Teaching Systems-Based Practice Through a Resident-Led Quality Review in the Department of Emergency Medicine

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ABSTRACT

Background: Resident education in safety and quality has historically relied on didactics alone. To enhance alignment with the Accreditation Council for Graduate Medical Education (ACGME) milestones, a resident-led case review process was implemented.

Methods: Senior residents reviewed cases for a 1-month period and met quarterly for discussion. Meetings were supervised by emergency medicine faculty and attended by junior residents. Survey feedback and descriptive statistics were used to evaluate the intervention's impact.

Results: Most residents rated this intervention as "extremely adequate" in teaching ACGME milestones, most notably "participating in the analysis of patient safety events" (n = 13, 54.2%) and "discussing how individual practice effects the broader system" (n = 14, 56.0%) Most enjoyed participation (n = 18, 75.0%).

Discussion: Residents perceived this educational intervention as enjoyable and adequate for teaching ACGME milestones.

BACKGROUND

The Accreditation Council for Graduate Medical Education (ACGME) outlines 6 competencies: medical knowledge, patient care, interpersonal and communication skills, professionalism, systems-based practice (SBP), and practice-based learning and improvement.[1,2] In highlighting SBP, the ACGME recognizes the importance for residents' ability to navigate the health care system.[2-4]

Program directors recognize challenges to teaching SBP competencies, including limited faculty expertise and institutional support, residents' perceptions that this is a diversion from medicine, time constraints, financial limitations, and varying educational needs by postgraduate year.[5,6]

Despite these challenges, educators seek to develop robust, affordable, and fair teaching modalities for learning SBP competencies.[3,6] The literature recommends methods that promote active learning rather than lecture-based didactic sessions.[7] Emergency medicine (EM) program directors from the 2010 Council of Emergency Medicine Residency Directors (CORD) Academic Assembly Consensus Workgroup recommended SBP education methods, including expert modeling, informal small-group discussions, and formal small-group activities.[6] One Department of Ophthalmology recommended standardized and simulated examinations, qualitative reviews, evidence-based literature reviews, a resident portfolio, case presentations, chart review, and chart-stimulated recall as methods for teaching SBP skills. They emphasized that real-world patient cases can serve as a platform for discussion, reflection, and improvements in SBP.[3]

EM program directors report using expert modeling, formal small-group activities, formal lectures, self-directed learning projects, and facilitator-guided rotations.[6] However, little is published on the implementation or effectiveness of resident-led case reviews to teach SBP competencies. We describe an SBP education intervention that includes resident review of cases triggered by quality measures.

METHODS

A resident-led review of cases was implemented in our academic Department of Emergency Medicine with a 3-year residency program. The affiliated hospital is an urban tertiary care cen-

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ter with an annual emergency department (ED) census of approximately 81 000. This educational quality improvement project was deemed exempt from review by the institutional review board.

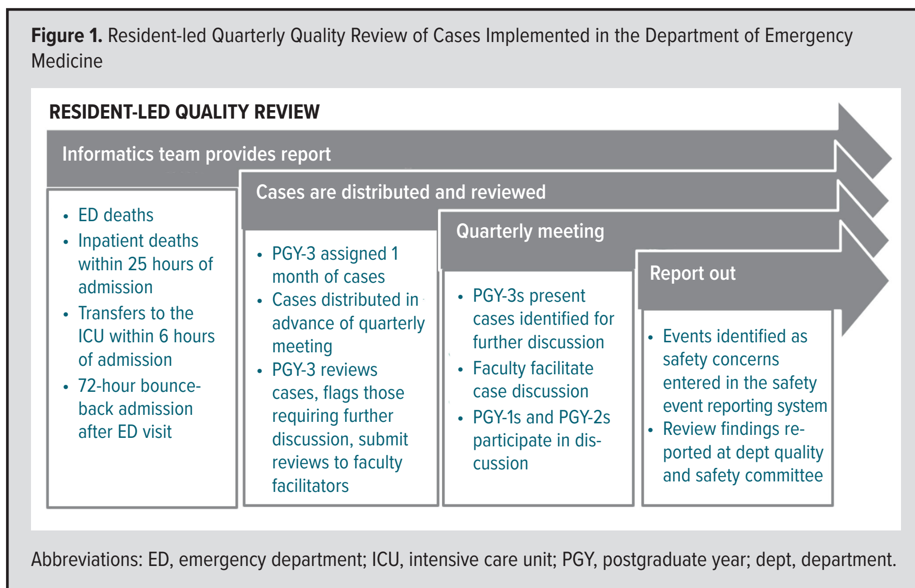


Figure 1. Resident-led Quarterly Quality Review of Cases Implemented in the Department of Emergency Medicine

Abbreviations: ED, emergency department; ICU, intensive care unit; PGY, postgraduate year; dept, department.

Development

The intervention was designed, implemented, and facilitated by an EM faculty member serving as the patient safety and quality officer for house staff (EH); the EM director of quality, safety, and experience (NJ); and the EM program directors (KW). Facilitation required approximately 1 to 2 hours of faculty time outside the 1-hour quarterly meetings. No shift buy-down was used. This intervention expanded upon preexisting SBP teaching, including a quality improvement lecture series. It augmented but did not replace safety event and quality measure reviews by the Department of Emergency Medicine Division of Clinical Operations.

Case Selection

Cases were selected using quality measures, including ED and inpatient deaths within 24 hours of admission, unplanned intensive care unit transfers within 6 hours of admission, and bouncebacks within 72-hours of an ED visit with subsequent admission. These measures are used by hospitals across our system to identify cases that may require further review. In this ED, fewer than 1% of total cases meet each of these measures. The electronic health record was queried to generate a case list. This document was protected under Wisconsin Statutory Sections 146.37 and 146.38, making it nondiscoverable and peer-protected.

Case Distribution and Initial Review

Third-year residents (postgraduate year [PGY]-3, n = 12) were each assigned the case list for 1 month. They reviewed cases and populated a deidentified case log with relevant clinical information and potential recommendations for further review. They then returned completed case logs to the supervising faculty before the quarterly meeting.

Quarterly Case Discussion

PGY-3s presented and led discussions on cases they determined needed further review. Discussions were supervised by the authors and additional interested EM core faculty. First-year (PGY-1) residents and second-year (PGY-2) residents were required to attend 1 quarterly meeting per academic year. Meetings were held via Microsoft Teams (Microsoft Corporation) secure videoconferencing.

Reporting Outcomes

Presented cases with significant safety concerns were identified by either residents or faculty and were referred for formal departmental review. Trends, interesting cases, and lessons learned were presented at resident conferences by the resident presenting that quarter. Other quality improvement and patient safety didactics continued per departmental standards. The workflow for this intervention, from case identification through reporting of outcomes, is depicted in Figure 1.

Measuring Effectiveness

Twelve months after implementation, participating residents were surveyed. The survey was nonvalidated and nonpiloted and was developed de novo by the authors. Postgraduate year was recorded. Surveys asked residents to rate the adequacy of this intervention for supporting the SBP milestones, as well as their level of enjoyment and ability to objectively review cases of their peers and attending physicians. An opportunity for written feedback was provided.

Analysis

Descriptive statistics were used to analyze all quantitative data. A simple thematic analysis based on author consensus was used to evaluate written feedback. The response rate was calculated using the American Association for Public Opinion Research's (AAPOR) Response Rate 2 definition.[8]

RESULTS

There was an 88.88% response rate using the AAPOR RR2 definition (12/12 PGY-1s, 9/12 PGY-2s, and 11/12 PGY-3s at least partially responding). This educational intervention positively affected resident perceptions of support for achieving systems-based practice patient safety milestones. Most residents rated this intervention as somewhat or extremely adequate for demonstrating knowledge of common patient safety events (22/24,

91.67%), identifying system factors that lead to patient safety-events (21/23, 91.3%%), conducting analysis of patient safety events (21/24, 87.5%), participating in the analysis of patient safety events (22/24, 91.67%), engaging teams and processes to modify systems to prevent patient safety events (17/23, 73.91%), act as a role model and/or mentor for others in the disclosing of patient safety events (22/24, 91.67%).

This intervention also positively affected resident perceptions of support for achieving SBP quality improvement milestones. Most respondents rated the intervention somewhat or extremely adequate for participating in local quality improvement initiatives (22/25, 88.0%), discussing how individual practice affects the broader system (22/25, 88.0%), discussing how components of a complex health care system are interrelated and how these affect patient care (22/25, 88.0%), describing local quality improvement initiatives (21/24, 87.5%), and demonstrating knowledge of basic quality improvement methods and metrics (20/25, 80.0%). Figure 2 illustrates resident perceptions of this intervention's adequacy in supporting achievement of ACGME SBP and quality improvement milestones.

A subanalysis of PGY-3s and PGY-2s and PGY-2s was conducted. Third-year residents most frequently rated the intervention as extremely adequate to support "conducting analysis of patient safety events" (5/9, 55.6%). Meanwhile, PGY-1s and PGY-2s most frequently rated the intervention extremely adequate for "discussing how individual practice affects the broader system" (10/16, 62.5%). Figure 3 illustrates resident responses.

Most residents enjoyed participation (18/24, 75.0%). However, responses were mixed among PGY-3s, with 6 of 8 (75.0%) agreeing and 2 of 8 (25.5%) strongly disagreeing that they were able to objectively assess cases. Written feedback was mixed and offered insights for potential improvements. Positive feedback highlighted the interactive nature of the intervention and

Figure 2. Adequacy of Education Intervention for Milestone Alignment in the Accreditation Council for Graduate Medical Education Patient Safety and Quality Improvement Competencies

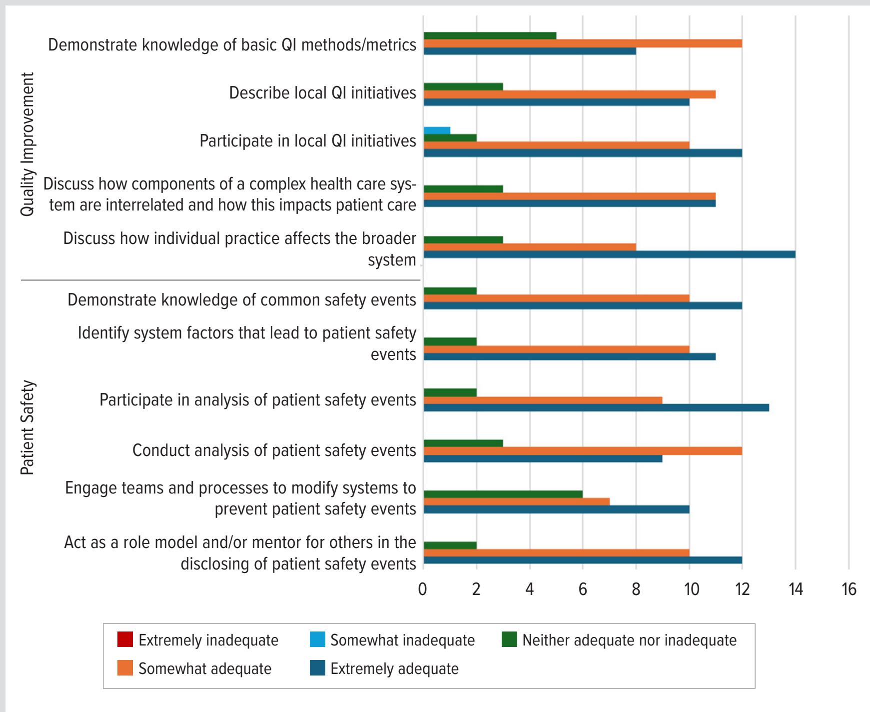
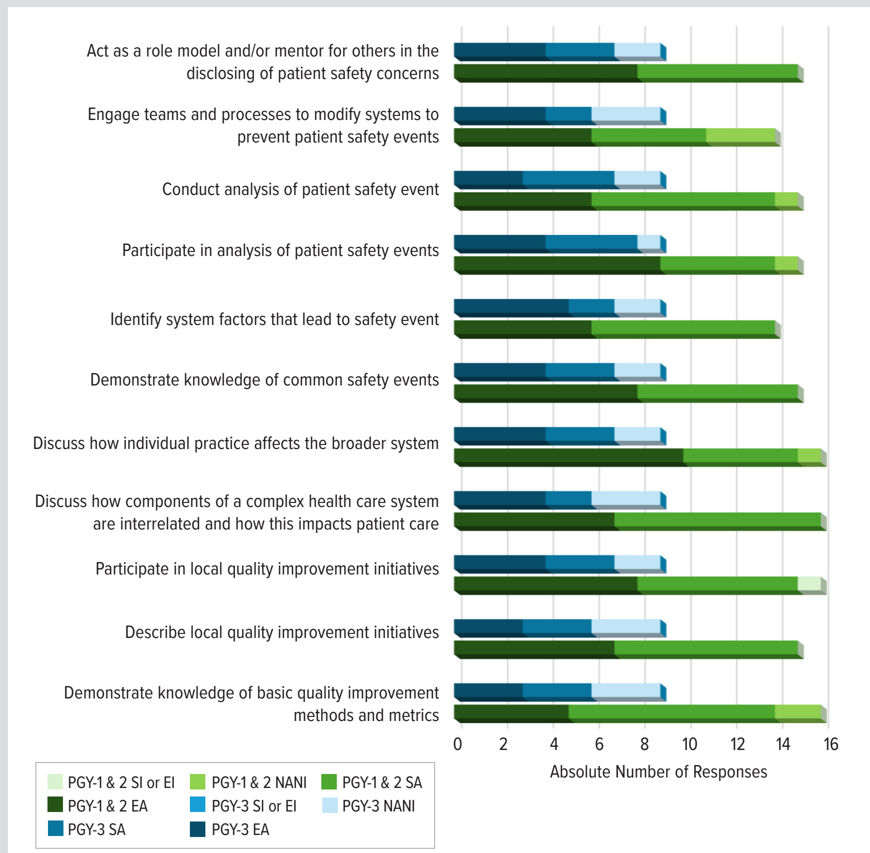


Figure 3. Subanalysis of PGY-3 and PGY-1 and PGY-2 Perceptions of Adequacy in Teaching the Accreditation Council for of Graduate Medical Education System-Based Practice Competencies



Abbreviations: PGY, postgraduate year; SI, somewhat inadequate; EI, extremely inadequate; NANI, neither adequate nor inadequate; SA, somewhat adequate; EA, extremely adequate.

insights into safety events. Negative feedback highlighted the work and time necessary to review cases.

DISCUSSION

We describe a resident-led review of cases, aligning resident experiences with the ACGME systems-based practice competencies. This intervention provides a platform for residents to discuss cases in small groups and an opportunity for expert modeling, as PGY-1s and PGY-2s observe PGY-3s presenting cases and PGY-3s observe faculty participating in discussions. While PGY-1s and PGY-2s discuss cases, PGY-3s conduct reviews and present cases, thus addressing different needs based on training level. Wray et al describe case-based learning, expert panels, and clinicopathologic cases as effective education modalities for residents.[7] This intervention incorporates similar approaches, as supervising faculty serve as content experts and discussions are case based.

This intervention overcomes commonly cited challenges to teaching SBP competencies.[6] It includes quarterly meetings, overcoming the time challenges of frequent meetings or on-shift teaching. It has no inherent cost. Most faculty supervisors have protected time for educational and/or operational work, increasing faculty availability for involvement. Given faculty expertise in education and administration, they have familiarity with ACGME milestones and systems of care. Written feedback highlighting the amount of time and effort necessary for reviews suggests that a mismatch between learner preferences and effective teaching methods for SBP milestones may persist in this intervention.

Limitations

Our intervention and assessment of impact have several limitations. We did not include outcomes data on resident performance in our analysis, focusing only on resident perspectives. The survey was developed de novo by the authors and was not validated or piloted. Further, this intervention was implemented at a single residency program and is therefore limited by a small sample size and may lack generalizability. Future work may include multiple residency programs, making validation and piloting of any future survey appropriate. While an 88% response rate is encouraging, results may be affected by nonresponse bias.

CONCLUSIONS

This resident-led quality review merged clinical operations and education to fill a gap in resident education. Residents who participated in the program reported that the intervention adequately addressed ACGME systems-based practice competencies and found the experience enjoyable. However, some residents found it difficult to objectively assess cases. Given the challenges of educating residents in this SBP, ongoing work is needed to determine best practices.

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REFERENCES

1. Swing SR. The ACGME outcome project: retrospective and prospective. *Med Teach.* 2007;29(7):648-654. doi:10.1080/01421590701392903

2. Cooney RR, Murano T, Ring H, Starr R, Beeson MS, Edgar L. The Emergency Medicine Milestones 2.0: Setting the stage for 2025 and beyond. *AEM Educ Train.* 2021;5(3):e10640. doi:10.1002/aet2.10640

3. Lee AG, Beaver HA, Greenlee E, et al. Teaching and assessing systems-based competency in ophthalmology residency training programs. *Surv Ophthalmol.* 2007;52(6):680-689. doi:10.1016/j.survophthal.2007.08.021

4. Beeson MS, Carter WA, Chrostopher TA, et al. The development of the emergency medicine milestones. *Acad Emerg Med*. 2013;20(7):724-729. doi:10.1111/acem.12157

5. Varkey P, Karlapudi S, Rose S, Nelson R, Warner M. A systems approach for implementing practice-based learning and improvement and systems-based practice in graduate medical education. *Acad Med.* 2009;84(3):335-339. doi:10.1097/ACM.0b013e31819731fb [Erratum appears in *Acad Med.* 2009;84(6):694].

6. Wang EE, Dyne PL, Du H. Systems-based practice: summary of the 2010 Council of Emergency Medicine Residency Directors Academic Assembly Consensus Workgroup--teaching and evaluating the difficult-to-teach competencies. *Acad Emerg Med.* 2011;18(suppl 2):S110-S120. doi: 10.1111/j.1553-2712.2011.01160.x

7. Wray A, Wolff M, Boysen-Osborn M, et al. Not another boring resident didactic conference. *AEM Educ Train*. 2019;4(Suppl 1):S113-S121. doi:10.1002/aet2.10367

8. American Association for Public Opinion Research. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys.* 9th ed. AAPOR; 2016.

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