Improving Reporting of High Radiation Dose Fluoroscopy Events to Meet New Joint Commission Requirements

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**Aim Statement**

The goal is to improve the detection rate of high radiation dose fluoroscopy events by using a semi-automated reporting process.

**Background**

- Complex procedures in interventional radiology often result in high fluoroscopic doses.
- Patients receiving high doses of radiation require monitoring to assess for skin injury.
- As of January 2019, the Joint Commission mandates recording fluoroscopy dose information, establishing radiation dose investigation thresholds, and following patients when thresholds are exceeded.
- Our original process required the operator to self-report high doses and was unreliable. For example, some events would go unreported until the patient is seen in clinic.

**Baseline Conditions**

- Intentional staff were expected to note cumulative air kerma (CAK) for each case in the radiology information system (RIS).
- If CAK exceeded a threshold of 5 Gy, a skin injury dose risk estimate form was completed and faxed to the Environmental Health and Safety Office (EHSO).
- Peak skin dose (PSD) was calculated by a medical physicist using additional information about the acquisitions from the fluoroscopy unit.
- Due to periodic deletion, delays in reporting would result in loss of information needed to calculate skin doses.
- Cumulative patient doses were difficult to track when using manual tracking of doses.

**Baseline number of high dose events over time**

![Graph showing baseline number of high dose events over time]

**Results**

- Dose tracking challenging to implement—some equipment required software upgrades or working with manufacturer to enable data transfer.
- Dose tracking system detected dose trends excessive dose trends resulting in the discovery of a malfunctioning unit which was decommissioned until repaired.
- Increased number of events detected; more so far in first 3 quarters this year than previous years.
- RIS audit revealed 7 cases missed by dose tracking software due to sending errors and from older equipment that could not send data.

**Analysis**

**Actions/Tests of Change**

<table>
<thead>
<tr>
<th>Test of Change</th>
<th>Date</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added capable equipment to dose tracking system which generates alerts for high doses</td>
<td>5/2016-12/2017</td>
<td>Increased number of cases detected.</td>
</tr>
<tr>
<td>Added cumulative dose alert 6 month dose &gt;15 Gy</td>
<td>12/2017-</td>
<td>No events during this time period</td>
</tr>
<tr>
<td>Reviewed monthly reports of required manually recorded CAK in (RIS)</td>
<td>1/2019 -</td>
<td>Discovered 7 high dose events that were missed due to sending errors or older equipment</td>
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</tbody>
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**Reflection/Follow-up**

- Dose tracking system revealed underreporting of excessive dose events.
- Audit of manual entry in RIS was a remediation step to improve reporting reliability.
- Automated alerts enabled us to detect trends which revealed malfunctioning equipment earlier.
- Automated recording of doses also allowed tracking of cumulative patient exposure.
- Dose tracking planned for fluoroscopy units in other procedure areas (Cardiology) which continue to rely on faxed forms.