Staffing and Provider Productivity in the Emergency Department

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KEYWORDS

• Productivity • Staffing • Scheduling • Rostering • Capacity • Demand • Staircase

KEY POINTS

- Managing productivity and staffing in the emergency department is an ongoing journey, not a static destination.
- Data collection and metrics are critical for identifying improvement opportunities.
- The emergency department is a system within a system of systems; communication and coordination with other departments are critical to extract the maximum benefit from emergency department operations.
- A thorough understanding of demand and capacity allows for meaningful scheduling adjustments to improve throughput and the overall provider experience.
- Provider productivity is not static; it decreases in a stepwise manner over the course of a shift. Staffing based on this "staircase" model permits more accurate measures of demand and capacity.

INTRODUCTION

Staffing and productivity are at the core of any efficient emergency department (ED). Appropriate staffing increases throughput, lowers departmental costs, and improves flow. Understanding the drivers of productivity can allow managers to maximize providers' efficiency and measure workload.

Although this article focuses on variables more directly in the control of departmental leadership, skilled leaders must understand that both staffing and productivity have significant interplay with factors beyond the control of ED staff. These factors include—but are not limited to—overall volume, patient acuity, crowding, and other linked processes such as nursing, radiology, laboratories, and inpatient bed availability.

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Emerg Med Clin N Am 38 (2020) 589–605
https://doi.org/10.1016/j.emc.2020.04.002
emed.theclinics.com

Significant research has been performed to assess factors that affect the productivity of attending emergency physicians—ranging from the impact of scribes to appropriate shift lengths—although such studies are still underrepresented within the broader discourse of emergency medicine research. By providing a readily available summary of these findings, we offer guidance to help increase productivity within individual EDs' unique limitations.

The foundations of staffing are simple for smaller EDs where single coverage is sufficient throughout the day. As volume increases, the complexity of staffing options increases. Decisions include adding attending physicians and advanced practice practitioners (APPs), as well as changes to shift length, timing, and the degree of overlap. This section discusses tools to handle the first few tiers of complexity in a stepwise manner.

PRODUCTIVITY

Measuring Productivity

Despite being an essential element of ED management, there exists no standard productivity measure for emergency physicians. Productivity is most commonly defined as the ability of an attending physician to see, treat, and disposition new patient arrivals. The most frequently used individual measurements are the number of patients seen per hour and the relative value units (RVUs) a physician generates per hour. Both metrics quantify the work completed over time, although only the second incorporates patient complexity. Measuring RVUs per patient has distinct advantages, because it is often linked directly to billing and helps to control for case complexity (**Table 1**). A 2012 survey of department chairs showed the majority tracked productivity to determine compensation.[1] Although RVUs were the most common metric for incentivizing physicians, other factors include patient satisfaction, length of stay metrics, publications, grants, and committee attendance. Unfortunately, neither patients seen nor RVUs generated per hour are perfect measures, because they exclude time spent after assigned shifts seeing patients and documenting, time spent on signed out cases, and other unmeasured contributions to patient care.

Table 1
Pros and cons of common productivity metrics

Metric	Pros	Cons
Patients per hour	Easy information to gather Correlates with capacity planning	Does not account for patient acuity Does not account for departmental issues (crowding, etc) May incentivize cherry picking of patients likely to have low complexity
RVUs per hour	Correlates to revenue Incorporates both complexity and volume	Cannot calculate until billing information is complete Does not account for departmental issues (crowding, etc) May incentivize cherry picking of patients likely to have high RVU reimbursement
RVUs per patient	Encourages capturing appropriate complexity and charting	Depends on thoroughness of charting May incentivize additional testing and procedures on patients Does not encourage department throughput

Drivers of Productivity

Prior research shows that both attending and resident productivity follows a predictable hourly decrease throughout a shift.[2,3] Providers start a shift operating at their highest productivity level with a stepwise decrease as the shift progresses, forming a staircase shape. Signed out patients without clear dispositions have a notable effect on productivity.[4] In this section, we review the roles and processes that have been demonstrated to have effects on ED productivity.

Roles

The presence of a variety of different roles in the ED—both providers and nonproviders—has been studied to determine the effects of productivity (**Table 2**).

Advanced practice practitioners Data on the overall benefits of APPs is limited, but suggests that they can be a potent addition to productivity in certain clinical contexts. When compared with resident physicians, APPs were found to see more patients per hour and generate more RVUs per hour than resident physicians—an average of 2.21 relative to 1.53 patients per hour.[5] This difference may be due to experience; by definition, residents have been working for a few years at most, whereas many APPs' experience may come primarily from seeing lower acuity complaints. A potentially fraught productivity benefit of APPs staffing versus trainees is that, in many EDs, APPs do not necessarily staff lower acuity patients with a supervising physician, which may intrigue some administrators while causing heartburn for others.

Another study by the same group found that, even in higher acuity settings, APPs still see slightly more patients per hour than residents.[6] However, in these settings a resident actually generates more RVUs per hour, because APPs may still tend to see lower acuity patients within the setting, and residents conversely tend to document more thoroughly.

Resident physicians Residents are an integral part of the staffing of most academic medical centers, but are also present within many community hospital EDs to varying degrees. Among the most substantial distinctions between residents are whether they are EM trainees or off service from other specialties. Off-service residents tend to see fewer patients per hour than emergency medicine residents,[3,7,8] and even direct interventions to motivate and track off-service residents' patient encounters have only been shown to minimally increase their productivity.[9]

The productivity of emergency medicine residents increases markedly during training, with the greatest gains in patients per hour and RVUs per hour occurring

Table 2
Common ED roles

Role	Key Points
APPs	Productivity difficult to measure; have both independent productivity (unstaffed low acuity cases) and dependent productivity (staffed cases) Excel in certain settings (eg, fast track)
Residents	Have no true independent productivity (attending must staff) Increase attending productivity and complicate its measurement Administrators have limited control over resident staffing Vary in training background and experience level
Students	Generally do not increase or decrease attending or resident productivity
Scribes	Off-load various tasks to allow for increased productivity

between the first and second years of training.[8,10–13] The data for postgraduate year 3 and postgraduate year 4 residents is somewhat limited because senior residents serve in supervisory or teaching roles at many academic sites and perform other non–RVU-generating activities.[10] How more advanced trainees perform within community ED rotations and while moonlighting requires further investigation, but likely approaches that of attending physicians.

Although there has long been a perception that teaching slows down clinical care, several studies have demonstrated that the presence of EM residents positively impacts attending productivity. In one instance, the creation of an EM residency increased attending RVUs per hour by 4.98. As each class was added, RVUs per hour increased in a stepwise manner. Overall, 32% more patients would be seen, and staffing hours decreased by 6% for attending physicians and 60% for APPs.[14] However, any savings from a new residency program need to be balanced against the substantial costs of time and resources outside of the clinical sphere. For departments with existing programs, residents have been shown to increase the number of patients per hour by 0.12 versus attending-only shifts.[15,16]

Medical students Although medical students are just starting their medical education, cannot work independently, and require more intensive supervision than residents, the literature suggests that these factors likewise do not have a negative impact on productivity. When medical students are present and supervised by residents, they do not have a negative impact on residents' patients per hour or RVUs per hour.[17] Unlike residents, medical students did not lead to increased attending productivity or changes in throughput times.[15,16] Although there may be other qualitative factors involved in working with medical students (perhaps attending physicians simply work harder in their presence), they should not be regarded as an operational resource in terms of increasing productivity in an ED.

A controversial topic related to productivity is the effect that dedicated teaching has on productivity. Many studies cite a commonly held belief that teaching demands while working clinically decreases overall productivity. This effect has not been demonstrated consistently. Multiple studies looked at whether higher RVUs per hour are associated with lower median teaching evaluations and no correlation was found.[18–20] In fact, higher teaching performance ratings were found to be associated with more RVUs per hour.[21] Structured interviews with these high-performing providers found they focused on seeing a high volume of patients, dictating each one immediately, and focusing on a teaching point for each case. So, although this belief is commonly held, there has been no documented negative relationship between quality of teaching and overall department productivity.

Scribes Scribes have the potential to provide productivity gains across a variety of domains. Although they are primarily known for facilitating charting on shift, they may help with a variety of tasks, such as following up on laboratory tests and sending pages. Several studies have demonstrated significant gains in productivity from employing scribes, ranging from to 0.8 patients per hour and 2.4 RVUs per hour over a 10-hour shift when working with scribes,[22,23] with increase of 0.15 RVUs per patient, likely owing to improved billing from documentation. Notably, the quality of scribes' documentation has not been studied extensively, which is needed to better understand the nature of this effect on RVUs per patient.[24] Although some of the productivity benefits of scribes may accrue from their ability to help physicians to mitigate some of the inefficiencies of electronic health records, there are also likely important qualitative benefits that scribes may offer emergency physicians, such as

increased time spent at the bedside or increased availability to teach. Ultimately, the benefits of a scribe program must be balanced against its hourly and administrative costs.

Processes

Shift length The most common shift lengths of 8 and 12 hours carry unique trade-offs.[25] Both lengths can have an impact on circadian scheduling, but the fatigue in the last few hours of a 12-hour shift has the potential to coincide with the existing decrease in new patients seen per hour found in the staircase model. For emergency medicine residents, working 9-hour shifts has been shown to lead residents to naturally assume a higher overall rate of patients per hour than those working 12-hour shifts.[26] Shift length also has implications beyond individual provider productivity; shorter shifts also allow for more flexibility to increase staffing during high-volume periods.

However, despite the potential productivity benefits of shorter shifts, longer shifts are the most viable option for low-volume centers with few providers on staff. Similarly, longer shifts may be preferred by groups who wish to work fewer shifts overall, because they allow fewer providers to work during undesirable times, such as nights, weekends, and holidays.

Shift overlap and sign-outs The goal of overlapping shifts is to provide a dedicated time for the outgoing provider to clean up his or her patients so that the oncoming provider will have less to do for each signed-out patient. This is another potential disadvantage of longer (eg,12-hour) shifts, although the prospect of adding an hour of explicit overlap to an 8-hour shift, during which no new patients are seen, is much more palatable. However, studies examining overlap note that the practice does not necessarily lead to significantly fewer signed-out patients,[27] although these patients may require less additional work on the part of the oncoming provider. Comparatively, the waterfall shift model may potentially reduce the total number of sign-outs by significantly staggering shift start times.[28]

A significantly different shift type that has been proposed is the float shift. Float shifts entail a dedicated provider assigned to care for boarding patients, allowing other providers to see a greater number of new patients (1.1 patients per hour more in one study).[29] This finding accords with data from a study of resident physicians, which has suggested that patients who are in observation status impose a greater productivity burden than other signed-out patients.[4] Although this additional shift is likely an effective means of improving the overall productivity and throughput of the ED, it creates a new attending shift that is not RVU-generating, which must be considered when analyzing overall and individual productivity.

STAFFING

Introduction and Objectives

ED provider productivity and staffing share many common principles and are at the core of departmental cost and throughput (**Table 3**). Both must be considered in decisions of hiring, workforce management, and patient care. This section provides an overview of the following considerations:

- What is the landscape of the ED provider workforce?
- What shift timings will use that staff most efficiently?
- How many providers should be hired to staff an ED?
- What provider mix may be appropriate?

Table 3
ED staffing concepts

Concept	Description
Rostering	Describes the number and type of providers employed or contracted
Scheduling	Describes how provider shifts are allocated to meet patient demand
Day-of-week differences	Additional hours needed on Mondays or decreased hours mid week
Seasonal shifts	Changing shifts by season (eg, summer shifts in a vacation town)
Weekend reduction	Decrease shifts on weekends by expanding length
Flex up	Avoid scheduling 12-h shifts to allow flexing up to longer shifts
Fast track	Dedicate resources to focus on lower acuity patients
Provider in triage	See patients before traditional nurse triage
Call	Add provider to schedule to be ready to come in

The Emergency Department Workforce and Costs of Staffing

As of 2018, approximately 44,000 physicians and 14,000 APPs were working in US EDs. Of the physicians, 80% are trained in emergency medicine, with the remainder having backgrounds in other specialties. Providers trained in non-emergency medicine specialties are more prevalent in rural environments. In general, the provider labor force is very competitive, with the vast majority of emergency providers being employed by hospitals.[30–32]

ED staff make up approximately 75% to 80% of the ED-specific costs of running an ED, excluding separate hospital costs[33]; providers are a major portion of this cost. Emergency physician full-time equivalents (FTEs) have a national mean compensation of 300,000 to 472,000 USD per year. Compensation varies significantly by region and institution, and ED directors looking to hire or change compensation should survey regional competitive rates.[34] Data on APP compensation is more limited, although it can be expected that an APP salary will be at least 100,000 USD per year, in addition to other benefits.[35]

Understanding Patient Demand

Patient demand concepts

Patient demand is primarily measured by ED arrivals, usually recorded as the number of patients arriving at a given hour. ED census, or how many patients are in the ED at one time, is useful to measure workload, identifying peak load and crisis situations, and managing bed capacity (**Table 4**). Most arrival curves follow a "whale curve" (**Fig. 1**), which is used in the case study in this article, along with the corresponding census. Note that peak ED census tends to occur a few hours after the period of peak ED arrivals, and how the curve is generally flatter. Administrators must understand their own demand curves to rationalize and monitor their staffing strategy.

Patient demand and variability

Some of the greatest challenges to ED staffing are the multiple dimensions by which ED patient demand can vary, including the following.

- *The 24-hour ED cycle*. As depicted in **Fig. 1**, more patients typically arrive during the day than during the night (particularly 10 AM to 10 PM). Peak ED census often continues for hours even after patient arrivals begins to decrease.[36]

Table 4
Patient demand concepts

Concept	Description
ED census	How many patients are in the ED at one time
ED arrivals	How many patients arrive in a given time interval (usually by hour)
EMS arrivals	Number of EMS arrivals in a given time interval (typically have more complex care needs)
Arrivals by ESI	Number of arrivals in a given time interval stratified by emergency severity index (allows for resource allocation)
Vertical patients	Ambulatory patients, who typically demand fewer resources

- *Day-of-week variability*. There is a fairly predictable variation by day-of-week in patient visits (**Fig. 2**). Monday is typically the busiest day of the week.[37] Even within the same day of the week, a director can expect as much as 30% to 40% variation in ED patient volume.
- *Seasonal variability*. There are well-documented seasonal differences in ED volume related to certain common diseases, for example, the winter flu and viral illness season.[38] Some centers also exist in regions with major seasonal population differences, for example, a summer resort town.

It is no small challenge to account for these different factors. A reasonable rule of thumb is to measure and visualize patient arrivals per hour based on historical data and then staff provider capacity to meet patient demand up to the 70th to 80th percentile. The case study provides a closer look. With this starting point, directors can begin to account for additional dimensions of variation.

Staffing to Demand

Rostering

Multiple strategies can be used for determining the number of FTEs needed on staff.

- *Minimum single provider coverage*. Even the lowest volume EDs will have a bare minimum number of 5 FTEs on staff to provide 24/7 coverage (ie, 168 hours of coverage per week) and account for provider vacation and coverage.[30,39]
- *Generic approach to estimate FTEs*. Once annual volume is greater than 18,000 to 20,000 visits, one can estimate needing approximately 2.8 FTEs of coverage per 10,000 patient visits.[40]

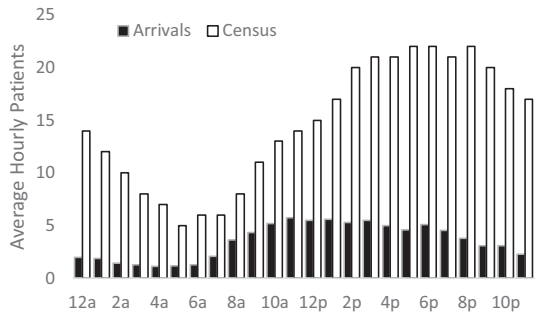

Fig. 1. Arrivals and census by hour.

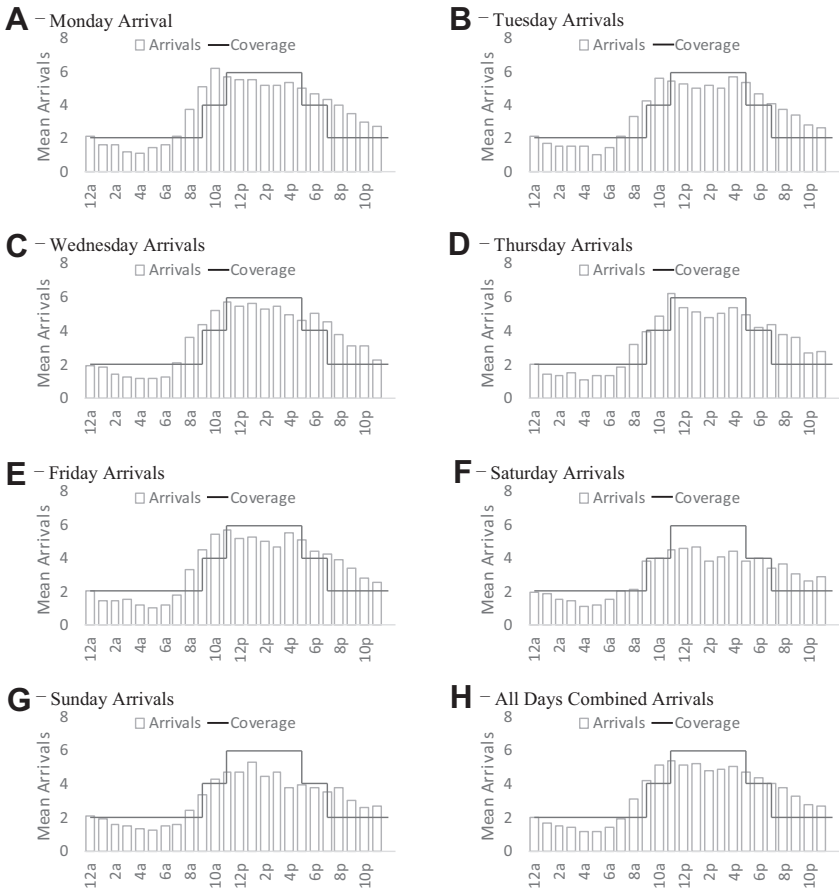

Fig. 2. Mean hourly arrivals for each day of the week; (a) Monday, (b) Tuesday, (c) Wednesday, (d) Thursday, (e) Friday, (f) Saturday, (g) Sunday, (h) All Days Combined

- *Specific approach to estimate FTEs*. Providers at different centers may have different mean productivity. Some groups may consider a physician an FTE even if fewer than 40 hours per week are spent on ED clinical work. A more sophisticated approach looks at specific parameters to make a more accurate estimate:
  1. (Annual patient visits covered per FTE) = (Mean provider patients per hour) × (clinical hours worked by FTE per week) × (nonvacation weeks worked per year by FTE)
  2. (Number FTEs required) = (Annual patient visits)/(Annual patient visits covered per FTE)
- *Hiring APPs*. Accurate estimation for APP FTEs is more challenging, because APP productivity is harder to measure given its intersection with attending physician productivity. One approach is to work backwards once a need for APP shifts is identified in the schedule, and then to hire sufficient APPs to cover the number of estimated shifts needed. This process can be beneficial when additional provider coverage is needed during certain hours, but attending coverage will be expensive and provide excess productivity.

Scheduling

Once sufficient providers are on staff, the challenge is allocating their clinical capacity to patient demand.

Shift length In general, 8- to 10-hour shifts provide more ability to flex up and account for variability and complexity. Smaller centers may not be able to avoid 12-hour shifts, to allow for sufficient days off. Longer shifts can also be used at undesirable times (eg, weekends, nights, holidays, etc) to decrease how often providers must work during those periods of time.

Set base single-provider coverage The most common strategies involve shifts starting at 0700, 1500, and 2300 for 8-hour shifts or 0700 and 1900 for 12-hour shifts. This is the framework upon which additional shifts will be laid.

Graph patient demand versus provider capacity Provider capacity is usually graphed based on flat productivity. Areas where provider capacity is greater than patient arrivals represent excess capacity. Areas where patient demand is higher represent periods when the department may be understaffed (Fig. 3).

Allocate additional providers based on demand Once single coverage is deemed inadequate, static modeling should be used to determine where to add additional coverage. See Patient Demand and Variability as well as the Case Study elsewhere in this article. Adding an APP is a more cost-effective step for a small excess of demand, with more complicated mixes of physicians and APPs required for larger units of unmet demand.

Complex Scheduling

- *Fast track*. Fast track is a form of split flow that diverts low-acuity patients to be seen by dedicated providers, typically in a dedicated space. It is usually staffed by 1 provider, with coverage by APPs used to meet additional demand. Studies have estimated that an APP will see approximately 2.2 patients per hour in a fast track setting.[5] Although the RVU per patient of these patients tends to be low, the support for flow can significantly reduce the likelihood of running out of beds.

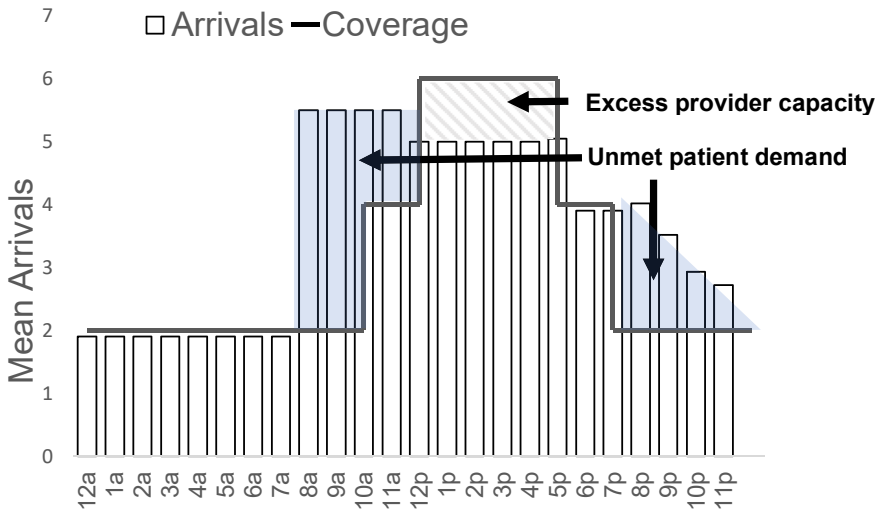

Fig. 3. Patient demand versus provider capacity.

- *Provider-in-triage (PIT)*. A PIT model creates complicated challenges for staffing, because it is difficult to measure how much patient demand is covered by this provider. There is limited evidence that a senior PIT is more effective than staffing an APP or resident in decreasing wait times and length of stay; however, the cost of this factor must be considered when assessing this intervention.[41] A general approach would be to staff the PIT area during times that the waiting room tends to be most full. Alternatively, a phased approach can be considered, where the PIT model is not activated until ED beds are full (as measured by ED census). The PIT model can significantly improve quality measures, such as arrival to provider times, and start diagnostic testing earlier, which decreased bottlenecks.
- *Dynamic solutions—Queuing theory, simulation, and computer modeling*. Matching provider capacity to patient demand has limits. In complex systems with split flow, multiple zones of patient care, triage providers, and rate-limiting factors outside of ED control, computer simulation may be required to determine where additional provider time will best improve patient throughput.

Staffing Limitations

- *Patient demand varies*. Staffing plans assume a predictable pattern of patient arrivals and complexity. There are meaningful trends, but they will not predict your ED census tomorrow. Design a phased plan for surge and crises.
- *Provider productivity varies*. Not all providers have the same speed and skill. Even the same provider may differ in performance from one day to the next when overworked, stressed, or purely by chance.
- *Hourly provider productivity is not flat*. Standard demand–capacity modeling assumes a constant patients per hour, when it has been shown that physician productivity decreases during the course of a shift (**Fig. 4**).[2]
- *Staffing for the mean*. A department staffed for the mean volume will be understaffed and in crisis 50% of the time, which can lead to issues with patient safety and burnout. A department that is always staffed for the busiest days on record will be financially unsustainable. The right answer is likely in between, and many departments staff for the 75%ile of patient arrivals.
- *The human element of staffing*. Staffing involves people who have needs and preferences that go beyond the throughput of the department.

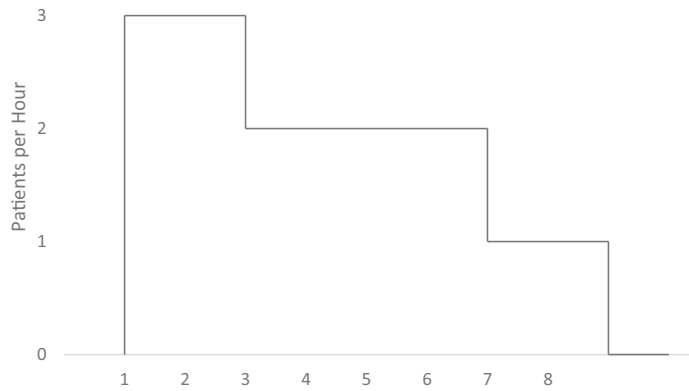

Fig. 4. Staircase model of provider productivity.

- Nights and weekends may be intentionally understaffed if providers value minimizing the number of these shifts. Consider paying a higher rate for these shifts (subtracted from other shifts to stay cost neutral).
- Older providers may have greater challenges working overnights. A one-size-fits-all model for scheduling may not support individual provider needs.
- Centers with regular high acuity at night may want to avoid single coverage, even if on average night providers will not work to capacity.

ED leaders must be aware of these considerations to make the department a more desirable place to work.

CASE STUDY

You are a new ED director and have taken on the responsibility to staff and manage the productivity of your department that sees an average of 80 visits per day (about 30,000 per year). You currently staff 40 physician-hours per day, with all days of the week having the same shifts. This costs roughly $2 million per year. After interviewing the staff on where they see issues and opportunities, you note the following concerns.

- Mondays are brutal on staff, and patients often complain about long wait times.
- Night shifts often start with many patients in the waiting room.
- Physicians are burning out and scheduling is a challenge when anyone goes on vacation.
- Resentment is growing owing to variability in perceived physician effort.

You decide to take a data-driven approach by working through the steps of understanding patient demand, staffing to that demand, rostering, scheduling, and measuring variability in productivity. Data in the hospital electronic medical record system logs information for each patient, including arrival time, provider name, provider time, disposition, disposition time, and depart time.

Understanding Patient Demand

To understand patient demand, you visualize demand by hour of day, day of week, month of year, and between years, as shown in Fig. 5. This modeling demonstrates that Mondays have about 10% more patients per day than the other days of the week, summer and winter tend to have higher demand than average, and that year over year demand is increasing. Demand varies significantly across the day, and follows a whale curve. More research finds that the shift map has not changed since the beginning of 2017, meaning the average patients per hour has increased from 1.9 to 2.1 (13% increase). Additional analysis finds that summer Mondays in 2019 averaged 92 patients (2.3 patients per hour), with several extreme days having more than 100 patients.

The current shifts are 0700 to 1500, 0900 to 1900, 1100 to 2100, 1500 to 2300, and 2300 to 0700. Fig. 2 shows these shifts plotted alongside the mean patient arrivals by day of week, assuming 2.0 patients per hour capacity for every hour of every shift. The productivity target should be a true average of productivity, not how hard your providers are working at peak load, or your department will feel understaffed one-half of the time (providers cannot sustainably operate above peak load). Note how in Fig. 2A, patient demand is not met at 9 PM, 10 PM, and 11 PM , which suggest significant queueing for the night shift.

Using the data collected, you form a table of operational metrics (Table 5), including mean daily arrivals (by day of week) and physician hours scheduled. Dividing arrivals by

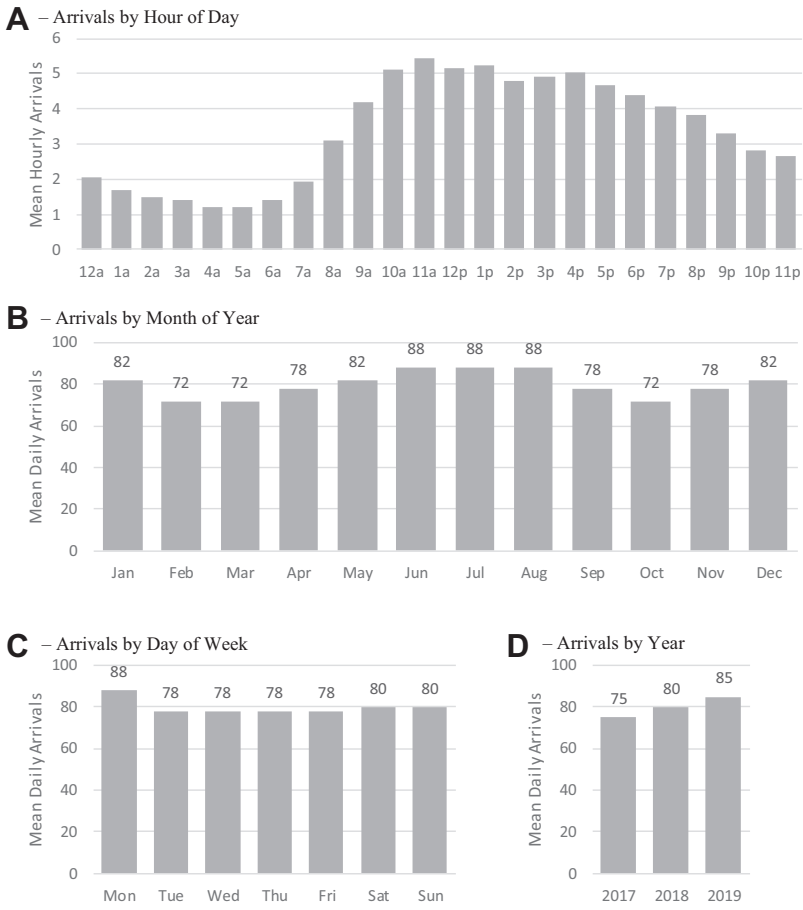

Fig. 5. Mean daily arrival analysis; (a) Arrivals by Hour of Day, (b) Arrivals by Month of Year, (c) Arrivals by Day of Week, (d) Arrivals by Year

physician hours gives the effective patients per hour productivity of the physicians working on that day of the week. This is one estimate of your provider workload and adequacy of staffing. In addition, you record *median* arrival-to-provider, provider-to-disposition (PtD) times, and the *mean* rates of left before being seen.[42] PtD can be further divided into admitted and discharged patients (PtD-A and PtD-D). These metrics are useful for determining when providers have been stretched beyond peak capacity and when the ED is reaching a peak load crisis. Recording disposition to departure from the ED for admitted patients (DtD-A) can identify when the system is experiencing dysfunction owing to processes outside the ED (such as an inpatient bed crisis).

These measures can be tracked by month to assess the change in performance after the staffing adjustments are made. Finally, provider satisfaction should be considered as changes are made.

Staffing to Demand

Based on these findings and your department benchmark of 2.0 patients per hour, you divide the average number of patient arrivals each day in the table by 2.0. You determine that Mondays should have 44 hours of coverage, and the other days of the week

Table 5
Performance measures by day of week

DOW	Arrivals	Patients per Hour	Arrival-to-Provider Time (Min)	PtD-D (Min)	PtD-A (Min)	DtD-A (Min)	LOS (Min)	LWBS (%)
Mon	88	2.2	28	126	252	175	305	5.1
Tue	78	2.0	12	72	144	180	265	2.4
Wed	78	2.0	13	78	156	175	270	2.6
Thu	78	2.0	14	81	162	195	260	2.5
Fri	78	2.0	13	75	150	190	265	2.4
Sat	80	2.0	15	90	180	184	275	2.6
Sun	80	2.0	16	105	210	191	270	2.5

should have 40 hours of coverage. You assess the periods of excess patient demand on Mondays and adjust your schedule as shown in **Table 6**.

You plot the patient demand versus the original and new patient capacity in **Fig. 6**A, B, respectively. However, you recall that provider productivity is nonlinear, with the first hour of each shift seeing significantly more patients than a normal hour, and the last hour of each shift seeing significantly fewer. To incorporate this important staffing concept without creating unrealistic complexity, you decide to increase the first hour's assumed productivity to 3 patients per hour, and decrease the last hour to half productivity. The before and after nonlinear Mondays are shown in **Fig. 6**C, D, respectively, with the staircase assumptions.

Expanding Monday coverage and level-loading capacity to demand, especially in the evening, should improve the difficulty of Mondays, and decrease the number of patients in the waiting room before the night shift. Short shifts were chosen to allow for flexing up. Tracking key performance indicators and surveying providers will help you to understand if the new staffing produces both measurable and perceived improvement.

Rostering and Scheduling

To understand the need for expanding the roster, you pull the hours worked by week for each physician. Although the average hours worked per week is 36, you find that several physicians are working more than 40 hours per week. In addition, not only did these physicians work a large number of hours, they frequently worked consecutive shifts starting at significantly different times of the day. Both the hours and variability in shift time contributed to burnout, and kept the ED as crisis-level work. To add 4 additional hours per week and keep all providers at 36 hours per week, you decide to hire an additional FTE. You also implement restrictions on scheduling, such that no shift can start more than 2 hours earlier than the previous day's shift.

Table 6
Revised shift structure

Day of Week \ Shift Number	1	2	3	4	5
Mon	0700–1500	0900–1700	1100–2100	1500–2300	2100–0700
Tue-Sun	0700–1500	0900–1600	1200–2000	1400–2200	2200-0700

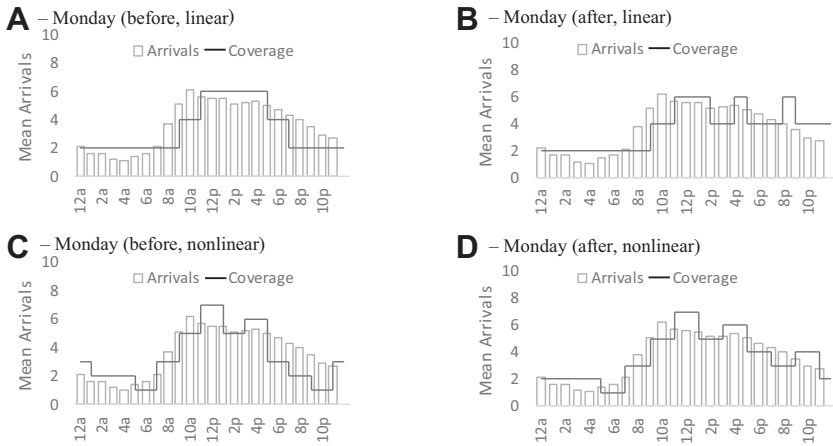

Fig. 6. Mondays before and after shift adjustment; (a) Monday (before, linear), (b) Monday (after, linear), (c) Monday (before, nonlinear), (d) Monday (after, nonlinear)

Recognizing that the solution increased costs for the ED, you research developing an APP program, developing a scribe program, and implementing lean process improvements. Your long-term goal is to have one-half of the ED staffed by APPs, increase the overall number of hours worked, and decrease the overall total staffing cost. Quarterly reviews of productivity support an incentive program based on RVUs generated. You continuously track your operational data and use it to support staffing updates.

SUMMARY

Higher productivity and staffing to demand are fundamental goals of ED operations. However, a single-minded drive to greater productivity can risk tradeoffs, including a lower quality of care, lower patient and provider satisfaction, and compromised handoffs. It is critical for ED leaders to simultaneously manage and balance productivity, quality, and timeliness of care, with both provider and patient experience. This process is ongoing and requires significant investments of time in listening to the concerns of staff, acquiring accurate data, and coordinating with other departments.

Part of the ED management journey is acknowledging that much of the improvement opportunities lie not just in enhancing people, processes, and technology, but also in enhancing the interfaces with other departments. Much of this involves situational awareness, such as knowing when other departments change shifts (eg, nursing), aligning incentives (eg, inpatient physicians), ensuring resource availability (eg, radiology), and keeping open lines of communication with other leaders.

DISCLOSURE

The authors have nothing to disclose.

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