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The Effects of Session Standardization and Template Optimization on Improving Access to High-Demand Pediatric Subspecialty Care

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Abstract: A major focus of US health care systems is ensuring timely patient access to subspecialty care. This article describes the experiences of a large children's hospital after implementation of clinic session standardization and template optimization. Outpatient specialty clinic sessions were standardized to 4-hour periods, and all unfilled complex appointment slots were made available for any appointment type within 72 hours of the clinic date. Three high-demand outpatient clinical services achieved increased aggregate potential and completed outpatient appointments over a 2-year period. These improvements were mostly due to an increase in providers and were not always coupled to shorter patient lag times. **Key words:** *pediatric outpatient access, session standardization, template optimization*

ADVANCES in modern medicine and subspecialization of clinical expertise have challenged the capabilities of services to absorb outpatient demand in a timely manner. Any obstacles for patients to access care cause disturbances throughout the health care organization impacting productivity, efficiency, health care costs, and the quality of care delivered (Huang & Verduzco, 2015). In addition, patients and families experience significant stress and anxiety during long waiting periods for specialty appointments (Harrington et al., 2014; Mulcahy et al., 2010).

The accessibility to outpatient care varies across institutions and specialty services with several contributing factors: these include the clinic's physical space, support staff, appointment policies, no-show rates, and demand uncertainty (Cayirli et al., 2006; Huang & Marcak, 2015). Various health care delivery models have been studied in the literature suggesting solutions to access challenges. Standardizing appointment slot lengths (Huang, 2016a), analyzing no-show rates with predictive overbooking (Creps & Lotfi, 2017; Huang & Hanauer, 2014, 2016; Reid et al., 2015), reviewing scheduling methods including open access scheduling (Ansell et al., 2017; Cruz et al., 2018; Kopach et al., 2007; O'Connor et al., 2006; Stubbs

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et al., 2012), scheduling groups (Huang, 2016b), shared appointments (Edelman et al., 2015; Jhagroo et al., 2016), appointment slot times (Huang & Verduzco, 2015; Huang & Marcak, 2015; Qu et al., 2013), and appointment systems (Vissers, 1979), have all been evaluated. Most studies have utilized simulation or analytical modeling to predict access outcomes (Creps & Lotfi, 2017; Huang, 2016a, 2016b; Huang & Hanauer, 2015, 2016; Kopach et al., 2007; Qu et al., 2013; Reid et al., 2015; Vissers, 1979), with a paucity of case-specific reports. Our goal was to look at the impact of standardizing 4-hour sessions and optimizing appointment templates 3 days prior to a visit date for 3 high-demand pediatric subspecialty services at a large children's hospital.

METHODS

A large children's hospital in Texas provided care to almost 4.3 million patients in fiscal year (FY) 2018, with more than 1 million patient encounters occurring in the outpatient setting. Patients travel from all 50 states and nearly 70 countries to obtain expert care from over 40 pediatric subspecialties. A task force was assembled when patient access was identified as the primary institutional focus for FY2018. After evaluating multiple suggestions for improvement opportunities from a multidisciplinary group of stakeholders, the leadership committee identified standardization of clinic sessions and template management as the initial interventions to improve access to care.

A "clinic session" was defined as a time block of 4 hours. All providers were required to adhere to this 4-hour template; however, the allocation of time for each visit type and the number of new patients per session varied based on provider preference. In addition, some template appointment slots were being "held" for very complex subspecialty patients. These slots, at times, went unfilled. With the endorsement of the task force, unoccupied "held" slots were "flipped" open for any patient within 72 hours of the clinic date. Outpatient clinical time or outpatient sessions per year were a by-product of total clinical effort minus procedural and inpatient responsibilities. Three high-demand medical specialties with associated long wait times were identified—service A, service B, and service C. In several instances, historical clinic session times for services A, B, and C were noted to be anywhere between 2.5 and 3 hours. Clinic session standardization and 72-hour flips were initiated for services A and B on March 1, 2018, with the go-live for service C on April 1, 2018.

Data collection

New patient lag time was determined to be the gold standard metric to assess wait times and access. New patient lag time was defined as the consolidated amount of time between the appointment scheduling date and the date of service, as both of these data points were easily extractable from the scheduling data. No patient-specific information was evaluated. The following scheduling and operational metrics were retrieved and defined:

- *Completed appointments*—the number of scheduled clinic appointments completed
- *No-shows*—the number of occurrences in which a patient failed to present for his/her scheduled appointment without any advance notification
- *Clinical full-time equivalent agents* (cFTEs)—average portion of a provider's contracted time spent in clinical care based on a 40-hour work week
- *Fill rate*—the percentage of a provider's clinical capacity filled with *arrived* patients
- *Template utilization*—the percentage of a provider's clinic capacity filled with *scheduled* appointments based on available appointment slots
- *Median lag time*—the consolidated amount of time between the appointment scheduling date and the date of service

Additionally, the following values were calculated:

- *Total potential appointments* (completed appointments + no-shows)
- *No-show rates* (no-shows/total potential appointments)
- *Completed appointments/cFTEs*

Three different periods were evaluated—FY2017 (October 2016 through September 2017), early FY2018 (October 2017 to March 2018) annualized, and late FY2018 (April 2018 to September 2019) annualized. The data were annualized in 6-month blocks to identify and accentuate any changes in late FY2018 that may have resulted from the go-live of standardization of clinic sessions and the 72-hour flip template optimization.

RESULTS

Results of our study revealed variations in access outcomes and service productivity. Annualized potential and completed appointments increased after session length standardization and template optimization in the 2 intervals of FY2018 (Table). All 3 services realized a gain in annualized completed appointments (service A, 13%; service B, 5%; and service C, 6%) (Figure 1). Completed appointments per cFTE increased for service A (3%), with a decline in service B (−9%) and no discernible change in service C (−0.4%) (Figure 2). While lag times declined for service A from FY2017 through FY 2018 (9 days), lag times increased for services B (10 days) and C (16 days) (Figure 3).

DISCUSSION

Standardization has been employed throughout health care systems to improve performance metrics, efficiency, and quality of care (Adams et al., 2003; Ansari et al., 2018; Guzman et al., 2015; Huang, 2016a; O'Brien et al., 2018). After an institution-wide standardization of 4-hour clinic sessions and 72-hour flips, our study demonstrated the effects of these changes on patient access, more specifically, median lag times were inconsistent. Organizing and assessing the potential drivers of shortened lag times requires both an appreciation of the metrics, their benchmarks, as well as a full understanding of the scope of the clinical services of the specialty.

While all 3 services had an increase in their potential and completed annualized appointments in the periods examined, this increase was predominantly due to the hiring of new providers. Completed appointments per cFTE only increased slightly for service A, while services B and C were lower and flat. If the standardization of 4-hour sessions and 72-hour flips would have impacted access, there should have been a concomitant rise in appointments per cFTE as each cFTE's template utilization should have been positively affected, resulting in shorter lag times. Clearly, there are more levers to pull for improved access. On a microlevel, providers can customize visit types and attach them to time blocks to allow schedulers to fill sessions effectively. This is usually a scheduling strategy that providers prefer to customize themselves. A study by YL Huang evaluated mandated standardization of appointment-type slot length among 4 providers at a primary care clinic using simulation modeling (Huang, 2016a). The study demonstrated lower clinic productivity, service quality, and patient access to care, while increasing costs. It was concluded that appointment slots should be individualized by provider to improve service quality and patient access (Huang, 2016a). Once templates are built for each provider, all attempts must be made to accommodate new patient visits and minimize unavailable time slots that require "provider approval." On a more macrolevel, high-demand services with prolonged wait times need to understand their true outpatient capacity—the supply of providers to meet ambulatory demand. An increase in a service's cFTE number does not necessarily correlate with an increase in outpatient clinical effort. The best example of this in our article is the increase in lag times for service C despite an increase in cFTEs. Most of the clinical time for this service went toward an elective admission program essential to the service line, not the clinic. Calculating a cFTE for outpatient work requires backing procedural and inpatient time out of a contracted total cFTE. Many times, the proposed annual sessions per outpatient cFTE remain poorly defined. This may be compounded by a disproportionate share

Table. Access Outcomes and Service Productivity

	FY2017	Early FY2018 (October to March) Annualized	Late FY2018 (April to September) Annualized	Change Between FY2017 and Late FY2018
Completed appointments				
Service A	18 679	20 774	23 466	+25.6%
Service B	31 489	31 726	33 148	+5.3%
Service C	27 455	26 968	28 538	+3.9%
No shows				
Service A	2 869	3 084	3 292	+14.7%
Service B	5 477	5 564	6 128	+11.9%
Service C	5 682	5 786	6 460	+13.7%
Total potential appointments				
Service A	21 548	23 858	26 758	+24.2%
Service B	36 966	37 290	39 276	+6.2%
Service C	33 137	32 754	34 998	+5.6%
No-show rate				
Service A	0.13	0.13	0.12	−7.7%
Service B	0.15	0.15	0.16	+6.7%
Service C	0.20	0.18	0.18	−10.0%
RVUs				
Service A	30 595	33 320	38 256	+25.0%
Service B	109 526	116 248	126 648	+15.6%
Service C	84 737	89 690	93 204	+10.0%
cFTEs (average)				
Service A	8.26	8.51	9.30	+12.6%
Service B	32.53	32.84	37.69	+15.9%
Service C	23.70	24.10	25.60	+8.0%
Completed appointments/cFTEs				
Service A	2 261.38	2 441.13	2 523.23	+11.6%
Service B	968.00	966.08	879.49	−9.1%
Service C	1 158.00	1 118.50	1 114.30	−3.8%
Fill rates				
Service A	0.86	0.88	0.93	+8.1%
Service B	0.88	0.91	0.92	+4.5%
Service C	0.86	0.89	0.93	+8.1%
Template utilization				
Service A	0.73	0.74	0.79	+8.2%
Service B	0.76	0.78	0.79	+4.0%
Service C	0.71	0.74	0.76	+7.0%
Median lag time, d				
Service A	54	42	45	−16.7%
Service B	71	72	81	+14.1%
Service C	48	56	64	+33.3%

Abbreviations: cFTEs, clinical full-time equivalent agents; FY, fiscal year; RVUs, relative value units.

of a provider's paid time off coming out of their outpatient commitment. High-demand services need to understand the importance of getting patients "in the door." Achieving "timely" initial appointments requires redefining the importance of those providers who predominantly work in the outpatient setting. These providers are the foundation

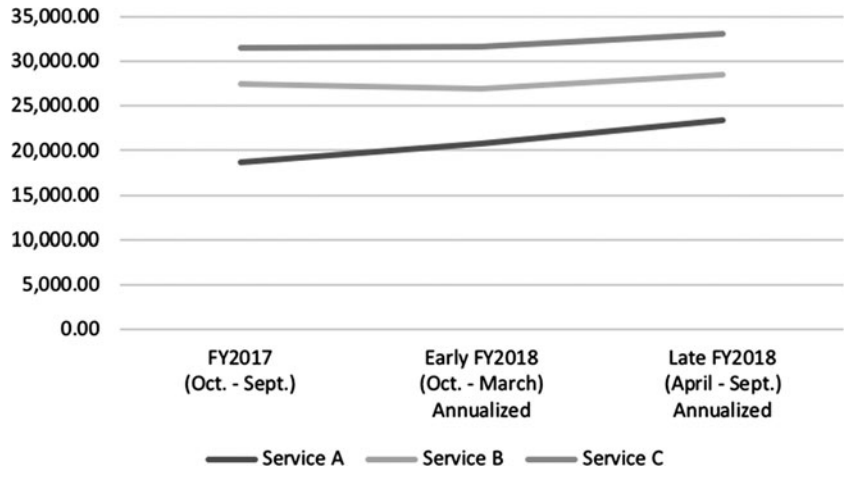

Figure 1. Total completed appointments.

for successfully maintaining the balance between supply and, on many occasions, dramatic shifts in seasonal demand. There needs to be consideration in incentivizing providers to excel in the outpatient environment and removing them from the scrutiny of relative value unit (RVU) metrics many institutions utilize to assess productivity as most RVUs come from procedures and inpatient work. The use of nurse practitioners and physician assistants also becomes relevant when a service is trying to expand capacity to meet excessive demand (Klassen & Yoogalingam, 2019).

The simplest way to assess the potential strategy for a high-demand specialty to improve access is to understand the graphical depiction of Figure 4. Benchmarking the overall productivity of a service per cFTE is the first metric. While there is national benchmarking data for work RVUs per cFTE, a more accurate measure dictating outpatient productivity would be potential outpatient encounters per outpatient cFTE. While there are no national benchmarks for this, this may be an internal metric aligned to budget. Potential encounters would be preferred over actual encounters as to not penalize providers for an institutional no-show rate. The second metric is wait times, using lag times as a proxy. The targeted intersections of the x- and y-axis can also be an

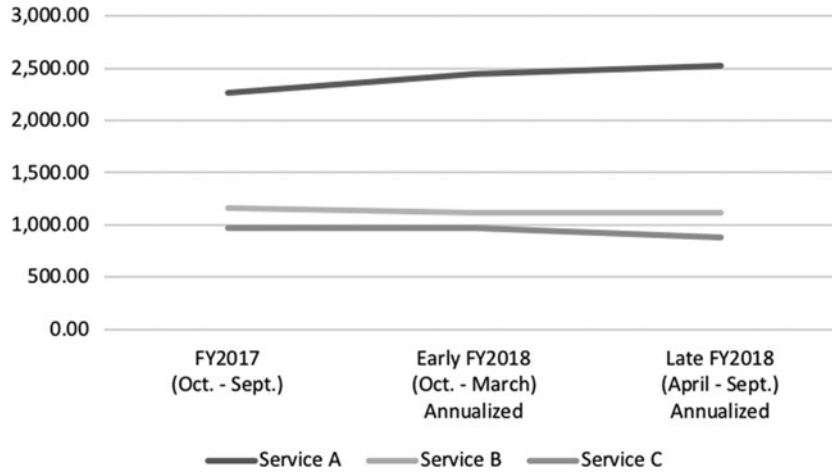

Figure 2. Completed appointments per cFTE. cFTE indicates clinical full-time equivalent agent.

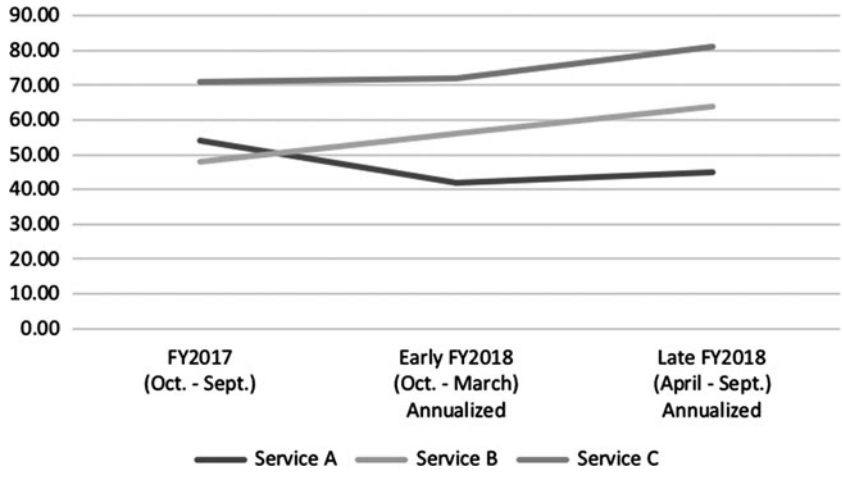

Figure 3. Lag time.

institutional decision. For example, the intersection of the y-axis, in Figure 4 , may be the expected number of potential encounters per outpatient cFTE per year. The intersection of the x-axis may be a median targeted lag time, for example 14 to 30 calendar days. Square "A" is the ideal practice situation. Services are working efficiently with potential encounters per outpatient cFTE operating at levels above expectations combined with low lag times. In scenario "B," providers are working with high efficiency; however, they are still not able to meet demand with patients experiencing long appointment wait times. This is a scenario where there is an obvious need for more providers. This is also a scenario where there is a high risk of provider burnout. In the final 2 scenarios in which provider potential encounter is lower than expectations, additional considerations are required. Scenario "C" is a situation where there may be an expected ramp-up of volume, there is a need for marketing, or there is an overabundance of providers. Scenario "D" is the most difficult situation to evaluate. In this scenario, there may be ambulatory infrastructure needs or electronic medical record optimization that would help improve provider activity. This is also a scenario where a deeper dive into template build and management could be helpful. Finally, based on inpatient and procedural obligations of the service, there may be a need for more dedicated outpatient providers, specifically nurse practitioners and physician assistants.

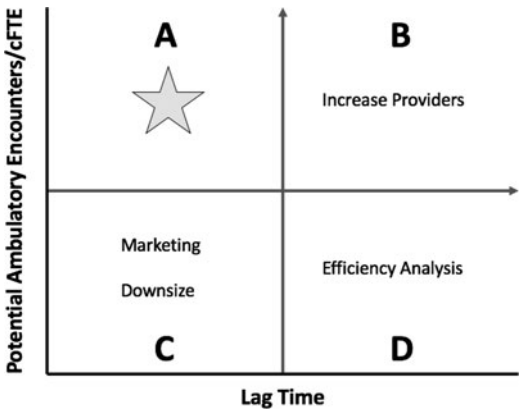

Figure 4. Strategies for access improvement.

Limitations

Several limitations exist in our single-institution study. As mentioned earlier, several access initiatives were implemented during the study period, and we are unable to determine which factor had a greater influence on access changes. Additionally, our study focused on only 3 medical specialty services with high demand and prolonged wait times. We did not report the impressive declines in wait times for the entire institution and its 40

different medical and surgical subspecialties. Our key outcome measure was lag time defined as the consolidated time between the appointment scheduling date and the date of service. A more accurate definition for lag time may have been the consolidated time from when the referral was received to the date of service, as typically there is a time gap between when the referral was received and when the appointment was made. We limited our study to the collection of independent and dependent variables that contribute to and define access to care. We did not measure any outcomes related to clinical quality or patient satisfaction. Our study focused on the acute changes seen from session standardization and template optimization. The session and template changes went into effect in FY2018, leading us to annualize the findings in each half of FY2018. This extrapolation of the data may not be the fairest depiction of potential access improvements, as these changes probably require a longer window of time to realize significance.

CONCLUSION

Patient access to care and long appointment wait times are major problems of outpatient health care delivery systems. Implementing clinic session standardization and template optimization has the potential for increasing aggregate potential and completed outpatient appointments for a high-demand service. This increase is not always coupled to shorter wait times. Services must focus on their true outpatient capacity and identify the outpatient providers who will serve as the pillars to meet excessive demand.

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