The physicist's to-do list:
Benchmarks, alerts and reports

Ingrid Reiser, PhD DABR
The University of Chicago

Outline

Tasks of medical physicists in the dose review process
1. Institutional benchmarks
2. External benchmarks
3. Identifying outliers and generating alerts
4. Generating reports

Task 1: Institutional benchmarks

Joint Commission
Elements of Performance
PC.01.03.01 A 25: Establish diagnostic CT imaging protocols ... which address key criteria including ... expected radiation dose index range
PI.02.01.01 A 6: Review and analyze incidents where dose from diagnostic CT examination exceeds expected dose level
Principles of CT Radiation Dose Process Control

• Principle 2: Consistent Optimization Requires a Target Outcome ("set point")
  i.e., institutional benchmark
Principles of CT Radiation Dose Process Control at the Local Level

- Principle 3: CT Image Quality, Not Patient Dose, Constrains the Optimization Problem and Determines the Target Outcome

The first step is to determine what is meant by "adequate diagnostic image quality."


Principles of CT Radiation Dose Process Control at the Local Level

- Principle 8: Verification of Process Control Is Greatly Enhanced by Proper Framing and Graphical Display

Benchmarking studies that use TCM?


Order or imaging protocol??

Task 2: Comparing to external benchmarks

Joint Commission
Element of Performance for PI.02.01.01 A6:
Review and analyze incidents where dose from diagnostic CT examination exceeds expected dose level
Compare these incidents to external benchmarks


External benchmarks

Reference Values for Diagnostic Radiology: Application and Impact

RVs are used to compare radiation doses from individual pieces of radiographic equipment with doses from similar equipment assessed in national surveys.


External benchmarks

TYPICAL DOSE FOR TEMPORAL BONE CT?
Monitoring and reporting CT dose

Monitoring CT doses

- Effective tools needed
  - Graphics?
  - Automated reporting?
  - Action criteria/thresholds?

Task 3: Identifying outliers

Alerts

➢ When?
➢ Who?
➢ What?

Task 4: Creating reports

• KPI?
• Templates?

SD Times: Flexibility is critical for Big Data Analysis
Serving up “the right” data

Task 4: Creating reports

• Example uses:
  – Internal dose monitoring
  – Auditing

SD Times: Flexibility is critical for Big Data Analysis
Serving up “the right” data
**Auditing and sharing of best practices**

Optimization of radiation doses?


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**Task 4: Creating reports**

- Example uses:
  - Internal dose monitoring
  - Auditing
  - Hospital ranking (leapfrog 2018)

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**SD Times: Flexibility is critical for Big Data Analysis**

Not all hospitals are alike.
Task 4: Creating reports

- Example uses:
  - Internal dose monitoring
  - Auditing
  - Hospital ranking (leapfrog 2018)
  - Next?

Thank you
Hands-on workshop: Dose monitoring software

**Demonstrations of**
1. Creating institutional benchmarks
2. Comparing against external benchmarks
3. Identifying outliers and generating alerts
4. Generating reports

**Presenters:**
1. GE dose watch (Dave Miller)
2. IMALOGIX (Dan Steigerwalt)
3. PACSHealth (Steve Massey)
4. QAELUM DOSE (Niki Fitousi)
5. Radimetrics Enterprise Platform by Bayer Radiology (Carolyn Hohenberger)
6. SIEMENS teamplay (Peter Shen)