Automated Quality Control Monitoring of Diagnostic Imaging Equipment Using a Cloud-Based Compliance Platform

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Purpose:
Automation was used to improve compliance with MRI and CT quality control (QC) requirements and equipment performance.

Materials and Methods:
QC data were recorded in a cloud computing solution (CCS) (ZetaSafe, SEER, Charleston, SC) for CT and MRI QC per ACR Quality Control Manuals. Technologists entered QC results for each test in real-time. Notifications were sent to medical physicists for missing QC items and out-of-limit results. Additional notification thresholds were set for values which were within limits but borderline. Physicists followed up to determine the reason for each missed or out-of-limit test and implement corrective action. Over a two-year period, monitoring was deployed for 37 CT scanners and 30 MRI scanners at 28 sites. All items requiring corrective action were held open until follow-up was complete.

Results:
Completion rates increased from 60-70% during the first month to 95% or greater by the fourth month. Rates were sustained over a two-year period. Medical physicists eliminated review of QC records during annual survey site visits, saving 30-60 minutes onsite per scanner per year. State inspection citations for incomplete CT QC records, frequent before the use of CCS, were eliminated after deployment. Follow-up on one CT scanner resulted in a major repair that was completed during a one-day scheduled downtime; this would have required two to three days of downtime if the problem had resulted in a down scanner before detection.

Conclusion:
Recording QC results in a CCS enables automation of QC monitoring, periodic reporting, and real-time notifications of items requiring follow-up and corrective action. This reduces the time required for medical physicist review; shortens the time from occurrence to detection to correction of problems; improves compliance with QC requirements; and enables failure prediction. Storage of QC data in a CCS simplifies reporting.