



# ***Justification in Radiation Protection: Warming Right to Reasonable A Radiologist's Voice***



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

**donald.frush@duke.edu**

**No relevant Disclosures**

# Principles of Radiation Protection: ICRP

- Justification
- Optimization
- Dose Limits



**01**

**Enhance the implementation of the principle of justification**

- Introduce and apply the 3As (awareness, appropriateness and audit), which are seen as tools that are likely to facilitate and enhance justification in practice;
- Develop harmonized evidence-based criteria to strengthen the appropriateness of clinical imaging, including diagnostic nuclear medicine and non-ionizing radiation procedures, and involve all stakeholders in this development;
- Implement clinical imaging referral guidelines globally, keeping local and regional variations in mind, and ensure regular updating, sustainability and availability of these guidelines;
- Strengthen the application of clinical audit in relation to justification, ensuring that justification becomes an effective, transparent and accountable part of normal radiological practice;
- Introduce information technology solutions, such as decision support tools in clinical imaging, and ensure that these are available and freely accessible at the point-of-care;
- Further develop criteria for justification of health screening programmes for asymptomatic populations (e.g. mammography screening) and for medical imaging of asymptomatic individuals who are not participating in approved health screening programmes (e.g. use of CT for individual health surveillance).

Bonn Conference  
2012



## MEMORANDUM

## Essentials of the system of radiological protection

## OPEN ACCESS

RECEIVED  
6 August 2025ACCEPTED FOR PUBLICATION  
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Werner Rühm<sup>1,\*</sup> , Kimberly Applegate<sup>2,21</sup> , Nobuhiko Ban<sup>3</sup> , Francois Bochud<sup>4</sup> , Simon Bouffler<sup>5</sup> ,  
Kun-Woo Cho<sup>6</sup> , Chris Clement<sup>7</sup> , Eduardo Gallego<sup>8</sup> , Olga German<sup>7</sup> , Gillian Hirth<sup>9</sup> ,  
Makoto Hosono<sup>10</sup> , Michiaki Kai<sup>11,12</sup> , Dominique Laurier<sup>13</sup> , Senlin Liu<sup>14</sup> , Nicole E Martinez<sup>15</sup> ,  
Sergey Romanov<sup>16</sup> , Thierry Schneider<sup>17</sup> , David G Sutton<sup>18</sup> , and Andrzej Wojcik<sup>19,20</sup> 

The principle of justification involves the process of determining whether an exposure to ionising radiation is **beneficial overall**, i.e., whether the benefits to individuals or to society of any proposed action involving ionising radiation **outweigh the harm or damage it might cause** given the circumstances. This principle ensures that unjustified radiation exposures are avoided, i.e., that there is an overall net benefit of any activity involving ionising radiation.

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- Develop harmonized evidence-based criteria to strengthen the appropriateness of clinical imaging, including diagnostic nuclear medicine and non-ionizing radiation procedures, and involve all stakeholders in this development;
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**Bonn Conference  
2012:  
still relevant**

# Much Has Been Published

## IAEA Safety Standards

for protecting people and the environment

### Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

Jointly sponsored by  
EC, FAO, IAEA, ILO, OECD/NEA, PAHO, UNEP, WHO



General Safety Requirements Part 3  
No. GSR Part 3

## Proceedings Series

### Justification of Medical Exposure in Diagnostic Imaging

Proceedings of an International Workshop  
Brussels, 2-4 September 2009



**International Atomic  
Energy Agency (IAEA).  
Report of a consultation  
on justification of  
patient exposures in  
medical imaging. Radiat  
Prot Dosimetry. 2009  
Jul;135(2):137-44**

# Justification in Medical Imaging

*Use of radiation:*

*Protection means BOTH preventing harm and promoting health*

Radiation

Can promote performance

\*Resource consuming

Other safety

\*Hofmann B et al. Visualizing the invisible: invisible waste in diagnostic imaging. Healthcare (Basel) 2021;9: 1693.

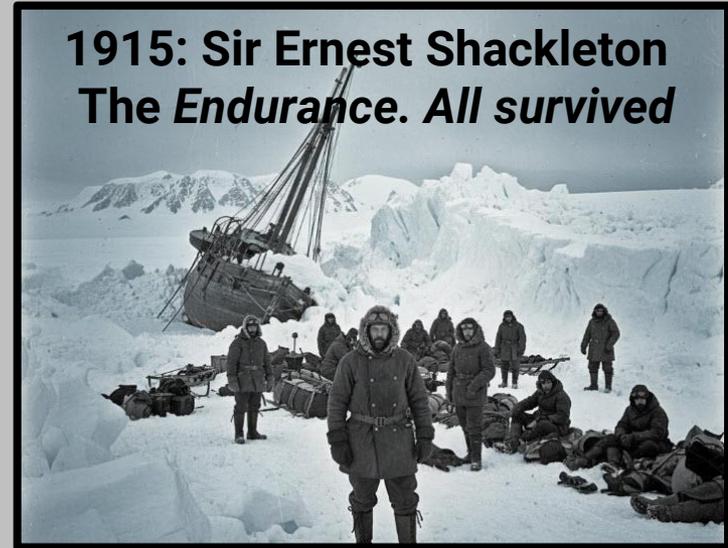
# Justification in Radiation Protection

## Towards Melting the **ICE** : the “Cold” Realities



- This approach is holistic

- *engaging, insightful (awareness), provocative, and aligning*
- *excuse my experience as predominantly US based*
- *everyone of you has better experience in some domain*



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  - *everyone of you has better experience in some domain*
- Defining benefit is difficult
- What = “outweigh”, “substantially”?
- Perspectives vary: pt, provider, caregiver, imager, radiographer, regulators/admin, lawyers
- The imaging side is judgmental: i.e., use of the terms justified/unjustified
  - *“Just” Latin derivation “right” or “law”*

# Justification in Radiation Protection

## Towards Melting the **ICE** : the “Cold” Realities



- We own optimization, share justification
- Citations : mixed successes and failures
- We are rarely patient facing
- Clinical environment poorly understood
- Referrers are not intentionally “unjustified”
- Measuring justification (i.e. outcome)
- Recurrent Imaging

**The mission is excellent patient care**

**Justification is a strategy**

**What are the (current) tactics?**

RESEARCH ARTICLE

# Trends in Head CT Use in US Emergency Department Patients From 2007 to 2022

A Nationwide Analysis

Layne Dylla,<sup>1,\*</sup> Neeharika Krothapalli,<sup>2,\*</sup> Long Tu,<sup>3</sup> Seyedmehdi Payabvash,<sup>4</sup> James F. Burke,<sup>5</sup> Kevin N. Sheth,<sup>2,6</sup> Charles Wira,<sup>1</sup> and Adam de Havenon<sup>2</sup>

*Neurology*® 2025;105:e214347. doi:10.1212/WNL.0000000000214347

Correspondence

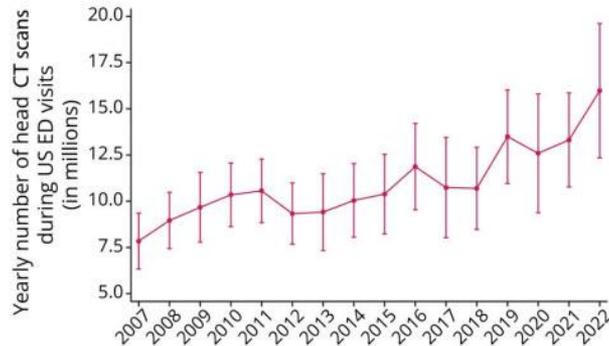
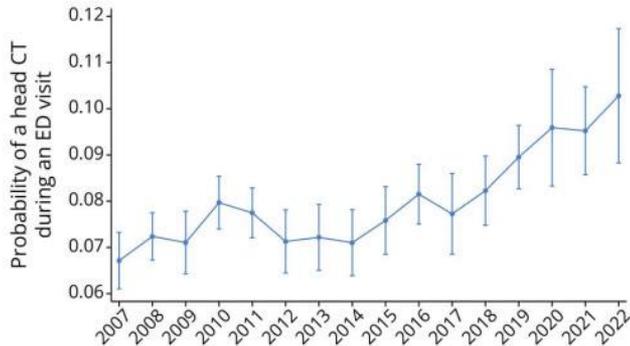
Dr. de Havenon  
adam.dehavenon@yale.edu

Abstract

RELATED ARTICLE

**“The tension between underuse leading to missed diagnosis and the overuse resulting in radiation exposure and additional clinical and financial strains on the health care system remains in place.”**

**Was care better or not?**



The probability of a head CT (A) and the total number of head CT scans (B) in the ED increase over time. Error bars represent 95% CI around the point estimate. ED = emergency department.

**SPECIAL REPORT**

# Recurrent medical imaging exposures for the care of patients: one way forward



Donald Paul Frush<sup>1\*</sup> , Jenia Vassileva<sup>2</sup>, Marco Brambilla<sup>3</sup>, Mahadevappa Mahesh<sup>4</sup>, Madan Rehani<sup>5</sup>, Ehsan Samei<sup>1</sup>, Kimberly Applegate<sup>6</sup>, John Bourland<sup>7</sup>, Olivera Ciraj-Bjenjac<sup>8</sup>, Danielle Dahlstrom<sup>9</sup>, Vesna Gershan<sup>2</sup>, Paddy Gilligan<sup>10</sup>, Barbara Godthelp<sup>11</sup>, Hakon Hjemly<sup>12</sup>, Franz Kainberger<sup>13</sup>, Miriam Mikhail-Lette<sup>8</sup>, Ola Holmberg<sup>2</sup>, Diana Paez<sup>8</sup>, Suz Schrandt<sup>14</sup>, Andreas Valentin<sup>15</sup>, Tahera Van Deventer<sup>16</sup> and Richard Wakeford<sup>17</sup>

“The authors believe that it should not be construed ... that the two positions were absolute in either obviating dose history or requiring it and that the value of dose history was both a matter of setting (unexpected vs planned [recurrent] procedure) and lack of harmony was more a matter of degree than divergence.”

**Table 3** Writing group recommendations for recurrent imaging and ionizing radiation exposure

1. Recognize that the two statements are not contradictory, refer to different scenarios and are subject to uncertainty. Avoid extreme interpretations of either of the current statements. The potential value of dose information in recurrent imaging will vary depending on whether unexpected or planned imaging scenarios
  2. Recognize primacy of patient agency in medical decision making (i.e., recognize patient/public needs)
  3. Collaborate towards multidisciplinary optimization of protocol driven imaging
  4. Strengthen dosimetry and accuracy of dose representations to reduce uncertainties in patient dose and risk assessment
  5. Foster vendor accountability for availability of high fidelity dose information for the medical community
  6. Employ effective communication and education (relevant to the various stakeholders) to facilitate understanding of and role of anticipated or past medical radiation exposure
  7. Disseminate exposure monitoring systems, their expansion to multi-facility and national level, and their integration with other healthcare information technology systems including electronic health records
  8. Explore application of diagnostic reference level model for individual examinations to singular and recurrent imaging
- Limitation: We observe that the most relevant incorporation of radiation risk in imaging practice is dependent on the use of the most appropriate metric of patient radiation burden, proper and effective education of all associated care providers, effective communication tools and resources for the patients and care providers, effective information technology resources, and practical implementations in the clinic. As such, a rollout plan and effective campaign should be put in place to fully embody the recommendation of this consensus document*

# Appropriate Use in the U.S.

## Who Drives use?

- The medical/scientific imaging community
- **Workforce shortage**
- Referrers
- Industry
- Non-radiologists
- Payers
- Government
- Regulators
- Health policy makers
- Lawyers
- Administration
- Public
- Patient
- Parents/caretakers
- Media

# Appendicitis Imaging Options: What to Do?

Pediatric Radiology 2009; 39: p 200

## Resources Vary

- Personnel
- Training/experience
- Time of day

### Resources

(1) Personnel: sonographic technologists in the U.S. who deal primarily with adult patients are not, as a group, expert in evaluating patients with possible appendicitis. Virtually all imaging in adult patients in the U.S. is now by MDCT, although one recent report advocated US as the first-line approach in adult patients [33]. For many children cared for in general hospital environments, MDCT is utilized as well. Sonographic expertise for children with suspected appendicitis is becoming limited to large specialty centres, including university hospitals and children's hospitals.

- (2) Radiology residents in the U.S. do not actively participate in hands-on US, as a rule.
- (3) Changes in trainee duty hours may limit experience with both clinical examination and imaging evaluation. A corollary is that reduced manpower in certain disciplines or specific times of day will affect decision making.
- (4) Experience will differ at the beginning of an academic year versus the end of the training year.
- (5) Individual experience will alter an algorithm established for patient evaluation. For example, imaging decisions may be different after evaluation by a junior resident, versus a senior resident, versus a fellow, versus junior faculty, versus senior faculty. This applies to emergency department and surgical evaluations, as well as those of imaging specialists.
- (6) Individual experience may also affect when imaging is obtained (i.e. before or following evaluation by a surgeon) [19]. The use of teleradiology (and night coverage – “nighthawk” – services) may result in less accountability and communication as this technology and practice model becomes more pervasive in the U.S. In this circumstance, MDCT would be more of a default choice because of limited interaction between the clinical team and the radiologist if questions arise on US evaluation.
- (7) The time of day is clearly a factor in imaging decisions. Doria et al. [34] found that there were often longer wait times during standard day-time hours to get imaging evaluation than for after-hours evaluation and provided explanations for why this was the case. In addition, the shift in thinking by many paediatric surgeons to consider appendectomy an urgent rather than emergent procedure has altered imaging practices, particularly among already hospitalized patients.

# The ALARA\* Concept in Pediatric Imaging



Pediatric Emergency Physicians:  
 “We order CT because [reliable] US is not always available...”  
 Also, EM physician performance partly driven by length of stay.

*\*As Low as Reasonably Achievable*

February 23-24, 2008

Hyatt Regency Orlando International Airport  
 Orlando, Florida

*This program endorsed by:*



The Society for  
 Pediatric Radiology



American Academy of  
 Pediatrics



American College of  
 Radiology



American College of  
 Emergency Physicians



National Council on Radiation  
 Protection & Measurements

*Supporting Organization:*



*Jointly sponsored by:*

American College of Radiology

## Program

### FRIDAY, FEBRUARY 22

4:00 - 6:00 pm **Registration**

### SATURDAY, FEBRUARY 23

7:30 - 8:30 am **Registration and Continental Breakfast**

8:30 - 8:45 am **Program Introduction, Welcome, and Announcements**  
 Donald P. Frush, M.D., Karen S. Frush, M.D.

9:45 - 9:45 am **“Start with a Question?” Emphasis on Bedside**



11:00 am - 12:00 pm **The Art of Communication: Strategies to Improve Patient and Information Flow**

11:00 - 11:30 am **Radiology Perspective**  
 Thomas L. Slovits, M.D.

11:30 - 12:00 pm **ED Perspective**  
 Steven E. Krug, M.D., F.A.A.P.

12:00 - 1:15 pm **Lunch**

1:15 - 3:30 pm **Imaging Utilization**

1:15 - 1:40 pm **Imaging Utilization: Radiology Perspective**  
 Martin H. Reed, M.D., F.A.A.P.

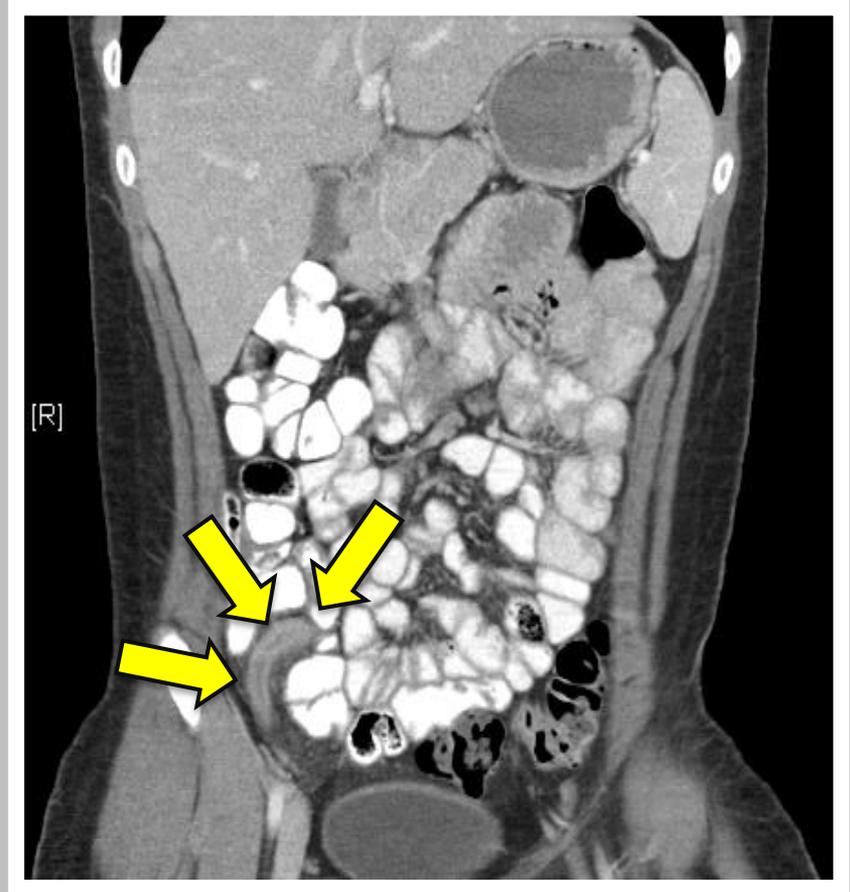
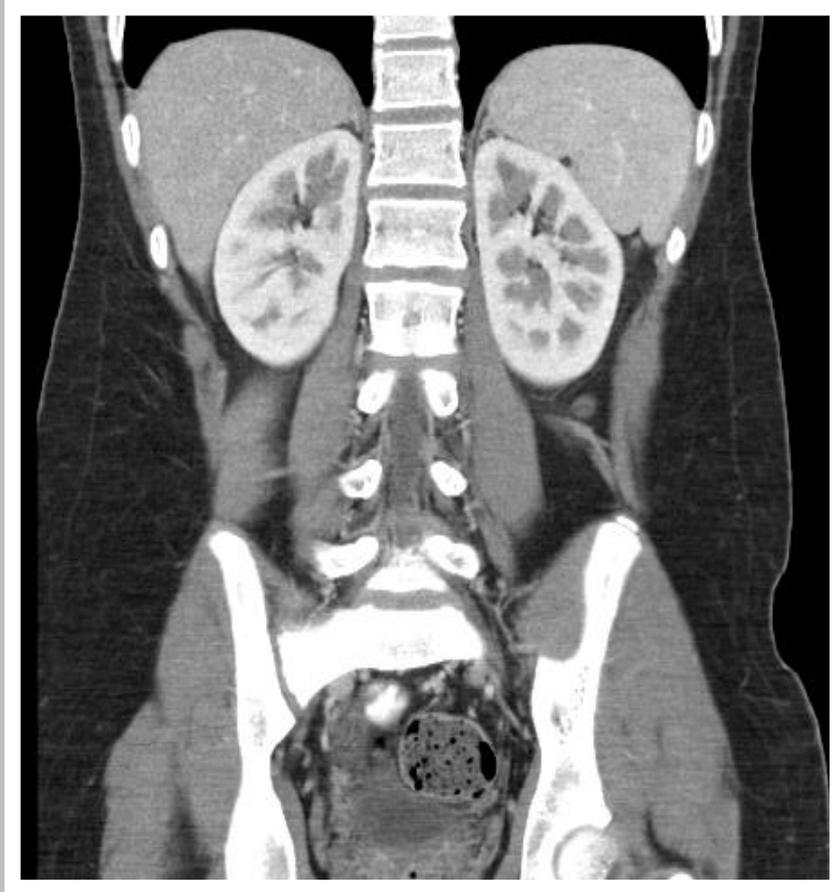
1:40 - 2:05 pm **Imaging Utilization: ED Perspective**  
 Joshua Broder, M.D.

2:05 - 2:30 pm **Imaging Utilization: What We Need to Do**  
 Nathan Kuppermann, M.D., M.P.H., F.A.A.P.

2:30 - 3:00 pm **Contemporary Imaging: Technology and Controversies**  
 Carlos J. Sivit, M.D.

3:00 - 3:30 pm **Bedside Pediatric Emergency Evaluation Through  
 Ultrasonography**  
 Ann M. Dietrich, M.D., F.A.A.P., F.A.C.E.P.

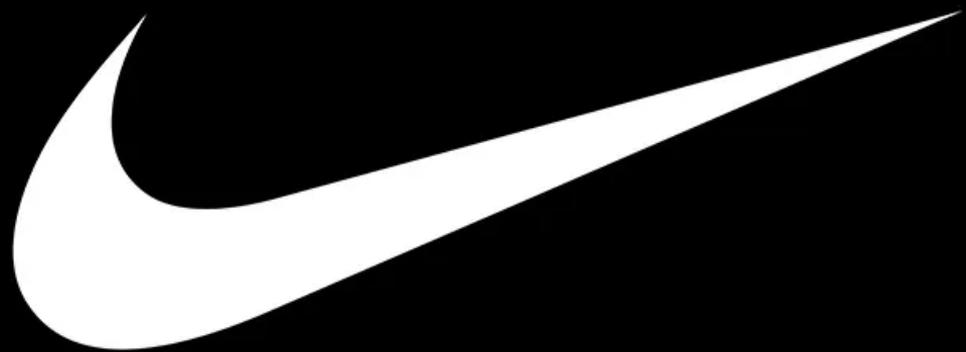
# So is CT Unjustified?



# Appropriate Use in the U.S.

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- **Lawyers**
- Administration
- Public
- Patient
- Parents/caretakers
- Media



**JUST DO IT.**

# Unnecessary Tests and Procedures In the Health Care System

What Physicians Say About  
The Problem, the Causes, and the Solutions  
*Results from a National Survey of Physicians*

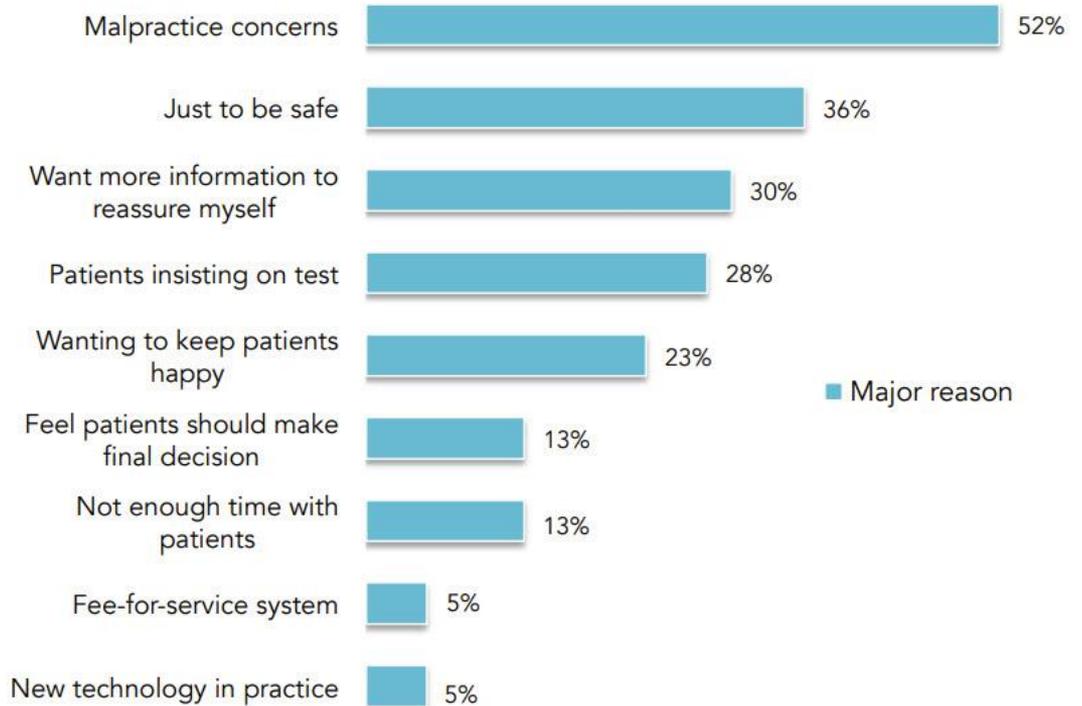
May 1, 2014

Conducted for  
The ABIM Foundation

By  
PerryUndem Research/Communication

**Figure 5: In your own practice, is this a reason you sometimes end up ordering an unnecessary test or procedure? IF YES: Is this a major reason or minor reason?**

Total n = 600



# Following Guidelines

Radiation Protection Dosimetry (2008), Vol. 129, No. 1–3, pp. 6–12  
Advance Access publication 29 February 2008

doi:10.1093/rpd/ncn012

*INVITED PAPER*

## NEW ETHICAL ISSUES FOR RADIATION PROTECTION IN DIAGNOSTIC RADIOLOGY

J. F. Malone\*

St James's Hospital, Trinity College Health Sciences Centre, Dublin 8, Ireland

The ethical basis for many medical practices has been challenged over the last two decades. Radiology has seen enormous growth during the same period. Many practices and equipment types, now commonplace, did not exist a generation ago. Yet the fundamental ethical basis for these practices has not seen a corresponding level of development. This is possibly an oversight, and may be particularly important given that these innovations have taken place over a period of changing social attitudes. Areas of concern include, for example, issues around justification, consent/authorisation, inadvertent irradiation of the foetus/embryo during pregnancy and the place of paternalism/individual autonomy in the structure of practice. This paper provides the background to a workshop on these issues held in late-2006 and presents a summary of its findings.

**“Much concern was voiced by some practitioners that the justification process is sometimes weak, or non-existent, or at the very least lacks transparency in practice. In addition, the scientific and audit bases for justification are underdeveloped.”**

### Table 5. Issues with justification.

---

Sometimes weak or lacks transparency in practice  
Seriously underdeveloped scientifically  
Issues around consent, individual choice and self-referral  
Is exemption from dose limit always warranted?  
Whistle blower concerns raised at length on  
justification issues

---

# Following Guidelines

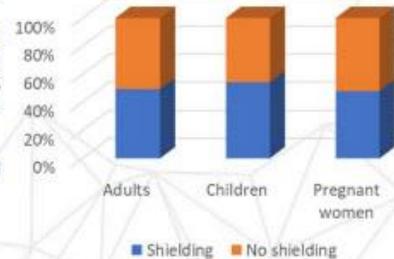
Hiles P, et al European consensus on patient contact shielding. Insights Imaging. 2021 Dec 23;12(1):194

## European survey on the use of patient contact shielding during radiological examinations

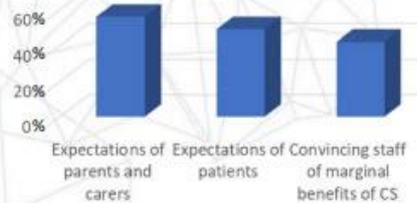
Insights into Imaging  
ESIRF EUROPEAN SOCIETY OF RADIOLOGY

- Contact shielding (CS) of patients is still largely used in European radiology departments, despite increasing evidence that this practice is not useful in many cases
- Contact shielding was most frequently used in conventional radiography, where the most frequently shielded organs were the gonads, followed by thyroid, female breasts, and eye lens.
- Most European radiology departments could adopt a non-shielding policy when the main European bodies involved in radiology provide recommendations to this regard

Use of patient shielding among European centers



Main obstacles for the implementation of a non-shielding policy



**According to this survey expectations of patients and carers, and skepticism among professionals about the limited benefits of CS are the most important obstacles to the application of a no-shielding policy. A strong commitment from European and national professional societies to inform practitioners, patients and carers is fundamental**

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- Recurrent Imaging

**The mission is excellent patient care**

**Justification is a strategy**

**What are the (current) tactics?**

## Addressing Overutilization in Medical Imaging<sup>1</sup>

Radiology

William R. Hondo, PhD  
Gary J. Becker, MD  
James P. Borgetodo, MD  
Jennifer Bosma, PhD  
William J. Casarella, MD  
Bath A. Erickson, MD  
C. Douglas Maynard, MD  
James H. Thrall, MD  
Paul E. Wallner, DO

The growth in medical imaging over the past 2 decades has yielded unarguable benefits to patients in terms of longer lives of higher quality. This growth reflects new technologies and applications, including high-tech services such as multisection computed tomography (CT), magnetic resonance (MR) imaging, and positron emission tomography (PET). Some part of the growth, however, can be attributed to the overutilization of imaging services. This report examines the causes of the overutilization of imaging and identifies ways of addressing the causes so that overutilization can be reduced. In August 2009, the American Board of Radiology Foundation hosted a 2-day summit to discuss the causes and effects of the overutilization of imaging. More than 60 organizations were represented at the meeting, including health care accreditation and certification entities, foundations, government agencies, hospital and health systems, insurers, medical societies, health care quality consortia, and standards and regulatory agencies. Key forces influencing overutilization were identified. These include the payment mechanisms and financial incentives in the U.S. health care system; the practice behavior of referring physicians; self-referral, including referral for additional radiologic examinations; defensive medicine; missed educational opportunities when inappropriate procedures are requested; patient expectations; and duplicate imaging studies. Summit participants suggested several areas for improvement to reduce overutilization, including a national collaborative effort to develop evidence-based appropriateness criteria for imaging; greater use of practice guidelines in requesting and conducting imaging studies; decision support at point of care; education of referring physicians, patients, and the public; accreditation of imaging facilities; management of self-referral and defensive medicine; and payment reform.

\* RSNA, 2010

<sup>1</sup>From the Departments of Radiology (W.R.H.), Radiation Oncology (W.R.H., S.A.E.), Biophysics (W.R.H.), and Population Health (W.R.H.), Medical College of Wisconsin, 8701 W Watertown Plank Rd, Milwaukee, WI 53226-4801; American Board of Radiology, Tucson, Ariz (G.J.B.); Department of Radiology, University of Colorado, Denver, Colo (J.P.B.); American Board of Radiology Foundation, Tucson, Ariz (J.B.); Department of Radiology, Emory University School of Medicine, Atlanta, Ga (W.J.C.); Department of Radiology, Wake Forest University School of Medicine, Winston-Salem, NC (C.D.M.); Department of Radiology, Massachusetts General Hospital, Harvard Medical School, Boston, Mass (J.H.T.); and 21st Century Oncology, Fort Myers, Fla (P.E.W.). Received January 9, 2010; revision requested February 17; revision received March 6; accepted April 16; final version accepted April 21. Address correspondence to W.R.H. (e-mail: whondo@mcw.edu).

© RSNA, 2010

# North American Approach Global Relevance

- Decision support at point of care
- Evidence-based appropriateness criteria
- Greater use of practice guidelines
- Education between stakeholders
- Accreditation of facilities
- Management of self referral and defensive medicine
- Payment reform



An initiative of the ABIM Foundation

Physicians with exposure to the Choosing Wisely campaign are 17 points more likely to have reduced the number of unnecessary tests and procedures done in the last 6 months.

### Unnecessary Tests and Procedures In the Health Care System

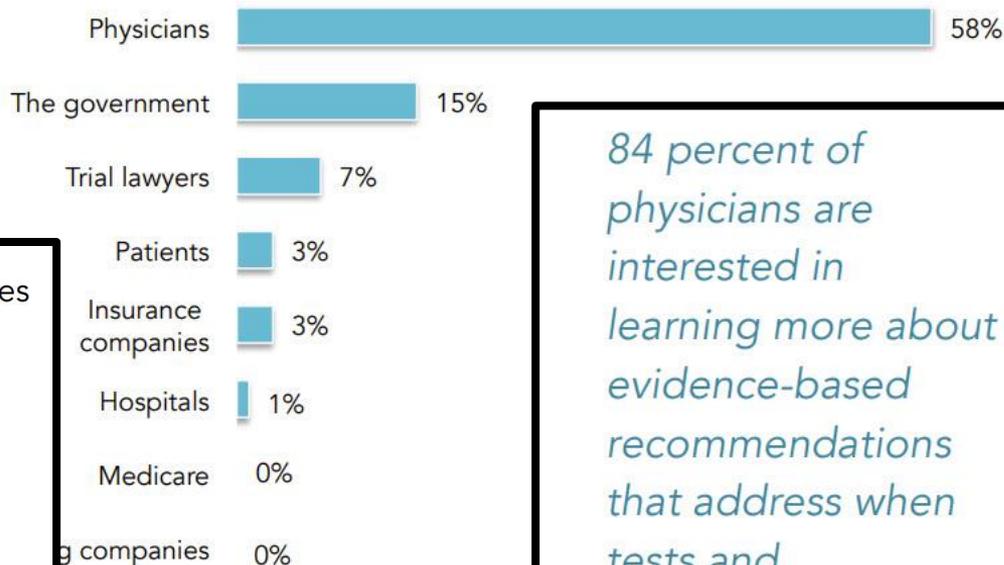
What Physicians Say About The Problem, the Causes, and the Solutions Results from a National Survey of Physicians

May 1, 2014

Conducted for The ABIM Foundation

By PerryUndem Research/Communication

Figure 10: Who do you think is in the best position to help address the problem of unnecessary tests and procedures?\*



84 percent of physicians are interested in learning more about evidence-based recommendations that address when tests and procedures may be unnecessary.

# Old Decision *Support*



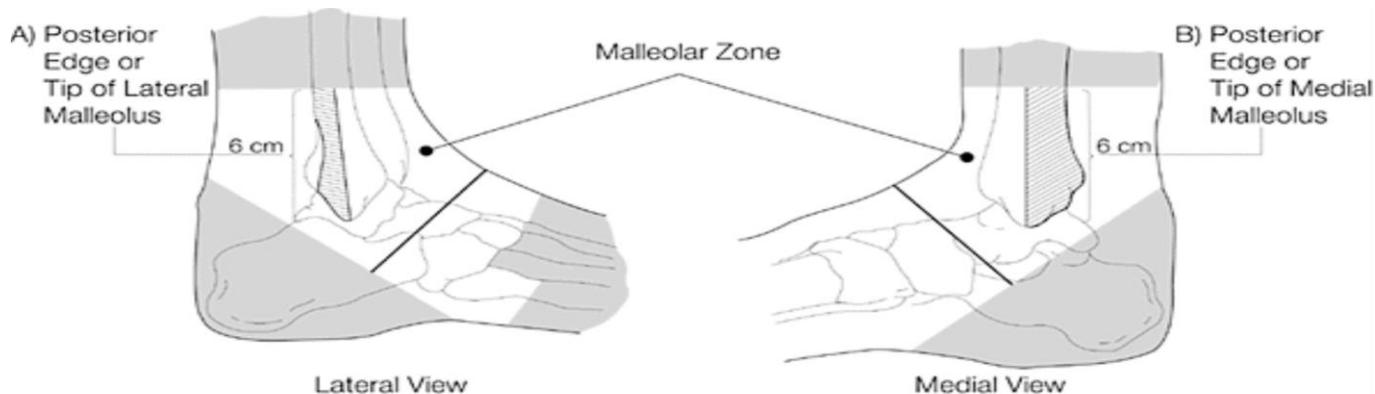
# Building Decision Support: Tactics

## Terms

- **Decision Rules:** A function or rule that takes an observation and produces an action. Narrower prediction. A step.
- **Appropriateness Criteria (a guideline):** combination of a patient's condition and a specific exam or treatment. Broader scope
- **Imaging Referral Guidelines:** Imaging referral guidelines are also evidence-based recommendations for appropriate tests

Guidelines provide the "what" to do; clinical decision support systems provide the "how" especially at the point of care.

**Many, but three major: ACR, ESR and RCR**



**Decision Rule: If A,  
then *probability* of B**

An ankle x-ray series is required only if there is any pain in the malleolar zone and any of these findings:

1. Bone tenderness at A  
or
2. Bone tenderness at B  
or
3. Inability to bear weight both immediately and in emergency department



Explore by scenario

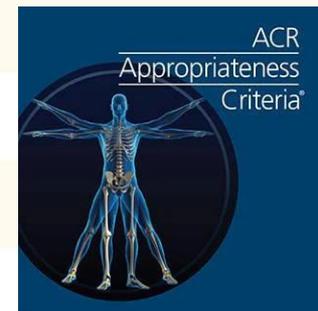
Explore by topic

Explore by procedure

[Terms and Conditions](#)

Panel:  Sex:  Age:  Body Area:  Priority Clinical Areas:

Panel	Scenario	Sex	Age	Body Area	Priority Clinical Areas
Pediatric	3149305 <a href="#">Appendicitis suspected, complication suspected on imaging</a>	All	0 - 17	Abdomen-pelvis	
Pediatric	3149303 <a href="#">Appendicitis suspected, high clinical risk, initial exam</a>	All	0 - 17	Abdomen-pelvis	
Pediatric	3149302 <a href="#">Appendicitis suspected, intermediate clinical risk, initial exam</a>	All	0 - 17	Abdomen-pelvis	
Pediatric	3149301 <a href="#">Appendicitis suspected, low clinical risk, initial exam</a>	All	0 - 17	Abdomen-pelvis	



Total Records: 31

Appendix

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Appendicitis suspected, low clinical risk, initial exam	3149301	● US abdomen	0 mSv ○	0 mSv [ped] ○	Usually not appropriate
		● US abdomen RLQ	0 mSv ○	0 mSv [ped] ○	Usually not appropriate
		● US pelvis	0 mSv ○	0 mSv [ped] ○	Usually not appropriate
		● Radiography abdomen	0.1-1mSv ⊗⊗	0.03-0.3 mSv [ped] ⊗⊗	Usually not appropriate
		● MRI abdomen and pelvis without and with IV contrast	0 mSv ○	0 mSv [ped] ○	Usually not appropriate
		● MRI abdomen and pelvis without IV contrast	0 mSv ○	0 mSv [ped] ○	Usually not appropriate
		● CT abdomen and pelvis with IV contrast	1-10 mSv ⊗⊗⊗	3-10 mSv [ped] ⊗⊗⊗⊗	Usually not appropriate
		● CT abdomen and pelvis without IV contrast	1-10 mSv ⊗⊗⊗	3-10 mSv [ped] ⊗⊗⊗⊗	Usually not appropriate
		● CT abdomen and pelvis without and with IV contrast	10-30 mSv ⊗⊗⊗⊗	10-30 mSv [ped] ⊗⊗⊗⊗⊗	Usually not appropriate

## Clinical Decision Support

Improve appropriate imaging utilization with Clinical Decision Support (CDS). CDS is the digital mechanism for providing appropriate use criteria to clinicians. When you implement CDS, you ensure your patients receive the right imaging at the right time and help them avoid imaging they do not need.

Stay informed 



[ACR](#) > [Clinical Resources](#) > [Clinical Tools and References](#) > [Clinical Decision Support](#)

## CMS Clinical Decision Support Program Paused — Not Repealed

The Protecting Access to Medicare Act of 2014 (PAMA) requires an appropriate use criteria (AUC) consult to be performed via a Centers for Medicare and Medicaid Services (CMS) qualified clinical decision support mechanism (qCDSM) when a healthcare provider orders advanced diagnostic imaging for Medicare patients.

The AUC-based CDS program is not cancelled or repealed. The 2024 Medicare Physician Fee Schedule final rule simply paused implementation while Congress considers legislative CDS improvements.

ACR® will continue to work with Congress and CMS to eliminate the real-time claims processing requirement that has resulted in this pause.

ACR and CMS urge providers that have already implemented CDS to continue its use during this pause.

# U.S.A. Imaging Decision Support Journey

- **2014 Protecting Access to Medicare Act (PAMA): CDS required**
- **Through qualified mechanism**
- **Multiple pauses, CMS never required**
- **Current: Radiology Outpatient Ordering Transmission (ROOT) Act: resuscitates AUC for advanced imaging services**

<https://www.acr.org/News-and-Publications/Media-Center/2025/acr-backs-house-root-act>

12 year old Male

Edit

Service: Not Selected

Edit

Indication(s):

RLQ abdominal pain, appendicitis suspected ✕

Edit

### Appropriateness rankings for a 12 year old Male



Appropriateness	Service	Cost	RRL	Display Evidence...
8	US, abdomen	€€		Select this service
7	CT, abdomen-pelvis, w iv contrast	€€€	☠☠☠☠	Select this service
6	XRAY, abdomen	€	☠☠	Select this service
5	CT, abdomen-pelvis, wo iv contrast	€€	☠☠☠☠	Select this service
5	MR, abdomen-pelvis, wo/w iv contrast	€€€€		Select this service
5	US, pelvis	€€		Select this service
4	MR, abdomen-pelvis, wo iv contrast	€€€€		Select this service
3	CT, abdomen-pelvis, wo/w iv contrast	€€€	☠☠☠☠☠☠	Select this service
2	FLUOR, contrast enema	€€€	☠☠☠☠	Select this service
2	NUC, bone scan WBC, abdomen-pelvis, Tc-99m	€€€	☠☠☠☠	Select this service

Feedback

### Acute abdominal pain in children

Paediatrics  
P28

Search term

system

- Oncology
- Interventional radiology
- Musculoskeletal system
- Urogenital and adrenal
- Neurological system
- Gastrointestinal system
- Trauma

Asymptomatic?

Show available guidelines only

[Share](#)  
[Bookmark](#)

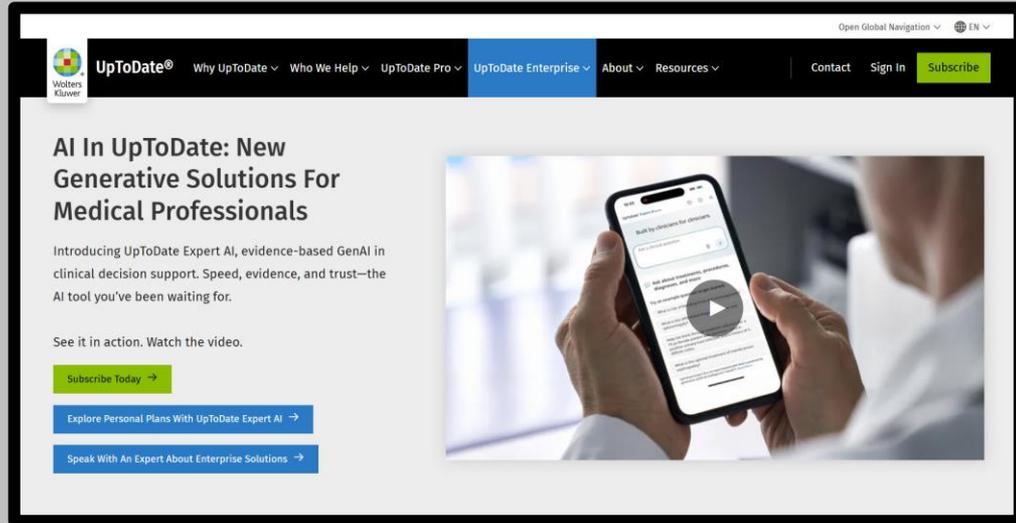
Investigation	Dose	Recommendation	Comment
US	None	Indicated [B]	There are many causes of acute abdominal pain. US is a useful first investigation but needs to be guided by clinical findings.  CT and US have similar specificities but US is preferable whenever possible to avoid radiation dose.
CT		Specialised investigation [B]	Paediatric-appropriate dose CT, is useful in trauma, suspected kidney stones and for bowel obstruction.
AXR		Indicated only in specific circumstances [C]	AXR is rarely of value. US is the first line investigation.
MRI	None	Specialised investigation [B]	MRI can be used for problem-solving to rule out acute appendicitis, adnexal mass and acute pyelonephritis when US has excluded obstructive uropathy.

# Improving Medical Imaging Order Entry With Artificial Intelligence Tools: Insights and Action Items

*Melina Hosseiny, MD, Christoph I. Lee, MD, MS, MBA*

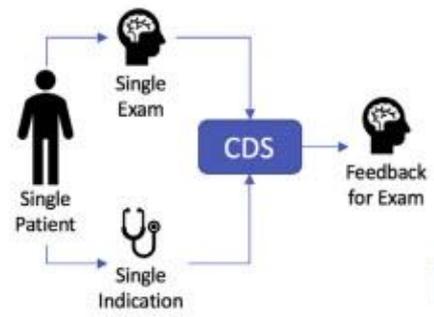
**Potential following implementation of AI tools for analysis of free-text indications:**

- **increase the accuracy and efficiency of medical imaging order entry,**
- **in turn will improve the performance and experience for ordering clinicians, radiologists, and, most important, patients.**



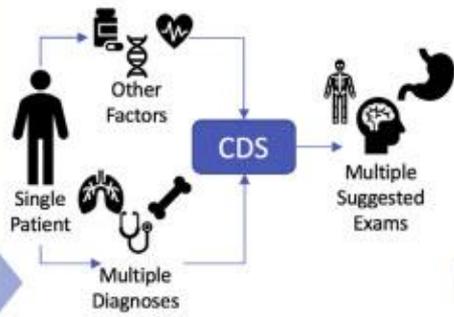
The screenshot shows the UpToDate website homepage. The navigation bar at the top includes the UpToDate logo, a search bar, and links for "Why UpToDate", "Who We Help", "UpToDate Pro", "UpToDate Enterprise", "About", and "Resources". On the right side of the navigation bar are links for "Contact", "Sign In", and a green "Subscribe" button. The main content area features a video player with the title "AI In UpToDate: New Generative Solutions For Medical Professionals". Below the title is a short introductory text: "Introducing UpToDate Expert AI, evidence-based GenAI in clinical decision support. Speed, evidence, and trust—the AI tool you've been waiting for." Below the text is a "See it in action. Watch the video." prompt, followed by a green "Subscribe Today" button and two blue buttons: "Explore Personal Plans With UpToDate Expert AI" and "Speak With An Expert About Enterprise Solutions". To the right of the text is a video player showing a person holding a smartphone displaying the UpToDate interface.

**Present State:**  
Exam/Indication-Based Responses



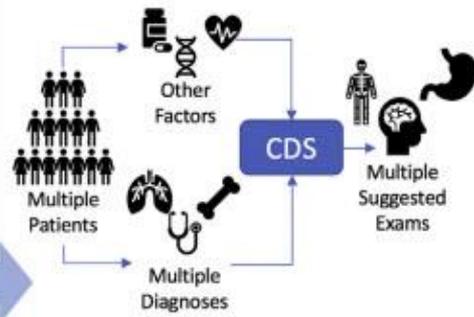
- Provider actively selects an exam and then indication
- CDS system provides feedback for that particular combination, suggests alternative/preferred exams
- Requires provider to be actively engaged with single patient's record
- Limited ability to account for additional considerations (other diagnoses, implants, allergies, prior imaging history)

**Emerging State:**  
Diagnosis-Based Suggestions



- Provider documents patient's diagnoses and problems as part of routine care
- CDS systems actively suggests exams likely to lead to furthering patient's care
- May be able to account for multiple diagnoses and other imaging factors (implants, allergies, prior imaging)
- Requires provider to be actively engaged with single patient's record

**Future State:**  
Population-Based Monitoring



- Providers document patients' diagnoses and problems as part of routine care
- CDS systems monitor populations for exams likely to optimize population health care (early diagnosis, preventative care)
- Can provide active reminders to providers and practice managers even when individual patient records are not manually accessed

Artificial Intelligence and Clinical Decision Support for Radiologists and Referring Providers

*Bernardo C. Bizzo, MD, MS<sup>a,b,c,\*</sup>, Renata R. Almeida, MD, PhD<sup>a,b,c,\*</sup>, Mark H. Michalski, MD<sup>a,b,c</sup>, Tarik K. Alkasab, MD, PhD<sup>a,b,c</sup>*

J Am Coll Radiol 2019;16:1351-1356.

# ***Now...Trust***

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

- Intrinsically human**
- Implicit vulnerability**
- Essential in patient care**

## 2025 Honesty and Ethics of Professions Ratings

Please tell me how you would rate the honesty and ethical standards of people in these different fields -- very high, high, average, low or very low?

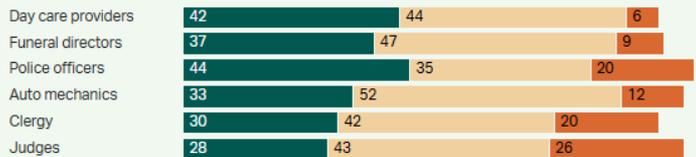
**Gallup**

■ % High/Very high ■ % Average ■ % Low/Very low

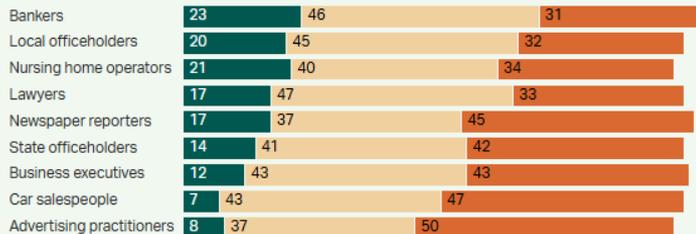
### Majority positive



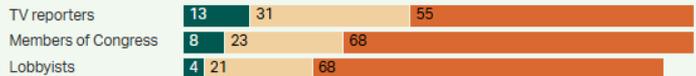
### Net positive



### Net negative



### Majority negative



Professions are listed in order of net % high (% high/very high minus % low/very low).  
% No opinion is not shown.

Dec. 2-18, 2024

Get the data • Download image

GALLUP

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

## Recent Changes in Americans' High Ratings of Professions, 2021 to 2024

% Rating honesty and ethics very high or high

	Dec 1-16, 2021	Dec 2-18, 2024	Change
	%	%	pct. pts.
Medical doctors	67	53	-14
Judges	38	28	-10
Police officers	53	44	-9
Day care providers	50	42	-8
Pharmacists	63	57	-6
Clergy	36	30	-6
Nursing home operators	27	21	-6

# Understanding and Warming the Justification Iceberg



Warming up is better  
than acting “cold”

- We are (co)owners
- Recognize our (perceived) value in healthcare
- Stakeholder, especially those in the clinical domain (including patient), voices are essential
- CDS is a partnership: we need to work to be *trusted*
- Leverage AI
- Regulations cannot conflict with reality

© Health Research and Educational Trust  
DOI: 10.1111/j.1475-6773.2006.00689.x  
RESEARCH ARTICLE

# Physician and Patient Behavior

## Time Allocation in Primary Care Office Visits

*Ming Tai-Seale, Thomas G. McGuire, and Weimin Zhang*



**“A typical problem-oriented visit to a primary care provider in the US is around 15-20 minutes, although the average is closer to 15.7 to 18 minutes”**

**... including radiation risk discussion as part of justification??**

# Understanding and Warming the Justification Iceberg



Warming up is better  
than acting “cold”

- We are (co)owners
- Stakeholder, especially clinical voice is essential
- CDS is a partnership: we need to work to be *trusted*
- Leverage AI
- Recognize our (perceived) value in healthcare
- Regulations cannot conflict with reality
- **Efficient and effective; mindful and tolerant of inherent variations**
- **Education**
- **Resourced efforts**