5 recommendations to achieve excellence in pediatric medical imaging

Strategies to improve performance at healthcare facilities of all sizes

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If you work in radiology in a community healthcare facility, you may have low demand for pediatric medical imaging. As a result, your staff has less experience in this specialty.

My name is Dr. Lori Barr and I am a practicing pediatric radiologist with Radiology Associates of Florida. I am passionate about improving the performance and interpretation of pediatric medical imaging. Here are five recommendations to help radiology departments achieve excellence in pediatric medical imaging in care settings of all sizes. With advance planning and an emphasis on learning, your facility can perform imaging studies with the same standard of care as a large children's hospital. Scroll to the end of this post to see my list of resources.

Consequences of "children are just small adults" thinking

Those of us in the radiology profession are ingrained with the principle of "As Low as Reasonably Achievable" (ALARA). The balance of dose and image quality is even more important in pediatric medical imaging. Not only are children more radiosensitive than adults (the cancer risk per unit dose of ionizing radiation is higher), but children also have a longer expected lifetime, which puts them at greater risk of cancer following radiation exposure.(1) To support ALARA, and also to provide optimum patient outcomes, it is critical that you and your staff know your equipment and adhere to validated protocols. For example, while multiple phases of a contrast-enhanced CT exam are common in adults, they are far less frequently necessary in children.

Likewise, professional training and practice experience are haphazard teachers for all of us. It is easy to think that imaging techniques that work for small adults are appropriate for children, especially if you do not image them often.

Typically, one of two things may happen when an imaging technologist or sonographer who infrequently performs pediatric diagnostic imaging studies images a child. On one hand, they perform the exam to the best of their ability without any support, even though they might feel stressed, scared and inadequate. If the resultant images are not adequate, the child may need to return for an additional study, potentially increasing their exposure to radiation.

On the other hand, the imaging technologist or sonographer may decline to perform the exam and the child must go to another facility or provider. Neither outcome is in the best interest of the patient.

1: Review your imaging equipment

When your car is having trouble, do you get better results by taking it to the local gas station or when you take it to a mechanic who has the diagnostic software and equipment to work on your particular

year, make, and model of car?

The same is true with children's imaging. If your equipment is not suited for pediatric imaging, then your staff should think twice about doing the exam. This is an important and definitive line to draw. For example, if a CT scan is ordered on a child that is easily performed without sedation on a current generation scanner, but you have an older, slower first-generation scanner that does not meet current standards for radiation dose exposure and would require sedating the child for the study, then your facility should seriously consider not offering this service for children.

Likewise, it is in the best interest of the child to decline an order for an exam for scoliosis if you only have conventional radiography equipment and are incapable of offering the child the benefit of decreased exposure by standard PA positioning and digital imaging systems. You can visit Image Gently, a great resource for determining if your equipment is appropriate for pediatric imaging and what you can do to optimize it for minimum radiation exposure in children.

If you don't know or don't have specific pediatric use recommendations for your imaging equipment readily available, ask your equipment manufacturer to provide them and to introduce you to the radiologists and technologists using the same equipment at a children's hospital. This is an acceptable request even if your equipment is no longer under a service contract. Most manufacturers are more than happy to comply. Medical physicists are another terrific resource. Keep in mind that protocols from one imaging system are not always transferable to another if the scanner's design, configuration, and software revision are identical.

2: Make use of existing pediatric protocols developed by experts

Save your time and improve your practice by adopting pediatric best practices protocols that have been validated by experts. There are plenty of resources available for education and support around pediatric imaging. At the end of this post, I included links to protocols from experts who practice in children's hospitals and community settings. Here are a few that are particularly useful no matter where you find yourself imaging children.

Austin Radiological Association is a premier radiology practice that serves a wide variety of hospitals and owns a good number of outpatient imaging clinics in central Texas (full disclosure: I was previously a partner at ARA). They make their outpatient and hospital protocols for children and adults freely available on their website so that any technologist can find what they need to do a great exam on their patients.

Pediatric foreign body ingestion is a common situation that prompts pediatric imaging at the nearest emergency care facility. The North American Society For Pediatric Gastroenterology, Hepatology & Nutrition produces and updates a robust guideline regarding imaging, reporting and treatment of

ingested foreign bodies. This is an example of a consensus effort where experts create best practices guidelines and protocols.

Both Austin Radiological Association and my current practice, Radiology Associates of Florida, are part of the largest radiology practice in the world, Radiology Partners. On a national level, we also focus on best practices to decrease unnecessary imaging and radiation exposure in adults and children.

We recently adopted a nationwide pediatric appendix ultrasound performance protocol, sonographer worksheet, and radiologist reporting template in order to decrease CT utilization for this diagnosis nationwide. After we piloted the program locally, we made it available inside and outside of our national practice. You can enroll in the free, on-demand course at Pediatric Appendix Ultrasound Standardized Performance and Reporting Training. The course provides two hours of CME credit and is appropriate for sonographers, medical students, residents, nurse practitioners, physician assistants, physicians who practice point-of-care ultrasound (POCUS) and radiologists.

Our vision is to have widespread national adoption of the protocol to decrease unnecessary CT imaging and reduce the length of hospital stays for children who present with abdominal pain. Our latest results will be presented as a scientific poster presentation at RSNA 2023, the annual meeting of the Radiological Society of North America.

These are but a few resources that can assist you in improving your pediatric imaging protocols across all modalities. Realize that local, national, and international resources are available with a little bit of on-line research. Set aside time each month to stay up to date on the current guidelines.

3: Encourage and monitor learning

Once you have the equipment and protocols appropriate for children in place, encourage and monitor learning amongst the staff. Ask yourself these three questions:

1. Are the technologists and sonographers familiar with the American College of Radiology Practice Parameters that apply to children?
2. Do you provide timely feedback when an exam is performed well, and when there is room for improvement?
3. Is your current quality and safety assurance process effective in decreasing exposure doses, repeat exams and callbacks?

Creating an environment where educational resources are as readily available as an individual's mobile phone has the potential to improve patient care if downtime is used for small bits of education instead of checking social media or reading a novel during work hours when not on a break. One useful resource for short time duration pediatric imaging education is the Society for Pediatric Radiology educational resources page. Registration is free and there are links to multiple resources

that have case-based learning opportunities that can be consumed in 5 minutes or less.

You might be wondering, “how do you keep up skills when you don’t have many pediatric patients?” This is a frequent question regarding pyloric and appendix ultrasounds in children. If you are doing adult abdominal ultrasounds daily, then you have the perfect opportunity to practice imaging the pylorus and appendix. The CPT code for Ultrasound Abdomen Complete includes the bowel and it is perfectly acceptable to incorporate views of the pylorus, ileocecal valve and appendix, the portions of the bowel where disease is likely to occur no matter what your age, as a part of your routine scanning protocol.

4: Leverage peer support

Encourage your radiographers and sonographers to develop relationships with their peers so that they have people to turn to when they need guidance or support. Choose an association based on their profession, or a particular imaging modality or organ. Most groups have a forum for asking questions and getting answers. Also, look at the makeup of the members to find those in your peer group. For example, I am a member of the Society of Chiefs of Radiology at Children’s Hospitals (SCORCH). They have a listserv where any member can post a question to the entire group by sending it as an email to the listserv email address. Feedback from a group like this is especially helpful when adding new services or buying new equipment.

Each of these communities offers something similar to members: the American College of Radiology (ACR), Radiological Society of North America (RSNA), Association of Registered Diagnostic Medical Sonographers (ARDMS), American Society of Radiologic Technologists (ASRT) and the Society of Radiology Physician Extenders (SRPE).

5: Put your pediatric patients at ease

Putting a child at ease is perhaps the most important step in capturing the best images possible and achieving ALARA. Two tips in this regard: first, control your own anxiety. When you are nervous, the child and the parent pick up on that.

Second employ methods of distraction that will hold their attention during the imaging process. In our ultrasound rooms, one of the best distraction devices we employ is a device that displays lights on the ceiling. The one I like the best and that is very soothing to children (and adults) projects green and blue ocean waves on the ceiling that blend nicely with our undersea room décor. You can get devices like this that project random patterns of light and a starry night sky or constellations on-line for between $20 – $40. The ceiling light show keeps children of all ages engaged for a considerable amount of time.

Mobile phones and tablets with games, cartoons or age-appropriate movies on them are another

good tool. Lastly, don't overlook conversation. When you take the time to talk with and listen to your patients and their parents, they know that you are there just for them and that they have your full attention. This is the most important gift you can share with anyone.

Wrapping it up

Now that you realize how many resources are out there to assist you, the next step is yours. Although your community hospital may not have the specialized equipment and resources of a large children's facility, the only thing that truly can limit you from creating a child-friendly environment and providing excellent pediatric diagnostic imaging is your own creativity. I hope you and your staff will find a least one helpful idea from my suggested recommendations.

Remember, one idea is all it takes to change your world!

Resources:

- Image Gently
- Peer Learning Real Time: National Shared Learnings From Pediatrics
- Society for Pediatric Radiology
- ACR Appropriateness Guidelines
- ACR Practice Parameters
- Cleveland Clinic Children's Hospital Pediatric Radiology Digital Teaching File Archive
- Austin Radiological Association Protocols
- Pediatric Appendix Ultrasound Standardized Performance and Reporting Training
- Balancing Dose with Image Quality

About the author

Lori Lee Barr, M.D., F.A.C.R., F.A.I.U.M. is a Partner, Local Practice Board Member-at-Large, Chair – Patient Safety Committee, and the Panhandle Division Director of Radiology Associates of Florida, a subsidiary of Radiology Partners, Inc. She is the Chair of Medical Imaging at Ascension Sacred Heart Hospital Pensacola & Studer Family Children's Hospital in Pensacola, Florida. Dr. Barr is a Clinical Professor, Department of Clinical Sciences, at Florida State University College of Medicine-Pensacola. She holds a Certificate of Added Qualification in Pediatric Radiology. When Lori is not seeing patients, she loves to snorkel and scuba dive. Follow her on LinkedIn and check out her podcast, The Doctor's Mentor Show, on iTunes or your favorite podcast app.

Reference:

1 U.S. Food & Drug Administration: Pediatric X-ray Imaging

https://www.fda.gov/radiation-emitting-products/medical-imaging/pediatric-x-ray-imaging

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