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Research Article

Optimizing Procedural Documentation in Graduate Medical Education: Implementation of the PACE Score System

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Abstract

Accurate procedure tracking is crucial for maintaining residency program accreditation. However, lapses in logging procedures present challenges. To address this, we developed an online tracking system that integrates site-specific procedure logs into Google Sheets. Real-time comparisons of residents' procedure count against anticipated values were performed, generating a dynamic scoring system. This system was regularly shared with residents and attendings to monitor procedural progress. Our objective was to assess the impact of this system on the Accreditation Council for Graduate Medical Education procedural reporting. Post-implementation, we observed significant increases in total procedures (87%, p=0.004) and live procedural documentation (60%, p=0.06). Additionally, simulation utilization rose substantially (86%, p=NS). Residents rated the system moderately beneficial (3.4/5, 95% CI: 3.1-3.7), indicating positive reception and utility. Our findings demonstrate that this system enhances the Accreditation Council for Graduate Medical Education's procedural reporting and SIM utilization while addressing procedure logging lapses. The system's positive reception among residents further underscores its value in improving procedural documentation and overall program efficacy.

Introduction

The Accreditation Council for Graduate Medical Education (ACGME) mandates that graduates of accredited residency programs fulfill specific procedural requirements. Emergency medicine (EM) residents must meet minimum numerical thresholds for 15 key index procedures [1]. Annual reporting of these procedures to the ACGME via Web ADS is mandatory, and increasing numbers of employers require resident procedure logs for credentialing. Future procedural requisites may escalate as a strategy to regulate the number of EM graduates, emphasizing the need for robust procedural documentation. Considerable variations exist in procedural achievements among individual residents and programs [2,3]. Traditionally, procedural tracking has relied on semi-annual evaluations, which may result in delayed recognition of deficiencies. To address this, we developed an online tool using Google Sheets that integrates with our procedural logging system (New Innovations) in real-time. We implemented a straightforward scoring system, termed the Procedural Achievement Count Evaluation (PACE) score, to further analyze data. This data was presented monthly at Emergency Department (ED) meetings and quarterly to residents. We hypothesized that the PACE score would provide both residents and program leadership with valuable insights. By analyzing the PACE score, program directors could better identify procedures requiring targeted education and track deficiencies more effectively. This system aimed to improve procedural documentation for ACGME compliance and enhance resident training.

Materials and Methods: The study was conducted at a suburban ED with a three-year residency program and an annual census of approximately 90,000 patients. An online spreadsheet was developed using Google Sheets to track resident procedural accomplishments. Residents' names were listed along the y-axis, while the 15 required procedures and their respective ACGME minimum thresholds were organized along the x-axis. A per-month minimum target for each procedure was calculated based on residency level, generating a numerical metric termed the PACE score. Residents were categorized as below PACE (insufficient procedures for training level), at PACE (meeting expected numbers), or above PACE (exceeding expectations). Deficient procedures were flagged for skills labs (Cadaver and/or SIM). Residents below PACE in >50% of procedures received targeted education on documentation importance. A summative report detailing PACE scores and deficiencies was distributed quarterly to residents and monthly to faculty to guide skills lab enhancements. The number of documented procedures by graduating PGY3 residents pre- and post-implementation was compared, categorizing procedures as "live" or "SIM." Statistical analyses included percent changes and significance testing (Wilcoxon Signed-Rank, $p<0.05$). Resident perceptions were assessed via an anonymous online survey using a 5-point Likert scale.

Results: Following implementation, significant improvements were observed in ACGME procedural reporting. Among the 15 core procedures, 87% (N=12) showed increased total numbers post-implementation (p=0.004). The average percentage increase in total procedures relative to the minimum requirement was 37% (95% CI 23-46). Live procedural documentation increased in 60% (N=9) of procedures (p=0.06), while overall live procedures saw a 3% increase (95% CI -25, 30). Certain procedures, including pacing, chest tubes, lumbar punctures, and pericardiocentesis, did not show improvement in live procedural documentation. However, SIM utilization increased in 86% of procedures post-implementation, with an overall increase of 24% (95% CI 18-36, p=NS). Survey responses were obtained from 45 of 54 residents. Residents rated the PACE score moderately beneficial (3.4/5, 95% CI 3.1-3.7) and did not find it offensive (3.9/5, 95% CI 3.6-4.2). PGY3 residents found the PACE score significantly more beneficial (4.1) than PGY1s (3.3) (difference: 0.8, 95% CI 0.1-1.5) and more motivating (4.0 vs. 3.2) (difference: 0.8, 95% CI 0.5-1.5). While no PGY level found the PACE score offensive, PGY3s rated it significantly less offensive than PGY1s (difference: 1.0, 95% CI 0.2-1.6).

Discussion: This study examines the efficacy of the PACE score as an analytical tool for evaluating Emergency Medicine key index procedures mandated by the ACGME, ultimately enhancing procedural reporting. While procedural competency is a core aspect of graduate medical education, ensuring that each resident meets the required number of procedures remains a challenge. The PACE score provides a straightforward and robust method for comparing residents' procedural data, allowing the administrative team to systematically assess procedural competencies. Although case volume alone does not determine the

quality of training, it serves as an essential metric for evaluating whether residents receive adequate exposure to a sufficient volume of emergency medicine cases. Consequently, the number of procedures completed remains a crucial objective measure in resident evaluation protocols.

A key advantage of the PACE score is its ability to identify underrepresented procedures in real time during clinical practice. This data-driven approach, rather than relying on anecdotal impressions, informs decisions regarding supplementation through simulation (SIM) or cadaver labs. For instance, our analysis revealed a 50% deficiency among senior residents in pediatric trauma procedures—an issue persisting even in programs affiliated with high-volume children's hospitals [3]. Previous research has shown that incorporating uncommon emergency procedures into didactic sessions is well-received by residents [4-6]. Recognizing the limitations of clinical training opportunities, the ACGME allows up to 30% of procedures to be performed in workshops, with rare procedures such as cardiac pacing, pericardiocentesis, and cricothyroidotomy being entirely conducted in skills labs. While debate continues over the role of numerical procedural requirements in GME education, a refined analysis of a program's clinical rotation limitations enables more effective and targeted resident training [7]. As a result, integrating PACE scores into our residency evaluation process has become indispensable, significantly optimizing the use of our procedural labs.

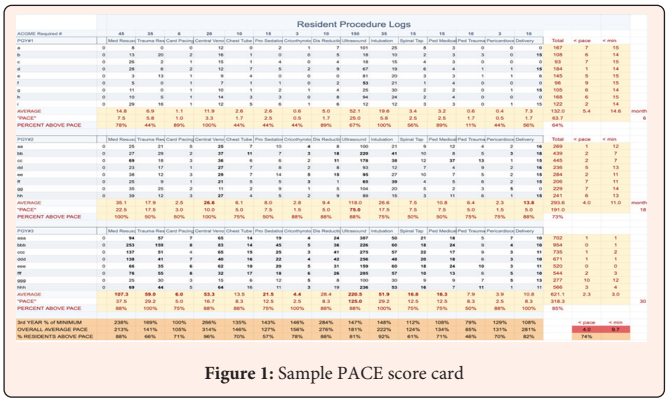

Figure 1: Sample PACE score card

A persistent challenge remains in identifying residents who fail to document their procedures accurately. To address this, our team established a threshold: senior residents are classified as deficient if more than 50% of their procedures fall below the PACE. This criterion often suggests inadequate documentation, as seen in Figure 1 (resident "ggg"). However, when a senior resident fall significantly behind the PACE in a specific procedure, it may represent a documentation issue or, more likely, a statistical anomaly (Figure 1, resident "gg" intubations). Regular evaluations and discussions with core faculty help determine whether residents are on track to exceed the ACGME's minimum procedural requirements. Additionally, monthly department meetings provide attendings with updates on both global and individual procedural deficiencies, encouraging improved documentation practices. When a specific procedure shows a widespread deficiency, faculty members are encouraged to redirect associate practitioners from performing it and instead ensure that residents gain hands-on experience.

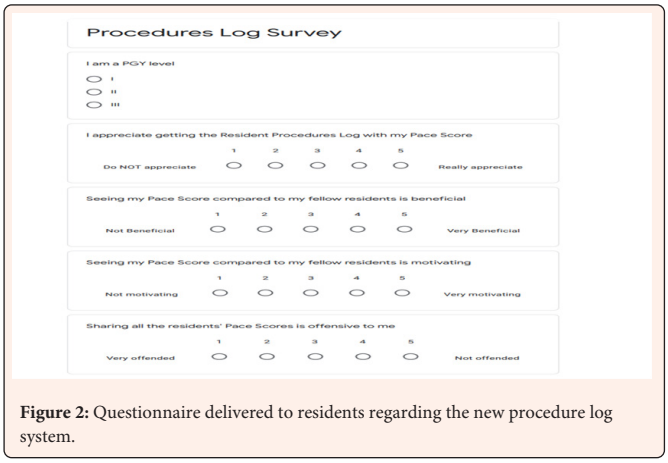

Figure 2: Questionnaire delivered to residents regarding the new procedure log system.

Table 1: Emergency Department Census and Resident Procedure Logging Metrics Before PACE Implementation.

	Number	Percent
Annual ED visits	1,01,000	
Total ED residents in three years	27	
PGY1	9	33%
PGY2	9	33%
PGY3	9	33%
Pre-PACE Total procedures documented	449	
Pre-PACE Procedures over threshold	14	93%
Pre-PACE Average Percent over threshold		53%

Our analytical tool has proven to be a valuable asset in tracking resident procedural progress, leading to improved ACGME documentation, enhanced program analysis, and more efficient utilization of bio-skills labs. To provide a comprehensive assessment of residents' capabilities and growth, educators must integrate competency assessment alongside numerical procedural benchmarks.

Conclusion

The PACE score significantly improved ACGME procedural reporting and increased SIM utilization. Residents perceived it positively, particularly senior residents who found it beneficial and motivating. However, study limitations include its single-site design, potentially limiting generalizability. Future research should explore the broader applicability of this system in diverse residency settings. Integrating competency assessment alongside procedural tracking remains crucial for comprehensive resident evaluation and training enhancement.

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