

# Information for medical imaging managers and clinicians

## Building capacity and protection during COVID-19 surge

This information sheet applies to the medical imaging diagnosis of COVID-19 and the diagnosis of other conditions in patients with suspected, probable or confirmed COVID-19. The imaging strategies and principles for infection prevention and control aim to support staff and patient safety. The document also aims to provide information to assist with the long term sustainability of medical imaging services during COVID-19 pandemic surge periods.

This document outlines the imaging strategies and principles for infection prevention and control. This information sheet aims to ensure staff and patient safety and long-term sustainability of medical imaging services during the COVID-19 pandemic.

The provision of medical imaging services for patients with suspected, probable or confirmed COVID-19 should be based on a risk assessment or laboratory or clinical clearance criteria. This document assumes that during a surge period, resources will be redirected from non-urgent outpatient settings to COVID-19 surge priorities.

All other (non-COVID-19, COVID-19-negative) patients should be treated via normal pathways.

The guidance on infection prevention and control requirements for the management of these patients and the use of personal protective equipment (PPE) in New South Wales (NSW) healthcare settings should be based on the Clinical Excellence Commission (CEC) [Infection Prevention and Control Management of COVID-19 in Healthcare Settings](#) in conjunction with the [NSW Infection and Prevention Control Policy Directive](#), the COVID-19 Infection Prevention and Control Response and escalation framework and local procedures and guidance.

### 1. Reducing traffic through medical imaging departments

Medical imaging should be performed at sites with less foot traffic and with fewer critically ill patients in that area to avoid secondary patient and staff exposure.<sup>3</sup>

Medical imaging departments should seek to reduce the number of patients coming into the department, reduce patient transits through the department and increase the use of mobile examinations.

For example, medical imaging meetings can be conducted using telehealth or videoconferencing, and the number of people present during procedures reduced, to ensure compliance with physical distancing parameters of 1.5m distance between individuals.

Many radiologists will be working from home (split team arrangement with team A and team B) with VPN capabilities. It is recommended that a central point of contact for COVID-19 medical imaging enquiries be established at each local health district (LHD).

Signs indicating 'maximum occupancy' on relevant rooms such as tea rooms and meeting rooms, should be considered.

Tearooms should allow for physical distancing. Consider using larger seminar rooms as lunchrooms with 1.5m physical distancing with hand washing facilities (alcohol-based hand rub or soap and water wash) for staff.

Waiting rooms and trolley bays should also use the 1.5m physical distancing rule for chairs and beds.

## 2. Maintain capacity and protection through appropriate use of medical imaging modalities

### Imaging requests and e-orders for COVID-19

Imaging requests and e-orders for COVID-19 cases should be sent via a locally approved pathway. Rationalisation of cases will occur with relevant senior staff via a centralised communication pathway. Structured advice on the approval pathway should be determined by each LHD or hospital.

Continued demand for urgent procedures must receive optimal care.

### Chest imaging

Chest imaging is not a screening tool for COVID-19.<sup>1,15</sup> The majority of patients with COVID-19 have mild symptoms and minimal evidence of disease on chest X-ray.<sup>15,24</sup>

If chest imaging is requested for COVID-19 positive or COVID-19 suspected patients, it is recommended that a designated 'COVID-19 mobile X-ray unit' stay in specified wards. A two-person team, 'hot' and 'cold' team, should be rostered wherever possible. Covered (plastic vs linen) detector to the 'hot' team member inside the room and 'cold' member to stand outside the room, if possible. (See example CXR protocol at the ACI Medical Imaging COP COVID-19 SharePoint).\*

### CT chest (non contrast)

RANZCR strongly advises against conducting routine chest CT scans for all individuals undergoing emergency surgery in Australia and New Zealand. They believe the misuse of chest CT and misapplication of results will bring unnecessary and clinically important risks to the surgical team and the patient, given the current status of the COVID-19 pandemic in Australia and New Zealand.<sup>4</sup>

There is no role for CT scans in determining the management of COVID-19 positive patients or the diagnosis of COVID-19. CT use is not supported by literature.<sup>6,23,25</sup>

Chest CT is not superior to RT-PCR for the initial detection of COVID-19 and has more false positives. It is likely to be useful in confirming COVID-19 in patients with a suspicious clinical presentation but who have a false-negative SARS-CoV-2 RT-PCR test.<sup>25</sup>

Advice regarding the use of CT was released by the Royal Australia and New Zealand College of Radiologists (RANZCR) was consistent with position

statements released by both the American College of Radiology and the Society of Thoracic Radiology (STR).<sup>4-6</sup>

While the STR does not recommend routine CT screening for the diagnosis of patients under investigation for COVID-19, chest CT can be restricted to patients who test positive for COVID-19 and those suspected of having complicating features, such as abscess or empyema.<sup>6</sup>

For CT examinations on COVID-19 or suspected COVID-19 patients, ensure:

- an identified, dedicated CT scanner is used, if possible, e.g. the use of CT in nuclear medicine may be possible
- all ancillary equipment is covered with linen or plastic sheets in the CT room
- all non-essential items are removed from the room or placed into suitable cupboards to reduce the surfaces that need to be cleaned post-scan.

At least two radiographers should be present (or one radiographer and a nurse or technical assistant). Healthcare workers within 1.5m of a COVID-19 suspected case should have gloves, apron or gown, and depending on the risk, surgical mask and eye protection.<sup>11</sup> The radiographer in the control room may have less PPE but will still need a face mask, gown and gloves.

If the CT room is sealed off and staff are able to stay in a clean or green separated zone, then no PPE is required due to no COVID-19 contact. A change of gloves is required if contact is made with the patient during the scan.

### Advice on CT technique

- Advice is available from [RANZCR](#).
- A volumetric CT of the entire chest at end inspiration is recommended, with reconstruction of contiguous high-resolution (HR) images at 0.625–1.5mm slice thickness (without an interslice gap) for assessment of the lungs.
- Use non-contrast as much as possible. Intravenous contrast should be used when clinically indicated.
- International review of COVID-19 clinical appearances on non-contrast CT, which can be obtained at the ACI Medical Imaging COP COVID-19 SharePoint.\*
  - Cleaning and disinfection of high touch points and terminal clean at the end of the session or end of the day, as per local protocols.

\* To request access to the ACI Medical Imaging COVID-19 resources on SharePoint, email [ACI-MI@health.nsw.gov.au](mailto:ACI-MI@health.nsw.gov.au).

## Interventional radiology and interventional neuroradiology

Interventional radiology and interventional neuroradiology examinations should be screened for COVID-19 transmission risk and a radiologist consulted prior to booking. The clinical need, risk of delay and assessment of feasibility, should all inform the decision to cancel, postpone or proceed with an elective intervention. These decisions will be specific to the local health district or facility. Consider whether any procedural cases will require access to ICU beds, general anaesthesia/sedation and airway manipulation etc.

### For more information

[The Society of Interventional Radiology](#) for information about clinical notification.

[Cardiovascular and Interventional Radiological Society of Europe checklist](#) for preparing to respond to COVID-19.

## Ultrasound (US)

Where possible, all ultrasound examination requests on COVID-19 (suspected or positive) patients, mobile imaging should be performed to minimise the chances of cross infection.

It should be recognised that each examination requires close proximity for an extensive time. For these examinations, accurate clinical history and specific region of interest would help minimise the time the sonographer is in close proximity to the patient.

When requesting an ultrasound examination, the risks and benefits should be considered. Where possible, another modality may be more appropriate, e.g. CT.

Use a portable unit that stays in a designated location where possible. The unit must be cleaned and disinfected after use.

Please refer to the Australasian Society of Ultrasound in Medicine (ASUM) guidelines for mobile ultrasound in the ICU and fixed units.<sup>16</sup>

Ultrasound probes can be cleaned as per current practices for high level disinfection (HLD) via a trophon or approved HLD device. Probes should undergo HLD after touching infected patients.<sup>17,18</sup>

For point of care (POC) units, the following recommendations have been published, which are similar to medical imaging units.<sup>18</sup>

- If possible, designate a specific ultrasound machine for suspected COVID-19 patients.
- Handheld ultrasound devices should preferentially be used, as they can be completely encased with a probe cover, can be easily cleaned and disinfected after every case, and do not have a cooling fan.
- If a handheld device is not available, cart-based ultrasound machines should be stripped of all unnecessary items, like printers, baskets, and gel bottles.
- Machines with touch screens are preferable to machines with keyboards or buttons.
- Employ single-use gel packets instead of gel bottles.<sup>18</sup>

Some LHDs have referred ultrasound cases to local private facilities or used BreastScreen sites for non-COVID-19 cases.

## MRI

MRI use should be based on risk assessment and other modalities substituted for COVID-19 positive or suspected cases, if appropriate, because deep cleaning of MRI units is not achievable. Where there is a lag time in eMR infectious status, LHDs are asking for a statement in the clinical information indicating, COVID-19 negative, not suspected COVID-19 status or wait until COVID-19 results are available.

New eMR/Cerner Millenium software for COVID-19 flagging in e-Orders and requests are being progressed.

International MRI COVID-19 evidence states:

- For patients known to have tested positive or are persons under investigation (PUI) for COVID-19, the American College of Radiology (ACR) recommends that practitioners minimise the use of magnetic resonance imaging (MRI) except where absolutely necessary, and postpone all non-urgent or non-emergent exams.
- In some cases, the use of alternative imaging methods such as point of care or portable imaging may be appropriate.
- As with all imaging, the impact of the results of the imaging must potentially affect imminent clinical management.<sup>12</sup>

PPE in MRI has a risk of mask dislodgement on patients and staff in the magnetic field.

There is also an increased risk of artefact and heating for patients wearing masks during MRI. If the patient is symptomatic, then the procedure may be delayed or postponed based on the clinical condition. If the procedure is necessary, then there are only two masks that have been tested at 1.5 T. After testing, only one P2/N95 mask (Halyard Fluidshield) and one surgical mask (Primed PM4–306) have been passed as being MR safe with no artefact at 1.5 T. These must be used by both staff and patients entering the MRI room. The mask and face shield combo unit currently being used by the anaesthetists are weakly attracted to the magnet.

### If MRI is critical then ACR suggests<sup>12</sup>

- If there is a metal strip in the surgical mask, inpatients should be fit with known MR safe masks or respirators, prior to arriving to the radiology department. If this is not possible, metallic components from a face mask should be removed prior to, or when necessary, upon the patient's arrival at the MR suite. Tape may be applied across the bridge of the nose section of the mask after removing the metal strip if the site feels that this would be sufficient for adequate fomite control and to maintain the intended function of the mask.
- If the patient has a tracheostomy, a face mask without metallic component should also be placed over the tracheostomy.
- MRI examinations with non-MR conditional masks are strongly discouraged. If absolutely necessary for unanticipated reasons, lowering SAR values and/or shortening RF transmission durations and/or introducing cool-down periods between scans, may help minimise the risks of patient injury. However, this will all result in longer study times for the patient.<sup>12</sup>

**The ACI MRI Scans in COVID-19 Pandemic Surge and MRI Protocols is also available at the [ACI Medical Imaging SharePoint](#).**\*

\* To request access to the ACI Medical Imaging COVID-19 resources on SharePoint, email [ACI-MI@health.nsw.gov.au](mailto:ACI-MI@health.nsw.gov.au).

## 3. Outpatient services

For advice on resumption of Outpatient clinics, please see the [NSW Health risk assessment and mitigation processes](#). For patients who were previously COVID-19 positive see the ['release from isolation' information](#).

Outpatient services will be reprioritised, and in some instances be sent to local private practices. Outpatient cases should be restricted in accordance with pandemic conditions.

In particular, ultrasound services have been referred to local private radiology facilities or to BreastScreen sites in some LHDs. (See OP criteria examples at the ACI Medical Imaging COVID-19 resources on SharePoint.)\*

### Nuclear medicine

- Gamma camera gantry covered in plastic for use with COVID-19 positive patients or cleaning the gantry after all COVID-19 positive and suspected patients and between 'hot' and 'cold' patients.
- Consider converting one CT scanner dedicated for COVID-19 patients.
- There is a risk of COVID-19 cases having VQ (ventilation/perfusion) scans due to problems such as circuit contamination, AGP, patient coughing etc. CT pulmonary angiogram (CTPA) can be considered instead or a variation in protocol, such as a perfusion scan or perfusion with non-contrast CT as a surrogate. Even without the ventilation scan, the lung perfusion scan can provide helpful information to the referring physician.<sup>13</sup>
- Some local radiopharmaceutical production may exist for cancer management and diagnosis of bone fractures, infections, and cardiac and neurological conditions in both adults and children. Examples include:
  - F18 NaF for PET bone imaging for cancer staging and diagnosis of fractures or infection in adults or children
  - F18 PSMA for prostate cancer staging or detection of recurrence
  - F18 FET for brain tumour
  - FDG for hospitals in NSW and Australia
  - F18 DOPA: under validation.

## 4. Infection control

There is a growing need to preserve workforce capacity by providing appropriate PPE and COVID-19 flagging in e-orders and medical imaging requests to support the health service during the COVID-19 response.

In most situations, when caring for patients with suspected or confirmed COVID-19 and contact and droplet precautions are needed. Best practice is a single-use surgical mask, along with eye protection, apron or gowns and gloves. P2/N95 masks are reserved for aerosol generating procedures, such as intubation, to help reduce the wearer's respiratory exposure to contaminants, such as airborne particles.

Frontline staff should be educated in the donning and doffing PPE. Staff should be encouraged to adopt the same 'time-distance-shielding' philosophy for COVID-19 cases, i.e. reduce time of imaging, increase distance from patient and shield themselves with careful adherence to PPE.

[The CEC's video](#) on PPE outlines combined contact and droplet precautions and combined contact, droplet and airborne precautions.<sup>11</sup> This resource provides specialised training on the correct application and removal of PPE for frontline staff.

The covering of medical equipment with plastic should be done with caution because of the potential of electronics overheating. There must always be a cooling passageway for instrumentation, as required by service maintenance contracts.

Approved guides have been developed by the Clinical Excellence Commission (CEC).

- [Management of COVID-19 in Healthcare Settings](#).
- [Advice for health workers](#).<sup>9</sup>
- CEC resources for health workers around COVID-19 and PPE are also available.<sup>10,11</sup>
- [COVID-19 Infection Prevention and Control Response and Escalation Framework](#).

### PPE for patients

- Level 1 masks should be provided for all patients with suspected or confirmed COVID-19 to use during transfer to and from, and also during medical imaging investigations.<sup>11</sup>
- Patients should be provided with hand hygiene, such as an alcohol-based hand rub, on arrival.

### PPE for staff

- Aerosol generating procedures (AGP), where a virally positive person may cough, ventilation or intubation is no longer closed circuit for COVID-19 positive or suspected patients:
  - AGP PPE – gown, gloves, N95 or P2 mask, eye protection
  - discard after procedure.
- Non-AGP, such as chest X-ray in general room, for COVID-19 positive or suspected patients:
  - PPE – apron, gown, gloves, surgical mask, eye protection
  - discard PPE after procedure
  - gloves must be changed after every patient and hand hygiene performed
  - consider extended or sessional use if risk of contamination is low.
- For COVID-19 positive, suspected or probable patients requiring extended close contact procedures, such as ultrasound, for other patients:
  - gloves and surgical mask (optional, if risk assessment deems necessary for droplet transmission)
  - surgical masks, if used, should not be left in place for extended periods of time to prevent soiling, being touched or otherwise contaminated. Once removed, it should be discarded and should not be worn around the neck.

- Brief contact procedures, such as X-rays and CT, for other patients:
  - surgical masks, if used, should not be left in place for extended periods of time (>4 hours) to prevent soiling, being touched or otherwise contaminated. They should be removed and discarded for each meal break.

If using a surgical mask for other patients, a new mask is not required for every patient. In consideration of mask burn rates, they can be worn for up to four hours if due care is taken to avoid touching the mask or face.

- Sonographers should conduct a risk assessment on all patients and ensure that they wear a surgical mask, gloves and gown when appropriate and where close contact is anticipated.<sup>16</sup> The RSNA suggests patients with suspected COVID-19 wear a mask during imaging procedures for droplet precautions.<sup>1</sup>
- If patients are unlikely to have, or are COVID-19 negative, standard precautions is all that is required, subject to the requirements of the response and escalation framework.<sup>7</sup>
- It is important that staff do not contaminate themselves or their workplace when removing PPE or by leaving soiled PPE on when changing from a 'hot' to a 'cold' area. Ensure staff have a buddy to support them when removing PPE.
- Stress the importance of hand hygiene to all staff. Ensure there are sufficient hand hygiene stations throughout the department.
- Ensure staff wipe down all keyboards, phones and workstations at the beginning of shifts using a hospital grade and TGA approved dual purpose detergent and disinfectant.
- Contractors, service engineers and visitors must follow the CEC visitor recommendations.

## Terminal Clean

- Cleaning of large medical imaging equipment should follow manufacturer guidelines.<sup>22</sup>
- Terminal cleaning is required as per routine processes of LHDs.
- Cleaning and disinfection of high touch points (frequently touched items) for all COVID-19 positive or suspected COVID-19 patients. This includes any symptomatic patients with acute respiratory illness.<sup>19</sup>
- Full terminal clean, after every case, should be based on a risk assessment and local protocol.
- Aeration is only required after an AGP is conducted on a COVID-19 patient but not after routine patient care.
  - The time for aeration will depend on the air changes per hour in that room, however, the time required for droplet nuclei to settle is estimated to be about 30 minutes.
  - If an AGP has not taken place, the room does not need to be left for the 30 minutes and can be cleaned straight away.
  - Cleaners must wear PPE and a P2 mask to clean the room if 30 minutes has not elapsed after an AGP.
  - Cleaners should be trained to wear PPE for cleaning in various situations.
  - The CDC has published [advice on ventilation specifications](#).

## 5. Workforce capacity strategies

- Wellness checks are recommended for all staff before starting shifts.
- Ask staff to call in as soon as practicable before a shift if they are unwell.
- Consider placing local private practice staff in casual pools.
- Limited licences can be explored with the Environment Protection Authority (EPA), e.g. sonographer with radiography background and no EPA licence or other health professionals with an imaging background.
- Working with children check and other police check clearances have all been extended for six months from the date of expiry during the COVID-19 pandemic.<sup>14</sup>
- AHPRA is fast-tracking of return to practice professionals. AHPRA provides a pandemic sub register for medical radiation practitioners whose registration has been lapsed for 12 months. This has been extended for 12 months as at 20 April 2020.<sup>20</sup>
- Staff who do not develop COVID-19 symptoms while in quarantine can return to work without a medical clearance. Testing for COVID-19 is not necessary.<sup>26</sup>
- AHPPC has published [advice](#) for redeploying vulnerable staff.

### Special risk settings for healthcare workers

All healthcare workers should observe usual infection prevention and control practices in the workplace. This includes healthcare workers and other staff in any setting who have direct patient contact. Healthcare workers with influenza-like illness should not work while they are symptomatic. They should be tested for SARS-CoV-2 and undergo isolation pending results. Healthcare workers who are defined as close contacts should be treated as such. In settings where the loss of the healthcare worker will have a significant impact on health services, an individual risk assessment should be conducted in collaboration with the public health unit. Quarantined healthcare worker close contacts should be advised on the processes for seeking medical care.<sup>21</sup>

## 6. Workforce wellbeing

- Psychological wellbeing of staff is important at this time of high anxiety and workload.
- Ways to mitigate and alleviate fear include:
  - sending staff to counselling
  - encouraging testing
  - roster staff to offsite units that image low risk cases
  - provide improved PPE training
  - provided regular meetings or a safety huddle each shift keeps staff up to date on PPE, wellness, infection control, changes in processes as BAU
  - provide COVID-19 guidelines to help reduce anxiety, e.g. NSW Ministry of Health COVID-19 website, LHD websites.
- Resources for the health and wellbeing of staff can be found each LHD and at the CEC. Other resources include:
  - [Safety fundamentals for teams](#)
  - [Cognitive Institute webinars](#)
  - [Guidance for psychological](#)
  - [Isolation guide](#)
  - [Isolation fact sheet](#)
  - [Accommodation for health staff](#)
  - [Vulnerable workers – COVID-19](#).

\* There are national guidelines by the Communicable Diseases Network Australia (CDNA) that provide updated recommendations for surveillance, infection control, laboratory testing and contact management for COVID-19.<sup>22</sup>

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Further resources are available on the [ACI Medical Imaging SharePoint](#).

For further enquiries or access to SharePoint, please email [ACI-MI@health.nsw.gov.au](mailto:ACI-MI@health.nsw.gov.au) to request access.

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