Radiology Education in Medical School Curriculum: Current State and Future Directions

Arman Mahmood, Kevin Pierre MD, Gabriel Flambert, Jessica Gemmell, Alan Xu, Eric Zeng, Jesse Winton, MD, Dhanashree Rajderkar, MD

Introduction

Although radiologists provide final interpretations, all physicians must acquire basic imaging competencies. Clinicians frequently rely on their own interpretations in emergencies or in situations requiring immediate decisions before formal reports are available.

Most medical schools offer limited radiology exposure (often <25% mandate a formal rotation) and rely primarily on didactic lectures. Surveys indicate that up to 72% of students feel inadequately prepared in imaging interpretation and appropriate study selection.

Challenges and Gaps

There is limited curricular time. As medical curricula expand to include emerging fields (e.g., AI, digital health), radiology content is often squeezed into isolated lectures or electives.

Many institutions struggle to deliver a consistent, high-quality curriculum as, often, there are only a small proportion of radiology faculty dedicated to medical student education.

Standardization is difficult as the rapid development of imaging techniques requires continual updates to teaching materials.

There are disparities in graduates' imaging competencies as implementation varies widely across institutions, despite AMSER's guidelines.

Existing Models of Integration

1. Vertical and Horizontal Integration
Example: At the University of Wisconsin, radiology is introduced early within anatomy courses and reinforced during clinical rotations.

2. Case-Based and Interactive Learning
Example: Programs using flipped classrooms, small-group discussions, and audience-response systems.

3. E-Learning and Simulation Platform
Examples: UF WIDI Case-Based Intro to Radiology Platform and PACS simulators.

4. Integration With Foundational Sciences
Example: UFCOM co-teaching clinically relevant gross anatomy and radiology during third year clerkships.

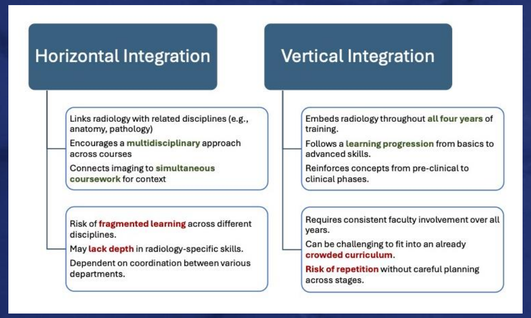


Figure 1. Integration strategies in radiology education.

Teaching format	Pros	Cons
Lecture	• Simple method to employ • Ability to incorporate relevant anatomical imaging with corresponding systems block	• Passive, students are not engaged • Usually does not require problem-solving • Not case-based
Computer-based	• Convenient, students may complete work at any location • Self-paced, not reliant upon lecturer's schedule	• Difficult to determine if students engaged meaningfully with material • Limited access
Team-based learning	• Active learning method • Encourages engagement with classmates • Learn from peers	• Must include a physician to ensure learning objectives are obtained successfully

Figure 2. Comparison of teaching formats.

Proposed Strategies

- Mandate adoption of the AMSER framework and integrate the ACR Appropriateness Criteria
- Embed radiology content across the entire curriculum, from preclinical courses to clinical rotations, with a structured mentor–mentee system.
- Invest in dedicated teaching time, professional development, and grant support to enable faculty to create and maintain up-to-date educational materials.
- Utilize e-learning modules, VR simulations, and flipped classroom approaches to provide interactive, self-directed learning experiences that reduce faculty workload.
- Encourage joint grand rounds, team-based simulations, and structured mentorship.
- Advocate for national bodies (AAMC, LCME) to set standards for competencies in image interpretation, radiation safety, and modality selection.
- Develop standardized assessments (e.g., AMSER exams or STARS platforms) to objectively evaluate and refine curricular effectiveness.

Conclusions

Standardization and efficient integration of radiology education in medical school is needed to prepare future physicians proficient in appropriate imaging utilization and interpretation.

References

1. AAMC. Curriculum Reports [Internet]. Association of American Medical Colleges (AAMC); 2020 [cited 2024 Nov 11]. Available from: https://www.aamc.org/data-reports/curriculum-reports/report/curriculum-reports

2. Rohren SA, Kamel S, Khan ZA, Patel P, Ghannam S, Gopal A, et al. A call to action; national survey of teaching radiology curriculum to medical students. J Clin Imaging Sci. 2022;12:57.

3. Penn L, Golden ED, Tomblinson C, Sugi M, Nickerson JP, Peterson RB, et al. Training the New Radiologists: Approaches for Education. Semin Ultrasound CT MR. 2024 Apr;45(2):139–51.

4. Shetty S, Bhat S, Al Bayatti S, Al Kawas S, Talaat W, El-Kishawi M, et al. The Scope of Virtual Reality Simulators in Radiology Education: Systematic Literature Review. JMIR Med Educ. 2024 May 8;10:e52953.

5. McLaughlin JE, Griffin LM, Esserman DA, Davidson CA, Glatt DM, Roth MT, et al. Pharmacy student engagement, performance, and perception in a flipped satellite classroom. Am J Pharm Educ. 2013 Nov 12;77(9):196.