



THE UNITED REPUBLIC OF TANZANIA

**MINISTRY OF HEALTH, COMMUNITY
DEVELOPMENT, GENDER, ELDERLY AND
CHILDREN**

**STANDARD OPERATING PROCEDURES FOR
IMAGING PATIENTS DURING THE COVID-19
PANDEMIC IN TANZANIA**

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ABBREVIATIONS

AFRA	-	African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology
BMC	-	Bugando Medical Centre
CT	-	Computed Tomography
CXR	-	Chest X-Ray
IAEA	-	International Atomic Energy Agency
IPC	-	Infection Prevention and Control
ISRRT	-	International Society of Radiographers and Radiological Technologists
KCMC	-	Kilimanjaro Christian Medical Centre
MUHAS	-	Muhimbili University of Health and Allied Sciences
MoHCDGEC	-	Ministry of Health, Community Development, Gender, Elderly and Children
MRIPC	-	Medical Radiology and Imaging Professionals Council
ORCI	-	Ocean Road Cancer Institute
PPE	-	Personal Protective Equipment
SOPs	-	Standard Operating Procedures
TARA	-	Tanzania Association of Radiographers
TARASO	-	Tanzania Radiology Society

FOREWORD

As the outbreak continues to evolve, Tanzania may be considering options to prevent introduction of the disease to new areas or to reduce human-to-human transmission in areas where COVID-19 virus is already circulating. Public health measures to achieve these goals may include quarantine at home for mild cases when the need arise, which involves the restriction of movement or separation of healthy individuals who may have been exposed to the virus, from the rest of the population, with the objective of monitoring symptoms and the early detection of cases.

On the other hand, Diagnostic Imaging has been a tool used frequently in cases where there is a COVID-19 suspect and/or confirmed patient. Due to this scenario the Government is putting forward Standard Operating Procedures (SOPs) on how Diagnostic imaging in the form of X-Ray, CT and other advanced imaging modalities can be used safely for the purpose of confirming or ruling out COVID-19 in clients.

Need for adherence and compliance by Imaging Professionals to Infection Prevention Control (IPC) measures, procedures and protocols before, during and after imaging patients with suspected or confirmed COVID-19 patients in order to protect imaging professionals and other staff, clients and accompanying relatives as well as the public.

The SOPs have been carefully developed to guide Radiology and Imaging Professionals in the following areas:

- 1) Imaging modalities and reporting, of which different imaging modalities are explained for the purpose of ensuring available resources are used efficiently and effectively.
- 2) Necessary IPC measures which will ensure safety is maintained by health providers, clients and suspected and/or confirmed COVID-19 patients.
- 3) SOPs for safe imaging of a suspect or confirmed COVID-19 case, including duties before, during and after procedures. This provides Technologist functions, patient considerations, and equipment/imaging room considerations.
- 4) An inside look on the risks of personnel, and

- 5) Additional recommended resources, which can be used in furthering the knowledge and competencies of Professionals.

With this in mind, I would wish to urge all Medical Radiology and Imaging Professionals to utilize the SOPs properly and where necessary to ensure that all concerned people including patients are well informed on the risks and precautions needed in conducting Imaging procedures during the era of COVID-19 and other emerging pandemics.


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1. BACKGROUND

COVID-19 (Corona Virus Disease 2019) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as 2019 novel coronavirus (2019-nCoV), a species of coronavirus. The first cases were seen in Wuhan, China in December 2019 before spreading globally to be recognized as a pandemic March 2020[1].Tanzania, recorded its index case in mid March 2020 [2], at the time of finalizing these standard operating procedures (SOPs), 480 cases and 16 deaths had been confirmed [3], stressing need to revisit and revise Infection Prevention Control (IPC) practices during imaging of patients.

PURPOSE

The purpose of this SOP;

- a. To formulate practicable standard Procedures and recommendations during imaging of suspected or confirmed COVID-19 patients within our local resource limited settings, based on local and international procedures including experience.
- b. To maintain radiologic diagnostic, radiotherapy treatment and interventional support for the entirety of the hospital and health system.

RATIONALE

Need for adherence and compliance by Imaging Professionals to IPC measures, procedures and protocols before, during and after imaging patients with suspected or confirmed COVID-19 patients in order to protect imaging professionals and other staff, clients and accompanying relatives as well as the public.

2. STANDARD OPERATING PROCEDURE FOR PERFORMING CHEST X-RAY

Majority of cases demonstrate normal chest radiographs when mild or early during the course of disease. When abnormal, bilateral and/or multi-lobar involvement is common, acute respiratory distress syndrome (ARDS) features are also common.

Radiographer must ensure, imaging on COVID-19 patients only when imaging will impact management of patient's care, mobile radiography and special room must be used whenever possible.

The following are pre, during and post standard procedures for Radiographer to consider performing Chest Examination Procedure;

TABLE 1: X-Ray Examinations and Infection Prevention Control

CXR Exam and Covid-19 control	Radiographer task	Patient consideration	Equipment and Imaging room
Preparation	<ul style="list-style-type: none"> i) Patients and staff use the main department entrance and do not enter the department without permission. ii) Do not allow patients to wait in the waiting room for long periods, adapt social-distance, appointment. ii) Portable radiography Chest X-ray is recommended to be done at isolation room/ward depends with Hospital resource. v) To Confirm medical exposure has been justified avoiding rescheduled v) Disinfect - wash hands. -Don PPE appropriate for the clinical task, Put surgical mask/N-95, long water resistant gown, gloves and eye protection. 	<ul style="list-style-type: none"> i) Patient to wear a mask wherever possible. ii) To controlled arrival and departure of patients and escort staff in the radiology department. 	<ul style="list-style-type: none"> i) Disinfection and Decontamination with appropriate Infection disease control eg spirit to the following equipment; <ul style="list-style-type: none"> - X-ray table or Vertical Bucky. - Mobile X-ray machine with DDR detector or CR cassettes. - DDR/CR detector to be placed in a protective bag.
During Exam	<ul style="list-style-type: none"> (i) Preferably work in pairs with one radiographer, facilitate contact/non-contact technique. (ii) The patient is placed facing the improvised cassette holder/wheel chair inside the isolation room. (iii) A double-plastic bagged x-ray cassette placed under the thorax for CXR. (iv) For supine radiography, cover the X-ray couch with disposable paper. (v) Radiographer should indicate optimal positioning adjustments from a 	<ul style="list-style-type: none"> (i) Patient continues to wear mask. 	<ul style="list-style-type: none"> (i) X-ray generator and mobile control screen knobs must be used with gloves (ii) X-ray couch to be covered with single use paper per patient. (iii) Working in pairs in X-ray room the generator console keyboards, mouse and exposure control panel are considered clean.

	<p>distance of minimum 1 meter.</p> <p>(vi) After exposure, the radiographer disinfects the cassette outer bag and brings the cassette by the door of the room.</p> <p>(vii) Radiographer disinfects the inner bag, removes the cassette and then for film/image processing. Afterward, the plastic bags are appropriately disposed.</p> <p>(viii) Don't take off mask, Disinfect hands with hand sanitizer before you enter the console area i.e. before touching the keyboard, mouse, the control console etc.</p>		<p>(iv) 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.</p>
<p>Post procedure</p>	<p>(i) 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.</p> <p>(ii) Ensure decontamination-disinfection of Vertical Bucky or X-ray couch, contact points (sponges, fixing pads, and knobs) and cassette by the use of a suitable disinfectant.</p> <p>(iii) Remove your gown, gloves carefully FIRST, followed by Mask avoiding contamination.</p> <p>(iv) Disinfect - Wash hands well.</p> <p>(v) Return to radiography department, complete any post imaging tasks to be reported by Radiologist.</p>	<p>(i) Patient keeps mask</p>	<p>(i) Disinfection- Decontamination-Deep Cleaning by the use of a suitable disinfectant in accordance to Hospital Infectious Diseases Control to:</p> <ul style="list-style-type: none"> - X-ray couch. - Vertical Bucky. - to the knobs, keyboards, console, mouse, phones, pagers etc. as they are also contaminated. <p>(ii) The room should be vacant for a time, (2hrs), before the next patient is examined to facilitate the exchange of the air in the X-ray room/Isolated room.</p>

2.1 WORK – FLOW STEPS



1. Confirm patient details on receiving request ,
Fix time, availability of staff, check downtime for
portable CXR machine from log book



2. At Anteroom: Enter patient details
Wear lead apron followed by PPE as per
guidelines



3. Placing X-ray detector in plastic sleeve and placing
detector into portable machine or carried by
accompanying shifting staff



4. Make sure patient is masked and adequate
space for machine manoeuvring



5. Placing detector behind the patient and
sanitise the gloved hands



6.Center the intensifier and sanitise the gloved
hands



7. Step-out, then expose and check for adequacy of exposure



8. Take detector from patient, place sleeved detector on floor and sanitise the gloved hands



9. Remove detector from sleeve, place in machine's detector stand, discard the sleeve and sanitise the gloved hand



**10. Move machine into anteroom, sanitise gloved hands Clean and disinfect the machine and detector
At last remove PPE as per institute guidelines**

3. STANDARD OPERATING PROCEDURE (SOP) FOR CHEST CT-SCAN PROCEDURES

CT should not be used to screen for or as a first-line test to diagnose COVID-19. CT should be used sparingly and reserved for hospitalized, symptomatic patients with appropriate and specific clinical indications for CT. Appropriate infection control procedures should be followed before scanning such patients.

Radiologists and Radiographers should familiarize themselves with the CT appearance of COVID-19 infection according to the current reporting systems in order to be able to identify findings consistent with infection in patients imaged for other reasons.

The following are pre, during and post standard procedures for Radiographer to consider performing CT-Scan Chest Examination Procedure:-

TABLE 2: CT Examinations and Infection Prevention Control

CT Exam and Covid-19 control	Radiographer task	Patient consideration	Equipment and Imaging room
Preparation	<ul style="list-style-type: none"> (i) Same Preparation procedure of CXR (i, ii, iii, iv) must be performed (ii) For confirmed COVID-19 patients, don a N95/FFP2 mask, use gloves, full face mask and gown. 	<ul style="list-style-type: none"> (i) Same procedure of CXR(i, ii) 	<ul style="list-style-type: none"> (i) Same procedure of CXR(i) -CT SCANNER (immobilization straps, positioning sponges) - Automatic Contrast Medium Injector (IV connectors).
During	<ul style="list-style-type: none"> (i) Same during procedure of CXR (i, ii, iii) performed. (ii) Perform examination/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 Ethical Code. 	<ul style="list-style-type: none"> (i) Patient continues to wear mask 	<ul style="list-style-type: none"> (i) CT Gantry controls and CM injector control screen keys must be used with gloves (ii) CT couch is covered with single use paper per patient. (iii) CT console keyboard, mouse and exposure pad, CM injector remote control are considered clean s, must be used without gloves
Post procedure	<ul style="list-style-type: none"> (i) When entering the CT scanner room (dirty area), wear disposable gloves. (ii) The Same Post procedure of CXR (i, ii, iii, iv, v) 	<ul style="list-style-type: none"> (i) Patient keeps mask 	<ul style="list-style-type: none"> (i) The Same Post procedure of CXR(i)

3.1 Other Modalities

Same measures are taken for patients imaged **MRI, ultrasound, Radiotherapy or nuclear medicine procedures** where imaging/treatment is performed in the respective imaging suites. Patient transfers are restricted in order to limit staff exposures and to conserve PPE.

4. Risks to Personnel

Imaging plays a critical role in assessing the severity and disease progression in COVID-19 infections, thus majority of the patients may require imaging at some point. Infected aerosols or droplets may land on objects and surfaces in the Radiology Department. These surfaces may include the X-ray table, CT gantry and patient couch, ultrasound probes and cables, computer keyboards and mouse. People become infected with COVID-19 by touching these contaminated objects or surfaces, then touching their eyes, nose or mouth [4].

In case of staff contact with a suspected or confirmed case, the following protocol is recommended:

- 4.1** Report exposure to the Immediate Supervisor and the COVID-19 rapid response team.
- 4.2** Report other exposed members to the COVID-19 rapid response team.
- 4.3** COVID-19 rapid response team will advise and guide management according to the updated Hospital Guidelines in line with the National Guidelines and Policy

5. Additional Recommended Resources

- 5.1** Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC). Case Management and Infection Prevention and Control Subcommittee. Standard Operating Procedures (SOPs) for Case Management and Infection, Prevention and Control. March 2020.
<https://www.moh.go.tz/en/guidelines>
- 5.2** Risk assessment and management of exposure of health care workers in the context of COVID-19: interim guidance, 19 March 2020.
<https://apps.who.int/iris/handle/10665/331496>
- 5.3** Infection-prevention-control-for-the-care-of-patients-with-2019-nCoV-healthcare-settings
https://www.ecdc.europa.eu/sites/default/files/documents/Infection-prevention-control-for-the-care-of-patients-with-2019-nCoV-healthcare-settings_update-31-March-2020.pdf
- 5.4** 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. <https://www.isrrt.org/full-guideline-protective-measure>
- 5.5** AFOMP Guidelines on Radiation Oncology Operation during COVID-19. [https://www.acpsem.org.au/Tenant/C0000020/AFOMP-RT-guideline-COVID-April4\(002\).pdf](https://www.acpsem.org.au/Tenant/C0000020/AFOMP-RT-guideline-COVID-April4(002).pdf)
- 5.6** COVID-19-Radiology-Resources
<https://www.acr.org/Clinical-Resources/COVID-19-Radiology-Resources>

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