonitis should be performed where indicated, including bacterial cultures, acute and convalescent serology, urinary antigen testing and nucleic acid tests for respiratory viruses, according to local protocols.

Serology for 2019-nCoV is not yet available.

See Appendix A for additional 2019-nCoV laboratory testing information.

3. Case management

Response times

On the same day as notification of a suspected or confirmed case, begin follow up investigation and, where applicable, notify your central state or territory communicable diseases agency.

PHU staff should be available to contribute to the expert assessment of patients under investigation as possible cases on request from hospital clinicians or general practitioners.

Response procedure

Case investigation

The response to a notification will normally be carried out in collaboration with the clinicians managing the case, and be guided by the 2019-nCoV public health unit checklist and the 2019-nCoV Investigation Form (currently pending).

Regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness.
- Confirm results of relevant pathology tests, or recommend that tests be done.
- Seek the treating doctor's permission to contact the case or relevant care-giver.
- Determine if the diagnosis has been discussed with the case or relevant care-giver before beginning the interview.
- Review case and contact management.
- Ensure appropriate infection control guidelines are followed in caring for the case.
- Identify the likely source of infection.

Note: If interviews with suspected cases are conducted face-to-face, the person conducting the interview must have a thorough understanding of infection control practices and be competent in using appropriate PPE.

Case treatment

In the absence of pathogen-specific interventions, patient management largely depends on supportive treatment, and vigilance for and treatment of complications.

Further advice on clinical management is available from WHO: (https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf?sfvrsn=bc7da517_2)

Education

Provide 2019-nCoV factsheet to cases and their close contacts.

Ensure that they are aware of the signs and symptoms of 2019-nCoV, the requirements of isolation, contact details of the PHU and the infection control practices that can prevent the transmission of 2019-nCoV.

Isolation and restriction

Cases will generally be managed in hospital. If clinically indicated, cases may be managed at home only if it can be ensured that the case and household contacts are counselled about risk and that appropriate infection control measures are in place.

Healthcare workers and others who come into contact with suspected, and confirmed cases must be protected according to recommended infection control guidelines. Visitors should be restricted to close family members.

A risk assessment should be undertaken for suspected cases who initially test negative for 2019-nCoV. If there is no alternative diagnosis and a high index of suspicion remains that such cases may have 2019-nCoV infection, consideration should be given to continued isolation and use of the recommended infection control precautions, pending further testing (see Laboratory testing section and Appendix A) and re-assessment.

Given the severity of reported infections, the evidence of limited person-to-person transmission, and gaps in knowledge of transmission pathways, the recommendations on isolation and PPE for management of suspected and confirmed cases take a deliberately cautious approach.

Infection control measures should be those applicable to control the transmission of pathogens that can be spread by the airborne route. These measures are detailed in the Interim infection prevention and control advice for acute care hospitals relating to suspected Middle Eastern respiratory syndrome coronavirus (MERs-CoV) infections and can be applied to circumstances with suspected cases of 2019-nCoV.

In summary, transmission-based precautions for suspected and confirmed cases should include:

- Placement of cases in a negative pressure room with an ensuite bathroom, if available, or in a single room from which the air does not circulate to other areas.
- Airborne transmission precautions, including routine use of a P2 respirator/N95 mask where available otherwise a surgical mask is sufficient for routine care, long sleeved disposable gown, gloves, and eye protection when entering a patient care area.
- Contact precautions, including close attention to hand hygiene.
- If transfer of the confirmed case outside the negative pressure room is necessary, asking the patient to wear a “surgical” face mask while they are being transferred and to follow respiratory hygiene and cough etiquette.

Active case finding

Contacts (see Contact management section) should be identified and advised to immediately seek medical advice should they develop symptoms. Contacts or caregivers should be asked to also inform the public health agency if they develop symptoms.

4. Environmental evaluation

Where local transmission of 2019-nCoV is thought possible, a thorough review of contributing environmental factors should be done. This should include a review of infection control procedures, and opportunities for exposure to respiratory or faecal contamination.

If a case has had occupational exposure to animals it may be appropriate to consult with animal health authorities.

5. Contact management

As there remain gaps in the understanding of infectivity of 2019-nCoV cases and transmission modes, the definition of contacts and their public health management is based on observations from similar serious coronaviruses – SARS-CoV and MERS-CoV. Distinction is made between close contacts and casual contacts.

Identification of contacts

All persons categorised as a contact (see definitions of “close contacts” and “casual contacts” following) of confirmed cases should be followed-up, and monitored for the development of symptoms for 14 days after the last exposure to the case (i.e. the maximum incubation period).

Contacts of suspected cases should also be considered for contact management if there is likely to be a delay in confirming or excluding 2019-nCoV infection in the suspected case, such as delayed testing.

Close contact definition

A close contact is defined as requiring greater than 15 minutes face-to-face contact with a symptomatic confirmed case in any setting, or the sharing of a closed space with a symptomatic confirmed case for a prolonged period (e.g. more than 2 hours).

For the purposes of surveillance, a close contact includes a person meeting any of the following criteria:

- Living in the same household or household-like setting (e.g. in a boarding school or hostel).
- Direct contact with the body fluids or laboratory specimens of a case without recommended PPE.
- A person who spent 2 hours or longer in the same room (such as a GP or ED waiting room).
- A person in the same hospital room when an aerosol generating procedure is undertaken on the case, without recommended PPE.

- Face-to-face contact for more than 15 minutes with the case in any other setting not listed above.

Contact needs to have occurred within the period extending from the day of onset of symptoms in the case until the case is classified as no longer infectious by the treating team (usually 24 hours after the resolution of symptoms).

Casual contact definition

Casual contact is defined as any person having less than 15 minutes face-to-face contact with a symptomatic confirmed case in any setting, or sharing a closed space with a symptomatic confirmed case for less than 2 hours. This will include healthcare workers, other patients, or visitors who were in the same closed healthcare space as a case, but for shorter periods than those required for a close contact. Other closed settings might include schools or offices.

Note that healthcare workers and other contacts who have taken recommended infection control precautions, including the use of full PPE, while caring for a symptomatic confirmed 2019-nCoV case are not considered to be close contacts. However, these people should be advised to self-monitor and if they develop symptoms consistent with 2019-nCoV infection they should isolate themselves and notify their public health unit or staff health unit so they can be tested and managed as a suspected 2019-nCoV case (see recommendations below under Management of symptomatic contacts).

Other casual contacts may include:

- Extended family groups, e.g. in an Aboriginal community.
- Aircraft passengers who were seated in the same row as the case, or in the two rows in front or two rows behind a symptomatic confirmed 2019-nCoV case. Contact tracing of people who may have had close contact on long bus or train trips should also be attempted where possible, using similar seating/proximity criteria.
- All crew-members on an aircraft who worked in the same cabin area as a symptomatic confirmed case of 2019-nCoV. If a crew member is the symptomatic 2019-nCoV case, contact tracing efforts should concentrate on passengers seated in the area where the crew member was working during the flight and all of the other members of the crew.

Where resources permit, more active contact tracing may be extended to other persons who have had casual contact (as defined above), particularly in school, office, or other closed settings. In these circumstances, the size of the room/space and degree of separation of the case from others should be considered in identifying contacts.

Contact assessment

All persons identified as having had contact with a symptomatic confirmed case should be assessed to see if they should be classified as a close contact and have demographic and epidemiological data collected. Information on close contacts should be managed according to jurisdictional requirements.

Identification and assessment of the contacts of suspected cases may be deferred pending the results of initial laboratory testing.

Close contact testing

Routine laboratory screening for 2019-nCoV infection is not recommended for asymptomatic contacts.

Prophylaxis

No specific chemoprophylaxis is available for contacts.

Education

Close contacts should be counselled about their risk and the symptoms of 2019-nCoV and provided with a 2019-nCoV Factsheet. They should be advised to self-isolate if they develop symptoms, and to immediately notify their public health unit and, if appropriate, their facility infection control unit (i.e. for healthcare workers).

Isolation and restriction

Close contacts

Home quarantine of asymptomatic contacts is not routinely recommended, but people identified as close contacts are advised to monitor their health for 14 days after the last possible contact with a symptomatic confirmed 2019-nCoV case.

Public health units should conduct active daily monitoring of close contacts for symptoms for 14 days after the last possible contact with a symptomatic confirmed 2019-nCoV case.

Close contacts should be advised to immediately telephone the public health unit to arrange medical attention if they develop symptoms such as fever, respiratory symptoms (including coughing and shortness of breath), headache, muscle pain or diarrhoea.

Less frequent active follow-up together with passive surveillance may be necessary if there are large numbers of close contacts to monitor.

Close contacts should also be advised to not travel internationally for 14 days after the last close contact with a confirmed case of 2019-nCoV, and any travel within Australia during this period should be subject to discussion with the public health unit.

Close contacts should be excluded from schools and sensitive occupations or settings such as health care, aged care, or child care during the 14 days after last unprotected contact with a case.

Casual contacts

Casual contacts should monitor their health for 14 days and report any symptoms immediately to the local public health unit. There are no restrictions on movements; however casual contacts should be advised to isolate themselves and contact the public health unit if they develop symptoms.

Healthcare worker close contacts

Healthcare worker close contacts (i.e. persons exposed while unprotected, as described in the Contact definition section) should not undertake work in a healthcare setting for 14 days following the last possible contact with the case. Home quarantine is not routinely recommended during this period if these individuals remain asymptomatic, but some restrictions may be recommended based on a risk assessment of the particular circumstances.

Public health units may assist infection control units of health facilities to identify and monitor healthcare worker close contacts.

It is recognized that clinical work restrictions on healthcare worker close contacts may place strain on individuals and on health services. This underlines the importance of ensuring healthcare workers implement appropriate infection control precautions when assessing and managing suspected, confirmed 2019-nCoV cases.

CDNA will continue to monitor the emerging evidence around 2019-nCoV transmission risks in healthcare settings and revise these recommendations as needed.

Management of symptomatic contacts

If fever, respiratory symptoms or other symptoms consistent with 2019-nCoV infection develop within the first 14 days following the last contact, the individual should be immediately isolated and managed as per the current recommendations for suspected 2019-nCoV cases, with urgent testing for 2019-nCoV infection undertaken in an environment which minimises the exposure of others.

Ill contacts who are being evaluated for 2019-nCoV infection can be appropriately isolated and managed at home, unless their condition is severe enough to require hospitalisation.

Symptomatic contacts who test negative for 2019-nCoV by PCR will still need to be monitored for 14 days after their last contact with a confirmed 2019-nCoV case and may require re-testing.

Appendix A 2019-nCoV Laboratory testing information

Laboratory testing for 2019-nCoV is likely to evolve rapidly with the accumulation of clinical data, and as reagents and protocols are refined.

The aim of testing is to exclude common respiratory viruses using local hospital and community nucleic acid testing capacity, and to simultaneously refer onward to a reference laboratory with capacity to test for 2019-nCov. As co-infection is possible, initial testing protocols should include testing for 2019-nCoV in patients with epidemiological risk, even where another infection is shown to be present. As more information accumulates regarding the risk of dual respiratory viral infections this may be reviewed.

Samples for testing

(i) upper respiratory tract samples
(ii) lower respiratory tract sample if the lower tract is involved
(iii) Serum (to be stored pending serology availability)

Upper respiratory tract samples

1. Nasopharyngeal swab and/or oropharyngeal swab, Dacron or Rayon, flocked preferred
    - nasopharyngeal: insert a swab into each nostril parallel to the palate, leave the swab in place for a few seconds to absorb secretions
    - oropharyngeal: swab the tonsilar beds, avoiding the tongue
    - place swabs back into the accompanying transport media
2. Nasal wash/aspirates
    - collect 2-3 mL into a sterile, leak-proof, screw-top dry sterile container

Lower respiratory tract samples

1. Sputum
    - patient should rinse his/her mouth with water before collection
    - expectorate deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container
2. Bronchoalveolar lavage, tracheal aspirate, pleural fluid
    - collect 2-3 mL into a sterile, leak-proof, screw-top sputum collection cup or dry sterile container

Given that for SARS-CoV and MERS-CoV there is evidence that lower respiratory tract specimens contain the highest viral loads, it is therefore advised that lower respiratory tract specimens should be collected where possible for 2019-nCoV testing. Repeat testing (especially of lower respiratory tract specimens) in compatible cases should be performed if initial results are negative and there is a high index of clinical suspicion.

Serology

Where possible, serum should be collected during the acute phase of the illness (preferably within the first 7 days of symptom onset), stored, and when serology testing becomes available tested in parallel with a convalescent serum collected 3 or more weeks after acute sample collection. If no acute sample was collected, a single serum sample collected 14 or more days after symptom onset may be tested.

Handling of specimens in the laboratory

Virology

Laboratory staff should handle specimens under PC2 conditions in accordance with AS/NZS2243.3:2010 Safety in Laboratories Part 3: Microbiological Safety and Containment. Specimens should be transported in accordance with current regulatory requirements as diagnostic samples for testing.

Clinical Pathology

Standard precautions should be used for non-viral pathology testing.

Respiratory Virus Diagnostic Testing

Nucleic acid testing of the upper respiratory tract sample is done for influenza and other common respiratory viruses using standard protocols and methods of the hospital or community laboratory.

Standard protocols of the testing laboratory for respiratory sample processing should be used. This is expected to consist of PC2 laboratory practices, and use of a Class II Biosafety cabinet for processes potentially generating aerosols. Attempted viral culture, which would require higher levels of biocontainment would not routinely be attempted.

The residue (original swab and remaining eluate) of the upper tract sample is forwarded together with the lower tract sample and the serum to the reference laboratory with 2019-nCoV testing capacity requesting '2019-nCoV/Wuhan Coronavirus' testing.

As stated above, clinician liaison with jurisdictional public health officers is essential to coordinate referral & testing.

As above, standard protocols should be used for sample packaging and transport as diagnostic samples for testing.

2019-nCoV specific testing

NAT using reverse-transcriptase polymerase chain reaction (RT-PCR) is the method of choice for detection of 2019-nCoV. Diagnostic capability for 2019-nCoV is expected to evolve rapidly, hence will be described here only in broad terms. Protocols will be available from the WHO in January 2020, and include PCR followed by specific probe detection of amplicons. The intial PCR detects 2019-nCoV and SARS-CoV, but not commonly circulating coronaviruses usually detected by commercial assays (eg NL63, 229 strains).

Several Australasian Public Health Laboratory Network (PHLN) reference laboratories currently offer PCR assays capable of detecting a wide range of coronaviruses, including zoonotic and novel pathogens. A number of these have been mapped against the promulgated nucleic acid sequence of the 2019-nCoV, and are expected to detect it on that basis. Nucleic acid sequencing of amplicons from positive tests is used to identify the coronavirus in this approach.

Specific PCR primer sets to detect the 2019-nCoV are becoming available, however the majority, including those available through WHO will also detect other zoonotic coronaviruses such as SARS coronavirus.

The 2019-nCoV is yet to be internationally available for use as a test positive control. Synthetic positive control material in the form of nucleic acid templates is becoming available through WHO/ European Viral Archive (EVAg). SARS-CoV may be used as an interim positive control for testing by PHLN member laboratories as an interim measure.

Testing algorithms are likely to be revised pending further information about the virus, and the number of specimens received in the laboratory for testing.

Viral culture should not be performed for routine diagnosis, and should only be attempted in reference laboratories with appropriate experience and containment facilities.

No Quality Assurance Program (QAP) is currently available internationally specific to the 2019-nCoV, although QAPs are available in Australia for respiratory viruses including non-2019-nCoV coronaviruses. The RCPAQAP with Commonwealth support will introduce a 2019-nCoV specific QAP to supplement previously available SARS-CoV, MERS-CoV and other coronaviruses, during 2020.