The American College of Radiology

Dose Index Registry

ABR PQI Project Description

July 3, 2012

American College of Radiology
1891 Preston White Drive
Reston, VA 20191-4397
<table>
<thead>
<tr>
<th>Date</th>
<th>Description of Revisions</th>
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<tbody>
<tr>
<td>June 18, 2012</td>
<td>Original issue</td>
</tr>
<tr>
<td>July 3, 2012</td>
<td>Appendix A</td>
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<tr>
<td></td>
<td>Step 3 revised to allow for a change in optimization target</td>
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1. **Introduction**

This document describes how diplomates of the American Board of Radiology (ABR) can use the Dose Index Registry (DIR) towards the fulfillment of their Part IV Maintenance of Certification (MOC) requirements. DIR is a data registry that allows facilities to compare their CT dose indices to regional and national values. Information related to dose indices for all CT exams is collected, anonymized, transmitted to the American College of Radiology (ACR), and stored in a database. Participating facilities are then provided with periodic feedback reports comparing their results by body part and exam type to aggregate results. Data collected from the registry will be used to establish national benchmarks for CT dose indices.

Data for DIR are collected at the facility level, so participation will apply to all radiologists and medical physicists at a facility who choose to participate in the project. Participants in the project must be registered on the DIR website to receive credit for the project.

Participating facilities choose an exam type on which to base a Practice Quality Improvement (PQI) plan. The impact of the PQI plan is measured by comparing the facility’s target measure calculated during the baseline period to the same measure calculated during the post-improvement period.

2. **Data Collection and Analysis**

2.1 **Baseline Cycle**

The following steps describe the process for beginning the baseline cycle:

- Register for DIR participation online, on the National Radiology Data Registry website (nrdr.acr.org). This step includes entering the names and birth dates of all participating diplomates.
- Install software provided by the ACR on a facility workstation. The facility’s CT scanners must be configured to send dose index data to the workstation, which in turn transmits the data to DIR.
- Define a measure to be obtained.
- Establish a desired measurement target/goal.
- Estimate the predicted baseline measurement result.
- Notify the ACR of the diplomates’ intent to complete a DIR PQI project, as described in Section 3 below.
- Transmit data on all CT examinations performed at the facility for a period of six months. This period spans January 1 to June 30, or July 1 to December 31, of a specific year.

The following steps are performed at the end of the first six-month period:

- Collect baseline measurement summary data. This information is available in the semi-annual feedback report loaded to the DIR website every six months.
- Perform baseline data analysis.
- Develop and implement an improvement plan during the following six months.

2.2 **Post-Improvement Plan Cycle**

The following steps are performed before collecting data for the second cycle:

- Determine that the improvement plan has been successfully implemented.
- Reaffirm the measure to be obtained.
- Reaffirm the desired measurement target/goal.
- Estimate the predicted measurement result after implementation of the improvement plan.

The post-improvement plan cycle is completed as follows:
- Transmit data on all CT examinations performed at the participating facility for a period of six months. This period spans January 1 to June 30, or July 1 to December 31, of a specific year.
- Collect post-improvement measurement summary data. This information is available in the semi-annual feedback report loaded to the DIR website every six months.
- Perform post-improvement data analysis.
- Determine whether the group project has met its performance goal.
- Write a participant self-reflection statement.
- Attest to project completion in the ABR PQI Personal Data Base of each participant.
- Notify the ACR of project completion.

3. **Administrative**

The participating group must document the project according to ABR MOC requirements. An example is shown in Appendix A. The group also must submit the following information to the ACR:

At the start of the project:
- Information necessary to identify participants to the ABR (that is, name and date of birth). This information must be entered on the DIR website before the project begins (nrdr.acr.org).
- The six-month span in which baseline data will be collected.

After the improvement plan has been developed:
- The measure to be improved,
- The target measure,
- The six-month span in which assessment data will be collected, and
- A statement affirming that the diplomates have formulated the plan, and that it meets all MOC requirements.

After the improvement plan has been completed:
- A statement of how closely the target measure was approximated.

The ACR will verify that the facility has participated in DIR during the baseline and post-implementation data collection periods. If the facility has supplied the information listed above to the ACR, and has responded adequately to any requests for resolution of data anomalies, the ACR will notify the ABR and the facility by e-mail that the project has been successfully completed. Diplomates must sign on to their ABR Personal Database at www.abronline.org in order to officially attest to their participation in the project. The project cannot be repeated by the same participants for additional PQI credit.
Appendix A  

Example

American Board of Radiology

MOC Part 4: Practice Quality Improvement (PQI)

Group Participant PDSA (Plan-Do-Study-ACT) Checklist & Summary Record*

BASELINE PDSA CYCLE (Cycle #1)

(In Cycle #1, a topic is selected and baseline data gathered to compare with post-improvement plan data in Cycle #2.)

☐ Step 1: PLAN. Identify and Describe the Project (Group-Designed)

[GROUP MEETING #1]

○ Select a Topic:
  ■ On August 24, 2011 the Joint Commission issued a Sentinel Event Alert concerning the radiation risks of diagnostic imaging. To address this concern, our facility plans to monitor radiation dose indices for diagnostic exam procedures.

○ Define a Measure to be obtained:
  ■ Mean CTDIvol for a CT Head Without IV Contrast
  ■ While we intend to monitor dose indices for all exams, for the purpose of this PQI project we are focusing on CT Head Without IV Contrast

○ Establish a desired measurement target/goal (What does the group want it to be to achieve an appropriate standard of performance and/or patient care?):
  ■ Our target/goal is to be at or below the national average CTDIvol for a CT Head Without IV Contrast. The national average is the average CTDIvol of all facilities participating in the Dose Index Registry (DIR)

○ Estimate the predicted baseline measurement result (What does the group think it will be?):
  ■ We estimate that our mean CTDIvol for this exam will be 75mGy

☐ Step 2: DO. Baseline Measurement Summary

○ Number of Data Points collected:
  ■ 157 CT Head Without IV Contrast

○ Baseline Measurement Value calculated:
- Mean CTDIvol = 118 mGy (see plot)

### CT HEAD WITHOUT IV CONTRAST

**CTDIvol (mGy) per Exam**

<table>
<thead>
<tr>
<th>Summary metric</th>
<th>Facility Sample Facility</th>
<th>Location Northeast</th>
<th>Type Community Hospital-based</th>
<th>Region Northeast</th>
<th>DIR</th>
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<tr>
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<td>10</td>
<td>10</td>
<td>11</td>
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<td>146</td>
<td>118</td>
<td>118</td>
<td>118</td>
<td>146</td>
</tr>
</tbody>
</table>

- Step 3: STUDY. Baseline Data Analysis
  
  **[GROUP MEETING #2]**
  
  - How did the baseline results compare to the predicted results?
  
    The baseline results were much higher than predicted
  
  - How did the results compare the desired target goal?
  
    The baseline results were much higher than the DIR average of 76 mGy
  
    - If baseline results *did not* meet the target:
    - Cite Potential Contributing Factors and Root Causes:
      1. We found that in a small number of cases, exams that were labeled as CT Head Without IV Contrast were in fact CT Perfusion studies.
2. We also found that some patients were being given the wrong protocol for a CT Head Without IV Contrast resulting in a higher than expected CTDIvol.

3. We found that the late-night technologist was sometimes adjusting the protocol incorrectly at the scanner

4.

5. 
   - Proceed to Step 4.

If the baseline results unexpectedly did meet or exceed the desired goal, return to Step 1 to select a new project and begin a new PDSA process. Complete Steps 9 and 10 as appropriate. Alternatively, review the baseline results for other exam types whose dose indices are not optimized. Continue the project with Step 4, using one of these exam types as a target for optimization.

☐ **Step 4: ACT. Improvement Plan Development**

   - Discuss and adopt actions to address Contributing Factors and Root Causes
     - Review and adjust processes for assigning exam descriptions
     - Review and edit all of our protocols for CT Head Without IV Contrast
     - Develop and implement training courses for our CT technologists regarding our protocols and the effect of changes to the protocol on radiation exposure

   - **Construct** an Improvement Plan based on these findings and a process by which to implement the plan. Determine an appropriate time interval after plan implementation to allow for the plan to have its desired effect. Then proceed with re-measurement to assess improvement in Cycle #2.

   **Improvement Plan:**

   - Review and adjust processes for assigning exam descriptions
     - Select a committee to review process
     - Committee meets and provides recommendations
     - Recommendations are implemented

   - Review and edit all of our protocols for CT Head Without IV Contrast
     - Select a committee to review protocols
     - Committee meets and revises protocols
- Recommendations are implemented

- Develop and implement training course for our CT technologists regarding our protocols and the effect of changes to the protocol on radiation exposure

**POST-IMPROVEMENT PLAN PDSA CYCLE (Cycle #2)**

*(In Cycle #2, re-measurement is performed after implementation of the Improvement Plan developed in Cycle #1.)*

☐ **Step 5: PLAN**

  - Determine that the Improvement Plan constructed in Cycle #1 has been successfully implemented.
    
    - All steps of the Improvement Plan has been successfully implemented
  
  - Reaffirm the Measure to be obtained.
    
    - Mean CTDIvol for a CT Head Without IV Contrast
  
  - Reaffirm the desired measurement target/goal (What does the group want it to be?):
    
    - Our target/goal is to be at or below the national average CTDIvol for a CT Head Without IV Contrast. The national average is the average CTDIvol of all facilities participating in the Dose Index Registry (DIR).
  
  - Estimate predicted measurement result *AFTER* implementation of the Improvement Plan (What does the group think it will be?):
    
    - We think that it will be 76mGy which was the DIR average on the last report.

☐ **Step 6: DO. Repeat Measurement Summary**

  - Number of Data Points Collected:
    
    - 157 CT Head Without IV Contrast
  
  - Re-measurement Value obtained:
    
    - Mean CTDIvol = 65 mGy (see plot)
Step 7: STUDY. Re-measurement Data Analysis

[GROUP MEETING #3]

- How did the measurement results compare to the predicted results?
  - Our results were better than predicted (predicted=76 mGy; actual=65 mGy)
- How did the results compare the desired target goal?
  - Our results were better than the target goal (target=DIR average of 76 mGy; actual=65 mGy)
- If results did not meet the target:
  - Re-evaluate the Improvement Plan by determining any problems with the plan design or its implementation, including issues preventing root causes from being addressed effectively.
• Has the target/goal been set too high? Is an adjustment in order?
• Is the measure the correct one?
• Are modifications to the improvement plan warranted?
• Proceed to Step 8.
  o If results did meet or exceed the target: Proceed to Step 8

☐ Step 8: ACT. PROJECT DECISION POINT
   [GROUP MEETING #4]
   o Determine whether the group project has met its performance goal.
     • Yes, we have met the target goal
     • If “yes,” adopt the improved practice process as a standard and proceed to a new PQI Project.
     • If “no,” proceed with additional PDSA cycle(s) as needed to adjust the improvement plan or the measure target/goal. Continue the existing project either until the goal is met or an end-point is otherwise determined. (Any improvement identified through this process is an indication of success and in some cases, the magnitude of improvement in the project measure achieved may be all that can be reasonably expected.)

☐ Step 9: Participant Self-Reflection Statement:
   (This brief narrative completes the quality improvement process. The PQI participant records his/her reflections on the project, improvements in quality/safety to which it has led, and its overall value to the practice or patient care.)

We feel that this exercise has led to an improvement in both our ability to monitor dose indices as well as in the level of radiation exposure that our patients are receiving. We will continue to monitor our dose indices through the DIR and will expand the review of our protocols to include all exams.

☐ Step 10: Each Group PQI Participant Must Attest to Project Completion his/her ABR Personal Data Base **
   *This optional form is contains the structural elements for GROUP PQI Project process record keeping. Separate recording of data elements of a project should be attached to this form. DO NOT SEND this form to the ABR, unless requested to do so during an audit. This form is appropriate for GROUP PQI efforts.
Appendix B  Abbreviations

ABR  American Board of Radiology  
ACR  American College of Radiology  
CT  Computed tomography  
MOC  Maintenance of Certification  
PQI  Practice Quality Improvement