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Leveraging Artificial Intelligence to Adjust Staffing Levels in the Emergency Department

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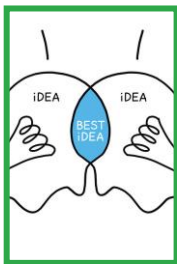
Background/Significance

- Emergency department (ED) nurse leaders often find themselves reacting to staffing challenges due to tremendous census fluctuations.
- Whether it is being understaffed due to an influx of patients or overstaffed because too many staff members are working at a time when census drops, staffing challenges result in suboptimal productivity index levels.
- By leveraging AI technology to streamline workflows and using analytics to make better staffing decisions, one ED moved from being reactive to proactive.

Methods



ED faced significant challenges with daily staffing, often misaligned with patient census, which directly impacted the productivity index level (PIL), falling below targeted levels (100%-105%).



In response, collaboration with IT department led to development and implementation of a predictive analytics AI model; implemented in January 2024.



AI model leveraged historical data to accurately forecast daily patient volumes, which enabled ED leaders to adjust staffing levels proactively, eight weeks in advance.

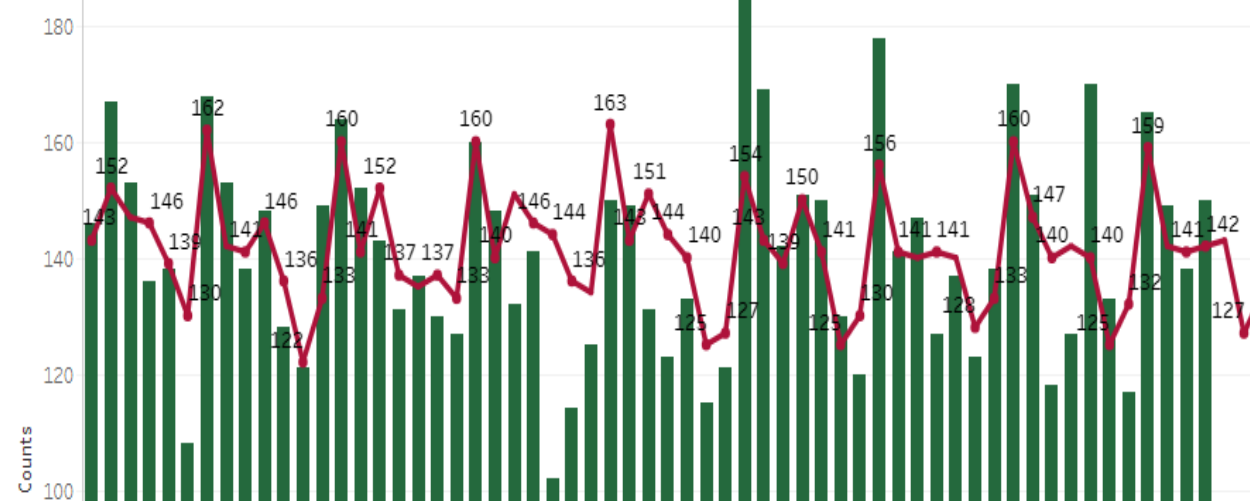
Implications/Discussion

- By utilizing AI to forecast patient volumes, the ED not only enhanced its operational efficiency but also demonstrated a remarkable improvement in meeting productivity targets.
- These outcomes illustrate the potential of data-driven decision-making processes in optimizing staff allocation, which can lead to better patient care and satisfaction.

Project Goal/Objectives

Project purpose was to improve ED productivity and efficiency by utilizing AI to predict daily patient volume and tailor staffing levels accordingly.

AI Model: Daily Volume Prediction

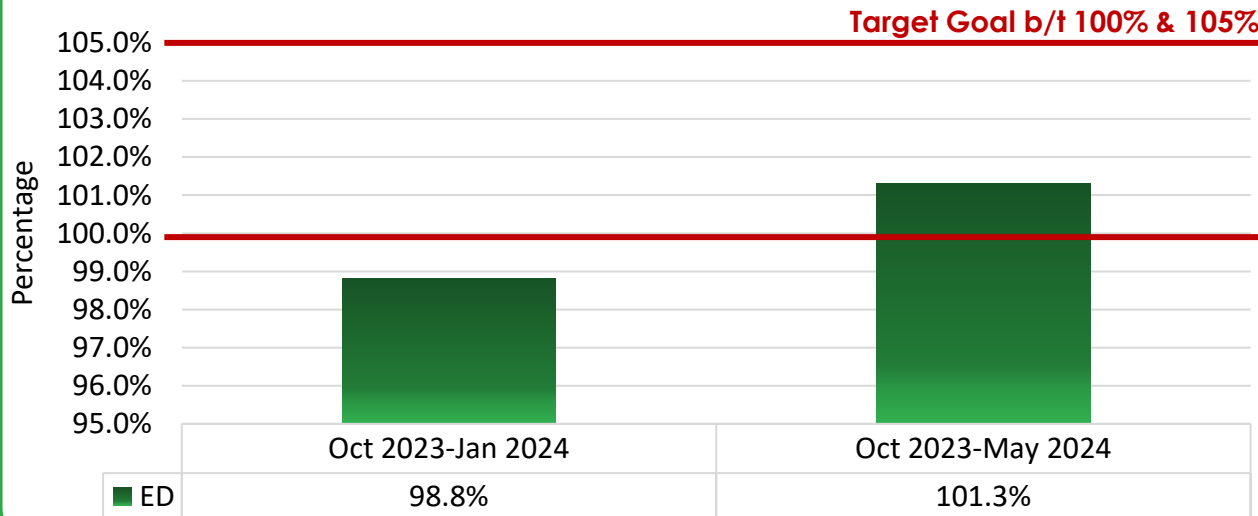


- Red line - AI-predicted daily patient census
- Green bar - actual daily census

Results/Outcomes

- Target PIL 100%-105% achieved.
- <100% = underproductive (too many staff, not enough patients)
- >105% = over-productive (too many patients, not enough staff)

Productivity Index Level
ED
FY2024 YTD



Conclusion

The success following the AI model's implementation provides a compelling case for the continued adoption and refinement of predictive technologies in healthcare settings.

References

- Nashwan, A. J., Abujaber, A. A., & AbuJaber, A. (2023). Nursing in the Artificial Intelligence (AI) Era: Optimizing Staffing for Tomorrow. Cureus, 15(10).
- Nguyen, L. A., & Park, M. (2022). Artificial Intelligence in Staffing. Vision, 09722629221096803.