

**ED PHYSICIAN ADMISSION HOLDING ORDERS  
MAINE MEDICAL CENTER**

**Publication Year: 2013**

**Summary:**

ED Holding Order Set Intervention that consists of five discrete phases to help facilitate and expedite the admission process.

**Hospital:** Maine Medical Center

**Location:** Portland, ME

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**Category:**

- B: Bed Placement
- C: Clinician Initial Evaluation & Throughput
- D: Disposition
- E: Exit from the ED

**Key Words:**

- ED Boarding
- ED Length of Stay
- ED Output

**Hospital Metrics:**

- Annual ED Volume: 66,000
- Hospital Beds: 637
- Ownership: Public, Non-profit
- Trauma Level: 1
- Teaching Status: Yes

**Tools Provided:**

- Results Charts

**Clinical Areas Affected:**

- Ancillary Departments
- Emergency Department

**Staff Involved:**

- Administrators
- Case Management
- Clerks
- Consult Services
- ED Staff
- IT Staff
- Nurses
- Physicians
- Registration Staff
- Social Workers
- Technicians

## Innovation

With growing emphasis on the need for system wide approaches to the healthcare crisis, emergency department crowding has taken center stage. As evidenced by the Joint Commission's National Hospital Inpatient Quality Measures, institutions are now being held accountable for ED based performance metrics. Of particular focus are metrics ED1a and ED2a, which call for the reporting of median ED length of stay and ED boarding times, respectively. ED crowding and subsequent increases in ED LOS directly challenge patient satisfaction and have been shown to be associated with suboptimal patient outcomes, increases in medical errors and to delays in the delivery of essential interventions. Although it is common to focus on throughput inefficiencies innate to many emergency departments in an attempt to address ED crowding, many of the operational inefficiencies common to the emergency departments are tied to system-wide hospital processes downstream of the ED. The impact of improvement strategies focusing on the mechanics of ED throughput are often dwarfed by the effect of system wide changes that address bottlenecks associated with the flow of patients out of the emergency department. The intervention described here is just one of many attempts to address ED boarding and extended length of stay in our institution. Examples include the development of a hospital surge protocol, use of hospitalist in the ED to assist with and expedite admissions, use of electronic messaging to encourage early discharges of admitting patients and surgical schedule smoothing, to name a few. We have both an active Hospital Flow Team and an ED Output Team dedicated to addressing these issues on a continuous basis. The intervention presented here was initiated by the ED Output Team.

Our analysis identified the time elapsed from completion of emergency physician evaluation to the time admitted patients left the department as a significant contributor to emergency department length of stay and boarding. Specifically, we found that it took greater than 90 minutes for bed orders to be placed after emergency physicians had made contact with admitting inpatient providers. Prior to our intervention, the median time from the ED decision to admit a patient to the time the patient left the ED was approximately 180 minutes, the same amount of time it took our emergency physicians to completely evaluate and decide to admit a typical patient.

Using clinical microsystems methodology (Nelson et al. 2002), an Emergency Department-based clinical microsystems team initiated a structured, stepwise process to identify and measure key factors adversely affecting Emergency Department (ED) flow, with a primary focus on ED output. The team was a multi-disciplinary group of frontline providers, including attending physicians, registered nurses, resident physicians, registration personnel and medical technologists. There was balanced representation from both from the emergency department and inpatient units for each type of provider. The team met at regular intervals (2-4x/month) to employ analytic tools to our data, including fish bone diagrams, brain-storming, and process-flow mapping. This analysis identified the time elapsed from completion of emergency physician evaluation to the time patients left the department as a significant contributor to ED length of stay (LOS) and boarding. Once identified, frontline providers developed, implemented and closely monitored a test-of-change involving the use of holding orders placed by emergency physicians. The intervention led to a reduction in ED LOS of approximately 60 minutes when it was utilized. Implementation was completed in multiple phases and included the development of a novel performance based compensation metric for emergency physicians. Ultimately the team's intervention led to a hospital-wide shift in the admission process, significantly reducing median ED LOS for all admitted patients. Although a small group of frontline providers were responsible developing the initial test-of-change (TOC), the personnel from across the entire institution were critical in the successful implementation of the TOC hospital-wide.

The ED Holding Order Set Intervention consisted of five discrete phases. Front-line providers developed, implemented and closely monitored a test-of-change (TOC) involving the use of holding orders placed by emergency physicians to help facilitate and expedite the admission process. The Holding Order Set Intervention is as follows: After presenting patients to the appropriate admitting service, ED physicians discussed the placement of ED holding orders (also termed admission transition orders or transition orders), including a bed request, patient class determination, code status, diet orders, activity level, primary inpatient team contacts, pain management, and other pertinent medication and lab orders. Transition orders were limited, set automatically expire after 4 hours had elapsed. Due to observed statistically significant reductions in ED length of stay (EDLOS) and Doctor Done to Bed Order (DDBO) times during the initial TOC, the intervention was extended. Despite initially promising results the many barriers associated with making changes in

clinical practice prevented optimal utilization of the ED holding orders. To address this, and promote their use a performance-based compensation incentive was subsequently tied to the utilization of the ED holding order set protocol. In addition, an enhanced mechanism of individualized physician audit and feedback was also employed to improve compliance.

## Results

During the 19-month study period, 7,317 adult admitted patients were eligible for emergency physician-initiated holding orders, 955 prior to and 6362 following implementation of the initial test-of-change. Overall, the ED-based holding orders were initially used in only 42/955 (4.4%) cases in the pre-implementation phase (Phase 0) and in 1549/6362 (24.3%) cases during the post-implementation period,  $\chi^2=194.216$ ,  $df = 1$ ,  $p < 0.001$ . The median time from completion of the emergency physician evaluation to placement of an admitting bed order (DDBO) was 42 minutes (IQR 20, 88) for those patients receiving ED-based holding orders and 102 minutes (IQR 62, 160) for those without holding orders,  $p < 0.001$ . In addition, the median ED LOS for holding orders patients (411 minutes; IQR 331, 527) was significantly shorter than the median LOS for patients without holding orders (475 minutes; IQR 375, 593),  $p < 0.001$ . Further analysis of the different stages of the intervention indicate stepwise improvements in order set usage with 4.4% (42/955) utilization in Phase 0, 13.4% (331/2471) utilization during Phase I of the intervention, 15.1% (246/1743) utilization after the announcement of the intervention as a compensation metric (Phase II), 32.3% (255/789) utilization with the addition of unblinded feedback on personal performance (Phase III), and 51.2% (700/1366) utilization in Phase IV, following the initiation of the hospital-wide patient cohorting policy. Analysis of the percent utilization across the various phases of transition, indicate statistical significance across all transitions except from Phase I to Phase II. Statistically significant reductions in median DDBO times were noted in the transition of all phases excepting from Phase 0 to I, Phase I to II and Phase III-IV. The median DDBO times for each phase are as follows: Phase 0 (99 minutes; IQR 59, 164.5), Phase I (96 minutes; IQR 53, 156), Phase II (93 minutes; IQR 52, 151), Phase III (77 minutes; IQR 37.5, 131), and IV (73 minutes; IQR 32, 137). Statistically significant reductions in LOS were also noted in all phase transitions, aside for Phase I to III and Phase II to III. The median LOS times for each phase are as follows: Phase 0 (497 minutes; IQR 385.5, 629.5), Phase I (471 minutes; IQR 369, 590), Phase II (458 minutes; IQR 362, 570), Phase III (464 minutes; IQR 367, 583) and Phase IV (421 minutes; IQR 339, 537). Ultimately, the results from the initial TOC and subsequent increased utilization of the admission pathway led to a shift in the admission practice across the institution. As a result, we now admit 100% of patients admitted through the ED using this process. Our latest data suggest success across the spectrum of our ED performance metrics. As of June 1, 2013, our EDLOS for admitted patients continues to fall and is currently 283 min, an approximate 43% reduction when compared to Phase 0 of our trial. Similarly, vast reductions in DDBO have also resulted. The new admission process has essentially brought the DDBO time to 0 minutes, the closest remaining metric is Doc Done to Bed Assigned (DDBA), currently at 20 minutes, but is notably further along the admission process than the former DDBO metric.

## Timeline

The intervention described here took over 12 months of dedicated planning before the initial test of change was implemented. A planning group of frontline providers (our ED Output Team) initially met on a weekly basis following microsystem methodology to walk through the admission process. During this process metrics were established and refined over approximately 3 months. An initial test of change involving a hospitalist stationed in the ED was a potential solution proposed by the ED Output Team, this took considerable time to vet with the associated providers and was up and running for a 4 month period before it was terminated and replaced the presented innovation, an overall investment of 8 months. The final specifics of the innovation described here took considerable effort to establish buy-in, but such efforts were able to capitalize on the prior test of change; obtaining substantial buy-in took approximately 2 months. Phase 0 began Jan 1st 2011 and Phase I (The intervention's initial test of change) started 2½ months later on March 15, 2011. During this period, overall usage of order set and its effects were reported. Phase II began October 1, 2011 and lasted 4½ months; during this time providers were notified that the intervention was chosen as performance-based compensation metric for ED physicians. Phase III began on Feb 15, 2012 and lasted 2 months; during this phase faculty were reminded of the performance based metric and were given unblinded personal usage information. Phase IV began on April 15, 2012, when the new admission cohorting process was launched. On Jan 15, 2013, the hospital

accepted this admission mechanism as the standard for all admissions that enter through the ED; this process is continuing to be used at the time of this writing.

### **Innovation Implementation**

The ED Holding Order Set Intervention consisted of five discrete phases, described below ([also see attached graphs](#)). The intervention was as follows: After presenting patients to the appropriate admitting service, ED physicians the placement of ED holding orders, including a bed request, patient class determination, code status, diet orders, activity level, the primary inpatient team contacts, pain management, and other pertinent medication and lab orders. Holding orders were limited, set automatically expire after 4 hours had elapsed. During each of the five phases below, provider performance and ED throughput metrics were closely monitored. Phase 0 refers to the pre-implementation period. During this phase, baseline performance data were obtained and were used to drive the performance improvement initiative forward. This period served as baseline reference, allowing us to evaluate the success of the intervention. Phase I refers to the start of the initial test-of-change. During phase I, provider adherence to the intervention was encouraged through frequent electronic communications and departmental discussions with the provision of feedback regarding the physician group's overall utilization of the ED holding order set. Phase II of the intervention began with the announcement of the intervention as a performance-based compensation metric. During phase III, providers were given individual data regarding their personal utilization of the order set and were reminded of the metric's impact on provider compensation. Phase IV followed an institution-wide change in the admission process designed to streamline admission through an inpatient cohorting policy. This policy provided an innate mechanism to facilitate utilization of the ED holding order set, where admissions were accepted by a single inpatient provider and then distributed to inpatient care teams covering specific units based on the patient's admitting diagnosis and available resources. The following outcome measures were monitored closely at each of the five phases: ED length of stay (EDLOS), door to physician time (DTP), door to completion of emergency physician evaluation time (DTDD), completion of emergency physician evaluation to the time the patient leaves the department (DDTPG), completion of emergency physician evaluation to inpatient bed order time (DDBO), time from bed order to the time the inpatient bed is ready (BOBR), and the time from the inpatient bed being ready to the time the patient leaves the emergency department (BRPG).

### **Cost/Benefit Analysis**

Minimal costs were associated with the development and implementation phases of this intervention. Although there was considerable time commitments from various providers across the institution, such efforts were part of a pre-established institutional performance improvement strategy. The implementation of this intervention has not resulted in any direct cost. The resulting savings are considerable. Although it is difficult to estimate the financial savings associated with reduced ED LOS for the approximately 50 patients admitted to the institution on a daily basis (approximate 22% admission rate for a volume of 65,000), we anticipate that the nearly 50% reduction in ED LOS will have a significant impact not only on the patient experience but also on patient outcomes. In addition, Care Management has become a significant component of the new admission process. Now that 100% of patients admitted through the ED receive their class determination and admission orders from the ED physicians, we have centralized Care Management to the ED. Prior to this change, the institution was experiencing significant financial shortfalls resulting from the frequent miscoding of patient class upon admission. As part of the new admission process, all ED admits are reviewed with Care Management and the appropriate class determination is made at that time. The resulting cost savings is estimated to be over 2 million dollars per fiscal year. The full time employees associated with the Care Managers now stationed in the ED were repurposed from their prior workflows and are not considered to be a significant cost related to this intervention. More importantly, there work flows have been optimized and have led to significant improvements in the admission process.

### **Advice and Lessons Learned**

In this population, adherence to an emergency department-based quality improvement intervention was more effective following the implementation of individualized performance-based compensation metrics that included the provision of adequate audit and feedback. This ED-based process improvement initiative highlights one of the potential implications that performance-based compensation may have on system-wide mechanisms of change. Here, the addition of

performance-based compensation metrics to a departmental quality initiative led to hospital-wide changes that ultimately facilitated the use of the ED holding order set and allowed for subsequent reductions in LOS. A closer look at the evolution of this intervention clearly highlights a few very important aspects that have contributed to its success. First, the role of frontline providers cannot be underestimated. The personal knowledge gained and transferred to peers from the in-depth analysis of the barriers associated with ED boarding, led to real-time improvement strategies designed by the providers actually participating patient care. As a result, buy-in across the spectrum of our interdisciplinary providers was a natural process all its own. Second, although one would expect physician compensation to play a pivotal role in performance improvement, our data suggest that this alone is an inefficient mechanism to facilitate change, while audits of physician performance and subsequent feedback were much more effective drivers of change. It is likely that the combination of physician compensation with appropriate audit and feedback have a synergistic role in performance improvement. Finally, true change occurs through system-wide modifications that are tailored to address identified barriers of success. Here we were able to demonstrate the effect of modifying the institution's admission practices (through a patient cohorting policy) to help facilitate the use of an expedited admission process (the use ED holding orders), that has ultimately reduced both ED LOS and ED boarding.

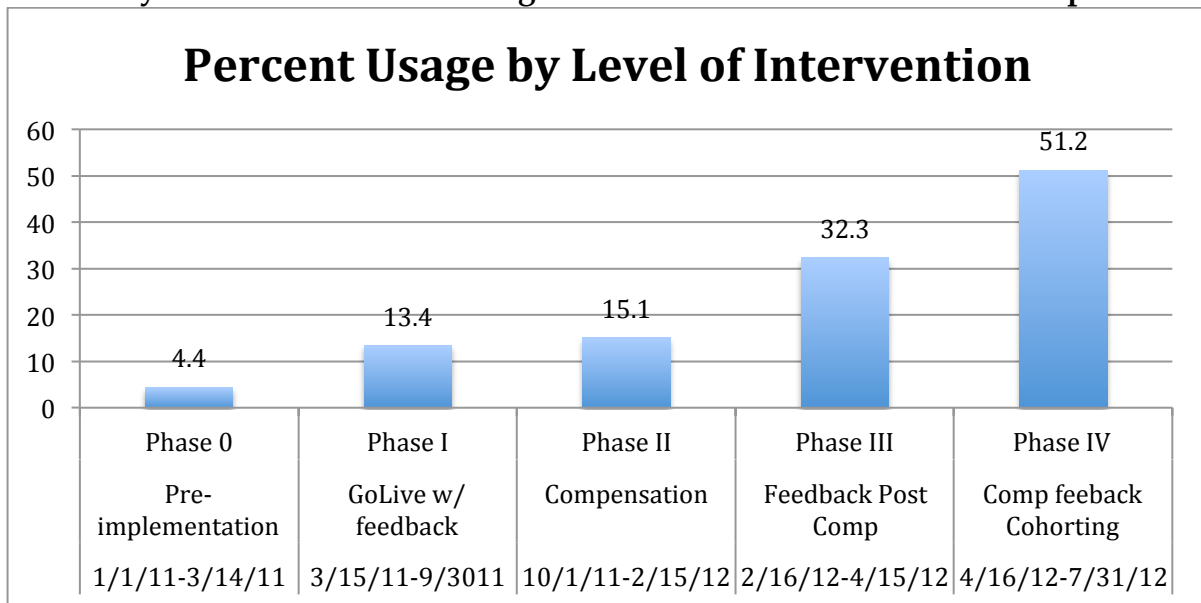
### **Sustainability**

As noted in the description of the intervention, considerable time and dedication from both frontline providers and administrative leaders was required to establish buy-in and refine the new admission process. These efforts led to a system-wide shift in the admission process that is far improved over the prior model used and, for all intents and purposes, appears to be self-sustaining. The resulting reductions in ED LOS and improvements to the patient experience together with the expected improvements in patient outcomes, will lend themselves to the sustainability of this intervention.

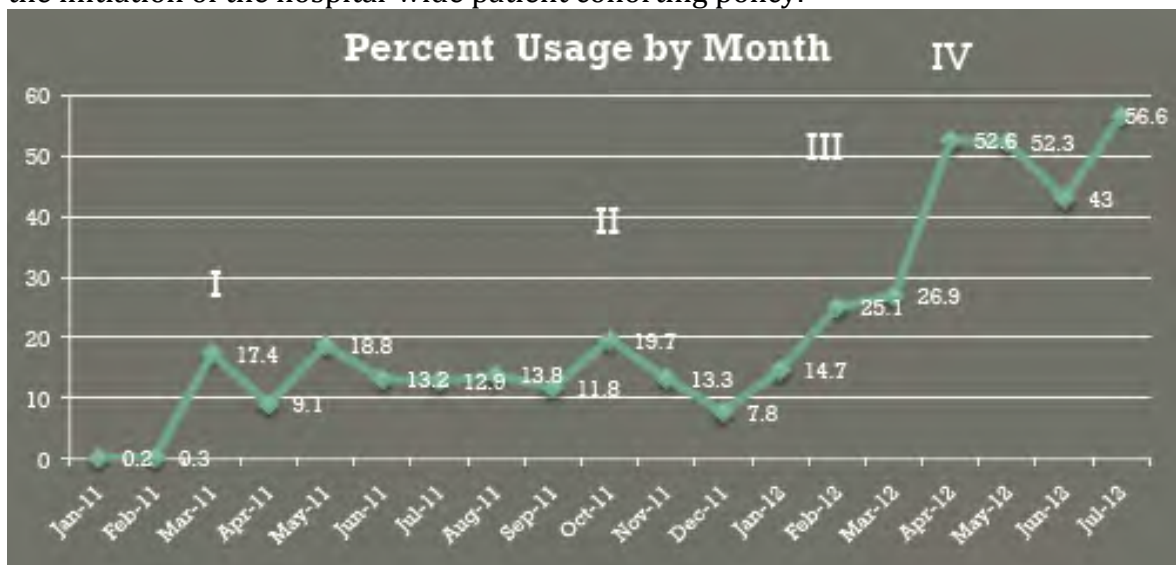
### **Tools to Download**

- [Results Graphs](#)

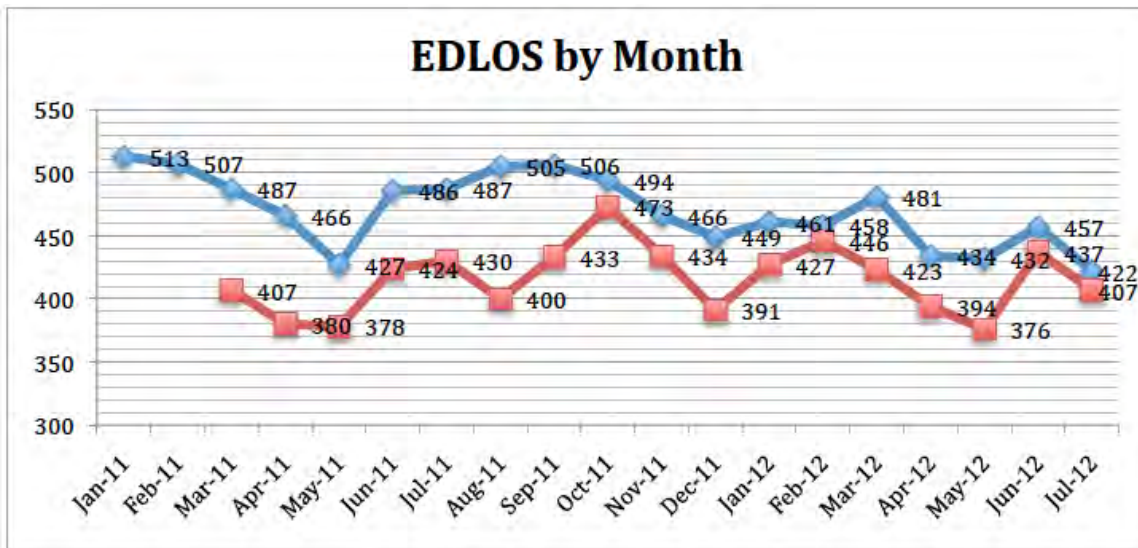
## ED Physician Transition/Holding Admission Orders Intervention Graphs



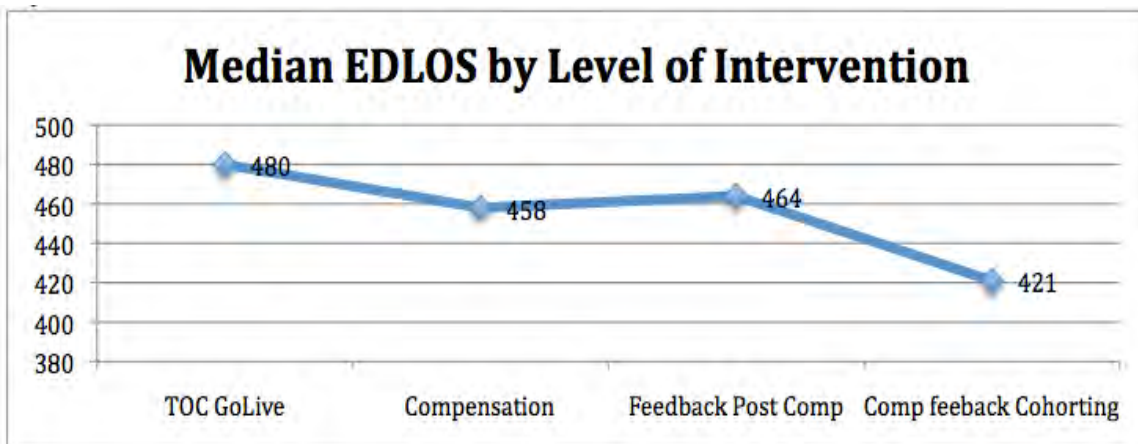
**Figure #1** Percent usage of ED Holding orderset by Phase of intervention. Utilization climbs from 4.4% (42/955) utilization in Phase 0, 13.4% (331/2471) utilization during Phase I of the intervention, 15.1% (246/1743) utilization after the announcement of the intervention as a compensation metric (Phase II), 32.3% (255/789) utilization with the addition of unblinded feedback on personal performance (Phase III), and 51.2% (700/1366) utilization in Phase IV, following the initiation of the hospital-wide patient cohorting policy.



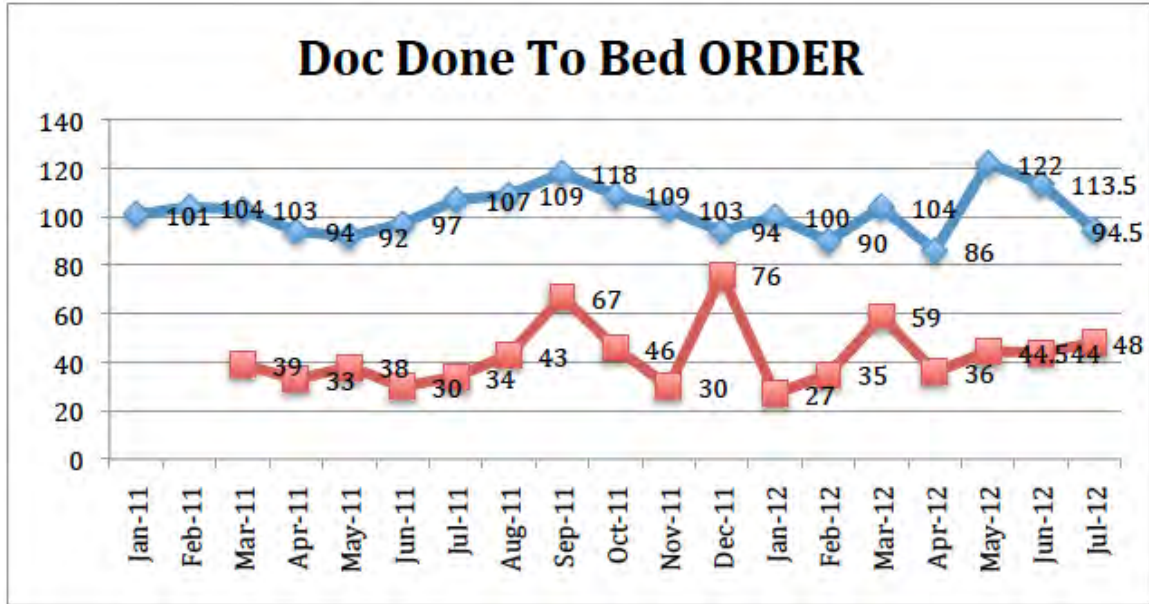
**Figure#2:** Stepwise performance improvement in the use of ED Holding orders evident with progression of quality initiative. Performance improvements correlate with phases of the intervention, Phase "0" pre-implementation phase (1/1/11-3/14/11), Phase "I" initiative GoLive with provision general feedback, Phase "II" Compensation program initiation, Phase "III" audit & feedback post compensation program and Phase "IV" hospital wide patient cohorting policy



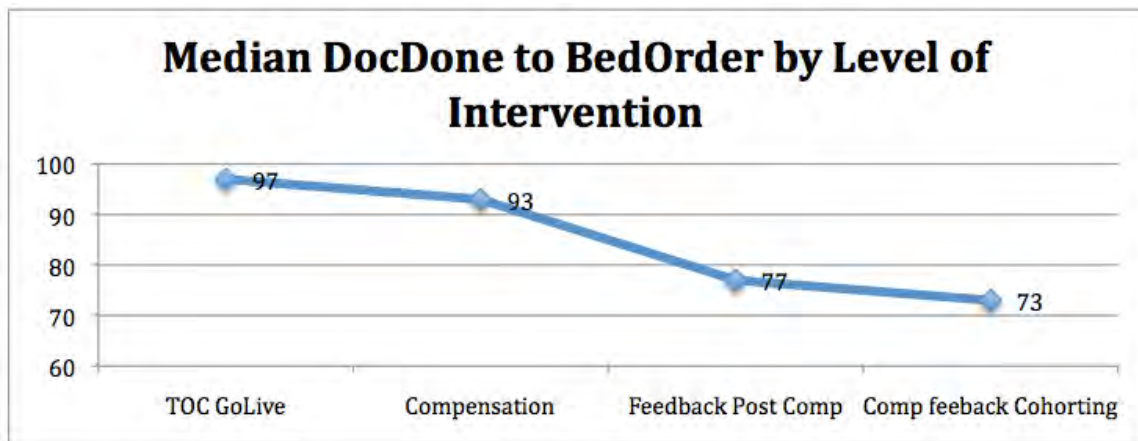
**Figure #3** EDLOS by month of intervention ED Transition Admission Process (red) vs Typical Admission Process (blue)



**Figure #4** EDLOS by Phase of Intervention  
 Use of the ED Holding orders led to reductions in ED LOS. Reduction in overall EDLOS for all subjects is also evident as the usage of the orderset increased. The median LOS times for each phase are as follows: Phase 0 (497 minutes; IQR 385.5, 629.5), Phase I (471 minutes; IQR 369, 590), Phase II (458 minutes; IQR 362, 570), Phase III (464 minutes; IQR 367, 583) and Phase IV (421 minutes; IQR 339, 537).



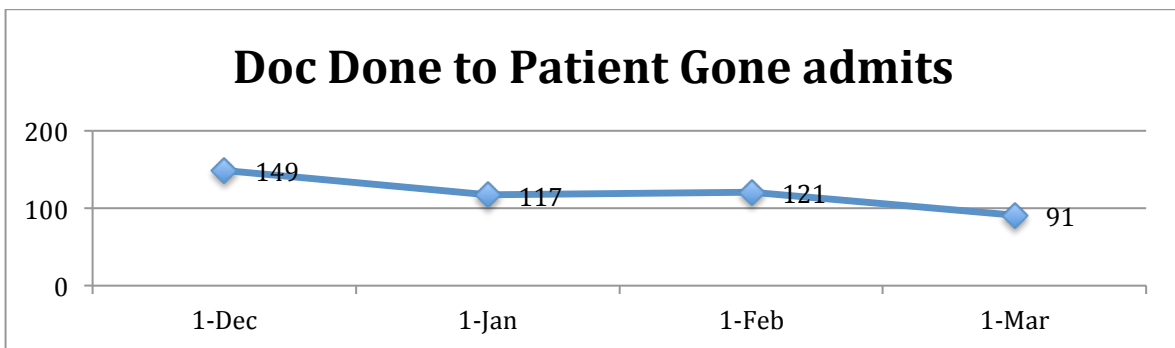
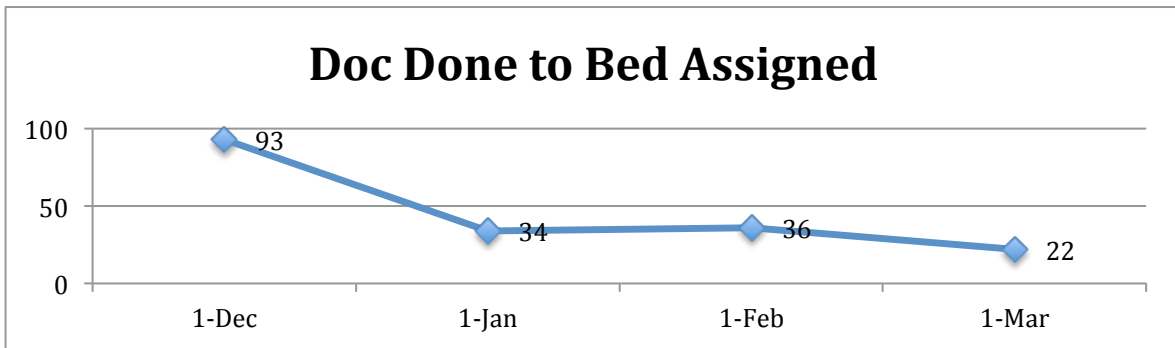
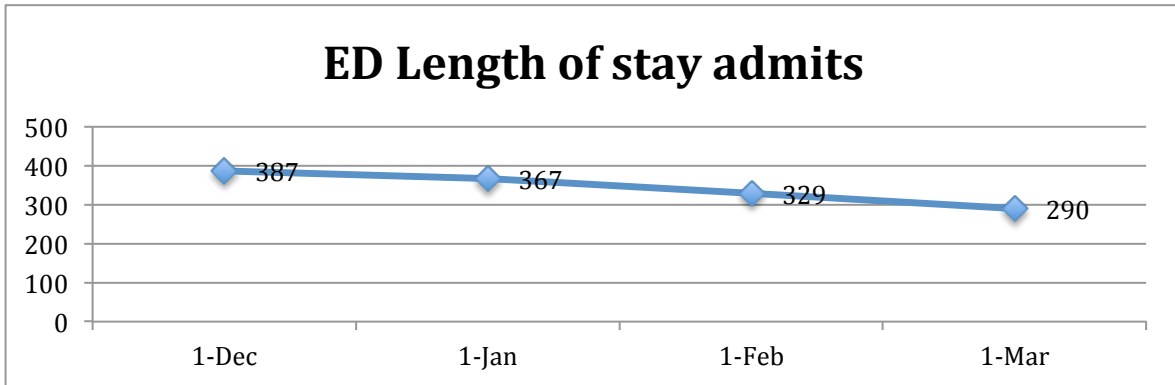
**Figure #6.** Doctor Done to Bed Order (Time to bed order)  
 Median ED Doctor done to bed order by month, ED Transition Admission Process (red) vs Typical Admission Process (blue)



**Figure #7** Median ED Doctor done to bed order by level of intervention  
 Use of ED Holding orders led to reduction in the time it took to place bed orders. Reduction in overall DDBO for all subjects is also evident as the usage of the orderset increased. Statistically significant reductions in median DDBO times were noted in the transition of all phases excepting from Phase 0 to I, Phase I to II and Phase III-IV. The median DDBO times for each phase are as follows: Phase 0 (99 minutes; IQR 59, 164.5), Phase I (96 minutes; IQR 53, 156), Phase II (93 minutes; IQR 52, 151), Phase III (77 minutes; IQR 37.5, 131), and IV (73 minutes; IQR 32, 137).



**Starting Jan 15<sup>th</sup> 2013 all admits through the had ED Holding Orders placed (ED Transition orders)**



With hospital wide acceptance of the new admission process, we were able to implement the initial “test of change” for all admission through the ED. This has led progressive declines in ED output metrics, resulting in significant reduction’s in EDLOS.

\*Note in December 2013, we implemented a new Electronic Health Record (EPIC)