The Medical Community: Reality and Ruminations on (Risk) Communication

A Radiology Perspective

Donald P. Frush MD, FSPR FACR FAAP FSBI
Duke University Medical Center

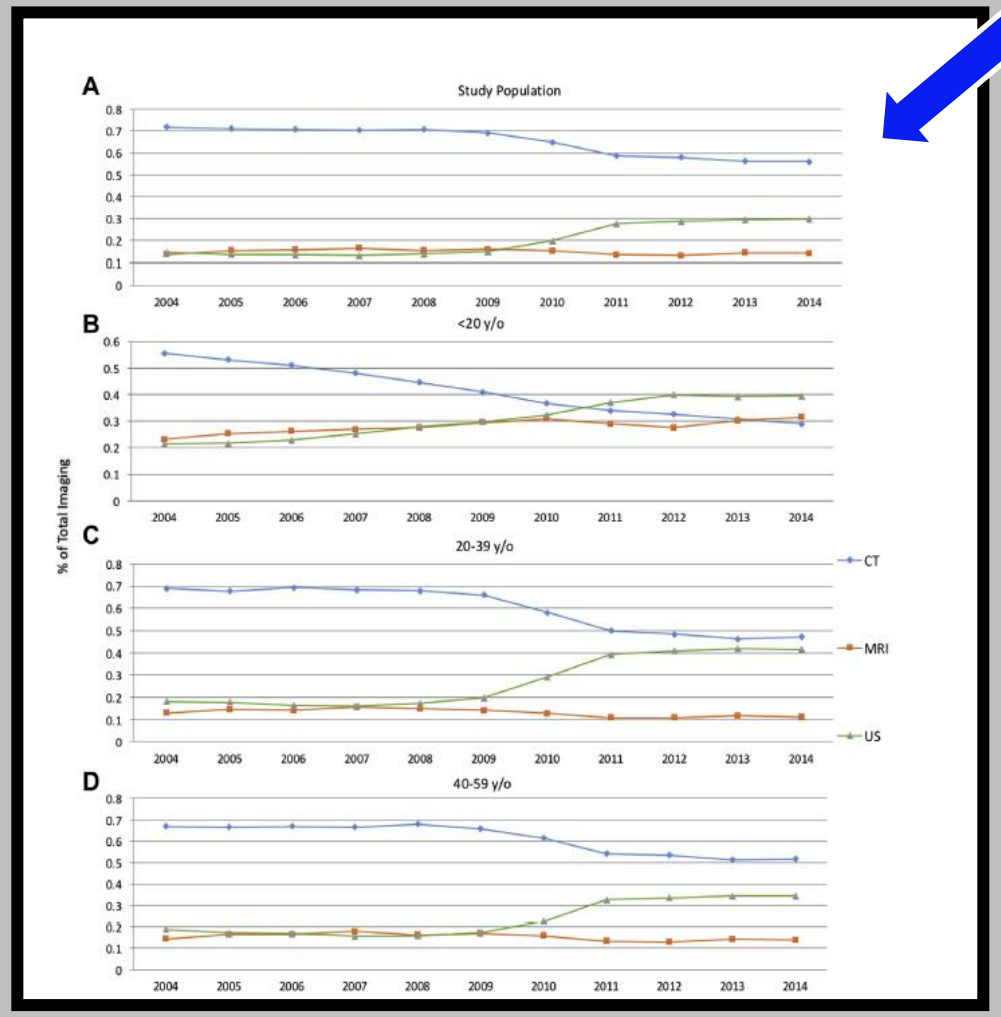
donald.frush@duke.edu

No relevant Disclosures

Towards Success

- Emphasize value of imaging
- Promote informed use: not sensationalized
- Branding: simple, resonant message of advocacy
- Head, hands and heart
- Consensus of all stakeholders
- Parity of representation
- Economy of operation; wealth of volunteers
- Independence from conflicts of interest
- Products: defined and personalized for “customers”

Making a Difference…



CT
US
MR

ORIGINAL ARTICLE LEADERSHIP

image gently®

CrossMark

Evaluating an Image Gently and Image Wisely Campaign in a Multihospital Health Care System

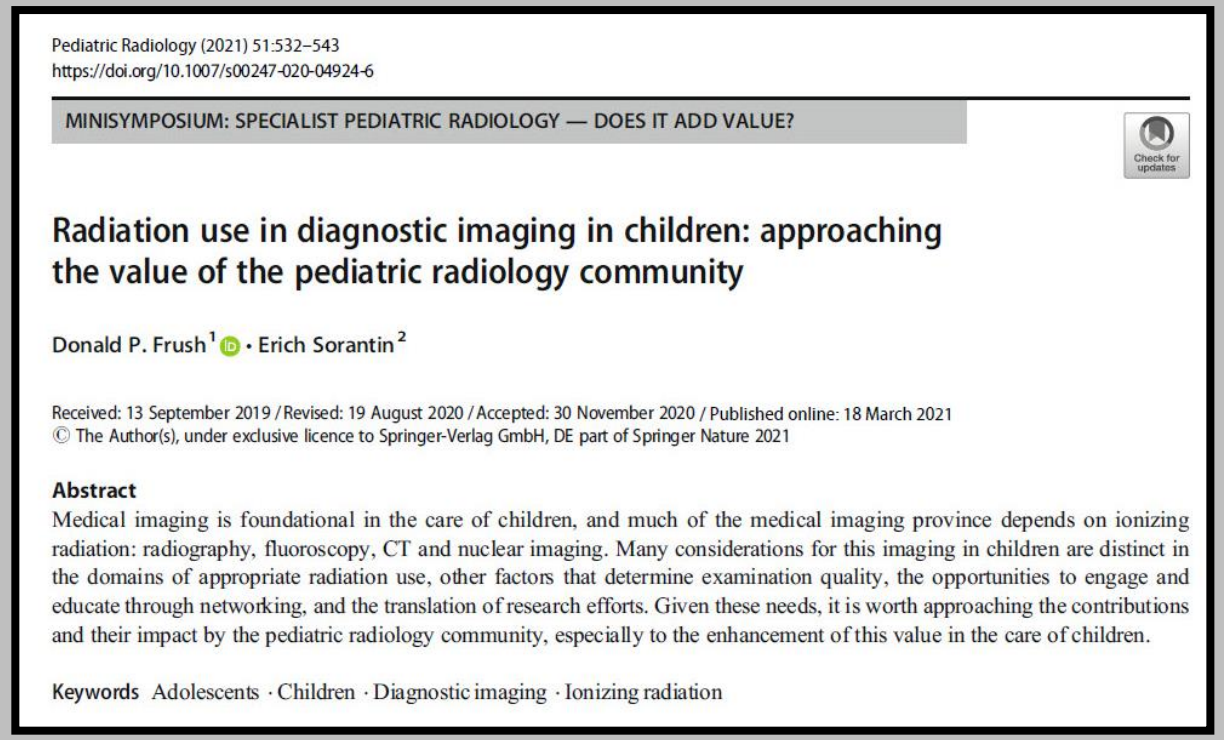
Kevin Fernandes, BS[a], Terry L. Levin, MD[b], Todd Miller, MD[b], Alan H. Schoenfeld, MS[b], E. Stephen Amis Jr, MD[b]

Abstract

Purpose: The efficacy of an Image Gently®/Image Wisely® radiology departmental campaign consisting of the optimization of CT protocols to reduce dose while maintaining quality, and an educational effort to alter the ordering patterns of referring physicians at a multihospital academic center, was evaluated.

Methods: The numbers of CT, MR, and ultrasound studies performed at inpatient, outpatient, and emergency facilities in the hospital system before and after the initiation of the departmental campaign (2010) were obtained for a 10-year period (2004-2014) using a radiology information system. For the same time period, dose per scan (volumetric CT dose index) was obtained through the Dose Index

Making a Difference…



Pediatric Radiology (2021) 51:532–543
https://doi.org/10.1007/s00247-020-04924-6

MINISYMPOSIUM: SPECIALIST PEDIATRIC RADIOLOGY — DOES IT ADD VALUE?

Check for updates

Radiation use in diagnostic imaging in children: approaching the value of the pediatric radiology community

Donald P. Frush[1] · Erich Sorantin[2]

Received: 13 September 2019 / Revised: 19 August 2020 / Accepted: 30 November 2020 / Published online: 18 March 2021

Abstract
Medical imaging is foundational in the care of children, and much of the medical imaging province depends on ionizing radiation: radiography, fluoroscopy, CT and nuclear imaging. Many considerations for this imaging in children are distinct in the domains of appropriate radiation use, other factors that determine examination quality, the opportunities to engage and educate through networking, and the translation of research efforts. Given these needs, it is worth approaching the contributions and their impact by the pediatric radiology community, especially to the enhancement of this value in the care of children.

Keywords Adolescents · Children · Diagnostic imaging · Ionizing radiation

"… it is not unreasonable to attribute that at least a part of this decline [in CT use] was from concurrent efforts at education implementation of various models … [49–51]. In fact, this position of attribution effect has been promoted in several publications and recent organizational news releases [41, 42, 52–56]."

Making a Difference…

Pediatric Radiology
https://doi.org/10.1007/s00247-020-04909-5

ORIGINAL ARTICLE

Clinical concordance with Image Gently guidelines for pediatric computed tomography: a study across 663,417 CT scans at 53 clinical facilities

Taylor Brunton Smith[1,2] · John Heil[3] · Donald P. Frush[4] · Ehsan Samei[1,2,5]

Received: 29 June 2020 / Revised: 7 September 2020 / Accepted: 9 November 2020

Abstract

Background Managing patient radiation dose in pediatric computed tomography (CT) examinations is essential. Some organizations, most notably Image Gently, have suggested techniques to lower dose to pediatric patients and mitigate risk while maintaining image quality.

Objective We sought to validate whether institutions are observing Image Gently guidelines in practice.

Materials and methods Dose-relevant data from 663,417 abdomen-pelvis and chest CT scans were obtained from 53 facilities. Patients were assigned arbitrary age cohorts with a minimum size of n=12 patients in each age group, for statistical purposes. All pediatric (<19 years old) cohorts at a given facility were compared to the adult cohort by a Kruskal-Wallis test for each of the four scan parameters — (1) x-ray tube kilovoltage (kV), (2) tube-current-by-exposure-time product (tube mAs), (3) scan pitch and (4) tube rotation time — to assess whether the distribution of values in the pediatric cohorts differed from the adult cohort. The same was repeated with volume CT dose index ($CTDI_{vol}$) and size-specific dose estimate (SSDE) to assess whether pediatric cohorts received less dose than adult cohorts. A P-value of <0.05 was deemed significant.

Results Across the 150 pediatric cohorts, 134 had scan parameters that were more child-sized than their adult counterparts. In 128 of these 134 pediatric cohorts, the $CTDI_{vol}$ was less than the adult counterpart. In 111 of these 128 pediatric cohorts, the SSDE was less than the adult counterpart.

Conclusion The study reaffirms that in practice, Image Gently's suggestions of lowering tube mAs and peak kilovoltage are commonly employed and effective at reducing pediatric CT dose.

Keywords Children · Computed tomography · Image Gently · Informatics · Monitoring · Radiation dose

"This study reaffirms that in practice, Image Gently's suggestions of lowering tube mAs and peak kilovoltage are commonly employed and effective at reducing pediatric CT dose."

Making a Difference…

TABLE 3
Dose Estimates for One CT Scan versus One Chest Radiograph

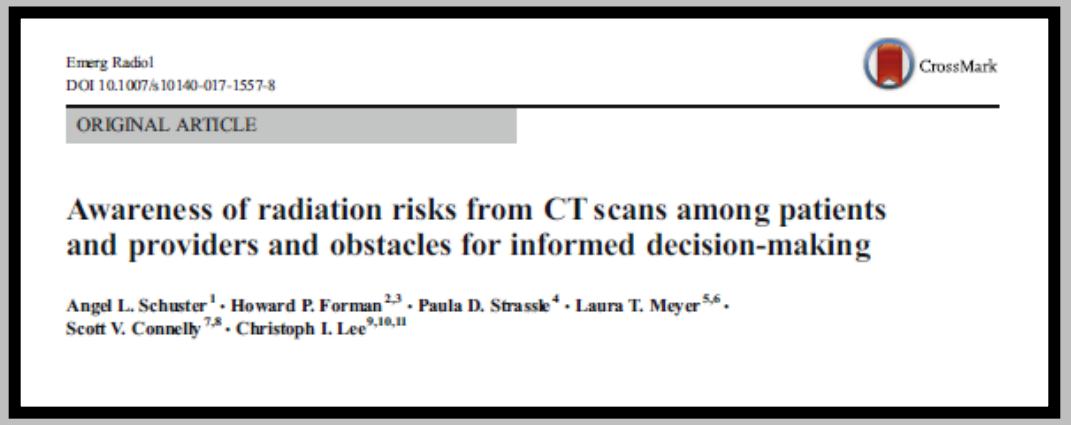
Respondent Group	CT ≤ CR	CT > CR < 10 × CR	CT ≥ 10 × CR < 100 × CR	CT = 100–250 × CR*	CT ≥ 500 × CR
Patients (n = 67)	19 (28)	43 (64)	5 (7)	0 (0)	0 (0)
ED Physicians (n = 45)	3 (7)	20 (44)	10 (22)	10 (22)	2 (4)
Radiologists (n = 39)	2 (5)	22 (56)	6 (15)	5 (13)	4 (10)

Note.—Data are the number of respondents. Numbers in parentheses are percentages. χ^2 test result, 67.04; $P < .001$. CR = chest radiograph.

* Accurate range.

Lee CI et al Radiology; 2004; 231 393-398

Making a Difference…



Emerg Radiol
DOI 10.1007/s10140-017-1557-8

ORIGINAL ARTICLE

Awareness of radiation risks from CT scans among patients and providers and obstacles for informed decision-making

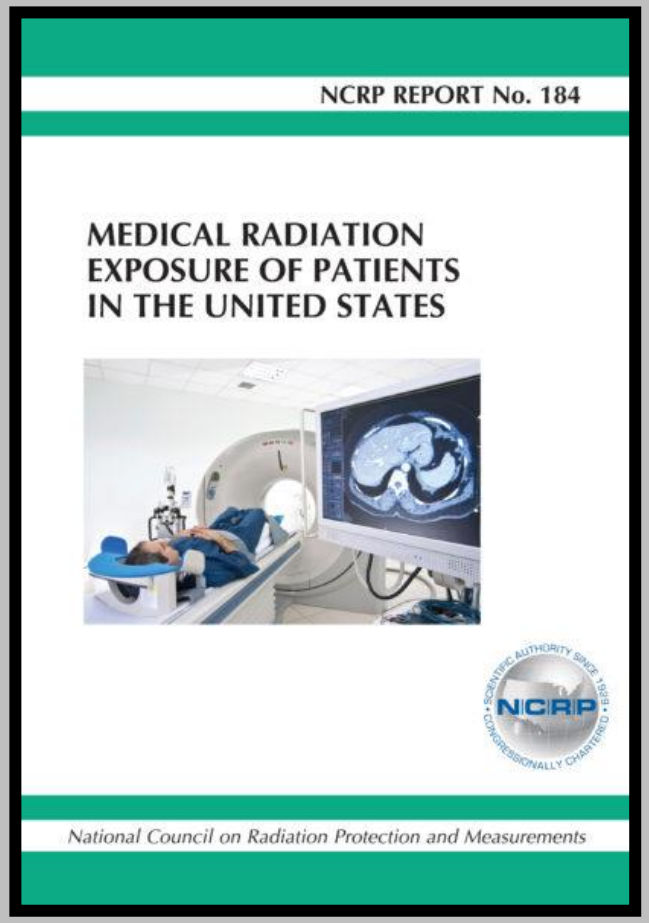
Angel L. Schuster[1] · Howard P. Forman[2,3] · Paula D. Strassle[4] · Laura T. Meyer[5,6] · Scott V. Connelly[7,8] · Christoph I. Lee[9,10,11]

CT Dose relative to CXR:

% correct estimation		2004	2010
Patients	:	0	23
Emergency Providers	:	22	39
Radiologists	:	13	48

"This change in radiation dose awareness between our study and the initial study seems to reflect favorably upon [Image Gently and Image Wisely] educational efforts."

Making a Difference…



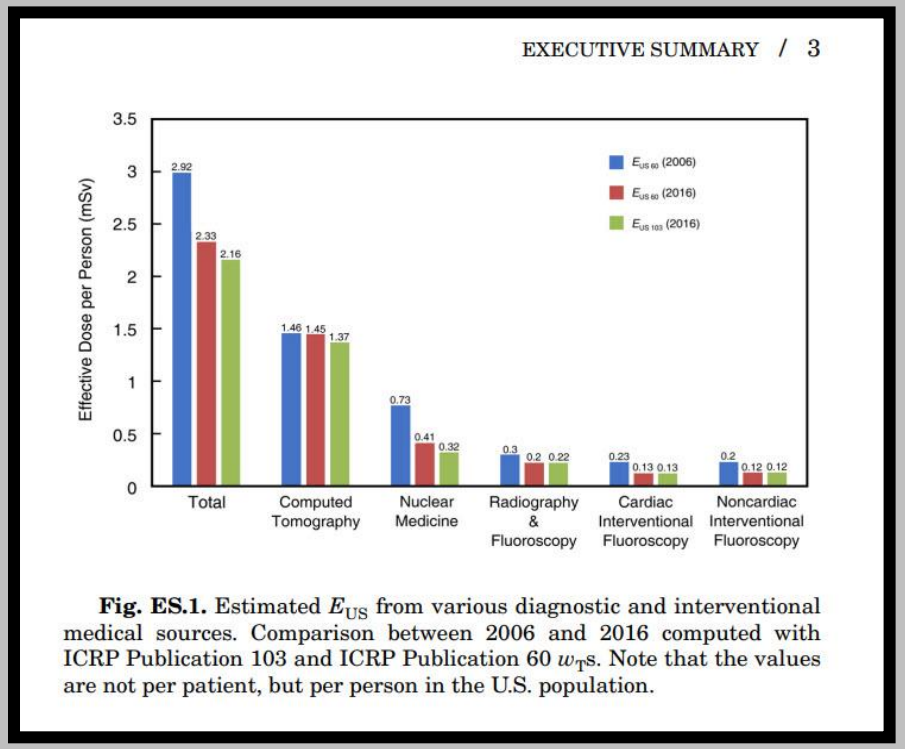
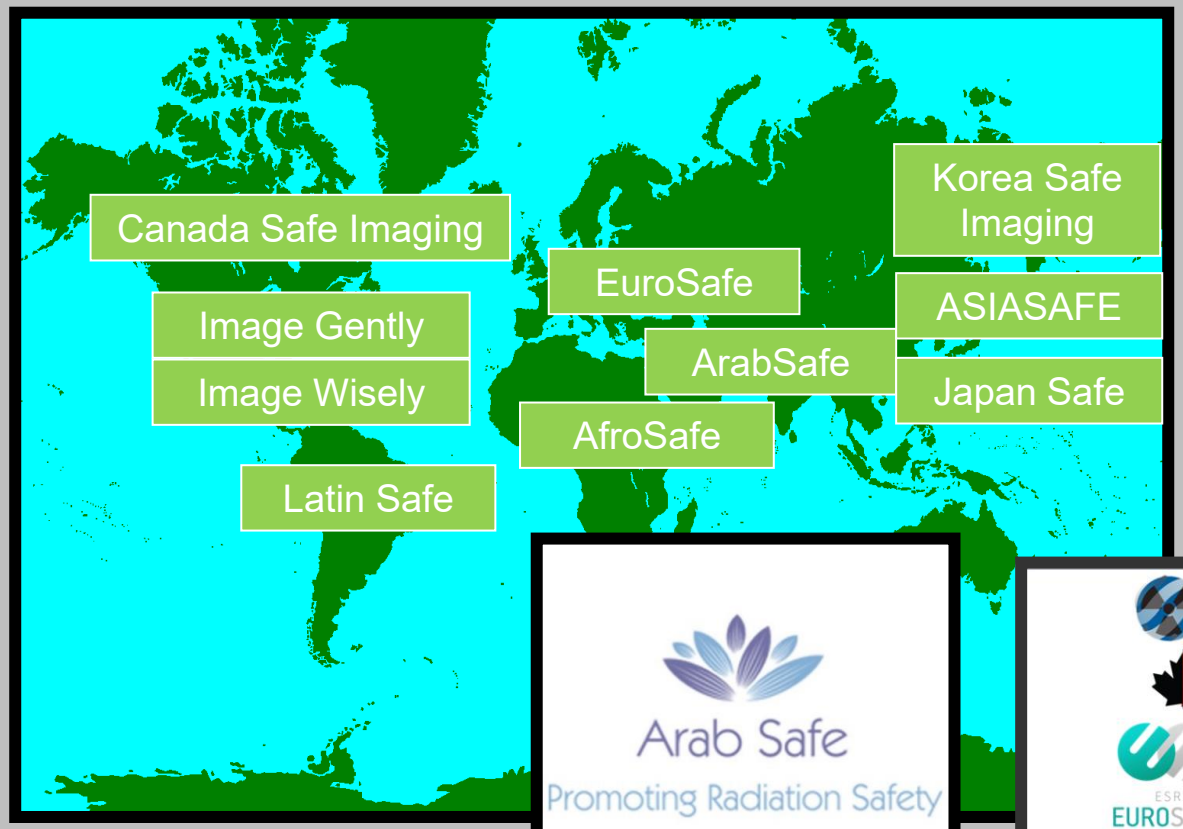


Fig. ES.1. Estimated E_{US} from various diagnostic and interventional medical sources. Comparison between 2006 and 2016 computed with ICRP Publication 103 and ICRP Publication 60 w_Ts. Note that the values are not per patient, but per person in the U.S. population.

15 to 20% reduction in diagnostic and interventional medical radiation doses to the U.S. population from 2006 to 2016.

Global Cooperation



ISR QSA

Arab Safe
Promoting Radiation Safety

AFROSAFE RAD
Championing Radiation Safety

Canada Safe Imaging | Imagerie Sécuritaire Canada

ESR EUROSAFE IMAGING

image gently®

IMAGE WISELY

LATIN SAFE

LATIN SAFE PEDIATRIA

ASIASAFE

A Radiology (Clinical) Perspective: The Landscape

1. **The clinical risk *participants*:**
   - **Patient/caregiver**
   - **Provider**
   - **Imaging team members (e.g., shielding practice)**

Risk: A Radiology Perspective

The overwhelming risk in (*day-to-day*) clinical practice is not providing sufficient, timely, clear diagnostic information.

Justification - canvas:
Provider

Optimization - paints/pallete:
Medical physicists

Nota bene: neither completely exclusive of the radiologist

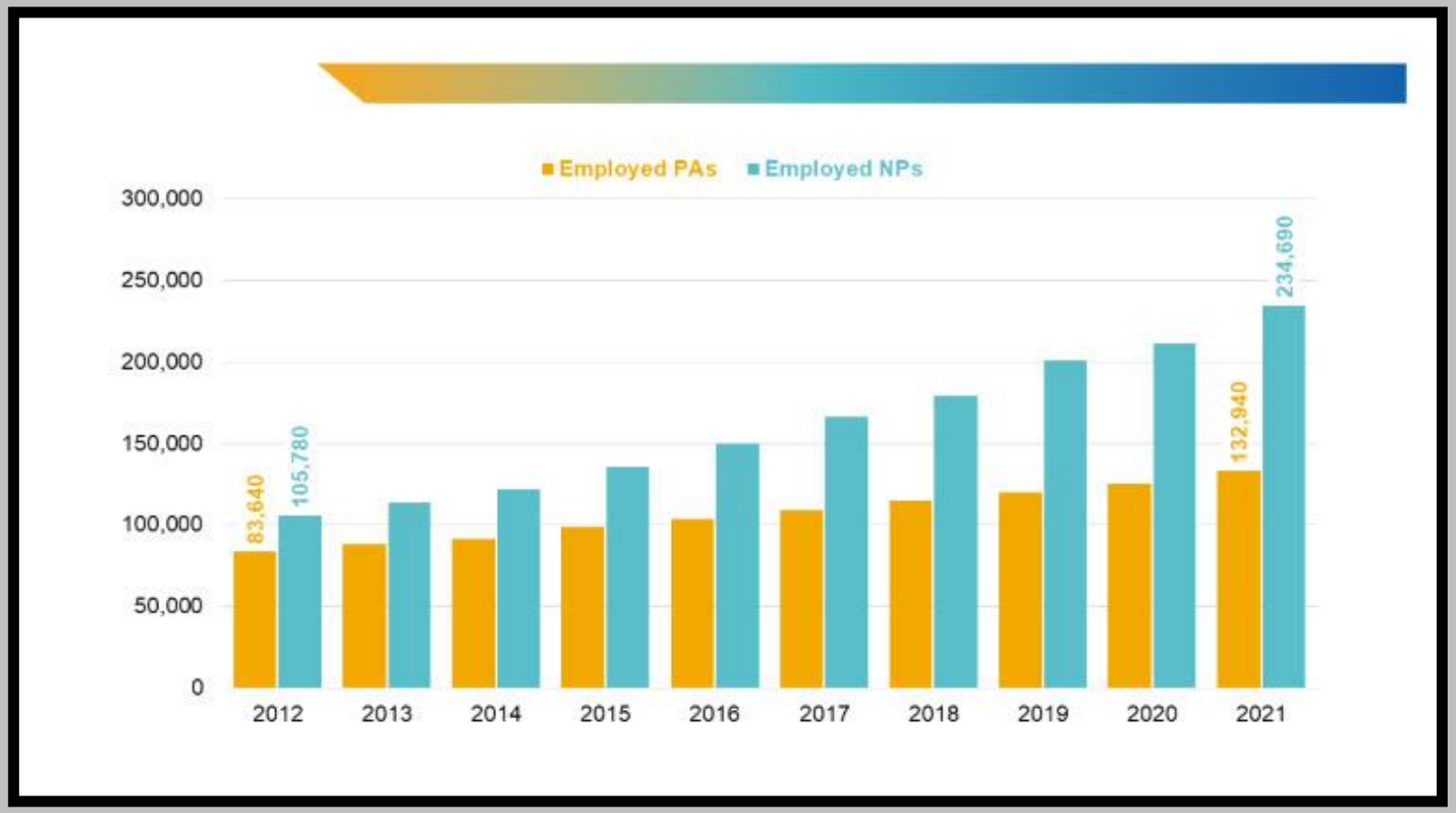
Unique Considerations for Pediatric Imaging Compared with Adult Imaging Care: *Radiation Protection Relevance*

- *Different disorders*
- *Different clinical manifestations of similar disorders in adults*
- *Different imaging appearances for similar disorders*
- *Preverbal patients*
- *Requisite engagement with caregivers*
- *Need for child friendly environment*
- *Imaging team comfortable with and capable of pediatric care*
- *Increase dependence on sedation and anesthesia*
- *Familiarity with other immobilization strategies*
- *Large range of sizes*
- *Impact of morbidity and mortality and longer life expectancy*
- *Variations in anatomy*
- *Variations in physiology*
- *Variable availability of pediatric referrers*
- *Potentially inadequate configurations for ionizing radiation equipment for children*
- *Challenges with dose estimation*
- *Challenges with radiation sensitivity and risk estimations*
- *Transfer of care: "age out"*
- *Majority of imaging (85%) in practices that are not pediatric centers (US)*
- *Potentially higher sense of significance with child morbidity and mortality*

The need for stewardship:

making decisions FOR our youngest

Physician Extenders:
A Growing Imaging Consumer in the United States



https://www.bls.gov/oes/

A Radiology (Clinical) Perspective: The Landscape

1. The clinical risk *participants*:
   - Patient/caregiver
   - Provider
   - Imaging team members (e.g., shielding practice)
2. The clinical risk *place* (setting):
   - e.g., urgent emergent vs planned
3. Risk *perception*
   - Take-away from media: association = cause

Diagnostic Imaging Radiation Risk

1. Unbalanced presence in media
2. Inherent (conflicting) risk and exposure uncertainties complicate
3. Dialogues cannot be entirely formulaic
   - e.g., numeracy is a brick, not a building
   - Literacy
   - Medical care is fundamentally a human experience
4. Relevance to holistic medical journey
5. Gaps in understanding scope/scale and success metrics

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Wednesday September 17th, 2025

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Medical Imaging and Pediatric and Adolescent Hematologic Cancer Risk

Rebecca Smith-Bindman, M.D.,[1-3] Susan A. Alber, Ph.D.,[4] Marilyn L. Kwan, Ph.D.,[5] Priscila Pequeno, M.Sc.,[6] Wesley E. Bolch, Ph.D.,[7] Erin J.A. Bowles, M.P.H.,[8] Robert T. Greenlee, Ph.D.,[9] Natasha K. Stout, Ph.D.,[10,11] Sheila Weinmann, Ph.D.,[12,13] Lisa M. Moy, M.P.H.,[5] Carly Stewart, M.H.A.,[1] Melanie Francisco, Ph.D.,[12] Cameron Ko
Jonathan Duc
Jason D. Pole

CONCLUSIONS

Our study suggests an association between exposure to radiation from medical imaging and a small but significantly increased risk of hematologic cancer among children and adolescents. (Funded by the National Cancer Institute and others.)

Wednesday October 1st 2025

AboutLawsuits

SUBOXONE TOOTH DECAY | DEPO-PROVERA | OZEMPIC WEGOVY AND MOUNJARO | BARD POWERPORT

Children Exposed to Radiation From CT Scans Face Increased Blood Cancer Risk

United States performs more CT scans and MRIs per capita than any other developed country, raising concerns about overuse and unnecessary radiation exposure in children.

October 1, 2025 Martha Garcia Add Your Comments

New research warns computed tomography (CT) scans and other types of medical imaging may cause 10% of all childhood cancers, after finding the risk increases as the dose of radiation increases, a strong indication of a causal connection.

CT scans, also commonly referred to as CAT scans, are a type of medical imaging that uses computers and ionizing radiation to help model internal organs, bones and soft tissue.

New research warns computed tomography (CT) scans and other types of medical imaging may cause 10% of all childhood cancers, after finding the risk increases as the dose of radiation increases, a strong indication of a causal connection.

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PRESIDENT DONALD J. TRUMP

The WHITE HOUSE

45 | 47

PRESIDENTIAL ACTIONS

ORDERING THE REFORM OF THE NUCLEAR REGULATORY COMMISSION

Executive Orders | May 23, 2025

https://www.whitehouse.gov/presidential-actions/2025/05/ordering-the-reform-of-the-nuclear-regulatory-commission/

… NRC to reconsider its reliance on the linear no-threshold (“LNT”) model for radiation exposure, and the “as low as reasonably achievable” (“ALARA”) standard, which is predicated on the LNT model. According to the order, the LNT and ALARA policies exemplify the NRC’s extreme risk aversion…

Diagnostic Imaging Radiation Risk

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   - **e.g., numeracy is a brick, not a building**
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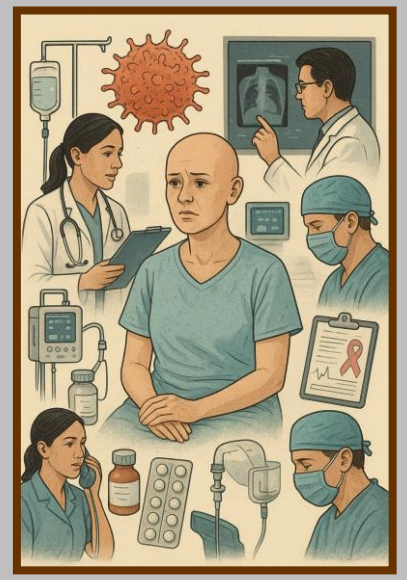
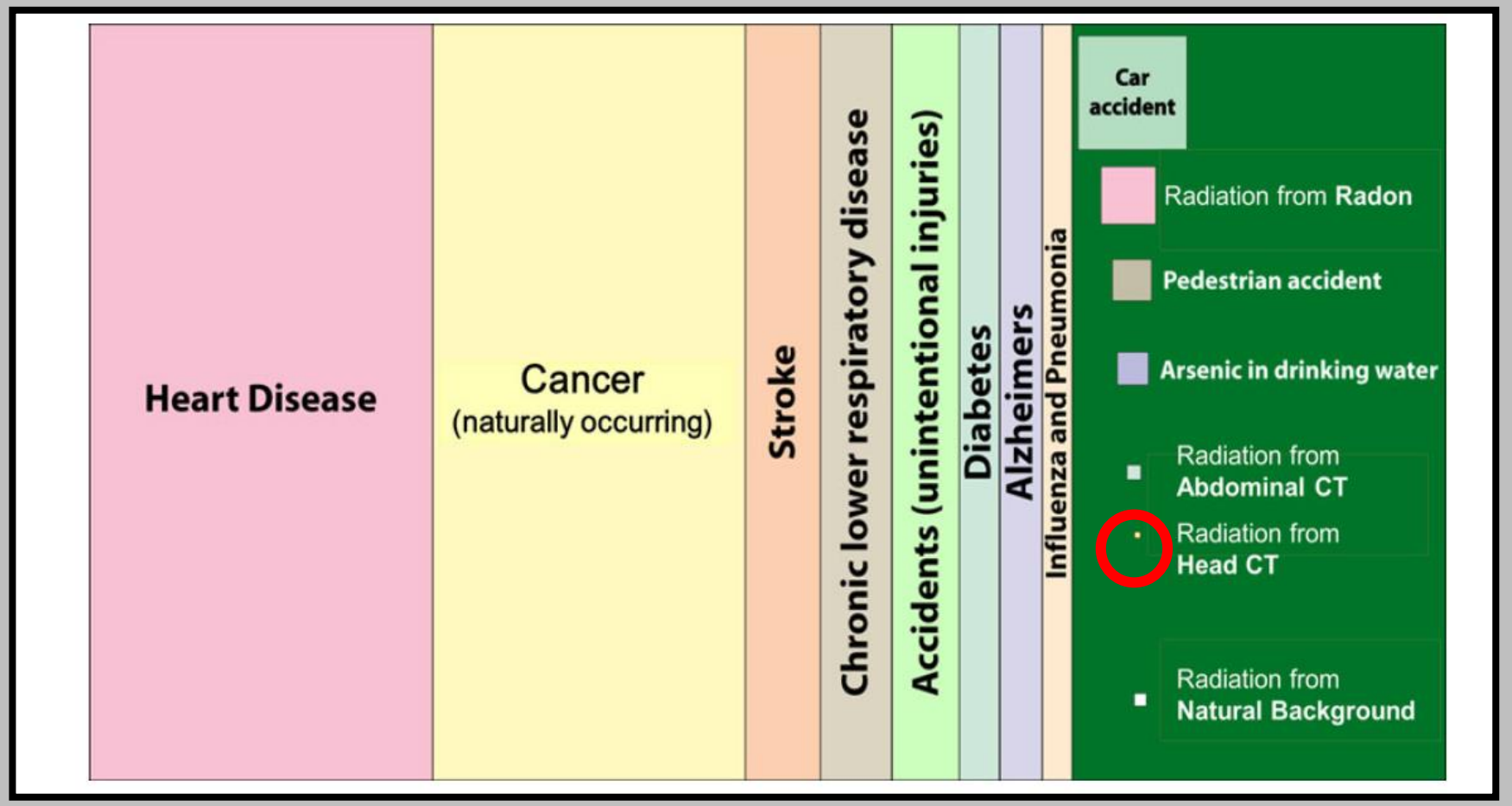
4. **Relevance to holistic medical journey**
   - **Lower priority makes data difficult to come by**
5. Gaps in understanding scope/scale and success metrics



Risk Stratification



Fletcher et al. Perspective on Radiation Risk in CT imaging. Abdominal Imaging 2012

The longest government shutdown in U.S. history is over. Here's what you need to know

NOVEMBER 15, 2025 · 5:00 AM ET

Domenico Montanaro

This photo taken on Nov. 12 shows the U.S. Capitol in Washington, D.C., the United States. The U.S. House of Representatives on Wednesday night passed a Senate-approved spending package, ending the congressional deadlock that led to the longest government shutdown in American history.

Hu Yousong/Xinhua via Getty Images

“Roughly 15 million people will lose health coverage and become uninsured by 2034…”

https://www.cbo.gov/publication/61570

Diagnostic Imaging Radiation Risk

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PCORI Radiation Risk Communication Project

Overall Goal:

"…To improve patient-provider communication, and promote shared decision-making…"

Surveys and virtual and in-person listening sessions

AMERICAN ASSOCIATION *of* PHYSICISTS IN MEDICINE

Advancing Medicine Through Excellence in the Science, Education and Professional Practice of Medical Physics

What we have learned so far
Radiation Risk Communication (RRC)

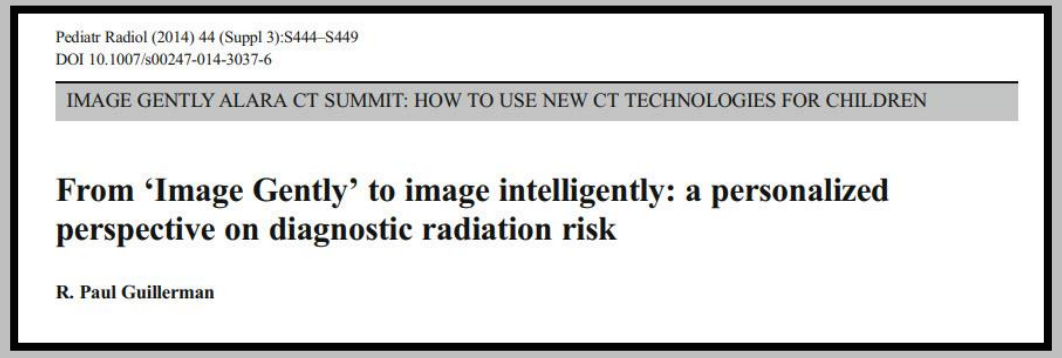
- Provider understanding of radiation risk is inconsistent
- RRC frequently deprioritized amidst the complexity of (eg time for) other healthcare needs
- Dismissive "minimal risk" and exaggerated “radiation kills” messaging
- Ambiguity on who is responsible for initiating and managing risk communication
- Communication depends on setting (eg acute vs routine care)

What we have learned so far
Radiation Risk Communication (RRC)

- **Need for the *radiation care community* to improve RRC**
- **Resources: varied and can be unreliable**
- **Clear demand for diverse, patient-preferred, age-appropriate methods of communication**
- **Dismissive "minimal risk" and exaggerated “radiation kills” messaging**

Risks More Heavily Weighted When

- Unkown or low
- Senstionalized (e.g., harm and alarm)
- Bad outcomes
- Personally relevant



Pediatr Radiol (2014) 44 (Suppl 3):S444–S449
DOI 10.1007/s00247-014-3037-6

IMAGE GENTLY ALARA CT SUMMIT: HOW TO USE NEW CT TECHNOLOGIES FOR CHILDREN

From 'Image Gently' to image intelligently: a personalized perspective on diagnostic radiation risk

R. Paul Guillerman

Guillerman RP. Pediatr Radiol. 2014 Oct;44 Suppl 3:444-9.

Medical (Imaging) Environment

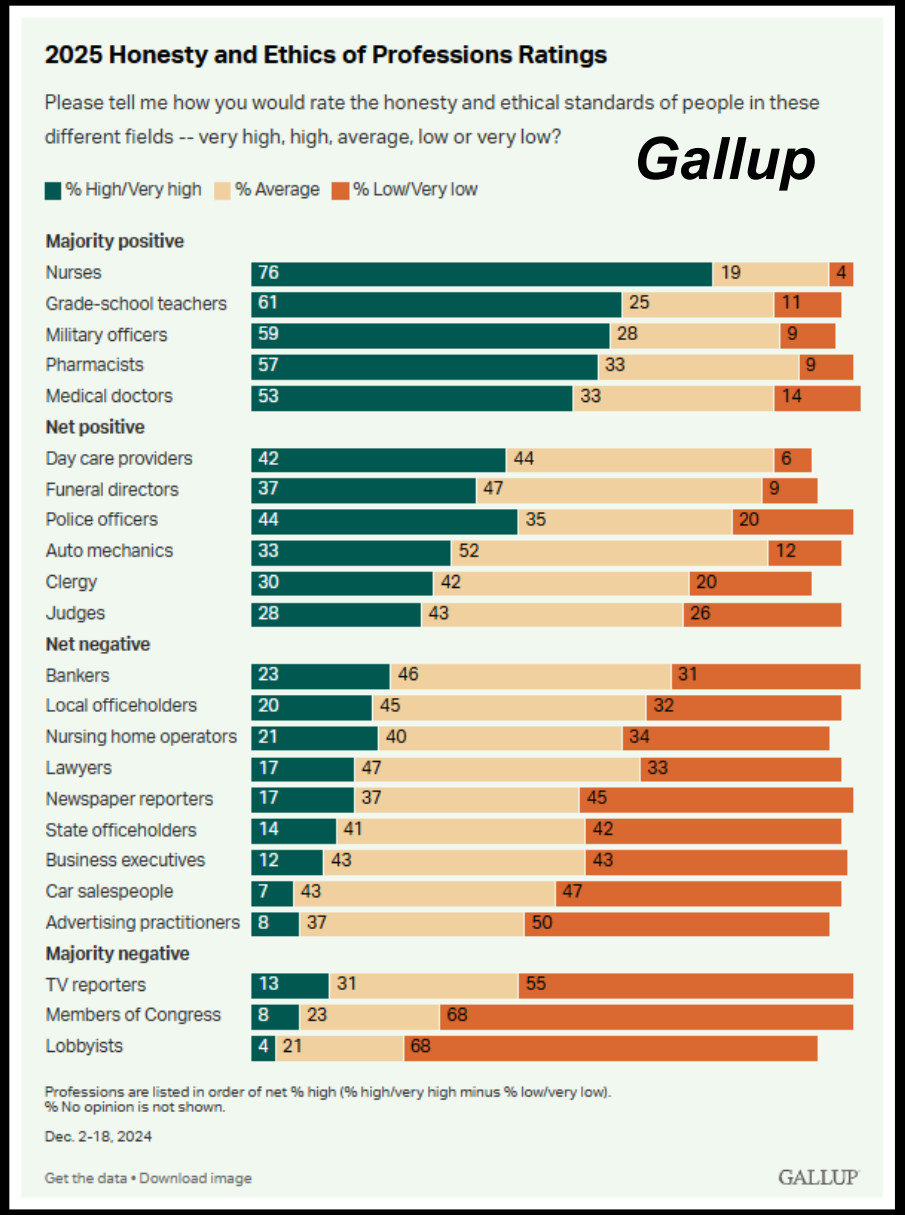
- Potential lack of control (helplessness)
- Unfamiliarity
- Decisions for others
- High anxiety
- Sense of urgency
- Potential consequences
- Limited access

What do parents hear when you say "1 in 2,000 risk of cancer"

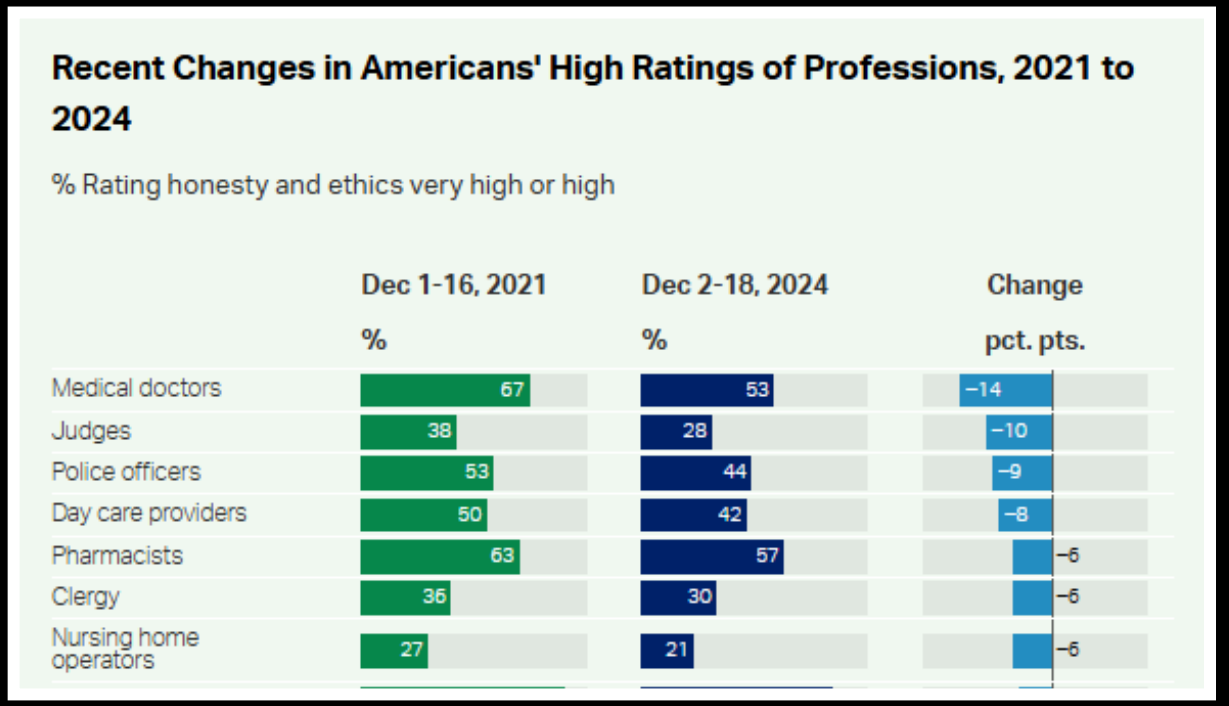
1 in 2,000 = "my child" AND 1999 others

What we have learned so far
Radiation Risk Communication (RRC)

- **Need for the *radiation care community* to improve RRC**
- **Resources: varied and can be unreliable:**
  - **Social media, friends and family, generic web searches**
- **Clear demand for diverse, patient-preferred, age-appropriate methods of communication**
- **Dismissive "minimal risk" and exaggerated “radiation kills” messaging**
- ***Trust is lacking in general; quiet “acceptance” of decisions***



Americans' sense of how much they can trust each profession varies widely, likely influencing how they engage with each.



Trust

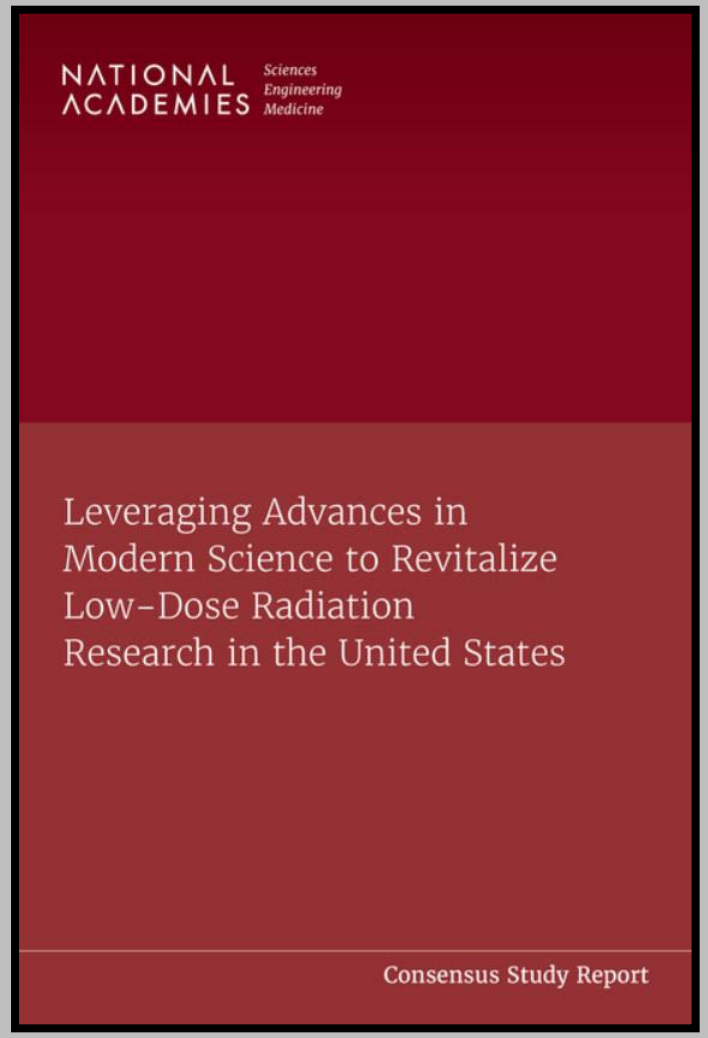
…firm belief in the reliability, truth, or ability of someone or something.

A partnership.

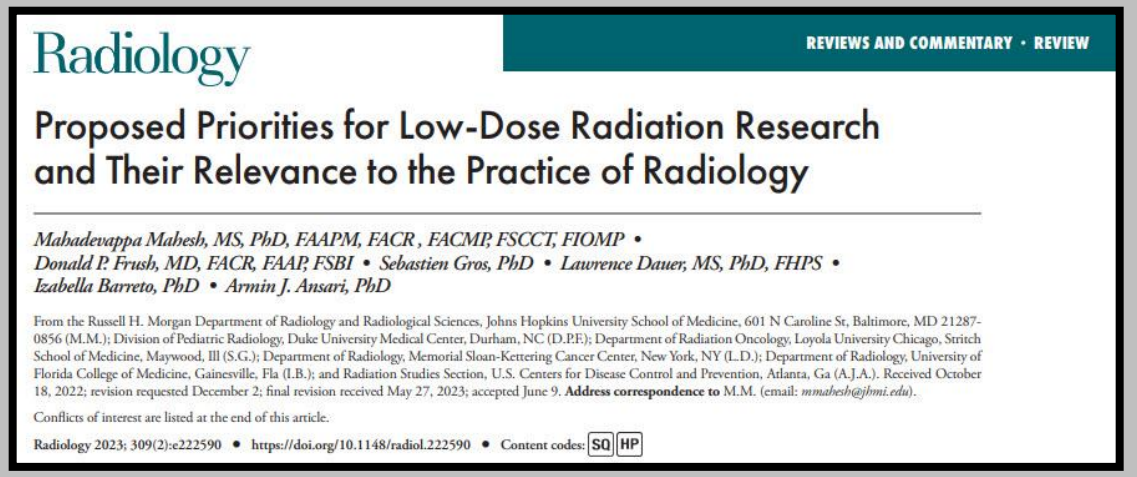
- **Innately human**
- **Implicit vulnerability**

Trust and Radiation Risk Understanding: Challenges for Imaging Professionals

- Social (group) and personal communication pathways
- We are image “facing” rather than patient facing
- “Risk is very low”: Optics of self preservation
  - can undermine trust building
- Radiation protection requires resources
  - business success: increase revenue and/or decrease cost



https://nap.nationalacademies.org/catalog/26434/leveraging-advances-in-modern-science-to-revitalize-low-dose-radiation-research-in-the-united-states



Radiology

REVIEWS AND COMMENTARY • REVIEW

Proposed Priorities for Low-Dose Radiation Research and Their Relevance to the Practice of Radiology

Mahadevappa Mahesh, MS, PhD, FAAPM, FACR , FACMP, FSCCT, FIOMP •
Donald P. Frush, MD, FACR, FAAP, FSBI • *Sebastien Gros, PhD* • *Lawrence Dauer, MS, PhD, FHPS* •
Izabella Barreto, PhD • *Armin J. Ansari, PhD*

From the Russell H. Morgan Department of Radiology and Radiological Sciences, Johns Hopkins University School of Medicine, 601 N Caroline St, Baltimore, MD 21287-0856 (M.M.); Division of Pediatric Radiology, Duke University Medical Center, Durham, NC (D.P.F.); Department of Radiation Oncology, Loyola University Chicago, Stritch School of Medicine, Maywood, Ill (S.G.); Department of Radiology, Memorial Sloan-Kettering Cancer Center, New York, NY (L.D.); Department of Radiology, University of Florida College of Medicine, Gainesville, Fla (I.B.); and Radiation Studies Section, U.S. Centers for Disease Control and Prevention, Atlanta, Ga (A.J.A.). Received October 18, 2022; revision requested December 2; final revision received May 27, 2023; accepted June 9. **Address correspondence to** M.M. (email: *mmahesh@jhmi.edu*).

Conflicts of interest are listed at the end of this article.

Radiology 2023; 309(2):e222590 • https://doi.org/10.1148/radiol.222590 • Content codes: SQ HP

2023: "Is this recommendation for the timeline and amount of funding realistic given challenges at the government level with approvals, changes in administration and dollars allocated, and public perception of the importance of low-dose medical radiation?"

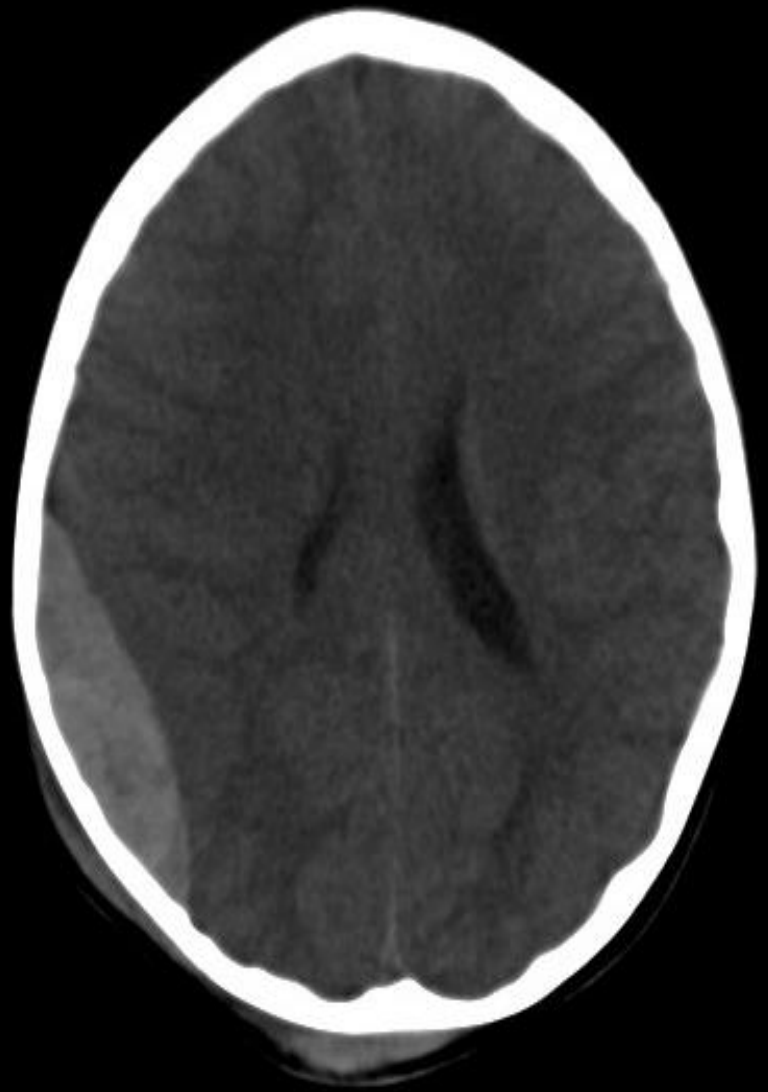
Effective *Interpersonal* Communication

- **Informativeness:** quantity and quality of health information provided by the physician; **be informed**
- **Interpersonal sensitivity:** affective behaviors that reflect the doctor's attention to, and interest in, the parents' and child's feelings and concerns; **be sensitive**
- **Partnership building:** the extent to which the physician invites the parents (and child) to state their concerns, perspectives, and suggestions during the consultation. **be engaging**

PEDIATRICS Volume 121, Number 5, May 2008

What Should You Say?
As an artist, risk and benefit are in landscape

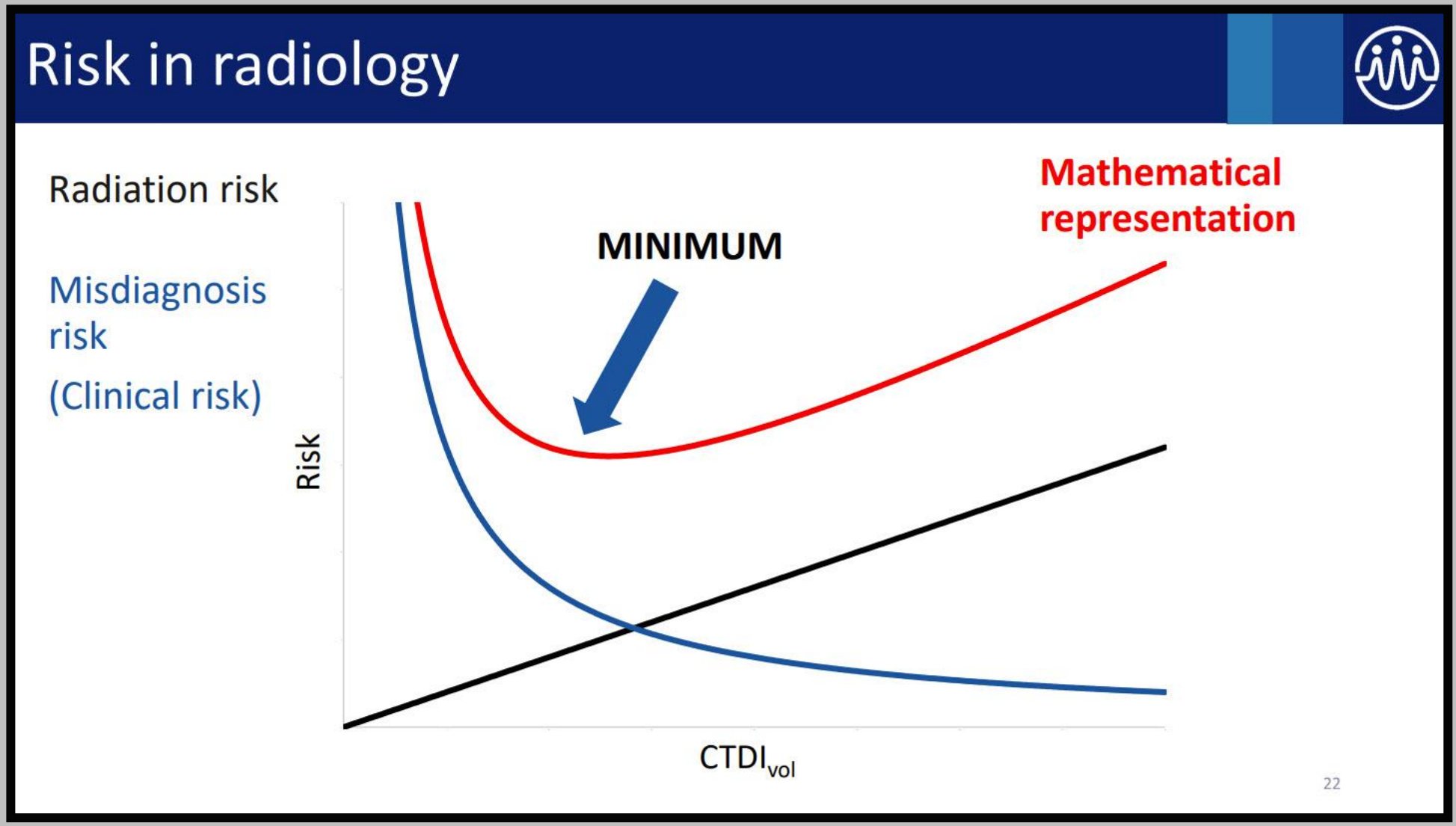
1. That is a good question: sensitive
2. I can answer that: informed
3. We have (*hopefully*) expertise
   - know the doses
   - minimize radiation
4. This is a necessary/important exam
   - I avoid “numbers”
5. Other questions? engaging



Remember the value of what CT provides

“You have a 1 in 10,000 chance of getting cancer from this CT … and you have a 1:2-20 chance of dying from this brain injury”

Risk in radiology



Courtesy Franceso Rio, PhD Duke Medical Center

Diagnostic Imaging Radiation Risk: Contribute to Building Trust: Need Vision

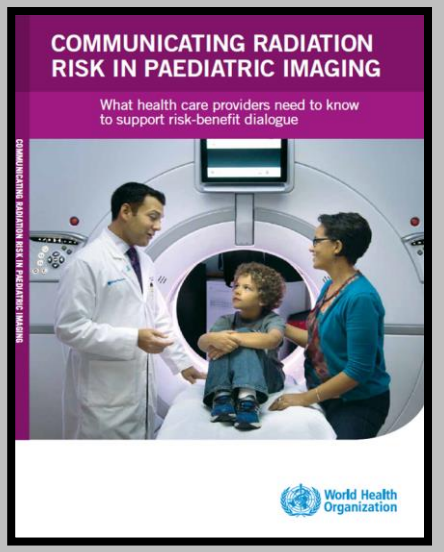
1. Unbalanced presence in media: leverage AI

2. Inherent (conflicting) risk and exposure uncertainties complicate: be certain about uncertainties

3. Dialogues cannot be entirely formulaic: target providers to best serve nuances of the provider patient covenant
   - e.g. numeracy is a brick, not a building
   - Literacy
   - Medical care is fundamentally a human experience
   - Morality: there is a person "behind" every picture:
   - Authoritative source(s)

4. Relevance to holistic medical journey:
   - "Perfect" risk understanding does not = the map

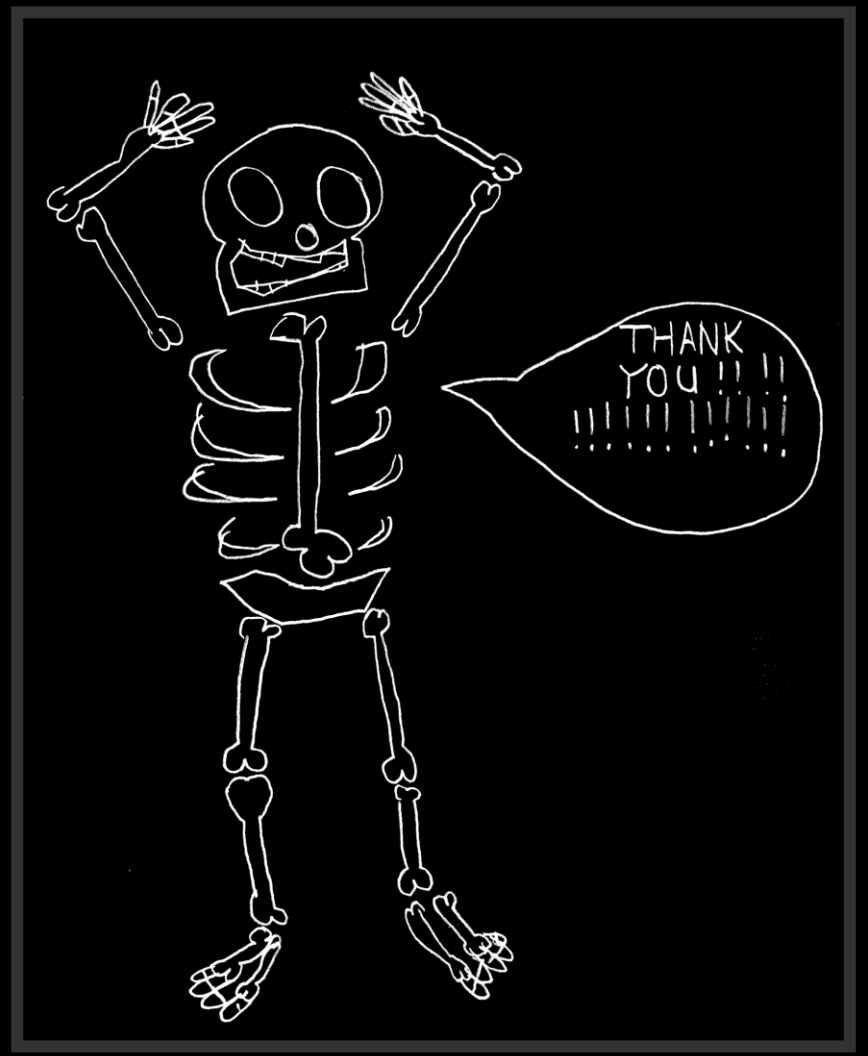
5. Gaps in understanding scope/scale and success metrics: Needs work



Medicine is a both an intellectual and moral *service* profession.
"Dialogues" need content and character

"In medicine in general, I share the view that the proper end of medicine (rather than money, autonomy, patient preference fulfillment, or fame) is the health of the patient. The purpose of the radiologist is to work toward this end."

BWF, MD 2024 Internist, palliative care


THANK
YOU!!!!
!!!!!!!!!!!!!!