Emergency Department Door to Discharge Times

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ABSTRACT

Introduction: Efficient emergency medical care is becoming more important with continually increasing emergency department volumes. Decreasing door to discharge (D2D) times has been shown to improve patient satisfaction and decrease wait times and health care costs. We hypothesize that standardized onboarding for new faculty physicians in microhospital emergency departments will reduce D2D times.

Methods: In this retrospective observational study, D2D times were tracked for newly hired physicians at 2 microhospital emergency departments within an academic health system during 2021-2022. Physicians hired after July 2022 received an onboarding process that emphasized reducing D2D times. D2D times for these physicians were compared with those of physicians hired earlier who did not receive any onboarding. D2D means and standard deviations (SD) of each group were compared with 2-sample *t* tests.

Results: There were 25 newly hired emergency department physicians across both study locations over 2 years; 15 received no onboarding, while 10 received onboarding. At one of the emergency departments, physicians who received onboarding had a significantly reduced mean D2D time compared with those who received no onboarding (119 minutes [SD = 29] vs 146 minutes [SD = 34], $P = 0.049$). At the other emergency department, there was no significant difference in D2D times between physicians who did or did not receive onboarding (97 minutes [SD = 35] vs 102 minutes [SD = 30], $P = 0.760$). Across both locations, physicians who received onboarding had a nonsignificant reduction in D2D times compared with those who received no onboarding (110 minutes [SD = 32] vs 126 minutes [SD = 39], $P = 0.160$).

Conclusions: After implementing an onboarding process for new physician hires, there was a statistically significant decrease in D2D times at one of the microhospital emergency departments. Thus, an onboarding process may represent a simple, cost-effective technique that emergency departments can use to reduce D2D times and prevent overcrowding. Future work may evaluate the efficacy of such processes in non-microhospital emergency department settings.

INTRODUCTION

In 2019, 1 in 5 US adults were evaluated in the emergency department (ED), a rate that has increased progressively over the past 20 years.[1] Despite increasing patient volumes, the number of available hospital-based EDs has shrunk significantly over the same period.[2] These temporal trends have heightened the importance of efficient and timely care in the ED to avoid overcrowding. In emergency medicine, excellent patient care comes first, but a close second is the efficiency in which this care is provided. Thus, quality improvement initiatives to enhance ED efficiency have become increasingly necessary.

Door-to-Discharge (D2D) times are a commonly used metric for evaluating the efficiency, speed, and preparedness of EDs and physicians. This value measures the time from patient arrival to the ED to their discharge from the ED. Studies show that ED overcrowding, prolonged ED waiting times, and longer D2Ds have been associated consistently with poorer quality of care, reduced patient satisfaction, increased costs, and higher mortality rates.[3-11] In fact, longer patient waiting times were found to be the second most cited cause of decreased patient satisfaction in the ED, behind only poor staff-patient communication.[12] Prior quality research has suggested a number of techniques to decrease D2D and waiting times, including nurse staffing adjustments, development of standard order sets, medical scribe use, and variation in patient flow models.[13-16]

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In this study, we took a novel approach to evaluate whether D2D times decreased after the implementation of a standardized onboarding process for newly hired emergency faculty physicians at 2 microhospital EDs within an academic health care system. This rigorous orientation focused primarily on increasing ED efficiency and patient throughput. Use of standardized onboarding processes in other medical domains has been shown to improve a variety of outcomes, including reducing hospital staff turnover, improving protocol adherence, and increasing staff familiarity with new demands.[17-20] To our knowledge, no prior study has evaluated the effectiveness of a standardized onboarding process for newly hired emergency physicians and, specifically, its impact on D2D times. Given the prior research described above, we hypothesized that the implementation of a standardized onboarding process would lead to decreased mean D2D times in our microhospital ED setting. This would represent a simple and cost-effective technique EDs could introduce to reduce overcrowding and costs, while also improving patient outcomes and satisfaction.

METHODS

At the start of the 2022 academic year, an onboarding process was enacted at 2 microhospital EDs within the Froedtert & Medical College of Wisconsin (MCW) academic health care system: the Froedtert Community Hospital–New Berlin ED and the Froedtert Community Hospital–Pewaukee ED. These sites were chosen because they are in a pay-per-performance agreement between the Department of Emergency Medicine and the health system. The metrics related to the pay goals are D2D times and patient satisfaction.

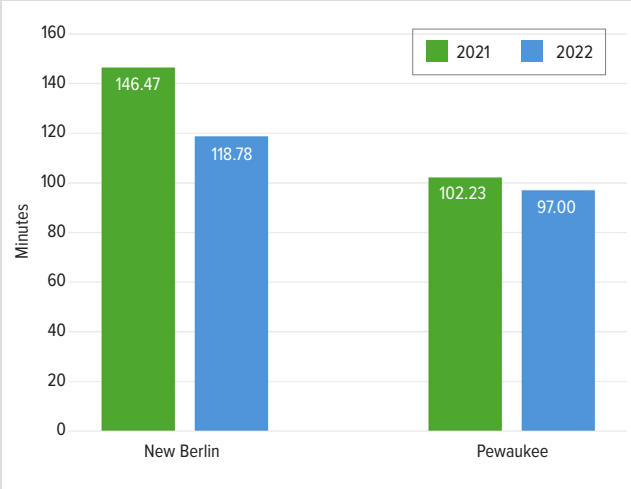
New faculty starting at these sites prior to July 2022 did not receive any onboarding related to ED metrics. Starting in July 2022, each newly hired ED physician worked their first shift at one of these sites alongside either a medical director or the vice chair of community medicine. During this shift, the newly hired physicians were given a presentation on metric strategies while providing care at these microhospital ED sites. The presentation specifically emphasized the D2D time metric, with a goal average D2D time of less than 120 minutes. These presentations discussed evidence-based practices that could be implemented to increase patient satisfaction and decrease D2D times, as well as tips from successful faculty within the department. At 3 months and 6 months after receiving their onboarding orientation, these physicians met with the medical directors to discuss their metrics–including average D2D times–and strategies to improve if needed. A retrospective observational review on D2D time metrics was then performed for newly hired physicians from July 2021 through January 2022 who did not participate in a standardized onboarding orientation shift. These data were compared to the D2D time metrics for the physicians hired in July 2022 through January 2023 who did receive the multifaceted standardized onboarding process. The department statistician performed a 2 sample *t* test to determine statistical difference between the 2 groups, calculating means, standard deviations, *t,* df, and *P* values.

Table 1. Physician Demographics

	New Hires	Males	Females	Former MCW Residents
2021				
New Berlin only	2	1	1	0
New Berlin and Pewaukee	13	9	4	3
Total hires	15	10	5	3
2022				
New Berlin only	3	2	1	0
New Berlin and Pewaukee	7	4	3	1
Total hires	10	6	4	1

Abbreviations: MCW, Medical College of Wisconsin

Figure. Mean Door to Discharge Times



RESULTS

Between July 1, 2021, and January 1, 2022, there were 15 new faculty physicians hired to work at the New Berlin and Pewaukee microhospital EDs. Between July 1, 2022, and January 1, 2023, there were 10 new faculty physicians hired to work at these microhospital EDs. Key demographics are presented in Table 1.

The D2D time decreased significantly for physicians who started at the New Berlin ED in 2022 compared to 2021 ($P = 0.049$). The implementation of an onboarding process resulted in patients being in the ED for 28 minutes less than patients were previously (Table 2). There was not a statistically significant difference in the D2D times of the physicians who started at the Pewaukee ED in 2021 versus those who started at the same ED in 2022 after implementation of the onboarding process (Table 2, Figure). This lack of significant improvement in D2D times at the Pewaukee ED may stem from the baseline differences between these 2 EDs, such as annual patient volume, average Emergency Severity Index (ESI) score, and average number of patients seen per day (Tables 3 and 4). When comparing

Table 2. Door to Discharge Statistical Analysis

	2021 Mean D2D	2022 Mean D2D	*P* value	SD	*t* value	*df*
New Berlin	146.47 min	118.78 min	0.049	34.62	2.10	19.05
Pewaukee	102.23 min	97.0 min	0.76	30.67	0.32	8.50
Both sites	125.93 min	110.07 min	0.16	37.12	1.43	33.44

Abbreviations: D2D, door to discharge; df, degrees of freedom; min, minutes.

Table 3. Site Demographics

	Volume 2021	Avg PPD 2021	Volume 2022	Avg PPD 2022	Avg ESI 2021	Avg ESI 2022	Avg ESI Overall
New Berlin	6332	34.41	6119	33.26	3.09	3.27	3.18
Pewaukee	2951	16.04	3396	18.46	3.30	3.30	3.30
P value	N/A	<0.01	N/A	<0.01	<0.01	0.05	<0.01
t value	N/A	28.98	N/A	34.52	-13.22	1.94	-11.19
df	N/A	366	N/A	366	5723.8	7085.6	12922

Abbreviations: Avg, average; PPD, patients per day; ESI, Emergency Service Index; df, degrees of freedom.

Table 4. Emergency Service Index Proportions Per Site

	New Berlin (%) 2021		Pewaukee (%) 2021
ESI 1	23 (0.36)		2 (0.07)
ESI 2	1138 (17.97)[a]		354 (12.00)
ESI 3	3501 (55.29)[a]		1420 (48.14)
ESI 4	1576 (24.89)		1106 (37.49)[a]
ESI 5	95 (1.48)		68 (2.31)[a]
Total	6332 (100)		2950 (100)
P value		*P* < 0.01	
X^2		X^2 = 188.98	
df		*df* = 4	
	New Berlin (%) 2022		**Pewaukee (%) 2022**
ESI 1	8 (0.13)		0 (0.00)
ESI 2	624 (10.20)		364 (10.72)
ESI 3	3349 (54.73)[a]		1695 (49.93)
ESI 4	1959 (32.02)		1282 (37.76)[a]
ESI 5	179 (2.93)[a]		54 (1.59)
Total	6119 (100)		3395 (100)
P value		*P* < 0.01	
X^2		X^2 = 51.57	
df		*df* = 4	
	New Berlin (%) 2021 & 2022		**Pewaukee (%) 2021 & 2022**
ESI 1	31 (0.25)[a]		2 (0.03)
ESI 2	1762 (14.15)[a]		718 (11.32)
ESI 3	6850 (55.02)[a]		3115 (49.09)
ESI 4	3535 (28.39)		2388 (37.64)[a]
ESI 5	273 (2.19)		122 (1.92)
Total	12450 (100)		6345 (100)
P value		*P* < 0.01	
X^2		X^2 = 180.98	
df		*df* = 4	

Abbbreviations: ESI, Emergency Service Index; df, degrees of freedom.
[a]Signifies a statistically significant higher proportion.

total D2D data from 2021 to 2022 across both sites, there was a nonsignificant reduction in D2D times after implementation of the onboarding process (Table 3).

DISCUSSION

In this retrospective observational study, we analyzed the impact on D2D times after initiating a formal onboarding process for new faculty physician hires at 2 separate microhospital EDs within the Froedtert & MCW academic health care system. After performing a data analysis using 2-sample *t* test, the results revealed a statistically significant improvement of D2D times from 2021 to 2022 at the New Berlin site, while the D2D times at the Pewaukee site did not show statistically significant improvement from 2021 to 2022. Since 20 out of 25 (80%) of the newly hired physicians in 2021 and 2022 worked at both EDs within their first 6 months, we also gathered data from both sites to compare the overall D2D time between 2021 and 2022. In doing so, it was evident that after implementation of a new onboarding process at both locations in 2022, there was a decrease in D2D times, but it was not a significant improvement of the D2D times when compared to 2021 data.

Interestingly, though D2D times at New Berlin improved significantly between 2021 and 2022, the D2D times at Pewaukee improved during the same period but not at a statistically significant rate. It is possible that given the small sample size of this group of physicians (n = 10), there was not enough data to reveal significance. Additionally, baseline differences between these 2 sites, such as annual patient volume, average ESI, and average patients seen per day, may have affected the D2D times for each site uniquely. For example, the New Berlin ED sees a slightly higher acuity of patients and nearly double the annual volume and average number of patients per day versus the Pewaukee ED. This is likely a reason why the average D2D times from Pewaukee are significantly less than those of New Berlin in both 2021 and 2022. Furthermore, with already low D2D times in the setting of a smaller patient volume and higher ESI, there is likely less room for statistically significant improvement—even after an intervention such as implementing an onboarding process. The lack of significant change at the Pewaukee site likely had a diluting impact on the insignificance calculated when evaluating the total data from 2021 versus 2022.

Additional variables that may have affected D2D times include specific physician factors, such as age, sex, years of experience, fellowship training, location of training, time or day of shift worked, and average shift load. For example, increased years of experience may be associated with shorter average D2D times, whereas D2D times may be slightly higher for a physician who received train-

ing outside of the Froedtert & MCW academic health system. Additionally, a comparison of the types of shifts worked by specific physicians may reveal that D2D times differ between weekends and weekdays or overnight shifts versus day shifts. Unfortunately, this type of demographic data was not obtained for this study and could not be analyzed.

There are confounding variables that may have affected these data over the 2 years studied. The age, previous Froedtert and MCW health system experience, or the number of years post-residency of the physician may have affected each individual physician's D2D times. There also could have been differences in nursing efficiency, specialty availability, transfer capabilities and speed, and overall system capacity constraints. This study also was limited due to the small sample size (2021: n = 15, 2022: n = 10) and lack of demographics obtained from these samples. Future iterations of this study would benefit from a larger sample size, which could be obtained by continuing to study new physician hires at these sites and by expanding the study to other microhospital sites within the system. Furthermore, it may be informative to gather additional demographic data about the physicians being studied to assess the impact of any confounding variables, such as age and experience.

In addition to the small sample size and lacking demographics, it is possible that the data may have been skewed by variations in ESI levels year-to-year between the 2 sites. For example, though the overall average ESI level for the New Berlin site is higher than that of the Pewaukee site, when these data were extrapolated and compared year-to-year, the New Berlin ED had a slight decrease in acuity from 2021 to 2022, whereas Pewaukee's ESI and, therefore, acuity remained consistent (Table 4). It is possible that this difference in ESI from 2021 to 2022 at New Berlin was a confounding variable affecting the statistically significant decrease in D2D time seen. Once again, obtaining data over multiple years to evaluate the fluctuations in ESI or volume between the 2 sites and the impact of these variables on ED efficiency would provide further insight into this study.

CONCLUSIONS

After the implementation of a standardized orientation and onboarding process for new emergency medicine faculty physician hires, there was a statistically significant decrease in D2D times at 1 of the 2 microhospital EDs within the academic health care system involved in this study. While other studies have shown success in implementing orientation protocols for resident and nursing roles, this is the first study of its kind to our knowledge to provide a framework for developing an onboarding process for newly hired emergency physicians. Future studies would benefit from an evaluation of the impact of an onboarding process in different ED settings, including EDs with varying volumes and acuity levels, as well as a comparison between the impact of these protocols in different types of EDs, such as academic, community, county, and veterans affairs.

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