An Appeal for Safe and Appropriate Imaging of Children

Stephen J. Swensen, MD, FACR, James R. Duncan, MD, PhD,† Rosemary Gibson, MSc,‡ Stephen E. Muething, MD,§ Rebecca LeBuhn, MA,‖ Jean Rexford,¶ Carol Wagner, RN, MBA,** Stephen R. Smith, MD, MPH,†† Becky DeMers, RN, MSN, MBA,** Richard L. Morin, PhD,‖‖ John Santa, MD, MPH,‡‡ and Charles J. Homer, MD, MPH§§*

DO YOU AGREE?

- ○ That our nation's children deserve safe and appropriate medical imaging.
- ○ That when used properly, medical imaging is lifesaving.
- ○ That there are risks to almost every aspect of health care. For medical imaging, one of the risks includes exposing children to radiation.
- ○ That parents must be able to trust that the teams who image their children have earned that privilege.
- ○ That the future of our nation depends on our ability to create a better health care system with superior patient and family experience, better outcomes, and lower cost.

If so, we need your help.

THE HARMS

The benefits of medical imaging far outweigh the risks when children receive The Right Exam, ordered The Right Way, with The Right Radiation Dose.[1–6]

However, overuse and misuse of imaging change the benefit-risk ratio.

Recently, an 11-year-old girl presented to a Midwestern emergency department with abdominal pain. To investigate if the cause was appendicitis, she received a computed tomographic (CT) scan instead of following an "Ultrasound First" policy. The CT showed a normal appendix but also revealed an incidental lung nodule. In this region of the Midwest, such nodules are very common and usually result from a benign fungal infection. The CT scan report read: "3 mm nodule, unknown malignant potential." A follow-up chest CT with and without contrast material was recommended and performed a few weeks later although a dual-phase CT is widely considered inappropriate for this situation; the second scan added nothing. Furthermore, international Fleischner Society guidelines recommend against follow-up in situations such as this one.[7] Furthermore, CT follow-up for 2 years was inappropriately recommended. The family was very concerned and asked about a lung biopsy. After discussion, the family decided against biopsy. The nodule will be followed up with subsequent CT scans.

This child has already received an estimated ~20 mSv, which carries with it an increased cancer risk of approximately 1 in 500. Stories like this likely occur every day in the United States.[8]

This unfortunate sequence of patient harm, waste, and needless anxiety could have been completely avoided with the Ultrasound First policy being used at many centers.

None of this had to happen. None of this *has* to happen.

From the *Mayo Clinic, Rochester, Minnesota; †Washington University School of Medicine, St. Louis, Missouri; ‡The Hastings Center, Garrison, New York; §Children's Hospitals Solutions for Patient Safety, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio; ‖Citizen Advocacy Center Redding, Washington, DC; ¶Connecticut Center for Patient Safety, Redding, Connecticut; **Washington State Hospital Association, Seattle, Washington; ††Warren Alpert Medical School of Brown University, Providence, Rhode Island; ‡‡Consumer Reports Health, Yonkers, New York; and §§National Institute for Children's Health Quality; and ‖‖Department of Radiology, Mayo Clinic Jacksonville, Jacksonville, Florida.

Correspondence: Stephen J. Swensen, MD, FACR, Mayo Clinic W-2, 200 First St SW, Rochester, MN 55905 (e-mail: swensen.stephen@mayo.edu).

Rosemary Gibson, MSc, is the author of *The Treatment Trap*.

Rebecca LeBuhn is a public member of the American Board of Radiology Foundation Board.

John Santa is a full-time employee of Consumer Reports. The other authors disclose no conflict of interest.

There are risks associated with ionizing radiation. Peer-reviewed research provides compelling evidence that exposing children to radiation causes a small but measurable increase in their risk for cancer. Children are by far the most susceptible to risks of ionizing radiation. The only substantive disagreement among physicians and scientists concerns the number of preventable deaths.[1,9–16] We have ample opportunities to improve:

- Approximately 40% of US children are exposed to at least 1 medical imaging examination with ionizing radiation during a 3-year period.[17]
- There is 50-fold variation in radiation exposure for patient conditions such as headache.[18,19]
- There is a nearly 5-fold variation in the use of head CT in children.[20]

Such needless variation creates unnecessary risk and is inexcusable in 21st-century America.

Beyond radiation, exams that never should have been done inflict harm through incidental and false-positive findings and misallocation of financial resources. The wasted money spent on unnecessary imaging is not available for other societal purposes. Currently, America squanders billions of dollars per year on overuse of imaging examinations for all patients.[10,21–25]

We have a professional and fiduciary responsibility to create a system that delivers safe and appropriate imaging to the children of this country.

THE PROPOSAL

We submit that no hospital or medical imaging facility in the country should be granted the privilege of imaging children unless it first meets fundamental safe practice performance measures. Our plan is to engage the American College of Radiology, The Joint Commission, the Intersociety Accreditation Commission, and the Centers for Medicare & Medicaid Services with a proposal to include 3 safe practice performance measures for accreditation of all American hospitals and advanced diagnostic imaging facilities.

By design, the 3 child-centered measures we propose for accreditation align perfectly with the National Quality Forum Safe Practice for Pediatric Imaging.[4] We recommend the following patient-centered requirements as reasonable first steps.[2]

1. The Right Exam
   a. Minor head trauma imaging: use of the Pediatric Emergency Care Applied Research Network Clinical Prediction Rule (Appendix 1)
2. The Right Way
   a. Protocols to reduce dual-phase head and chest CT imaging (Appendix 2)
3. The Right Radiation Dose
   a. Use of size-specific pediatric CT imaging protocols (Appendix 3)

We have the knowledge and the tools today that can substantially. improve the safety and quality of care for our children (while also decreasing costs). We start with the premise that there is a strong professional obligation to do nothing less. We have a compelling opportunity to reduce harm for the most susceptible population: our children.[26] We know we can do a better job for our children.

These safe practices are consistent with our professional obligation to perform imaging on children only when indicated, with the proper protocols, and with the correct radiation dose. The measures are the products of years of work by dedicated professionals including the Alliance for Radiation Safety in Pediatric Imaging, Image Gently, Image Wisely, the American Board of Radiology Foundation, and American College of Radiology. Principles and recommendations have been endorsed as a National Safe Practice after the thorough, iterative consensus review and approval process of the National Quality Forum.[4]

We see accreditation as 1 part of a multidimensional strategy, including public reporting, payment policy, collaborative quality improvement, and family engagement, all intended to achieve the goal of no needless medical radiation exposure for any child.

THE URGENCY

Why should we not wait for these uncontroversial practices to passively diffuse on their own to more than 10,000 US hospitals and advanced diagnostic imaging facilities?

> In 1982, it was crystal clear that using β-blockers after myocardial infarction significantly lowered mortality.[27] There was no debate about what was the right thing to do for patients. However, it took 25 years and 6 weeks for American physicians to treat 9 of 10 myocardial infarction patients the safest way. Although professional societies played an important role, the 90% mark was reached only after federal public reporting and after The Joint Commission spurred it on.[28,29]

- Will it take 25 years for voluntary passive diffusion of what we know now to be the best medical imaging care for children?
- Are we willing to wait a generation before we create a system that reliably provides safe and appropriate medical imaging for children?

> "Some is not a number, soon is not a time."
>
> Donald Berwick, MD MPP

CALL TO ACTION

Every parent has the right to have any imaging of their child be The Right Exam, ordered The Right Way, and with The Right Radiation Dose.[30,31] We seek to engage patients, public organizations, and medical professionals in this movement (Accessed March 12, 2014: http://www.100kchildren.org/).

It has now been 12 years since 2 articles shined a bright light on potentially serious pediatric patient risk from diagnostic imaging radiation. The same questions were raised 31 years ago in our literature. Our professional community has acted gradually.[32–34] We know what needs to be done. Who would ever drive a car without first fastening his/her child's seat belt or securing his/her infant carrier? We must dramatically accelerate improvement.

No hospital or medical imaging facility in the country should be granted the privilege of imaging children unless it meets these safe practices. This is why accreditation agencies exist. Parents need help. Accreditation must have meaning.

We request that the American College of Radiology, The Joint Commission, the Intersociety Accreditation Commission, and the Centers for Medicare & Medicaid Services require these 3 safety practices for accreditation of all American hospitals and advanced diagnostic imaging facilities.

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APPENDIX 1

Safe Practice 1 (The Right Exam): Minor Head Trauma Imaging

Minor head trauma is a common childhood injury. Most patients who undergo head CT examination after minor trauma show no evidence of serious injury. Use of the Pediatric Emergency Care Applied Research Network (PECARN) Clinical Prediction Rule for minor head trauma has been shown to significantly reduce the number of CT scans yet identifies 100% of cases in which appropriate neurosurgical intervention is beneficial.[35] When the pretest probability of a serious injury for which there is therapy is extremely low, the risks of the ionizing radiation and false-positive findings outweigh any potential benefits.

- Accreditation should be granted only if the hospital or the advanced diagnostic imaging facility has protocols in place to reduce inappropriate CT imaging for children with minor head trauma. Computed tomographic imaging should be reserved for children who meet specific criteria.[35] Demonstration of protocol use and acceptable results are necessary for accreditation.

APPENDIX 2

Safe Practice 2 (The Right Way): Dual-Phase Head and Chest CT Imaging

Computed tomographic examinations are too often ordered as double studies (i.e., without and with intravenous contrast material).[36] These dual-phase or "double" CT exams expose patients to unnecessary radiation while most often providing negligible additional useful information.

- Accreditation should be granted only if the hospital or the advanced diagnostic imaging facility has protocols in place to reduce dual-phase CT examinations of the head and the chest for pediatric patients. Demonstration of protocol use and acceptable results are necessary for accreditation.

APPENDIX 3

Safe Practice 3 (The Right Radiation Dose): Pediatric CT Imaging Protocols

The amount of radiation for a useful CT examination is highly dependent on patient size (i.e., smaller children need less radiation). There is significant variation in the radiation dose.[37–39] Even among America's best hospitals, there is substantial variation in size-specific dose estimate for pediatric CT.[40,41]

- Accreditation should be granted only if the hospital or the advanced diagnostic imaging facility has protocols in place including established size-specific pediatric patient protocols. Demonstration of protocol use and acceptable results are necessary for accreditation.