

Mid-level Providers Working in a Low-acuity Area are More Productive than in a High-acuity Area

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Introduction: Mid-level providers (MLP) are extensively used in staffing emergency departments (ED). We sought to compare the productivity of MLPs staffing a low-acuity and high-acuity area of a community ED.

Methods: This is a retrospective review of MLP productivity at a single center 42,000-volume community ED from July 2009 to September 2010. MLPs staffed day shifts (8AM-6PM or 10AM-10PM) in high- and low-acuity sections of the ED. We used two-tailed T-test to compare patients/hour, relative value units (RVUs)/hour, and RVUs/patient between the 2 MLP groups.

Results: We included 49 low-acuity and 55 high-acuity shifts in this study. During the study period, MLPs staffing low-acuity shifts treated a mean of 2.7 patients/hour (confidence interval [CI] +/- 0.23), while those staffing high-acuity shifts treated a mean of 1.56 patients/hour (CI +/- 0.14, $p < 0.0001$). MLPs staffing low-acuity shifts generated a mean of 4.45 RVUs/hour (CI +/- 0.34) compared to 3.19 RVUs/hour (CI +/- 0.29) for those staffing high-acuity shifts ($p < 0.0001$). MLPs staffing low-acuity shifts generated a mean of 1.68 RVUs/patient (CI +/- 0.06) while those staffing high-acuity shifts generated a mean RVUs/patient of 2.05 (CI +/- 0.09, $p < 0.0001$).

Conclusion: MLPs staffing a low-acuity area treated more patients/hour and generated more RVUs/hour than when staffing a high-acuity area. [West J Emerg Med. 2013;14(6):598–601.]

INTRODUCTION

Background

Emergency department (ED) patient visits have risen significantly in recent years. The National Hospital Ambulatory Medical Care Survey estimates that ED visits have grown from 94.9 million in 1997 to 123.8 million in 2008.^{1,2}

Many EDs use mid-level providers (MLPs) to help augment the emergency physician workforce in the face of a rising ED census. The proportion of EDs reporting use of MLPs has increased from 28.3% in 1997 to 77.2% in 2006 and is likely even higher in academic EDs.^{3,4} The number of ED patients seen by MLPs has also increased dramatically from 5.5% in 1997 to 12.7% in 2006.³

Using MLPs has allowed EDs to better manage

increasing patient volumes and helps to offset the need for more emergency physicians.^{4,5} MLPs typically see a low-acuity case mix; however current guidelines do not address the function of the MLP in the care of high-acuity patients.⁶ As a result, MLPs may serve in a variety of roles depending on state law and hospital policy.⁴ Although MLPs are most commonly tasked with the care of patients triaged as low-acuity rather than high-acuity, there is little evidence to support this practice.

Objective

This study evaluates the productivity of MLPs when staffing low-acuity and high-acuity areas by examining patients/hour, relative value units (RVUs)/hour, and RVUs/patient.

METHODS

Study Design

This is a retrospective chart review of patients seen by MLPs staffing a low-acuity and high-acuity area of a single ED. The institutional review board reviewed this study and found it to be exempt.

Setting

This study was performed at a single center 45,000-volume community ED from July 2009 to September 2010. The ED has a low-acuity area staffed with single coverage by 9 MLPs (8 physician assistants and 1 nurse practitioner), and about 20% of the ED census is seen in this area. Additionally, the same group of MLPs works 2 high-acuity day shifts each week, on Monday and Thursday. Monday has MLP high-acuity staffing to account for the higher census that occurs on Mondays. This community ED also hosts emergency medicine (EM) residents on an irregular basis, as it is a community affiliate of a residency training program, and MLPs staff the high-acuity area on Thursdays because it is a resident conference day. Low-acuity area patients have triage Emergency Severity Index (ESI) scores of 4 and 5. Patients with ESI scores of 1, 2, and 3 are seen in the high-acuity area of the ED.

Data Collection and Processing

A single researcher trained all research associates, and data were entered into a standardized Excel spreadsheet. The research associates collected census and productivity data through query of the Verinet coding system (LightSpeed Technology Group, © 2004-2005). The Verinet system records individual provider shift data regarding the total number of patients seen, the total number of RVUs generated, and the mean RVUs generated per patient (RVU/patient). In the event of patients being signed over from shift to shift, the transfer of care to the next provider is recorded on the electronic medical record, but the system credits the original provider with care of the patient. Shift hours and location (low-acuity vs. high-acuity area) were recorded from the MLP work schedule and cross-referenced with the Verinet system on a day-by-day basis to ensure accuracy of the schedule. We calculated RVUs per hour (RVU/hour) and patients seen per hour (patients/hour) using the data from the Verinet system and the monthly schedule. We also recorded census data to ensure that there were no differences in overall daily ED census for high-acuity and low-acuity shifts used in this study. Only day shifts (8AM-6PM for high-acuity or 10AM-10PM for low-acuity) staffed by MLPs on Monday and Thursday were included. We excluded shifts worked on other days of the week or other times of day to help control for volume and resident and nursing staffing fluctuations, as residents are permitted to change their schedules liberally, and documentation delineating the specific shifts they work is sparse.

Data Analysis

A power calculation determined that a sample size of 60 (at least 30 per group) was required to determine a 25% difference in productivity between MLPs working high-acuity and low-acuity shifts with an alpha of 0.05. This calculation used prior data regarding the same MLP's productivity extrapolated from low-acuity shifts at another site.⁷ We analyzed data using the two-tailed T-test to compare patients/hour, RVUs/hour, RVUs/patient, and daily census between the 2 MLP groups. Simple linear regression was used to determine the correlation of patients/hour to RVUs/hour.

RESULTS

The mean daily census for low-acuity shifts was 129, and the mean census for high-acuity shifts was 130 ($P = \text{NS}$).

We included 49 low-acuity and 55 high-acuity shifts in this study. All low-acuity shifts were 12 hours in length (10AM-10PM) and all high-acuity shifts were 10 hours in length (8AM-6PM). During the study period, MLPs staffing low-acuity shifts treated a mean of 2.7 patients/hour (confidence interval [CI] ± 0.23) while those staffing high-acuity shifts treated a mean of 1.56 patients/hour (CI ± 0.14 , $p < 0.0001$). MLPs staffing low-acuity shifts generated a mean of 4.45 RVUs/hour (CI ± 0.34) compared to 3.19 RVUs/hour (CI ± 0.29) for those staffing high-acuity shifts ($p < 0.0001$). MLPs staffing low-acuity shifts generated a mean of 1.68 RVUs/patient (CI ± 0.06), while those staffing high-acuity shifts generated a mean of 2.05 RVUs/patient (CI ± 0.09 , $p < 0.0001$).

Linear regression for correlation between RVUs/hour and patients/hour showed an R^2 of 0.87 on low-acuity shifts. Linear regression for correlation between RVUs/hour and patients/hour showed an R^2 of 0.74 on high-acuity shifts.

During the study period, 0.16% of the total patients seen at the institution were coded out to 99281 (E/M Level 1), 0.30% were coded out to 99282 (E/M Level 2), 49.5% were coded out to 99283 (E/M Level 3), 29.9% were coded out to 99284 (E/M Level 4), 17.9% were coded out to 99285 (E/M Level 5), and 2.27% were coded out to 99291 (E/M Critical care). In terms of RVUs, this translates to 0.03% of RVUs generated from E/M Level 1 charts, 0.12% of RVUs generated from E/M Level 2 charts, 30.3% of RVUs generated from E/M Level 3 charts, 34.3% of RVUs generated from E/M Level 4 charts, 30.4% of RVUs generated from E/M Level 5 charts, and 4.90% of RVUs generated from E/M Critical Care charts. Therefore, taking all-comers (both low-acuity and high-acuity areas of the ED), the mean RVUs/patient for the study institution was 2.79 during the study period.

DISCUSSION

MLPs are rapidly being incorporated into EDs throughout the country, yet few data exist on how to best use this resource.⁵ In this study of one community ED, we demonstrated that MLPs treated significantly more patients/hour and generated more RVUs/hour when staffing low-

acuity shifts compared to high-acuity shifts. MLPs also generated higher RVUs/patient when staffing a high-acuity area, as one would expect in light of the higher levels of resource use and acuity.

There are several potential explanations for the improved productivity of MLPs in a lower acuity setting. Literature has shown that RVU generation is directly correlated to patients/hour, particularly in a low-acuity setting.⁸ Our study also supports this, with high correlation between productivity as measured by RVUs/hour and patients/hour in the low-acuity area ($R^2 = 0.87$). MLPs may be able to see more patients and maintain this linear relationship between RVUs generated and patients seen because they may be more comfortable in the management of low-acuity patients. MLPs are typically used in lower acuity settings, and their training is often targeted toward this patient population.^{9,10} Therefore, this might simply represent a training effect, where MLPs are best at performing in environments similar to the ones in which they trained. This increased comfort may translate to a more expedited ordering of tests and completion of disposition.

The correlate to this is that MLPs may be less comfortable with the management of high-acuity patients. MLPs spend fewer years in training as compared to physicians, with most providers completing a single year of classroom time and an additional year of clinical time. Although there are physician assistant fellowships in EM, these are very few, and currently the majority of MLPs in practice in EM have no specific specialty training beyond on-the-job training from their peers. Specialized ED training has been shown to be a predictor of MLP ability to render care with increased RVU generation.¹¹

This potential knowledge gap could cause delays in ordering appropriate testing or making disposition decisions. Additionally, MLPs may have a perceived or actual need for additional attending physician supervision for high-acuity patients, which may create delays related to waiting for the attending physician to become available, presenting the patient, and altering the initial treatment plan after involvement of the attending physician. There is also the potential that, even in an area of high acuity, MLPs may choose to see the lowest available acuity within that area due to level of comfort and familiarity. This may explain why, in the high-acuity area of the ED, MLPs averaged 2.05 RVUs/patient, but the department as a whole averaged 2.79 RVUs/patient.

Another theory regarding the differences in productivity is that MLPs may be deficient in their documentation. Because MLPs spend large amounts of time working in low-acuity environments, they may be habituated to documenting to a lower standard than physicians who are accustomed to a higher-acuity patient base. MLPs working in the high-acuity area only generated 2.05 RVUs/patient, which is just slightly above the RVUs generated by an E/M Level 3 visit (1.80 RVUs) and significantly lower than expected. High-acuity patients often qualify for E/M Level 4 or 5 coding, which is

highly influenced by documentation effectiveness as compared to low-acuity patients, who may only qualify for E/M Level 2 or 3 coding and require only minimal documentation.¹² Studies examining the effectiveness of documentation education at increasing RVU generation have shown positive results when applied to residents in an academic setting, and it is possible such an intervention could show similar gains with MLPs, although this has not been studied.^{8,13} Finally, in this institution, there are no productivity incentives for MLPs, and although attending physicians sign MLP charts, documentation oversight is minimal. This may limit MLP interest in improving their documentation and coding.

LIMITATIONS

Our study was performed in a single community ED. Some of the productivity differences may be inherent in the layout, setup, and staffing of the low-acuity area compared to the high-acuity area. The low-acuity area may be more conducive to seeing patients in an expedient manner, with more point-of-use equipment and supplies and shorter distances needed to travel between patients, as compared to the high-acuity area. Also, differences in nursing and ancillary staff coverage between the low- and high-acuity areas could contribute to differences in productivity. If some of the productivity differences are inherent in the layout, setup, and staffing of the low-acuity area compared to the high-acuity area, then perhaps other providers, such as attending physicians, would realize similar productivity differences.

With a limited number of MLPs ($n = 9$) evaluated, individual differences in MLP productivity may have skewed results. Although the CIs for productivity were fairly small, several MLPs regularly treated more patients and generated more RVUs than the rest of the group. It is unclear whether our 9 MLPs are representative of the national pool of MLPs working in EDs.

CONCLUSION

Understanding how to best utilize MLPs can help to optimize ED staffing. This study demonstrated improved MLP productivity in a low-acuity area compared to a high-acuity area. However, our conclusions are limited by only evaluating one ED, and noted lower-than-expected productivity in both high- and low-acuity settings. Further study is needed to further evaluate factors influencing MLP productivity in high- and low-acuity areas of the ED.

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REFERENCES

1. National Hospital Ambulatory Medical Care Survey: 2008 Emergency Department Survey Tables. Available at: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/nhamcsed2008.pdf. Accessed June 12, 2011.
2. Tang N, Stein J, Hsai RY, et al. Trends and Characteristics of US Emergency Department Visits, 1997-2007. *JAMA*. 2010;304(6):664-670.
3. Menchine MD, Wiechmann W, Rudkin S. Trends in midlevel provider utilization in emergency departments from 1997 to 2006. *Acad Emerg Med*. 2009;16(10):963-969.
4. Doan Q, Sabhaney V, Kissoon N, et al. A systematic review: The role and impact of the physician assistant in the emergency department. *Emerg Med Australas*. 2011;23(1):7-15.
5. Hooker RS, Klocko DJ, Larkin GL. Physician assistants in emergency medicine: the impact of their role. *Acad Emerg Med*. 2011;18(1):72-77.
6. Guidelines Regarding the Role of Physician Assistants and Nurse Practitioners in the Emergency Department. ACEP policy statement January 2007. Available at: <http://www.acep.org/content.aspx?id=29492>. Accessed June 12, 2011.
7. DelCollo J, Jeanmonod D, Shingles J, et al. A Comparison of Resident and Physician Assistant Productivity in an Urgent Care Environment. *Acad Emerg Med*. 17(5):s94, 2010. (abstract)
8. Pershad J, Whitley M, Herman M. Visit-level acuity and resource-based relative value unit utilization in a pediatric emergency department. *Pediatr Emerg Care*. 2006;22(6):423-425.
9. Ginde A, Espinola J, Sullivan A, et al. Use of midlevel providers in US EDs, 1993 to 2005: implications for the workforce. *Am J Emerg Med*. 2010;28(1):90-94.
10. Rodi S, Grau M, Orsini C. Evaluation of a fast track unit: alignment of resources and demand results in improved satisfaction and decreased length of stay for emergency department patients. *Qual Manag Health Care*. 2006;15(3):163-167.
11. Sturmann K, Ehrenberg K, Salzberg M. Physician assistants in emergency medicine. *Ann Emerg Med*. 1990;19(3):304-308.
12. RegulatoryUpdateFeeSchedule2011[1].pdf, accessed through www.acep.org on 6/12/11.
13. Carter K, Dawson B, Brewer K, et al. RVU ready? Preparing emergency medicine resident physicians in documentation for an incentive-based work environment. *Acad Emerg Med*. 2009;16(5):423-428.