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

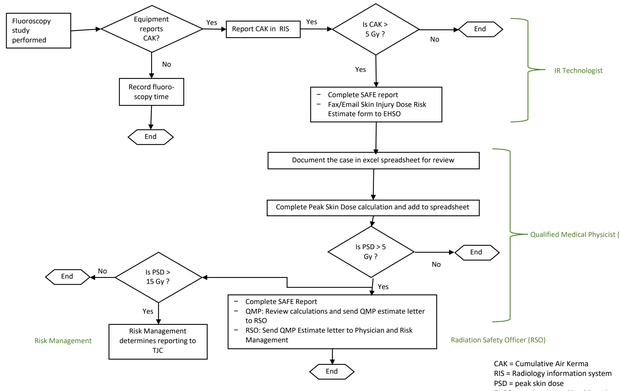
- Complex procedures in interventional radiology often result in high fluoroscopic doses.
- Patients receiving high doses of radiation require monitoring to assess for skin injury.
- As of January 2019, the Joint Commission mandates recording fluoroscopy dose information, establishing radiation dose 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

- Interventional 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.

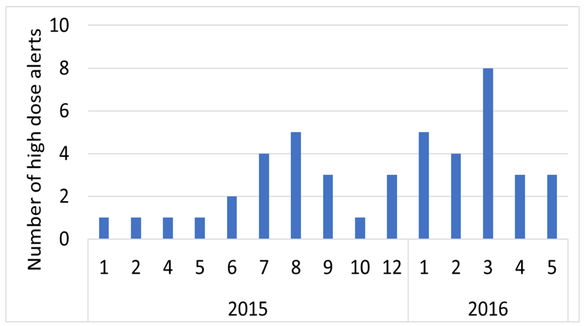
Analysis

Baseline process



CAK = Cumulative Air Kerma
RIS = Radiology information system
PSD = peak skin dose
EHSO = environmental health and safety

Baseline number of high dose events over time



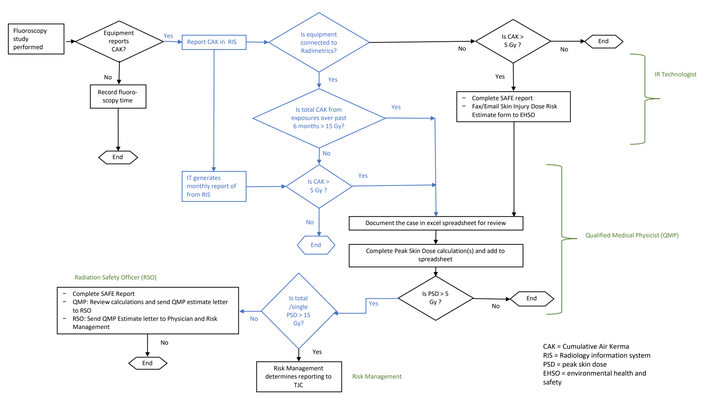
Measures

Number of high radiation dose cases detected by faxed forms, dose tracking software, and monthly audit of manual entered dose in the RIS.

Actions/Tests of Change

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

Revised Process (new steps in blue)



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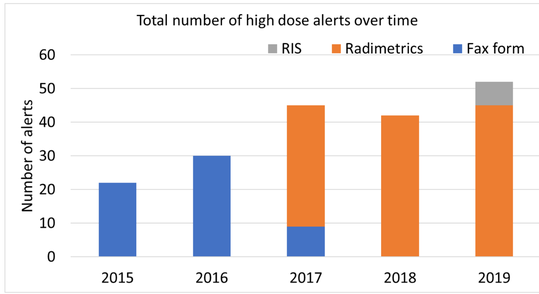
Results

- 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.



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.