Projects in Practice Quality Improvement

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Disclosures

Bruce Thomadsen is the president of the non-profit Center for the Assessment of Radiological Sciences, and organization dedicated to improving the safety of radiotherapy.

Sharon White and Michael Yester have no conflicts to disclose.

Objectives

- Discuss the goal of practice quality improvement (PQI)
- Look into some example projects for radiotherapy physics

Program

- Michael: Some basics of PQI
- Sharon: Example project in nuclear medicine
- Bruce: Example projects in radiotherapy
- Michael: Example project in diagnostic imaging
- Discussion

Disclaimers

- The examples given are based on each presenter's best interpretation of the ABR PQI guidelines.
- The examples are suggestions only.
- The examples come with no warrantee, implicit or explicit.
- PQI projects should only be attempted by trained individuals.
- PQI projects should only be attempted by qualified medical physicists. Disputes regarding these presentations will be settled according to the laws of Wisconsin or Alabama. This presentation is intended for viewing by consenting adults. None of the presenters belong to subversive organizations. Buy low, sell high. A fool and his money are soon parted. A stitch in time saves nine. No shirt, no shoes, no service.

PQI for Radiotherapy Physics

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PQI Requirement

1 Project looking back at the last 3 years

PQI Parts

- Background: boiler plate
- Objective: to improve some part of the practice
- Program: overview of what should happen
- Procedures:
  - Metrics - required
  - Improvement Plan - steps in the procedure
  - Remeasure - repeat after change
  - Evaluation - did it help? Report

PQI Guidelines: Therapeutic Medical Physics

Project Examples

1. Category: Accuracy of Analyses and Calculations
2. Category: Safety for Patients, Employees and the Public
3. Category: Practice Guidelines and Standards

Let's look at the examples on the website.

MOC MP Therapeutic PQI Guidelines www.theabr.org ABR 2013

1. Category: Accuracy of Analyses and Calculations
Project: HDR Graphical Optimization

- Background: Yada yada yada
- Objective: Assess optimized cases
- Program: Compare DVH for 5 case among physics staff
- Procedures:
  - Metrics-As above
  - Improvement Plan-Discuss how best plans generated
  - Remeasure-Repeat necessary and check for improvement
  - Evaluation-Did it help? Report

2. Category: Safety for Patients, Employees and the Public
Project: Standardizing Physics Chart Checks

- Background: Need to standardize chart checks
- Objective: Uniformity of checks
- Program: Compare checks between staff and with TG 40; check how each staff compares for 2 mo
- Procedures:
  - Metrics-As above
  - Improvement Plan-Examine each checks utility, make master
  - Remeasure-Repeat for 2 mo using master
  - Evaluation-Did it help? Report

3. Category: Practice Guidelines and Standards
Project: Standardizing Dose Constancy Testing

- Background: Monthly unit QA
- Objective: Check compliance with standards
- Program: Compare consistency among staff
- Procedures:
  - Metrics-Collect data for 1 y do standard deviation (How about Statistical Process Control?)
  - Improvement Plan-Compare methods; establish optimum
  - Remeasure-Repeat for 6 mo using master
  - Evaluation-Did it help? Report

What Do We Notice?

1. Each project assumed multiple physicists at facility.
2. The proposals just test using the state of the practice, which many facilities already do.

Projects from Professional Societies: AAPM

1. Is there a clearly documented procedure for annual calibration, monthly QA, and daily output checks? (TG40 can be used as a guideline)

   - ○ No Record (Full TG51 not performed within the past year)
   - ○ Incomplete or Partial Records (Not all monthly or daily procedures performed or documented)
   - ○ Full Records

2. Is there documentation that indicates all physics instrumentation calibration and maintenance was performed in accordance with nationally recommended intervals?

   - ○ No Record
   - ○ Incomplete or Partial Records
   - ○ Full Records

3. Is there documentation that treatment machine(s) output calibrations are verified by an independent method? (RPC/RDS TLD, independent physicist's calibration)

   - ○ No Record
   - ○ Incomplete or Partial Records
   - ○ Full Records

4. Are there records to indicate geometric precision and mechanical integrity have been evaluated according to TG40 guidelines and intervals?

   - ○ No Record
   - ○ Incomplete or Partial Records
   - ○ Full Records

Projects from Professional Societies: AAPM

5. Is there a documented procedure to verify Treatment Planning System output and Monitor Unit calculations?

   - ○ No Record
   - ○ Incomplete or Partial Records
   - ○ Full Records

6. Are records well documented such that another Physicist, Reviewer, State or other inspector could easily understand and evaluate the quality management program at the facility?

   - ○ No Record
   - ○ Incomplete or Partial Records
   - ○ Full Records

7. Are initial reviews of patient charts, including dosimetry calculations and all relevant parameters, regularly performed by this physicist within three fractions or 10% of the dose?

   - ○ Review at treatment completion or not at all
   - ○ After three fractions or 10% total dose delivery
   - ○ Within three fractions or 10% total dose delivery

8. From a random sample of 10 patient charts, were all charts reviewed by the physicist (or designee) on a weekly basis?

   - ○ Charts not reviewed
   - ○ Charts reviewed, not on a consistent weekly basis
   - ○ Charts reviewed on a consistent weekly basis

Projects from Professional Societies: AAPM

Score	No.# of Members
5 out of 16	1
8 out of 16	1
9 out of 16	3
10 out of 16	11
11 out of 16	15
12 out of 16	26
13 out of 16	47
14 out of 16	56
15 out of 16	79
16 out of 16	234

Projects from Professional Societies: ACR

*Project is available only to QRRO-recognized institutions.

*Thanks guys!

So, What's a Good Project?

One could be setting up an incident reporting and learning system.

- Look at events over a year.
- Analyze the events and address "root causes."
- Look at the next year.
- Did it help?

For guidance, see 2013 AAPM Summer School book or

So, What's a Good Project?

Better could be participating in a national incident reporting and learning system.

- Analyze the incidents that you report.
- Compare your analysis with that from the system.
- See if your analyses improve over a year.
- Did it help?

So, What's a Good Project?

Read the TG-100 Report

- Learn how to perform risk assessments
- Use the technique to design QM for a process in your department.
- How does it compare with what you are doing?
- Easily doable by a single physicist.

TG-100 should be out this year. In the meantime, see the 2013 Summer School Text or Pawlicki et al. *Quality and Safety in Radiotherapy* (2010 Taylor & Francis)

Some More Projects

- Take one of the ASTRO whitepapers on QA in SBIR or IMRT or IGRT and put those into practice. As a follow-up, second project, assess if the QA has been followed or how much difference it has made.
- Establish statistical process control for your accelerator.* As a follow-up, second project, assess if the accelerator has been in control.

*2013 Summer School Text

Some More Projects

- Keep a record of the problems you find on initial chart checks over 6 mo. Sort them by type of failure. Analyze what changes in your procedures could address the problems. See if it made a difference over the next 6 mo. Similar to the second example above but only needs one physicist.
- With the radiation oncologist (you both can use this project) keep track of cases in rounds that had recommendations, whether the recommendations were looked into and made any improvements.

Summary

- You need not approach PQI with approach avoidance – it is not so bad.
- The projects need not cover long periods.
- Metrics are good (hey, we're scientists, after all) but they might only be binary: is something done?
- The goal is a project that improves something about your practice – we do that all the time.