

2014 AAPM Annual Meeting: Professional Symposium on Communicating Risk

*What works (most of the time)  
what doesn't work (most of the time)  
what always or never works*

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**DISCLOSURES**

Research Support:

NIH	Other
EB 017095	Mayo Discovery Translation Award
EB 017185	Mayo Center for Individualized Medicine Award
EB 016966	Thrasher Foundation
DK 100227	Siemens Healthcare
HR 046158	
RR 018898	

Off Label Usage  
None

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*If your goal is to sell newspapers  
(or scare patients)*

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**This always works**

**Study: Unnecessary CT scans exposing patients to excessive radiation**

**The New York Times**  
**Report Links Increased Cancer Risk to CT Scans**  
 Cedars-Sinai investigated for significant radiation overdoses of 206 patients  
 The finding prompts the FDA to issue an alert urging protocols for CT scans.

**USA TODAY**  
 By Steve Sternberg, USA TODAY  
 Overdose of diagnostic CT scans may cause as many as 3 million excess cancers in the U.S. in the next three decades.

**Class Action Lawsuit Filed Against Cedars-Sinai Over CT Radiation Overdose**

**CT Scan Increase Could Mean More Cancer Down the Road**

**U.S. probing more cases of CT radiation overexposure**

**Doctors 'Shocked' by Radiation Overexposure at Cedars-Sinai**

**CT scan radiation can equal nuclear bomb**

**Study: CT scans raise cancer risk**

**Study: Increased Use of CT Scan Poses Cancer Risk**

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*Public response: Fear and anxiety*

- Patients and family members are worried, seeking expert help before and/or after exposures
- Parents in particular calling, in tears, about “what they have allowed to be done to their child”

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*Being dismissive never works*

- “They don’t know what they’re talking about”
- “Just trust me on this ...”
- “Don’t be so silly”
- “You can’t possibly believe that garbage?”
- “What, you’re afraid of turning into Spiderman?”

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### *All other strategies are situational*

- No perfect recipe for what “always” works
- Treat individuals with respect and compassion
- They are scared, likely have other health stressors
- Identify primary concern
- Based on concern, address 2 or 3 key points
  - Stick to these primary points, phrased in different ways
  - Don’t get into an exhaustive debate of the literature
  - Don’t drill down into too many details
    - Could either be confusing or distracting
- Stick to key points

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### *Key message: Big benefit, small (if any) risk*

- Radiation does cause cancer at very high doses, but at low doses, the effects are too small to be measured, or do not exist
  - References: radiation protection organizations
- You/your family member received low doses
  - References: internal and published typical doses, and patient-specific data from medical record
- The risk (if it exists at these low doses) is negligible compared to the benefit of a necessary medical exam
  - Give examples tailored to situation, with references such as ACR appropriateness criteria

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### *Secondary message: You are in good hands*

- Our facility
  - uses age and size appropriate doses
  - tailors the exam for the diagnostic task
  - has advanced imaging devices with radiation dose management features
  - is accredited by ACR and JCAHO
  - participates in national dose registry
  - monitors our dose data closely
  - has rigorous quality testing of equipment
  - is staffed by board certified medical physicists
  - all CT technologists have additional certification in CT

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### Case 1: Facebook inquiry

- ... I was hoping to ease some anxiety about the conflicting information re: cancer and radiation esp in children ... 6 days old son fell off bed ... of course **not being educated or told of the risks of radiation** they ordered a CT scan and spinal x-ray and we obliged.
- ... The tech didn't want to do it saying it was A LOT of radiation and now those words stick with me with along with **the guilt that I have given my son a cancer and death sentence.**
- ... I keep reading Dr. Internet about the risk of childhood cancers like leukemia and lymphoma (which my dad had) and **I am literally sick to my stomach every day with worry.** He has an enlarged lymph node on his neck, this constant cough and although drs not concerned, I have **convinced myself it is linked to cancer** b/c of all these tests.

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### Case 1: Facebook inquiry

- I don't know how to make peace with [our] decision to put him through all these tests and can't convince myself that the risks outweighed the benefit esp reading that most ERs do these tests to cover their butts.
- ... I look at him all happy and playing and I fear I have caused him future harm.
- ... I wish I could turn back the hands of time and I would never have put him through all this. He was so young and is only 3 now.
- ... While I am definitely worried about the CT scan (total mAs 1301, CTD1vol1 30.90, DLP (mGycm 417.50-not sure what these numbers mean) I am also worried about the possible cumulative effect of all the radiation from all the tests he has had [additional chest x-rays for difficulty breathing and a barium swallow for reflux]

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### Mother has bachelor and masters degrees

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### Case 2: Via telephone

- Senior scientist at major aeronautics engineering firm
- Regrets his choice to allow a head and neck CT scan to be performed on him
- Looked up numbers (6 rem) and is appalled
  - “Dose” of 60 mGy ~ 6R ~ 6 rem
  - “Effective dose ~ 1-2 mSv ~ 100-200 mrem
- Chance meeting in June. He thanked me for my help, but proceeded to talk 30 minutes about his concerns that does perform CT scans when they don’t need to
- “He could have just told me to keep taking ibuprofen”

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### Primary concern: Post-exam regret/fear

- Remind patient/family member that a negative exam is not an “unnecessary” exam
- Inform re: consequences of not having the exam could range from inconvenient (delayed treatment and healing) to catastrophic (death from brain bleed, paralysis from spinal cord injury due to broken vertebrae)
- Express happiness that the injury was not serious and glad that the CT could “clear them” to go home safely
- I share personal story of my daughter, where the “optional” CT prevented unnecessary emergency surgery

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### Education level doesn’t matter

- People with more education, esp. physicians, can be the most difficult to “re-educate”
- “Just trust me” isn’t effective
- Educated patients/family members have the skills to seek out literature on the topic (*Dr. Internet?*)
- People tend to seek out data to support their opinion
- Don’t argue. Don’t *debate* the literature. Do clarify misinformation (e.g. type of “dose”, units)
- Be familiar with current literature and prepared to cite a few key references to support what you are explaining

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### Good article for physicians



OPINION

Don't let radiation scare trump patient care:  
10 ways you can harm your patients by fear of  
radiation-induced cancer from diagnostic imaging

Alan S Brody,<sup>1</sup> R Paul Guilleman<sup>2</sup>

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### Case 3: Via e-mail

- Please forgive if contacting you in this way is way out of line, but I am growing desperate for information from a well- informed source.
- I had a pelvic CT scan with a gastrogravin enema ... I felt so bad when I got home, about an hour and a half later, that I laid down and fell asleep for two hours (something I very rarely do). I awoke with a splitting headache, primarily in the eyes, and then, about seven hours after the procedure, I began to throw up violently.

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### Case 3: Via e-mail

- I guess this could have been a reaction to the gastrogravin, but I called the facility that did the procedure to find out if that could be the case and to determine what my radiation dose had been. They said the gastrogravin could not have such an effect
- They gave a Dose Length Product figure of 102.57 mGY. I was later given a 1.9 millesievert figure ... but the tech could not tell me how the two figures relate or anything else about the procedure, except that one can't even get radiation sickness from a medical procedure, which brought little in the way of consolation.

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*Primary concern: Radiation poisoning*

- Could you possibly tell me whether the 102.57 mGY DLP is high (I'm a 105lb. female)?
- I really need to know whether to seek treatment of any kind.

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**Gastrografin**  
 Generic Name: diatrizoate meglumine and diatrizoate sodium  
 Dosage Form: oral, rectal liquid

**Information for the Patient**  
 Patients should receive the following information and instructions:  
 This drug has been prescribed to perform an x-ray of the gastrointestinal tract. Inform the physician if pregnant or if allergic to iodine, any foods, or x-ray materials. The iodine in diatrizoate salts may interfere with some thyroid tests if these are needed in the future. Inform the attending physician at that time about this gastrointestinal study.  
 This drug may cause abdominal cramping, nausea, vomiting, diarrhea, skin rashes, itching, heartburn, dizziness, or headache in some patients, but most reactions are mild and pass quickly.

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*Provide reassurance and logical explanation*

- Did not start with “you can’t possibly have radiation poisoning”
- Emails, facebook, other written communication allows time to do your homework
  - Checked drug information and spoke with a GI radiologist
- Offering a clear, logical explanation of “what caused this” *erased* the radiation poisoning fear
- Reassured her that the dose numbers where very reasonable/good and *then* assured her that her dose (all imaging doses) was 100-1000 times below the level where radiation poisoning occurs

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Mayoclinic.org

Early symptoms of radiation sickness\*

	Mild exposure (1-2 Gy)	Moderate exposure (2-6 Gy)	Severe exposure (6-8 Gy)	Very severe exposure (8-10 Gy or higher)
Nausea and vomiting	Within 6 hours	Within 2 hours	Within 1 hour	Within 10 minutes
Diarrhea	--	Within 8 hours	Within 3 hours	Within 1 hour
Headache	--	Within 24 hours	Within 4 hours	Within 2 hours
Fever	--	Within 3 hours	Within 1 hour	Within 1 hour

\* Adapted from Radiation exposure and contamination. The Merck Manuals: The Merck Manual for Healthcare Professionals.

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Case 4:

- 84 y.o. male
- Abdominal aortic aneurysm
- Pre-surgical CT Angiogram ordered
- NEJM article of dangers of CT is published
- Leaves message for physician "requesting that his CT 'with the cancer-causing stuff' be changed to an ultrasound"
- Physician requests that I contact patient so that he will have the CT, as it is essential for surgical planning

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Primary concern: Refusing needed exam

- Explaining the CT exam and the information that the doctor needs from it is a strong start
  - Use 3D images if possible
  - Explain stent graphs and how they are custom fit
  - CT let's doctor "take his measurements"
  - US can't do this with same accuracy (show US image)
  - US can't see tiny arteries that are critical to avoid




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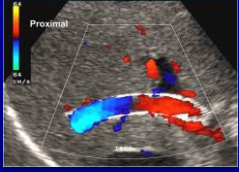
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Benefit, benefit, benefit



Secondary messages about safety of our practice were also helpful

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