Image Gently and Image Wisely

Priscilla F. Butler, MS, FAAPM, FACR
Senior Director and Medical Physicist
American College of Radiology
Basic Principles of Radiation Safety in Imaging

- Justification
- Optimization
New Approaches Taking Wing - Social Marketing

- Use public media
- Use commercial marketing techniques

“......to promote behavior changes that will improve the health of the population”
The Alliance for Radiation Safety in Pediatric Imaging

The *image gently* campaign
CT Scans: Just How Safe Are They?
Computed tomographic (CT) scans help doctors zoom in on everything from head trauma to kidney stones. But some researchers are worried that unnecessary scans may increase your lifetime cancer risk. Long-term studies investigating a tumor connection are under way, but in the meantime, patients may be getting some serious radiation exposure. A study of 1,243 randomly chosen hospital patients showed that, on average, they had been exposed to 45 millisieverts (mSv) of radiation (the typical chest X-ray delivers 0.02 mSv), and 12% had been exposed to more than twice that amount. And not all of this exposure may even be necessary. Earlier studies have suggested that some doctors order duplicate scans, while others prescribe CTs in an abundance of caution, just to rule out potential diseases.

The Sorry State of American Health
Despite advances in medicine, Americans are less healthy than we used to be, and the next generation may be even worse off. How to reverse the trend—before it's too late...
Founding Organizations

- The Society for Pediatric Radiology
- American Society of Radiologic Technologists
- American Association of Physicists in Medicine
- American College of Radiology
The Alliance for Radiation Safety in Pediatric Imaging

- Coalition of health care organizations dedicated to providing safe, high quality pediatric imaging worldwide.
  - >80 health care organizations/agencies
  - >800,000 radiologists, radiology technologists, medical physicists
- Primary objective of the Alliance is to raise awareness in the imaging community of the need to adjust radiation dose when imaging children.
- The ultimate goal of the Alliance is to change practice.
Image Gently Campaigns

- CT (The original “Image Gently” campaign)
- Fluoroscopy (“Pause and Pulse”)
- Interventional Radiology (“Step Lightly”)
- Nuclear Medicine (“Go with the Guidelines”)
- Digital Radiography (“Back to Basics”)
Campaign Rollout

- Editorials in
  - Pediatric Radiology - Improving Health Literacy for Parents about CT Scans for Children - Why We Need to Talk to Parents about CT Imaging
  - AJR
  - AAP News
- Presentations – SPR
- Advertisements
The Image Gently ALARA CT summit was held February 21, 22, 2014 in Orlando Florida.

Take the Image Gently pledge!

The new Image Gently website was launched January 1, 2014. If you have difficulty finding what you need, please contact us!

One size does not fit all...so when we image, let's image gently!

Image Gently has created many educational and awareness opportunities for parents, patients, and medical professionals.

Parents, please explore our website to find lots of information on the different types of radiology exams that may be ordered for your child. Our brochures have been developed with you in mind. Learn about the exams and be prepared for your child's visit.
For Parents

What is an X-ray?
X-rays are invisible beams of ionizing radiation that pass through the body and are absorbed by different tissues to create 2-dimensional images of many organs.

What is a CT scan?
CT scans use x-rays generated from a source that is rotated around the body to create 3-dimensional images of the body. CT studies can provide critical information for the care of your child, but obtaining the images results in more radiation exposure for the study than a single X-ray.

How much radiation is used in these exams?
We are all exposed to small amounts of radiation daily from soil, rocks, building materials, air, water, and cosmic radiation. This is called naturally occurring background radiation. The radiation used in X-rays and CT scans has been compared to background radiation we are exposed to daily. This comparison may be helpful in understanding relative radiation doses to the patient.

Radiation source | Days background radiation
---|---
Background | 1 day
Chest X-ray (single) | 1 day
Lower CT | up to 8 months
Abdominal CT | up to 20 months

Butterfly Effect

“Dictionary.com defines the butterfly effect as “a cumulatively large effect that a very small natural force may produce over a period of time.” Image Gently’s quarterly newsletter, Butterfly Effect brings you up-to-date information to continuously change and update your practice to improve radiation protection for children. What began as a small initiative is making a large change in world wide pediatric radiology practice.

Public Service Announcements from ACR

Heartfelt “Thank you” to the American College of Radiology for the creation of Public Service Announcements designed to support the Image Gently campaign. In the wake of the Japan nuclear crisis, we may not see a lot of news reports to find them, but they are there to help.

Image Gently Resources in Arabic

فحص الأشعة برفاق

Download the 2-page Parent Information Brochure
Download the 8-page Parent Information Brochure (4 pages in Arabic)

Download the 2-page Parent Information Brochure
Download the 8-page Parent Information Brochure (4 pages in Arabic)
Downloadable Pamphlets on www.imagegently.org

- 8 page Long Version on Medical Radiation Safety for parents
  - Detailed information
    - web sites
    - references
www.imagegently.org

- 2 page Short Version on CT radiation safety for parents
- Useful as a handout for
  - Radiology departments
  - Emergency departments
  - Pediatric offices

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Radiation source..........................Days background radiation
Background........................................1 day
Chest X-ray (single)............................1 day
Head CT.........................................up to 8 months
Abdominal CT.................................up to 20 months
Provides resources for radiologists, imaging technologists, medical physicists, other imaging practitioners, and patients to help them lower the amount of radiation used in medically necessary imaging studies of adults and eliminate unnecessary procedures.
Image Wisely

- Joint Task Force between ACR & RSNA
- Co-Chaired by James Brink and Richard Morin
- Focus on dose reduction for adults
- Introduced at RSNA 2010
CT and Nuclear Medicine Content for Imaging Professionals

» Imaging Physicians
Radiologists make daily decisions about how to balance effective studies and treatment with safe radiation dose. The information provided here focuses on the aspects of imaging of greatest relevance to imaging physicians and which influence dose, either directly or indirectly.

» Medical Physicists
Medical physicists contribute valuable knowledge and experience to the maintenance of quality in CT images and to reducing radiation dose to patients from CT examinations. Medical physicists help design and select optimum imaging protocols to acquire necessary information at the lowest possible radiation dose.

» Imaging Technologists
Imaging technologists carry out the vital role of dispensing the ionizing radiation necessary for producing image data. The resources presented here cover the physics and principles of operating modern CT devices, best practices for CT exam protocols, and peer-to-peer discussion boards.
Content for Imaging Professionals

http://www.imagewisely.org/

Reduce Ionizing Radiation — Image Wisely

» CT Protocol Design
   Download PDF
   Developing CT protocols to maximize diagnostic yield while minimizing dose

» Adaptive Iterative Reconstruction in CT: What Does It Do? How Can I Use It?
   Download PDF
   Using ASIR to substantially reduce image noise with no impact on spatial or contrast resolution

» Pediatric CT Imaging
   Download PDF
   Important differences when performing CT imaging of children related to CT dose and potential stochastic risks
   > Visit ImageGently.org for complete pediatric imaging resources

» Considerations Regarding Radiation Exposure in Performing F18-FDG PET-CT
   Download PDF
   Strategies for effective reduction of whole body dose without compromising critical diagnostic information as an essential part of optimizing PET-CT imaging protocols

» Why Seek Accreditation of Your CT Program?
   Download PDF
   Achieving accredited status for CT shows an ongoing commitment to the quality and safety of your CT exams.
Content from Manufacturers About Optimizing Dose with their CT Equipment

My Equipment

Visit the sites of the device manufacturers below for CT dose guidelines tailored to the equipment you use. The manufacturer guidelines will help you fulfill your pledge to image wisely by using optimal dosages for the types of exams you perform.

VENDORS

GE Healthcare  HITACHI  PHILIPS  SIEMENS  TOSHIBA

*These links to manufacturers' web sites contain information regarding dose settings for their specific equipment models. These links do not constitute ACR or Image Wisely endorsement of that manufacturer or equipment, and the ACR and Image Wisely are not responsible for the accuracy of any information on the manufacturers' sites.
SAFETY

New case study on dose management in endovascular image-guided neurointerventions

Learn More

NEWS

Dose Is Not Always What It Seems
Where Very Misleading Values Can Result From Volume CT Dose Index and Dose Length Product.
» Read article

The Uses and Abuses of CT Scans
Responses to the "We Are Giving Ourselves Cancer" op-ed.
» Read article

We Are Giving Ourselves Cancer
This New York Times op-ed was co-authored by a cardiologist and a radiologist.
» Read article

Take the pledge

View the honor roll of facilities and associations who have pledged.

22,021
PLEDGES TO DATE

Visit our Partners in Safety
Pledge

Yes, I want to *image wisely.*

I wish to optimize the use of radiation in imaging patients and thereby pledge:

1. To put my patient’s safety, health and welfare first by optimizing imaging examinations to use only the radiation necessary to produce diagnostic quality images;

2. To convey the principles of the Image Wisely Program to the imaging team in order to ensure that my facility optimizes its use of radiation when imaging patients;

3. To communicate optimal patient imaging strategies to referring physicians, and to be available for consultation;

4. To routinely review imaging protocols to ensure that the least radiation necessary to acquire a diagnostic quality image is used for each examination.
Pledge for Facilities - Levels of Commitment

- **LEVEL 1** – Take the Image Wisely pledge
- **LEVEL 2** – Earn accreditation from an organization that directly evaluates the following:
  - Radiation dose indices and compliance with accreditation pass/fail thresholds
  - Clinical image quality (peer-reviewed by an external, qualified interpreting physician)
  - Phantom image quality (peer-reviewed by an external, qualified medical physicist)
  - Personnel (qualifications set by the accrediting organization)
- **LEVEL 3** – Participate in a dose index registry that includes routine evaluation of procedures and dose indices
ACR Dose Index Registry

- A tool for quality improvement so facilities can review dose indices and optimize protocols
  - Collects and compares dose index information across facilities
  - Fully automated; uses standard methods of data collection and processing (DICOM SR, IHE REM Profile, RadLex)
  - Will help to develop size-specific reference levels
- CT DIR launched in May 2011
What the ACR Dose Index Registry is Not

- It does **not** collect individual patient doses; only dose indices
  - CTDIvol – Computed Tomography Dose Index
  - DLP – Dose Length Product
  - SSDE - Size Specific Dose Estimate
    (although getting closer with SSDE, still not there yet)

- It does **not** collect patient identifiable information
  - HIPAA (Health Insurance Portability and Accountability Act of 1996) privacy concerns
  - Participation agreement

- It is **not** a mechanism to track individual patient dose
Participation is Growing
As of July 2013, over 750 facilities/458 fully active; 4.8 million exams/8.5 million scans
At least 2 facilities are outside of the US
Content for Referring Practitioners

Referring Practitioners

Referring physicians and other health care providers need reliable information to help manage their patients’ imaging needs. Consulting with your radiologist colleagues can help you and your patients make informed imaging decisions.

In addition, please use the resources below for medical information that addresses imaging-related questions such as: Does my patient need diagnostic imaging? When does it make sense to use alternatives to ionizing radiation? What about the special concerns of radiosensitive patients?

And be sure to take the pledge to image wisely!

Resources

» Radiation Safety Information and Resources for Referring Practitioners
Information presented in Q&A format to assist you in determining the right exams for your patients, the risks of and alternatives to ionizing radiation, and special considerations for radiosensitive patients, among other topics. Download PDF

» ACR Appropriateness Criteria®
Developed specifically for use by referring practitioners, these evidence-based guidelines can help you make the most appropriate imaging or treatment decision for a patient’s specific clinical condition.

» Patient Medical Imaging Record
ACR Appropriateness Criteria®

- **Appropriate utilization**
  - First developed in 1993
  - Evidence-based guidelines to assist referring physicians in making the most appropriate imaging or treatment decision
  - Developed by expert panels in diagnostic imaging, interventional radiology, and radiation oncology that includes referring physicians
  - Addresses over 180 clinical conditions
  - Topics reviewed annually and updated as appropriate

- **ACR Select – for computerized order entry**
Relative Radiation Levels - Sample Variant Table

American College of Radiology
ACR Appropriateness Criteria®

Clinical Condition: Right Upper Quadrant Pain
Fever, elevated WBC, positive Murphy’s sign.

<table>
<thead>
<tr>
<th>Variant 1:</th>
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<tbody>
<tr>
<td>US abdomen</td>
</tr>
<tr>
<td>CT abdomen with or without contrast</td>
</tr>
<tr>
<td>Cholescintigraphy</td>
</tr>
<tr>
<td>MRI abdomen with or without contrast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL *</th>
</tr>
</thead>
<tbody>
<tr>
<td>US abdomen</td>
<td>9</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>CT abdomen with or without contrast</td>
<td>6</td>
<td>Generally should follow US of the RUQ based on US findings. With IV contrast preferred.</td>
<td>☀️ ☀️ ☀️</td>
</tr>
<tr>
<td>Cholescintigraphy</td>
<td>6</td>
<td>Generally should follow US of the RUQ based on US findings.</td>
<td>☀️ ☀️</td>
</tr>
<tr>
<td>MRI abdomen with or without contrast</td>
<td>6</td>
<td>Generally should follow US of the RUQ based on US findings. See statement regarding contrast in text under “Anticipated Exceptions.”</td>
<td>0</td>
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Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level
Patients

As a patient, you may have concerns about the imaging procedures prescribed for you. How much medical radiation is too much? What are the benefits of CT scans? Does my age or gender affect my risk? What are the risks?

For answers to these questions and more, visit RadiologyInfo.org - Radiology Benefits and Risks.

For pediatric radiation safety information, visit ImageGently.org.

Concerned about radiation?
Before you receive a medical imaging exam, ask your doctor these important safety questions:

- How will this exam improve my care?
- Are there alternative imaging exams that don't use radiation?

View these public service announcements before your scan:

RadiologyInfo.org
Radiology Benefits and Risks

How much medical radiation is too much?

Radiation Dose in X-Ray and CT Exams

- What are x-rays and what do they do?
- Measuring radiation dosage
- Naturally-occurring "background" radiation exposure
- X-ray safety
- X-rays over your lifetime
- Pregnancy and x-rays
- Radiation exposure from interventional radiology procedures
- Safety in nuclear medicine procedures

What are x-rays and what do they do?
X-rays are forms of radiant energy, like light or radio waves. Unlike light, x-rays can penetrate the body, which allows a radiologist to produce pictures of internal structures. The radiologist can view these on photographic film or on a TV or computer monitor.

X-ray examinations provide valuable information about your health and play an important role in helping your doctor make an accurate diagnosis. In some cases x-rays are used to assist with the placement of tubes or other devices in the body or with other therapeutic procedures.

Measuring radiation dosage
The scientific unit of measurement for radiation dose, commonly referred to as effective dose, is the millisievert (mSv). Other radiation dose measurement units include rad, rem, roentgen, sievert, and gray.
Imaging History Card

<table>
<thead>
<tr>
<th>Date</th>
<th>Exam</th>
<th>Facility Where Exam Performed</th>
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Name: ____________________________

My Medical Imaging History

Use this handy record to track your imaging history

Before undergoing any X-ray exam or treatment procedure, remember to ask your doctor:

- Why do I need this exam?
- How will having this exam improve my health care?
- Are there alternatives that do not use radiation and which are equally as good?

Remember:

- Be sure to tell the doctor or technologist if you are, or might be, pregnant before having an exam.
- Don’t insist on an imaging exam if the doctor explains there is no need for it.
- And, don’t refuse an imaging exam if there’s a clear need for it and the clinical benefit outweighs the small radiation risk.

For more information, go to [www.ImageWisely.org](http://www.ImageWisely.org) and [www.fda.gov/forConsumers/ConsumerUpdates/ucm095505.htm](http://www.fda.gov/forConsumers/ConsumerUpdates/ucm095505.htm)

Co-Sponsored by Image Wisely and the US Food and Drug Administration
What’s Next

- Dental imaging IG
- Pediatric head trauma (IG & IW)
- Fluoroscopy (IW)
- Guidance to meet TJC dose standards (IW)
But in the meantime, we will continue to deal with this. Despite great strides in prevention and treatment, cancer rates remain stubbornly high and may soon surpass heart disease as the leading cause of death in the United States. Increasingly, we and many other experts believe that an important culprit may be our own medical practices: We are silently irradiating ourselves to death.

The use of medical imaging with high-dose radiation — CT scans in particular — has soared in the last 20 years. Our resulting exposure to medical radiation radiation doses of CT scans (a series of X-ray images from multiple angles) are 100 to 1,000 times higher than conventional X-rays.

Of course, early diagnosis thanks to medical imaging can be lifesaving. But there is distressingly little evidence of