are automatically flagged for review by the ED information management system. The primary outcome measure is AEEs as adjudicated by the whole QA committee for those cases that screened positive by individual reviews. Adverse events are defined as events or circumstances that caused patient harm. Errors were defined as patient care that violated the standard of care as determined by the QA committee. The variable of primary interest is EM PGY level. The expected number of AEEs per EM class was calculated by taking the total number of AEEs and dividing by 3. Chi squared test was performed to test the null hypothesis that there is no difference between EM PGY level and AEEs.

Results: A total of 1769 cases were screened as floor to ICU transfers within 24 hours of the ED. Of these 29 were attributed to be an AEE due to EM residents by the QA committee. This represents an AEE rate of 1.6%. Eight were by PGY1, 19 were by PGY2 and 2 were by PGY3. Chi squared test yielded a $p < 0.001$, rejecting the null hypothesis.

Conclusions: There is an association between PGY level and AEEs of floor to ICU transfers. This is likely due to the increased acuity and complexity of patients seen by the PGY 2 resident. However it may be due to decreased supervision of PGY2 residents and may present an opportunity for improvement.

23 Door to Balloon in Patients with ST Elevation Myocardial Infarction: Minding the Gap

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Background: Delayed diagnosis in patients with ST elevation myocardial infarction (STEMI) still represent a blind spot in the assessment of quality healthcare indicators.

Objective: We aimed to evaluate a "fast-track" intervention intended to shorten door-to-balloon waiting times in patients presenting to emergency department (ED) triage with STEMI.

Design & Method: In 2016, a "fast-track" intervention program for patients with chest pain was implemented in the ED at Rambam Health Care Campus. We determined a set of clinical guidelines for patients' assessment as follows: 15 minutes to triage, 10 minutes to electrocardiogram (ECG), 40 minutes for physician assessment, 60-minute waiting time for decision and 90 minutes to catheterization lab (door-to-balloon time). The program was comprised of four steps:

1. Laying the patient immediately. Or: Laying the patient down immediately
2. Marking the chart with a dedicated sticker (Figure 1).
3. Assessing time lags according to defined clinical guidelines.
4. Signing of the ECG and the dedicated sticker by a physician (Figure 2).

We conducted a retrospective-archive study between January 2015 and December 2016 to evaluate the intervention program achievements. We compared the adherence to clinical guidelines between all STEMI patients (n=140) who presented to the ED before (i.e., in 2015, n=60) and after (i.e., in 2016, n=80) implementing the intervention. We used a lift chart and receiver operating characteristic (ROC) curve to determine the optimal time lags in the ED for achieving the objective of 60 minutes for evaluating the patients in the ED.

Results: Table 1 presents the adherence to time lags pre- and post-intervention. After implementing the intervention more patients reached ECG evaluation within 10 minutes (57.5%) compared to pre-intervention (40%) ($p=0.04$); and more patients remained in the ED less than 60 minutes (87.5% and 63.3%, respectively, $p=0.01$).

Table 2 describes the time lags in relation to clinical guidelines before and after intervention. It clearly appears that when comparing post- to pre-intervention, the time lags (in minutes) were of shorter duration after the clinical guidelines were put in place.

Figure 3 shows that patients who were treated in the ED according to the three clinical guidelines (15 minutes for the nurse, 10 minutes for ECG and 40 minutes for the physician), had the largest probability to uphold the 60-minute waiting time in the ED (AUC=0.975).

Conclusion: Implementation of "fast-track" management for patients with chest pain to provide early diagnosis of STEMI shortened the waiting time for catheterization. The findings call for implementing programs that identify patients at risk for STEMI in ED triage and begin interventions as quickly as possible to reduce time lags for reperfusion for these patients.

Figure 1.

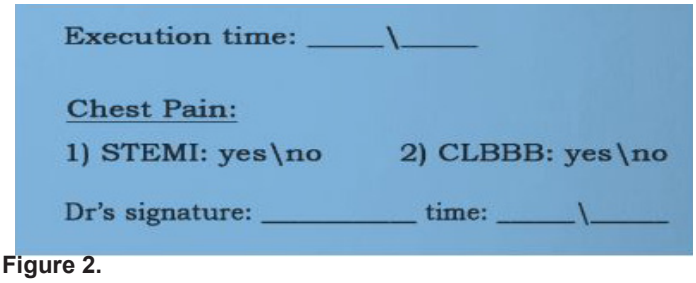

Figure 2.

Table 1. Adherence to clinical guidelines in patients with STEMI (n=140) before and after the intervention program.

Clinical guidelines	Adherence to time lags (n=140)		Improvement difference	P value
	Pre intervention n=60	Post Intervention n=80		
Triage within 15'	43 (71.7)	64 (80.6)	8.9	0.23
ECG within 10'	24 (40)	46 (57.5)	17.5	0.04
Physician assessment within 40'	44 (73.3)	66 (82.6)	9.3	190.
Total waiting time in ED of 60'	38 (63.3)	70 (87.5)	24.2	0.01
Door to balloon time within 90'	37 (61.7)	56 (70)	8.3	0.30

Table 2. Time lags in relation to clinical guidelines before and after intervention.

Clinical guidelines	Adherence to time lags (in minutes)		P value
	Pre intervention	Post intervention	
Triage			
≤15'	7.65±3.84	7.06±4.69	0.50
>15'	27.35±14.34	22.81±5.6	0.20
ECG			
≤10'	6.95±2.74	5.69±2.83	0.10
>10'	24.55±14.21	20.26±7.29	0.12
Physician assessment			
≤40'	20.48±10.37	18.83±10.28	0.41
>40'	70.25±30.24	52.86±13.51	0.05
Total waiting time in ED			
≤60'	37.93±11.54	32.91±14.8	0.10
>60'	126.18±59.63	72±9.67	<0.001
Door to balloon			
≤90'	66.88±17.2	60.57±19.63	0.12
>90'	164.61±53.89	125±32.25	0.01

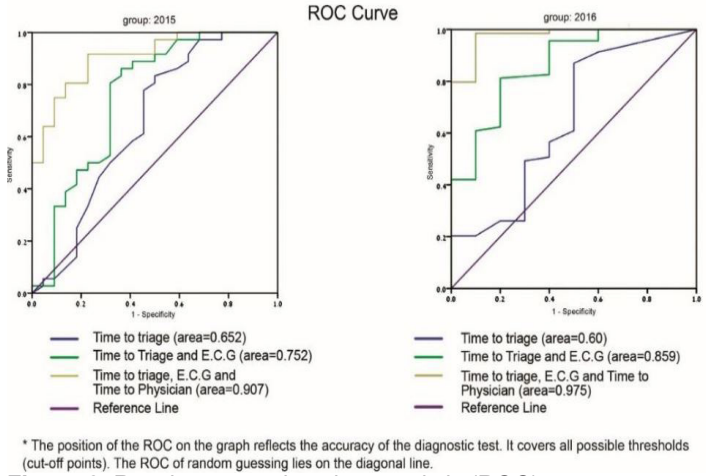

Figure 3. Receiver operating characteristic (ROC) curve

24 Analysis of Patient Dispositions by Hour of Shift for Emergency Physicians

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Objective: Emergency departments (ED) across the country continue to see increasing volumes with higher acuity, which can have consequences on ED throughput. One major metric of throughput is the time to decision or disposition time. Once a patient is seen, evaluated, and with a completed work-up, a decision to find the appropriate disposition becomes necessary to generate throughput and open up the bed for the next patient. We performed this study to analyze how decision times are distributed throughout the length of an ED shift.

Design and Method: We conducted the study at an academic hospital with an emergency medicine residency where resident shifts are matched with attending shifts. Shift lengths are eight or nine hours. We performed a retrospective analysis from 07/01/2015 to 06/30/2016 for a total of 2,190 shifts. The number of patient dispositions (PDs) by hour elapsed since shift started was recorded. Dispositions included were discharge, against medical advice, inpatient, or observation bed requested. Eloped patients and left without being seen were excluded. We calculated the expected number of PDs by shift hour by taking the median time to disposition (stratified by ESI) and adding it to the time when the patient was seen by the attending. A chi-squared test was performed on the data.

Results: The first two hours had a similar number of observed PDs (0.3 and 0.8) when compared to expected (0.3 and 0.5). The third through seventh hour had a smaller number of observed PDs (1.4, 1.8, 2.1, 2.4 and 2.8, respectively) compared to expected (3.7, 3.2, 3.0, 2.9 and 3.0, respectively). From the eighth hour onward, there was a larger number of observed PDs (3.1, 2.9, 1.8, 1.2, 0.8 and 0.6, respectively) compared to expected (2.8, 2.4, 1.3, 0.2 and 0.0, respectively). The p-value of the chi-squared test was <0.001, representing a statistically significant difference.

Conclusion: The observed number of PDs by hour of shift differs significantly from the expected number. Whereas the observed data showed PDs toward the later part of the shift, the expected data anticipated more PDs toward the early and middle portions of the shifts. Many factors could contribute to this difference, including the desire to have dispositioned patients prior to sign-out to decrease the burden for the oncoming physician. Other factors might include a non-linear degradation in provider efficiency as the number of hours elapsed during a shift, as well as the number of tasks that had to be performed.