



COVID-19

ISRRT Response Document - Appropriate and safe use of Medical Imaging and Radiation Therapy with infection control measures considered in addition to standard radiation protection procedures.

ISRRT Board of Management approved April 2020

Based on Input to the World Health Authority (WHO) Non-Governmental Organizations (NGOs) meeting facing COVID-19 held March 27th 2020 and development of various WHO/IAEA Technical documents including 'WHO-Rapid Advice Clinical Guide on appropriate use of radiological imaging in COVID-19' and IAEA/WHO Technical brief for Nuclear Medicine in COVID-19.

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Table of Contents

1. [General Summary and ISRRT Statement of Purpose and Support for All Radiographers and Radiological Technologists](#)
2. [Acknowledgements – Expert Contributors](#)
3. [General Checklists for All Imaging Procedures](#)
4. [Personal Protective Equipment \(PPE\) – COVID-19 Considerations](#)
5. [Imaging Departments ‘Checklists’ and General Guidance for Consideration during COVID-19](#)
 - [All Departments – Checklist and General Advice](#)
 - [All Departments – Additional measures and considerations](#)
 - [Radiography Department and Mobile Radiography](#)
 - [Interventional Department](#)
 - [CT](#)
 - [Ultrasound](#)
 - [Mammography](#)
 - [DXA](#)
 - [MRI](#)
 - [Nuclear Medicine and PET CT](#)
 - [Radiation Therapy](#)
6. [Student Education](#)
7. [Useful links – Bibliography](#)
8. Appendices
 - [A - Advice on the use of PPE equipment – Donning and Doffing \(Removal and Disposal\)](#)
 - [B – Decontamination of Couches and other equipment](#)
 - [C- PPE – Donning diagrams](#)
 - [D – PPE – Doffing \(Removal\) diagrams](#)
 - [E- Facial hair and FFP3 respirators safe usage](#)

COVID-19 - ISRRT Response Document - Appropriate and safe use of Medical Imaging and Radiation Therapy with infection control measures considered in addition to standard radiation protection procedures.

General Summary and ISRRT Statement of Purpose and Support for All Radiographers and Radiological Technologists

This document is provided to the World Health Authority (WHO) and the International Atomic Energy Authority (IAEA) as technical input for the development of joint WHO/IAEA guidance documents on COVID-19 safety procedures.

COVID-19 is a respiratory virus caused by a strain of coronavirus called SARS-CoV-2. Current evidence available suggests that the virus COVID-19, is transmitted from person to person through close contact and respiratory droplet transmission when a person coughs or sneezes. These droplets can enter the nose or mouth and subsequently be inhaled into the lungs. Transmission can also occur when a contaminated surface with droplets is touched by a person and they then touch their face, eyes or mouth. The evidence also suggests that COVID-19 isn't transmitted by airborne transmission.

People that are most at risk are healthcare personal that are in close contact with COVID-19 patients while performing Aerosol Generating Procedures (AGP's) or by caring for COVID-19 patients for an extended period of time. Additionally, it has been identified that the virus can exist on hard surfaces for up to 72 hours and therefore appropriate cleaning processes for the equipment and environment are important and must be clearly established.

Radiographers by virtue of their profession are at high risk of acquiring the COVID-19 virus. Radiographers are in close proximity with patients everyday as they perform medical imaging procedures. As frontline staff, radiography departments need to incorporate additional precautions for radiographers and support staff to protect themselves and prevent the transmission of COVID-19 in the healthcare setting.

The unprecedented COVID-19 virus is affecting many of our Radiographer colleagues around the world today. As a profession, we know these are turbulent times and we appreciate that radiographers/radiological technologists worldwide are serving as frontline professionals during this

pandemic. ISRRT recognises that your knowledge, care and efforts contribute greatly in the delivery and management of the care and treatment of patients affected by this pandemic.

This document has been developed in response to the requirement for a technical guidance document which addresses the personal protective equipment necessary for radiography personnel working in radiology imaging centres. As such the document considers the control of infection measures necessary to manage imaging procedures for patients who may carry the COVID-19 virus, as well as advising on measures for imaging the more complex and higher risk patients undergoing AGP's. All of these considerations are levelled against the necessary standard radiation protection and medical imaging safety measures.

At short notice experts from around the world have contributed to the content of this publication gathering and reflecting best practices in their countries as well as current guidance publications issued by several professional societies.

This document will assist in the development of an action plan for a safe way of working, outlining all the relevant steps to be considered for a range of imaging procedures and situations. This includes appropriate personal protective equipment (PPE) needed to protect against COVID-19 transmission and daily best practice for social distancing of radiographers, patients and personnel including health care workers.

There is also valuable information relating to best practice for general cleaning after performing medical imaging procedures on patients with COVID-19 virus.

PPE is based on risk of exposure by the activity being performed and the transmission dynamic of the virus considering the three types of transmission of diseases: contact, droplet and aerosol.

Evidence shows that COVID-19 transmission is by droplet. Appropriate personal protective equipment (PPE) is mandatory if COVID-19 spread is to be reduced. Appropriate PPE for droplet precaution includes eye protection either goggles or face shield, surgical masks, N95/FFP2/FFP3 masks or PARP, depending on procedure being performed, fluid resistant isolation gown and disposable gloves.

An effective PPE program, includes selecting and using PPE appropriately and must include training on how to put on (donning), remove (Doffing) and dispose of PPE articles worn. By mastering these additional precautions radiographers can protect themselves and prevent the transmission to others in the healthcare setting.

Acknowledgements – Expert Contributors

The ISRRT wishes to thank all content experts that made this best practice technical document possible:

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General Checklist for All Imaging Procedures

Control of COVID- 19 Check List	Radiographer/RT Tasks	Patient Considerations	Equipment Considerations	Imaging Room or Mobile Imaging Environmental Considerations
Preparation	<p>Will the imaging procedure change patient management and/or could the procedure be delayed? Is mobile imaging (XR, US, CT or Gamma camera) an option for suspected and positive COVID-19 cases? Ensure Staff backup in case of AE-calls in the emergency situation. Staff risk evaluation (pregnancy, immune, mental health concerns etc. Don PPE with all appropriate steps – see appendix ‘A’</p>	<p>Is it needed now, or could this be delayed? Is mobile imaging possible? PPE during transfer to department when cannot be done mobile</p>	<p>Remove unnecessary equipment from imaging room Could the examination be performed as a mobile?? Cover equipment that cannot be moved with suitable plastic</p>	<p>Ensure infection prevention measures are employed when managing the imaging room and imaging equipment. This must be subject to regular cleaning consistent with local IPC guidance and cleaning schedules completed and signed and dated.</p>
During	<p>Appropriate PPE Employ “contaminated and non-contaminated radiographer /technologist” scenario Ensure single patient attendance to the Imaging department wherever possible to enable further imaging If this is required.</p>	<p>PPE, comfort, reassurance</p>	<p>Infection control and barrier precautions</p>	<p>Control access to imaging room or patient area during mobile radiography</p>
Post procedure	<p>Review of imaging by radiographer for suspicious features and organise additional imaging if required Appropriate staff ‘Doffing’ of PPE equipment – see Appendix A</p>	<p>PPE during patient transfer, rapid results to guide management</p>	<p>Appropriate decontamination including air exchange</p>	<p>Appropriate equipment decontamination. Where feasible, environmental decontamination should be performed when it is considered appropriate to enter the room or area without an N95/FFP2/FFP3 respirator. The imaging room may be closed up to two hours depending on the room air exchange rate. PHE, however, indicate that a single air change is estimated to remove 63% of airborne contaminants, after 5 air changes less than 1% of airborne contamination is thought to remain. A minimum of 20 minutes, that is 2 air changes, in hospital settings where the majority of these procedures occur is considered pragmatic (PHE 6.4.20)</p>

Note: This checklist should complement any agreed standard ‘Infection Control’ protocols established at your Health Institution.

Checklist Notes

In addition to this check list remember that radiographers/radiological technologists are at the front line of the healthcare service so you must follow existing guidance/protocols: -

- Ensure all routine initial key checks are performed i.e. the Imaging Request is justified, suitably protocolled and the patient identification procedures followed.
- When a patient is suspected or confirmed to have COVID-19 use barrier nursing techniques in pairs as required i.e. in mobile radiography procedures.
- Apply standard radiation protection and optimisation principles where relevant.
- Always ensure the image is diagnostic before leaving the patient – using Direct Digital Radiography (DDR) will enable this
- Always ensure the image is received and available in PACS ready for reporting.
- Always work within your scope of practice and job role.
- Separate cold/blue/clean from hot/red/contaminated areas.
- Decontamination of couches and other equipment is described in [Appendix B](#)

Additional measurers and considerations

- Consider rescheduling all routine, asymptomatic screening mammography until community risk is minimal– triaging - same for all disciplines. However, it is important that time-sensitive procedures such as fetal anomaly screening is recommended to continue (RCOG). Hospital authorities may transfer imaging of these patients to community centres to reduce the traffic at busy hospitals.
- For Waiting rooms and work areas adapt international social distancing standards of 1meter (3 feet) minimally or alternatively adopt local or national guidelines i.e. 2 meters (6 feet).
- Ensure the key screening questions performed as required for Outpatient procedures: -
 - Has the patient recently or currently experienced a fever (37.8°C? or above)
 - Persistent Cough
 - Shortness of Breath (Considering pre-existing medical conditions may be present)
 - NB in the acute setting for emergency admissions and in-patients this will be completed
- Expanding the wellbeing of the radiographers during the pandemic is a priority.
- Careful record keeping facilitating clinical audit and what we can learn for the future.

Note

- **Mobile radiography** in this document is defined as imaging outside of the main department but within the healthcare setting.

Personal Protective Equipment (PPE) - COVID-19 Considerations

Imaging and Therapy departments will play a vital role in managing patients during the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) COVID-19 pandemic. Radiographers and Radiological Technologists in particular are crucial patient-facing staff that will play a key role. Guidance and recommendations are fluid and rapidly changing as evidence emerges and evolves. It is essential that imaging departments - including radiographers, radiologists and support staff - are kept up to date. This is a shared responsibility between management and individuals. Local policy should be adapted and consistent with national and international guidance. Infection control, especially hand hygiene, will be central to mitigation. In order to protect themselves, colleagues and patients, it is critical that radiographers have access to - and training in - the safe use of personal protective equipment (PPE). Updated PPE guidance has been issued in response to the increasing prevalence of COVID-19 cases. Different Government bodies offer advice and one example Public Health England (PHE) advice is for in all secondary care/acute hospital settings that do not involve non-aerosol generating contact, staff should wear a surgical mask, eye protection, disposable apron and disposable gloves.

Specific guidance on PPE for imaging departments has been provided, reinforcing the key role that radiographers are playing, particularly with chest radiograph (CXR) acquisition forming a pivotal role in diagnosis. Surgical mask and eye protection should be worn for a 'session' (e.g. mobile ward round). This is consistent with World Health Organisation (WHO) guidance and supported by a recent single centre case report from Singapore and a meta-analysis.

Health organisations should have clear policies in place for imaging staff in relation to suspected or confirmed COVID-19 patients and systems in place to ensure these are regularly updated and as disease prevalence increases. Current PHE guidance indicates that all emergency/acute imaging referrals should be treated as potential COVID-19 cases. Policies should include:

- Decontamination of imaging equipment (CT and MRI gantries, ultrasound probes) and any surface that may have come into contact with respiratory droplets
- Clean techniques for imaging, including dual working where possible
- Mobile imaging wherever possible avoiding transfer of the patient
- Transfer of patients to imaging departments when mobile imaging is not appropriate

Radiographers should receive an update on the safe application and removal of PPE relevant to the level of potential exposure – see appendix A. Fit testing for FFP3/N95 masks should occur for key staff likely to be involved in aerosol generating procedures. Recent research suggests SARS-CoV-2 (coronavirus causing COVID-19) can persist on steel and plastic surfaces for up to 72 hours, reinforcing the need for appropriate barrier precaution (for example detector covers) and decontamination of imaging equipment and rooms.

Masks, Respirators and Eye and Face protection

- Surgical/Medical Masks

These are worn when dealing with patients suspected or confirmed COVID-19. – WHO guidance

- Respirators – used for COVID-19

WHO advises to use a particulate respirator at least as protective as a US National Institute for Occupational Safety and Health-certified N95, European Union standard FFP2, or equivalent, when performing or working in settings where aerosol-generating procedures, such as tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy are performed. PAPR respirators are also recommended for specific situations. FFP3 respirators are recommended by Public Health England.

N95/FFP2/FFP3	N95 respirators filter at least 95% of airborne particles, FFP2 at least 94% and FFP3 at least 99% airborne particles. The HSE states that all staff who are required to wear an FFP3 respirator must be fit tested for the relevant model to ensure an adequate seal or fit (according to the manufacturers' guidance). Fit checking (according to the manufacturers' guidance) is necessary when a respirator is donned to ensure an adequate seal has been achieved.
PAPR	Powered air Purifying respirator (PAPR) is a type of personal protective equipment used to safeguard workers against contaminated air. PAPR's consist of a respirator in the form of a hood, or full-face mask, which takes ambient air that is contaminated with one or more type of pollutant or pathogen, actively removes (filters) a sufficient proportion of these hazards, and then delivers the clean air to the user's face.

- Eye and face protection

Eye and face protection provide protection against contamination to the eyes from respiratory droplets, aerosols arising from AGPs and from splashing of secretions (including respiratory secretions), blood, body fluids or excretions.

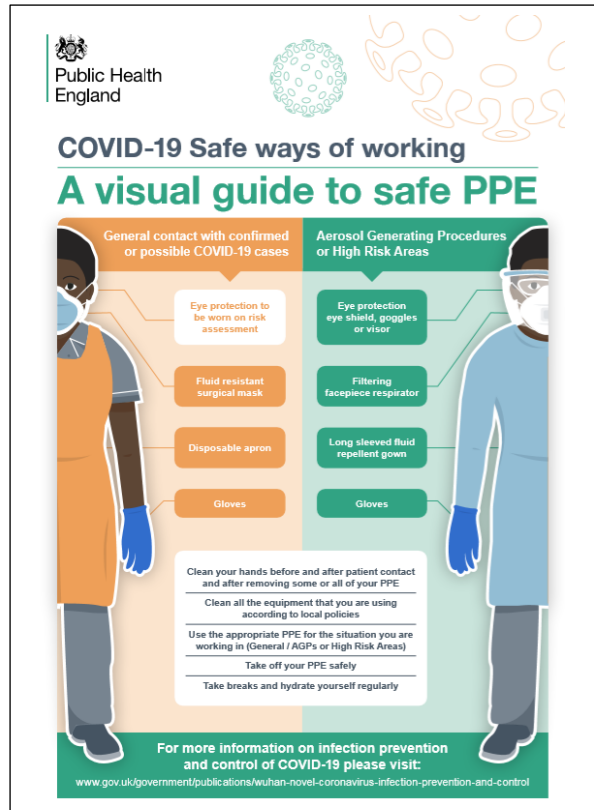
Eye and face protection can be achieved by the use of any one of the following:

- surgical mask with integrated visor
- full face shield or visor
- polycarbonate safety spectacles or equivalent

Regular corrective spectacles are not considered adequate eye protection.

Personal Protective Equipment (PPE) – COVID-19 Considerations

Summary or Use



Poster courtesy of Public Health England -

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878056/PHE_COVID-19_visual_guide_poster_PPE.pdf

See also RCR and SCoR posters based on the PHE visual guide:- 'Personal protective equipment advice for imaging departments and teams [Appendix F](#)' and 'Personal protective equipment advice for oncology departments and teams [Appendix G](#)'

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Summary of use COVID-19 PPE equipment	
General Contact with confirmed or possible COVID-19 cases	Aerosol Generating Procedures or High-Risk Areas
Eye protection to be worn on risk assessment	Eye protection eye shield, goggles or visor
Fluid resistant surgical mask	Filtering face piece respirator
Disposable apron	Long sleeved fluid repellent gown
Gloves	Gloves

Important Actions

- Clean your hands before and after patient contact and after removing some or all of your PPE
- Clean all the equipment that you are using according to local policy guidance
- Use the appropriate PPE for the situation you are working in (General / AGPs or High-Risk Areas)
- Put on (Don) and take off (Doff) your PPE safely.
- Take breaks and hydrate yourself regularly

CDC (Centre for Disease Control - USA) ([link here](#), diagrams [here](#))

Suspected / known COVID-19

Preferred gloves, gown, N95, eye protection

Acceptable gloves, gown, facemask, eye protection

ECDC (European Centre for Disease Control - EU & UK) ([link here](#))

Suspected / known COVID-19 gloves, a long-sleeved gown or apron, fit-tested FFP2, eye protection.

AGPs gloves, a long-sleeved FR gown or apron, fit-tested FFP2/3, eye protection.

PHE (Public Health England) ([link here](#))

Radiology – all pts gloves, plastic apron, FRSM, eye protection

AGPs gloves, FR gown, FFP3, eye protection

Imaging Departments Guidance for Consideration during COVID-19

All Departments - General Advice

- Screening questionnaire for COVID-19 prior to patient examination at scheduling, entrance to facility (hospital or free-standing clinic)
- Specific isolation room for patients that answer 'Yes' to screening questions at entrance of facility
- Door signage warning for coronavirus symptoms
- Display current guidance on the entrance door
- Be clear about who may/may not enter the area
- Where possible have entrance and exit doors within the department
- Imaging on COVID-19 patients only when imaging will impact management of patient's care, mobile radiography whenever possible
- Increasing scheduling intervals or appointment times to allow adequate time to clean equipment as needed, this must also include radiation protective aprons and devices
- When transporting COVID-19 patients or suspected COVID-19 patients ensure that the patient wears an appropriate mask and that a clean sheet is placed over the patient for the journey to the radiology department and the patient's examination room. Ensure that the patient wears mask throughout his/her visit in the department and during the imaging procedure according to CDC guidelines
- Adhere to standardized protocols for decontaminating imaging rooms including typical passive air exchange of up to 2 hours between patients (or based local practice recommendations) before cleaning if a COVID-19 patient takes off their mask and coughs in the imaging room. This time frame will depend on the type of ventilation and air exchange inside the room.
- Radiology leadership work within the hospital response plan to ensure plan meets changing situation as it arises
- Develop a dedicated team in radiology leadership to coordinate and standardize the protocols for patient care and operational workflow and address concerns from departments, staff and physicians
- Hold daily electronic briefing to determine access status and concerns from leadership in each department, communicate important daily changes and determine overnight incidents
- Leadership - create a list of staff's additional skills or certifications for training and redeployment consideration of staff during peak of COVID-19
- Management - communicate regularly with Providers and Staff on updated Clinical Practice Guidelines as well as with general updates and status information related to the COVID-19 pandemic
- Adhere to the WHO safety distance standard of 1 meter (3 feet) or where possible best practice countries recommendations of 2 metres (6 feet) between individuals in waiting rooms and work areas as much as feasible

- When possible with two facilities make one facility the COVID-19 facility and have the other non COVID-19 facility, also if more than one piece of equipment is available, designate one for COVID-19 and the other for non COVID-19
- Work with Supply chain and Vendors to ensure enough PPE (Personal Protective Equipment) available.
- Centralize PPE supplies and accurately manage stock levels, monitoring demand, so as not to over or under stock essential items. Allocate based on clinical need and store securely to prevent theft.
- Wear appropriate PPE for the examination and always wear single use gloves, a mask and wear a face shield when appropriate and disinfect per facility policy
- Decrease in person consultations in reporting rooms with referring physicians; implement video or phone consultation on patient cases
- Avoid crowding in imaging console areas, examination rooms and rest areas, only necessary persons involved in the procedure to be present.
- Use telemedicine whenever possible

Consideration for Pregnant Radiographer / Radiological Technologist workers.

- Pregnant radiographers should not provide direct patient care to the patient under investigation (PUI's) for suspected COVID-19 or confirmed COVID-19 positive patients
- Pregnant radiographers should wear a surgical mask at work throughout the duration of their shift
- Pregnant radiographers should not perform direct patient care procedures in the last two weeks prior to the anticipated delivery i.e. no later than 37 weeks (protect the radiographer / technologist from risk of becoming PUI or COVID-19 Patient at delivery.
- Front desk staff are to ask patients the appropriate triage questions including have you a new or recent presentation of fever, persistent cough or shortness of Breath.
 - Inform all clinics, departments and outpatients to wear a mask before entering the radiology departments
 - Request that patients wash their hands with antibacterial specific gel/soap before entering department
 - Set up the waiting room to incorporate social distancing
 - Accompanying person with patient only if the patient needs assistance i.e. for memory concerns
 - Reschedule non urgent tests
 - Limit access by visitors and relatives to the radiology facility to an absolute minimum. If visits by vendor representative or other support personnel is needed, they should be wearing same PPE as staff. Vendors tend to visit multiple departments and may easily spread virus in the process. Vendors that are essential to patient care operations are permitted to have limited access to areas in the radiology department. Vendors that have third-party contracted work are subject to same procedures and protocols

that employees are following. Examples of such types of vendors are construction services, cleaning companies and technical services.

- Organize refresher training:
 - Hand Hygiene
 - Donning and Doffing of Personal Protective equipment (PPE) properly
 - N95/FFP2/FFP3 mask fitting session for all staff and needed visiting support/vendor personnel.
 - Powered Air Purifying Respirator (PAPR) training all staff that perform
- Have staff wear PAPR when performing all Aerosolized procedure (Airborne/Contact precautions)

Waiting rooms

Remove as considered source of infection

- Remove magazines as they may be considered a source of infection and can make hard surface cleaning difficult
- Remove disposable cups
- Remove coffee makers or tea pots makers and coffee/teas cups and condiments
- Maintain the WHO social safety distance or where possible 2 metres (6 ft.) between individuals in waiting rooms
- Patient-facing staff in the waiting room and imaging rooms should wear a facemask at all times, if available

Radiology Department and Mobile Radiography Checklist

Radiography Department and Mobile Radiography on at risk COVID-19 patients				
Control of COVID- 19 Check List	Radiographer/RT Tasks	Patient Considerations	Equipment Considerations	Imaging Room Environmental Considerations
Preparation	<ul style="list-style-type: none"> • Ensure that patients and staff use the main department entrance and do not enter the department without permission and without specific reason. • Do not allow patients to wait in the waiting room for long periods, adapt international social distancing or or adapt best practice of local and national guideline. • For mobile radiography liaise with clinical team to arrange an appropriate time • Confirm that medical exposure has been justified as urgent accordingly and/or cannot be rescheduled • Inform the referring physician that the patient should enter the department wearing the appropriate mask in accordance with the Hospital Infectious Diseases Committee guidelines. • Appropriate fit-tested radiographer to undertake general and mobile radiography where aerosol generating procedures are performed and if possible, to work in pairs • Ensure areas and equipment have been adequately disinfected-decontaminated. • Disinfect - wash hands. • Don PPE appropriate for the clinical task being performed with all appropriate steps - for AGP situations: - <ul style="list-style-type: none"> ○ Perform Hand Hygiene ○ Put on long sleeve fluid resistant gown 	<ul style="list-style-type: none"> • Controlled arrival and departure of patients and staff in the radiology department and only using the central entrance • Patient to wear a mask wherever possible 	<p>Disinfection-Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status (i.e. asymptomatic-suspected-confirmed COVID 19):</p> <ul style="list-style-type: none"> • X-ray table or Vertical Bucky (immobilization straps, positioning sponges which should be covered with plastic protection) • Auxiliary equipment (i.e. ECG, Defibrillator, suction device, Oxygen mask) • Mobile X-ray machine with DDR detector or CR cassettes • DDR/CR detector to be placed in a protective bag 	<p>Disinfection-Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection status (i.e. asymptomatic-suspected-confirmed COVID 19)</p>

	<ul style="list-style-type: none">○ Put on N95/FFP2/FFP3 or PAPR (If radiographer wears glasses take off until FFP is secured in place- put glasses back on)○ Place Face mask (if reuses N95/FFP2/FFP3 mask face serves as barrier) or goggles in place (If reuses N95/FFP2/FFP3 put surgical mask over your N95/FFP2/FFP3) (The facial mask should be put on first, then head/hair cover that covers all hair and both ears.)○ Clean hands with antibacterial liquid before putting on gloves and put on non-Sterile Nitrile gloves (be sure gloves cover cuffs of gown)○ You may now enter the patient room			
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<p>During</p>	<ul style="list-style-type: none"> • Preferably work in pairs with one radiographer to facilitate contact/non-contact technique • Introduce yourself and colleague by name and explain what you are about to do • Get consent for the examination if that is possible • For supine radiography cover the X-ray couch with disposable paper. • For imaging that requires the detector/cassette to be in contact with the patient, such as mobile radiography, insert the image receptor with a disposable plastic cover • Remove any radiopaque objects in the region of interest from the patient • Patient and image receptor positioned – for mobile radiography the DDR/CR detector placed under the thorax for CXR. • Contact radiographer undertaking imaging in the department stands in the radiation protected area – without touching anything • Contact radiographer undertaking mobile radiography stands outside the controlled area without physical contact with the team or any objects • Ensure correct anatomical marker in beam • Image acquisition/exposure made by non-contact radiographer, ensuring the principles of justification, optimization, radiation dose limitation as well as the radiographer’s/Radiologic Technologist’s Ethical Code and RG/RT Professional Rights at all times • Image checked and if optimum image quality send to PACS • Remove gloves and dispose of them in the Clinical Waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC) • Remember, when exiting the X-ray room (contaminated area) or Ward bed location clothing may be contaminated. 	<ul style="list-style-type: none"> • Patient continues to wear mask 	<ul style="list-style-type: none"> • If working alone X-ray generator and mobile control screen keys are considered contaminated so they must be used with gloves • X-ray couch is covered with single use paper per patient. • Working in pairs in an X-ray room the generator console keyboards, mouse and exposure control panel are considered clean. • For mobile radiography where there is the risk of droplet transmission it is prudent to wear gloves for all equipment that has been in the patient care area. 	
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	<ul style="list-style-type: none">• Don't take off mask!• Disinfect hands with hand sanitizer before you enter the console area (clean area) i.e. before touching the keyboard and mouse, the control console, and the injector.			
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<p>Post procedure</p>	<ul style="list-style-type: none"> • Contact radiographer re-enters the X-ray room (dirty area) or patient bedside, wearing PPE equipment • Carefully remove the used paper cover from the X-ray couch, if used, without touching your clothing and dispose of it in the corresponding bin according to hospital policy. • Ensure decontamination-disinfection of Vertical Bucky or X-ray couch CTS gantry/LBD keypad, surfaces contact points (sponges, fixing pads, knobs) and the DDR/CR detector by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee equipment manufacturer’s instructions. • After disinfection/decontamination/deep cleaning, the RG/RT must visually inspect the X-ray room and auxiliary equipment without removing gloves and mask. • Must not remove your mask yet! • Carefully remove your gloves carefully FIRST! • Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC • Disinfect hands immediately as there is danger of being contaminated without gloves! • Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes), and dispose of it in the Clinical Waste bin (yellow Hazardous contaminated waste) in accordance with the HWMC. • Disinfect - Wash hands well (again because you touched your mask)! • For mobile radiography <ul style="list-style-type: none"> ○ The mobile X-ray machine should be move to the clean area where the detector cover is disposed into a clinical waste bin by ensuring that the detector is not touched by gloves and disinfected 	<ul style="list-style-type: none"> • Patient keeps mask 	<ul style="list-style-type: none"> • If used, Single use X-ray couch paper cover is removed and deposited of into the corresponding bin according to hospital policy. • Disinfection-Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee X-ray manufacturer’s instructions of: <ul style="list-style-type: none"> - X-ray couch - Vertical Bucky - CTS gantry and LBD keypad - Immobilization Velcro straps and positioning sponges 	<p>Disinfection-Decontamination-Deep cleaning of:</p> <ul style="list-style-type: none"> - surfaces - contact points (knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control - the room should be vacant for a suitable time, up to two hours, before the next patient is examined to facilitate the exchange of the air in the X-ray room - the duration should be based on local practice recommendations. <p>Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.</p>
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	<ul style="list-style-type: none">○ Dispose of PPE equipment in the clinical waste bin as per the visiting ward instructions○ Wash hands before leaving the area○ Return to the radiography department and complete any post imaging tasks and record dose			
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Radiography Department and Mobile Radiography General Advice

- Radiographers, as the first healthcare professional to see diagnostic images, should be trained to recognise appearances suspicious for COVID-19, especially in asymptomatic patients, and triage for an immediate/urgent clinical report.
- Where possible, designate a mobile unit for investigation of suspected or confirmed COVID-19 cases and leave this within the patient care area to reduce transmission risk
- Ensure appropriate personal protective equipment is available for staff and that staff are trained in the safe use of all PPE based on local risk assessment and national/international guidance
- Use Direct Digital Radiography (DDR) imaging whenever possible, this reduces transmission risk and minimises radiographer workload
- Designate one or two image receptors specific for COVID-19 patients if Computed Radiography (CR) or film/screen technology is to be used
- Cover x-ray detector/cassettes with plastic cover or disposable cellophane wrapper and make sure to clean X-ray cassette in between each patient
- Clean and disinfect all imaging equipment, including mobile X-ray machine, X-ray couch and chest stand between each patient. Recognise that appropriate air exchange is also required and to allow sufficient time between patients to reduce cross-contamination
- When performing imaging, both within the department and undertaking mobile radiography, wherever possible, one radiographer positions the X-ray tube and makes the exposure, the second positions the patient and the covered detector and applies the anatomical marker.
- Inform superiors/other health care professionals/colleagues of patients that are at risk
- Remove students from high risk scenarios
- Activate retired/vacationing radiographers/technologists when possible, ensuring appropriate risk assessment, access to supervision and refresher training is available
- Do not allow staff who are potentially ill to work
- Triage patients (only urgent cases)
- Adjust protocols to limit exposure and speed up throughput while maintaining quality
- Inform patients of need for hand hygiene and the use of tissues when sneezing
- Split staffing into multiple shifts to limit exposure of the entire team, ensuring appropriate skill ix and experience wherever possible

Interventional Department Checklist

Cardiac & Vascular Interventional				
Control of COVID- 19 Check List	Radiographer/RT Tasks	Patient Considerations	Equipment Considerations	Imaging Room Environmental Considerations
Preparation	<ul style="list-style-type: none"> • Create a staffing plan that is designed to preserve physician and staff availability in the event that individuals become exposed and sick. Consider backup teams. • Consider performing an immediate pre-procedure staff huddle to discuss all aspects of the procedure to minimize unnecessary exposures. • Each member of the interventional team should have a clear understanding of the role they play so that procedures can be undertaken with the least amount of stress and confusion while limiting unnecessary cross interactions. • Protocols for the diagnosis, triage, isolation, and management of COVID-19 patients with cardiovascular complications and/or cardiovascular patients with COVID-19 should be developed in detail and rehearsed. • Many departments have staff who provide clinical services at multiple locations. These cross-covering staff who has been in contact with COVID-19 patient risk exposing multiple healthcare teams to the contagion. It is prudent to create a separate clinical team which includes the treating physician and an entire unit of nurse, technician, as well as other support staff, who are 	<ul style="list-style-type: none"> • For patients requiring urgent intervention, the requesting clinical team must be instructed to assess the patients for fever, myalgia, or respiratory symptoms. • When possible, bedside procedures are preferable (e.g., intra-aortic balloon pump, pericardiocentesis, ECMO, temporary venous pacemakers in order to minimize the need to remove the patient from an isolation room and avoid risk of additional exposure through transportation to the CCL. • There should also be a PPE guide for patients and visitors. For example, all known COVID-19 patients, patients who are suspected of COVID-19, patients with ARI symptoms and all immunocompromised 	<ul style="list-style-type: none"> • Cath/Angio labs should create COVID-19 carts with all potential supplies for these procedures. • Store all personal protective equipment (PPE) in secure locations with limited access, implement inventory controls, and clearly define PPE to be used based on patient status (non-PUI, PUI/COVID-19 positive) and procedure type with necessary HCP training for each type of PPE. • PPE recommendation for performing Cath lab procedures on known COVID-19 patients and patients suspected of COVID-19 is surgical cap, N95/FFP2/FFP3 mask, eye protection (face shield or goggles), full length long-sleeved gown and gloves. For aerosol generating procedures (AGP), PAPR is recommended. 	<ul style="list-style-type: none"> • Vendors, visitors, observers, research coordinators, and any non-essential personnel should be restricted from the Cath/Angio lab to the extent possible during the pandemic. • Limiting all traffic through the healthcare facility is paramount in establishing control. The entry point of all confirmed cases should be limited to one designated section. • Signs and posters are recommended at these points detailing instructions on hand hygiene and cough etiquette, appropriate use and disposal of masks. • Adequate alcohol-based hand sanitizers and receptacles for waste disposal should be placed in these areas. • If intubation is required in the Cath/Angio lab, all personnel not essential to the act of intubation should exit the room to avoid the associated higher risk of virus exposure during the process.

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	<p>necessary for complete patient care at one particular center.</p> <ul style="list-style-type: none"> Maximum barrier precautions (cap, mask, sterile gown, sterile gloves, double glove use, and large sterile drape) is advised during the insertion of central venous catheters and all invasive interventional procedures. <p>Donning PPE:</p> <ol style="list-style-type: none"> Tall disposable shoe covers COVID-19 designated lead apron. Leaded glasses or prescription glasses First head cover (cover ears) N95 Mask Second head cover (cover ears) Surgical mask Eye protection: Goggles or face shield Hand Hygiene: Surgical scrub Non-sterile gown Sterile gloves 1 Sterile gown Sterile gloves 2 	<p>patients should wear surgical masks at all times if possible. Note that oxygen masks can be worn over surgical masks in these patients.</p> <ul style="list-style-type: none"> Performing endotracheal intubation in the CCL should be avoided to the extent as possible. In patients with respiratory distress, early intubation (prior to transfer to the CCL) should be considered in order to minimize aerosolization. High-flow nasal cannula, non-invasive ventilation, and use of an ambubag should be avoided to minimize potential aerosolization and dissemination of virus. 	<ul style="list-style-type: none"> PPE recommendation is stratified according to COVID-19 infection risk. For low risk patients i.e. without COVID-19 risk factors, surgical mask is used. For moderate to high risk patients including patients with pneumonia and patients under quarantine for close contact with known COVID-19 patients, N95/FFP2/FFP3 mask is recommended 	<ul style="list-style-type: none"> Ideally, airborne infection isolation rooms (AIIR), respirators and facemasks are core practices to be adopted Interventional radiology and COVID-19 If capacity allows, one Cath/Angio lab suite should be designated the COVID-19 suite and be used exclusively for COVID-19 cases with all other interventions performed in the other suites. In the COVID-19 IR suite, all sterile interventional inventory should be stored elsewhere with only equipment required for the specific case brought into the room. All non-essential catheterization laboratory equipment should be removed from the procedure room, or covered, prior to bringing the patient into the room.
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<p>During</p>	<ul style="list-style-type: none"> Minimize staff in the procedure room and implement controls to ensure that all staff who will enter the procedure room and those in the control area have appropriate PPE for the procedure PRIOR to entering the procedure room. 	<ul style="list-style-type: none"> If cardiopulmonary resuscitation (CPR) is required in the CCL, consider using automated CPR devices for chest compression to minimize personnel exposure. 	<ul style="list-style-type: none"> Single-use sterile ultrasound gel is recommended. Suturing should be avoided as it increases the risk of oozing at the catheter entry site. The US unit and probe should have an extra-long cord and should be double-bagged. The C-arm also requires two layers of waterproof plastic. The use of a designated sink for bodily fluid disposal and use of personal protective equipment (PPE) by Cath/Angio lab staff during the disposal process is also advised. Two-handed needle recapping technique should be avoided and if re-capping is indicated, a re-capping device or a one-handed method is advised It is recommended that all attempts at vascular access be made with ultrasonography (US) guidance to increase the chance of access at first attempt. 	<ul style="list-style-type: none"> Reducing the number of personnel who enter or exit the procedure room during each case will be important to minimize exposure and transmission of infection.
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<p>Post procedure</p>	<p>Doffing PPE:</p> <ol style="list-style-type: none"> 1. Hand Hygiene (HH1) 2. Remove surgical gown by breaking neck/back straps and dispose sterile gloves. 3. HH2 with alcohol foam in room 4. Remove eye protection 5. Remove surgical mask 6. Remove second head cover in room 7. Remove PPE gown and gloves 8. HH3 with alcohol foam in room 9. Remove shoe covers at doorway in room and step out of room 10. HH4 with alcohol-based disinfectant (i.e.: Sterillium) 11. Remove N95 mask 12. Remove first head cover 13. HH5 with surgical scrub 14. Remove COVID-19 lead 15. Change to clean scrubs 	<ul style="list-style-type: none"> • Have a clear exit plan for COVID+ patients that minimizes exposure to staff and HCP • Patient keeps mask 	<p>-</p>	<ul style="list-style-type: none"> - Post-intervention observation room must be close to the intervention room and rules of hygiene for this part of the area are the same as those for the intervention area. - All non-disposable medical equipment should be cleaned and disinfected according to manufacturer’s instructions and facility policies. Environmental protection agency (EPA)-registered disinfectants that have qualified under EPA’s emerging viral pathogens program for use against SARS-CoV-2 should be used. - UV light-based disinfection may also be a reasonable strategy to employ. - Thorough cleaning procedures may require extra time therefore, if feasible, such cases should be performed as the final procedure of the day. - Ensure staff are able to exit the doffing area; ensure staff scrubs are changed and lead aprons are cleaned with an EPA-approved disinfectant. - All workstations, suites, departmental areas in use should be cleaned and disinfected prior to and after a new team member uses it. - Mandatory cleaning should be undertaken 4 times a day to reduce any transmission risk.
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				<ul style="list-style-type: none">- Routine cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces prior to applying an EPA-registered, hospital-grade disinfectant to frequently touched surfaces for appropriate contact times as indicated on the product's label) are appropriate for SARS-CoV-2 in healthcare setting
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Interventional Department General Advice

- Delay procedures that require overnight hospitalization to ensure hospital bed availability during the peak COVID- 19 surge time
- Powered air purifying respirators (PAPRS) are recommended when performing Aerosol generating procedures (AGP) on COVID -19 patient or suspected COVID -19 patients
- When performing on all other patients a minimum of a N95/FFP2/FFP3 mask with eye protection is recommended

List of AGPs include:

- Positive pressure ventilation (BIPAP, CPAP)
- Intubation and extubation
- Airway suctioning (if not closed suctioning system)
- Oral suctioning
- Tracheostomy suctioning
- Chest physiotherapy
- Nebulizer treatment
- High flow nasal cannula therapy
- Naso-pharyngeal/oral pharyngeal swab collection
- Sputum induction
- Endoscopy (including bronchoscopy)
- Cardio-pulmonary resuscitation (CPR)
- Manual ventilation (air-viva bagging) before intubation
- High speed devices used for surgical procedures
- Tracheostomy creation/insertion
- Nasogastric tube insertion
- procedures via the nasal or oral routes
- Lung biopsies are included in this category due to patients coughing during procedure

Computed Tomography Checklist

CT examination on Asymptomatic – Suspected – Confirmed COVID-19 Patients				
Control of COVID- 19 Check List	Radiographer/RT Tasks	Patient Considerations	Equipment Considerations	Imaging Room Environmental Considerations
Preparation	<ul style="list-style-type: none"> • Ensure that patients and staff use the central entrance and do not enter the department without permission and without specific reason. • Do not allow asymptomatic patients with PUI to wait in the waiting room with suspected confirmed COVID-10. Have them wait in a separate designated room? • Maintain WHO social distancing or 2meters (6 feet). • Confirm that medical exposure has been justified as urgent accordingly and/or cannot be rescheduled • Inform the referring physician that the patient would not be allowed to enter the department and examination room unless wearing the appropriate mask in accordance with the Hospital Infectious Diseases Committee guidelines. • Ensure areas and equipment have been adequately disinfected-decontaminated. • Disinfect - wash hands. • For asymptomatic- suspected COVID-19 patients wear a simple surgical mask and single use gloves when receiving a paper referral, identify the patient and continue with the procedure. • For confirmed COVID-19 patients, don a N95/FFP2/FFP3 mask for Aerosol Generating Procedures (AGP) and single use gloves, full face mask when available or goggles and a fluid resistant isolation gown • When receiving a paper referral, identify the patient and continue with the procedure 	<ul style="list-style-type: none"> • Controlled arrival and departure of patients and staff in the radiology department and only using the central entrance • Patient always wears mask 	<p>Disinfection-Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status (i.e. asymptomatic-suspected-confirmed COVID 19):</p> <ul style="list-style-type: none"> • CT SCANNER (immobilization straps, positioning sponges) • Automatic Contrast Medium Injector (consumables- syringes, tubing, IV connectors) • Auxiliary equipment (i.e. ECG, Defibrillator, suction device, Oxygen mask) 	<p>Disinfection-Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection status (i.e. asymptomatic-suspected-confirmed COVID 19)</p>

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<p>During</p>	<ul style="list-style-type: none"> • Ensure that the trolley or stretcher is removed from the examination room • Cover the CT couch with disposable paper • Remove any metallic objects in the region of interest from the patient with particular care (especially when it comes to artificial dentures where there is a risk of getting infected). • Remove gloves and dispose of them in the Clinical Waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC) • Remember, when exiting the CT scanner room (contaminated area) clothing may be contaminated. • Don't take off mask! • Disinfect hands with a hand sanitizer before you enter the CT console area (clean area) i.e. before touching the keyboard and mouse, the control console, and the injector. • Perform examination (i.e. scanning and IV CM injection) in consideration of the diagnostic requirements and the principles of justification, optimization, radiation dose limitation as well as the Radiographer's/Radiologic Technologist's Ethical Code and RG/RT Professional Rights at all times 	<ul style="list-style-type: none"> • Patient continues to wear mask 	<ul style="list-style-type: none"> • CT Gantry controls and CM injector control screen keys are considered contaminated so they must be used with gloves • CT couch is covered with single use paper per patient. • CT console keyboard, mouse and exposure pad as well as the CM injector remote control panel are considered clean so they must be used without gloves • CM injector control panel may be covered with a disposable plastic cover. 	
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<p>Post procedure</p>	<ul style="list-style-type: none"> • When entering the CT scanner room (dirty area), wear disposable gloves. • Carefully remove the used paper cover from the CT couch without touching your clothing and dispose of it in the corresponding bin according to hospital policy. • Ensure decontamination-disinfection of CT couch-gantry keypad, CM injector control panel and surfaces / contact points (sponges, fixing pads, knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee CT manufacturer’s instructions. • • After disinfection/decontamination/deep cleaning, the RG/RT must visually inspect the scanning area, CT scanner and auxiliary equipment without removing gloves and mask. • Must not remove your mask yet! • Carefully remove your gloves FIRST! • Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC • Disinfect hands immediately as there is danger of being contaminated without gloves! • Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes) and dispose of it in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the HWMC. <ul style="list-style-type: none"> • Disinfect - Wash hands well (again because you touched your mask)! 	<ul style="list-style-type: none"> • Patient keeps mask 	<ul style="list-style-type: none"> • Single use CT couch paper cover is removed and disposed of into the corresponding bin according to hospital policy. • Disinfection-Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee CT manufacturer’s instructions of: <ul style="list-style-type: none"> - CT couch - Gantry keypad - Immobilization Velcro straps and positioning sponges, - CM injector control panel <p>In case of contamination i.e. if patient mask is removed during a procedure or during an aerosol generating procedure, ensure that the CT and auxiliary equipment is disinfected accordingly, and areas are ventilated adequately for 30-60 minutes (based on local practice</p>	<p>Disinfection-Decontamination-Deep cleaning of:</p> <ul style="list-style-type: none"> - surfaces - contact points (knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control <p>In case of contamination i.e. if patient mask is removed during a procedure or during an Aerosol producing procedure, ensure that the CT unit examining room is disinfected accordingly and ventilated adequately for 30-60 minutes (based on local practice recommendation) before the next examination.</p> <p><i>Note 1: Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.</i></p> <p><i>Note 2: CT areas must be decontaminated at the beginning of each work shift</i></p>
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CT Department General advice

- CT shouldn't be used as screening tool for or a first line test to diagnosis COVID-19
- Consider rescheduling non-urgent lung cancer screening
- Consider implement a containment zipper (a room isolation tarp barrier with a zipper for room access) to separate the control area from the CT scanner room
- Practice infection control in accordance to the National Public Health guidelines, relevant department policies, Hospital Infectious Diseases Control Committee and the Hospital Waste Management Committee instructions.
- Avoid crowding and maintain the WHO safety distance or where possible 2 meters (6 feet).
- Record the personnel involved in and present during the procedure.
- If you wear eyeglasses, be careful not to touch them throughout the procedure, and at the end of use wash them thoroughly with a disinfectant.
- Apply thorough hygiene and safety instructions
 - Caution when removing mask and gloves
 - Meticulous hand washing
- Ensure deep cleaning of equipment and surfaces / patient contact points
- Ensure adequate ventilation of the premises and ideally should have vacuum/negative air pressures.
- Keep all surfaces free of unnecessary paper, and non-essential material to allow for rapid and effective disinfection-decontamination of areas and equipment.
- Separate clean console area from contaminated CT room area where the RG/RT must remove gloves and wash hands before entering the console area
- Wear mask at all times
- When performing CT on confirmed COVID 19 patients, RG/RTs must practice according to Hospital Infectious Disease Control Committee Instructions and Guidelines in terms of infection control.
- However asymptomatic patients pose a latent threat for Medical imaging and therapy departments and hence RG/RTs in CT are advised to follow the instructions divided in three stages (i.e. preparation, during and post procedure):

Checklist for Ultrasound/Echo Procedures – these are in addition to the generic guidance within this document

Control of COVID- 19 Check List	Sonographer / Sonologist / echo tech	Patient Considerations	Equipment Considerations	Imaging Room or Mobile Imaging Environmental Considerations
<p>Preparation, during and post procedure precautions.</p>	<ul style="list-style-type: none"> Imaging requests should be triaged scan, can be delayed without impacting on clinical care or can be avoided until after the pandemic. As per generic advice on PPE for all in close contact, remembering that sonography involves prolonged physical contact, often in a confined space. Attempt to shorten the duration of the examination by arranging for the most experienced Sonologist / sonographer to perform the examination (ISUOG, 23.03.20) Fetal anomaly screening programmes are time critical and we should continue to offer timely screening. (RCOG guidance 24.3.20). In the event that there is insufficient staff to provide the service, scans should be prioritised in the following order: <ol style="list-style-type: none"> Anomaly scan at 18+0 -23+0 weeks Ultrasound +/- screening at 11+2 - 14+1 Growth scans 	<ul style="list-style-type: none"> As per generic advice – patients with COVID-10 to wear mask. Schedule known Covid-19 patients last on list or last in day. Patients should be asked to attend alone Inform the patient that a detailed explanation will not be given during the examination (ISUOG, 23.03.20) 	<ul style="list-style-type: none"> As per generic advice. Set aside dedicated COVID-19 room / equipment / mobile / probe(s). After use with each COVID-19 patient, clean all equipment in line with the principles and advice on couch cleaning in the Appendix. <p>Remove all prober from the unit except the ones needed for the examination when performing exams mobile or in the designated exam room in order to avoid the necessity of high-level disinfection in the event the patient coughs or sneezes within the designated distance.</p>	<ul style="list-style-type: none"> As per generic advice. Set aside dedicated COVID-19 room / equipment / mobile / probe(s). This should be a room with air exchange of 6 exchanges per hour (WHO guidance, PHE 6.4.20) Use of single-use gel packs is recommended as opposed to re-fillable gel containers (ISUOG, 23.03.20). Consider probe cover for non-endoluminal probes (this is not a CDC absolute requirement (ISUOG, 23.03.20)). After use with each COVID-19 patient, clean all equipment in line with the principles and advice on couch cleaning in the Appendix.

Ultrasound General Advice

- Note that screening procedures are or may be paused, **with the exception of time-sensitive procedures within Fetal Anomaly Screening programmes.**
- Consider rescheduling non-urgent examinations
- Designate a waiting area which should be set up to adopt international guidelines for social distancing of at least 1 meter (3 feet) minimally or whenever possible adapt to local or national guidelines i.e. 2 meters (6 feet).
- Designate a specific Ultrasound room and machine and probes for use COVID-19 units
- Allow time between appointments for decontamination of the US system and room
- Single use ultrasound gel sachets should be considered for patient suspected or having COVID-19
- Cover probe with dedicated probe covers before procedure
- High level disinfection of any probe used to perform the examination on a COVID-19 infected
- Remove all probes from the unit except the ones needed for the examination when performing exams mobile or in the designated exam room in order to avoid the necessity of high-level disinfection in the event the patient coughs or sneezes within the designated distance
- Separate in-patients on the ward from out-patients
- If staffing levels impact on obstetrics and gynaecology scanning services, the International Society of Obstetrics and Gynaecology (ISUOG) provide guidance which can be used to prioritise patients. These include
 - [Early pregnancy](#)
 - [Routing and specialist obstetric scans](#)
 - [Gynaecology](#)
- Routine practice is to scan with one hand and annotating with the other to keep clean glove
- Follow manufacturer's recommendation for decontamination ultrasound system
- Waiting areas should be set up for international guideline for social distancing of at least 1 m (3 feet) or adapt best practice of local and national guideline
- Consider performing examinations using mobile unit in the patient's room
- Droplet Precautions considered for Treadmill or Bicycle stress echocardiograms which should be changed to pharmacological stress echo (due to patient coughing during test)
- Considered Aerosol Precautions use of PAPR recommended for Transthoracic echocardiograms (TOE) using a sterile Probe cover

Mammography General Advice

- Consider rescheduling all routine, asymptomatic screening mammography until community risk is minimal– triaging - same for all disciplines
- Consider postponing other non-urgent asymptomatic breast imaging, i.e. benign biopsy follow-up, high risk follow-up
- Symptomatic and image-guided breast biopsies may need to proceed for best patient care, with use of appropriate precautions.
- Scheduling intervals between patients may need to be adjusted to allow for proper cleaning time
- Call patients the day before appointments to review health and symptom questions.

If patient is experiencing current symptoms, test positive to COVID or has a positive case in their household, the appointment should be rescheduled.

- Limit to only one adult accompanying the patient to their appointment, as required due to additional patient needs.
- Apply social distance practices whenever possible upon registration, in waiting area, and with radiologist or technologist patient consultation
- Strict adherence to regular cleaning and disinfecting of surfaces should be performed using appropriate PPE, (as per local policies and standards), including doorknobs, imaging and work surfaces, computer & printer, telephones and dictation equipment at least daily and preferably, between users. Patient contact areas are disinfected between each use. Use facility and manufacturer approved wipes or disinfectants, in keeping with institutional recommendations.
- If possible, avoid staff rotation to different machines or locations during this period to minimize cross infection by staff. Minimize the number of technologists in each imaging room.
- Ensure masks, and other PPE, when imaging the patient especially when social distancing practices cannot be maintained for quality imaging.
- Follow facility guidelines and appropriate cleaning of shields if used.
- Ensure patient and radiographer/technologist handwashing/sanitizing prior to and after imaging.
- If mammography units are not used and if any required quality control testing is not able to be performed, document the end and start dates of mammography use for each unit. Explain why QC was not performed. Any regulatory or accreditation questions can be directed to the appropriate agency.

DXA Scanning General Advice

- Consider rescheduling non-urgent screening DXA screening – triaging - same for all disciplines
- Delaying or deferring DXA for diagnosis or monitoring is appropriate for 3-6 months because:
 - For most patients there will be little clinically meaningful change in BMD over the period.
 - For those on treatment with established acceptable response, there is a very low likelihood that the response will change.
 - For those transitioning from anabolic therapy to anti-resorptive therapy, it is far more important to consolidate gains achieved by switching without DXA results first.
 - For those newly on therapy set up for first monitoring DXA, there will also be little meaningful change over the interval.
- DXA services are increasingly performed in facilities, and many of those facilities already are or will be shifted to emergency and/or crisis management, where “elective” radiology will be severely limited if not curtailed. Over this anticipated short duration of 3-6 months, restricting this service does not pose a substantial threat to patients needing BMD testing.
- For most patients there will be little clinically meaningful change in BMD over the period.
- For those on treatment with established acceptable response, there is a very low likelihood that the response will change.
- For those transitioning from anabolic therapy to anti-resorptive therapy, it is far more important to consolidate gains achieved by switching without DXA results first.
- For those newly on therapy set up for first monitoring DXA, there will also be little meaningful change over the interval.
- DXA services are increasingly performed in facilities, and many of those facilities already are or will be shifted to emergency and/or crisis management, where “elective” radiology will be severely limited if not curtailed. Over this anticipated short duration of 3-6 months, restricting this service does not pose a substantial threat to patients needing BMD testing.

Magnetic Resonance Checklist

MRI EXAMINATION FOR ALL PATIENTS ATTENDING THE DEPARTMENT				
Control of COVID- 19 Check List	Radiographer/RT Tasks	Patient Considerations	Equipment Considerations	Imaging Room Environmental Considerations
Preparation	<ul style="list-style-type: none"> Reschedule all non-urgent MRI Examinations Single patient attendance wherever possible Ensure request are categorised as urgent and justified by Radiologist with protocol agreed Both MRI safety screening and COVID-19 questionnaire to be completed via telephone prior to patient arrival. Complete the safety questionnaire adopting WHO guideline on social distancing 1m (3 ft.) or adapt best practice of local and national guidelines where possible e.g. 2m (6 ft.). Ensure ward patients have passed MRI safety screening, are ferrous metal free and cannulated (if required) prior to transfer to department. The patient is to wear the appropriate mask- ensure MRI compatible. Ensure that patients and staff use the main entrance and do not enter the department without permission and without specific reason. Do not allow patient to wait in the waiting room for long periods, maintain international guideline for social distancing of at least 1 m (3 feet) or adapt best practice of local or national guideline. Identify staff roles- 1 Radiographer/ Tech to remain in control room throughout exam and scan. 2 staff to 	<ul style="list-style-type: none"> Controlled arrival and departure of patients and staff in the radiology department and only using the main entrance For COVID-19 confirmed patients - Move patient into the injection room/ sub waiting room on their Critical care bed If the MRI scanner has a removable couch/ bed, then move this into the injection room / sub waiting 	<ul style="list-style-type: none"> Remove all unnecessary equipment from the Preparation and scan rooms e.g. only the specific coil required. Position MRI scan table and coil for a swift transfer of the Patient. Cover Equipment which cannot be removed with suitable plastic. Disinfection- Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status (i.e. asymptomatic- 	<ul style="list-style-type: none"> Ensure high standards of infection prevention measures at all times Disinfection-Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection status

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	<p>scan, Employ a contact and non-contact Radiographer/Tech approach.</p> <ul style="list-style-type: none"> • Don MRI compatible PPE with appropriate steps- see Appendix A • In the Prep Room fully prepare the Patient • Identify Patient and check safety questionnaire • Give the patient full instructions, check compliance and consent. • Provide hearing protection prior to moving the Patient into the Scan Room. • Ask the patient to remove all ferrous objects and lock them in the lockers provided. • Ensure areas and equipment has been adequately disinfected-decontaminated. • Disinfect - wash hands. • Ensure the room is ready to scan. • Don apron, gloves surgical mask and glasses/ visor. • If necessary, cannulate the patient • Ensure the MRI couch is covered with disposable paper • The person cannulating the patient must then take the patient into the scan room and position them on the bed using the appropriate coils for the examination. • Select Protocol with shortest duration of scan time to reduce exposure to staff. • Remove gloves and dispose of them in the Clinical Waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC). • Don't take off mask! 	<p>room and transfer patient onto it. If not send for patient on the MRI compatible trolley and ensure patient connected to MRI compatible wireless anaesthetic monitoring before entering the MRI scan room.</p> <ul style="list-style-type: none"> • Transfer the patient into the scan room. If ward staff are accompanying the patient into the scan room, ensure that they are safety screened and safe to do so. • Ensure the wireless monitoring is working correctly and patient is safe to be scanned 	<p>suspected-confirmed COVID 19):</p> <ul style="list-style-type: none"> - MRI SCANNER (immobilization straps, positioning sponges) - Automatic Contrast Medium Injector (consumables- syringes, tubing, IV connectors) - Auxiliary equipment (i.e. ECG, Defibrillator, suction device, Oxygen mask) - MRI compatible anaesthetic equipment • Ensure all decontamination consumables and contaminated waste disposal bags are to hand 	
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	<ul style="list-style-type: none"> Disinfect hands with hand sanitizer before you enter the MRI console area (clean area) i.e. before touching the keyboard and mouse, the control console, and the injector. 	<p>and then proceed.</p> <ul style="list-style-type: none"> Check the Patient passes the MRI safety requirements. Ensure the Patient is not claustrophobic and fully understands the procedure Patient always wears a MRI safety compatible mask if suspected or positive for COVID 19 		
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<p>During</p>	<ul style="list-style-type: none"> • The Radiographers/ Techs within the scan room should confirm the Patients ID / MRI safety status etc. to the Radiographer/Tech in the control room via the intercom. • Perform examination (i.e. scanning and IV injection) in consideration of the diagnostic requirements and the principles of justification and ask the radiologist to review any images to ensure all sequences are carried out. • The Contact Radiographer/Tech to position the Patient and the non-contact to manoeuvre equipment and gantry controls. • If Possible, The Scan Room Radiographers/Techs should stay in the prep room for the duration of the scan <ul style="list-style-type: none"> - Should the patient require assistance during the procedure and - Be ready to transfer the Patient swiftly from the scanner once satisfactory Images have been acquired. • Ensure patient transfer team/ Porters etc. are on hand to ensure minimal wait times once the examination is complete. • After imaging is completed don the appropriate PPE again enter the MRI scan room remove the patient. • When the patient has left remove the protective PPE and place in the appropriate clinical waste bag as before • Don clean PPE and commence cleaning of the scan room • Carefully remove the used paper cover from the MRI couch without touching your clothing and 	<ul style="list-style-type: none"> • Patient continues to wear mask if COVID-19 suspected or query for all negative patient mask is not necessary. • Ensure Patient Comfort. • Give reassurance. 	<ul style="list-style-type: none"> • Gantry controls must only be used by the Non-Contact Radiographer/Tech. • The two scan room staff must maintain IPC measures and PPE integrity at all times. • MRI Gantry controls and CM injector control screen keys are considered contaminated so they must be used with gloves. • MRI couch is covered with single use paper per patient. • MRI console keyboard, mouse and exposure pad as well as the CM injector remote control panel are considered clean so they must be used without gloves. • MRI injector control panel may be covered with a disposable plastic cover. 	
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	<p>dispose of it in the corresponding bin according to hospital policy.</p> <ul style="list-style-type: none">• With gloves ensure decontamination-disinfection of MRI couch-gantry keypad, CM injector control panel and surfaces / contact points (sponges, fixing pads, and knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee MRI manufacturer's instructions.			
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<p>Post procedure</p>	<ul style="list-style-type: none"> All Images reviewed, processed and uploaded to PACS Immediately. Radiologist must be available to review Images prior to the Patient being removed from the scanner to ensure no additional imaging is required. Patient to be removed from scan room and transferred from the department as soon as possible. After disinfection/decontamination/deep cleaning, the radiographer must visually inspect the scanning area, MRI scanner and auxiliary equipment without removing gloves and mask. In the case of positive patients, the room must be left for up to one hour due to the air flow around the MRI scanner. If the patient is not query or confirmed, then just ensure room is dry <ul style="list-style-type: none"> Do not remove your mask yet! Carefully remove your gloves FIRST! Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC Disinfect hands immediately as there is danger of being contaminated without gloves! Remove apron Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes) and dispose of it in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the HWMC. Disinfect - Wash hands well (again because you touched your mask)! Doffing of PPE – See Appendix A 	<ul style="list-style-type: none"> Patient keeps mask if wearing Patient transfer- PPE still in place Rapid reporting of results to aid patient management. 	<ul style="list-style-type: none"> Single use MRI couch paper cover is removed and deposited into the corresponding bin according to hospital policy. Disinfection- Decontamination- Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee MRI manufacturer’s instructions of: <ul style="list-style-type: none"> MRI couch Gantry keypad Immobilization Velcro straps and positioning sponges, MRI injector control panel All surfaces/door handles MRI compatible anaesthetic equipment 	<p>Disinfection-Deep cleaning of:</p> <ul style="list-style-type: none"> surfaces contact points (knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control <ul style="list-style-type: none"> In case of contamination i.e. if patient mask is removed during a procedure or during an Aerosol producing procedure, ensure that the MRI unit examining room is disinfected accordingly and ventilated adequately for 30-60 minutes (based on local practice recommendation) before the next examination. <p>Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.</p>
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MRI (COVID-19 Non-Aerosol Generating MRI Procedure) General Advice

- Consider rescheduling non-urgent patients including breast screening ladies
- Take your time, do not rush, and check steps with a colleague as you proceed.
- Requests must be justified by a Radiologist and protocol agreed.
- Manage traffic to MRI Department allow slot length to give ample time to scan and patient and clean appropriately
- Ensure replacement plastic sheet/ disposable paper roll available for table and empty the scanning room and prep room of all nonessential equipment. Put equipment away in cupboards and close. Remove any curtains in the department.
- Prepare injection tray prior to arrival if contrast is necessary.
- Prepare for patient to come from ward/A&E by asking referring clinician or nurse responsible for the patients' care to fully complete the MRI questionnaire which can be sent by e-mail. Check the patient is able to understand the screening questions, using carers and family to support where required and can complete the screening questionnaire. If this cannot be completed follow departmental guidance for completion of the questionnaire
- Ask for patient to be cannulated if contrast is required/may be required, if already done check it is patent
- The patient must come wearing a fluid resistant mask. Ensure that there is no metallic strip present on the nose of the mask. If so ask ward to remove strip before transfer to the department.
- Identify scanning radiographer who will remain in the control room for the duration of the procedure. (take a comfort break first)
- Identify MRI staff (minimum of 2) who can don PPE. Departmental staff has all completed safety questionnaires to assist if needed.
- Follow all departmental guidance for the donning and doffing of PPE and uses areas that have been designated departmentally.
- Prepare bucket with chlorclean/Tristel for radiographer/ MRI staff to clean
- Prepare the scan room ready for the patient arrival.
- On arrival identify patient and check questionnaire
- Move patient into MRI scanner. Not all surgical masks are the same and some departments may differ with regards to choice of mask. Please check locally with regards to the appropriate masks to don. If the procedure requires a N95/FFP2/FFP3 mask you must be fit tested for the mask.
- Once the patient is positioned the donning and doffing of PPE will differ departmentally and as such follow local guidance.
- Patient leaves MRI and returns to the ward with porter wearing appropriate PPE.
- Remove gloves and gown in prep room, place in departmentally appropriate bag, perform hand hygiene. Remove glasses and mask, place in yellow clinical waste bin, perform hand hygiene.

- Don second set of full PPE to carry out full clean down of prep room and scanning room using COVID-19 cleaning procedures, ensure all door entry handles sanitised. Remove plastic sheet from MRI table and put in yellow bag in scanning room.
- Remove gloves and gown in prep room, place in departmentally appropriate bag, perform hand hygiene. Remove hat and mask, place in orange/red bag, perform hand hygiene. Return to COVID-19 changing area remove scrubs and place in red bag in soiled linen bin, perform hand hygiene, put uniform back on. Using Antibacterial wipes provided, clean down changing area paying particular attention to touch points.
- Ensure soiled linen and clinical waste is carefully disposed of and secured with swan neck, cable ties are in PPE box. Perform hand hygiene.
- When cleaning is complete the corridor can be reopened.
- The time for leaving the scan room after cleaning differs due to the air flow around the MRI Scanner and there is currently no official guidance about length of time to leave after a full clean. We allow for up to an hour before commencement of scanning other patients.

MRI (COVID-19 Aerosol Generating/ Intubated MRI Procedure) General Advice

- Consider rescheduling non-urgent patients including breast screening ladies
- Take your time, do not rush, and check steps with a colleague as you proceed.
- Requests must be justified by a Radiologist and protocol agreed.
- Manage traffic to MRI Department allow slot length to give ample time to scan and patient and clean appropriately
- Ensure replacement plastic sheet/ disposable paper roll available for table and empty the scanning room and prep room of all nonessential equipment. Put equipment away in cupboards and close. Remove any curtains in the department.
- Prepare injection tray prior to arrival if contrast is necessary.
- Prepare for patient to come from critical care by asking referring clinician or nurse responsible for the patients' care to fully complete the MRI questionnaire which can be sent by e-mail. Check the patient is able to understand the screening questions, using carers and family to support where required and can complete the screening questionnaire. If this cannot be completed follow departmental guidance for completion of the questionnaire
- Ask for patient to be cannulated if contrast is required/may be required, if already done check it is patent
- The patient must come wearing a fluid resistant mask or a fluid resistant cover over the tubing. Ensure that there is no ferrous element to any aspect of the equipment.
- Identify scanning radiographer who will remain in the control room for the duration of the procedure. (take a comfort break first)
- Identify MRI staff (minimum of 2) who can don PPE. Departmental staff has all completed safety questionnaires to assist if needed.
- Follow all departmental guidance for the donning and doffing of PPE and uses areas that have been designated departmentally.

- Prepare bucket with chlorclean/Tristel for radiographer/ MRI staff to clean
- Prepare the scan room ready for the patient arrival.
- Don all departmentally appropriate PPE for intubated patients/ aerosol generating procedures. Please check locally with regards to the appropriate masks to don. An MRI compatible N95/FFP2/FFP3 mask must be worn for these procedures and seek local advice with regards to this.
- On arrival identify patient and check questionnaire
- Move patient into the injection room/ sub waiting room on their Critical care bed.
- If the MRI scanner has a removable couch bed, then move this into the injection room / sub waiting room and transfer patient onto it. If not send for patient on the MRI compatible trolley and ensure patient connected to MRI compatible wireless anaesthetic monitoring before entering the MRI scan room.
- Transfer the patient into the scan room. If ward staff are accompanying the patient into the scan room, ensure that they are safety screened and safe to do so.
- Ensure the wireless monitoring is working correctly and patient is safe to be scanned and then proceed.
- Once the patient is positioned the donning and doffing of PPE will differ departmentally and as such follow local guidance.
- On completion of scan ensure Radiologist is contacted and images reviewed before removing the patient from the scan room.
- Patient leaves MRI scan room and is taken directly into the injection room/ sub waiting room for transfer back onto the critical care bed and returns to the ward with porter wearing appropriate PPE.
- Remove gloves and gown in prep room, place in departmentally appropriate bag, perform hand hygiene. Remove glasses and mask, place in yellow clinical waste bin, perform hand hygiene.
- Don second set of full PPE to carry out full clean down of injection room/ sub waiting room and scanning room using COVID-19 cleaning procedures, ensure all door entry handles sanitised. Remove plastic sheet from MRI table and put in yellow bag in scanning room.
- Ensure MRI compatible anaesthetic equipment is wiped down as per Trust guidance for equipment cleaning.
- Remove gloves and gown in prep room, place in departmentally appropriate bag, perform hand hygiene. Remove hat and mask, place in orange/red bag, perform hand hygiene. Return to COVID-19 changing area remove scrubs and place in red bag in soiled linen bin, perform hand hygiene, put uniform back on. Using Antibacterial wipes provided, clean down changing area paying particular attention to touch points.
- Ensure soiled linen and clinical waste is carefully disposed of and secured with swan neck, cable ties are in PPE box. Perform hand hygiene.
- When cleaning is complete the corridor can be reopened.
- The time for leaving the scan room after cleaning differs due to the air flow around the MRI Scanner and there is currently no official guidance about length of time to leave after a full clean. We allow for up to an hour before commencement of scanning other patients.

General Checklists for Nuclear Medicine Radiographer/ Technologist

COVID19 Emergency in Nuclear Medicine Departments				
Control of COVID- 19 Check List	Nuclear Medicine Radiographer/Technologists Tasks	Patient Considerations	Equipment Considerations	Imaging Room or Mobile Imaging Environmental Considerations
Preparation	<ul style="list-style-type: none"> Will the imaging procedure change patient management and/or could the procedure be delayed? Is mobile imaging an option for suspected and positive COVID-19 cases? Ensure Staff backup in case of A&E-calls in the emergency situation. Staff risk evaluation (pregnancy, immune, mental health concerns etc.) Don PPE with all appropriate steps – see appendix 'A' 	<ul style="list-style-type: none"> Is it needed now or could this be delayed? Is mobile imaging possible? PPE during transfer to the department when imaging cannot be performed mobile 	<ul style="list-style-type: none"> Remove unnecessary equipment from the imaging room Cover equipment that cannot be moved with suitable plastic 	<ul style="list-style-type: none"> Ensure infection prevention measures are employed when managing the imaging room and imaging equipment. This must be subject to regular cleaning consistent with local IPC guidance and cleaning schedules completed and signed and dated.
During	<ul style="list-style-type: none"> Appropriate PPE Employ “contaminated and non-contaminated technologist” scenario Ensure single patient attendance to the Imaging department wherever possible to enable further imaging if this is required. 	<ul style="list-style-type: none"> PPE, comfort, reassurance 	<ul style="list-style-type: none"> Infection control and barrier precautions 	<ul style="list-style-type: none"> Control access to imaging room or patient area during mobile Nuclear Medicine
Post procedure	<ul style="list-style-type: none"> Review of imaging by Nuclear Medicine Radiographer/ Technologist for suspicious features and organise additional imaging if required Appropriate staff 'Doffing' of PPE equipment – see Appendix A 	<ul style="list-style-type: none"> PPE during patient transfer, rapid results to guide management 	<ul style="list-style-type: none"> Appropriate decontamination including air exchange 	<ul style="list-style-type: none"> Appropriate decontamination including air exchange

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NUCLEAR MEDICINE VQ SCAN				
Control of COVID- 19 Check List	Nuclear Medicine Radiographer/Technologists Tasks	Patient Considerations	Equipment Considerations	Imaging Room Environmental Considerations
Preparation	<p>Pre- procedure consideration</p> <p>VQ Scan for known COVID-19 patients</p> <ul style="list-style-type: none"> The decision on whether to proceed with the VQ should be discussed with the referrer before booking. Most in-patient referrals are for VQ scans and these could include suspected or confirmed in-patient COVID-19 positive patients In--patient VQs with uncertain COVID-19 status as potentially positive and wear appropriate PPE VQ in most departments are the pregnant patients perform perfusion only scan than check if need aerosol procedure Ensure that patients and staff use the central entrance and do not enter the department without permission and without specific reason. Do not allow patient to wait in the waiting room for long periods, adopt international guideline for social distancing of at least 1 m (3 feet) and adapt best practice of local and national guideline. Confirm that medical exposure has been justified as urgent accordingly and/or cannot be rescheduled Ensure areas and equipment have been adequately disinfected-decontaminated. 	<ul style="list-style-type: none"> Controlled arrival and departure of patients and staff in the radiology department and only using the central entrance Provide patient with mask and gloves to wear during the procedure 	<ul style="list-style-type: none"> Disinfection-Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status Gamma Camera, (immobilization straps, positioning sponges) Auxiliary equipment (suction device, Oxygen mask) 	<ul style="list-style-type: none"> Disinfection-Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection status (i.e. asymptomatic-suspected-confirmed COVID 19)

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	<ul style="list-style-type: none">• Disinfect - wash hands.• Don PPE with all appropriate steps – see appendix 'A'• Be sure to wear a N95/FFP2/FFP3 mask with eye protection either goggles or face mask, gown etc. and single use gloves when receiving a paper referral, identify the patient and continue with the procedure			
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<p>During</p>	<ul style="list-style-type: none"> • During a VQ Lung Scan test every effort should be made to minimize the number of staff in contact with the patient imaging in a COVID-19 positive patient is best performed using two Nuclear Medicine Radiographers/Technologist , one donning full personal protective equipment mask with N95/FFP2/FFP3 or PAPR eye protection goggles or facemask, fluid resistant gown to attend to the patient, operate the scanner ,Aerosol unit and the other Nuclear Medicine Radiographer/Technologist will be considered clean and will operate including acquisition and processing equipment . • The use of a perfusion only scan is unlikely to be of any benefit if COVID-19 infection is suspected as the Coronavirus response alters MAA distribution. • Non hypertensive patients, consider increasing the DRL from 200MBq to 300MBq to bring about rapid SPECT imaging (5mins cp 12 mins). It would also reduce the time the patient and accompanying ward staff are in the department. • Patients with pulmonary hypertension should only receive 200MBq and always injected soon after preparation of MAA to reduce the number of particles (this usually means in the morning). • If more than one referral is made, these should be booked and performed consecutively, allowing for sufficient room re-circulations. National guidance states “A minimum of 20 minutes i.e. 2 air changes, in hospital settings where the majority of these procedures occur is considered pragmatic” • For all other VQ scans (i.e. those non-symptomatic for COVID-19), whether in-patient or outpatient, the 	<ul style="list-style-type: none"> • Patient continues to wear mask and gloves 	<ul style="list-style-type: none"> • Gamma Camera and remote hand control are considered contaminated so they must be used with gloves and the • Gamma Camera couch is covered with single use paper per patient. • Gamma Camera console keyboard, mouse and exposure pad are considered clean so they must be used only by the clean Nuclear Medicine Radiographer/Technologist 	
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	<p>operator should wear a surgical mask, gloves and gown.</p> <ul style="list-style-type: none"> • Use disposable tourniquets and any disposable waste from the procedure should be bagged in suitable waste bags as recommended by the local hospital • When performing a VQ scan on suspected or confirmed COVID-19 patients, the NM operator of choice would be those with no other medical conditions. • VQ scan may not be considered an actual aerosol. However, given the patient's likely symptoms (cough), the test warrants extra PPE. The operator (injector, and mask fitter) should wear the full PPE – gloves, eye protection Goggles or Facemask, and N95/FFP2/FFP3 or PAPR fluid resistant gown as there is a time during this test when the operator must be in close contact with the patient's mouth in order to fit the aerosol mask. <p>Pregnant Patients</p> <ul style="list-style-type: none"> • Pregnant patients are in a higher risk category and should be in the department for as short a time as possible. • If using Krypton, proceed with a dual energy Tc-MAA/Kr-gas VQ to complete the test quickly • Only perform ventilation at the same time if you have Krypton-81m available. Other ventilation agents may not be suitable due to the time required to be with the patient, and the unsatisfactory distribution due to likely patient non-compliance 			
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	<ul style="list-style-type: none">• If Technegas or aerosol is used follow the manufacturer's guidance <p>General precautions</p> <ul style="list-style-type: none">• Cover the gamma camera couch with disposable paper• Remove gloves and dispose of them in the Clinical Waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC)• Remember, when exiting the gamma camera scanner room (contaminated area) clothing may be contaminated.• Don't take off mask!• Disinfect hands with an hand sanitizer before you enter the (clean area) i.e. before touching the keyboard and mouse, the control console, principles of justification, optimization, radiation dose limitation as well as the Nuclear Medicine Radiographer's/ Technologist's Ethical Code and RG/RT Professional Rights at all times			
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<p>Post procedure</p>	<ul style="list-style-type: none"> • When entering the gamma (dirty area), wear disposable gloves. • Carefully remove the used paper cover from the gamma without touching your clothing and dispose of it in the corresponding bin according to hospital policy. • Disinfect gloves, and ensure decontamination-disinfection of Gamma couch-gantry keypad, and surfaces / contact points (sponges, fixing pads, and knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee manufacturer's instructions. • After disinfection/decontamination/deep cleaning, the RG/RT must visually inspect the scanning area, gamma and auxiliary equipment without removing gloves and mask. • Must not remove your mask yet! • Carefully remove your gloves carefully FIRST! • Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC • Disinfect hands immediately as there is danger of being contaminated without gloves! • Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes), and dispose of it in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the HWMC. • Disinfect - Wash hands well (again because you touched your mask)! 	<ul style="list-style-type: none"> • Patient keeps mask and gloves on 	<ul style="list-style-type: none"> • Single use gamma camera paper cover is removed and deposited of into the corresponding bin according to hospital policy. • Disinfection-Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee Camera manufacturer's instructions of: <ul style="list-style-type: none"> - Gamma camera, camera heads, remote hand control - keypad - Immobilization Velcro straps and positioning sponges, 	<ul style="list-style-type: none"> • Camera room should be closed, and after a delay of up to 2 hours (based on local practice recommendation) the imaging room can be cleaned. • For patients with known active COVID-19 or thought to be high-risk for COVID-19, between patients, equipment including cameras, beds, and anything that has been in contact with any patient and/or staff should be decontaminated, using appropriate PPE (as per local policies and standards), by locally available cleansing agents and as per manufacturer's recommendations • Disinfection-Decontamination-Deep cleaning of: <ul style="list-style-type: none"> • Surfaces desks and tables, chairs • Cameras, imaging viewing stations, Keyboards and mice beds, stretcher, should be cleaned after each test and sheets/linen replaced in compliance with local infection control recommendation contact points (knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control <p>Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.</p>
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FDG PET-CT (Oncology) Study Checklist

PET-CT ONCOLOGY				
Control of COVID- 19 Check List	Nuclear Medicine Radiographer/Technologists Tasks	Patient Considerations	Equipment Considerations	Imaging Room or Mobile Imaging Environmental Considerations
Preparation	<p>Pre- procedure consideration</p> <ul style="list-style-type: none"> • Will the imaging procedure change patient management and/or could the procedure to be delayed? • Select the protocol with the shortest duration of scan time and exposure to staff • Review prep and imaging questions, height, current weight virtual visit or telehealth (or equivalent) equipment from the patient before they come to the PET CT laboratory and document it in the electronic health record • Ensure that patients and staff use the central entrance and do not enter the department without permission and without specific reason. • Do not allow patients to wait in the waiting room for long periods. • Adopt international guidelines for social distancing of at least 1 m (3 feet) or adapt best practice of local and national guideline. • Confirm that medical exposure has been justified as urgent accordingly and/or cannot be rescheduled 	<ul style="list-style-type: none"> • Controlled arrival and departure of patients and staff in the radiology department and only using the central entrance • Provide patient with mask and gloves to wear during the procedure 	<ul style="list-style-type: none"> • Disinfection- Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status • PET- CT scanner (immobilization straps, positioning sponges) • Auxiliary equipment (i.e. suction device, Oxygen mask) 	<ul style="list-style-type: none"> • Disinfection Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection status

	<ul style="list-style-type: none"> • Inform the referring physician that the patient would not be allowed to enter the department and examination room unless wearing the appropriate mask in accordance with the Hospital Infectious Diseases Committee guidelines. • Ensure areas and equipment have been adequately disinfected-decontaminated. • Disinfect - wash hands. • Don PPE with all appropriate steps – see appendix ‘A’ • Be sure to wear a mask N95/FFP2/FFP3 or PAPR eye protection goggles or face shield, fluid resistant gown etc. and single use gloves when receiving a paper referral, identify the patient and continue with the procedure 			
<p>During</p>	<p>Injection Phase and Uptake phase of FDG Oncology PET CT Study</p> <ul style="list-style-type: none"> • During Injection phase and uptake phase of FDG Oncology PET CT every effort should be made to minimize the number of staff in contact with the patient. It is best practice to have two persons, one donning PPE to attend to the patient, glucose meter, scales, FDG dose after assay and during injection to the patient and the other to operate the dose calibrator, FDG dose before and during assay preparation, blanket warmer and Patient electronic charting during this portion of the test or as per local Institutional guidance • Consider the Bathroom contaminated which the patient uses to empty bladder before the imaging procedure 	<ul style="list-style-type: none"> • Patient to wear mask and use hand sanitizer 	<ul style="list-style-type: none"> • PET-CT Scanner and Gantry controls are considered contaminated so they must be used with gloves and all equipment in the injection/uptake room is considered contaminated, • glucose meter, scales dose calibrator and equipment for injecting considered contaminated 	

	<p>Imaging of FDG Oncology PET CT Study</p> <ul style="list-style-type: none"> • During PET CT Imaging for FDG Oncology PET CT every effort should be made to minimize the number of staff in contact with the patient imaging in a COVID-19 positive patient is best performed using two nuclear medicine radiographers/technologist , one donning full personal protective equipment to attend to the patient, operate the scanner , and the other nuclear medicine radiographer/ technologist will be considered clean and will operate the control room equipment, including acquisition and processing equipment. Ensure that the trolley or stretcher is removed from the examination room • Cover the PET -CT Scanner couch with disposable paper • Remove any metallic objects in the region of interest from the patient with particular care (especially when it comes to artificial dentures where there is a risk of getting infected). • Remove gloves and dispose of them in the clinical waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC) • Remember, when exiting the PET-CT scanner room (contaminated area) clothing may be contaminated. • Don't take off mask! 		<ul style="list-style-type: none"> • Consider the bathroom and all equipment in it contaminated after patient uses • Uptake chair/ table and other equipment should be covered with single use paper • PET -CT scanner couch is covered with single use paper per patient. • PET -CT Scanner console keyboard, mouse and exposure pad are considered clean so they must be used only by the clean technologist 	
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	<ul style="list-style-type: none"> Disinfect hands with an hand sanitizer before you enter the PET CT console area (clean area) i.e. before touching the keyboard and mouse, the control console, principles of justification, optimization, radiation dose limitation as well as the Nuclear Medicine Radiographer's/ Technologist's Ethical Code Professional Rights at all times 			
<p>Post procedure</p>	<ul style="list-style-type: none"> When entering the PET CT scanner room (dirty area), wear disposable gloves. Carefully remove the used paper cover from the PET CT couch without touching your clothing and dispose of it in the corresponding bin according to hospital policy. Disinfect gloves, and ensure decontamination-disinfection of PET CT couch-gantry keypad, CM injector control panel and surfaces / contact points (sponges, fixing pads, knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee PET CT manufacturer's instructions. After disinfection/decontamination/deep cleaning, the Nuclear Medicine Radiographer/Technologist must visually 	<ul style="list-style-type: none"> Patient keeps mask and gloves on 	<ul style="list-style-type: none"> Single use PET CT couch paper cover is removed and deposited of into the corresponding bin according to hospital policy. Disinfection-Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee Camera 	<ul style="list-style-type: none"> Injection and Uptake room and Camera room should be closed, and after a delay of up to 2 hours (based on local practice recommendation) the imaging room can be cleaned. For patients with known active COVID-19 or thought to be high-risk for COVID-19, between patients, equipment including cameras, beds, and anything that has been in contact with any patient and/or staff should be decontaminated, using appropriate PPE (as per local policies and standards), by locally available cleansing agents and as per manufacturer's recommendation.

	<p>inspect the scanning area, PET CT scanner and auxiliary equipment without removing gloves and mask.</p> <ul style="list-style-type: none"> • Must not remove your mask yet! • Carefully remove your gloves carefully FIRST! • Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC • Disinfect hands immediately as there is danger of being contaminated without gloves! • Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes) and dispose of it in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the HWMC. • Disinfect - Wash hands well (again because you touched your mask)! 		<p>manufacturer's instructions of:</p> <ul style="list-style-type: none"> • hand control area, PET CT couch and entire gantry inside gantry and outside <p>Gantry keypad Immobilization Velcro straps and positioning sponges,</p>	<ul style="list-style-type: none"> • Disinfection-Decontamination-Deep cleaning of: • Surfaces desks and tables, chairs • Cameras gantries, imaging viewing stations, Keyboards and beds, stretcher, Injection room equipment in it, infusion pumps, bathroom should be cleaned after each test and sheets/linen replaced in compliance with local infection control recommendation • contact points (door and cupboard knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control • Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.
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Nuclear Medicine Cardiology Study Checklist

NUCLEAR MEDICINE CARDIAC STRESS TESTING

Control of COVID- 19 Check List	Nuclear Medicine Radiographer/Technologist Tasks	Patient Considerations	Equipment considerations	Imaging Room Environmental Considerations
<p>Preparation</p>	<p>Pre- procedure consideration</p> <ul style="list-style-type: none"> • Avoid exercise nuclear stress testing due to risk of droplet exposure • Use pharmacological Nuclear stress testing for Cardiac Nuclear Medicine • Select the protocol with the shortest duration of scan time and exposure to staff • Consider using standard dose imaging with rapid imaging protocols • Consider stress first imaging protocols • Consider single day imaging protocols • Consider attenuation corrected imaging • Obtain consent using virtual visit or telehealth (or equivalent) equipment from the patient before they come to the nuclear laboratory and document it in the electronic health record • Ensure that patients and staff use the central entrance and do not enter the department without permission and without specific reason. • Do not allow patient to wait in the waiting room for long periods, adopt international guideline for social distancing of at least 1 m (3 feet) or adapt best practice of local and national guideline. • Confirm that medical exposure has been justified as urgent accordingly and/or cannot be rescheduled 	<ul style="list-style-type: none"> • Controlled arrival and departure of patients and staff in the radiology department and only using the central entrance • Provide patient with mask and gloves to wear during the procedure 	<ul style="list-style-type: none"> • Disinfection- Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status • Gamma Camera (immobilization straps, positioning sponges) • Auxiliary equipment (i.e. ECG, Defibrillator, suction device, Oxygen mask) 	<ul style="list-style-type: none"> • Disinfection- Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection

	<ul style="list-style-type: none">• Inform the referring physician that the patient would not be allowed to enter the department and examination room unless wearing the appropriate mask in accordance with the Hospital Infectious Diseases Committee guidelines.• Ensure areas and equipment have been adequately disinfected-decontaminated.• Disinfect - wash hands.• Don PPE with all appropriate steps – see Appendix 'A'• Be sure to wear a N95/FFP2/FFP3 mask with eye protection either goggles or face mask, gown etc. and single use gloves when receiving a paper referral, identify the patient and continue with the procedure			
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<p>During</p>	<p>Stress Test Portion of Cardiac Nuclear Study Stress Testing Protocol</p> <ul style="list-style-type: none"> • If exercise testing is deemed necessary, personnel should use PPE as indicated per local institutional guidance • selection minimize contact for written consent (wiping, gloves, disposing pens), consider verbal consent, or written consent with minimized contact and exchanges of papers and pens (e.g., separate pens, gloves), wiping surfaces before and after use • Pharmacological stress with vasodilators is preferred to minimize droplet exposure to exercise staff and minimize close contact between staff and patients • Regadenoson may be the preferred stress agent if available and not contraindicated for the patient, since it requires a single 10 second infusion, after which providers can maintain distance from the patient. For adenosine and dipyridamole stress testing, extra-long tubing can be used to keep distance between staff and patients • Automatic BP cuffs should be considered • During Pharmacological Stress portion of study or exercise Stress portion of a nuclear stress test every effort should be made to minimize the number of staff in contact with the patient is best practice to have two persons, one donning full personal protective equipment to attend to the patient, and the other to operate the stress lab equipment during this portion of the test 	<ul style="list-style-type: none"> • Patient continues to wear mask and gloves 	<ul style="list-style-type: none"> • Gamma Camera and remote hand r and Gantry controls are considered contaminated so they must be used with gloves and the • Gamma Camera couch is covered with single use paper per patient. • Gamma Camera console keyboard, mouse and exposure pad are considered clean so they must be used only by the clean Nuclear Medicine Radiographer/ Technologist 	
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	<p>Imaging of Nuclear Medicine Cardiac Stress test</p> <ul style="list-style-type: none"> • When performing Nuclear medicine Imaging portion nuclear medicine stress test every effort should be made to minimize the number of staff in contact with the patient imaging in a COVID-19 positive patient best practice would be to two Nuclear Medicine Radiographers/ Technologist , one donning full personal protective equipment to attend to the patient, operate the gamma camera and the hand control, and the other Nuclear Medicine Radiographer/Technologist will also be donning as well considered clean and will attend to the acquisition and processing equipment. • Ensure that the trolley or stretcher is removed from the examination room • Cover the gamma camera couch with disposable paper • Remove any metallic objects in the region of interest from the patient with particular care (especially when it comes to artificial dentures where there is a risk of getting infected). • Remove gloves and dispose of them in the Clinical Waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC) • Remember, when exiting the gamma camera (contaminated area) clothing may be contaminated. • Don't take off mask! • Disinfect hands with an hand sanitizer before you enter the console area (clean area) i.e. before touching the keyboard and mouse, the control console, principles of justification, optimization, radiation dose limitation as well as the Nuclear Medicine Radiographer's/Technologist's Ethical Code and RG/RT Professional Rights at all times 			
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<p>Post procedure</p>	<ul style="list-style-type: none"> • When entering the gamma room (dirty area), wear disposable gloves. • Carefully remove the used paper cover from the gamma without touching your clothing and dispose of it in the corresponding bin according to hospital policy. • Disinfect gloves, and ensure decontamination-disinfection of Gamma couch-gantry keypad, CM injector control panel and surfaces / contact points (sponges, fixing pads, knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee CT manufacturer's instructions. • After disinfection/decontamination/deep cleaning, the RG/RT must visually inspect the scanning area, gamma camera and auxiliary equipment without removing gloves and mask. • Must not remove your mask yet! • Carefully remove your gloves carefully FIRST! • Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC • Disinfect hands immediately as there is danger of being contaminated without gloves! • Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes) and dispose of it in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the HWMC. • Disinfect - Wash hands well (again because you touched your mask)! 	<ul style="list-style-type: none"> • Patient keeps mask and gloves on 	<ul style="list-style-type: none"> • Single use gamma camera couch paper cover is removed and deposited into the corresponding bin according to hospital policy. • Disinfection-Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee Camera manufacturer's instructions of: • Gamma camera, camera heads, remote hand control <ul style="list-style-type: none"> and entire gantry inside gantry and outside - Gantry keypad - generator cart - Immobilization Velcro straps and positioning sponges, 	<ul style="list-style-type: none"> • Stress Lab room and Camera room is appropriately cleaned, should be closed, and after a delay of up to 2 hours (based on local practice recommendation) the imaging room can be cleaned. • For patients with known active COVID-19 or thought to be high-risk for COVID-19, between patients, equipment including cameras, beds, and anything that has been in contact with any patient and/or staff should be decontaminated, using appropriate PPE (as per local policies and standards), by locally available cleansing agents and as per manufacturer's recommendations <p>Disinfection-Decontamination-Deep cleaning of:</p> <ul style="list-style-type: none"> • Surfaces desks and tables, chairs • Cameras gantries, imaging viewing stations, Keyboards and mice beds, stretcher, treadmill, blood pressure cuff and equipment, and infusion pumps should be cleaned after each test and sheets/linen replaced in compliance with local infection control recommendation • contact points (door and cupboard knobs) by the use of a suitable
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				<p>disinfectant in accordance to Hospital Infectious Diseases Control</p> <p><i>Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.</i></p>
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PET CT Cardiac Stress Testing Checklist

PET CT CARDIAC STRESS TESTING				
Control of COVID- 19 Check List	Nuclear Medicine Radiographer/Technologist Tasks	Patient Considerations	Equipment considerations	Imaging Room Environmental Considerations
Preparation	<p>Pre- procedure consideration</p> <ul style="list-style-type: none"> • Use pharmacological Nuclear Stress testing for Cardiac PET CT • Select the protocol with the shortest duration of scan time and exposure to staff • Consider using standard dose imaging with rapid imaging protocols • Consider attenuation corrected imaging • Obtain consent using virtual visit or telehealth (or equivalent) equipment from the patient before they come to the nuclear laboratory and document it in the electronic health record • Ensure that patients and staff use the central entrance and do not enter the department without permission and without specific reason. • Do not allow patient to wait in the waiting room for long periods, adopt international guideline for social distancing of at least 1 m (3 feet) and adapt best practice of local and national guideline. • Confirm that medical exposure has been justified as urgent accordingly and/or cannot be rescheduled • Inform the referring physician that the patient would not be allowed to enter the department 	<ul style="list-style-type: none"> • Controlled arrival and departure of patients and staff in the radiology department and only using the central entrance • Provide patient with mask and gloves to wear during the procedure 	<ul style="list-style-type: none"> • Disinfection- Decontamination with the use of appropriate technique and means according to Hospital Infectious Diseases Control Committee between patients depending on their infection status • PET- CT scanner (immobilization straps, positioning sponges) • Auxiliary equipment (i.e. ECG, Defibrillator, suction device, Oxygen mask) 	<ul style="list-style-type: none"> • Disinfection- Decontamination with the use of appropriate technique and means of areas and patient contact surfaces according to Hospital Infectious Diseases Control Committee between patients depending on their infection

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	<p>and examination room unless wearing the appropriate mask in accordance with the Hospital Infectious Diseases Committee guidelines.</p> <ul style="list-style-type: none">• Ensure areas and equipment have been adequately disinfected-decontaminated.• Disinfect - wash hands.• Don PPE with all appropriate steps – see appendix 'A'• Be sure to wear a N95/FFP2/FFP3 mask with eye protection either goggles or face mask, gown etc. and single use gloves when receiving a paper referral, identify the patient and continue with the procedure			
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<p>During</p>	<p>Stress Test Portion of PET CT Cardiac Stress Testing Protocol</p> <ul style="list-style-type: none"> • selection minimize contact for written consent (wiping, gloves, disposing pens), consider verbal consent, or written consent with minimized contact and exchanges of papers and pens (e.g., separate pens, gloves), wiping surfaces before and after use • Pharmacological stress with vasodilators is preferred to minimize droplet exposure to exercise staff and minimize close contact between staff and patients • Regadenoson may be the preferred stress agent if available and not contraindicated for the patient, since it requires a single 10 second infusion, after which providers can maintain distance from the patient. For adenosine and dipyridamole stress testing, extra-long tubing can be used to keep distance between staff and patients • Automatic BP cuffs should be considered • During Pharmacological Stress portion of study every effort should be made to minimize the number of staff in contact with the patient is best practice to have two persons, one donning full personal protective equipment to attend to the patient, and the other to operate the stress lab equipment during this portion of the test <p>Pharmacological PET CT Cardiac Stress test</p> <ul style="list-style-type: none"> • During a Pharmacological PET CT Cardiac stress test every effort should be made to minimize the number of staff in contact with the patient imaging in a COVID-19 positive patient is best performed using two nuclear medicine radiographers/Technologist, 	<ul style="list-style-type: none"> • Patient continues to wear mask and gloves 	<ul style="list-style-type: none"> • PET-CT Scanner hand control and Gantry controls are considered contaminated so they must be used with gloves and the • PET -CT scanner couch is covered with single use paper per patient. • PET -CT Scanner console keyboard, mouse and exposure pad are considered clean so they must be used only by the clean Nuclear Medicine Radiographer/ Technologist 	
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	<p>one donning full personal protective equipment to attend to the patient, operate the scanner , generator injection cart and the other Nuclear Medicine Radiographer/Technologist will be considered clean and will operate the control room equipment, including acquisition and processing equipment . The personal operating the EKG machine and injecting the stress agent should also be Donning in full personal protective equipment and considered dirty as they will also be attending to the patient as well.</p> <ul style="list-style-type: none"> • Ensure that the trolley or stretcher is removed from the examination room • Cover the PET -CT Scanner couch with disposable paper • Remove any metallic objects in the region of interest from the patient with particular care (especially when it comes to artificial dentures where there is a risk of getting infected). • Remove gloves and dispose of them in the Clinical Waste bin (yellow hazardous-contaminated waste) in accordance with the regulation of your Hospital Waste Management Committee. (HWMC) • Remember, when exiting the PET-CT scanner room (contaminated area) clothing may be contaminated. • Don't take off mask! • Disinfect hands with an hand sanitizer before you enter the PET CT console area (clean area) i.e. before touching the keyboard and mouse, the control console, principles of justification, optimization, radiation dose limitation as well as the Nuclear Medicine Radiographer's/ Technologist's Ethical Code and RG/RT Professional Rights at all times 			
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<p>Post procedure</p>	<ul style="list-style-type: none"> • When entering the PET CT scanner room (dirty area), wear disposable gloves. • Carefully remove the used paper cover from N95/FFP2/FFP3 or PAPR the PET CT couch without touching your clothing and dispose of it in the corresponding bin according to hospital policy. • Disinfect gloves, and ensure decontamination-disinfection of the PET CT couch-gantry keypad, control panel and surfaces / contact points (sponges, fixing pads, knobs) by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee CT manufacturer's instructions. • After disinfection/decontamination/deep cleaning, the RG/RT must visually inspect the scanning area, PET CT scanner and auxiliary equipment without removing gloves and mask. • Must not remove your mask yet! • Carefully remove your gloves carefully FIRST! • Dispose of them in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the regulation of your HWMC • Disinfect hands immediately as there is danger of being contaminated without gloves! • Remove mask carefully so that the cords or bands of the mask do not touch the face or mucous membranes of the face (and eyes) and dispose of it in the Clinical Waste bin (yellow hazardous contaminated waste) in accordance with the HWMC. • Disinfect - Wash hands well (again because you touched your mask)! 	<ul style="list-style-type: none"> • Patient keeps mask and gloves on 	<ul style="list-style-type: none"> • Single use PET CT couch paper cover is removed and deposited into the corresponding bin according to hospital policy. • Disinfection-Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control Committee Camera manufacturer's instructions of: PET CT couch control handle and entire gantry inside gantry and outside <ul style="list-style-type: none"> - Gantry keypad - generator cart - Immobilization Velcro straps and positioning sponges, 	<ul style="list-style-type: none"> • Camera room should be closed, and after a delay of up to 2 hours (based on local practice recommendation) the imaging room can be cleaned. • For patients with known active COVID-19 or thought to be high-risk for COVID-19, between patients, equipment including cameras, beds, and anything that has been in contact with any patient and/or staff should be decontaminated, using appropriate PPE (as per local policies and standards), by locally available cleansing agents and as per manufacturer's recommendations • Disinfection-Decontamination-Deep cleaning of: • Surfaces desks and tables, chairs • Cameras gantries, imaging viewing stations, Keyboards and mice beds, stretcher, treadmill, blood pressure cuff and equipment, and infusion pumps should be cleaned after each test and sheets/linen replaced in compliance with local infection control recommendation • contact points (door and cupboard knobs) by the use of a suitable
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				<p>disinfectant in accordance to Hospital Infectious Diseases Control</p> <p><i>Attention to the knobs, keyboards, console, mouse, phone, mobile phones, pagers, lighting switches, as they are also contaminated.</i></p>
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Nuclear Medicine and PET CT General Advice

- Lung Scan - consider not performing ventilation scans and only performing perfusion imaging part of the procedure with SPECT CT if available
 - Review of a current chest radiograph or CT that demonstrates lung opacification present, these patients should be referred for alternative testing, generally with CT pulmonary angiography (CTPA). If the lungs are clear, the patient should proceed to perfusion scintigraphy, using either planar or tomographic imaging.
 - If multiple machines are available designate one machine for COVID-19 patients, if possible, designate a portable gamma camera for COVID-19 Areas/floor
- All non-urgent nuclear cardiology studies should be postponed, and only urgent studies performed whenever clinically appropriate to expedite, management of outpatients, as well as assessment and disposition of inpatients and emergency department patients
 - Performance of imaging will be based on the guiding principle that imaging is per appropriate use criteria and will result in a change in patient management in the:-
 - near term (Priority 1, perform as scheduled)
 - intermediate-term (Priority 2, postpone by 2-4months)
 - long-term (Priority 3, postpone by > 4 months)
- Cardiac PET if available may be preferred for rapid throughput and to help minimize time spent by the patient in the laboratory
- Exercise stress testing, without or with vasodilator agents, should be generally avoided
- 18F-fluorodeoxyglucose (FDG) PET scan
 - Patients referred for FDG PET for myocardial viability should wait in a separate room during the insulin-glucose manipulation procedure
 - Special precautions should be taken for minimizing potential exposure to and transmission of COVID-19 in patients with suspected endocarditis
 - FDG PET should be considered for endocarditis in a febrile patient with bacteraemia as an alternative to Transoesophageal echocardiography, which carries a very high droplet risk exposure for operators
- CT images acquired for attenuation correction on SPECT CT or PET CT scans should be interpreted in the context of possible COVID-19 'ground-glass' findings. Outpatient images should be reviewed before the patient leaves. If there are signs consistent with COVID-19 on the images, the scanner needs to be 'deep' cleaned and room allowed appropriate air exchange prior to the next patient in case the patient.
- Request patients and staff to wear surgical masks to protect immunocompromised patients during Oncology PET CT scanning

- Nuclear medicine scans and Oncology PET CT scans require an uptake phase ranging from a few minutes to a few hours. During this time, the patients may be waiting in separate radioactive patient areas or in uptake bays if waiting for PET. While waiting patients must wear masks at all times for their protection.
- In-patient procedures - to minimise unnecessary patient transfer, administer isotope in the patient room on the ward and ensure appropriate radiation considerations are made for the environment and potential pregnant staff are identified. Radiographer / technologists should wear all appropriate PPE when on floor/area. Also, nuclear medicine Radiographer/Technologists should remove all unnecessary injection equipment from injection trays when going to patient hospital room for injection
- Plan for unit dose delivery of radiopharmaceuticals should be in place during crisis
- During crisis a radiopharmaceuticals plan should be confirmed and all products reviewed to ensure they can still be supplied as there may be some disruption
- When possible with two facilities make one facility the COVID-19 facility and have the other non COVID-19 facility,
- Review hospital's license for authorized users and radiopharmaceuticals to ensure that facilities have appropriate radiopharmaceuticals and authorized users needed to perform appropriate tests needed. If needed, apply for emergency amendment to your license to allow for isotopes to be delivered appropriately
- If possible, one camera should be set aside for non-symptomatic patients only (out or inpatients) with a different camera being reserved for symptomatic / unconfirmed / confirmed patients whenever possible. Also, if possible if you have a portable gamma camera have this used for the COVID floor/ Areas in hospital and when possible leave in the unit
- Immunocompromised oncology patients should be separated from other patients, and have separate personnel attending to them for their testing.
- Therapeutic Nuclear Medicine:
 - Each patient needs to be assessed on an individual basis.
 - Radioiodine therapy appointments for benign Hyperthyroidism may have to cease, since they are in the main, non-urgent, and would pose radiation protection issues should they be admitted to ITU. However, consideration should be given to giving the treatment to those patients who are unable to tolerate anti-thyroid medications, or those who have other severe comorbidity issues, whereby a delay in treatment would cause more harm than good.
 - Administration of radioiodine ablation therapy to Thyroid cancer patients needs careful consideration. Please follow Thyroid Cancer guidance for actions to be taken for low, medium and high-risk patients in terms of delay of treatment and measures to be taken should the decision be made to go ahead with treatment.
 - Lutathera for patients with low and medium grade Neuroendocrine tumours will need to be reviewed in light of local risk assessments/guidelines. However, since these patients could be considered as at risk due to possible marrow depletion post

procedure, it may be safer to defer treatment for a few months. Each patient should be reviewed in their own clinical and local contexts.

- Radium-223 dichloride can be administered as an outpatient procedure, provided the patients do not have comorbidities that would put them at high risk due to low immunity. Please review each patient in their own clinical and local contexts.
- Avoid in-person image review with referring services and use remote reviewing or screen sharing wherever possible and/or telephone discussions
- Patient-facing staff in the waiting room and laboratory should wear a facemask at all times, if available
- Adopt WHO guideline on social distancing 1m (3 ft.) or adapt best practice of local or national guidelines where possible e.g. 2m (6 ft.) distance in all patient/staff interactions when possible
- Rotating staff schedules for onsite and offsite work
- Minimize crowding in workplace
- Limit interaction between inpatients and outpatients
- Consider the possibility of separate imaging teams to handle inpatients and outpatients
- Suspected or confirmed COVID-19 cases, will result in the room / area to require thorough cleaning to be performed by the designated "cleaning team" or those appropriately trained following infection control policies at that institution, with strict adherence to local guidelines:
 - The Imaging room should be closed, and after a delay of up to 2 hours (based on local practice recommendation) the imaging room can be cleaned.
 - For patients with known active COVID-19 or thought to be high-risk for COVID-19, between patients, equipment including cameras, beds, and anything that has been in contact with ANY patient and/or staff should be decontaminated, using appropriate PPE (as per local policies and standards), by locally available cleansing agents and as per manufacturer's recommendations
 - PUI or active COVID-19 patients, additionally, air/ventilation system disinfection may be performed per local infectious disease recommendations
 - Regular cleaning of surfaces should also be performed using appropriate PPE, (as per local policies and standards), including door handles, table surfaces, computer keyboards, telephones and dictation equipment at least daily and, preferably, between users. This can be with locally available wipes or soaps, in keeping with institutional recommendations
 - stretcher, treadmill, blood pressure equipment, and infusion pumps should be cleaned after each test and sheets/linen replaced in compliance with local infection control recommendation

Radiation Therapy Procedures checklist

Control of COVID-19 Check-list	Role of RTT	Patient Considerations	Equipment Consideration	Treatment/ Radiobiological/ Environment Considerations
<p>1. Preparation for Patients not known to have COVID-19</p>	<ul style="list-style-type: none"> • Training or refresher course including visual and quick guides for putting on and taking off PPE for RTTS. • RTTs must undertake hand-washing /sanitizing before performing treatment/procedure for all patients. 	<ul style="list-style-type: none"> • Request patients to attend appointments without accompanying person. If not, limit to maximum one accompanying person per patient. • Advise patients on treatment to inform staff if they develop fever or respiratory symptoms before coming for treatment. • Patients must wash their hands on entry into the treatment room and use hand sanitizer. • If patients normally attend for special preparation for example ahead of time for bladder filling – where possible this is managed in a specific area of the department, as patients will be in the waiting room for longer. • Patients should not arrive ahead of their given appointment time unless needed for treatment preparations. 	<ul style="list-style-type: none"> • Remove unnecessary accessories from the treatment room. 	<ul style="list-style-type: none"> • Consider evidence-based shorter fractionation schedules and deferring radiotherapy for some groups. • Use the RADS (Remote, Avoid, Defer, Shorten) principle to help plan individual patient treatment: • Consider re-scheduling of non-urgent routine follow-up cases. • Explore remote monitoring of patients via telephone or video conferencing and follow up on those who are vulnerable and need support. • Contact new patients ahead of first appointments to screen patients on symptoms, temperature, travel history and risk of exposure. • Daily screening process should be in place to screen all patients and accompanying family member before entering the clinic. • If patient is found to have fever or high risk to exposure during screening, to isolate patient in a separate room and assess by doctor/nurse to determine if patient's condition is related to cancer treatment. If patients are suspected of fever with respiratory symptoms, or of high risk group. Please follow the hospital guidelines for action. • Adopt international guideline for social distancing of at least 1 m (3 feet) or adapt best practice of local and national guidelines within the radiotherapy department e.g. at patient waiting area to minimize cross infection.

During	<ul style="list-style-type: none"> • Staff to use surgical masking and gowns in line with WHO personal protective equipment guidance of radiation therapists when treating all patients 	<ul style="list-style-type: none"> • Provide reassurance and comfort to patient 	<ul style="list-style-type: none"> • Infection control and barrier precautions 	
Post Procedure	<ul style="list-style-type: none"> • RTTs must follow the principles of infection control and wash and sanitize their hands between treating patients 		<ul style="list-style-type: none"> • Wipe down of the treatment couch or accessories after each patient in line with department guidance during the pandemic 	<ul style="list-style-type: none"> • Evaluate current workflow to minimize inter-section/ department interaction

<p>2. Preparation for Patient who are on self-isolating / quarantine due to close contact with COVID-19 patients</p>	<ul style="list-style-type: none"> • Preparation of PPE • Availability of quick guides for putting on and taking off PPE for RTTS. 	<ul style="list-style-type: none"> • Patient should be wearing surgical mask when coming in for treatment. • Advise patients on treatment to inform staff if they develop fever or respiratory symptoms before coming for treatment. • Performing Swab test on suspected patient to guide management • Should minimize waiting time of the patient in the radiotherapy department • Upon arrival, patient should be waiting in an isolation room and prevent from moving around the department 		<ul style="list-style-type: none"> • Consider evidence-based shorter fractionation schedules and deferring radiotherapy when possible • Use the RADS (Remote, Avoid, Defer, Shorten) principle to help plan individual patient treatment: • Remote monitoring of patients via telephone or video conferencing whenever possible • Schedule patient appointment to be different timing from other patients who are at particularly increased risk of severe illness from COVID-19. • Clearly identified Isolation waiting areas for both CT and Treatment areas and for patients requiring specific treatment preparation ahead of treatment for example bladder filling. • If possible, to arrange for patient to be treated as the last patient of the day or in larger departments – allocate equipment for COVID-19 only patients.
<p>During</p>	<ul style="list-style-type: none"> • Recommended PPE to be worn when caring for suspected COVID-19 patients whenever possible • Consider employing “contaminated and non-contaminated RTTs when delivering treatment 	<ul style="list-style-type: none"> • Provide reassurance and comfort to patient 	<ul style="list-style-type: none"> • Ensure infection prevention measures are employed when managing the treatment room used to treat patient 	

Post Procedure	<ul style="list-style-type: none"> • Proper disposing of PPE after each patient to prevent cross infection 		<ul style="list-style-type: none"> • Appropriate decontamination based on hospital /international guidelines. 	
3. Preparation for Patient who are confirmed COVID-19 patients	<ul style="list-style-type: none"> • PPE must be worn when transferring or caring for COVID-19 patients. 	<ul style="list-style-type: none"> • Confirm patients should arrival in separate designated transport. • Separate entrance for COVID-19 patients whenever possible. • Staff receiving the patient should be dress in PPE. • Patient should be treated immediately upon arrival. 	<ul style="list-style-type: none"> • Ensure infection prevention measures are employed when managing the treatment room used to treat patient 	<ul style="list-style-type: none"> • Consider evidence-based shorter fractionation schedules and deferring radiotherapy when possible • Use the RADS (Remote, Avoid, Defer, Shorten) principle to help plan individual patient treatment: • Schedule patient appointment to be different timing from other patients who are at particularly increased risk of severe illness from COVID-19 • Patient should be waiting in an isolation room away from the main waiting area Designated “ • If multiple treatment machines are available, to designate ‘dirty’ machine for COVID-19 patients. If not possible, to arrange for COVID-19 patient to be treated as the last patient of the day • Consider having split team arrangement: - <ul style="list-style-type: none"> ○ For example, 1- Team A and Team B - Explore alternate work week or morning afternoon shift between the 2 teams (if possible to avoid or minimize physical contact between the 2 teams). ○ If split work shift arrangement is not possible, may consider designation of 2 different teams consisting of doctors, radiation therapists, nurses, physicists and support staff to a specific treatment machine. ○ i.e. Team A Machine’s patients will only be attended by the designated TEAM A staff and vice versa. • Implementing working from home whenever possible. Remote dosimetry/physics/ oncologist treatment planning through remote access. • This is to ensure continuity of service, minimize risk to patients and limiting the risk of COVID-19 exposure at work from fellow colleagues.

				<ul style="list-style-type: none"> Machine servicing and QA checks to move to weekend as much as possible.
During	<ul style="list-style-type: none"> Employ “contaminated and non-contaminated RTTs when delivering treatment. 	<ul style="list-style-type: none"> Provide reassurance and comfort to patient 	<ul style="list-style-type: none"> Ensure infection prevention measures are employed when managing treatment machines used by patient. 	
Post procedural	<ul style="list-style-type: none"> Proper disposing of PPE after each patient to prevent cross infection 		<ul style="list-style-type: none"> Appropriate decontamination based on hospital guidelines and including air exchange cleaning. 	
4. Preparation for Radiation Therapists (RTTs)	<ul style="list-style-type: none"> If possible, avoid staff rotation to different machines or location during this period to minimize cross infection. Consider twice daily temperature taking for all 			

	<p>staff- Once before reporting to work and once in mid-day.</p> <ul style="list-style-type: none"> • Mandate self-reporting of symptoms and exposure by all staff. • If possible, identify vulnerable category of RTTs staff to arrange for non-patient contact work. 			
5. Preparation for Radiation Therapists (RTTs) if exposed/confirm COVID-19	<ul style="list-style-type: none"> • RTT should not attend work if they develop symptoms while at home (off-duty), and notify their supervisor. • Support staff who are on self-isolating to keep in touch as much as possible, to support their mental wellbeing. 	<ul style="list-style-type: none"> • Isolation of all patients and staff that may be in close contact with the confirmed COVID-19 –RTTs. • Closely monitor the patients and staff on isolation and to provide support. 	<ul style="list-style-type: none"> • Appropriate decontamination of the whole work area used by staff based on hospital guideline. 	

Radiation Therapy Procedures General Advice

- Consider re-scheduling of non-urgent routine follow-up cases
- Screening process should be in place to screen all patients and accompanying family member before entering the clinic.
- To limit to only one adult accompanying patient
- Consider twice daily temperature taking for all staff- e.g. Once before reporting to work and once in mid-day. Mandate self-reporting of symptoms and exposure by all staff. Symptomatic staff should remain home or follow hospital reporting workflow
- If possible, avoid staff rotation to different machines or location during this period to minimize cross infection by staff
- Adopt international guidelines for social distancing of at least 1 m (3 feet) or adapt best practice of local and national guideline
- Maintain WHO social distancing or local and national guidelines within the radiotherapy department (at patient waiting area) whenever possible
- Encourage surgical masking, and possibly gowns, in line with departmental procedures of radiation therapists when treating all patients
- Encourage patient and therapist handwashing/sanitizing prior to and after entry into the treatment/procedure rooms for all patients
- Use of full PPE when treating of confirmed or suspected COVID-19 patients
- Wipe down of the treatment couch or accessories touch by patients to prevent cross infection in line with departmental policies.
- If multiple treatment machines available, to designate 'dirty' machine for all infectious patients. If not possible, to arrange for infectious patient to be treated as the last patient of the day.
- Consider having split team arrangement.

For example, 1- Team A and Team B. - Explore alternate work week or morning afternoon shift between the 2 teams (if possible, to avoid or minimize physical contact between the 2 Teams). This is to ensure continuity of service, minimize the risk to patients and limiting the risk of COVID-19 exposure at work from fellow colleagues.

If split work shift arrangement is not possible, may consider designation of 2 different teams consisting of doctors, radiation therapists, nurses, physicists and support staff to a specific treatment machine i.e. Team A Machine's patients will only be attended by the designated TEAM A staff. To consider implementing social distancing between the 2 TEAMS to minimize cross infection

Student Education General Advice

Clinical placement of radiography students

A pandemic outbreak like with the COVID-19 virus also impacts on educational programmes. Both traditional classroom teaching and clinical placements will mainly be placed on hold and postponed due to general regulations on social distancing.

Most radiology departments will need to prioritise their activities during such a health crisis and are unable to allocate personnel to take care of students in clinical placement. While traditional classroom learning activities can be substituted by various online resources, clinical skills will need practical training guided by a competent mentor. However, this critical requirement of the education of most radiography students must at some point be continued. This must be managed with extreme care for the protection of not only the students and faculty, but also the health workers and patients they meet.

All in-person clinical placement activities with patients should be considered to be halted and where possible the time converted to virtual or other options that do not involve in-person activities.

Options that include activities such as distance simulation, special online resources, and online activities such as telemedicine, teleradiology and similar means of care delivery are encouraged.

During the crisis the staff numbers to maintain an effective workforce is required, and some students may take up support workforce roles.

Useful links – Bibliography

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The Health Care Blog – COVID-19 Infection Control for COVID-19 Imaging – Article by Stephen Borstelmann, MD – addressing CT issues and estimated Turnaround times (TAT)

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COVID-19: Donning of Personal Protective Equipment (PPE)

https://www.youtube.com/watch?v=kKz_vNGsNhc

COVID-19: Removal and disposal of Personal Protective Equipment (PPE)

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<https://www.acr.org/Clinical-Resources/COVID-19-Radiology-Resources>

American Society of Breast Surgeons (ASBrS) American College of Radiology (ACR) Joint Statement on Breast Screening Exams During the COVID-19 Pandemic

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<https://www.rcr.ac.uk/posts/tailored-ppe-guidance-posters-imaging-and-cancer-teams>

Interventional Department useful links- bibliography

CIRSE checklist how to prepare IR services for COVID-19

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- [CDC General Hospital of Athens Laiko Greece. Safety Instructions for COVID 19 patients management \(Greek\)](#)
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- [Ministry of Health, Greece: Public Health Safety Precaution Measures for Healthcare Units to manage solid waste for SARS-COV2](#)
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COVID-19 - ISRRRT Response Document - appropriate and safe use of Medical Imaging and Radiation Therapy with infection control measures considered in addition to standard radiation protection procedures. April 2020 – Version 1

Johannes Czernin¹, Stefano Fanti², Philipp T. Meyer³, Martin Allen-Auerbach¹, Marcus Hacker⁴, Mike Sathekge⁵, Rodney Hicks⁶, Andrew M. Scott⁷, Jun Hatazawa⁸, Mijin Yun⁹, Heiko Schoöder¹⁰, Peter Bartenstein¹¹, and Ken Herrmann
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RCOG Guidance for fetal medicine units (FMUs) in the evolving coronavirus (COVID-19) pandemic, published 23rd March 2020
 ISUOG Safety Committee Position Statement: safe performance of obstetric and gynecological scans and equipment cleaning in the context of COVID-19 <https://www.isuog.org/uploads/assets/d03798de-11ff-4037-beecc9c1495d9572/e6f65fb1-f6af-4d94-beb02bb4ea78c0cc/ISUOG-Safety-Committee-statement-COVID19.pdf>

The RCOG guidance for fetal medicine units recommends that “patients should be asked to attend alone if possible or with a maximum of one partner/visitor” and for early pregnancy units, the recommendation is to attend alone. The ISUOG Consensus Statement on organization of routine and specialist obstetric ultrasound services in the context of COVID-19 recommends that “The number of visits should be reduced to the essential minimum and women should be advised to attend with no accompanying person to avoid virus spread”.

WHO recommended room air changes

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Decontamination of probes - AXREM, BMUS and SCoR best practice summary and international guidance

<https://www.axrem.org.uk/resource/ultrasound-transducer-decontamination-best-practice-summary/>

Centres for Disease Control and Prevention - Disinfection of Healthcare Equipment

<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/healthcare-equipment.html#DisinfectionHBV>

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DXA useful links-bibliography

<https://www.iscd.org/about-iscd/iscd-COVID-19-dxa-guidance/>

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Students useful links-bibliography

NHS Allied Health Professions student support guidance during COVID-19 outbreak

<https://www.hee.nhs.uk/sites/default/files/documents/AHP%20student%20support%20guide%20COVID-19.pdf>

COVID-19 - ISRRRT Response Document - appropriate and safe use of Medical Imaging and Radiation Therapy with infection control measures considered in addition to standard radiation protection procedures. April 2020 – Version 1

Appendix A

Advice on the use of PPE equipment – Donning and Doffing (Removal and Disposal)

Donning of Personal Protective Equipment (PPE) - COVID-19 – see Appendix C and E

1. Perform Hand Hygiene
2. Put on long sleeve fluid resistant gown
3. Put on N95/FFP2/FFP3 mask or PAPR (If radiographer wears glasses take off until FFP is secured in place- put glasses back on)
4. Place Face mask (if reuses N 95 mask face serves as barrier) or goggles in place (If N95/FFP3 put surgical mask over your N95/FFP3) (The facial mask should be put on first, then head/hair cover that covers all hair and both ears.)
5. Clean hands with antibacterial liquid before putting on gloves and put on non-Sterile Nitrile gloves (be sure gloves cover cuffs of gown)
6. You may now enter patient room
7. In general, shaving is recommended during this epidemic acknowledging that some people have cultural and religious needs, and they are recommended to seek advice from religious leaders for appropriate guidance for their own and patient safety. Source; Intensive Care Society

Doffing - Removal and disposal of Personal Protective Equipment (PPE) - COVID-19 – see appendix D

1. Do not step into clean area when removing PPE
2. Safely remove gloves by first grasping outside of the glove with the opposite gloved hand, peel off, hold the removed glove in gloved hand peel off glove and throw away
3. Clean hands with hand gel
4. Remove gown slowly undo necktie and waist tie, pull gown away from neck and shoulders touching the inside of the gown only using a peeling motion as outside of gown is contaminated, roll into bundle discard in garbage. Clean hands with antibacterial soap between every removal of PPE device/clothing
5. Remove visor, stand straight reach for elastic strap at back of head, close eyes and lift the strap upward than over the hear using both hands, place visor into clinical waste bin. Clean hands with antibacterial soap.
6. Step into clear area wearing respirator and now clear hands again with alcohol hand gel
7. If glasses are worn remove glasses and clean with alcohol wipe, don't put back on until you have completed doffing and washed your hands. PPE should be removed in controlled area between "infected" and "clean" room. Facemask should be kept on until clean area.
8. Remove N95/FFP2/FFP3 respirator without touching the front of the respirator which is contaminated (both hands find bottom strap and bring it up to the top strap, lift both straps over the top of the head, let the respirator fall away from your face and drop into waste bin
9. Wash hands with soap and water for 20 seconds with antibacterial soap

Appendix B

Decontamination of couches and other equipment¹

Decontamination of reusable non-invasive care equipment should be undertaken after suspected or known contamination.

Principle of decontamination

Equipment must be **cleaned** first, then **disinfected**.

Step 1 – Thorough cleaning with water and a neutral detergent, or disposable detergent wipes, to remove substances such as dust, soiling and organic matter, along with a large proportion of micro-organisms. Follow manufacturers' instructions and use suitable cleaning products in line with local policy.

Step 2 – Disinfection by use of chemicals to reduce the number of viable micro-organisms to a level that is not harmful to health.

Equipment needed

- PPE; disposable plastic apron and single-use non-sterile gloves
- Clean, colour-coded bucket (unless you are using disposable detergent wipes)
- Colour-coded cloth or disposable detergent wipes
- Cleaning trolley
- General-purpose detergent or general surface cleaner (unless you are using disposable wipes)
- Non-abrasive cloth (if you are cleaning a mattress)
- Disposable disinfectant wipes – for mattress cleaning.

The procedure

- Wash your hands, put on an apron and a pair of gloves (Fig 1).

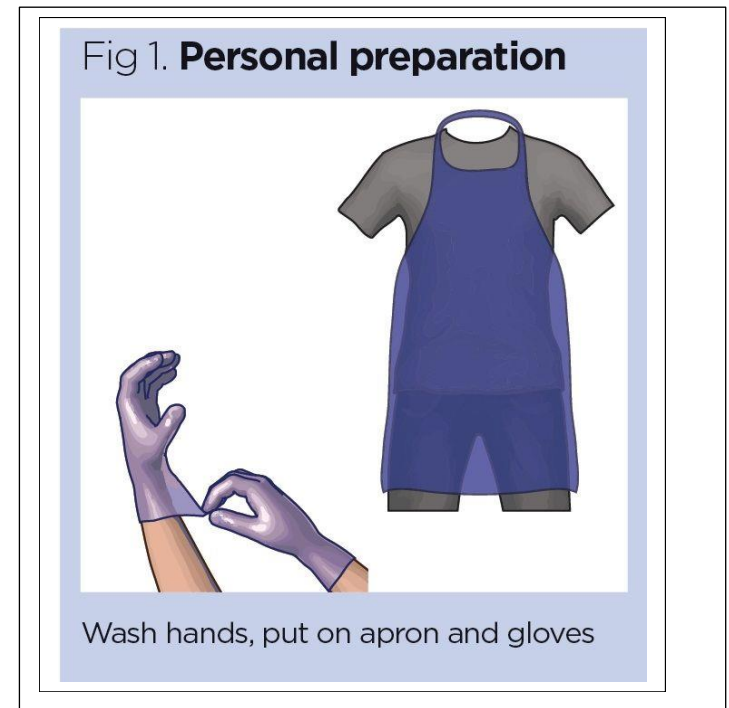
¹ Based on; Wigglesworth N (2019) Infection control 1: decontamination of non-invasive shared equipment. *Nursing Times* [online]; 115: 3, 18-20.
<https://www.nursingtimes.net/clinical-archive/infection-control/infection-control-1-decontamination-of-non-invasive-shared-equipment-02-03-2019/>
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- If not using disposable wipes, prepare the cleaning solution in the bucket according to the manufacturer's guidelines and place the bucket on a cleaning trolley.
- Raise or lower the couch to a convenient height.
- If damp dusting, dampen or rinse the cloth in the cleaning solution. If using detergent wipes, take a wipe from the container.
- Clean from top to bottom, working downwards to the base and wheels (Fig 2a). If damp dusting, turn the cloth regularly and rinse regularly in the cleaning solution; change the cleaning solution when it becomes soiled. If using wipes, replace when they become dry or soiled.
- Take care to clean the edges and undersides of surfaces after cleaning the tops.
- If cleaning the mattress, wipe the impermeable cover clean using an S-shaped motion (Fig 2b) and non-abrasive cloth. Turn the mattress and clean the underside, then clean all the edges. Change the cleaning solution and cloth when soiled or wipes when soiled or dry. Allow the mattress to dry, then wipe all surfaces with a disinfectant wipe.
- When the couch and mattress are dry, replace any items that were removed before cleaning commenced.
- Lower or raise the couch to its original position.
- Dispose of the cloths or wipes and cleaning solution.
- Clean and dry the bucket according to local policy.
- Remove the apron and gloves. Wash your hands.
- Document that cleaning has taken place according to local policy.

Fig 2. Cleaning a hospital bed and mattress



Diagrams courtesy of Public Health England



Appendix C

PPE – Donning diagrams

Donning or putting on PPE

Before putting on the PPE, perform hand hygiene. Use alcohol handrub or gel or soap and water. Make sure you are hydrated and are not wearing any jewellery, bracelets, watches or stoned rings.

- 1** Put on your plastic apron, making sure it is tied securely at the back.

- 2** Put on your surgical face mask, if tied, make sure securely tied at crown and nape of neck. Once it covers the nose, make sure it is extended to cover your mouth and chin.

- 3** Put on your eye protection if there is a risk of splashing.

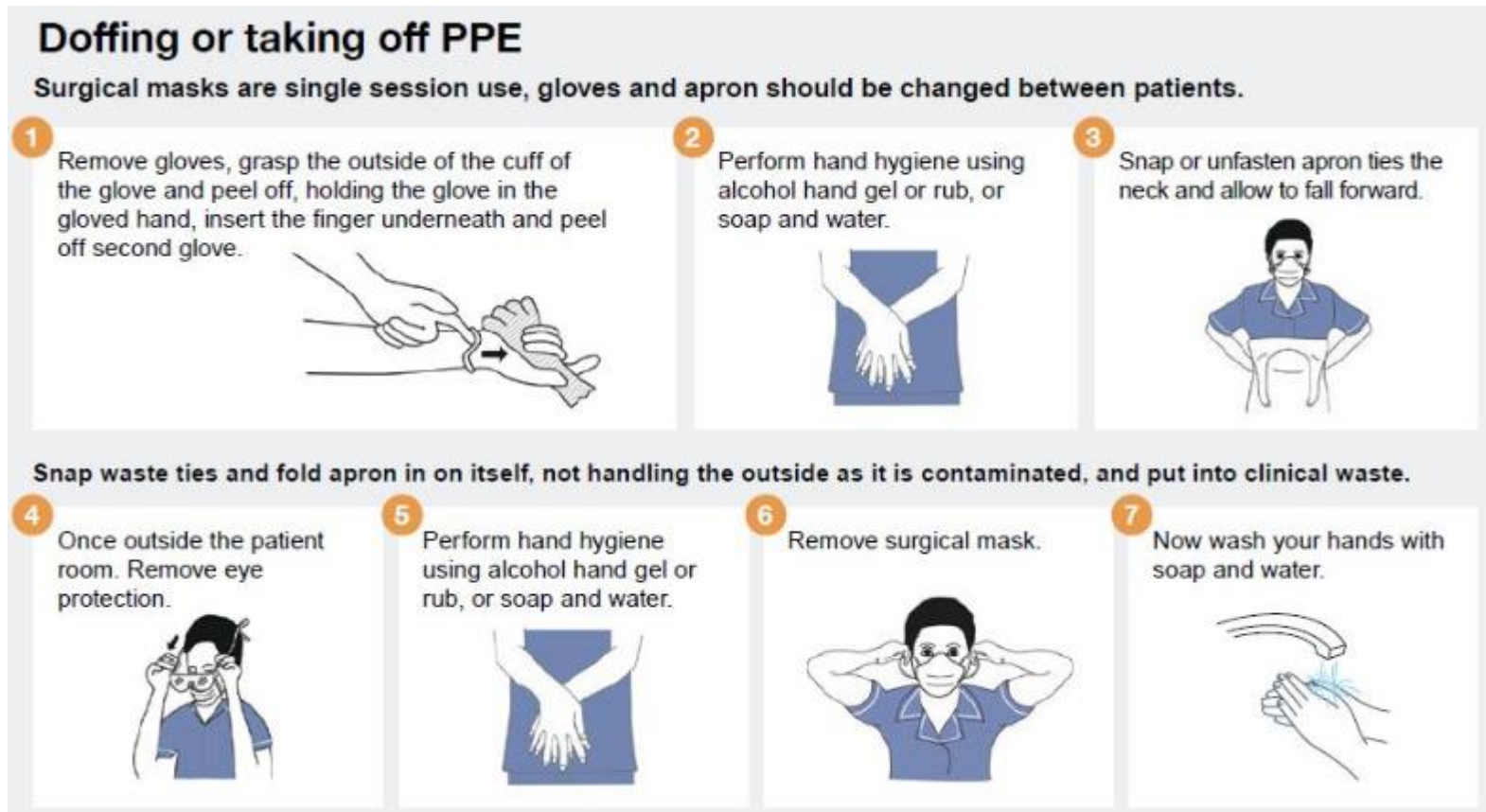
- 4** Put on non-sterile nitrile gloves.

- 5** You are now ready to enter the patient area.


Diagrams courtesy of Public Health England

Appendix D

PPE – D – PPE – Doffing (Removal) diagrams



Diagrams courtesy of Public Health England

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Appendix E

Facial hair and FFP3 respirators safe usage

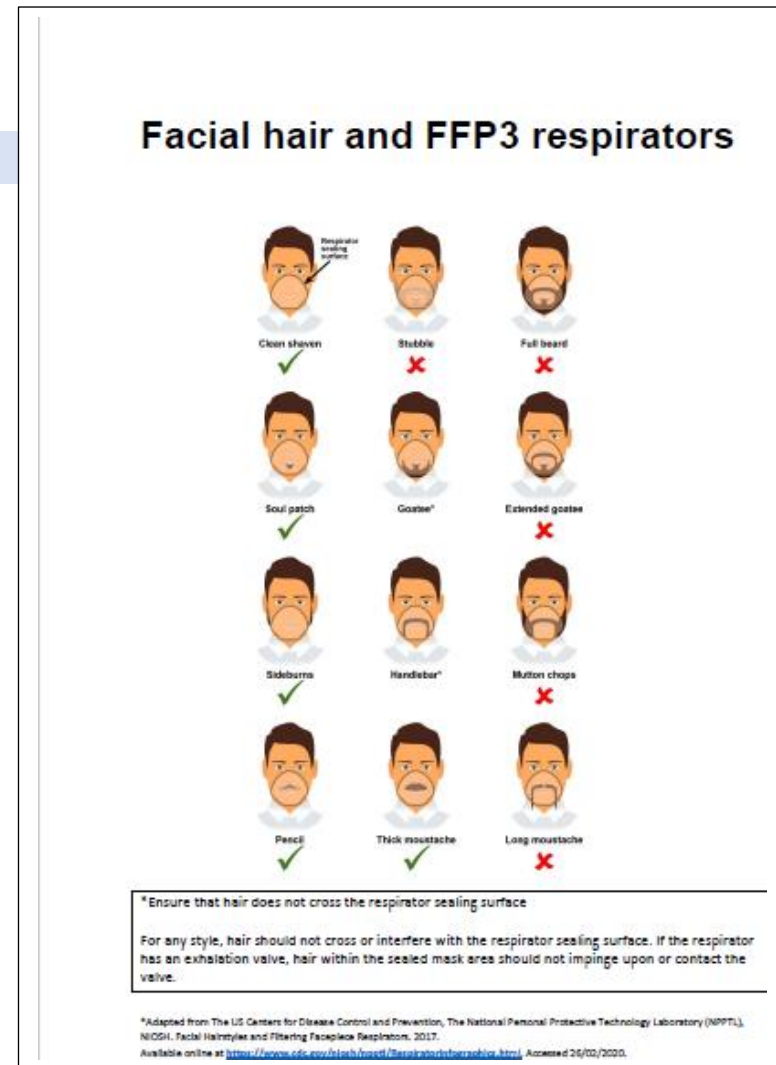


Diagram adapted from The US Centres for Disease Control and Prevention, The National Personal Protective Technology Laboratory (NPPTL), NIOSH. Facial Hairstyles and Filtering Face piece Respirators. 2017. Available online at <https://www.cdc.gov/niosh/npptl/RespiratorInfographics.html>. Accessed 26/02/2020.

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Appendix F

RCR and SCOR - Poster - Personal protective equipment advice for imaging department and teams – Imaging Departments

https://www.rcr.ac.uk/sites/default/files/radiology_ppe_poster_a3.pdf?utm_source=twitter&utm_medium=social&utm_term=radiology_ppe_pdf&utm_campaign=covid19

<https://www.rcr.ac.uk/posts/tailored-ppe-guidance-posters-imaging-and-cancer-teams>

Personal protective equipment advice for imaging departments and teams

CoR THE COLLEGE OF RADIOGRAPHERS **RCR** The Royal College of Radiologists

General contact with confirmed or possible COVID-19 cases

Aerosol Generating Procedures or High Risk Areas

X-ray, CT, MRI, nuclear imaging, fluoroscopy, ultrasound, portable X-ray with close patient contact (within 2 metres)

Staff working in the imaging department: not in close patient contact (more than 2 metres) mask only – no need to wear apron and gloves

Consider eye protection if the patient is coughing and ask the patient to wear a mask if they are able to

Imaging department room when performing aerosol generating procedures (AGPs)

Portable imaging in a higher risk acute care area e.g. HDU/ ITU/ Resus/ wards with non-invasive ventilation/ any area where AGPs regularly performed. Some IR cases

IR sutures, biopsies, drainages and line insertions but not AGPs as above but use a fluid resistant surgical mask, not an FFP mask

Eye protection for close patient contact

Eye protection for AGPs or High Risk Areas

Fluid resistant surgical mask

Filtering surgical respirator

Disposable apron

Long sleeved fluid resistant gown

Gloves

Gloves

Clean your hands before and after patient contact and after removing some or all of your PPE

Clean all the equipment that you are using according to local policies

Use the appropriate PPE for the situation you are working in (General / AGPs or High Risk Areas)

Take all your PPE safety

Take breaks and hydrate yourself regularly

For more information on infection prevention and control of COVID-19 please visit: www.gov.uk/government/publications/well-in-how-to-avoid-covid-19-infection-prevention-and-control

*In the context of sustained community COVID-19 transmission, seasonal use of PPE for **all patients** is recommended.

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Appendix G

RCR and SCOR - Poster - Personal protective equipment advice for imaging department and teams – Oncology Departments

https://www.rcr.ac.uk/sites/default/files/oncology_ppe_poster_a3.pdf?utm_source=twitter&utm_medium=social&utm_term=ppe_oncology_pdf&utm_campaign=covid19

<https://www.rcr.ac.uk/posts/tailored-ppe-guidance-posters-imaging-and-cancer-teams>

Personal protective equipment advice for oncology departments and teams

CoR THE COLLEGE OF RADIOGRAPHERS **RCR** The Royal College of Radiologists

General contact with confirmed or possible COVID-19 cases

- Eye protection to be worn at all times
- Fluid resistant surgical mask
- Disposable apron
- Gloves

Aerosol Generating Procedures or High Risk Areas

- Eye protection eye shield, goggles or visor
- Fitting respiratory respirator
- Long sleeved fluid resistant gown
- Gloves

Chemotherapy
Radiotherapy
Outpatient clinics
Acute oncology
with close patient contact (within 2 metres)

Staff working in the oncology department
not in close patient contact
(more than 2 metres) mask only - no need to wear apron and gloves

Consider eye protection if the **patient is coughing** and ask the patient to wear a mask if they are able to

Performing an **aerosol generating procedure (AGP)** for example nasendoscopy

Working in a higher risk acute care area for example a high-dependency unit (HDU)/intensive therapy unit (ITU)/wards/wards with non-invasive ventilation

Brachytherapy
under spinal anaesthetic - as above but with a fluid resistant surgical mask, not an FFP mask

Wash your hands before and after patient contact and after removing some or all of your PPE
Clean all the equipment that you are using according to local policies
Use the appropriate PPE for the situation you are working in (General / AGPs or High Risk Areas)
Take all your PPE safely
Take breaks and hydrate yourself regularly

For more information on infection prevention and control of COVID-19 please visit:
www.gov.uk/government/publications/what-an-covid-19-control-is-a-fection-prevention-and-control

*In the context of sustained community COVID-19 transmission, occasional use of PPE for **all patients** is recommended.

COVID-19 - ISRRT Response Document - appropriate and safe use of Medical Imaging and Radiation Therapy with infection control measures considered in addition to standard radiation protection procedures. April 2020 – Version 1