

INTRODUCTION

- Child Neurology and Neurodevelopmental Disabilities Residents at Boston Children's Hospital (BCH) have heterogeneous background and exposure to neurology prior to initiating the first year of neurology training (PGY-3).
- Due to the complexity and high volume of patients at BCH, trainees are rapidly expected to respond to neurologic emergencies and provide formulations include localization along the neuro-axis.
- Current core curriculum lectures cover a variety of topics that are geared towards residents of all levels, rather than specific to incoming residents.
- Foundational topics may be underemphasized by teachers farther away from their initial training and who provide material for all levels of learners.
- Core curriculum taught by senior faculty in the presence of senior residents as well as medical students makes new residents less comfortable with asking questions about foundational concepts.
- Extensive literature on bootcamps shows that near-peer teaching creates a "safe space" for learning and promotes resident knowledge acquisition, self-efficacy and confidence, and community-building.

PROJECT OBJECTIVES

- Implement interactive, learner-level appropriate teaching sessions for first-year Child Neurology and Neurodevelopmental Disabilities trainees (typically PGY-3) which cover foundational introductory and emergency neurology topics.
- Create a psychologically safe environment for learning.
- Develop residents as teachers.
- Evaluate the effectiveness of the intervention in terms of content knowledge acquisition, resident self-efficacy, community building, and hidden curriculum measures.

LEARNING OBJECTIVES

At the end of the bootcamp, participants will:

- Describe basic principles of localization along the neuroaxis based on exam findings.
- Develop age-appropriate differential for common neurologic complaints such as focal neurological deficits, tone abnormalities, and seizures.
- Initiate response to neurologic emergencies such as status epilepticus and code stroke.
- Build support networks with co-residents and senior residents.

METHODS

- A near-peer led bootcamp was developed based on Kern's 6-steps of curricular design.
- Bootcamp sessions consisted of 90-minute sessions on the first 9 Wednesdays of the academic year. Topics were chosen based on American Board of Psychiatry and Neurology (ABPN) learning objectives, as well as institutional needs of learners to address neurologic emergencies and function effectively on core services.
- Each session had learning objectives and content that were reviewed by junior trainees for appropriate zone of proximal development, staff neurologists for accuracy of content, and the bootcamp core team for educational methodology.
- Teachers were instructed to model vulnerability and demonstrate strategies for approach to uncertainty.
- To assess knowledge, learners completed anonymous pre- and post-bootcamp 20 question ABPN-style questions (Kirkpatrick Level 2).
- To assess behavior change (Kirkpatrick Level 3), residents responded through anonymous surveys about both planned and realized interval practice changes based on bootcamp.

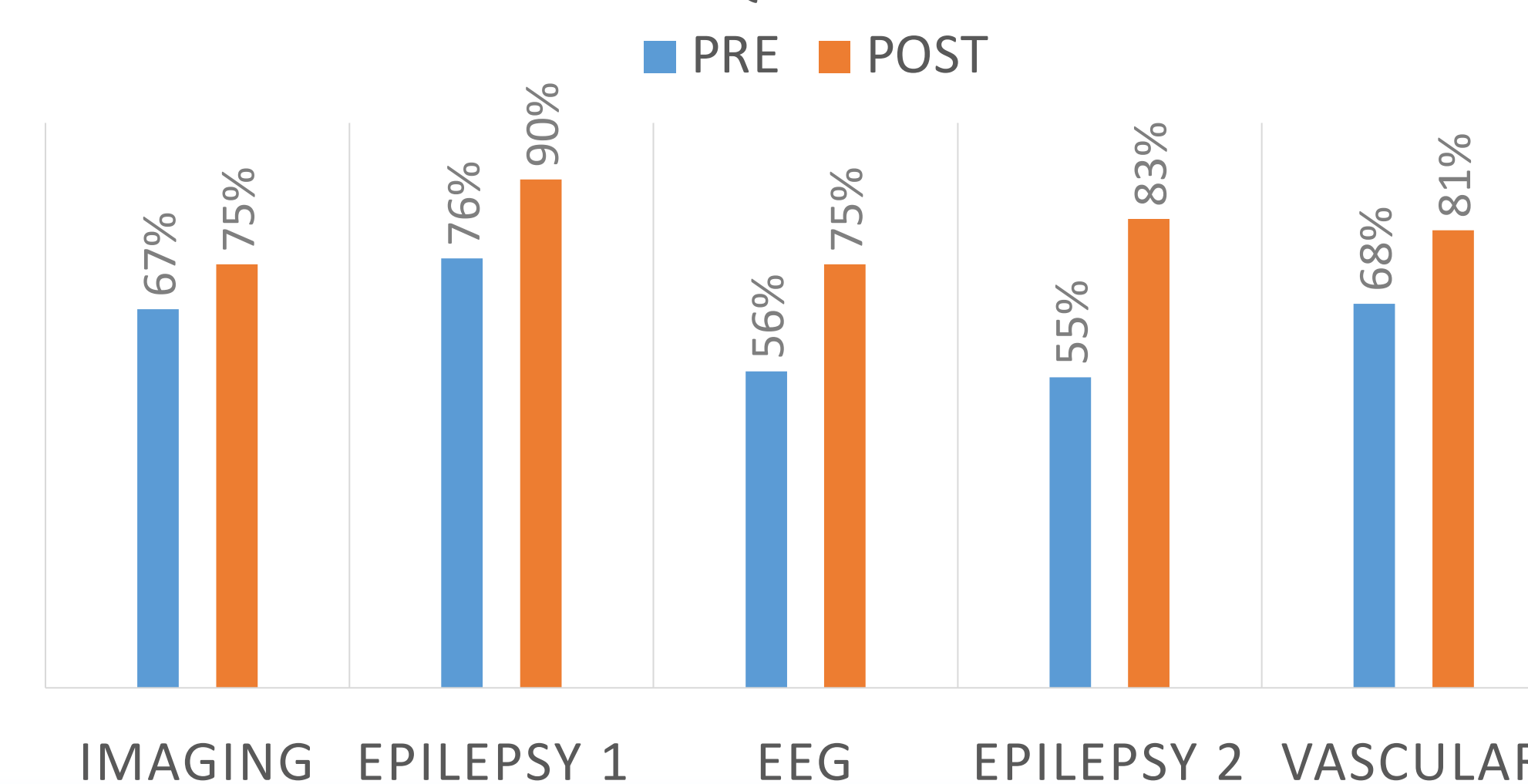
SESSION STRUCTURE

- Topics for the bootcamp included introduction and orientation to: Neurologic exam, Localization and Neuroimaging, Epilepsy (2 sessions), Electroencephalography, Vascular Neurology, Neuromuscular, Neuroimmunology and Headache, Review and Wrap-up.
- Interactive and case-based sessions with use of techniques including think-pair-share and small-groups.
- Taught by near-peers, including senior trainees and faculty members who graduated in the last 1-2 years.

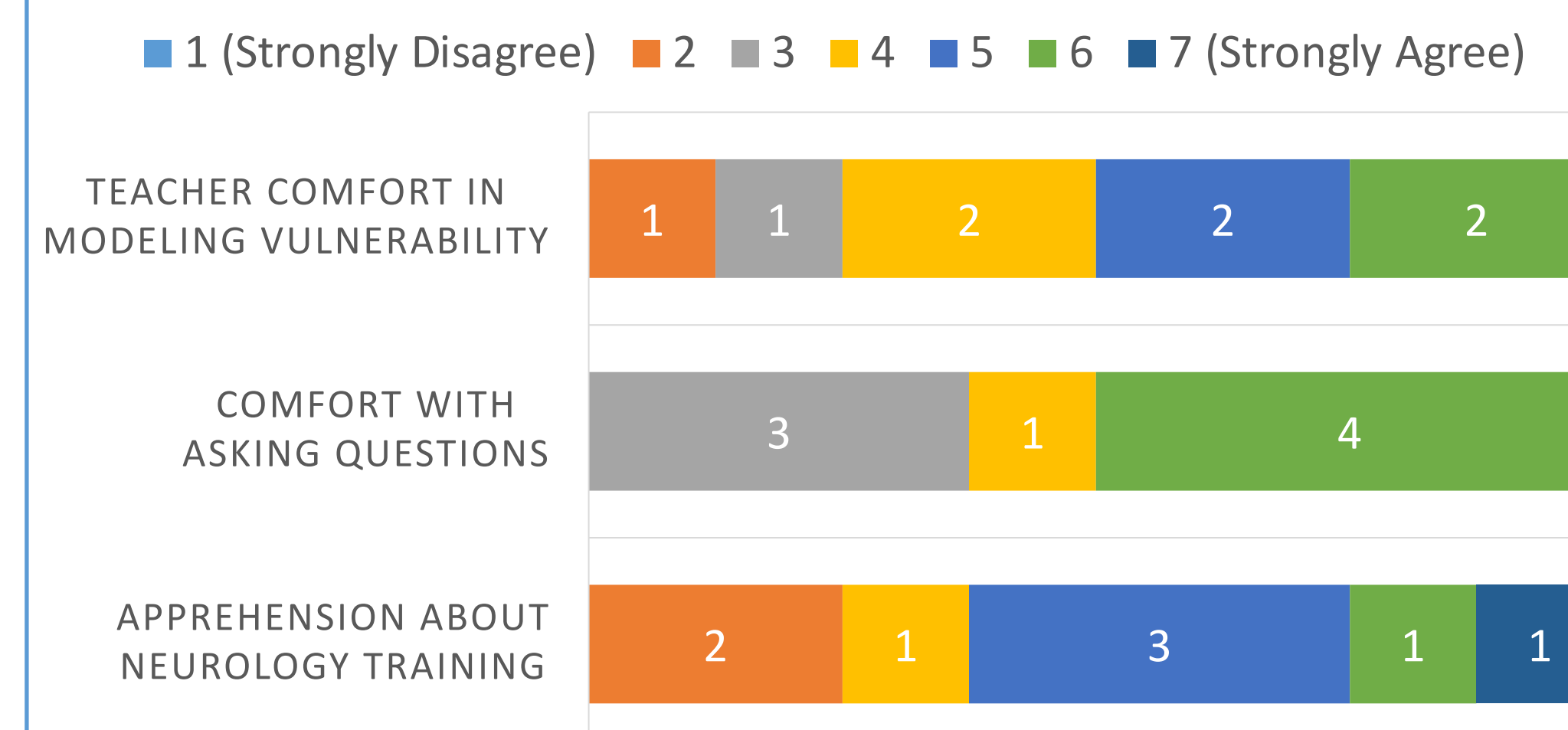
RESULTS

- All (8) residents agreed to participate in the study and filled the pre-bootcamp ABPN style questions

PRE VS. POST SESSION KNOWLEDGE-BASED QUESTIONS



PRE-BOOTCAMP COMFORT RATING



PRE-BOOTCAMP SELF EFFICACY RATING

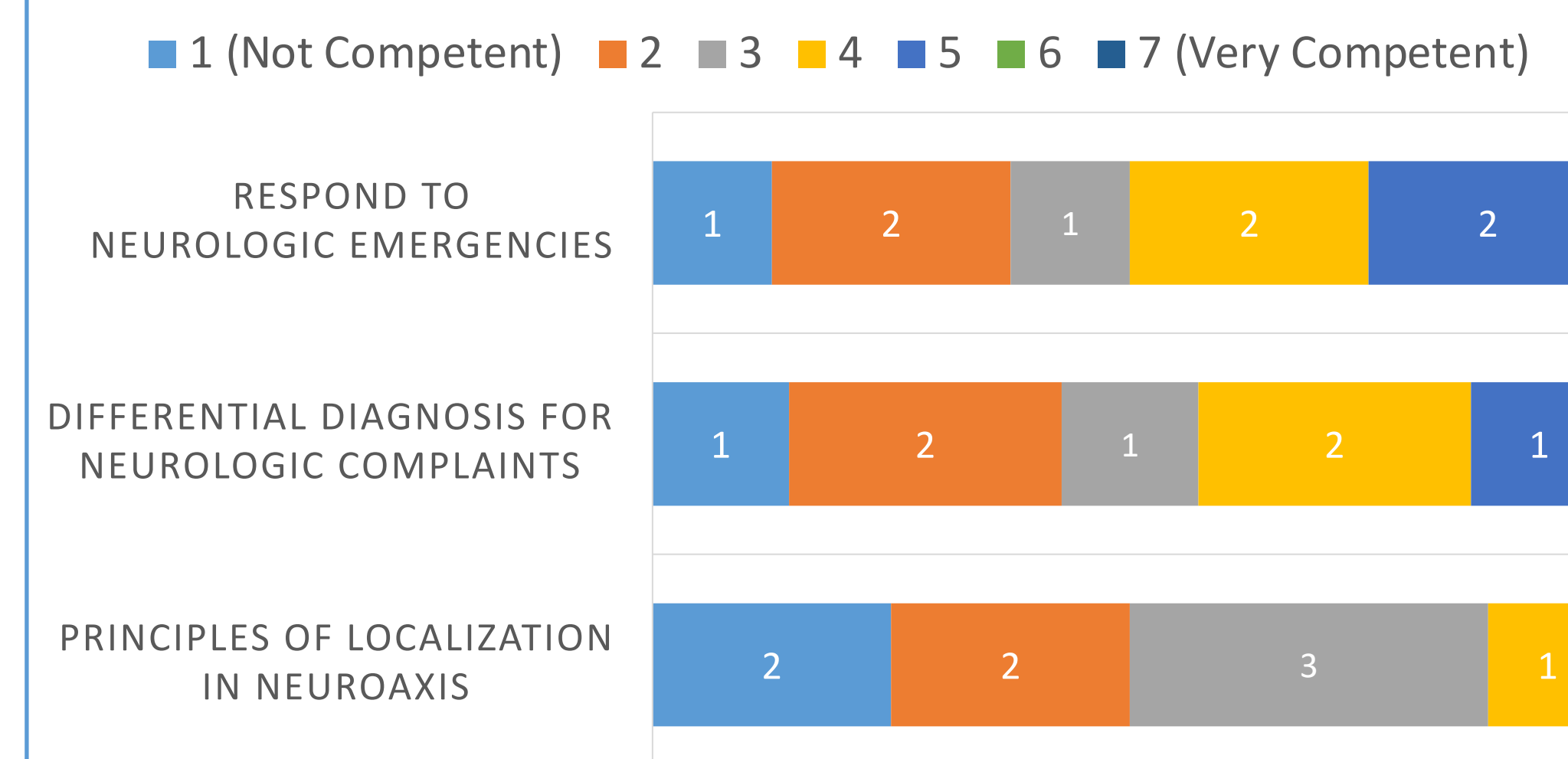


Table 1: Qualitative results on planned behavior change reported after sessions and enacted behavior changes due to bootcamp reported by residents

| | |
|---------------------------|--|
| Planned Behavioral Change | "More thorough mental status examination" "Stabilizing joint and moving distal for brachioradialis reflex" "Incorporate Fundoscopic exam in to every exam to practice" "My reflex exam. I now know how to properly grade 1-4 and how to augment" "Try to think of localization more with exam findings" "Study Anatomy" "Read more EEGs" "Reading and describing my own scans with more confidence" "Better ability to educate patients with better definitions of terms." |
| Enacted Behavioral Change | "My presentations are organized and I start with mental status exam that has actually systematic components" "Started doing a better motor exam" "Better neuro exams, particularly fundoscopic" "More torque with hammer" "More directed exam towards the question at hand. More confident in interpreting the exam" "Attempting to localize exam findings" "A lot more comfortable with my exam and history skills" "How I interpret EEG reports in my notes and what I document in the history" |

- Post-session surveys showed that:
 - On average, **difficulty of the content** was rated **5.0 out of 10** (1 being too basic and 10 too advanced).
 - On average, **clarity of the content** was rated **8.9 out of 10** (1 being not clear and 10 being very clear).
 - On average, **teachers modeling vulnerability** was rated **8.4 out of 10** (1 being too confident and 10 being effective modeling of not-knowing).

CONCLUSIONS

- PGY-3 residents reported low baseline self-efficacy on core neurologic topics such as how to respond to neurologic emergencies, differential diagnosis for common neurologic complaints such as focal neurologic deficits, tone abnormalities, seizures and localization.
- 62.5% of residents (5/8) reported at least some apprehension about starting neurology training.
- Residents reported that the content prepared was appropriate for learner level and taught clearly, and that teachers appropriately modeled vulnerability.
- Pre- and post-session surveys show an average improvement of 16% in knowledge-based questions.
- Residents reported improved understanding of topics discussed including neurologic exam, localization, imaging, EEG, epilepsy and vascular neurology.
- Residents reported intention to change practice and enacted behavioral changes due to bootcamp, particularly related to neurologic exam, localization, and interpretation of diagnostic studies.
- Our preliminary data suggest that bootcamps may be helpful in enhancing resident comfort, self-efficacy and knowledge, while creating a psychologically safe environment for learning foundational neurology topics. Proposed bootcamp model could be considered by other CN/NDD programs.

REFERENCES

- Young JQ, Ranji SR, Wachter RM, Lee CM, Niehaus B, Auerbach AD. "July effect": impact of the academic year-end changeover on patient outcomes: a systematic review. *Ann Intern Med.* Sep 2011;155(5):309-15. doi:10.7326/0003-4819-155-5-201109060-00354
- Ho CH. Beyond the "July Effect". *J Grad Med Educ.* Mar 2015;7(1):131. doi:10.4300/JGME-D-14-00479.1
- Gunther JR, Jimenez RB, Yechieli RL, et al. Introductory Radiation Oncology Curriculum: Report of a National Needs Assessment and Multi-institutional Pilot Implementation. *Int J Radiat Oncol Biol Phys.* 08 2018;101(5):1029-1038. doi:10.1016/j.ijrobp.2018.04.020
- Chen CA, Kotliar D, Drolet BC. Medical education in the United States: do residents feel prepared? *Perspect Med Educ.* Aug 2015;4(4):181-5. doi:10.1007/s40037-015-0194-8
- Minter RM, Amos KD, Bentz ML, et al. Transition to surgical residency: a multi-institutional study of perceived intern preparedness and the effect of a formal residency preparatory course in the fourth year of medical school. *Acad Med.* Aug 2015;90(8):1116-24. doi:10.1097/ACM.0000000000000680