New Radiation Diagnostic Reference Levels for Top 10 Pediatric CT Exams

ACR Dose Index Registry Benchmarks a Step Forward for Pediatric Dose Optimization

Reston, VA (Oct. 26, 2021) — American College of Radiology® (ACR®) Dose Index Registry [https://www.acr.org/Practice-Management-Quality-Informatics/Registries] diagnostic reference levels (DRL) for common pediatric CT scans can help imaging facilities and providers optimize radiation dose used in children's imaging. The radiation dose benchmarks were published today in a study in Radiology® [https://pubs.rsna.org/doi/10.1148/radiol.2021211241].

Prior to this long-awaited guidance, much less was known about pediatric dose indices. What little was published often was outdated, lacked data from diverse imaging settings and scanner manufacturers or had limited statistical power. The guidance—a working document for local radiology facilities to compare their dose levels with national benchmarks—was generated using 2016-2020 data from the ACR Dose Index Registry.

"Establishing these national benchmarks is a vital tool to guide local facilities in adjusting pediatric CT protocols and resultant doses for their patients," said Kalpana M. Kanal, PhD., DABR, lead author of the study and past chair of the ACR Dose Index Registry. "Children are more sensitive to radiation than adults. All efforts toward understanding how much radiation is used for common CT examinations is valuable, especially if one finds that local dose indices exceed the DRLs provided in this study."

In the report, both DRLs and achievable doses (ADs) are provided to encourage facilities to optimize radiation dose. DRLs should be used to determine if a local facility’s dose indexes are unusually high or low, but not be used as target doses. DRLs and ADs are not intended to be used for comparisons with dose indexes for individual patients but rather for the whole patient population. Facilities now can analyze and compare their size and/or age-grouped dose indexes with the respective size or age-based ADs and DRLs as appropriate.

"Radiologists, medical physicists and radiologic technologists have to work together to ensure that each patient receives an optimized dose while maintaining image quality," said Donald Frush, MD, senior author of the study and chair of the Image Gently Alliance. "These national level benchmarks provide contemporary and robust guidance for these groups toward ensuring quality patient care. This is especially valuable in practices where pediatric scanning is relatively infrequent."

The 10 most common pediatric CT exams in this study are:

1. Head without IV Contrast
2. Sinuses without IV Contrast
3. Maxillofacial without IV Contrast
4. Neck Soft Tissue with IV Contrast
5. C-Spine without IV Contrast
6. Chest without IV Contrast
7. Chest with IV Contrast
8. Abdomen/Pelvis without IV Contrast
9. Abdomen/Pelvis with IV Contrast
10. Chest/Abdomen/Pelvis with IV Contrast
In addition to dose trends, this study reports some interesting findings:

- Most pediatric patients are scanned at community hospitals and not at academic or dedicated pediatric hospitals.
- Most facilities scan less than 10 pediatric patients per month.
- 66% of the pediatric population in this study were over 10 years of age.

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**About The ACR Dose Index Registry**

Since 2011, the American College of Radiology Dose Index Registry (DIR) has helped clinicians and facilities improve the safety and quality of patient care by collecting CT dose indices through automated data transmission and leveraging that data to provide performance feedback reports, establish national peer comparisons and support research initiatives. One of eight registries that comprise the National Radiology Data Registry (NRDR), the DIR has data on nearly 135 million CT exams from more than 2,200 facilities.

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