



Received: 04-03-2026
Accepted: 14-04-2026

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Changes in Resident Coverage and its Effect on Emergency Department Metrics at a Community Hospital Emergency Department

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DOI: <https://doi.org/10.62225/2583049X.2026.6.2.6170>

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Abstract

Introduction: The training of resident physicians is vital to the future of Emergency Medicine. This study investigates whether schedule changes initiated by residents at a community Emergency Department (ED) affect ED metrics.

Methods: This study employed a retrospective cohort design. Data was collected from a community emergency department that trains emergency medicine residents. We compared the eight weeks prior to and after the changes in resident hours to determine if the emergency department's metrics were influenced. The metrics examined included daily census, left without treatment (LWOT) rate, emergency department (ED) length of stay (LOS), ED arrival to ED rooming time, and ED arrival to ED disposition time.

Results: Statistical significance was noted for improvements in both LWOT and ED LOS averages. The ED LOS average decreased from 278.5 minutes to 257 minutes. Both total ED LOS and arrival to room showed a p-value of 0.06, nearing statistical significance. The metrics that remained unchanged were the ED visit count and the time from ED arrival to disposition.

Discussion: Adjustments to resident hours improved ED LOS and (LWOT). The other metrics were not impacted.

Conclusion: This study advocates for resident-driven changes to emergency department schedules that do not negatively affect ED metrics and may even enhance them in some instances.

Keywords: Emergency Department Metrics, Resident Work Hours, Workforce Concerns, Community Hospital, Throughput

Introduction

Emergency department visits do not occur at random times; they vary based on the day and the time of arrival¹. A predictable pattern exists regarding when patients arrive at the emergency department². Given the somewhat predictable nature of patient arrivals at the emergency department, one might assume that staffing levels are reflective of these arrivals. However, this is not always true. Numerous factors influence the staffing of emergency departments with physicians. Departments have the flexibility to staff their physicians as needed.

Central to the future of Emergency Medicine is the training of upcoming Emergency Medicine physicians. Prior research has examined the effect of emergency medicine training on resident efficiency and growth, the impact of changes to resident and attending schedules on resident patient exposure, and general guidelines for resident scheduling³. Studies have also explored the influence of Emergency Medicine residents on emergency department metrics⁴. However, the effects of resident-driven schedule changes on Emergency Department metrics remain unstudied. This study aims to highlight changes in resident schedules at a community emergency department following feedback from residents.

Methods

This is a retrospective cohort study covering the eight weeks preceding and the eight weeks following the change in resident hour coverage. The resident schedule has changed from Shift A: 8:30 am - 6:30 pm and Shift B: 12:00 pm - 10:00 pm to Shift A: 9:00 am - 6:00 pm and Shift B: 2:30 pm - 10:30 pm. The relevant time frame before the intervention was from May 6, 2023, to June 30, 2023. The comparison group data spanned the eight weeks following the intervention, from July 1 to August 26, 2023. This study was IRB-exempt.

Data was uploaded from Epic via Tableau. The metrics used in this study included daily census, left without treatment (LWOT) rate, ED total daily length of stay (LOS) in minutes, ED LOS per patient, ED arrival to ED rooming time, and ED arrival to ED disposition time. Two-tailed T-tests were used to compare the data before and after the intervention. A P-value of less than 0.05 was considered statistically significant. Microsoft Excel 2020 was utilized for all statistical calculations.

Results

Results of each variable are described in Table 1. Results that were not statistically significant include: ED Visits per day (Before 131.32 visits/day v After 128 visits/day, $p = 0.154$), ED total daily LOS (Before 35399.71 minutes/day v After 32520.39 minutes/day, $p = 0.144$), ED arrival to disposition (Before 184.01 minutes/visit v 175.84 minutes/visit, $p = 0.107$), and ED arrival to room (Before 27.49 minutes/visit v After 21.71 minutes/visit, $p = 0.061$). Results found to be statistically significant included the left without treatment rate (Before: 3.5% of visits versus After: 1.6% of visits, $p < 0.001$) and the average ED LOS (Before: 278.55 minutes versus After: 257.02 minutes, $p = 0.034$).

Table 1:

ED Metric	Before ED Resident hour Change, Mean	After ED Resident Hour Change, Mean	P value
ED Visits per Day	131.32 visits/day	128.05 visits/day	0.154
Left Without Treatment rate	3.50%	1.60%	< 0.05*
ED Total Daily LOS	35399.71 minutes	32520.39 minutes	0.06
ED Arrival to Disposition	184.01 minutes	175.84 minutes	0.114
ED Arrival to Room	27.49 minutes	21.71 minutes	0.011*
ED LOS average	278.55 minutes	257.02 minutes	0.034*

Discussion

Statistical significance was achieved for improvements in both LWOT and ED LOS averages. The LWOT decreased from 3.4% to 1.6%, which is significant considering that the national average is 2% and most hospitals strive to meet this goal⁵. The ED LOS average improved from 278.5 minutes to 257 minutes. Reduced time for patients in the Emergency Department enhances throughput, improves patient satisfaction, and outcomes⁶. This highlights that resident-driven schedule changes can have a positive impact on emergency department (ED) throughput metrics.

Two metrics were close to statistical significance: ED LOS total and Arrival to room, with p-values of 0.06. Extending the study period to capture more time before and after the resident-driven schedule change may have resulted in a statistically significant outcome.

Metrics that were not affected were ED average daily visits and ED arrival to disposition. Schedule changes do not impact the ED average visit rate, as this metric is patient-dependent. To the author's knowledge, there were no external changes, such as the opening of new EDs, that could have impacted this result; therefore, the expected result was no overall change in patient visits per day. ED arrival to disposition was not affected. This was an interesting result, as the resident-driven schedule change had a positive impact on ED length of stay (LOS). There is no

obvious explanation for this result, and it is likely due to multifactorial confounders not accounted for in this study.

Overall, the ED metrics of LWOT and LOS were improved by the resident-driven schedule change. The other ED metrics improved, although the improvements were not statistically significant. Ultimately, the change benefited the residents by including them as valued members of the Emergency Department (ED) and improved ED metrics.

Limitations

The study length could have been extended to allow variable studies to reach statistical significance. This study was also conducted at a single center without 24/7 resident coverage in the ED, and therefore, its findings may not be broadly applicable. The results may also have been affected by hospital-wide changes rather than changes to the resident schedule.

Conclusion

Resident-driven schedule changes do not harm ED metrics and may improve ED metrics in Emergency Departments not fully staffed by resident physicians.

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