

Emergency Department Rotational Patient Assignment

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Study objective: We compare emergency department (ED) operational metrics obtained in the first year of a rotational patient assignment system (in which patients are assigned to physicians automatically according to an algorithm) with those obtained in the last year of a traditional physician self-assignment system (in which physicians assigned themselves to patients at physician discretion).

Methods: This was a pre-post retrospective study of patients at a single ED with no financial incentives for physician productivity. Metrics of interest were length of stay; arrival-to-provider time; rates of left before being seen, left subsequent to being seen, early returns (within 72 hours), and early returns with admission; and complaint ratio.

Results: We analyzed 23,514 visits in the last year of physician self-assignment and 24,112 visits in the first year of rotational patient assignment. Rotational patient assignment was associated with the following improvements (percentage change): median length of stay 232 to 207 minutes (11%), median arrival to provider time 39 to 22 minutes (44%), left before being seen 0.73% to 0.36% (51%), and complaint ratio 9.0/1,000 to 5.4/1,000 (40%). There were no changes in left subsequent to being seen, early returns, or early returns with admission.

Conclusion: In a single facility, the transition from physician self-assignment to rotational patient assignment was associated with improvement in a broad array of ED operational metrics. Rotational patient assignment may be a useful strategy in ED front-end process redesign. [Ann Emerg Med. 2016;67:206-215.]

Please see page 207 for the Editor's Capsule Summary of this article.

A **podcast** for this article is available at www.annemergmed.com.

0196-0644/\$-see front matter

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<http://dx.doi.org/10.1016/j.annemergmed.2015.07.008>

INTRODUCTION

Background

Numerous investigators have described strategies to streamline emergency department (ED) patient flow by improving operations, particularly in the “front-end” (the time between patient arrival and the time a provider assumes definitive care of the patient).¹ These redesign efforts, reviewed elsewhere,^{1,2} include (among others) placing an advanced provider at triage,³⁻⁵ bedside registration,^{6,7} and physically streaming patients through a “fast track.”^{8,9} Other novel solutions include telemedical triage,^{10,11} virtual patient streaming,¹² and complexity-based triage.¹³

Another potential opportunity for ED front-end improvement lies in optimizing the association of physicians with patients. Many departments use a physician self-assignment process, whereby physicians assign themselves to (or “pick up”) patients at physician discretion. Physicians may base their decision to pick up a patient on an internal calculation of their perceived capacity to treat another patient, how ill the patient is, the perceived needs of the department

(with respect to whether it is busy or not), how much time is remaining in the shift, and other factors. Physician self-assignment may be superior to a system in which nurses assign patients to physicians,¹⁴ but it may not be an optimal system for patient flow.

Previous work has suggested that a system of rotational patient assignment, in which predetermined criteria are used to assign patients to physicians or teams, may lead to ED operational improvements.¹⁵⁻¹⁸ We report the results of such an intervention at our facility.

Importance

Successful changes to front-end operations are of particular interest in ED process redesign because these operations are usually under the direct control of ED leadership. Changes to other phases of ED care, such as throughput and output, often require the involvement of external stakeholders (laboratory, radiology, or consulting/admitting services) and may be practically or politically more difficult. Novel or infrequently reported front-end

Editor's Capsule Summary

What is already known on this topic

Front-end strategies can improve emergency department (ED) throughput.

What question this study addressed

How do ED throughput metrics change when the process for assigning patients to emergency physicians changes from physician self-assignment to an algorithm-produced rotational assignment?

What the study adds to our knowledge

At a 26,000-visit-per-year ED where attending-level physicians treat a maximum of 1.8 patients per hour, changing to a rotational patient-physician assignment process reduced arrival to provider time by 17 minutes (44% decrease), lengths of stay for discharged patients by 29 minutes (14%), and cases of left before being seen by 3.7 in 1,000 (51%). There was little effect on length of stay for admitted patients or on 72-hour return visits.

How this is relevant to clinical practice

Although unique aspects of this ED may limit the generalizability of results, rotational patient-physician assignment may be worthy of consideration to enhance ED operations.

interventions, such as rotational patient assignment, represent important potential additions to the options for ED process improvement.

Goals of This Investigation

We report the results of transitioning from physician self-assignment to rotational patient assignment at a single facility, with the goal of reporting the operational metrics of length of stay, arrival to provider time, rate of left before being seen, rate of left subsequent to being seen, rate of early (within 72 hour) returns, rate of early returns who are admitted, and complaint ratio. We report these metrics while noting and accounting for several potential confounding variables.

MATERIALS AND METHODS

Study Design and Setting

This is a retrospective before-and-after observational study in which we analyzed routinely gathered ED operational data. This project was part of a quality

improvement effort, and our institutional review board process identified it as exempt with a waiver of the requirement for informed consent.

The Mayo Clinic Arizona Emergency Department is located in a tertiary care teaching hospital in Phoenix, AZ. There are 24 rooms, with the capacity to use up to 9 hallway spaces. Hallway spaces are used when volume necessitates, stretchers are physically available, and nurse staffing permits. The annual ED census during the study period was approximately 26,000 patients (with significant seasonal variation), and the admission rate was approximately 30%. The ED is staffed 24 hours per day with board-certified emergency physicians and, during the 2-year study period, had 52 to 54 hours of physician coverage per day on days of historically lower census and 61 to 62 hours per day on days of historically higher census. There is no emergency medicine residency training program, although residents from other services rotate through the department and assist in the evaluation of approximately 5% of ED patients.

The physician labor pool was relatively constant throughout the study period. Of the 24 physicians who worked during any part of the 2-year study period, 20 worked during part of both the physician self-assignment period and the rotational patient assignment period, including 16 who worked during the entirety of both periods. All 24 physicians had 3 years or more of postresidency emergency medicine experience.

Throughout the study period, the ED used both the Cerner (Kansas City, MO) electronic medical record and the Cerner FirstNet electronic tracking board. There were no significant changes in electronic processing (including major software updates) or physical patient processing in either the ED or on the part of key ancillary services (laboratory and radiology) during the study period.

Selection of Participants

There were 366 days (including February 29, 2012) in the last year of physician self-assignment and 365 days in the first year of rotational patient assignment.

On 23 of the busiest days in the last year of physician self-assignment (Mondays and Fridays during winter), we used a separate front-end intervention, a physician-nurse team in triage, in an attempt to increase throughput. To minimize confounding of our current data, we eliminated those 23 days from consideration. Because Mondays and Fridays during winter are qualitatively different from other days, with higher daily volume, we identified and eliminated a corresponding set of 23 matched days from the first year of rotational patient assignment as well. We identified a matched day in the first year of rotational patient assignment as the day that was on the same day of the week and within 2 calendar days of the

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