



# Improving Hospital Flow

## "ENSIAB Project"

### Background:

Emergency Department (ED) boarding is an indicator of less efficient hospital flow and is associated with longer inpatient length of stay, higher readmission rates, and increased risk of mortality and medical errors. In addition to the association with poor patient and staff satisfaction.

### Problem:

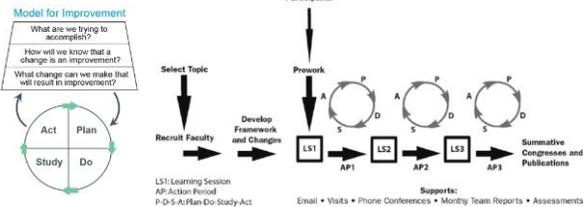
The project describes the efforts of six tertiary care governmental hospitals in the kingdom of Saudi Arabia that have enrolled in a collaborative improvement project to reduce ED boarding time with a cumulative bed capacity of 3736 beds across six cities. The pooled ED boarding time for the six hospitals was 16.6 hours at baseline.

### Design:

The hospitals implemented a multifaceted system interventions that included forming multidisciplinary flow improvement teams, implementing the NHS SAFER patient flow bundle, visual management system, and multidisciplinary ED bed huddles.

### Strategy:

Each hospital established improvement teams and executive leadership were engaged. Improvement teams used the IHI's Model for improvement as a tool for testing and implementing changes. Collaboration and learning between different hospitals were facilitated by conducting collaborative learning sessions using the IHI's Collaborative Model for Achieving Breakthrough Improvement. The improvement teams underwent four learning sessions and an additional four action periods. Each hospital implemented and presented at least three improvement cycles.



Details of enrolled hospitals

HOSPITAL	CITY	LOCATION	OWNERSHIP	NUMBER OF BEDS
A	Riyadh	Urban	Governmental	1341
B	Jeddah	Urban	Governmental	472
C	Khamis Mushait	Urban	Governmental	481
D	Taif	Suburban	Governmental	536
E	Dhahran	Suburban	Governmental	334
F	Tabuk	Urban	Governmental	572

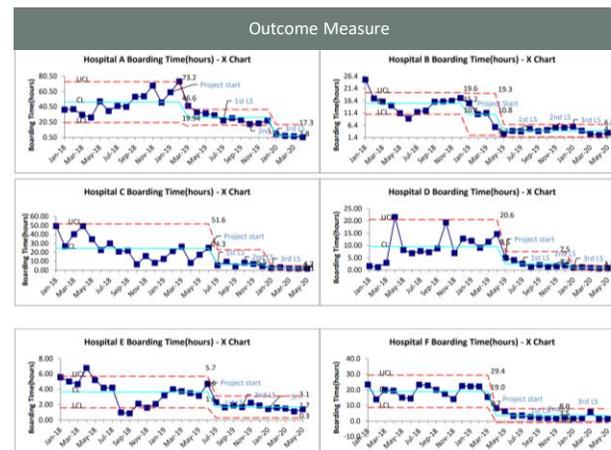
Project interventions

Intervention	Description
SAFER Patient flow Bundle	Multifaceted interventions based on best practices include daily senior review, documentation of clinical discharge criteria, documentation of the expected date of discharge, early admissions and discharges, and multidisciplinary team review of patients with extended lengths of stay.
Bed utilization visual management and tracking system	A visual management system to that is based on the NHS RED and GREEN bed days. RED and GREEN is a visual management system to assist in the identification of wasted time in a patient's journey and used during the board round.
Emergency admission bed huddle	A multidisciplinary team meets daily to discuss and act upon admissions to the hospital from the Emergency Department and manage fluctuations in patient presentations by promptly allocating boarded patients to inpatient beds and authorizing out of specialty admission.
Hospital flow teams	A specialized team that is led by a hospital executive and includes physicians, nurses, and bed managers. The team meets on a weekly basis and is responsible for to maintain patient flow and bed placement across hospital units, by monitoring hospital flow measures, elevating bottlenecks and supporting flow improvement activities.

### Results:

By the end of the project, All hospitals significantly reduced ED boarding time with a pooled mean difference of - 7.1 hours (16.6 before, 9 hours after. p-value <.001), reaching a pooled average of 2 hours in March 2020.

Furthermore, enrolled hospitals also experienced an improvement in hospital flow process measures without any increase in 30-day readmission rates or bed occupancy rates



Measure (Pooled data of 6 hospitals)	Before Intervention Mean ± SD	After Intervention Mean ± SD	Mean difference (95% CI)	P-value
MDT review for 7-day outliers	29% ± 30%	85% ± 14%	51% (25, 89)	0.002
7 days outliers	16.3% ± 7.1%	17.2% ± 7.5%	0.9% (-1.9, 3.7)	0.531
30 days outliers	18.8% ± 9.9%	15.9% ± 10.3%	-2.9% (-6.8, 1.0)	0.149
Bed Turn Over (patient/month)	3.9 ± 1	4.3 ± 1.6	0.3 (-0.1, 0.7)	0.125
Average Length of Stay	6.5 ± 2	6.8 ± 2	0.3 (-0.3, 1)	0.325
Number of Admission (per month)	1699 ± 584	1977 ± 567	277 (92, 462)	0.004
Number of Discharge (per month)	1767 ± 478	2111 ± 444	343 (196, 491)	<0.001
Number of ED visits (per month)	10589 ± 4870	12100 ± 3396	1511 (222, 2800)	0.022
Mortality of Boarded patients (per month)	140 ± 6	100 ± 3	-40	0.003

### Conclusion:

Our project demonstrates that implementing multifaceted system-wide intervention improves hospital flow and Emergency Department ED boarding time. Additionally, our project demonstrates a significant correlation between improvements in ED boarding time, daily consultant-led rounds, and early discharge from inpatient units.



### Project Impact:

- 484 lives saved/year
- 4116 More Admission / Year
- 605 more beds due to increased efficiency
- 950million SAR/year operational efficiency

\*Based on estimated reduction in ED boarding associated mortality  
†Based on increased bed turnover rate



Download the full project @ BMJ open Quality