

Brief Report

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Utilization of the Disaster Medical Assistance Team (DMAT) in an Inner-City Emergency Department During the COVID-19 Pandemic

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Abstract

Objective: To evaluate the effect of the Disaster Medical Assistance Team (DMAT) in an inner-city emergency department during the coronavirus disease (COVID-19) pandemic.

Methods: Data were abstracted from individual emergency department encounters over 6 weeks. The study compared left without being seen (LWBS) percentage, door-to-provider, and door-to-disposition times for 2 weeks before, during, and after the DMAT.

Results: The LWBS percentages for the 2 weeks before and after the DMAT were 16.2% and 11.6%, respectively. The LWBS percentage during the DMAT was 8.1%. Door-to-disposition times for the 2 weeks before and after the DMAT were 7.36 hours and 8.53 hours, respectively. The door-to-disposition during the DMAT was 7.33 hours. Door-to-disposition was statistically significant during the 2 weeks of the DMAT compared to the 2 weeks after the DMAT (7.33 vs 8.53, $P < 0.05$) but not statistically significant when compared to the period before the DMAT (7.36 vs 7.33, $P = 1.00$). Door-to-provider time was the longest during the DMAT (122.5 minutes [2.04 hours]) when compared to the time frame before the DMAT (114.54 minutes [1.91 hours]) and after the DMAT (102.84 minutes [1.71 hours]).

Conclusion: The DMAT had the most positive impact on LWBS percentages. The DMAT showed no improvement in door-to-provider times in the study and only in door-to-disposition times when comparing the time the DMAT was present to after the DMAT departed.

Hospitals across the country have experienced strain during the coronavirus disease (COVID-19) pandemic, including, but not limited to, staffing, supplies, and space issues. The Department of Health and Human Services National Disaster Medical System (NDMS) Disaster Medical Assistance Teams (DMAT) provide high-quality, rapid-response medical care when public health and medical emergencies overwhelm state, local, tribal, or territorial resources. One of several patient-care functions the DMAT performs includes hospital decompression, in which medical care is provided within an existing hospital with limited staff or is otherwise unable to provide adequate care to the number of people needing medical attention.¹ Upstate University Hospital (SUNY Upstate) in Syracuse, NY, was not immune to the nationwide shortages. When the DMAT arrived, the tertiary medical center was short over 150 nurses and had over 140-bed closures during the Omicron spike of the COVID-19 pandemic. Before the pandemic, the SUNY Upstate left without being seen (LWBS) percentage was similar to the national average. However, that number increased to over 10% and sometimes greater than 30% during the Omicron spike, while other academic hospitals saw rates of only around 3% in 2021.² It's known that the patient population that leaves the ED before evaluation is at significant risk for poor outcomes.³ Academic facilities also saw door-to-provider times of 0.45 hours and average length-of-stay times between 3 and 4 hours.² SUNY Upstate metrics were notably higher. The study aimed to determine whether the DMAT could improve these standard metrics.

Methods

Upstate University Hospital is the only Level 1 trauma center in central New York, with an adult emergency department volume of 67 000 patients annually. Participants of the study included adult patients (> 19 years old) who were either walk-in patients or emergency medical services (EMS) patients who were deemed appropriate to go directly to the waiting room upon arrival. Patients were triaged based on the Emergency Severity Index (ESI), and those designated with an ESI 3, 4, or 5 were eligible to be seen by the DMAT. The DMAT included a board-certified emergency medicine physician, an advanced practice provider, a team of nurses, pharmacists, and emergency medical technicians (basic EMT or paramedic). The study compared left without being seen (LWBS) percentage, door-to-provider, and door-to-disposition times for 2 weeks before the arrival of the DMAT (Period 1, December 20, 2021–January 3, 2022), 2 weeks while the DMAT was present (Period 2, January 4, 2022–January 17, 2022), and 2 weeks following the DMAT departure (Period 3, February 1, 2022–February 14, 2022). Door-to-provider time was

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Table 1. Comparison of the proportions of left without being seen (LWBS) for the 2-week periods before DMAT arrival (12/20/21–01/03/22), during DMAT (01/04/22–01/17/22), and after DMAT departure (02/01/22–02/14/22)

Period comparisons	Difference	95% CI	P value
Before DMAT vs during DMAT	8.1%	5.65–10.28%	$P < 0.001$
During DMAT vs after DMAT	3.5%	1.09–5.65%	$P = 0.005$
Before DMAT vs after DMAT	4.6%	2.74–6.44%	$P < 0.001$

Table 2. Door-to-disposition and door-to-provider times in hours for the 2-week periods before DMAT arrival (12/20/21–01/03/22), during DMAT (01/04/22–01/17/22), and after DMAT departure (02/01/22–02/14/22)

Period comparisons	Difference	95% CI	P value
Door-to-disposition			
Before DMAT vs during DMAT	0.29	–0.61 to 0.66	$P = 1.00$
During DMAT vs after DMAT	–1.21	–2.03 to –0.38	$P = 0.001$
Before DMAT vs after DMAT	–1.18	–1.85 to –0.50	$P < 0.001$
Door-to-provider			
Before DMAT vs during DMAT	–7.69	–30.04–14.12	$P = 0.79$
During DMAT vs after DMAT	19.76	–2.23–41.75	$P = 0.96$
Before DMAT vs after DMAT	11.80	1.14–22.45	$P = 0.23$

when the patient was registered until the team assigned its members in the electronic medical record. Door-to-disposition time was when the patient was registered until the patient had a disposition (discharge or admission) selected in the electronic medical record. Statistical analysis was conducted using IBM® SPSS® Statistics V.28.0.1.0 and MedCalc V.20.018. The proportion of patients LWBS was analyzed for statistically significant differences by chi-square analysis. Individual differences in proportions were further analyzed using the chi-square test of portions. Differences in mean door-to-disposition and door-to-provider time were analyzed ANOVA with post hoc tests corrected from multiple comparisons. A significant difference was defined as a P value < 0.05 . Data were collected through BusinessObjects. The electronic medical record software utilized was Epic Systems. No patient information was collected or reviewed and was deemed exempt from IRB review.

Results

The LWBS percentages for the 2 weeks before and after the DMAT were 16.2% and 11.6%, respectively. The LWBS percentage during the DMAT was 8.1%. There was a statistically significant difference in the proportions of patients LWBS between these periods, $\chi^2(2, N = 5923) = 43.97, P < 0.001$. Individual period comparisons are provided in Table 1. There was a statistically significant difference in the door-to-disposition between the different DMAT time periods, $F(3.9938) = 12.09, P < 0.001$. Door-to-disposition for the 2 weeks before and after the DMAT was 7.36 (95% CI: 7.09–7.63) hours and 8.53 (95% CI: 8.10–8.97) hours, respectively. The door-to-disposition during the DMAT was 7.33 (95% CI: 6.87–7.78) hours. There was statistical significance regarding door-to-disposition times when comparing Period 1 and Period 2 with

Period 3. However, there was no statistical significance in door-to-disposition times when comparing Period 1 with Period 2. Mean difference with 95% CI and P values for individual time period comparisons are provided in Table 2. There was also a statistically significant difference between DMAT time periods for door-to-provider time, $F(3.9938) = 8.24, P < 0.001$. Door-to-provider time was the longest during the DMAT (2.04 [95% CI: 1.78–2.30] hours) when compared to the time frame before the DMAT (1.91 [95% CI: 1.81–2.01] hours) and after the DMAT (1.71 [95% CI: 1.62–1.81] hours) (Figure 1).

Discussion

During the 2 weeks the DMAT was present, the team saw 20.8% of the patients who came through the emergency department. The patients that DMAT evaluated fell into ESI 3, 4, and 5. Patients with an ESI of 3 were only seen if they were considered “ambulatory”—those patients who could ambulate and sit in a chair during their care. The DMAT evaluated the patients in an ED area adjacent to triage, care started, and ultimately dispositioned from the waiting room. The DMAT team reviewed patient charts to determine whether they were appropriate to be seen by their team or whether they should wait to be evaluated in the main ED. The DMAT did not see patients who most likely warranted admission based on the triage note and instead were evaluated in the main ED. It is suspected that the additional time it took to chart a review led to a slight increase in door-to-provider times. Of the metrics studied, there was a dramatic decrease in left without-being-seen (LWBS) percentages while the DMAT team was present. During the second half of 2021, SUNY Upstate LWBS average was 21.9%. According to the AAAEM benchmark survey in 2022, the average LWBS percentage in 2021 was 3.01%. The LWBS percentage did decrease to 8.1% during Period 2, which is still above the average; however, it improved from the SUNY Upstate baseline. The perception that patients were being seen faster when the DMAT was present may have led to decreased LWBS. Patients in the waiting room watched others be seen, and the workup started. It’s hard to determine why the door-to-disposition had no statistical significance from Period 1 to Period 2 but was significant when comparing those to Period 3. Further analysis of the throughput metrics in other periods and evaluating the overall status of the ED (volume, boarding, diversion) would be beneficial. Door-to-provider and door-to-disposition remained well above the national average even with DMAT assistance, showing that additional dedicated personnel did not improve overall throughput. The hope of bringing in a DMAT to improve important metrics resulted in LWBS percentages being cut by more than half. The benefit of this improvement is that more patients were evaluated rather than left without evaluation, hopefully preventing poor outcomes.

Limitations

Inconsistencies in the timing that providers assigned themselves to patients and ordered laboratory tests excluded those patients from our data. For instance, if a provider ordered laboratory tests or selected a disposition before assigning themselves in the medical record, the entirety of that patient’s data was not considered. The time between Period 2 (DMAT [January 4–17, 2022]) and Period 3 (after DMAT [February 1–14, 2022]) had a 2-week separation as another DMAT team was assisting from January 18–31, 2022. However, this team only consisted of ancillary and nursing

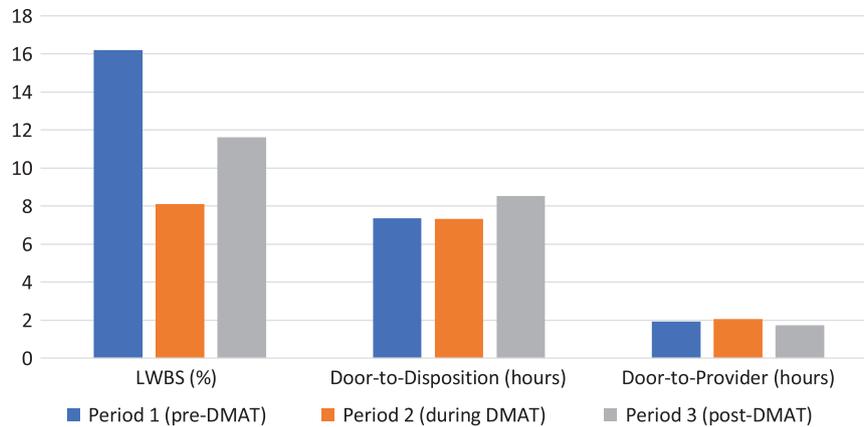


Figure 1. Comparison of LWBS, door-to-disposition, and door-to-provider metrics across time.

assistance, not a dedicated provider. Therefore, this period and its data were excluded.

Conclusion

The DMAT had the most positive impact on LWBS percentages. The DMAT helped bring LWBS closer to national averages. The DMAT showed no improvement in door-to-provider times and only in door-to-disposition times when comparing the time the DMAT was present to after the DMAT departed. There was no improvement in door-to-disposition times before the DMAT and during the DMAT.

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