Patient Radiation Overdose

Do You Know Your True Risk?

Christopher T. Baird, MS, DABMP, LMP

2 August 2012
Evolving Technology, Regulatory and Safety Needsé

Technology
- Rapid evolution of imaging equipment
- Dose reduction features and software
- Exposure alerting systems
- ACR Dose Registry
- Independent radiation dose tracking software and measurement solutions

Regulatory
- Accreditation requirements
- State regulations:
  - California
  - Massachusetts
  - New Jersey
  - Pennsylvania
- CARE Bill (dose alerting)
- Congressional Hearings

Safety
- Joint Commission Sentinel Event Alert on Radiation Dose (Issue 47, 8/24/11)
- NCRP Report 168 - Radiation Dose Management for Fluoroscopy (7/21/10)
- Consumer Reports on Health – “Do you need that CT scan?” (9/11)
- New York Times Articles
- National initiatives - Image Gently, Image Wisely, Step Lightly, etc.

...leaves healthcare leaders wondering “What Should I Do About Radiation Dose???”
# Patient Radiation Safety – A Growing National Concern

## Awareness
- 24 New York Times Articles to Date
- Consumer Reports on Health – “Do you need that CT scan?” (9/11)
- National initiatives for dose optimization
  - “Image Gently”
- FDA 2010

## Local Intervention
- HCA Radiation Safety Initiatives
- Individual hospital patient dose monitoring programs, particularly in regulated states
  - Memorial Sloan Kettering
  - Mass General
  - Northshore LIJ

## State Regulations
- Emerging state-by-state regulations:
  - NY (Pt 16)
  - Mass
  - New Jersey
  - Pennsylvania
  - California

## Industry Self-Regulation
- CT Dose Check Alerts
- Clinical DSS/Training
- SOPs/nomenclature
- ACR National Dose Registry
- Informed Consent

## Government Authority
- Congressional Hearings
- CARE Bill
- NCRP Report 168—Radiation Dose Mgmt for Fluoro-Guided Intervventional Procedures (7/21/10)
- TJC Sentinel Event Alert on Radiation Dose (Issue 47, 8/24/11)
100 YEARS OF RADIATION BURNS

Radiation burns are documented prior to WWI

Isn’t it time to STOP!
Major Concerns

**ÅCT, Interventional**

- Top concern is acute skin injury
- Increased cancer risk
Opportunities for dose management are numerous, fragmented and can be overwhelming.

Responsible Imaging enables clients to transform many fragmented dose management opportunities into a comprehensive picture, and focus on those that are complimentary and address your evolving needs.
Education Strongly Suggested!

Non-Radiologist Fluoroscopy Users need Education!

American College of Radiology

*ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures*

“Each facility should have a policy for credentialing all physicians who perform fluoroscopy”

State of California Bill Requires Accreditation

With accreditation comes an increased level of education among staff and physicians!

Food and Drug Administration

Cites education and awareness as necessary components to minimizing patient dose!

International Atomic Energy Agency

Believes there is a direct link between education and dose. Education must be a priority in the management of patient exposure!

American College of Cardiology introduces *Imaging in Focus* program
Credentialing Physician Fluoro Users

- Who is Credentialed
- Wagner & Archer Program
- Competency
- Utilize content for facility specific competency
Totals: Procedures vs. Cumulative Dose

## Relative % to Total Procedures
- Over 500 million diagnostic ionizing radiation procedures are done in the USA annually. CTs make up 16% of total.
- Conventional represent 76% of the total.
- Radionuclide represent 4% of the total.
- Interventional represent 4% of the total.

## % Contributed to Cumulative Dose
- However, conventional procedures contribute only 11% to the total cumulative dose of radiation received by patients.
- CTs contribute 49%.
- Radionuclide procedures contribute 26%.
- Interventional procedures contribute 14%.

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Three modalities are 89% of the problem — CT alone is nearly 50%
A complimentary publication of The Joint Commission

Issue 47, August 24, 2011

Radiation risks of diagnostic imaging

Diagnostic radiation is an effective tool that can save lives. The higher the dose of radiation delivered at any one time, however, the greater the risk for long-term damage. If a patient receives repeated doses, harm can also occur as the cumulative effect of those multiple doses over time. Conversely, using insufficient radiation may increase the risk of misdiagnosis, delayed treatment, or, if the initial test is inadequate, repeat testing with the attendant exposure to even more radiation. The risks associated with the use of ionizing radiation in diagnostic imaging include cancer, burns and other injuries. X-rays are officially classified as a carcinogen by the World Health Organization’s International Agency for Research on Cancer, the Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention, and the National Institute of Environmental Health Sciences.
TJC Sentinel Event 47: Background

- U.S. population's total exposure to radiation has almost doubled over the past 2 decades
- No knowledge of past radiation procedures
- Estimated incidence of cancer related to CT: 0.02% – 0.04%
- Focused on diagnostic radiation
TJC Sentinel Event 47: Background

CMS requires facilities providing advanced imaging procedures in non-hospital, freestanding centers to be accredited.

California SB 1237
- Facilities that furnish CT services must be accredited by July 1, 2013
- Patient CT dose must be documented
- Dose errors must be reported to patients and physicians
<table>
<thead>
<tr>
<th>TJC Sentinel Event 47: Suggested Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Right Test</strong></td>
</tr>
<tr>
<td>- Can other imaging techniques such as ultrasound or MRI be used?</td>
</tr>
<tr>
<td>- Educate referring physicians on appropriate use of CT</td>
</tr>
<tr>
<td><strong>Right Dose</strong></td>
</tr>
<tr>
<td>- Adhere to ALARA and Image Gently</td>
</tr>
<tr>
<td>- Review dosing protocols</td>
</tr>
<tr>
<td>- Record the dosage or exposure</td>
</tr>
<tr>
<td><strong>Effective Processes</strong></td>
</tr>
<tr>
<td>- Password-protect protocols</td>
</tr>
<tr>
<td>- Involve the RSO in patient safety. Include the RSO as a member of the Patient Safety Committee</td>
</tr>
<tr>
<td>- Ensure physicians receive proper training</td>
</tr>
<tr>
<td><strong>Safe Technology</strong></td>
</tr>
<tr>
<td>- Audit equipment for potential risks</td>
</tr>
<tr>
<td>- Have equipment inspected by a Qualified Medical Physicist</td>
</tr>
<tr>
<td><strong>Safety Culture</strong></td>
</tr>
<tr>
<td>- Refer to applicable TJC standards</td>
</tr>
</tbody>
</table>
What is a Medical Physicist?

- MS or Ph.D. in medical physics, physics, radiation biology, or a related discipline and training in clinical medical physics
- Certified by the American Board of Radiology (ABR) or the American Board of Medical Physics (ABMP)
- Licensed professional in Texas
- Typically *not* credentialed by hospital
The Role of a Medical Physicist

Assure the safe and effective delivery of radiation to achieve a diagnostic or therapeutic result as prescribed by the physician:

- Contribute to the effectiveness of radiological imaging procedures, therapeutic techniques, and assure radiation safety
- Develop improved imaging techniques
- Design treatment plans
- Monitor equipment and procedures
## RSO Principle Duties

<table>
<thead>
<tr>
<th>TASK</th>
<th>RSO</th>
<th>DESIGNATE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ONGOING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Film badge orders</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Personnel monitoring history verification</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Responsibility of a film badge user verification and maintenance</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Investigating reportable fluoroscopic events</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Importing nanodot shipment sensitivities</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Initial training &amp; quiz for CT competency</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Chair Radiation Safety Committee</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Perform and/or oversee the maintenance required for the radioactive material’s license to remain compliant with the facility’s license application and applicable state/federal regulations.</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Competency new individuals for daily fluoro QA</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Analyze, interpret and initiate action for all quality data as it pertains to equipment, personnel, and patients.</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>WEEKLY</strong></td>
<td></td>
<td></td>
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<tr>
<td>microStar patient review (exporting spreadsheet or visual at unit)</td>
<td>•</td>
<td>•</td>
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<tr>
<td><strong>MONTHLY</strong></td>
<td></td>
<td></td>
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<tr>
<td>microStar monthly QA</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Review of CT monthly audit form</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Monthly/Quarterly film badge review</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Director’s monthly dosimetry badge time-out audits</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>RSO’s monthly badge user usage audit</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Review monthly fluoro QA logs for each room</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
Delegation of Authority

Authority vehicle for Radiation Safety Officer

- Covers Radiation Safety Program actions including
  - Initialization
  - Recommendations
  - Corrections
  - Compliance
  - Adds the oversight of ionizing radiation equipment
Reporting Structure

Radiation Safety Committee & Officer Reporting Structure

Board of Directors

- Medical Executive Committee
- Patient Safety and Quality Council
- Safety Committee
- Radiation Safety Committee

Chief Operating Officer

Radiation Safety Officer

Imaging Director
Surgery Director
Cath Lab Director
Other (department with radiation emitting equipment)

Effective Date: 08/11/10
Radiation Safety Committee

- Required Membership
- Quorum
- Meeting Minute Requirements
- Record Retention
- Expanded Membership
- Meeting Frequency
Administrative Commitment

- Regulatory compliance
  - ALARA program
  - Quality Management Program
  - Safe use of Radioactive Materials
  - Written Procedures
  - Authorized User compliance
  - Posting requirements
  - Loss of or missing Radioactive Materials
Radiation Protection CT

Education

- Operators need to understand the concept of Computed Tomography Dose Index (CTDI\(_{\text{vol}}\))
  - What it means and how to apply that information
  - CTDI, in mGy, is related to possible skin burns

- Operators also need to understand the concept of Dose Length Product (DLP)
  - DLP has implications for patient effective dose
  - which may relate to possible long term cancer risks but we have no baselines for this effect
Physicist Equipment Specific Inspections
- Imaging

- Annual Inspections of High output Fluoroscopic Units
- As Requested Evaluations
- Communication of Results
- Maintenance of Records
- Use of the Daily Phantom provides confirmation that radiation doses are essentially unchanged since the previous Medical Physics testing
Physicist Equipment Specific Inspections - Therapy

- Annual Calibration/QA of Linear Accelerator
- Monthly QA of Linear Accelerator
- Weekly Review of Dose Constancy
- Use of the Daily Phantom provides confirmation that radiation doses are essentially unchanged since the previous calibration

- Evaluation of Imaging Equipment
What is Radiation Dose Management?

Radiation Dose Management is the process by which a facility decides to give a dose and, if giving dose, make sure that dose is optimized.

- **Patients**
  - What procedures did the patient have (in the past)?
  - What dose did they get from past procedures?
  - What impact will the next procedure likely have on cumulative dose?
  - How do I identify patients with high exposure?

- **Equipment**
  - What are the best practices for managing my equipment?
  - Are my protocols optimized?

- **Operators**
  - Are my operators adequately trained on equipment they use?

- **Radiation Exposure Tracking (Radimetrics):**
  - Systematically track patient radiation exposure (organ dose, effective dose, and cumulative dose)
  - Review individual dose reports before and/or after a study
  - Radiation exposure alerts before and/or after study
  - Contribute to dose registry

- **Medical Physics (GPS - Responsible Imaging):**
  - Data analysis to understand key contributors to high dose, identify/ prioritize opportunities for improvement, and track impact of dose optimization initiatives
  - Aid in implementing targeted radiation safety initiatives, such as staff training/credentialing, protocol optimization, best practices, policies & procedures, equipment QA, etc.

- **Independent Dose Measurement / Verification**
Responsible Imaging
Actionable Radiation Dose Management Solutions, Measurable Outcomes

Responsible Imaging Radiation Safety Program

- **MEASURE**: Tools and processes to systematically track patient and occupational radiation exposure

- **ANALYZE**: Independent assessment to identify highest-priority opportunities to optimize patient radiation dose, or minimize occupational exposure at your facilities

- **OPTIMIZE**: Implement tailored radiation safety "best practices" to address evolving technology, safety and regulatory needs
Implementation of Responsible Imaging at a Mid-Sized Hospital

- Gap assessment based on recommended action from Joint Commission Sentinel Event Alert identified five high-priority needs
- GPS partnered with the client’s clinical team to develop a tailored action plan and implement best practices to address specific needs

<table>
<thead>
<tr>
<th>Gaps Identified</th>
<th>Deliverables (LANDAUER and GPS)</th>
<th>Client Actions / Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation Safety Policies &amp; Procedures</td>
<td>Audit of Imaging policies and procedures and resulting playbook for radiation safety policies that reflect best practice principles</td>
<td>One to 3 meetings with leadership team to review current policies and make modifications</td>
</tr>
<tr>
<td>CT Protocol Review</td>
<td>Lead Committee to Optimize existing CT protocols, and established low-dose protocols</td>
<td>Form committee (Radiologist, CT Spvsr, MP). Meet monthly/qtrly for &gt;6 months</td>
</tr>
<tr>
<td>Credentialing of Fluoroscopy Users</td>
<td>1-hour, online radiation safety training program for all MDs and staff with Fluoro privileges</td>
<td>Coordination with Education Department, and one hour of time for Fluoro users</td>
</tr>
<tr>
<td>Accreditation</td>
<td>ACR accreditation for all advanced imaging equipment, including CT, fluoroscopy and nuclear medicine</td>
<td>Access to all advanced imaging equipment, ½ - 1 day per machine</td>
</tr>
<tr>
<td>Occupational Exposure Tracking and Monitoring</td>
<td>Periodic review of occupational exposure history using existing Landauer badge data</td>
<td>Routine compliance with dosimeter use and return to Landauer</td>
</tr>
<tr>
<td>Patient Dose Tracking and Monitoring</td>
<td>Implement Radimetrics™ dose tracking system, establish key metrics to track performance, and routine monitoring of dose metrics</td>
<td>Integration of Radimetrics with PACS system. Input on key metrics.</td>
</tr>
<tr>
<td>Patient &amp; Referring MD Education</td>
<td>Medical Grand Rounds presentation, education brochures and FAQs</td>
<td>Approval of brochures, and access to referring MDs</td>
</tr>
</tbody>
</table>
### Responsible Imaging Implementation Timeline

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Implement Best Practices</th>
<th>Measure Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify metrics to track performance</td>
<td>Implement tailored best practices to address high-priority gaps</td>
<td>Track metrics identified during phase I ton a routine basis of measure outcomes of Responsible Imaging program</td>
</tr>
<tr>
<td>Establish baseline measurements</td>
<td>Review and approval by internal committees (e.g., CT protocol review committee, medical advisory board, etc.)</td>
<td></td>
</tr>
<tr>
<td>Perform gap assessment, based on baseline measurements and input from all stakeholders</td>
<td>Internal communication and education on Responsible Imaging best practices</td>
<td></td>
</tr>
<tr>
<td>Identify high-priority gaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop action plan to address high-priority gaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliverables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline metrics</td>
<td>Medical Grand Round presentation</td>
<td>Processes and/or systems for tracking key metrics</td>
</tr>
<tr>
<td>Gap analysis</td>
<td>Educational brochures and FAQs for patients and/or referring physicians</td>
<td>Periodic review of metrics by GPS</td>
</tr>
<tr>
<td>Action plan to address high-priority gaps</td>
<td>Educational materials for internal personnel and physicians</td>
<td></td>
</tr>
<tr>
<td>Timing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6 weeks</td>
<td>3-6 months</td>
<td>2-4 weeks</td>
</tr>
</tbody>
</table>
FDA is advocating the universal adoption of two principles of radiation protection:

- appropriate justification for ordering each procedure,
- careful optimization of the radiation dose used during each procedure.

Each patient should get the right imaging exam, at the right time, with the right radiation dose.

In support of this goal, FDA will use our regulatory authority and also collaborate with others in the Federal government and the healthcare professional community to:

- Promote safe use of medical imaging devices;
- Support informed clinical decision making; and
- Increase patient awareness.
Obstacles

• There is no $ in the (dept operating) budget
• CT schedule is full all the time
• We will irritate referring MDs
• No radiologist is willing to spend the time
• Radiologists will never agree to standardize
• Technologists are too busy
• All protocols are fine (set by manufacturer)
  (Ignorance is bliss)
• No regulatory requirement
Motivations for Radiologist

• Patient Care (General)
• Useful when answering questions (specific patient)
  ï “We have reviewed all of our protocols”
• ABR MOC
• Risk Management
• Communication with referring physicians
  ï Marketing: “We are doing this new project”
• TJC Sentinel Alert
Guidelines for PQI Projects

Projects in five project areas listed below could be designed by individual radiologists, radiology practice groups or departments, institutions, healthcare systems, or by professional societies. Every radiologist participating may receive PQI credit for the project. (Some projects may offer CME credit as well, through the normal CME approval process.) Because the key competencies to be addressed through PQI projects include systems-based practice, practice-based learning and improvement, and interpersonal/communication skills, it is strongly encouraged that others involved in the provision of care to radiology patients be incorporated into the project team.

Projects selected to meet the practice quality improvement (Part IV) requirement of the ABR’s Maintenance of Certification (MOC) program should:

- Be relevant to your practice
- Be achievable in your practice setting
- Produce results that are suited to repeat measurement during your MOC cycle
- Be reasonably expected to bring about quality improvement

PQI Projects broadly conform to the following template. The appropriate steps within a PQI Project are:

1. Select a topic area in which you would like to see your practice improve, and within it, decide on a challenge that is relevant to your practice
2. Decide what specifically you will measure to assess current performance and future improvement, and create a data collection form to record the measurements (if one does not already exist)
3. Make a baseline measurement in an appropriate number of cases drawn in an unbiased manner
4. Analyze results
5. Identify the potential root causes of error or suboptimal performance
6. Develop a written improvement plan
## Available PQI Projects and Templates

<table>
<thead>
<tr>
<th>Type</th>
<th>Title</th>
<th>Org</th>
<th>Date Qualified</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗳️</td>
<td>CT Colonography Registry</td>
<td>ACR</td>
<td>01/30/2008</td>
<td>N/A</td>
</tr>
<tr>
<td>🗳️</td>
<td>Performance of VCUG Examinations: Safety, Quality of Care: Practice Guideline</td>
<td>SPR</td>
<td>03/11/2008</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>Universal Protocol/Procedural Pause</td>
<td>RQ</td>
<td>08/11/2008</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>Intravenous Iodinated Contrast Extravasation During Computerized Tomography</td>
<td>SUR/ACR</td>
<td>10/22/2008</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>Fluoroscopy Dose Recording</td>
<td>SIR</td>
<td>02/04/2009</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>Prospective Analysis for Radiation Dose Reduction</td>
<td>SIR</td>
<td>02/04/2009</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>Patient Safety Improvement Program (PSIP)</td>
<td>ABMS</td>
<td>09/22/2008</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>Chest CT Radiation Safety</td>
<td>ARRS</td>
<td>12/31/2008</td>
<td>N/A</td>
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<tr>
<td>🗳️</td>
<td>RADPEER</td>
<td>ACR</td>
<td>04/17/2009</td>
<td>RADPEER examples</td>
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<tr>
<td>🗳️</td>
<td>National Mammography Database</td>
<td>ACR</td>
<td>08/03/2009</td>
<td>N/A</td>
</tr>
<tr>
<td>🗳️</td>
<td>Image Gently: PQI in safety for children undergoing CT scan</td>
<td>Cincinnati Children's Hospital &amp; SPR</td>
<td>04/17/2009</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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### Image Gently Campaign

Let’s *image gently* when we care for kids! The Image Gently Campaign is an initiative of the Alliance for Radiation Safety in Pediatric Imaging. The campaign goal is to change practice by increasing awareness of the opportunities to lower radiation dose in the imaging of children.

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**A PRACTICE QUALITY IMPROVEMENT PROGRAM FOR RADIOLOGISTS**

Welcome to Image Gently: A Practice Quality Improvement (PQI) Program in Computed Tomography (CT) Scans in Children

This online learning program consists of:

- Practice Quality Improvement (PQI) Project:
  - This PQI module will capture how your practice performs CT scans in children, and allows you to compare your practice to “safe practice” in the literature and ACR guidelines. A survey tool allows you to compare your practice to others who have taken the module. The survey tool is not a scientific survey or registry.
  - PLEASE NOTE: that practice improvement should be tailored to your practice! The practice interventions suggested in this module and practice tools provided are samples for you to use or modify as appropriate. They are not intended to be standards. This PQI program has been approved for the American Board of Radiology Maintenance of Certification Part IV.
Medical Malpractice Verdicts, Settlements & Experts Database 2007-2012

- Total Cases: 7,000
- Total Radiology &…: 214
- Failure or Misdiagnose: 161
- Other: 34
- Overdose: 6
- Drug Error - Chemo: 6
- Fall: 5
- Drug Error: 2

# of Cases
### Average Cost per Case

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overdose</td>
<td>$2,067,777.00</td>
</tr>
<tr>
<td>Failure or Misdiagnose</td>
<td>$1,926,720.00</td>
</tr>
<tr>
<td>Total Average Radiology &amp; Oncology Case</td>
<td>$1,946,067.00</td>
</tr>
</tbody>
</table>

Average Overdose cost includes 9 cases from 2002-2012 for better statistical sampling, $16M claim not included due to abnormal payout.
18 Overdose Settled Cases 2002-2012

Confidential Settlement
Over $10M
$5.1M - $10M
$2.1 - $5M
$1.1 - $2M
$500.1K - $1M
$250.1 - $500K
0-$250K
Defense Verdict returned

Number of Claims
# Known Hospital Locations with Overdose Occurrences

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Location</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedars-Sinai</td>
<td>CA</td>
<td>LA/NY Times</td>
</tr>
<tr>
<td>Mad River Community Hospital</td>
<td>Atcata, CA</td>
<td>NY Times</td>
</tr>
<tr>
<td>Philadelphia Medical Center</td>
<td>PA</td>
<td>Philadelphia Inquirer</td>
</tr>
<tr>
<td>St. Joseph</td>
<td>Burbank, CA</td>
<td>LA/NY Times</td>
</tr>
<tr>
<td>Advocate Health, Lutheran General Hospital</td>
<td>IL</td>
<td>Medical Malpractice Verdicts, Settlements</td>
</tr>
<tr>
<td>Glendale Adventist Medical Center</td>
<td>Glendale, CA</td>
<td>LA/NY Times</td>
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<tr>
<td>Little Company of Mary</td>
<td>Cook County, IL</td>
<td>Medical Malpractice Verdicts, Settlements</td>
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<td>St. Vincent’s</td>
<td>Manhattan, IL</td>
<td>NY Times</td>
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<td>State University of New York Downtown</td>
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<td>NY Times</td>
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<td>University of Chicago</td>
<td>IL</td>
<td>Levin &amp; Perconti Attorney Web-site</td>
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<td>University of Southern California</td>
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<td>NY Times</td>
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<td>Bakersfield Memorial</td>
<td>Bakersfield, CA</td>
<td>NY Times</td>
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<td>South Lake Hospital</td>
<td>FL</td>
<td>NY Times</td>
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<td>?</td>
<td>San Francisco, CA</td>
<td>NY Times</td>
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<tr>
<td>Evanston Hospital</td>
<td>IL</td>
<td>NY Times</td>
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<tr>
<td>CoxHealth</td>
<td>Springfield, MO</td>
<td>NY Times</td>
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<tr>
<td>West Suburban Medical Center</td>
<td>Oak Park, IL</td>
<td>Survey</td>
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Summary

Å When radiation events occur they are costly
  ï Several patients affected
  ï Highly publicized
Å Make sure the RSO is part of your Patient Safety Committee
Å Consider credentialing the Medical Physics staff