

Purpose: The purpose of this study was to develop six-sigma practices towards the enhancement of patient safety in an electronic, quality checklist (QCL) driven, multi-center, paperless radiation medicine department.

Methods: A baseline QCL process map (QPM), stratified into consultation through treatment-completion stages was incorporated into the Mosaiq Oncology-Information-Systems platform. A cross-functional quality management team conducted Quality-Function-Deployment (QFD) and DMAIC [Define/Measure/Analyze/Improve/Control] six-sigma exercises with a focus on patient safety. QPM procedures were ranked in order of patient-safety risk with Failure-Modes-and-Effects-Analysis (FMEA). Quantitative metrics for a grouped set of nine highest-risk procedures were established. These included procedural delays, associated standard deviations and Z-scores. Custom Crystal reports to extract QCL procedural data from Mosaiq were created.

Baseline performance of the QPM was established over the previous year of usage. Data driven analysis led to simplification, standardization and refinement of the QPM with standard deviation, slip-day reduction and Z-score enhancement goals. In addition to standard-deviation reduction, a No-Fly-Policy (NFP) for patient safety was introduced at the control DMAIC phase, with a process-map interlock imposed on treatment initiation in the event of FMEA-identified high risk tasks being delayed or not completed. The NFP was introduced in a pilot study with specific stopping rules and the same metrics used for performance assessments. A custom root-cause-analysis (RCA) database was deployed to monitor patient safety events.

Results: Relative to the baseline phase, average slip days and standard deviations for the risk-enhanced QPM procedures improved by over three-fold factors in the NFP phase. Z-scores improved by 25%. A trend for proactive delays instead of reactive hard stops was observed with no adverse effects of the NFP.

Conclusions: With complex technologies, resource-compromised staff and pressures to hasten treatment initiation, the use of six-sigma driven process interlocks may mitigate patient safety risks as demonstrated in this study.

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No Conflicts of Interest