

## Image Gently: toward optimizing the practice of pediatric CT through resources and dialogue

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In this edition of Pediatric Radiology there is an article titled “ALARA, Image Gently and CT Induced Cancer” by Mervyn D. Cohen [1]. Cohen, an accomplished and widely recognized pediatric radiologist, discusses aspects of understandings and misunderstandings of cancer risks, risk communications and implications on patient and public perceptions and provides many excellent points that are, in general, richly cited, often underrepresented in discussions and provocative. Cohen is correct in many elements of his discussion: the need for accountability, for awareness (through consideration of what’s certain and uncertain regarding cancer risk) and for a call for action through informed conversations. This article reminds us of our duty as critical scientific and medical professionals to examine and re-examine our thoughts and actions and, importantly, the consequences of such. What then are the consequences, intended and otherwise, of the Image Gently campaign to which this article alludes? The title of Cohen’s article suggests that as an unintended consequence, the campaign may have contributed to undue concern and an alarmist reaction by the media, referring physicians and parents. To this end, let us look at the mission of the Alliance for Radiation Safety in Pediatric Imaging, the Alliance’s actions to date and the relevance of these actions in a more global awareness of potential risk from diagnostic medical imaging, and assess the impact of the Alliance on diagnostic medical imaging,

exemplified by CT, and determine if the practice and understanding of pediatric CT is ultimately better because of the Alliance.

### The Alliance for Radiation Safety in Pediatric Imaging

The Alliance for Radiation Safety in Pediatric Imaging, more familiarly known as the Image Gently Alliance, was created in 2007. The core of the Alliance was a consensus group of founding professional imaging organizations consisting of radiologic technologists, medical imaging physicists, and pediatric radiologists. The mission statement of the Alliance is “to improve the safety and effectiveness of the imaging care of children worldwide. This is achieved through increased awareness, education and advocacy on the need for the appropriate examination and amount of radiation dose when imaging children. The ultimate goal of the Alliance is to change practice locally to improve the health and safety of the child.”

Currently, there are 86 affiliate organizations and societies, including medical, surgical and dental specialties, with a currently estimated membership of more than 1,000,000 health care professionals. The strategic model for the Alliance is based on social marketing where behavior is influenced through educational campaigns that are intended to benefit society rather than the organizations responsible for the campaigns [2]. The Alliance has conducted seven campaigns to date including radiography, a parent communication campaign, diagnostic fluoroscopy, interventional radiology, nuclear imaging and, most recently, dental imaging. CT was the first and is also the modality focus of Cohen’s comments. At the heart of the matter is the potential risk of medical imaging radiation-induced cancer in children resulting from a CT scan. Without this platform of risk, discussions on and debates over

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justification and optimization (two tenets of radiation protection) are in today's environment much less compelling, acknowledging that there are additional consequences to overutilized imaging such as the cost and use of resources, especially in an evolving and uncertain health care environment.

### The Alliance and justification and optimization

The topic of justification of pediatric CT is exhaustive and has never been a primary goal of the Alliance, other than subscribing broadly to the position that CT should be used only when necessary (Fig. 1). The many and complex driving forces influencing justification were recently discussed at the 2014 Image Gently ALARA Conference entitled “Why, When and

How to Use New CT Technologies for Safer Care of Pediatric Patients” in Orlando [3]. In addition, strategies to achieve more appropriate imaging utilization were presented by the Alliance during a 2011 summit sponsored by the American Board of Radiology Foundation [4]. Recommendations from this summit included decision support at point of care, evidence-based appropriateness criteria, greater use of practice guidelines, education of stakeholders, accreditation of facilities, management of self-referral and defensive medicine, and payment reform. The Alliance is primarily invested in the recommendation of education of stakeholders. Several of the American Board of Radiology Foundation Summit strategies require (likely time-consuming) integration of multiple parties to provide guidance and tools (although implementing “decision support” also consists of a phone call or walk to the clinic

**Fig. 1** Poster from the Image Gently CT Campaign summarizes the objectives of the campaign primarily focused on appropriate CT techniques for children

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or emergency department). In some practices, the reality may be that radiologists perform examinations that are requested with the generation of the “request” as the sole justification for the examination. This may happen in community as well as academic settings. If and until some of these top-down recommendations for improved utilization become more prevalent (and easy to use and effective), the appropriateness of an examination will often be open to interpretation. However, what is not open to interpretation is that the appropriateness of a CT examination is a shared responsibility between the referrer and the radiologist. Consensus responsibility requires efforts on both parties’ part and a partnership of involved stakeholders [5]. The affiliate organizations in the Alliance but outside of the imaging profession (e.g., the American Academy of Pediatrics and the Pediatric Orthopedic Society of North America) are a testimonial to the recognition of shared responsibility for appropriate utilization.

The Alliance does have a primary role in providing resources for optimization of pediatric CT examinations (Table 1). Efforts include recently published scaling factors with technique charts for pediatric CT examinations sponsored by the Alliance and involvement in review of the American Association of Physicists in Medicine (AAPM) Task Group 204 for the size-specific dose estimate (SSDE) method for improved pediatric body CT dose estimations [6, 7]. In addition, there have been two Alliance-sponsored summits on CT, including a vendor summit in 2008 that drew attention to the need for a size-based dose metric. The Alliance has been a reviewer for the U.S. Environmental Protection Agency (EPA), the U.S. Food and Drug Administration (FDA) and Medical Imaging

and Technology Alliance (MITA) documents related to CT performance in children. Eight educational modules for CT technologists were also developed. Publications include one providing 10 simple steps that can be taken for pediatric CT, which was authored by Alliance leadership [8].

**Alliance impact**

What is the impact of these efforts? This depends on the measure of impact. If recognition is a measure, then the answer is clearly yes. Since 2008, there have been 27 publications (PubMed) with “Image Gently” in the title, the vast majority from Alliance leadership. A 5-year review summarized efforts and potential impact in 2012 [9]. Some additional noteworthy recognition include acknowledgement of Alliance resources in the September 2014 draft Joint Commission Proposed Revisions to Diagnostic Imaging Standards ([http://www.jointcommission.org/standards\\_information/field\\_reviews.aspx](http://www.jointcommission.org/standards_information/field_reviews.aspx)), as well as the August 2011 Joint Commission Sentinel Alert ([http://www.jointcommission.org/assets/1/18/sea\\_471.pdf](http://www.jointcommission.org/assets/1/18/sea_471.pdf)). The Image Gently Alliance was a model and impetus for the successful Image Wisely campaign for adult imaging. From a global standpoint, the recognition of the Image Gently emblem is clearly present through the affiliation with the International Atomic Energy Agency (IAEA) and their highly visited Radiation Protection of Patients (RPoP) website, as well as a close partnership with the World Health Organization Global Initiative on Radiation Safety in Health Care Settings ([http://www.who.int/ionizing\\_radiation/about/med\\_exposure/en/index1.html](http://www.who.int/ionizing_radiation/about/med_exposure/en/index1.html)). Currently, there are 34 affiliate international organizations. Since affiliation comes with affirming the mission and goals of the Alliance, organizations then pledge to disseminate Alliance information to their membership.

Has the Alliance made pediatric CT lower radiation? This is more difficult to determine. If recognition is a measure, then the answer is clearly yes. One survey through an American College of Radiology database consisted of 186 practice leaders from 42 U.S. states and territories. Almost 98% of respondents did not practice in a freestanding children’s hospital although nearly 95% perform imaging examinations in the pediatric age group. When asked if the Image Gently Alliance CT campaign had resulted in a change in practice to lower-dose CT protocols, responses included lower-dose protocols for head CT (57%), chest CT (66%), and abdomen or abdomen/pelvis CT (69%) [10]. However, there is still variability [11], as Cohen rightly points out.

**The Alliance and position on radiation risk**

What is the Alliance’s position on risk from diagnostic imaging procedures? Position statements can be found through

**Table 1** Image Gently initiatives in CT

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Two CT meetings (CT vendor summit in 2008, IG ALARA in 2014)
Parent communication campaign in CT
Pediatric accreditation through ACR
Web-based Practice Quality Improvement Program in Pediatric CT
Parent information (multilingual)
Eight web-based education modules for CT technologists
International speakers’ bureau for requested talks on pediatric CT
Cosponsor: American Association of Physicists in Medicine Task Group 204
Review of regulatory documents for CT in children
Timely comments to scientific articles (letters to parents and editors) and media
International outreach with International Atomic Energy Agency, World Health Organization and World Federation of Pediatric Imaging
Work with U.S. Food and Drug Administration, U.S. Environmental Protection Agency, National Quality Forum
Social media (website, newsletter, Twitter, Facebook)
Dental campaign, including cone beam CT

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ACR American College of Radiology, ALARA as low as reasonably achievable, IG Image Gently

AAPM (<https://www.aapm.org/publicgeneral/StatementMedicalImaging.asp>), International Organization for Medical Physics [12], and the Health Physics Society ([http://hps.org/documents/riskassessment\\_ps008-2.pdf](http://hps.org/documents/riskassessment_ps008-2.pdf), [http://hps.org/documents/risk\\_ps010-2.pdf](http://hps.org/documents/risk_ps010-2.pdf)), among others. There is no formal Alliance position, other than reducing unnecessary radiation in a relatively vulnerable population. Cohen is correct in many respects. Much of what is in the lay press, sometimes leaching into the medical literature, is alarming. Cohen is right: We as a profession have not been able to sufficiently promote the tremendous benefits of modalities that use ionizing radiation, especially CT. (Our experience though, is that the New York Times and similar outlets are simply not interested in these helpful and life-saving benefits. It doesn't sell papers). He is right that this misinformation is especially pervasive in the lay press, an especially influential medium. This may have real and potential consequences, as outlined in his commentary. Many of us have long bemoaned the inability to convey a balanced benefit-cost/risk discussion through these very media outlets. Alarm sells. Assurance is a less attractive product. There is a need for improved content and style of communication both within and outside the radiology domain, one of the pillars of the Image Gently Alliance. Take, for example, the emergency medicine community as recently as several months ago [13]. He also emphasizes the many and recognized successes of the Image Gently Alliance, and the aspiration that the campaigns have resulted in improved use of radiation and technical improvements as goals of the campaigns. He also provides a very compelling discussion on certain aspects of radiation risk as portrayed by the media and sometimes amplified by a small but vocal medical contingency, in concert unfortunately promoting an unbalanced and highly visible perspective on potential cancer risk. Responses to much of this hyperbole have been covered elsewhere [14]. Suffice it to say that the Alliance's message has not been the impetus for alarm; there are no unintended consequences here. The Alliance's efforts generating unwarranted alarm have not been raised once, to the best of our knowledge, in more than 8 years of existence and through more than 85 organizations. Not one of the lay press articles implicates the presence of the Alliance as a cause for concern and hundreds of e-mails to the Alliance have not even implied that the presence of resources or the Image Gently brand have resulted in unnecessary and inflated focus on the potential risk of cancer in children from CT. It has been just the opposite. The very mission of the Alliance is to provide information on radiation dose management and optimization strategies for a variety of modalities, and to educate the public, patients and their families, and health care providers: The essence of the Alliance is education and advocacy, improving our understanding and affording more informed discussions. The intent of the Alliance is not to promote the debate of cancer risk with low-level radiation but partly to provide

resources (sometimes with contrary perspectives) for those who want more information on risk. Is there any reason to believe that there are unintended consequences? The alarm generated is not a result of the campaign but because of forces outside of this group. The genesis of this fear would arguably be more substantial without the balanced and consistent voice of the Alliance including the many educational materials available on the website. Does the presence of *alarming* information affect decisions? Many pediatric radiologists would, we would offer, say "probably," although to what extent is unclear, since some will have anecdotal, although in the scope of things, rare support for this outcome. Does the availability of *balanced* information on potential risk in imaging affect the decision of parents and other caregivers? Larsen et al. [15] concluded not.

## Conclusion

It is reasonable that we reduce unnecessary radiation through appropriate use of CT in children. Opportunities for improvements in the justification aspect of CT are exemplified through Alliance affiliations which extend beyond the imaging community and can only be obtained through consensus, a posture of shaking hands as opposed to pointing fingers. Justification is a shared responsibility. Education through information and guidance on dose management strategies for the performance of CT, simply child-sizing what we do, is a fundamental goal of the Image Gently campaign. We can always communicate better to patients, their families, the public, and to our medical and dental colleagues, especially in promoting the benefits of medical imaging. We should continue to improve the performance of medical imaging for children through educational efforts and partnerships. And we should continue to speak in an increasingly united and undistracted voice: CT is extremely valuable. Through these efforts, we can have the intended consequence of improving the imaging care of children.

**Conflicts of interest** None

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