



The continuous lure of pediatric radiology

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Abstract

Pediatric radiology is an immensely rewarding career choice. Eight pediatric radiologists, enthusiastic for their profession, were asked six questions about their career choice. Their responses illustrate the common virtues of pediatric radiology and also demonstrate the diverse paths and activities that pediatric radiologists take and pursue.

Keywords Career choice · Enthusiasm · Fulfillment · Pediatric radiology · Profession

Introduction

Pediatric radiology is an immensely rewarding career choice. The many virtues of the profession were elegantly enumerated by Richard Gunderman [1] in a 2001 editorial, “The Lure of Pediatric Radiology”. From time to time, it is helpful to revisit what makes our specialty so unique and fulfilling. To do this, we asked eight pediatric radiologists to share their enthusiasm for pediatric radiology by answering a few questions. The same set of five questions was posed to each pediatric radiologist, with a single additional question unique to the individual. The responses have been lightly edited for length and format.

We hope that readers, particularly those in training considering the field of pediatric radiology as a career, find this exercise informative and inspirational. Those who succeed in pediatric radiology take many paths and enrich their careers in different ways, yet there are common themes to their fulfillment.

Erin K. Romberg, MD

Dr. Romberg completed the questionnaire as a fellow and is now in her first year of pediatric radiology practice at Seattle Children’s Hospital.

Why did you choose pediatric radiology?

As a brand new pediatric radiologist, I have a bit of a dark secret — I never wanted to work with kids. So many in pediatrics say interacting with kids all day is the most rewarding and motivating factor in their career. And I get that — kids can be super adorable — but that was never a motivation for me as I moved through my medical training. I hated my pediatrics rotation in medical school and gave no thought to a career in pediatrics. So I was completely surprised by how much I enjoyed my pediatric radiology rotations. As opposed to the slog of grading osteoarthritis all day or the list of 20 hepatocellular carcinoma follow-up MRIs, in pediatrics I had variety.

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One day I would be reading abdominal ultrasounds, and the next day head CTs and knee MRIs. The prevalence of congenital and syndromic conditions meant new or unusual pathologies daily. Imaging was mostly reserved for problem-solving, so any given study was more likely to be positive. This diversity kept me refreshed and interested throughout my day. In addition, the challenges associated with pediatrics, such as uncooperative patients or the need for minimizing radiation, kept me thinking critically and creatively.

What makes pediatric radiology so rewarding?

I get the most professional satisfaction from feeling like my efforts and expertise are seen and appreciated by clinicians and family. Overall, I feel that pediatric physicians are highly interested in a radiologist's opinions and input, which was not always the case when working with adult specialists. Physicians in pediatrics actively seek to involve their radiology colleagues, frequently reaching out in person or by phone. On a daily basis I am reminded that my opinion and skills are directly impacting patient care. I never feel like I am dictating into a void.

Tell me about a compelling case where you made a difference in the life of a child.

My favorite case is not a glamorous one, but a routine follow-up PET [positron emission tomography]/CT on a child undergoing radiation for relapsed lymphoma. The oncologist came to the reading room explaining that they were in a tricky situation — the patient had a tender enlarging lymph node outside the current radiation field, with a differential of lymphoma or lymphadenitis. Options ranged from watching, performing a sedated biopsy or enlarging the radiation field, all with potential risks and benefits. Three minutes later, we had two oncologists, a radiation oncologist, and an interventional radiologist all on conference call discussing relative risks and how to deliver the best care for this child. The level of commitment and collaboration was truly gratifying.

Why was pediatric radiology the right choice?

Aside from the benefits of a varied and stimulating career that led me to pediatric radiology in the first place, I have been amazed at how supportive and friendly my new colleagues have been, both at my institution and nationwide. Pediatric radiology feels like a small world, with senior physicians reaching out to welcome and support trainees and junior radiologists. This [was] particularly encouraging to me as I prepare[d] to take on an academic attending position at Seattle Children's Hospital.

What would you tell a junior resident considering pediatric radiology as a career choice?

When I was choosing a subspecialty, there was a strong bias that pediatrics was an “academic-only” specialty; choosing pediatrics would restrict you not only to an academic career, but to a life where your only job opportunities were at major pediatric medical centers. I have not found this to be true. Although I [took] an academic position at a major pediatric medical center, I have had many job opportunities both in private practice and in semi-academic settings where research is optional but you enjoy the benefits of working with residents.

What does the future hold for pediatric radiology?

I think pediatric radiology will only continue to grow in size and importance. With decreasing CT dose techniques and increasing MRI efficiency, imaging of pediatric patients continues to increase. In addition, as subspecialization increases, the generalist's comfort level with pediatrics decreases and pediatric radiology's expertise becomes even more in demand. Also of note — the large range of normal variability in pediatric radiology makes it a particular challenge for artificial intelligence, leading to both interesting research challenges as well as good job security!

Delma Y. Jarrett, MD

Dr. Jarrett is a faculty pediatric radiologist at Boston Children's Hospital with clinical and research expertise in musculoskeletal imaging.

Why did you choose pediatric radiology?

As a resident, I thought about how the focus and culture of each of my radiology rotations fit with the things I most enjoyed about medicine. I wanted to be part of a collegial practice where radiologists were an integral part of patient care. I enjoy talking with clinicians, understanding their concerns and having input in how best to answer their questions. I found these interactions to be commonplace during my pediatric radiology rotations. I was also somewhat conflicted about what kind of “box” I wanted to have. When I was in medical school, we were told that we would all have the same volume of knowledge, but the box that contained it would either be broad and shallow or narrow and deep. I saw in pediatric radiology the best of both worlds. My attendings moved from head ultrasounds, to chest radiographs, to liver MR with ease. They saw patients from 0 days to 20 years, and still had detailed subspecialty knowledge in their particular areas of interest.

What makes pediatric radiology rewarding?

Thankfully, the assessment I made as a resident was correct, and the things that drew me to pediatric radiology are what I find most rewarding. I love being a consultant, part of the team caring for a patient, pooling my knowledge and experience with other medicine and surgery specialists to come up with a diagnosis for a complex patient. I appreciate that the breadth of pediatric radiology makes it a constant challenge. There is always something more to learn, and my job is never boring.

I also like meeting my patients and their families. Pediatric radiology has more patient contact than many other fields of diagnostic radiology. Besides fluoroscopy, we tend to be more hands-on in ultrasound and may visit a family before their exam to make sure that the most appropriate study is being performed. We are there to answer questions and provide reassurance when necessary. These interactions are almost always positive and are a great reminder of the importance of the work that we do.

Tell me about a compelling case where you made a difference in the life of a child.

Rather than one case, there is a particular scenario where I feel like I make the most difference in my work. There are instances when a child is sent from the pediatrician's office for what is thought to be a minor complaint, and I make a diagnosis that is far more complex and urgent than the referring doctor anticipated. Sometimes, in communicating the findings to the pediatrician, I find that with my experience, proximity to the patient, and resources, I am the best equipped to acutely manage and direct patient care. I discuss the diagnosis and plan with the parents, ensure that any additional necessary imaging studies are performed, help the pediatrician get referrals to the appropriate specialist, or have the patient escorted to the emergency department if necessary. This scenario has played out with numerous different diagnoses, from tumors to infection. It is rewarding to directly see that much of our hard work and thoughtful actions are appreciated and positively impact patient care.

How does your focus in pediatric musculoskeletal imaging inspire you?

I completed a year of study in adult musculoskeletal imaging before my fellowship in pediatric radiology. This has allowed me to create a bridge between the two worlds, bringing different ideas and perspectives to each. Pediatric musculoskeletal imaging has really evolved in the last several years. In addition to the focus on more traditional orthopedic topics, sports medicine and related imaging have greatly increased in importance. It is exciting to be part of the growing group of pediatric radiologists who are working to meet these imaging needs,

understanding the different patterns of injury in children versus adults, and the implications for management.

What would you tell a junior resident considering pediatric radiology as a career choice?

I have never second-guessed my decision to become a pediatric radiologist. When I meet residents who say that they have enjoyed their time in pediatric radiology but really like neuro-radiology, musculoskeletal imaging or cardiac imaging, my response is, "You are in luck! We have all those things." Despite being a specialty, pediatric radiology is an extremely diverse field that holds an incredible amount of opportunity for academic pursuits and personal satisfaction.

What does the future hold for pediatric radiology?

Given the increasing complexity of our patients and imaging techniques, I think there will be even more focus on subspecialization to maintain high standards for imaging and diagnosis.

Jonathan R. Dillman, MD, MSc

Dr. Dillman is a faculty pediatric radiologist at Cincinnati Children's Hospital Medical Center and serves as associate chief of research for his department.

Why did you choose pediatric radiology?

As a resident, I had terrific experiences on my various pediatric radiology rotations. I was exposed to pediatric radiology early on and observed brilliant clinicians (both within and outside radiology). I also loved the opportunity to take care of children. Pediatric radiology ensured that every day was different — one day fluoroscopy, the next day ultrasound or CT/MRI. Pediatric radiology was never boring, to say the least. I also have to say that in some manner, pediatric radiology also chose me. Very early in residency, a pediatric radiologist actively took me under his wing as a mentor. Seeing how much he enjoyed imaging and caring for children, including many who are quite vulnerable, inspired me to want to pursue a similar career.

What makes pediatric radiology so rewarding?

To me, the opportunity to make the unknown known and directly impact the clinical care of children is incredibly gratifying. Through accurate and timely diagnoses, I have the opportunity many times a day to influence the health and well-being as well as possibly the future of children. What could be more rewarding?

Tell me about a compelling case where you made a difference in the life of a child.

It is hard to think of just a single case. I think most pediatric radiologists make many positive differences in the lives of children daily. One particular scenario that has occurred over and over through the years is when a child from an outside institution arrives with a reported “mass.” It is incredibly rewarding when you realize the mass is either a relatively benign pathology (e.g., kidney infection and not Wilms tumor) or something normal for a pediatric patient (e.g., prominent thymus and not lymphoma). As a pediatric radiologist who subspecializes in abdominal imaging, another very specific setting where we can make a tremendous difference is with young girls who are experiencing both daytime and nighttime incontinence. In this scenario, physical examination, laboratory testing and ultrasound are commonly normal. Yet, a quick 30-min MRI examination of the kidneys and urinary tract can be used to identify the cause (an ectopic ureter). The detection of an ectopic ureter sends the patient to curative surgery and is literally life-altering.

How does your research inspire you?

I love clinical radiology and I derive an incredible amount of career satisfaction from interpreting imaging examinations. That said, I derive a nearly equal amount of career and personal fulfilment and happiness from conducting research. It seems as if every day new clinical questions arise in the reading room. Similarly, imaging technologies are continually advancing. The ability to answer these clinical questions or help validate these new imaging techniques is unbelievably gratifying and inspires me. I have to say that I also love the research process, from idea and hypothesis generation, to study design, to actually carrying out the study, to analyzing and writing up the results. Believe it or not, certain times during the research process can be exhilarating. While it is satisfying to see your research eventually referenced in a paper or referred to at a meeting, it is even more rewarding (and humbling) to have the opportunity to change the way we practice pediatric radiology and improve patient care.

What would you tell a junior resident considering pediatric radiology as a career choice?

You can't go wrong by choosing our field! Pediatric radiology is an incredibly fulfilling, stimulating career. The people involved in pediatric radiology (e.g., radiologists, technologists) are collegial, caring, kind, giving and incredibly dedicated. In pediatric radiology there is a sense of community that is only growing stronger with each generation. Pediatric radiology also will allow you to find a niche should you desire. While pediatric radiology has many “general radiology” aspects to it, it also

allows subspecialization (neuroradiology, body, musculoskeletal, cardiac, nuclear medicine, fetal, etc.). This subspecialization allows the pediatric radiologist to become a subject matter expert, form professional and often personal relationships with clinical colleagues at one's own institution as well as with pediatric radiologists literally from around the world, and perform extremely high-quality clinical care and research.

What does the future hold for pediatric radiology?

The future is bright. As I see it, the importance of the pediatric radiologist continues to increase, whether it is in the emergency department, at multi-disciplinary care conferences or in consultation with the surgical team. Additionally, advances in MRI, CT and ultrasound continue to increase our footprint in the care of children. Today, we can accurately detect and characterize more disease processes than ever before. As such, we are more valuable than ever to the medical and surgical treatment of children. As a clinician–researcher, I am incredibly enthusiastic about the direction of our field and believe that the research we are conducting today will help secure our field's future for the next generation of pediatric radiologists.

Daniel A. Dessner, MD, FACR

Dr. Dessner is a private-practice pediatric radiologist in the Toledo Radiological Associates group in Toledo, OH.

Why did you choose pediatric radiology?

On my first day of medical school, a pediatric radiologist (Alan Oestreich) gave my class a lecture. It was really a pep talk about how wonderful it was to become a physician and the joys and privileges that awaited us. It was clever and heartfelt and it made a big impression on me. A few weeks later, we were asked to pick a clinical experience that would get us out of the lecture halls and labs for a half-day each week and I picked pediatric radiology in hopes of hanging out with people like Dr. Oestreich. I walked over to Cincinnati Children's and into a reading room with Janet Strife, Bill Ball, Rich Towbin and Robert Kaufman. They were very gracious to me as a total newbie and I loved every minute of it. It was clear that these doctors were the smartest in the room, that they loved what they were doing, that they were helping their patients tremendously and that they had the respect and admiration of their clinical colleagues. They were having more fun than any other group of doctors I had seen in action. I started to spend much more than a half-day each week with them, skipping lectures and other things, and within a few weeks, I was well on my way to becoming a pediatric radiologist.

What makes pediatric radiology so rewarding?

Working with pediatric physicians is the biggest difference. As a group, they are the kindest, most gracious, most humble and decent group of people I've found in medicine. They have always treated me with respect and kindness, and being their trusted and valued resource is a tremendous honor and privilege. I know them all by first name, while my non-pediatric partners often admit they haven't met most of the doctors who are ordering the studies they are interpreting.

Tell me about a compelling case where you made a difference in the life of a child.

Reducing an intussusception is always very rewarding personally because it makes a huge impact on the child and the family. We recently had a child who had been ill for a few days, seen at an outside hospital without a diagnosis before coming to us. We made a diagnosis at ultrasound and were able to perform a successful air reduction. The look on his parents' faces as the child settled and we told them that we had succeeded in curing him was and always is a profoundly rewarding moment in the life of any pediatric radiologist.

What are the unique virtues of private-practice pediatric radiology?

For most of my career, I have been the only pediatric radiologist in our system in a region with about 500,000 people. Most children live in communities like mine and not in cities with large, sophisticated children's medical centers. There is a lot of work to do, work that needs to be done well. In this model, I have the responsibility for establishing the imaging protocols; training our techs; assisting the hospital in acquiring, using and maintaining pediatric-specific imaging equipment; and working with the clinicians to ensure that their patients get good care in our department. It is a great honor and responsibility to be seen as "the go-to guy" by my non-pediatric-fellowship-trained partners who see pediatric cases and rely on me for help and advice on the tougher cases. I get great satisfaction from being able to bring a high level of care to the children in my hometown.

What would you tell a junior resident considering pediatric radiology as a career choice?

Do it! It's a great choice that will provide you with everything a physician could desire including tremendous intellectual challenge, soul-satisfying work, a very good living, and the opportunity to pursue academic or private-practice settings.

What does the future hold for pediatric radiology?

I think the future is very bright indeed. As research leads to true revolutions in care, imaging continues to grow in volume and power. Excellent pediatric radiologists will continue to be at the center of diagnosis and management for many patients and essential members of the care team.

Janet R. Reid, MD, FRCPC

Dr. Reid is a faculty pediatric radiologist at Children's Hospital of Philadelphia who has been recognized for her excellence in education with both the Singleton/Taybi Award and the Haller Award from the Society for Pediatric Radiology.

Why did you choose pediatric radiology?

I began my career as a family doctor in a remote community in northern Canada. In the days before PACS [picture archiving and communication systems], the radiologist would drive in every 2 weeks from the nearest city 5 h away to review a stack of films with us, so in between we were on our own. During film review, I had a pit in my stomach, hoping I had not missed anything too important. It was the radiologist's incredible depth of knowledge and insight that I saw as a critical element in the diagnostic process and that led me to radiology. I chose pediatric radiology because it allowed me to pair my love of diagnostics with my desire to maintain a direct patient connection. In addition, I knew that the field would present the greatest challenge and reward throughout my career.

What makes pediatric radiology so rewarding?

After 21 years in pediatric radiology, I am continually challenged and rewarded. The challenges lie in everything from the technical difficulties in imaging the moving patient, to the intense human experience of dealing with sick children and their families. The pediatric patient grows and changes and has a unique set of health conditions. The practice demands a level of empathy that is unparalleled in other radiology subspecialties and the challenges can be very rewarding. It is fortunate that our radiology and clinical colleagues share a collective bond in practicing patient-centered care.

Tell me about a compelling case where you made a difference in the life of a child

I recall a defining moment early in my career that made me fortunate to be a pediatric radiologist. An 8-month-old girl was brought in by concerned parents who, at birth, had noticed a lump in her thigh covered by a reddish patch of skin. The parents were reassured by the clinician that the lesion was

a common “birthmark” and that it might grow before it regressed. Our MRI interpretation suggested malignancy and we recommended biopsy. Despite the radical therapy recommended to treat the confirmed sarcoma, the parents were overcome with gratitude for saving their daughter’s life.

What are the rewards of teaching pediatric radiology?

Pediatric radiology attracts some of the best teachers, and perhaps this comes from the nurturing aspect of pediatric care. It gives you permission to be a little silly, a little casual, and to share stories. The pediatric radiologist is invested in learners at so many levels from patients and families through to fellows and colleagues, and can often find it challenging to teach all groups in the same sitting. But the best moments in teaching are when your students get it; these I refer to as the “a-ha” moments. The rewards of teaching are akin to the rewards of connecting with patients and families.

What would you tell a junior resident considering pediatric radiology as a career choice?

To those considering a career in pediatric radiology, I say, “Do it!” The field is truly patient-centered, supporting close interaction with children, families and colleagues. We are highly respected by our clinical colleagues — they *need* us. The specialty offers many practice settings both within and outside academia. Within the field there are so many potential career paths, with role models and paths forged in education, research, specialized imaging, public health, health care policy, global health, etc. The field will open many doors.

What does the future hold for pediatric radiology?

In terms of future, much of the excitement in pediatric radiology is related to the impact of artificial intelligence in eliminating motion in MRI, which will reduce exam time and which translates as lesser need for sedation and anesthesia. We will see a reduction in the need for intravenous contrast agents, which will move advanced CT and MR imaging to the outpatient setting with improved access and comfort for patients and families. The pediatric radiologist will become even more strongly integrated into the health care team through personalized medicine. Interventional pediatric radiology will have a key role in the management of multiple conditions through image-guided targeted therapy.

Pediatric radiology isn’t going away! Like the child, pediatric radiology continues to grow and develop and only get bigger.

Sarah S. Milla, MD, FAAP

Dr. Milla is a faculty pediatric radiologist at Emory University in Atlanta who has been a voice for pediatric radiology in the American Academy of Pediatrics, including serving as chair of the Section on Radiology.

Why did you choose pediatric radiology?

I initially chose the field of radiology because of the blend of technology, the amazing concept of noninvasively seeing inside the body and the visual nature of radiology. I think Dr. Gunderman’s [1] article is an amazing summary of the reasons why most of us were inspired to go specifically into pediatric radiology. I have relisted his excellent reasons while lending my own perspective:

1. The care of children — personal and professional satisfaction in helping children in need.
2. The family connection — patient/family interaction; we are a uniquely patient-facing subspecialty of radiology.
3. The resilience of children — children heal and deal much better than us grown-ups.
4. The whole organism — we get to view the child as a whole being, imaging literally head to toe. This has advantages both conceptually and in actuality because our population has systemic disorders and syndromes where radiologists are key in making the diagnosis.
5. All imaging techniques — opportunities to keep/develop skills in all modalities, including interventions.
6. Human development — body and brain develops during fetal/pediatric life — we see it all!
7. Congenial environment — nothing beats the colorful, upbeat and event-filled children’s hospital. Wouldn’t you want therapy dogs and occasional ponies in the courtyard?
8. Great colleagues — to be a pediatrician or pediatric subspecialist, you have to be a doctor with great communication skills with kids and adults, have a kind heart and have a sense of humor. These qualities also make the best of friends and colleagues to work and collaborate with.
9. Human excellence — this may be the aspect Dr. Gunderman discusses that I didn’t realize going into the field, but I believe is absolutely true: we are better doctors, humans and parents for being pediatric radiologists. Seeing, diagnosing and being on the team taking care of children allows us the perspective in life and parenting to realize the importance of radiology in pediatric care, the preciousness of our family’s health and the value of being present in today.

What makes pediatric radiology so rewarding?

My elevator pitch on pediatric radiology is short and sweet, and a summary of Question #1. This is the perfect field for an intelligent, caring, problem-solving, mystery-loving, great communicator. The field is rewarding because it is truly a radiology subspecialty where we are an active part of the team, communicating daily with our clinical teams, intensive care units and pediatric referrers. To people who say, “How can you see sick kids every day?” — I say, “I am part of the team working to get them healthy again!”

Tell me about a compelling case where you made a difference in the life of a child.

Recently, I had the opportunity to help make an accurate diagnosis of a rare entity in an atypical location. The child had been transferred from a referral facility with an outside CT that did not have optimal technique or a final diagnosis, but they recognized the child needed tertiary pediatric care. We performed ultrasound and subsequently MRI to obtain diagnostic imaging. My good fortune in having dedicated pediatric subspecialty radiology training and experience working with our vascular anomalies clinic helped me identify this child’s unusual mesenteric kaposiform hemangioendothelioma and allowed for the appropriate treatment of rapamycin to start quickly. The additional subspecialty training we receive in pediatric radiology is critical to pediatric clinical care.

Why is getting involved important?

Getting involved in our primary subspecialty field is important — to educate others and advance the field. It is also imperative to break out of our silo and stay closely connected with our referring clinicians and pediatric subspecialists. Through my involvement with the American Academy of Pediatrics Section on Radiology, I have seen the incredible effects of interdisciplinary communication, collaboration and advocacy.

Recently, we were able to combine advocacy efforts among the Society for Pediatric Radiology, the American College of Radiology and the American Academy of Pediatrics and fight a national insurance company guideline that did not allow coverage for many children to receive outpatient imaging at hospital-affiliated imaging centers, which is most likely where pediatric radiologists practice. When the American Academy of Pediatrics leadership and many of our referring colleagues were notified of this radiology issue, they helped lobby on our behalf, as well, advocating for the need for dedicated pediatric radiology interpretations. Advocating for our pediatric patients, their care and their imaging is of utmost importance. Children are a group that historically has not been able to advocate for themselves, and as a part of their physician team,

we must do this for them and work together with our colleagues in pediatrics.

What would you tell a junior resident considering pediatric radiology as a career choice?

With a genuine smile on my face, I would tell them that I would choose the same career again today! Many pediatric radiologists are even choosing subspecialties within pediatric radiology by modality (e.g., ultrasound, MRI, nuclear medicine) or by body part (e.g., musculoskeletal, neuroradiology, interventional radiology, fetal imaging). There are many clinical, teaching and research opportunities as well. Our society is filled with mentors and there are many growth and leadership opportunities. Pediatric radiology is a fantastic career and I am surrounded daily by wonderful colleagues and friends.

What does the future hold for pediatric radiology?

I am extremely excited about the future of radiology and pediatric radiology! As artificial intelligence is beginning to be developed in radiology, this is a fantastic opportunity for pediatric radiologists to help improve and augment interpretation of pediatric imaging studies. Pediatric radiology also has the opportunity to grow and expand teleradiology into rural and global locations, to help communities that may not have access to local pediatric radiologists. I am confident that we will continue to advocate, educate and advance the field. We are always looking for great doctors to join us!

Richard E. Heller III, MD, MBA

Dr. Heller is a private-practice pediatric radiologist who works for Radiology Partners in Chicago, IL, has additional training in business and is an expert on health care economics and the practice of radiology.

Why did you choose pediatric radiology?

I found working with children more fun than working with adults. In residency, rarely did I walk into an ultrasound or fluoroscopy room at the adult hospital and end up playing with the patient or debating who would win in a fight — Superman or Iron Man — but this happened repeatedly at the children’s hospital (oh, and it is clearly Superman). While I appreciated that pediatric radiology would afford me the ability to work across modalities and anatomical segments, it was this fun factor that most attracted me to the subspecialty. Interestingly, my passion for pediatric radiology increased when I became a parent myself. When my son was sick and hospitalized, I experienced life on the other side, as a parent.

This experience deepened my appreciation for our mission to care for children.

What makes pediatric radiology so rewarding?

When speaking with families, I reflect on my own experience of being the parent of a sick child. I recall speaking with my son's doctors and hanging on their every word. While we can't always promise everything will be OK, we can look them in the eye, tell them that we are here and that we are going to do what is right for their child. For example, when I diagnose an intussusception, I know it's new and terrifying for them, so I take the time to explain what is happening. I tell them what to expect, and I reassure them that we will take care of their child. The look in relieved parents' eyes when I tell them the reduction was successful is a powerful reminder of how fortunate I am to be in this subspecialty. More than once a parent has cried and hugged me. This is why I went into medicine; this is why I wanted to be a doctor.

Tell me about a compelling case where you made a difference in the life of a child.

One of the most compelling cases I witnessed is also what initially inspired me to consider radiology. My father, also a pediatric radiologist, would spend time as the camp doctor at my sleepaway camp. One evening one of the best athletes in camp didn't feel well. The counselors and nurses thought it was a mild asthma attack, but my father sensed this was more serious and took the child to the nearest hospital. They didn't have a pediatric radiologist, but my father was able to review the radiographs and diagnose a pneumothorax and suspected lymphoma, which was sadly confirmed. Even though that child, whom I remember as a powerful athlete, eventually lost his fight, my father's quick actions and skill gave that family extra time with their son. The parents were forever grateful that the camp doctor happened to be a pediatric radiologist.

Why are business and economics important to pediatric radiology?

Coming from a private-practice perspective, pediatric radiology has tremendous value. One of my own practice's principles is "radiology is a team sport," and while other subspecialties may be more relative value unit efficient (RVU), there is more to a successful practice. For example, in order to consistently obtain hospital and imaging center contracts, a full complement of subspecialties is often required. Pediatric clinicians want imaging exams on their patients interpreted by pediatric radiologists and are willing to direct their patients to hospitals and centers that have pediatric radiology. Delivering good pediatric radiology services is not only good for patients and families, it's good for the health of a practice.

What would you tell a junior resident considering pediatric radiology as a career choice?

I have found pediatric radiology to be both incredibly rewarding and intellectually stimulating. Helping children and families provides meaning to my life. Perhaps what has most impressed me, and something I didn't realize until I was a fellow, was how embracing the community of pediatric radiology is. Attending the annual meeting of the Society for Pediatric Radiology is like a giant family reunion with continuing medical education credits. When I have needed assistance professionally, it's almost always a Society for Pediatric Radiology colleague whom I turned to for support and guidance. I try to honor that legacy by paying it forward and by being the kind of colleague that I have benefited from. That is the culture of our subspecialty.

What does the future hold for pediatric radiology?

While I think the future is bright for all of radiology, perhaps it is brightest for pediatrics. As I look at my own practice, I see growth of pediatrics across the country. Increasing volumes and an increasing emphasis on subspecialty interpretations imply a greater need for pediatric radiologists. Artificial intelligence and machine learning systems will complement and support our work, but there is no replacement for the well-trained and compassionate pediatric radiologist.

Michael A. DiPietro, MD, FAAP, FAIUM

Dr. DiPietro is an active emeritus professor at C. S. Mott Children's Hospital of the University of Michigan who now works part time. He is a past chair of the Section on Radiology of the American Academy of Pediatrics and has been recognized by the Society for Pediatric Radiology with the Singleton/Taybi and Haller awards for teaching and the Pioneer Award for his work in pediatric ultrasound.

Why did you choose pediatric radiology?

I entered undergraduate college interested in pediatrics, and this interest continued throughout medical school. I matched and completed a residency in clinical pediatrics, becoming board certified in pediatrics. However, in the final months of medical school I changed my schedule on a whim to add a pediatric radiology elective. After a few weeks of that elective, I was told by a well-known radiologist that I had an aptitude for radiology but that I should make no drastic move regarding my approaching pediatrics residency, but merely keep pediatric radiology as a later option.

Throughout my pediatrics residency, I saw that the radiologists dealt with a wide range of medical and surgical

pediatric problems, much broader in scope and complexity than any one pediatrician would encounter. This, and the fact that I would still have patient contact (later expanded even more with development of ultrasound), interested me enough to take a subsequent radiology residency (3 years) and then a pediatric radiology fellowship (2 years).

What makes pediatric radiology so rewarding?

The primary reward is working with children and working with colleagues (the whole team, including technical and hospital support people) who want to be there because they are dedicated to the care of children. The pediatric hospital environment has good vibes, is a pleasant place to work. The resilience of children is inspiring. Interesting problems that we encounter include aspects of human growth, development and congenital issues (e.g., “applied embryology”), both medical and surgical.

We have a great professional society, the Society for Pediatric Radiology. It has a rich history that spans many generations. It is a high-performance, cutting-edge professional organization that is nevertheless cordial and welcoming to young pediatric radiologists. It is a society within which we can grow professionally throughout our career, as many of us have.

Tell me about a compelling case where you made a difference in the life of a child.

There is a unique case that stands out in my memory where I went outside the box, but in this circumstance it was the right thing to do. I think being a caring, understanding human and a physician can occasionally tip the scale away from strict “appropriateness criteria mode.” The role of pediatric radiologist involves taking ownership and being a physician first [2].

I was asked one Sunday morning to perform an upper gastrointestinal series (upper GI) to rule out intestinal malrotation in a newborn: no vomiting, no discomfort, no medical indication. The child looked normal, in fact great. I then learned the family history, that these parents had lost a young child only a month ago while rushing to the hospital. The child was dead on arrival in the car seat. Autopsy revealed midgut volvulus with dead bowel.

I knew of no report of non-syndromic familial malrotation (I checked) to indicate studying the new baby and then spoke with the attending pediatrician. The clinician was reasonable and not demanding. I listened to the story and realized that this still-grieving family, no matter what we said about malrotation not being hereditary, would understandably watch their new baby like hawks (the earliest helicopter parents?) and that they would be for sure in some emergency room after the kid’s first “wet burp.” I wouldn’t blame them.

I knew that I could do an upper GI with only a few seconds of fluoroscopy time to confirm the likely normally positioned duodeno-jejunal junction and then let the family relax and take care of their new baby. That is what I did, and that is what we found. The father was present during fluoroscopy. He was embarrassed to have asked for this study, but he was most appreciative and relieved. I think I made the right choice. One doesn’t read this in “the book.”

What makes pediatric radiology so much fun at the end of a career?

Is it fun? Is it any different as emeritus professor than as instructor or assistant professor? The answers are yes and yes. Working with children and working with the usually generous, pleasant and dedicated colleagues (physicians and non-physicians, the whole team) who work with children remains a fulfilling and rewarding experience for me, as it has always been.

Before, I could only look forward. Now I still look forward but with the benefit of several decades of hindsight. Having spent 37 years in one hospital has provided long-term continuity and the opportunity for me to see former patients grow up and for me to consult with faculty pediatricians and surgeons who I once taught when they were students and residents. Over the years I sometimes felt overwhelmed and wondered “is it worth it?” Then, when I thought of the children and their families who we helped, including some who we met personally, my question was answered — “yes.”

I experienced the beginnings of cross-sectional imaging and its adaptation to pediatrics. Ultrasound was of particular interest to me, especially performing scanning. Scanning children is a skill worth developing. This hands-on in-person encounter with the child and family sometimes revealed useful information beyond that on the saved images.

Now, with the opportunity at my stage to work part time, I enjoy reading plain radiographs while my younger colleagues read the high-tech cross-sectional studies. This is my choice. Plain radiography still plays an important role in pediatrics. I remember the great pediatric radiologists who taught me. They read radiographs with such skilled observation and deduction that the pediatricians considered them to be clairvoyant. Those memories inspire me today.

Curiosity is not confined to any particular chronological age or career stage. I still enjoy asking questions, occasionally inspiring young colleagues to pursue a project, but above all I enjoy the continued opportunity to learn and to be inspired through our joint ventures to help children.

What would you tell a junior resident considering pediatric radiology as a career choice?

Good choice. I would ask what activated the interest and what other subspecialty is also being considered. I would then inquire

about education and family background to learn about their interest in children and in the broader field of pediatrics. I would discuss the general atmosphere in children's hospitals and children's wards, how it changes around holidays (festive), how we are part of a much bigger and comprehensive team with all members on the same mission. As a general rule, people who deal with children tend to be pleasant to work with.

Pediatric radiology is the field where a specialist is also a generalist. We deal in all modalities and all organ systems, following the patient over the entire course of imaging during the admission and in follow-up. Some modalities, especially ultrasound, offer opportunities for hands-on patient contact. Learning how to communicate with and work directly with children and parents will be very important. Prepare to be a consultant and take responsibility for what you read and what you do.

What does the future hold for pediatric radiology?

An emphasis in adult radiology over the last 5 years or so has been to see a few patients a day and to have more physical presence (see David Levin's Radiologic Society of North America president's address from 2014 [3]). This is what we have been doing in pediatric radiology for decades. Close communication with clinicians (in pre-PACS era it used to be much more in-person communication) and direct interaction with patients have been a part of how we do business. Our stature in the broad field of radiology will grow as we are recognized as role models of such recently encouraged interactions.

Some medical students naively consider radiology a commodity susceptible to be replaced by artificial intelligence. They should be shown that radiologists are at the forefront of developing and using artificial intelligence as a tool, an aid to medical care that will remain a human interaction.

Children are precious. They are society's future. As long as this idea persists as it has through the ages, pediatric medicine, which includes pediatric radiology, will be valued. Emphasizing that pediatric radiology is a gratifying and valued way to care for children will ensure an influx and retention of excellent and caring pediatric radiologists. I remain optimistic about our future in pediatric radiology.

Conclusion

The practice of pediatric radiology has numerous virtues, many of which are unique in comparison to other subspecialties in radiology. In addition, pediatric radiologists have multiple avenues for developing subspecialty expertise, work skills or pursuits aligning with their personal interests. We thank Drs. Romberg, Jarrett, Dillman, Dessner, Reid, Milla, Heller and DiPietro for sharing their enthusiasm for pediatric radiology.

Compliance with ethical standards

Conflicts of interest None

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