RADIOLOGY				
NO	**INDICATOR**	**DIMENSION**	**STANDARD**	**SECONDARY DATA REPORTING FREQUENCY**
1	Percentage of patients with waiting time of ≤ 60 minutes for commencement of ultrasound examination	Timeliness	≥ 90%	3 Monthly
2	Percentage of reject-retake images	Effectiveness	≤ 5%	3 Monthly
3	Percentage of patients developed significant contrast media extravasation following CT examination with intravenous (IV) contrast media	Safety	≤ 0.5%	3 Monthly

<table>
<tr><th>Discipline</th><th>:</th><th>Radiology</th></tr>
<tr><td>Indicator 1</td><td>:</td><td>Percentage of patients with waiting time of ≤ 60 minutes for commencement of ultrasound examination</td></tr>
<tr><td>Dimension of Quality</td><td>:</td><td>Timeliness</td></tr>
<tr><td>Rationale</td><td>:</td><td>1. The aim of this indicator is to improve patient satisfaction.
2. For hospitals to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening the policy of outpatient services in hospital, apply Queuing Theory and having contingency plans.</td></tr>
<tr><td>Definition of Terms</td><td>:</td><td>Waiting time: Time of appointment/ registration (whichever is later) to the time the ultrasound examination is commenced.</td></tr>
<tr><td>Criteria</td><td>:</td><td>Inclusion:
1. All patients with scheduled appointments.

Exclusion:
1. Patients without prior appointments/ unscheduled.
2. Unprepared cases that contributed to waiting time of > 60 minutes.

Sampling:
Using an average of total patients seen in a month, 25% of the patients in each month need to be sampled for this indicator. Data is to be collected for 1 week (5 consecutive working days) in every month.</td></tr>
<tr><td>Type of indicator</td><td>:</td><td>Rate-based process indicator</td></tr>
<tr><td>Numerator</td><td>:</td><td>Number of sampled patients with waiting time of ≤ 60 minutes for commencement of ultrasound examination</td></tr>
<tr><td>Denominator</td><td>:</td><td>Total sample of patients who underwent ultrasound examination</td></tr>
<tr><td>Formula</td><td>:</td><td>Numerator x 100 %
Denominator</td></tr>
<tr><td>Standard</td><td>:</td><td>≥ 90%</td></tr>
<tr><td>Data Collection & Verification</td><td>:</td><td>1. Where: Data will be collected in the Radiology Department/ Unit.
2. Who: Data will be collected by Officer/ Paramedic/ Radiographer in-charge of the department/ unit.
3. How to collect: Data is suggested to be collected from appointment record book/ ultrasound procedure book/ RIS/ PACS.
4. How frequent: Monthly data collection within department.
Validated summarised secondary data to be sent 3 monthly to Quality Unit of the respective hospital for monitoring.
PVF to be sent 6 monthly to Quality Unit of hospital.
5. Who should verify:
<table>
<tr><td></td><td>Prepared by</td><td>Validated by</td></tr>
<tr><td>Primary Data</td><td>Officer/ Paramedic/ Nurse in-charge</td><td>Supervisor of the person who prepared the data</td></tr>
<tr><td>Secondary Data</td><td>Officer/ Paramedic/ Nurse in-charge</td><td>Head of Department/ Specialist in-charge</td></tr>
</table>
PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.</td></tr>
<tr><td>Remarks</td><td>:</td><td></td></tr>
</table>

Discipline	:	**Radiology**
Indicator 2	:	**Percentage of reject-retake images**
Dimension of Quality	:	Effectiveness
Rationale	:	1. This indicator is a reflection of many of the processes carried out in an imaging department. 2. This indicator has great relevance as it reflects on almost all the processes in the department namely radiographic techniques, performance of X-ray machines, film/ image processing and storage of films. 3. Internationally, the percentage of reject-retake images is quoted to be around 4-11% in average.
Definition of Terms	:	**Radiographs**: Films produced using conventional (non-digital) system. **Radiographic images**: Images acquired using digital (DR/ CR) system. **Rejected images:** Any radiographs or images acquired during radiographic examinations/ radiological procedures that has no diagnostic value and has to be repeated/ retake. This refers to radiographs or images of patients that are assessed by the radiographer or the requesting clinician/ radiologist to be clinically unacceptable. **Image retake**: Repeat exposure to the patient due to earlier non-diagnostic image or rejected by the radiologists and clinicians.
Criteria	:	**Inclusion**: 1. All radiographs/ radiographic images done in the facility including mobile X-rays. 2. Images rejected by radiographers, radiologist and clinicians. **Exclusion**: 1. Images discarded due to testing purposes. 2. Images used for quality assurance procedures.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of rejected radiographs/ radiographic images
Denominator	:	Total number of radiographs/ radiographic images made
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiology Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Radiographer in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from radiographs/ radiographic images record book. 4. **How frequent**: Monthly data collection within department. Validated summarised secondary data to be sent 3 monthly to Quality Unit of the respective hospital for monitoring. PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: | | Prepared by | Validated by |

		<table><tr><td>Primary Data</td><td>Officer/ Paramedic/ Nurse in-charge</td><td>Supervisor of the person who prepared the data</td></tr><tr><td>Secondary Data</td><td>Officer/ Paramedic/ Nurse in-charge</td><td>Head of Department/ Specialist in-charge</td></tr></table> PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	**:**	**Radiology**
Indicator 3	:	**Percentage of patients developed significant contrast media extravasation following CT examination with intravenous (IV) contrast media**
Dimension of Quality	:	Safety
Rationale	:	1. CT with intravenous (IV) contrast media is a commonly performed procedure in the Radiology Department. Contrast extravasation is a known complication which occurs more frequently with power injection. It may also occur with hand injections. 2. Large volumes (usually > 50mls) of contrast media are known to induce significant tissue damage. However, smaller volumes may also have adverse outcomes especially in paediatric patients. 3. Contrast media are known to induce significant tissue damage such as: a) Skin ulceration. b) Soft-tissue necrosis. c) Compartment syndrome. 4. Thus, the incidence should be kept to the minimum.
Definition of Terms	:	**Contrast media extravasation**: Contrast leaks into the tissue around the vein where the IV needle is inserted. **Significant contrast media extravasation**: Volume > 50mls which necessitate referral to the primary team or volumes not more than 50mls but requiring referral to the primary team.
Criteria	:	**Inclusion**: 1. All CT examinations performed involving IV contrast media. **Exclusion**: 1. Patients with abnormal circulation in the limb to be injected (e.g. atherosclerotic peripheral vascular disease, diabetic vascular disease, Raynaud's disease, venous thrombosis or insufficiency, or prior chemo/radiation therapy or extensive surgery (e.g. axillary lymph node dissection)).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients developed significant contrast media extravasation following CT examination with IV contrast media
Denominator	:	Total number of patients undergo CT examination with IV contrast media
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.5%

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2. Who: Data will be collected by Officer/ Paramedic/ Radiographer in-charge of the department/ unit.
3. How to collect: Data is suggested to be collected from CT scan record book.
4. How frequent: Monthly data collection within department.
Validated summarised secondary data to be sent 3 monthly to Quality Unit of the respective hospital for monitoring.
PVF to be sent 6 monthly to Quality Unit of hospital.
5. Who should verify:
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<tr><td>Remarks</td><td>:</td><td>*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.</td></tr>
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