2023 Academic Radiology Management Program

April 26-27, 2023

AUR RADIOLOGY MANAGEMENT PROGRAM

April 26-27, 2023

JW Marriott- Austin, TX
Room 203-204

Wednesday, April 26

7:45AM - 8:00AM	**Welcome and Overview** *Jocelyn D. Chertoff, MD, MS, FAUR* *Pablo R. Ros, MD, PhD, MPH, FAUR*
8:00AM - 9:30AM	Case 1 **The Hunger Games: Productivity Bases Compensation Plan for Academic Radiologists** *Kristen K. DeStigter, MD, FAUR* *Pablo R. Ros, MD, PhD, MPH, FAUR*
9:30AM - 10:00AM	**Break**
10:00AM - 11:30AM	Case 2 **The Journey to Develop a Successful "Hybrid" Radiology Department** *Bethany Casagranda, DO* *William Peterson II, MD*
11:30AM-12:00PM	**Alumni Oration** *Andrew Rosenkrantz, MD, FAUR*
12:00PM – 1:00PM	**Lunch**
1:00PM - 2:30PM	Panel Session **Report from the Frontline: Academic Radiology Post-Covid** *Moderators: Jocelyn D. Chertoff, MD, MS, FAUR and Pablo R. Ros, MD, PhD, MPH, FAUR* ***Hybrid Department:*** *Matthew A. Barish, MD; Bethany Casagranda, DO; Lori A. Deitte, MD; Marta Heilbrun, MD; Jamlik-Omari Johnson, MD; William Peterson II, MD; and Jessica Robbins, MD, FAUR* ***Role of AI:*** *Matthew A. Barish, MD and Christopher P. Hess, MD, PhD* ***Innovations in Education:*** *Matthew A. Barish, MD; Michael P. Recht, MD; and Jessica Robbins, MD, FAUR* ***Radiology Match****: Bethany Casagranda, DO and William Peterson II, MD*
2:30PM - 3:00PM	**Break**
3:00PM- 4:00PM	Case 3 **Principles of Negotiation for Radiology Leaders** *Christopher P. Hess, MD, PhD*
4:00PM - 5:00PM	**Discussion**
5:00PM – 6:00 PM	**Radiology Management Program Reception (Room 205)**

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Thursday, April 27

8:00AM - 9:30AM	Case 4 **Academic Radiology Departments Relationships with Industry** *Matthew A. Barish, MD* *Judy Yee, MD*
9:30AM -10:00AM	**Break**
10:00AM - 11:30AM	Case 5 **Designing the Academic Mission in an Era of Constraints** *Lori A. Deitte, MD, FAUR* *Lucy Spalluto, MD* *Jessica Robbins, MD, FAUR*
11:30AM - 12:00PM	**Executive Presence – Keynote Speaker** *Judy Yee, MD*
12:00PM - 1:00PM	**Lunch**
1:00PM - 2:30PM	Case 6 **City Mouse, Country Mouse Consulting** *Jocelyn D. Chertoff, MD, MS, FAUR* *Michael P. Recht, MD*
2:30PM - 2:45PM	**Break**
2:45PM – 4:15PM	Case 7 **Academic Medical Center Staffing: Introducing DEI to the Equation** *Marta E. Heilbrun, MD* *Jamlik-Omari Johnson, MD*
4:15PM - 4:45PM	**Closing Remarks** *Jocelyn D. Chertoff, MD, MS, FAUR* *Pablo R. Ros, MD, PhD, MPH, FAUR*
4:45PM – 5:00PM	**Program Recognition** *Jocelyn D. Chertoff, MD, MS, FAUR* *Pablo R. Ros, MD, PhD, MPH, FAUR*

Case Study Groups

Case 1 Groups

Dr. Amna Ajam
Dr. Naiim S. Ali
Dr. Ryan C. Avery
Dr. Greg D. Avey

Dr. Peeyush Bhargava
Dr. Terry Crow
Dr. Stephane Desouches
Dr. Katerina Dodelzon

Dr. Ankur Doshi
Dr. Michael Ferra
Dr. Halemane Ganesh
Dr. Nicole Hindman

Dr. Mai-Lan Ho
Dr. Deveraju Kanmaniraja
Dr. Bhasker Koppula
Dr. Matthew Edward Maeder

Dr. Jasnit Singh Makkar
Dr. Kyle Richard Minehart
Dr. Robert William Morris
Dr. Rupa Radhakrishna

Dr. Casey Allen Reed
Dr. Gelareh Sadigh
Dr. Nasim Sheikh-Bahaei
Dr. Dorothy Amy Sippo

Dr. Theodore Vander Velde
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Dr. Jennifer Suzanne Weaver
Dr. Carlos Zamora

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Case 3 Groups

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Case 6 Groups

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Case Study #1

“The Hunger Games”: Productivity Based Compensation Plan for Academic Radiologists

Kristen DeStigter, MD

Pablo Ros, MD, PhD, MPH, FAUR

The "Hunger Games": Productivity Based Compensation Plan for Academic Radiologists

Kristen K. DeStigter, MD, FAUR and Pablo R. Ros, MD, MPH

Background:

By all traditional measures of success, the Department of Radiology at Midwestern University Medical Center (The Department) was one of the leading academic departments in the country. The faculty was focused in innovation and the Department had discovered novel imaging technologies. Midwestern University Radiology was one of the top Departments in extramural funded research. Educationally, it also did very well on the resident match and its fellowship programs received rave reviews each year attracting talent nationally. Financially, faculty compensation had remained stable despite shrinking reimbursement for several years due to its modest increases in productivity. But the Department continued to operate at a loss for the Academic Medical Center Group Practice and ultimately the Health System.

The Department's overall priorities were balanced between clinical service, research and teaching; the classic "three-part mission". Historically, as in most academic departments, there was a greater emphasis on the research and teaching components of the mission. Faculty came and stayed in the Department because of the desire and opportunities to pursue their research and teaching interests. They also enjoyed being able to exclusively practice in their clinical sub-specialty. Furthermore, since compensation was tied to academic rank, the majority of radiologists were historically concerned about their academic activities, and less about clinical productivity and service. To pursue their academic interests in the Department, faculty accepted compensation levels that were less than what they could make in private practice.

Nationally and locally, the financial scenario had dramatically changed in just a few years forcing health systems to adapt. Market consolidation in healthcare was rampant and here to stay. Likewise reimbursement and academic subsidy declines combined with increased competition based on clinical service, convenience and price resulted in declining revenues and a major threat of the established Academic Medicine Center model. Market consolidation implied health systems anchored by an academic medical center were expanding buying community hospitals and making academic departments to transform into hybrid providers with general and subspecialty practices and variable productivity depending on subspecialty and assignment. Consequently, to survive economically, many departments were being forced by their Health Systems to accept a productivity based compensation model focused on clinical productivity. It became common for departments to reduce or eliminate faculty academic time, and implement benchmarked productivity goals. In some cases, clinical academic and community tracks were being implemented with different goals, compensation and work schedules. Faculty all over the country had become increasingly demoralized by the change in expectations, lifestyle and reduced emphasis on academics.

Departmental leadership had worked hard to protect Midwestern University Radiology Faculty from these drastic changes. Salaries were maintained and new faculty had been added to accommodate volume growth and the programmatic education and research needs. However, the economic realities of the current healthcare environment were catching up to the

Department and Health System. Although many parts (e.g. research grants) of the multi-dimensional departmental enterprise were still going well, the overall cost compared to income for the clinical service was off balance. It was clear there was no longer tolerance for discrepancy between compensation and clinical productivity benchmarks to pursue academic endeavors and the old order was no longer sustainable.

The Health System COO, Dr. Power, convened all the Chairs of the Clinical Departments to announce a productivity based compensation plan. Dr. Power felt strongly that drastic changes had to be made to prevent unsustainable costs of the Group Practice physicians.

The Strategy:

The Health System strategy was to move on from traditional compensation. Typically, a guaranteed base salary was established at the hiring time, based on market forces plus recruitment needs and pretty much locked in for years with minimal fluctuations except for rank promotions and COLA. Therefore base compensation wasn't directly related to productivity.
Although in the past Midwestern University Radiology had implemented a clinical productivity based incentive pay, rewarding both Divisional and Individual performance, this was considered both insufficient and unsustainable for success in the changing financial environment.

Dr. Power's rationale was to fundamentally change a culture of compensation entitlement to compensation accountability. So, base clinical compensation would be determined in an annual basis by the individual radiologist's productivity as compared with a national benchmark stratified by subspecialty and rank. So, it would be fine to increase compensation to busier radiologists and decrease it to others whose practice style would be less efficient.

Initial modeling considered substantial increases in the overall cost of the group practice, which would be upset with the commensurate increase in patient revenue.

It was clear that the new comp plan wouldn't address compensation for other parts of the mission, such as teaching, research and administrative duties. These would be considered outside of the plan and therefore untouched. The clinical compensation component was to be determined by the clinical % effort of clinical FTE (cFTE).

Dt. Power's hope was to establish a robust, easy to understand plan, flexible enough to cushion reimbursement changes and compensation variations according to market. But, above all it would introduce a cause/effect relationship between clinical productivity and financial reward.

Further, this strategy was supposed not only to generate more income but also help preserve the academic culture and goals stopping its traditional subsidization with clinical $. While the strategy developed by leadership was reasonably sound and according to the external consultants proven in multiple AMCs across the US, there were many challenges to effectively implementing it. Perhaps the biggest challenge for the Department Executive Committee was changing the faculty expectations without demoralizing them or losing sight of the academic components of its mission. Many faculty members perceived that meeting expectations would erode the traditional radiology team rather than individual culture. Faculty also perceived a significant conflict between their clinical goals, the academic requirements for promotion and fulfillment of their own academic and teaching interests and satisfaction.

The Plan:

One key element was to adopt a single plan for the entire group practice to minimize variations among its over one thousand academic physicians distributed in over 20 departments. Dr. Power and the Group Practice's HR service liked this simple and fair approach, plus facilitated implementation.

A second factor was to adopt established compensation and productivity national benchmarks, such as the AAARAD in Radiology. The productivity unit would be the wRVU, individually based

The third component of the plan would be to reset the base compensation annually.

An incentive component (approximately 5% of the base comp) would be added based primarily on goals other than productivity such as quality, citizenship, program development, etc. The incentive goals were to be developed by each department with group practice supervision.

It was emphasized from the beginning that the program was not at all likely to be "the perfect" program, but rather a reasonable "start" and to refine it in the years to come. The chosen mechanism to introduce changes was to establish a Compensation Council chaired by Dr. Power and integrated by Department Chairs and other key physicians.

Incentive Plan Design and Implementation:

The Incentive Plan was designed to exclusively encourage and reward individual clinical productivity without changing compensation for academic and administrative contributions.

The details of the Compensation Plan were announced to the Department Chair, Dr. Ray, a few months prior to its implementation. Among the Chairs and faculty of the Group Plan there was heavy resistance. There were concerns about the potential adverse impact the plan would have on morale and collegiality.

BASE SALARY

- Clinical comp only. No changes in research, teaching or admin components of comp
- Clinical productivity, compared to national benchmark
- All faculty with a cFTE ≥ 0.20 included
- Set annually, based on past year performance
- Minimal clinical productivity: 50thtile
- Academic Rank comp benchmark

INCENTIVE COMPENSATION

- Departmental leadership design, menu style:
    - Quality (peer reviews, report TAT, etc.)
    - Citizenship (Grand Rounds and faculty meetings attendance, program development, etc.)
    - No research and education components (excluded from Clinical Productivity Incentive Comp)

Dr. Ray was concerned because in his heart believed radiology in general, but particularly Midwestern University Radiology, functioned well and was productive as a team rather than

individuals (overall productivity had been about 75% of benchmark). Because Dr. Ray and his Executive Committee had asked the Division Chiefs to pay attention, there weren't large productivity discrepancies between faculty members within the different divisions.

Dr. Ray calculated the effects of the new plan after the 6 months trial period offered by Dr. Power. During this time no compensation changes were to happen but data would be collected for future implementation. With some trepidation the early modeling wasn't as bad as anticipated and many radiologists were set up to receive salary increases.

Review of performance measures during the trial period:

The overall clinical productivity increased about 7% over the previous year. Likewise, volume in the Department increased by 5%. Some individual Divisions had more significant increases than others did. Some Divisions showed no change in clinical productivity; and some even showed a decrease. The latter was especially noticed in sections with discordance between volume increase and added staff. Also, there was no longer resistance among faculty to cover unsavory shifts to support the System's growing strategies in ever more distant locations and evening/weekend hours.

This was the good news. However, something was very different at Midwestern University Radiology. The climate among radiologists had changed.

Anecdotal comments about the plan from the faculty were mixed. There was a perception among many that morale was decreasing. The compensation plan that focused on clinical productivity was brought up as a symbol of the decreased emphasis on academic interests and satisfaction. There were strong feelings that faculty were working as hard as they could and that they felt greater conflict between their compensation versus their academic promotion. For many it was tough to resolve this conflict on a day-to-day basis. Some people felt that the Department and the System should focus their energy on providing greater support for the individual's academic goals rather than clinical productivity based compensation.

The intradivisional competitiveness was clearly increasing and undesired behaviors started to appear. Poaching of simpler cases became routine, faculty were telling residents to assign cases to them and not to the attending of record, etc. Tensions started among colleagues who had collaborated for years. Interdivisional issues were also happening particularly between the community hospitals and academic medical center radiologists. Everyone was watching his or her RVU's!

One day, Dr. Ray heard from another Clinical Department Chair that radiologists were calling the current compensation plan "the Hunger Games".

After hearing these comments and even suffering poaching and snappy remarks himself, Dr. Ray decided to convene the Department's Executive Committee to strategize a response to the new compensation plan.

In his introductory remarks to Radiology's EC, Dr. Ray stated that it was clear that the plan had increased clinical productivity and service. Furthermore, he stated that the plan only rewards "productive" people and, therefore, will only appear positive to those who meet these criteria.

Plus, no matter what comp plan is implemented, there would be complaints about it and is critical to have a flexible comp model. It was his feeling however that legitimate adjustments

had to be proposed to improve it and make viable. Some more radical views included scrapping the plan altogether. End the Hunger Games!

Your charge:

You are a member of Midwestern University Department of Radiology Executive Committee. A special meeting of the EC has been scheduled on Thursday to modify the Health System's Compensation Plan. In preparation for the meeting, please develop your recommended answers to the following questions.

1) Would you recommend keeping Radiology out of the new plan entirely?
2) What arguments would you use to explain to the Comp Council that Radiology is different than other specialties?
3) Would you change or maintain the proposed Productivity Comp Plan?
   - Why?
   - How?
4) How would you "sell" your recommendations to your radiology colleagues?
5) What would you do to increase the likelihood that the plan would be successful?
6) What other tools would you use to motivate clinical faculty to improve performance?
7) What do you believe are realistic consequences if the compensation plan is implemented as designed?
8) How long will it take for fundamental change to occur? What would be the key components of your change management strategy?

Case Study #2

The Journey to Develop a Successful Hybrid Academic Radiology Department

Bethany Casagranda, DO

William Peterson II, MD

2023 Radiology Management Program

CASE & DISCUSSION

The Journey to Develop a Successful Hybrid Academic Radiology Department

Bethany Casagranda, DO
William Peterson III, MD

The Hybrid Academic Department – Three headed monster or peas in a pod?

City Radiology Associates (CRA) began as a private practice group in 1980. For decades, the group was self-sustaining and successful delivering radiologic interpretive and interventional services to one hospital in a metropolitan area. Their ACGME residency grew over the years from 3-5 residents, and they were adapting to the anticipated changes to the diagnostic and interventional radiology tracks. Both ACGME and non-traditional fellowships included musculoskeletal, abdominal, neuroradiology, breast imaging, interventional radiology and cardiothoracic imaging.

Over the years, ARA had affiliations with regional medical schools which provided professorship tracks for academically productive radiologists in exchange for clinical rotations of medical students in the radiology department.

In 1999, the hospital was acquired in a 5-hospital merger. Residents went to the 3 largest hospitals and this trio became known as “central campus”. The 2 smaller hospitals were further from the city and it was felt they didn’t provide additional educational value.

In 2013, the 5-hospital health system was acquired by a national leader in health care insurance (“the payer”) and renamed City Health Network (CHN). Throughout the next 10 years, each private provider practice became employed by CHN, and the payer remained the parent company.

In 2015, CRA becomes employed by the payer. Despite good faith agreement that the Chair from CRA would remain at the helm, the Chair was removed with an internal interim placed to lead the department through this turbulent transition. CRA loses 9 radiologists under interim leadership and 9 were hired rendering staffing neutral from 2015-2016.

In 2017, a permanent chair is hired. Payor/provider model continues to evolve over the next 5 years with the payor being the capital investor into the provider group and their strategies. Partnership between payor/provider deepens. Strategic alignment is an early and obvious challenge, but through relationship building and collaboration, the health system sees tremendous growth. Model moves from purely academic to academic/community to academic/community/remote: a 3-armed hybrid. By 2022, each weekday has approximately 40 radiologists working day shift, 13 evening shift and 3 overnight. On the weekends, 20 radiologists cover day shift, 5 evening shift and 3 overnight.

In 2017, CHN devised an aggressive 5-year recruitment strategy to accommodate anticipated growth which included:

- Get ahead of the trends/outside-the-box
- Establish remote subspecialty work
- Establish our own overnight ER division
- Build a competitive compensation plan
    - Base built off of experience; not time with the practice
    - Productivity (academic and RVU) and quality scorecards
    - Divisional RVU targets for central campus
    - Individual RVU targets for remote readers
- Utilize affiliates where staffing voids still existed (teleradiology company (TRC) and noncompeting regional university (NCRU)

The Chart below illustrates growth during the 5-year period under new leadership (2017-2022) and the supporting factors attributed with this growth including number of radiologists, location of radiologist, number of sites, annual wRVUs, compensation model and assistance from outside affiliates. 2013 is listed as a baseline for the private practice and 2015 is listed as a baseline for the beginning of health system employment.

Key: teleradiology company (TRC)
noncompeting regional university (NCRU)

Year	Radiologist #: onsite: remote	# of sites (H) (OP)	Annual RVU's	Comp model	Tele Affiliations
2013	38	3 H/ 3 OP	371,000	Private practice	none
2015	39	3 H/ 4 OP	423,000	Employed	none
2017	45	3 H/ 4 OP	410,791	Employed	none
2018	50 46:4	4 H/ 5OP	461,300	Employed	none
2019	58 53:5	9 H/ 9 OP	572,036	Shift based	none
2020	71 62:9	10 H/ 9 OP	604,833	Shift based	none
2021	88 71:17	12 H/ 17 OP	816,136	Shift based	TRC & NCRU
2022	105 84:21	14 H/ 28 OP	1,004,362	Shift based	TRC & NCRU

At the same time across the country many academic practices were developing some form of hybrid model. For CRA, this change was prompted by their acquisition into a rapidly enlarging health system. Expansion of services would need to extend from central campus into the community where previous competitors and new builds now exist. This endeavor would require monumental recruitment and capital investment. But what has prompted the change toward a hybrid model in other systems?

- Even if not acquired, many traditional academic groups have been asked to expand services into their surrounding communities with their flagship hospital becoming the anchor of an enlarging health system.
- COVID workplace trends including work-from-home, re-prioritizing life goals and improvement in remote capabilities.
- Growth of radiology venture capital groups (high compensation, work-from-home models)

Additional stressors were as follows:

- Strategic new builds continuously stressed the group by adding volume and sites of service (4 neighborhood hospitals, 1 full-service hospital and 8 outpatient centers)
- Not all acquisitions were anticipated or made visible to the radiology department where volume remained ahead of recruitment.
- Most acquired hospitals had deferred infrastructure and failing equipment (master plan costs range from 40M-100M per hospital)
- Acquired hospitals had private practice radiology groups which needed to be employed by CHN.
- On site radiologists started to become aggravated with the differences in job expectations when compared to remote radiologists.

GROUP DISCUSSION
Questions to Consider:

1. What are the top 3 anticipated challenges with this rate of growth?

2. How would you build and nourish EACH arm of the hybrid practice? (Academic, Community and Remote)

    a. Compensation plan differences
        i. Base comp
        ii. RVU expectations (divisional vs. individual)
        iii. Incentives (what behavior are you encouraging)
    b. Communication within and between groups

3. What opportunities do you see for implementation of value-based medicine incentives?

4. What challenges face radiology residency education because of an enlarging health system (more clinical sites, more faculty, and more imaging volume)? Is there a strategy that can be employed to insulate our trainees' education from these stressors?

Panel Session

Report from the Frontline: Academic Radiology Post-Covid

Moderators: Jocelyn D. Chertoff, MD, MS, FAUR and Pablo R. Ros, MD, PhD, MPH, FAUR

Hybrid Department: Matthew A. Barish, MD; Bethany Casagranda, DO; Lori A. Deitte, MD, FAUR; Marta Heilbrun, MD; Jamlik-Omari Johnson, MD; William Peterson III, MD; and Jessica Robbins, MD, FAUR

Role of AI: Matthew A. Barish, MD and Christopher P. Hess, MD, PhD

Innovations in Education: Matthew A. Barish, MD; Michael P. Recht, MD; and Jessica Robbins, MD, FAUR

Radiology Match: Bethany Casagranda, DO and William Peterson III, MD

Case Study #3

Principles of Negotiation for Radiology Leaders

Christopher P. Hess, MD, PhD

2023 Radiology Management Program

CASE 3 & DISCUSSION

Principles of Negotiation for Radiology Leaders

Christopher P. Hess, MD, PhD

MOUNTAIN UNVERSITY HEALTH AND RADIOLOGY SOLUTIONS PARTNERS – STRONGER TOGETHER?

Mountain University Health ("MUH") is an academic healthcare system that serves the three-corner region at the intersection of the states of California, Oregon, and Nevada. MUH is part of the larger California, Oregon, Nevada Alliance ("CONA") network that collectively serves around 250,000 patients. With 45% market share, CONA is the dominant health network in the three-state area. It competes with one other large private network, Tri-State Health ("TSH"), whose hospitals and clinics serve around 200,000 patients in the region. CONA, and by proxy MUH, enjoys a favorable payor mix, with 50% private payer contracts for physician and hospital services in 2021. There are multiple physician-owned practices in the tri-state area that serve patients from both large health networks, including a local private radiology group that owns an outpatient imaging center that is geographically proximate to the MUH.

MUH is known for its full spectrum medical practice that includes high-TQ services in oncology, neurosciences, orthopedics, and cardiology. Considered the highest-quality subspecialty referral center for the region, MUH provides patients access to national cancer trials, transplant surgery, Joint Commission-certified interventional stroke and cardiology programs, and high-volume joint replacement and women's health services. To support the continued expansion of these flagship programs at MUH, there is a growing need for more imaging resources. MUH's radiologists are hospital-based and university-employed. They are known for their subspecialty expertise and their highly ranked residency program in diagnostic and interventional radiology.

Most of the diagnostic imaging for MUH patients is performed at MUH hospitals and clinics, which also enjoy a reputation for high quality and state-of-the-art imaging facilities. For the past several years, however, growth in volume has outpaced access to MUH resources, and patients have had to wait up to

2 months to undergo non-urgent, elective imaging examinations. Long wait times have led MUH physicians to increasingly refer patients to the local private imaging center, which is generally been able accommodate patients within 1 week of referral. In 2022, 10-15% of imaging studies have been referred out of MUH and in 2023 it has been projected that 20% of imaging studies will be referred out.

MUH needs to expand its capacity for imaging while maintaining its brand for quality and do so in a cost-efficient manner. The MUH C-suite has suggested that the fastest and most cost-effective solution would be to purchase a local private imaging center and invest in an equipment upgrade at this site. There is a second, alternative option to lease a property closer to the main hospital and build out a new hospital-based imaging center. To meet the growing demand, it is estimated that at least 2 new MRI scanners, 2 CT scanners, 1 PET-CT scanner, 2 mammography units and 4 US systems will necessary. The lease terms are competitive, but the scanners, siting and construction costs are substantial. More importantly, the time to market is long— it will take more than 2 years before the new center could be open to patients. A third-party consultant has developed a proforma for MUH that includes estimates for the up-front capital costs, revenue, operational expenses, and expected annual profit for the new center.

MUH has arranged a meeting with **Radiology Solutions Partners, LLC ("RSP"),** a physician-owned Radiology group, to negotiate the purchase of their outpatient imaging center. The practice is owned by 3 local radiologists who incorporated 10 years ago. At the time, they purchased the lease on a building approximately 2 miles from the MUH main hospital and secured loans to purchase 2 MRI scanners, 2 CT scanners, 1 PET-CT scanner, 2 mammography units and 4 US systems (the same footprint that MUC requires for its expansion). With its loans now fully paid off, the RSP Imaging Center is now fully owned and operated by the 3 partners. Over the last decade, patient volumes have increased significantly because of both growth in the market and the larger number of referrals from MUH and other physicians. To meet the demand, two additional radiologists have been hired by the group as employees over the last 2 years. Both are on track to join the partnership next year, each with a $250,000 buy-in.

An external audit of RSP was recently completed, allowing a review of annual revenue, operational expenses, and profit in 2022. It was a challenging year for the partnership, in unanticipated expenses required to recover from the pandemic and a 10-15% decrease in annual volume. Even before COVID-19, negotiations with private payers had been an increasing challenge, and private payer mix had been eroded from 60% 10 years ago to only 40% in 2020, and the revenue per study has been in consistent decline. The scanners and other imaging resources in the RSP Imaging Center are now 10 years old and have lower image quality than MUH scanners and have been suffering from increasing downtime. The RSP partners have been discussing upgrading their imaging resources but are worried about the considerable costs, which would require securing a new business loan. Moreover, they perceive that their professional reputation among referring doctors has slipped over the years, as they are not familiar with some of the newer imaging techniques, had several high-profile quality and risk issues, and have not participated actively in the professional community to the same degree as their MUH Radiology colleagues.

Although their business remained marginally profitable through 2022, the partners are worried about further erosion in payer mix, increasing expenses to run their center and increasing competition. Rumors abound that MUH will be building their own outpatient imaging center a few blocks from their business that will compete with them. Having trained at MUH, they work well with the university radiologists, although they know that compensation for the academic radiology group is 10% less than their current earnings if they were to join MUH. They are motivated to sell their practice but recognize its current profitability and are reluctant to discount the value of the practice.

A consulting firm working with both MUH and RSP has valued the assets of the RSP outpatient imaging center at $10M, with no current debt service or other liabilities. The RSP partners feel strongly that the center has been undervaluated and is actually worth $20M. Additional bullet points from the report issued by the consultants are as follows:

- The center is operated by 8 full-time technologists and 4 full-time office staff who are employees of RSP. Their contracts are annual.
- In addition to the 3 partners, there are 2 employed radiologists. All are board certified.
- The center typically performs 12,000 exams, collects revenue of $6M and has practice expenses of $4M annually, allocates $500K towards capital purchasing each year. Because of the COVID-19 pandemic the center operated at a loss $1.2M in 2020 and 2021 and was break-even in 2022.
- Operational programs for the center were described as "acceptable, with several opportunities for improvement," with recommendation for modernization in the domains of management, scheduling, operating hours, and revenue cycle.
- ACR accreditation was not renewed last year for CT or MRI at the RSP Imaging Center.
- Current assets include a capital fund with $1M in accrued cash value.

Can a deal be reached? If so, what are strawman negotiated terms for MUH to purchase the RSP Imaging Center and RSP to join the MUH group of hospital-based radiologists?

- ***Transaction model – full acquisition? merger/joint venture? affiliation?***
- ***All-in cost for the transaction?***
- ***Does the agreement include a capital upgrade plan?***
- ***What is the disposition of the radiologic technologists and office staff? the employee radiologists?***
- ***Any employment assurances for the RSP radiologists or employees?***

In this case, you will take the role of the MUH team (the CEO, CFO and Radiology department head) or the RSP team (managing partners). As a part of the exercise, the MUH team and RSP team will first meet separately and then the two groups will meet for the negotiations.

Questions to consider for both groups before your negotiation:

1. What is the primary goal of this negotiation?

2. What are the principal points of self-interest for MUH and for RSP? Which are tangible and which are intangible? How would you prioritize these?

3. Describe the ZOPA and the reserve value for this negotiation. What is your team's BATNA?

4. Develop 2 separate proposals that your group would be willing to accept.

5. How will you gauge the success of your negotiation?

Case Study #4

Academic Radiology Departments Relationships with Industry

Matthew A. Barish, MD

Judy Yee, MD

Academic Radiology Departments Relationships with Industry

Matthew A. Barish, MD and Judy Yee, MD

For the following series of vignettes, you (along with the members of your table) are asked to place yourself into the role of a member of your Department's Executive Council. You are responsible for providing guidance to your Department Chair in each of the following scenarios. Your Chair has rarely gone against the Executive Council's recommendation so your decisions carry considerable weight.

This session's executive committee's meeting will focus on your department's (or an individual in your department) relationship with industry.

Scenario 1:

Your department is currently expanding both your clinical inpatient and outpatient MR facilities. You need to purchase several new MRI scanners. You currently have a mix of two MRI vendors (Admiral Eclectic (AE) and Mho MRI) but the majority of current scanners are from AE. Overall, your Radiologists are equally satisfied with both vendors' offerings. Pricing, site costs, operational costs and build-out are similar but **definitely** favor AE. AE machines currently enjoy a faster throughput in your department based on shorter protocols, tech familiarity with the platform, and shared protocols across all of the scanners.

However, you currently have a strong MR research program already in place, including several MD and PhD faculty, physicists, and physicians from outside the department. Nearly all of this research is conducted on Mho MRI scanners. This research is partially funded by Mho MRI and is based primarily on novel research sequences and/or coils available only on Mho machines. Mho MRI would agree to upgrade the current scanners to the latest software as part of the purchase of the new MRI scanners to keep all on the same platform.

You are currently finalizing the RFP and bid process.

Discussion (5 minutes)

1. Which vendor(s) would you favor to fill the contract?
2. Should you try to split the purchase between the vendors?
3. How much should your current research relationship influence your vendor choice(s) for your new MRI scanners?
4. Should you tailor the RFP to favor one vendor over the other?

By the way:

One of your PhD's just received a fundable score on a large NIH grant but it is only possible to carry out the grant on one of the specific vendor platforms. Should this change your decision?

Scenario 2:

You are a member of the Senior Executive Committee of your Radiology Department at Tulittle Munny University. Dr. Anita Buck, a junior member of the department has been doing research in Artificial Intelligence and has been approached by a company (SkyNet) wishing to collaborate with her. They have offered to pay her $100 per anonymized Head CT (including the redacted report) plus an hourly consulting rate to identify (fully outline) pathology in the images. In addition, SkyNet agrees to allow the use of software developed to detect intracranial hemorrhage in a research setting and for clinical use once 510k approval is obtained. The license will be for unlimited time during the research phase and for 3 years following 510k approval. At that point, the license will need to be purchased at list price minus a 25% discount. Additional support and service agreement must also be purchased at the same terms. Dr. Buck has told SkyNet she does not think there will be any problem and has been informally consulting for the company on her own time without compensation. She is asking for the Executive committee to allow her to go forward and begin working with the company.

1. Do you feel that the executive committee should make this decision or is this up to Dr. Buck alone?
2. What additional information would the executive committee need to know before discussing the potential collaboration?
3. Are there any red flags that already exist?
4. SkyNet sends details of the proposed agreement letter (see attached appendix)? Any concerns?

Scenario 3a:

Your facility is currently dissatisfied with its current PACS vendor. In an effort to keep your business, your current PACS vendor, recently upgraded your PACS system to the latest version. Although significantly improved, the CIO and hospital administration decides to change vendors to better integrate with the EMR and other hospital IT infrastructure. Immediately following the project kick-off, the new PACS vendor, Periphicity, wishes to come on-site with clinical applications and back-end engineers to document current workflow and IT procedures and processes in order to tailor the new system to the department, IT support and institutional needs. Periphicity asks to pair clinical applications personnel with various radiologists and technologists to understand and document current processes.

1. Does the committee have any concerns or issues with the process?

During the review period, several employees of Periphicity ask to understand how the old PACS vendor solved some key workflow issues. They ask if they can be paired with those hospital users with admin privileges to replicate some of the complex workflows. They begin to document the workflows, frequently with screen captures or cellphone pictures (HIPPA deidentified) of the current PACS menus, set-up functions, admin consoles, advanced features, and configuration files.

2. Does the committee have any concerns or issues with the process?
3. Do you notify the current PACS vendor of your processes?

Several of your current PACS vendor support personnel object to the competitor's employees seeing detailed workings of the upgraded system and refuse to perform any support services while the new PACS vendor personnel are present.

4. How do you handle this?

Scenario 3b:

You recently purchase a new MRI scanner from a vendor you have not worked with previously. All is working well in most areas, however, many of the radiologists are dissatisfied with the quality of the diffusion images. They feel the quality of the diffusion is substantially better on the competitor's scanner. Several of your radiologists meet with the new vendor's clinical applications personnel and with their physicists to improve the quality of the scans.

1. Does the committee have any concerns or issues with any of the following requests?
    a. The new vendor physicists asks for sample images from the competitor so they can understand the needs of the Radiologists.
    b. They ask for a full set of images, DICOM format, (HIPPA compliant) performed on the original vendor scanner?
    c. They ask to sit with the technologist at the competitor MR console during a patient or phantom scan.
    d. They ask to scan a phantom on the competitor console while they access the competitor console.

Scenario 4:

The department is interested in hiring a new section head of Abdominal Imaging. You are looking for a mid-level career Radiologist with excellent clinical, administrative and research skills. You have several candidates, but have effectively narrowed it down to two very equal candidates, Dr. Andre Prenoor and Dr. Supe Cleen. One of the search committee members, Dr. Bize Baddi, has some concerns because of certain entrepreneurial statements Dr. Prenoor made during the interview process. Dr. Baddi prints out a report of Dr. Prenoor's CMS Open Payments Data for the committee to review.

Year	Company	# Payments	Total Amount	%
2016	PFIZER INC.	115	$359,145.00	99.1%
2016	GE HEALTHCARE	2	$3,280.00	0.9%
2015	PFIZER INC.	11	$46,625.00	84.5%
2015	ASTRAZENECA	2	$6,000.00	10.8%
2015	EMD	1	$1,250.00	2.4%
2015	CELGENE	1	$1,300.00	2.2%
2015	COOK	1	$32.20	0.1%

1. Should the executive committee or search (hiring) committees regularly review the data available in the CMS Open Payments database?
2. Should the results be used in hiring decisions?
3. Does research or other support in the CMS database reflect positively or negatively on the candidate?
4. Should the executive committee regularly review all current Radiologist data in the CMS Open Payments database?
    a. If so, for what purpose?
    b. What would you do with this info?

Scenario 5 (if time):

Dr. Bize Baddi, has some concerns about one of the Radiologists in your department. Dr. Baddi reports that one of your radiologists, Dr. Dreamy, has been seen frequently having dinner with a member of the management team of a company with whom you are currently doing business. Dr. Dreamy voluntarily reports that a social non-professional relationship has developed between the two of them.

1. Should the executive committee discuss this topic at all?
2. Is there a conflict of interest?
3. At what point (if ever), should a Radiologist (or other employee) disclose a social relationship with a vendor employee?
4. Most COI reports only ask for spouse or significant other relationships be reported. At what point should this be reported?
5. Should the executive committee recommend any notification to the company?
6. Does the individual radiologist need to be excluded from purchasing discussions involving the company's products?
    a. What if the Radiologist is the department's expert in this particular area?
    b. What if the Radiologist only advises but is excluded from final purchasing decisions?

Case Study #5

Designing the Academic Mission in an Era of Constraints

Lori A. Deitte, MD, FAUR

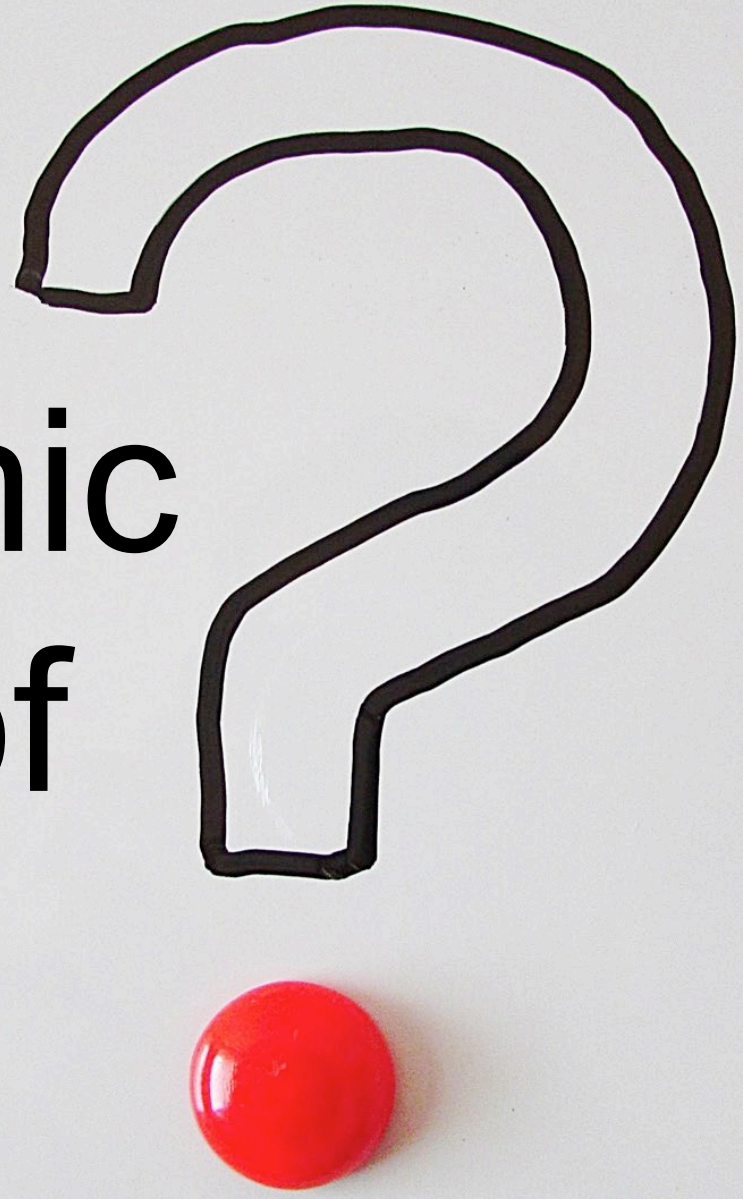
Lucy Spalluto, MD

Jessica Robbins, MD, FAUR

Case #5

Lori Deitte, Jessica Robbins, Lucy Spalluto

How to build a successful academic mission in an era of constraints



Meet Dr. Angela Jackson

- 52-year-old female
- Neuroradiologist and new Chair of Radiology at Golden State Medical Center (GSMC)
- Recently moved from the South to the West Coast to join GSMC
- GSMC Department of Radiology has 80 faculty (77 clinical radiologists and three PhDs)
- Previously served as Diagnostic Radiology Program Director in the South
- 107 publications; NIH R01-funded
- Married for 15 years with two kids

Golden State Medical Center Radiology Residents 2020-2021

First Year

Second Year

Third Year

Fourth Year

Golden State Medical Center Department of Radiology
Variable Compensation Plan

The Department of Radiology first implemented a Variable Compensation Plan in FY-14 for clinical faculty in the Department. In addition to the faculty member's base compensation, an Incentive Pool will be accrued from professional collections and distributed according to the following plan. Ten percent of the pool will be assigned to a Chairman's Discretionary Fund and the remaining 90% will be distributed based on Clinical Productivity.

The **Clinical Productivity** component uses wRVUs (physician work Relative Value Units), which serve as the basis for physician reimbursement by Medicare, to evaluate physician and section clinical productivity. These data are compiled for each physician, corrected for actual clinical effort, and compared to data within their subspecialties provided annually by the Association of Administrators in Academic Radiology (AAARad) from data supplied by approximately 90 academic radiology departments in the United States. If an individual is at or below the 50th percentile, they will be considered Low Tier and will thus not qualify to receive any of the incentive funds. Physicians who are above the 50th percentile will qualify for incentive funds. Qualifying physicians will be further divided into two groups: upper 1/3 (Top Tier) and bottom 2/3 (Middle Tier). Top Tier faculty will split 2/3 of the incentive funds; Middle Tier will split 1/3 of the incentive funds.

Qualification Chart

Percentile	Qualify for Incentive Pool
0 to 50% (Low Tier)	Does not qualify to receive incentive pool funds
51 to 100% (Top or Middle Tier)	Qualifies to receive incentive pool funds

Distribution of Incentive Funds to Qualifying Faculty

Group	Amount of Funds to be Split Among Group
Top 1/3 (Top Tier)	2/3 of funds will be given out to Top Tier faculty members
Bottom 2/3 (Middle Tier)	1/3 of funds will be given out to Middle Tier faculty members

As an example, for a given Incentive Fund amount of: $100,000
Top Tier faculty pool will be $67,000
Middle Tier faculty pool will be $33,000
Low Tier Faculty (ie. any faculty member <=50% percentile) will receive no incentive compensation.

It is the intention of the Department for all compensation paid to faculty to be fair market value for the services provided and unrelated to the volume or value of referrals.

Golden Dollar Award

Most RVU's

Golden State Medical Center
Department of Radiology
2020-2021

THIS CERTIFICATE IS PRESENTED TO

Roger Albright, MD

Professor of Clinical Radiology

Additional Discovery Artifacts will be shared during the session

Case Study #6

City Mouse, Country Mouse Consulting

Jocelyn D. Chertoff, MD, MS, FAUR

Michael P. Recht, MD

City Mouse, Country Mouse Consulting

Dr. Howard (country) and Dr. Fine (city) are Chairs of Academic Radiology departments with multiple sites including tertiary care hospitals, community hospitals and outpatient centers. As their departments grew and integrated sites, they had addressed and solved many issues and had experience with analyzing, integrated and staffing new sites, as well as with determining when to take on a new site, and when and how to change or leave a site. In fact, they were now teaching on the topic.

One day, they were contacted by a colleague who needed advice. Dr. Zeppo was the long-term Chair of an academic radiology department in an increasingly complex system whose system was acquiring two new hospitals and associated imaging centers. The first was a 700 bed hospital with a level 1 Trauma Center, and 4 outpatient imaging centers including 1 dedicated women's imaging center (20,000 admissions/year, 120K ED). The second location had 300 beds (10,000 admissions), a level 2 ED and 5 outpatient centers. The hospitals are currently staffed by a private equity backed national radiology private practice. The leaders of the system, due to their respect for Dr. Zeppo and his department, told Dr. Zeppo it was his choice whether to staff the new hospitals or decline and allow the current group to maintain the contracts.

Terms offered to DR. Zeppo for the new sites were as follows:

1. The radiology practice would perform its own professional billing.
2. There would be no subsidy for the department from the new sites.
3. Penalties would apply if the group did not meet the following TAT benchmarks:
    a. 30 minutes for emergency and STAT exams,
    b. 3 hours for inpatient routines
    c. 6 hours for outpatient studies, 24/7/365
4. Services were required to be provided by subspecialty trained radiologists.
5. Each new hospital required an on-site Radiology Chief.
6. Administrative responsibilities for each site included:
    a. OPPE and FPPE data,
    b. Biannual survey to evaluate their service with improvement plans,
    c. Attend bi-annual radiation safety and CT protocol meetings
    d. Participate in ACR and Joint Commission Surveys and hospital quality committees.

The current situation of Dr. Zeppo's faculty is as follows:

1. The group currently staffs the main tertiary care hospital of the system as well as 8 outpatient centers and interprets 800,000 exams per year.
2. The group is adequately staffed with 120 subspecialty radiologists but has no incremental capacity.
3. Current faculty are allowed to work from home 2 days per week.
4. The group currently trains both residents and fellows.
5. The finances of the group include professional billing in addition to yearly subsidies from the AMC to ensure that faculty salaries are at the 50% percentile of the AAARAD/ASCARD survey.

6. The residency program at the tertiary care hospital includes 10 residents per year and there are 18 fellows per year.

Dr. Zeppo asked Drs Howard and Fine to help him analyze the pros and cons of accepting or declining the offer to take over the new sites given the post Covid challenges facing all academic departments: increased faculty turnover; difficulty hiring new radiologists; requests for fully remote or hybrid work; and decreased work hours to accommodate work-life balance; and decreased reimbursement due to CMS cuts.

Each table will address one of the following topics as well as offer advice regarding whether Dr. Zeppo should accept or decline the offer.

1. What are the current and future risks and advantages of allowing a private equity based national practice to be incorporated into the system?

2. Which of the following terms of the RFP should Dr. Zeppo counter and how?
    a. Finances and in particular the lack of a subsidy from the AMC
    b. The presence of financial penalties for not meeting TAT benchmarks
    c. The requirement for fellowship trained subspecialty radiologists at all sites
    d. The administrative responsibilities
    e. Should Dr. Zeppo request a guarantee that the IT systems will become "common" and integrated?
    f. Should Dr. Zeppo be included in capital equipment purchases at each site?
    g. Should Dr. Zeppo negotiate for a share of technical revenue at any newly established outpatient centers?

3. If Dr. Zeppo decides to accept the offer, address the following structural questions:
    a. Should there be a separate "department" and parallel sections at each hospital or should radiologists rotate between sites?
        i. How should the IR and ED services be handled?
    b. Should all sites have common policies, procedures, workflows or should current local policies, procedures, workflows be maintained
    c. Should current AMC expectations and benchmarks (e.g. TAT) be extended to all sites or should there be different expectations at each site?

4. If Dr. Zeppo decides to accept the offer, address the following questions regarding faculty:
    a. Should the current private practice radiologists be retained if possible?
    b. Should there be the same criteria for faculty at each hospital?
    c. Should salaries/compensation plan be identical at the AMC and the other two hospitals/imaging centers?
    d. Should there be equal vacation and CME time for all radiologists?
    e. Should the policies on remote work or hybrid work be the same at all sites?
    f. Should productivity standards be identical for all faculty

5. If Dr. Zeppo decides to accept the offer, address the following educational and research questions:
    a. Do fellows and residents rotate to all sites or stay at central AMC sites?
    b. Should all faculty be required to teach?
    c. Should residents be responsible for call coverage at all sites or only at central AMC sites?
    d. Should all faculty have research expectations?
    e. Should all faculty receive academic time?

Case Study #7

Academic Medical Center Staffing: Introducing DEI to the Equation

Marta E. Heilbrun, MD

Jamlik-Omari Johnson, MD

AUR Management Course
Case 7: Academic Medical Center Staffing: Introducing DEI to the equation

Presenters: Marta Heilbrun, MD & Jamlik-Omari Johnson, MD

Task: Address staffing in your hospital-based radiology practice in a multi-hospital, urban integrated Academic Health System (AHS), BestOf Healthcare. You are being asked to define mechanisms/shift staff or resources to provide 24-hour faculty coverage at all hospitals.

Background: Paradox, the city where BestOf Healthcare is located, is in the top 10 of US cities for the number of Fortune 500 company headquarters and in the top 15 of all large cities for starting a new business. Paradox's violent crime rate is in the top 25 of all major cities in the US. More, 20% of the urban population lives in poverty, although that number has been declining with investment in urban renewal/gentrification. Paradox is in the top 5 cities for income inequality, ranking #1 in 3 of the most recent 10 years. The city hosts multiple professional franchise sports teams, including MLB, NBA, WNBA, NFL, NHL, and MLS. The MLB team is a recent World Series winner, and the NBA team makes it to the finals regularly but has not won in years.

BestOf Healthcare is part of a private university, Fabulous University (FabU), which consistently has a top 20 ranking for NIH research funding.
The Mission, Vision, Value statements of BestOf Healthcare are as follows:
Mission: Improving the health of individuals and communities at home and throughout the world.

Vision: Be the leading academic health science center in transforming health and healing through education, discovery, prevention and care.

Values
-We exemplify excellence, innovation and collaboration.
-We treat everyone with respect, caring, and compassion.
-We embrace diversity, equity, and inclusion.
-We steward our resources responsibly to optimize value.
-We serve with integrity.

Your radiology department provides comprehensive radiology clinical staffing for 3 hospitals that serve the city. The department has 11 clinical divisions with 100 faculty radiologists. The training program has 56 residents, including DR/IR, and 20 fellows. There are a handful of physician extenders who work primarily in IR. The department self-funds 2 of the resident positions/year (8 total) and 16/20 of the fellow positions.

The major characteristics of the 3 hospitals are presented in Table 1. Table 2 describes patient characteristics of the 3 hospitals. InnerCity Hospital is in the downtown area. University

Hospital is on the same campus as the FabU's School of Medicine (SOM), the undergraduate school and other graduate schools. Suburban Hospital is in the area with the highest socioeconomic indicators. InnerCity Hospital is on a separate EMR/PACS from the other BestOf Hospitals; however, the two hospitals use the same EMR vendor.

InnerCity Hospital is a training site for BestOf Healthcare as well as the SOM at Excellence University (ExU), a Historically Black College and University (HBCU). All attending physicians at InnerCity have faculty appointments from either FabU or ExU. ExU has residency programs for core programs, including Internal Medicine, Surgery, ObGyn, Family Medicine, but not Radiology or many subspecialities. There are no radiology faculty in ExU's SOM and there are no radiology rotations for ExU's medical students or housestaff.

As a department, the BestOf Healthcare's faculty's average clinical productivity is at the 65th %ile based on the AAARAD survey and salaries are targeted to the 55th %ile for private AHS radiology practices. Faculty receive approximately 70% of expected non-clinical time, including academic and administrative time, as well as time for meetings and vacation, however that number was 85% 5 years previously. All divisions are actively recruiting. All faculty have academic appointments and are expected to be promoted based on academic productivity/reputation. The AHS has recently created a mechanism to recognize those who serve primarily the clinical mission.

The residency program is consistently ranked in the top 10 in national surveys. The ABR core exam first time pass rate is 85%. Between 50-60% of trainees stay on to do their fellowships with BestOf Healthcare. There is buzz that the trainee call burden is on the high end and that it might be limiting other learning opportunities. Specifically, within the last year, trainees have raised concerns about the volumes at InnerCity Hospital, especially in the ED during the after-hours and weekend shifts, putting patients at risk and leading to resident and faculty burnout. The overnight clinically significant resident discrepancy rate has been trending upwards at InnerCity Hospital. An easier system was put in place to record discrepancies, and faculty are now provided feedback and encouragement in relation to their use of the resident report reconciliation tool.

In the current state, InnerCity Hospital is covered by faculty from 7AM until 1AM and has 24-hour trainee coverage. University and Suburban Hospitals have 24-hour faculty coverage. University Hospital has 24-hour trainee coverage as well. Table 3 describes the shift distributions and Table 4 describes the volumes, TAT and rate of trainee involvement in radiology reporting.

Data Describing the 3 Hospitals

Table 1: Services/clinical characteristics for the 3 Hospitals

	InnerCity Hospital	University Hospital	Suburban Hospital
Safety Net designation	X		
Level I Trauma	X		
Comprehensive Stroke Center	X	X	
Level I Emergency Cardiac Care			X
Burn Unit	X		
NCCN Designated Cancer Center		X	X
Major Organ Transplant Programs	Kidney	Heart, Liver, Lung, Kidney, Pancreas	Heart, Kidney

Table 2: Patient Characteristics for the three hospitals

	InnerCity Hospital	University Hospital	Suburban Hospital
Payor Mix			
Medicare	30%	35%	45%
Medicaid	30%	10%	10%
Commercial	15%	50%	35%
Uninsured/Self-Pay	25%	5%	10%
Self-Reported Race			
Black	70%	30%	10%
White	10%	60%	50%
Asian	5%	5%	20%
Other	15%	5%	20%

Table 3: Trainee to Faculty Shift distributions for the 3 hospitals

	# Daytime Shifts		**# Weekday Afterhours Shifts**		**#Weekend Shifts**		**Totals/ Location**
	Faculty	Trainee	Faculty	Trainee	Faculty	Trainee	
InnerCity Hospital	12	20	1	4	3	8	48
University Hospital	25	26	2	2	2	4	61
Suburban Hospital	20	3	2	0	3	0	28
Totals/Shift	57	49	5	6	8	12	

Table 4: Volumes and Turn Around Time for the 3 hospitals
(Excluding Breast, IR, Peds and Nucs)

	InnerCity Hospital	**University Hospital**	**Suburban Hospital**
Avg Monthly Volume			
Overall	19330	16500	10200
CT	6500	4600	3600
MR	780	1400	1000
US	1550	1500	1000
XR	10500	9000	4600
% read with trainee	60%	40%	10%
ED TAT Complete to Final	5 hours	45 minutes	35 minutes

Additional Facts/Issues

- Few faculty are hired specifically to staff InnerCity Hospital. Each division is responsible for deploying faculty to coverage sites.
    - InnerCity Hospital's leadership has repeatedly stated a preference for faculty who provide care there to have it be the place where the majority (>50%) of their effort is allocated.
- Approximately 70% of faculty have home workstations (HWS). Of these, 20% have HWS that work for all hospitals, 5% have HWS for only InnerCity Hospital, and the remainder have workstations that only work for University and Suburban Hospitals.

- Remote workstations for InnerCity Hospital are in multiple reading rooms at University Hospital.
- Faculty salaries and benefits are established at a department level, such that there is rank based base-salary equity, regardless of which hospital is the primary practice site for an individual radiologist.
- Incentive pay is variable.
    - Faculty with significant clinical and administrative effort allocated to InnerCity are eligible for approximately 10% less of the clinical incentive, because this is allocated from the physician group practice that only recognizes effort allocated to University and Suburban Hospitals.
    - Faculty with significant non-clinical effort (e.g. Funded Research or Administrative responsibilities) are eligible for a smaller pool of the clinical effort, but usually make it up in the other portions of the incentive plan related to academic and service metrics.

BIOSKETCH – Matthew A. Barish, MD

Dr. Matthew Barish is the Vice Chair of Informatics for the Radiology Service Line at Northwell Health in New York, responsible for the technology infrastructure for Northwell's 22 hospitals and 19 outpatient-imaging facilities. Dr. Barish is a Professor of Radiology at the Zucker School of Medicine at Hofstra/Northwell.

Dr. Barish graduated Summa Cum Laude from Boston University with a BS in Biomedical Engineering; he graduated Alpha Omega Alpha from Boston University School of Medicine. During his Residency at Boston Medical Center, he was Senior Chief Resident. His fellowship in Abdominal Imaging, with an MRI focus, was completed at Yale-New Haven Hospital, CT. Following fellowship, Dr. Barish was appointed Assistant Professor of Radiology at Boston University School of Medicine where he held the positions of Section Head of Abdominal Radiology, Director of MRI, Director of Radiology Operations, Director of Quality Assurance, Assistant Residency Program Director, Clinical Service Coordinator and Vice Chair of Radiology.

Dr. Barish was the Chief Medical Officer of Voxar Ltd, one of the largest providers of 3D software integrated directly into the PACS. He has two patents for co-developing two novel techniques for image processing.

Dr. Barish was the founder and director of Brigham and Women's Hospital's 3D and Image Processing Center. This center streamlined the 3D processing for the Department of Radiology as well as providing additional direct services to the departments of neurosurgery, orthopedics, vascular and cardiothoracic surgery. Subsequently he was appointed as Assistant Professor of Radiology at the Harvard Medical School as well as appointed to the position of Specialist, Business Development for the Department as well.

At the Dana Farber / Harvard Cancer Center, Dr. Barish established the Tumor Imaging Metrics Core, a new DF / HCC Core Facility, receiving the Partners Radiology Research Committee 2004 Collaborative Research Grant, between the Massachusetts's General Hospital (MGH) and Brigham and Women's Hospital.

Dr. Barish co-authored one of the first comprehensive peer-reviewed qualification studies of CT Colonography, published in the NEJM. Dr. Barish developed the first physician training course in CTC in 1998, is the founder of the Hands-on Training Course at the American College of Radiology Education Center and has trained over 600 practicing Radiologists and Gastroenterologists in the reading of CT Colonography and Virtual Colonoscopy.

Dr. Barish was the Vice Chair of Radiology Operations, Director of MRI, and co-Chief of Body Imaging in the Department of Radiology at Stony Brook University Hospital and Associate Professor of Clinical Radiology at the School of Medicine until moving to Northwell Health in 2020.

BIOSKETCH – Bethany Casagranda, DO

Bethany Casagranda, D.O. is an academic Musculoskeletal (MSK) radiologist from Pittsburgh, PA. She completed her residency and fellowship training at the University of Pittsburgh where she remained on Faculty until 2013. At that time, she moved to Allegheny General Hospital (AGH), part of Allegheny Health Network (AHN) also in Pittsburgh. At AHN, she has held positions including Program Director of the Radiology Residency, MSK Fellowship Director and the MSK Division Director. In 2017, she was promoted to System Chair of Radiology for the Allegheny Health Network which encompasses 10 hospitals and 28 outpatient imaging centers. She continues to do clinical work within the MSK division providing orthopaedic imaging care covering a breadth of pathology including trauma, tumor, weekend warriors, aging locals and sports medicine. She, along with her MSK colleagues, work closely with their orthopaedic associates at her institution to care for the Pittsburgh Pirates.

Dr. Casagranda's academic focus on sports medicine has produced 1 book, 15 peer-reviewed publications, 7 book chapters, 36 podium or poster presentations and 21 invited lecturer opportunities throughout the country. She has been invited to share her expertise as a contributing lecturer at national and local meetings including Radiological Society of North America (RSNA), American Roentgen Ray Society (ARRS), University of Pittsburgh's Panther Global Summit, Alumni Symposium of the Athletic Training Education Program of Duquesne University, American Osteopathic College of Radiology, American College of Osteopathic Family Physicians, Pittsburgh Roentgen Society, Society of Chairs of Academic Radiology Departments (SCARD), Society of Skeletal Radiology (SSR), Association of University Radiologists and visiting professor at elite universities. She was a long standing reviewer for Skeletal Radiology and abstract reviewer for ARRS. She was an author and editor of a recently released female-dominant book with several well published MSK colleagues entitled MRI: Upper Extremity Elbow, Wrist and Hand through Springer Publishers.

Dr. Casagranda was invited to participate in the American Board of Radiology Maintenance of Recertification Committee to discuss and establish the longitudinal CME implementation. She has been a leader on national committees including Chair of the Resident and Fellow Education Committee, Chair of the Nominations Committee and member of the Programs and Membership Committees of SSR. Her committee work with colleagues at the SSR was instrumental in the successful implementation of the MSK Match through the NRMP. She has been asked to participate in the Fellowship Committee, Productivity Committee and Diversity, Equity and Inclusion Committee for SCARD as well as sit on the American College of Radiology's (ACR) Committee on Practice Parameters for Musculoskeletal Body Imaging and Chair the ACR Writing Committee for ACR–SPR–SSR Practice Parameter for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the Ankle and Hind foot. Her most recent engagements include presenting Grand Rounds and Orthopaedic Case Conference for the Department of Radiology, Columbia University and invited lecturer at ARRS and RSNA. At AHN, she recently has chaired the Neurology and Ophthalmology Chair Search Committees.

Dr. Casagranda's dedication to academics and teaching has been reflected in being a recipient of several awards including the Michael P. Federle Mentorship Award, Robert J. Hoy Excellence in Teaching Award, MSK Divisional Teaching Award for two consecutive years, Young Investigator Award by SSR and the Roentgen Resident/Fellow Research Award by RSNA.

Outside of work, she enjoys quality time with her husband and two daughters who keep her busy between athletics and the arts. Her hobbies include running and tennis. She has a strong dedication to philanthropic work and serves as an active member of Women's Club of Mt. Lebanon, Serve 2 Cure, The Center for Theater Arts Board of Directors and St. Lucy Auxiliary to the Blind.

BIOSKETCH – Jocelyn D. Chertoff, MD, MS

Dr. Chertoff is Professor of Radiology and of Obstetrics and Gynecology at Dartmouth Hitchcock Medical Center. She is Chair of the Department of Radiology and Vice President of the Regional Radiology Service Line. She was the Program Director for the Diagnostic Radiology Residency for 17 years. She is past Chair of the Board of Directors of the Hitchcock Foundation. Dr. Chertoff recently joined the Board of Directors of Varex Imaging Corporation.

She grew up in New York City and graduated from Brown University, then from University of Vermont College of Medicine. Following a Transitional Internship at Hartford Hospital and a Pediatric Internship at University of Connecticut Health Sciences Center, and after spending two years in a physician shortage area in New York State, and serving as the Medical Director for Vermont EMS, she returned to the Medical Center of Vermont for a Residency in Radiology and a Fellowship in Cross-Sectional Imaging. She came to Dartmouth-Hitchcock Medical Center after completing her training in 1991. She was a 2003-2004 Fellow of the Hedwig van Ameringen Executive Leadership in Academic Medicine (ELAM) Program for Women, and she received a Master's degree from the Center for the Evaluative Clinical Sciences at Dartmouth College in 2005. She completed a Master's of Health Care Delivery Science a joint Master's program between the Tuck School of Business at Dartmouth College and The Dartmouth Institute in 2014.

Dr. Chertoff is particularly interested in workforce issues in Radiology, in Gastrointestinal Imaging, in resident education, in issues for women physicians, in healthcare's role in climate change, and in faculty development. She serves on multiple institutional and national committees, and is Past Chair of the AAMC Group on Women in Medicine and Science, Past President of the Association of Clinician Educators in Radiology (ACER), of the Association of Program Directors in Radiology (APDR), of the Association of University Radiologists (AUR) and the New Hampshire Radiological Society.

BIOSKETCH – Lori Deitte, MD, FACR, FAUR

Lori Deitte, MD, FACR FAUR is Professor and Vice Chair of Education of the Department of Radiology, as well as the Vice President for Continuous Professional Development, at Vanderbilt University Medical Center (VUMC) in Nashville, Tennessee. She is a devoted educator, mentor and sponsor who enjoys inspiring others to believe in themselves and be empowered to pursue successful careers.

Dr. Deitte specializes in abdominal imaging and ultrasound. She is active with teaching at all levels: medical students (hands-on ultrasound), residents, fellows, and practicing physicians. She has co-authored more than 60 peer-reviewed articles and has given more than 140 invited regional, national, and international presentations.

Dr. Deitte serves on the American College of Radiology Board of Chancellors as the Chair of the Commission on Publications and Lifelong Learning. She also serves as the co-editor for the column “Civil Discourse” in the Journal of the American College of Radiology and as a member of the Board of Directors for the Association for Women in Radiology. She is a past president of the Association of Program Directors in Radiology and a recent recipient of the APDR Achievement Award.

BIOSKETCH – Kristen DeStigter, MD, FACR

Dr. Kristen K. DeStigter, MD, FACR, is the John P. and Kathryn H. Tampas Green and Gold Professor and Chair of Radiology at the Larner College of Medicine at the University of Vermont and the Radiology Health Care Service Chief for the University of Vermont Health Network, which includes the only academic medical center in Vermont as well as six partner hospitals in Vermont and New York. With a career focused on education, she was program director of the diagnostic radiology residency program at the University of Vermont for 12 years and served as President of the Association of Program Directors in Radiology (APDR). In this role, she had an opportunity to serve the AUR on the Planning Committee and also as a member of the Board (2014-2015). For 7 years she sat on the Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee for Radiology. During her tenure as President of the Vermont Radiological Society for 5 years, she initiated the first resident and fellow section. She was an invited member of the New England Roentgen Ray Society Executive Committee, focusing on resident education. She is a recipient of the Radiological Society of North America (RSNA) 2016 Outstanding Educator Award, and the 2020 recipient of the APDR Lifetime Achievement Award.

Dr. DeStigter's scholarly interests and accomplishments include unique applications of ultrasound in rural medicine, the provision of integrated medical imaging services in under-served communities, medical education in diagnostic radiology, and global advances in women's health care. She is a champion of many projects for safety and quality of care in clinical radiology. In the international community, she participated as a member of the World Health Organization Referral Guidelines Development Group as part of the International Radiology Quality Network. She is past Chair of the RSNA Committee on International Radiology Education (CIRE) and RSNA Education Committee. She serves on the American College of Radiology (ACR) Foundation's International Outreach Committee. She is the invited Chair of the AUR International Relations Committee. In this role, she and the Committee have submitted an application for membership in the United Nations (UN) Economic and Social Affairs (ECOSOC) Consultative NGO Branch. In addition, they developed recommendations for AUR international membership that were subsequently approved by the AUR Board in 2022. Both of these activities will enhance the AUR through diversity in membership and programming, with a goal of improving the radiology educational experience for all and elevating radiology as a fundamental diagnostic specialty on the world stage. She is an invited member of the Executive Committee of the Lancet Commission on Diagnostics, focusing on access to essential diagnostics in low-and middle-income countries and resource-constrained areas in high-income countries, with a Lancet Report published in 2021. Her publications focus in global health and education, and she is an invited reviewer for several journals, including AUR *Academic Radiology*.

Drawing upon her experience in international radiology, education, and leadership, she co-founded a nonprofit organization, Imaging the World, which specializes in integrating low-cost ultrasound programs into remote health clinics where radiologists, technologists and the usual infrastructure required of imaging systems are lacking (www.imagingtheworld.org). Over the last fourteen years, clinical facilities in rural Uganda and Malawi have access to reliable imaging, close to home for many patients. Over 500 front-line health care workers received training, with over 2 million beneficiaries. Recent expansion includes refugee settlements in Uganda and rural areas of Kenya. The program has been supported by grant awards, including from the Bill & Melinda Gates Foundation. In 2016, she received the American College of Radiology Foundation Global Humanitarian Award for her work improving medical imaging and access to care. In addition, she received a Certificate of Recognition

from the Uganda Society for Advancement of Radiology and Imaging (USOFARI) for providing invaluable resources towards improving breast cancer diagnosis and management in Uganda. In 2018, she received the University of Vermont Citizen of the World Award from the Larner College of Medicine. She was the 2020 Keynote Speaker for the Opening Ceremony of the RSNA, speaking on, "The Power of Radiology to Drive Collective Action and Transform Global Health." Most recently, she was an invited speaker on "The Circular Economy" during the AUR2022 Plenary Session.

In Vermont and elsewhere, she continues to apply her imaging experience and expertise in rural medicine to new collaborative, transdisciplinary initiatives that improve the health of people and the planet.

BIOSKETCH – Marta Heilbrun, MD, MSCI

Marta Heilbrun, MD, MSCI is the Associate Medical Director for Quality and Patient Safety in Imaging Services at Intermountain Health, with a focus on care delivery in the Canyons region. This encompasses the care provided by 9 affiliated radiology practices and 2 employed groups over 24 hospitals and multiple clinics in Utah and Idaho. She leads system wide peer learning initiatives, coordinates harm event learning and patient concern evaluations as well as participating in multiple system initiatives to harness radiology report data to drive care pathways.

She completed medical school at the University of Utah, did a Preliminary Surgery Internship at Stanford, a Diagnostic Radiology Residency at Wake Forest/North Carolina Baptist Hospital and fellowship training in abdominal imaging and outcomes back at the University of Utah. Her initial career was built at the University of Utah, where she developed as an abdominal imager with expertise in GU diseases and as an outcomes/health services researcher and educator, eventually becoming the Diagnostic Radiology Program Director. She was at Emory in the Department of Radiology and Imaging Sciences from 2017-2022 serving as the Vice Chair for Quality, leading Quality and Safety initiatives throughout the entire Emory Healthcare Organization.

She is a nationally recognized leader in Quality Improvement and Informatics. She has studied medical decision making, evidence-based guidelines, and the potential insights available through medical and healthcare data mining. She believes that the most appropriate, personalized, and patient centered care is provided when the insights from front-line workers and metrics are used to break down barriers. Systems will improve how we care for our patients and communities when we embrace standard work as a foundation of change culture. She is a leader in the national conversation about radiology reporting, including content, interoperability standards, AI integrations and the value proposition for the care radiologists provide enabled by the systems in which radiologists work.

Dr. Heilbrun first became involved with the AUR during residency, as the recipient of the inaugural Radiology Alliance for Health Services Research (RAHSR) – Harvey L. Neiman Award in 2005. She subsequently received the General Electric-Association of University Radiologists Radiology Research Academic Fellowship (GERRAF) award from 2007-2009. She has served the AUR in multiple leadership roles and has been on the Board of Directors since 2012. She currently serves as the Secretary of the AUR Executive Committee.

BIOSKETCH – Christopher P. Hess, MD, PhD

Christopher P. Hess, MD, PhD is the Alexander Margulis Distinguished Professor and Chair of the Department of Radiology and Biomedical Imaging at the University of California, San Francisco. He completed his residency and fellowship training in Neuroradiology at UCSF after obtaining undergraduate, master's and doctorate degrees in electrical engineering at the University of Illinois working in signal and image processing and magnetic resonance imaging. His clinical interests revolve around imaging evaluation of dementia, epilepsy and neurovascular disease, and his current research interests are in high field and diffusion MRI and in computational neuroimaging. He is a fellow of the American Institute for Medical and Biological Engineering, the International Academy of Medical and Biological Engineering and the American Society of Functional Neuroradiology, has published broadly in clinical and scientific journals and lectured nationally and internationally in these areas. He participates in various leadership roles in the Radiological Society of North America, the International Society for Magnetic Resonance in Medicine, and the American Society of Neuroradiology, and serves as a regular panel member in NIH study sections.

BIOSKETCH – Jamlik-Omari Johnson, MD, FASER

Jamlik-Omari Johnson MD, FASER is a clinical professor of radiology and emergency medicine, interim chair of the department of radiology, and associate dean for faculty professional and leadership development at the Keck School of Medicine at the University of Southern California. He completed his undergraduate degree with honors from Brown University in Healthcare Organization and Policy, medical school at University of Pennsylvania and completed his surgical internship and radiology training at Columbia University.

Following training, he ventured into private practice in the emergency teleradiology domain. In addition to his clinical focus on trauma, emergency and acute care imaging, he was involved in quality, client relations and practice growth. He was recruited into the academic arena and spent four years on faculty at Massachusetts General Hospital and Harvard University. In addition to honing his clinical skills, he ignited his research interests and completed a two-year, multi-disciplinary leadership intensive sponsored by MGH/Harvard.

Dr Johnson was recruited to Emory University to develop and to lead the nascent emergency and trauma imaging division. As the inaugural division director, he fostered the growth of the clinical group to over 20 faculty covering five hospitals across the enterprise 24/7/365. Dr Johnson lead the local transformation of emergency radiology from an ad-hoc radiologist coverage pool to a fully-integrated, academic radiology sub-specialty. Throughout his private practice and academic career, Jamlik-Omari has championed the recognition of emergency imaging as an essential radiology subspecialty and closely partnered with his clinical colleagues in the emergency department. His research and operational efforts focus on process improvements, systems' efficiencies and efficacies, and equitable delivery of healthcare services. He served as the inaugural vice chair for diversity, equity and inclusion with a focus on faculty advancement. He served as the emergency radiology fellowship director for five years, integrated resident education to the division's mission and fostered research collaborations within the group, across the University and beyond. He has become a nationally recognized leader in the organization and advocacy of emergency radiology. He recently transitioned to the University of Southern California to help rebuild the Department of Radiology.

Passionate about mentoring, leadership development and fostering inclusive environments for patients, learners, educators, researchers, administrators, and clinicians, Dr Johnson is a change agent for institutional transformation and now regularly lectures about health equity. He is the President of the American Society of Emergency Radiology (ASER) and is also an active member in several other national radiology organizations.

Dr Johnson participated in the 2021 AUR Management Program.

BIOSKETCH – William Peterson III, MD

William Peterson is an academic musculoskeletal (MSK) radiologist from Pittsburgh, PA. He completed his residency training at the University of Pittsburgh Medical Center (UPMC) in diagnostic radiology in 2013 and a fellowship in musculoskeletal imaging and intervention at the University of Wisconsin in 2014. He joined the faculty at the Allegheny Health Network (AHN) in January 2018 as Assistant Program Director (APD) of the diagnostic radiology residency and was promoted to Program Director (PD) in July of 2020. His academic career strives to optimize resident education with an emphasis on promoting resident wellness and inclusivity.

Clinically, he specializes in orthopedic imaging as a member of the AHN division of musculoskeletal radiology and uses his imaging expertise and interventional care to diagnose and treat the spectrum of musculoskeletal pathologies. Of note, he and his MSK colleagues work closely with the department of orthopedic surgery in care of the Pittsburgh Pirates. He is particularly interested in musculoskeletal sonography and its clinical application as a diagnostic and therapeutic tool, but also, its potential to predict clinical outcomes. Further, his research interests include determining whether shear wave elastography can be used as a biomarker of tensile strength and a potential predictor of tendon/ligament failure. He has presented on this topic at the Society of Skeletal Radiology (SSR) and published in the Journal of Ultrasound.

His passion outside of work is his family, which includes his wife Maria and three young children Owen, Andrew, and Evelyn. He loves to run, which used to include marathons and other distance races, but now, mostly includes running after his children. He is an avid fan of Pittsburgh sports teams and an occasional good IPA.

BIOSKETCH – Michael P. Recht, MD

Michael Recht is the Louis Marx Professor and Chair of the Department of Radiology at NYU Langone Health. Dr. Recht studied medicine at the University of Pennsylvania and completed a residency in Radiology at the Hospital of the University of Pennsylvania, where he was Chief Resident. He completed an interventional fellowship at the University of Pennsylvania, an MR fellowship at the University of Pittsburgh, an Osteoradiology fellowship at the University of California at San Diego and 10 months in the Siemens MR research division in Erlangen, Germany.

His major clinical research foci have been the imaging of articular cartilage, the development of rapid MR protocols for the musculoskeletal system using novel methods of image acquisition and reconstruction, including machine learning reconstruction and most recently, use of data analytics and informatics to optimize value and workflow within a radiology department. His commitment to research is exemplified by his authorship of over 140 peer reviewed publications and over 100 scientific abstracts.

Dr. Recht is also committed to developing new educational models, exemplified by his leadership of the development of an online radiology residency core curriculum, and being one of the founders of the National imaging and Informatics Curriculum and Course. He is currently working on developing an AI enabled precision education curriculum for radiology residency. His combined interests in research, education and value have led to the funding of two NIH grants, “Discovering the Value of Imaging: A Collaborative Training Program in Biomedical Big Data and Comparative Effectiveness Research for the field of Radiology” and “Implementation and Evaluation of a Regional Image Share Network”.

BIOSKETCH – Jessica Robbins, MD, FAUR

Dr. Robbins is a Professor in the abdominal imaging section and the Vice Chair of Faculty Development and Enrichment in the Department of Radiology at the University of Wisconsin School of Medicine and Public Health. Her professional interests include advocacy for diversity and inclusion efforts in radiology, gender equity, and leadership development and her research interests focus on benign and oncologic gynecologic imaging.

BIOSKETCH - Pablo R. Ros, MD, MPH, PhD, FAUR

Dr. Ros received his MD and PhD, from the Autonomous University of Barcelona, Spain in his native city. He completed his Residency and Fellowship at Mount Sinai Medical Center/University of Miami, in Florida. He obtained a Master of Public Heath (Health Care Policy and Management) at the Harvard School of Public Health in 1998.

After completing his training Dr. Ros became Chief of Gastrointestinal Radiologic Pathology at the Armed Forces Institute of Pathology (AFIP); later, continued his association with the AFIP as a Visiting Scientist. He became in 1987 The Founding Director of the Division of Abdominal Imaging at the University of Florida (UF) and Director of Magnetic Resonance Imaging. At UF Dr. Ros was promoted to Professor of Radiology and appointed Associate Chairman.

In 1998, Dr. Ros was appointed Professor of Radiology at Harvard Medical School and Executive Vice Chair at the Brigham and Women's Hospital. In Boston, he also served as Director and Chief Operating Officer of Partners Radiology (Partners Healthcare integrates the Brigham and Women's Hospital and the Massachusetts General Hospital) and Chief of Radiology at the Dana Farber Cancer Institute.

Dr. Ros became the Theodore J. Castele University Professor and Chairman of the Department of Radiology at Case Western Reserve University and Radiologist-in-Chief of the University Hospitals Health System in 2009. In addition, he served as President of the Clinical Chairs Council and the Board for University Hospitals Cleveland Medical Center. Dr. Ros was appointed Founding Director of the UH Diagnostics Institute in 2017, which encompasses the Departments of Genetics, Pathology and Radiology. Currently serves at CWRU as Professor of Radiology and Pathology.

Dr. Ros has served or serves as President, Committee Chair or in the Board of Directors of several Radiological Societies, such as The Radiological Society of North America (RSNA), Association of University Radiologists (AUR), Interamerican College of Radiology (CIR), Society of Gastrointestinal Radiologists (now SAR), American College of Radiology and New England Roentgen Ray Society. He is a Fellow of the American College of Radiology, the Society of Abdominal Radiology, the Society of Computed Body Tomography and MRI and Honorary Fellow of the European Society of Gastrointestinal and Abdominal Radiology. He has received Honorary Memberships for the National Radiological Societies of Switzerland, Belgium, Argentina, France, Mexico, Germany, Cuba, Ecuador, and Japan.

His over 300 publications and 20 textbooks are primarily in Abdominal and Oncologic Imaging focusing on liver, pancreatic, mesenteric, and gastrointestinal cross-sectional imaging with pathologic correlation. Other research areas include Magnetic Resonance Imaging, the development of liver specific and oral contrast agents for MRI, CT and PET-CT imaging and Radiology Services Research. He holds eleven editorial positions including former Associate Editor of *Radiology* and Consultant to the Editor in the same journal.

Dr. Ros founded the AUR's Radiology Management Program in 2002 and has served as Program Chair or Director since then. The program has over 500 alumni with many Department Chairs and Vice Chairs among them.

BIOSKETCH – Andrew Rosenkrantz, MD, FAUR

Andrew Rosenkrantz is Professor of Radiology and Urology at the NYU Grossman School of Medicine, where he serves as Section Chief of Abdominal Imaging, Director of Prostate Imaging, and Director of Health Policy. Since 2020, he has served as Editor in Chief of *AJR*. He previously served as a Senior Affiliate Research Fellow of the Harvey L. Neiman Health Policy Institute. He attended medical school at Albany Medical College before completing a diagnostic radiology residency at University of Maryland Medical Center and a fellowship in body MRI at NYU.

With research interests in prostate MRI and health policy, he has over 350 peer-reviewed publications and has mentored over 75 trainees in projects leading to an abstract or peer-reviewed publication. He has previously served on the editorial boards of *Radiology*, *Journal of Magnetic Resonance Imaging*, *Academic Radiology*, and *Abdominal Radiology*, receiving over a dozen awards for distinction in reviewing. He was a founding co-chair of the Society of Abdominal Radiology Prostate Cancer Disease-Focused Panel and the editor of a state-of-the-art textbook on prostate MRI. He is a past recipient of the ARRS Berlin Scholarship in Medical Professionalism, the ARRS Melvin M. Figley Fellowship in Radiology Journalism, and the RSNA William R. Eyler Editorial Fellowship. He has received grant funding from numerous national radiology societies, as well as the NIH/NIBIB and Department of Defense. He was the president of the Radiology Research Alliance in 2018-2019. He currently serves on the Board of Chancellors of the American College of Radiology, as the Chair of the Commission on Body Imaging. He is the current President Elect of the New York State Radiological Society. He has been named a fellow of the Association of University Radiologists, Society of Abdominal Radiology, and Society of Advanced Body Imaging. Dr. Rosenkrantz was recognized by AuntMinnie in 2018 as the year's Most Influential Radiology Researcher.

BIOSKETCH – Lucy B. Spalluto, MD, MPH

Dr. Spalluto completed medical school at the University of Virginia School of Medicine, Diagnostic Radiology Residency at Brown University/Warren Alpert School of Medicine and Breast Imaging Fellowship at Vanderbilt.

She completed the VA Quality Scholars Health Services Research Fellowship and the Vanderbilt Master of Public Health Program in 2019. Dr. Spalluto is currently an Associate Professor in Vanderbilt's Department of Radiology and Radiological Sciences in the Breast Imaging Section. She serves as the department's Vice Chair of Health Equity and Associate Director of Diversity and Inclusion. She also founded the department's Women in Radiology initiative.

Dr. Spalluto is co-chair of the Radiological Society of North America's Health Equity Committee and a Past-President of the American Association for Women in Radiology. She leads an active research program to address disparities in lung cancer screening and breast cancer screening through an implementation science approach.

BIOSKETCH – Judy Yee, MD, FACR

Judy Yee, MD, FACR, is the University Chair of Radiology at Montefiore Health System and Professor of Radiology at Albert Einstein College of Medicine.

Dr. Yee received her medical degree and performed a radiology residency at the Albert Einstein College of Medicine. She then moved out West and performed an abdominal imaging fellowship at the University of California, San Francisco and was recruited to stay on as faculty. During her tenure at UCSF, Dr. Yee rose through the ranks to become Full Professor and Vice Chair of Radiology and Biomedical Imaging. She also served as the Chief of Radiology at the San Francisco VA Medical Center and Vice Chair of the Board of the Northern California Institute for Research and Education.

Dr. Yee is widely known as an accomplished abdominal radiologist with a research focus on CT Colonography (Virtual Colonoscopy), as well as liver and pancreatic imaging. She has performed multiple landmark studies and is considered a pioneer in the field of CTC which is now used for colorectal cancer screening and diagnosis around the world. Dr. Yee has published extensively, having produced more than 150 articles in peer-reviewed journals, 130 abstracts, 24 book chapters and she has served as the principal investigator of numerous funded research projects. Dr. Yee is the editor and primary author of a textbook entitled *Virtual Colonoscopy* and she holds a patent on Enhanced Virtual Colonoscopy.

Dr. Yee is an experienced leader and holds multiple leadership positions in major radiology organizations. She is Past President of the Society of Abdominal Radiology, and she currently serves as Chair of the American College of Radiology Colon Cancer Committee. She is on the Board of Directors of the Society of Chairs of Academic Radiology Departments (SCARD) and the Association of University Radiologists (AUR). She is a Founding Member of the Colon Cancer Foundation Steering Committee. She is a member of the Global Radiology Leaders Board for Health4The World which brings educational opportunities to underserved populations around the world. She is Chair of the Diversity, Equity, and Inclusion Committee for SCARD, a Board member and Co-Chair of the DEI Committee for the New York State Radiologic Society and a member of the DEI Committee for RSNA. She is an Associate Editor of *JCAT* and on the Editorial Board of *Abdominal Radiology* and Past Editorial Board Member of *Radiology, AJR and RadioGraphics*.

Dr. Yee is an invited speaker at numerous conferences and is the recipient of multiple awards. Most recently she was awarded the 2023 Gold Medal from the Society of Abdominal Radiology in recognition of her contributions to the field. She has also received the Excellence in Teaching Award from the Academy of Medical Educators, the SAR Visiting Professorship Award, the Best Speaker Award of the American Roentgen Ray Society and an Honored Educator Award from RSNA in 2021. She was the recipient of the Inaugural UCSF Outstanding Faculty Mentoring Award. In 2019 she received the Honorary Fellow Award of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) in recognition of her global contributions to the field. Dr. Yee is the first woman to receive this honor in the 30-year history of ESGAR. She also received the 2022 Honorary Fellow Award from the British Society of Gastrointestinal and Abdominal Radiology (BSGAR) for her contributions to abdominal imaging and for her DEI advocacy.

2023 Radiology Management Program Faculty Roster

Matthew A. Barish, MD
Dept of Radiology
Northwell Health

Bethany U. Casagranda, DO
Dept of Radiology
Allegheny General Hospital

Jocelyn D. Chertoff, MD, MS, FAUR
Dept of Diagnostic Radiology
Dartmouth Hitchcock Medical Center

Lori A. Deitte, MD, FAUR
Dept of Diagnostic Radiology
Vanderbilt University Medical Center

Kristen K. DeStigter, MD
Dept of Radiology
University of Vermont Medical Center

Marta E. Heilbrun, MD
Dept of Radiology & Imaging Sciences
Intermountain Healthcare

Christopher P. Hess, MD, PhD
Dept of Radiology & Biomedical Imaging
University of California San Francisco

Jamlik-Omari Johnson, MD
Keck School of Medicine

Andrew B. Rosenkrantz, MD, FAUR
NYU Langone

William M. Peterson II, MD
Dept of Radiology
Allegheny Health Network

Michael P. Recht, MD
Dept of Radiology
New York University Langone Medical Center

Jessica B. Robbins, MD, FAUR
Dept of Radiology
University of Wisconsin

Pablo R. Ros, MD, PhD, MPH, FAUR
Dept of Radiology
Stony Brook University

Lucy Spalluto, MD
Dept of Radiology
Vanderbilt University

Judy Yee, MD
Dept of Radiology
Montefiore Medical Center

2023 AUR Radiology Management Program Participant Roster

Amna Ajam, MBBS, MD
The Ohio State University Wexner Medical Center
Department of Radiology

Naiim S. Ali, MD, FRCPC
University of Vermont Medical Center
Radiology

Ryan C. Avery, MD
Northwestern Medicine
Radiology

Greg D. Avey, MD
University of Wisconsin
Department of Radiology

Peeyush Bhargava, MD, MBA
University of Texas Medical Branch
Radiology

Terry Crow, MBA
University of Virginia Health
Radiology and Medical Imaging

Stephane Desouches, DO
Medical College of Wisconsin
Radiology

Katerina Dodelzon, MD, FSBI
Weill Cornell Medicine at New York Presbyterian
Radiology

Ankur Doshi, MD
NYU Langone Health
Radiology

Michael Ferra, MD
Columbia University Irving Medical Center
Radiology

Halemane Ganesh, MBBS, FRCR
University of Kentucky
Radiology

Nicole Hindman, MD
NYU School of Medicine
Radiology

Mai-Lan Ho, MD
The Ohio State University / Nationwide Children's Hospital
Radiology

Deveraju Kanmaniraja, MD
Montefiore Medical Center
Department of Radiology

Bhasker Koppula, MD
University of Utah
Department of Radiology and Imaging Sciences

Matthew Edward Maeder, MD
Dartmouth-Hitchcock Medical Center
Radiology

Jasnit Singh Makkar, MD
Columbia University Irving Medical Center
Radiology

Kyle Richard Minehart, MBA
University of Iowa
Radiology

Robert William Morris, MD
University of Mississippi Medical Center
Radiology

Rupa Radhakrishnan, MBBS, MS
Indiana University School of Medicine
Radiology and Imaging Sciences

Casey Allen Reed, MD
University of Cincinnati
Radiology and Medical Imaging

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The Power of Design Thinking in Medical Education

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A goal of medical education should be to optimize educational experiences of our learners. How can we better understand their experiences and design educational activities that inspire them to learn? Design Thinking is a powerful process that consists of five iterative phases: empathize, define, ideate, prototype, and test. Empathy with the user experience is at the core of Design Thinking. This helps define the right problem so that the right solutions can be developed. In this article, we share our experiences with using Design Thinking in radiology education. As educators, we are constantly learning and innovating. Design Thinking provides a powerful process and a growth mindset to help develop creative solutions as we move forward. We invite you to join us in this discovery quest for innovative solutions in medical education through the Design Thinking process.

Key Words: Medical Education; Design Thinking; Curriculum Design; Radiology Education; Radiology Residency; Ultrasound Curriculum; Graduate Medical Education.

INTRODUCTION

Imagine you are an early career radiology faculty member asked to develop a 2-week required radiology course for third-year medical students. You are honored to have the opportunity to develop this course but have limited experience in curriculum development. You schedule a meeting with more experienced radiology faculty to brainstorm about the curriculum. The group decides that the course should include daily conferences on imaging modalities, appropriateness criteria, and/or radiograph image interpretation as well as 2-hour blocks in the subspecialty reading rooms each morning and afternoon.

You spend months preparing conferences for the course and cannot wait for it to start. Finally, the first day arrives. You deliver the first two conferences and then direct the medical students to their assigned subspecialty reading rooms.

After the course is completed you are excited to receive the first set of evaluations. Imagine your disappointment when you read student comments that the 2-hour reading room blocks are often "boring" and that students are afraid to ask questions because they might "disturb the clinical flow."

Although you have already invested much time and energy into developing this course, you decide to reconsider the approach. One of your colleagues recently attended a Design Thinking workshop and agrees to help you use a Design Thinking approach to redesign the medical student radiology reading room experience.

Instead of brainstorming with faculty about course content, you start by having conversations with medical students to better understand their experiences in the reading room. You learn that the first challenge for students is feeling welcome and finding someone to sit with. Students share that they do not have defined reading room roles or responsibilities and often end up sitting passively listening to radiologists dictate, which can be boring. Students express concern that asking too many questions slows radiologists down and disturbs the workflow.

You use this information to better understand "pain points" of the medical student reading room experience. This helps you reframe the question from "What content is important for the course?" to "How might we make the medical student reading room experience more engaging?" You and your colleague then invite medical students, residents and faculty to a Design Thinking session to ideate about creative solutions that can be prototyped and tested. This experience whets your interest in the Design Thinking process and future applications in medical education.

THE DESIGN THINKING PROCESS

The term "Design Thinking" has been present since at least 1987 (1) and has a long history of use in engineering (2), business and management (3–5), and health care (6). More recently, Design Thinking has been used in education (7–9). The literature includes a wide variety of books, scholarly articles, and articles in mainstream media. Design Thinking blends a mindset for empathy with a process of iterative human-centered design. Overall, the objective is to help foster innovation in fields that deliver a product and/or service.

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How is Design Thinking different from other types of brainstorming? A typical brainstorming session often involves a group discussion to develop creative solutions to a problem. Group participants can range from extroverts with a tendency to dominate the discussion to introverts who have creative ideas but may be hesitant to speak up. In contrast, with Design Thinking, every participant has an equal voice. Rapid-fire ideas are initially created in silence by each participant on post-its, which are then placed on a wall or whiteboard for group viewing. The group then votes on the ideas and determines which "big ideas" to further develop. This approach gets around pre-existing biases or mindsets by bringing diverse voices into the process. Simple questions such as "why", "what if", and "how might we" are asked to define a more interesting question and develop superior solutions (10).

Although variants of the Design Thinking process can be applied to different settings, all share a common goal of designing human-centered solutions to enhance the user experience. For this paper, we will focus on the five-phase Design Thinking model used at the Hasso Plattner Institute of Design at Stanford (11). In this model, individual ideas are communicated on post-its, and every participant is encouraged to generate as many ideas as possible.

The five Design Thinking phases are:

1 Empathize
2 Define
3 Ideate
4 Prototype
5 Test

Empathize

In the design process, the user is the person that the application, product or service is designed for. In medical education, the user is the learner. Empathy and understanding the user experience are at the core of Design Thinking. In fact, the empathy phase helps differentiate the Design Thinking process from other types of brainstorming or problem solving. The user experience refers to the emotions, attitudes, and overall satisfaction of the user when interacting with a product or service. In our medical student course example, the user was the medical student and empathy building was facilitated through conversations with students about their reading room experiences. Other potential methods include: directly observing the user experience, asking for feedback, listening to user stories, meeting with focus groups, and analyzing each step of the user experience.

Another method that we have utilized to understand the user experience involves creating a persona and an empathy map. For example, the persona "Catherine Smith is a fourth-year medical student from Alabama interviewing for a radiology residency slot in Massachusetts. She describes herself as shy but curious with a desire to make a positive impact on others. This is her first radiology interview experience and she's not sure what to expect." Based on this persona, each member of the Design Thinking group writes their ideas on post-its, one idea per post-it, representing what they think Catherine "says, thinks, does and feels" as she prepares for the interview day. The post-its are placed on a four-quadrant board called an empathy map (Fig 1), which is then used to help identify issues that might impact Catherine's interview experience.

Define

Understanding the user experience from different perspectives helps frame the problem in a user-centered manner. With our medical student radiology course example, after having conversations with multiple medical students, the problem was reframed from a content centered focus to a reading room experience centered focus. A goal of this phase is to define the right problem so that the right solutions can be developed. This often results in asking a "how might we" question: "How might we make the medical student reading room experience more engaging?"

Ideate

The goal of the ideate phase is to generate a broad range of ideas nonjudgmentally. Ideas are communicated on post-its and all perspectives are welcome. Participants are encouraged to go beyond the usual solutions and explore creative options. Providing constraints can help spark novel ideas. In our medical

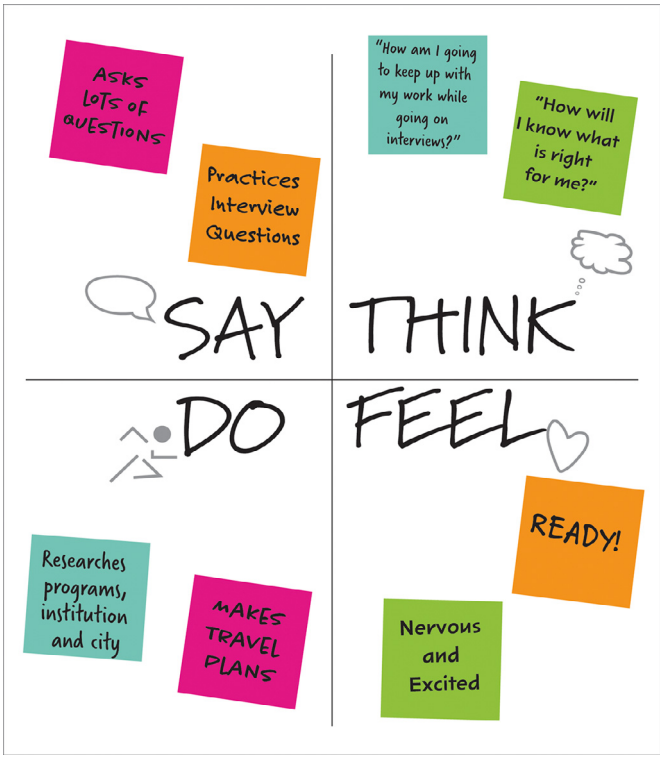

Figure. 1. Example of a four-quadrant empathy map to help understand the user experience. The post-its reflect ideas about what the user says, thinks, does and feels. (Color version of figure is available online.)

student course example, consider the following constraint: an attending radiologist can only dedicate 10 minutes to teach medical students during their 2-hour reading room block. Solutions might include providing a simulated environment for medical students to dictate preliminary reports to review with the radiologist, pairing medical students with an ultrasonographer or another technologist to participate in the acquisition of imaging exams to review with the radiologist, and assigning cases for medical students to review on their devices and then discuss with the radiologist.

This initial divergent phase encourages people to think divergently to generate as many ideas as possible, no matter how crazy. This is followed by a convergent phase of ideation when participants group ideas with a similar theme together and vote on the grouped ideas, ultimately identifying two or three ideas that are then carried forward for further development in the prototype phase (8). In the divergent phase, we create choices ("no ideas are bad"); however, in the convergent phase, we make choices ("let's select only the best ideas").

Prototype

The goal of the prototype phase is to experiment with developing the best possible solutions for the identified problems. This is the action phase. Quick inexpensive prototypes are developed, tested, and refined or discarded based on user feedback. A prototype can be a physical object that the user can interact with or a role-playing scenario that involves the user. A mantra of Design Thinking is to "fail fast" before becoming too invested in a single solution.

Test

The test phase provides an opportunity to solicit feedback from the user. The goal is to better understand and empathize with the user experience to refine the prototype, resulting in better solutions. This is an iterative process. In our medical student example, we might prototype a simulated environment for medical students to dictate reports and make modifications based on feedback. Or we might decide that this is not the best solution and move on to another prototype to engage students in the reading rooms.

DESIGN THINKING IN MEDICAL EDUCATION

We have used Design Thinking in our department and education programs for three years. Staff, medical students, residents, and faculty have all participated in Design Thinking sessions hosted by our department. A recent session focused on redesigning the radiology resident ultrasound experience. This was initially prompted by a review of comments on resident surveys and ultrasound rotation evaluations. Conversations with residents confirmed a desire to redesign the ultrasound experience to be more engaging.

A Design Thinking approach was used to ideate about potential solutions. Residents and faculty were included. Participants identified resident "pain points" and subsequently generated rapid-fire ideas on post-its for redesigning the resident ultrasound experience. The group voted on these ideas and identified the following top "big ideas": (1) Ultrasound boot camp, (2) Simulated scanning sessions with standardized patients and ultrasound-guided procedure sessions, (3) Procedure time with nurse practitioners to learn basic ultrasound-guided procedures such as thoracentesis and paracentesis, and (4) Updated noon conference content and format. New resources were developed including an introductory video on ultrasound transducer selection and scanning techniques. A 1-week boot camp was designed that included activities and resources, such as a compendium of relevant articles and practice cases for ultrasound call preparation. New hands-on ultrasound experiences were introduced into the rotation and at the simulation center. The rotation was restructured to include procedure time with nurse practitioners. Noon resident conferences were updated to be more relevant and engaging. These changes have been in place for two years now with slight modifications in resident conferences and the timing of the simulation experiences based on resident feedback via conversations and conference evaluations.

In our experience, this Design Thinking approach has several advantages over a more traditional hierarchal top-down approach for designing education experiences. Design Thinking starts with empathy for the user (learner). Every participant has an equal voice. The voices of introverts are amplified, and power differentials are neutralized. This approach results in a mindset of empathy, inclusion and empowerment, ultimately fostering the development of superior solutions.

CALL TO ACTION

A goal of radiology education should be to optimize educational experiences of our students and trainees. How can we better understand their experiences and design educational activities that inspire them to learn? Design Thinking is a powerful process that places the user experience front and center. This iterative approach engages the user with developing and refining solutions.

Empathy with the user experience is at the core of Design Thinking. This helps define the right problem so that the right solutions can be developed. All voices are "heard" through ideation with post-its. All proposed ideas are initially considered and then narrowed down by consensus to a smaller number of ideas that are carried over to the prototype phase. The Design Thinking process embraces a "bias towards action". The prototype and test phases allow designers to "fail fast" and refine the prototype or move on to the next idea.

For those of you who have already participated in a Design Thinking experience or workshop, we invite you to try Design Thinking techniques in education. It's not necessary to include all five steps in a single session. Perhaps start with inviting interested residents to your next

departmental education meeting and use post-its to "hear" everyone's ideas during a discussion on the resident education experience.

For those of you who have not yet participated in a Design Thinking experience, we invite you to give it a try. Initially, you may feel a little out of your comfort zone, which is true of many growth experiences. However, Design Thinking soon becomes a mindset, a new way of problem solving and finding innovative solutions to problems in education.

As educators, we are constantly learning and innovating. Design Thinking provides a powerful process and a growth mindset to help develop creative solutions as we move forward. We invite you to join us in this discovery quest for innovative solutions in medical education through the Design Thinking process. What will you do?

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