

Radiation Dose Management

The Problem

Traditionally, the Radiology department had a heterogeneous set of CT scanners across BIDMC, BID-Needham, Chestnut Hill and BID-Milton, each operating independently without external monitoring. This made it difficult to provide consistency in dose management (setting dose thresholds) among all systems, to compare performance to national indexes and to meet and document accreditation and regulatory requirements.

Aim/Goal

By designing and implementing a common external tracking system we aim to move from a system that requires a radiologist or technologist to recognize cases where dose thresholds are thought to be anomalous to a system that automatically identifies both systemic and individual anomalies, that compares all scanner dosage levels with industry benchmark values, and that documents and ensures the meeting of accreditation and regulatory requirements.

The Team

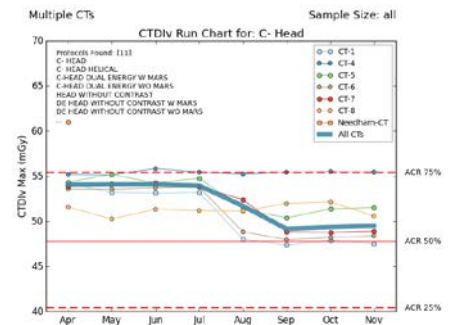
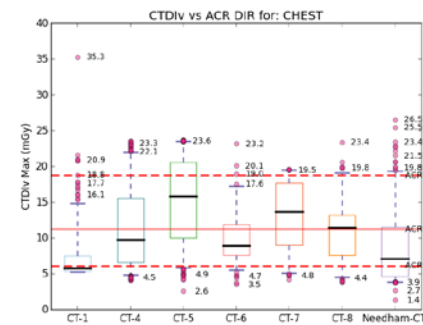
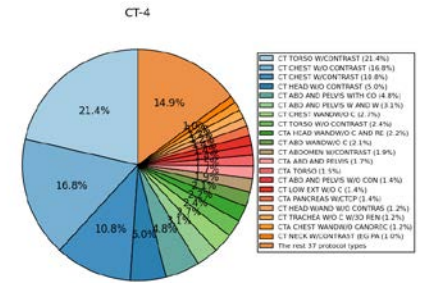
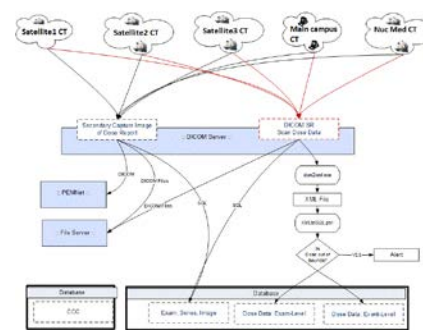
- Matthew Palmer, PhD, Manager, Medical Imaging Physics
- Da Zhang, PhD, DABR, Medical Imaging Physicist
- Carol Wilcox, RTR CT, Advanced Imaging Technologist
- Tim Parritt, BS, RTR CT, Technical Director
- Larry Barbaras, BS, Senior Programmer/Analyst
- Olga Brook, MD, Associate Director of CT Services

The Interventions

- Install server based software to catalog dose data
- Program all CT scanners to send dose reports to server
- Create reporting tool to extract data from server
- Evaluate and present data at CT Quarterly QA meeting

The Results/Progress to Date

- Identified protocols where dose levels could be reduced without affecting image quality (chest pain, CT colon, CTA)
- Increased dose levels on brain perfusion studies to improve quality



Figures show system architecture (top left), frequency distribution of studies by protocol for a single scanner in the network (top right), radiation dose distribution for chest protocols performed across the network (bottom left), and the response to a change in the C-head protocol effected in July 2015.

Lessons Learned

- Each vendor's scanner has different capabilities in presenting structured reporting and dose reduction features
- How to separate true triggers from data anomalies and known protocol deviations
- How to manage the system on a timely basis

Next Steps/What Should Happen Next:

- Continue to work towards a timelier review of triggers
- Look for additional opportunities to manage CT protocols across network
- Expand system to other diagnostic modalities such as fluoroscopy



Beth Israel Deaconess Medical Center



A teaching hospital of Harvard Medical School

THE SILVERMAN INSTITUTE
For Health Care Quality and Safety

For More Information Contact
Tim Parritt, BS, RTR, CT Director
tparritt@bidmc.harvard.edu