Increasing Scheduling Efficiency in an Outpatient Urology Clinic

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On my honor, I pledge that I have neither given nor received any unauthorized assistance on this paper. – Whitney Sharpe

Abstract

Context The use of efficient scheduling systems is needed to maximize healthcare outcomes and minimize costs in outpatient, non-emergent settings; however, clear and consistent procedures do not exist.

Objective To determine the effect of a nurse navigator on scheduling accuracy, efficiency and patient access in an outpatient urology clinic.

Design, Setting, and Participants A pre-post intervention study was conducted at a single site in the Mid-Atlantic. During the collective 180 days, a total of 30 clinics were held and 431 patients were seen by two urology providers. On average, each provider saw 14 patients (SD 2.83) per clinic day.

Intervention A new scheduling system was implemented, whereby a nurse navigator reviewed clinic schedules prior to patients' scheduled clinic appointments. The average number of patients per day was used to compare pre-intervention and post-intervention to determine if significant differences in scheduling inefficiencies existed with utilization of a nurse navigator.

Results After implementation, a statistically significant effect was observed in patients scheduled with the wrong specialist ($p < .05$, Fisher's exact test), missing records ($\chi^2 = 8.52$, $p < .01$), with incomplete tests and/or imaging ($\chi^2 = 18.81$, $p < .01$), and requiring follow up ($\chi^2 = 9.21$, $p < .01$). No statistically significant effect was observed for safe patient discharge ($\chi^2 = 0.26$, $p = .61$).

Conclusion The findings of this project are significant for generating clinical processes that increase scheduling efficiency, as well as developing recommendations for future research.

Increasing Scheduling Efficiency in an Outpatient Urology Clinic

The United States healthcare system currently accounts for 17.8% of the Gross Domestic Product and is expected to grow to 19.9% by 2025 (Centers for Medicare & Medicaid Services, 2017). As the cost of healthcare rises, efficient scheduling systems are needed to maximize healthcare outcomes and minimize costs in outpatient, non-emergent settings. Scheduling can impact patient and provider satisfaction, as well as have an impact on the financial gains and losses of an institution. Outpatient scheduling, however, is a challenging process at the local, national, and international levels (Agency for Healthcare Research and Quality, 2016). One reason scheduling is so challenging is healthcare systems vary amongst practices and institutions, and there are multiple options for scheduling system design and implementation (Bradenburg, Gabow, Steele, Toussain, & Tyson, 2015).

Although there is considerable research on various options for scheduling systems, the design and deployment of an efficient scheduling system has eluded today's healthcare arena. This purpose of this quality improvement (QI) project was to increase scheduling efficiency in an outpatient urology specialty clinic through the utilization of a nurse navigator.

Background and Significance

Background

At an outpatient urology clinic, located in an academic medical institution in the Mid-Atlantic, scheduling errors and inefficiencies are often a frustration for patients and providers. The six-month average patient satisfaction rating from July-December, 2016 for access to care in the department of urology was 79% (T. Boldin, personal communication, June 14, 2017), which exemplifies the opportunity for improvement. Annually, approximately one third of patients in the United States are referred to a specialist, and "specialist visits constitute more than half of

outpatient visits" (Mehrotra et al., 2011, p. 40). Due to the volume of self and physician referrals, an efficient scheduling framework for specialist visits is vital; however, improvements are needed to optimize the system (Chew, 2011).

Significance

Institutional data. According to Merritt Hawkins (2016), "Urologists…generate an average of $1.4 million or more in net revenue on behalf of their affiliated hospitals" (p.16). This revenue relies on scheduling teams to arrange patient consultations in a timely manner with the correct specialist. During the 2017 Fiscal Year, the department of interest had 24 clinical providers perform approximately 24,500 adult and pediatric clinic visits, 4,500 procedures, and 5,500 operative cases (T. Boldin, personal communication, July 27, 2017). Most of the providers have one clinical day per week to see patients, perform procedures, and schedule surgeries.

At the clinic of interest, a central scheduling team arranges appointments to specialty providers based on patients' diagnoses. Despite the presence of scheduling policies, factors such as patients' preference for a provider can pose a challenge to implementation (Gupta & Denton, 2008). Another challenge with scheduling accuracy is the manner in which patients' records are received. Patients are encouraged to have records faxed to the provider prior to their visit; however, most patients hand carry hard copies of their images and reports. If records are not available for review, the opportunity to discover scheduling errors prior to their appointment is missed.

National data. The National Quality Strategy (NQS) was developed to improve healthcare and quality at the local, state and national levels (Agency for Healthcare Research and Quality, 2016). One of the NQS's primary aims is better care to "improve the overall quality by

making health care more patient-centered, reliable, accessible and safe" (Agency for Healthcare Research and Quality, 2016, Achieving Aims Section). According to a recent study, 33% of patients identified delayed appointment scheduling as a hurdle to obtaining healthcare (Green, Savin, & Murray, 2007). The Institute of Medicine published a report with six goals to enhance healthcare. Timeliness is one of the stated six goals because delayed scheduling hinders patient care and affects healthcare outcomes (Institute of Medicine, 2001). An important component of achieving better care is designing scheduling systems that support increased patient access and deliver reliable service in a timely manner.

Purpose and Aims

This 12-week evidence-based project aimed to improve scheduling accuracy, efficiency and patient access in an outpatient urology clinic, located in an academic medical institution in the Mid-Atlantic. Desired outcomes included reducing patients scheduled with the wrong specialist based on diagnosis, increasing completeness of records received and completeness of tests/imaging performed prior to clinic visits, reducing unnecessary specialty clinic visits, and increasing patient flow with utilization of a nurse navigator and creating new procedures for gathering patient health histories. The project aims included: 1) to increase patient access to care over a 12- week period, 2) to increase clinic efficiency and patient flow over a 12-week period, and 3) to increase provider satisfaction scores by 10 percent, measured by pre- post- intervention survey.

Review of Literature

Prior to project development, a literature review was conducted fall 2017 to understand the complexity of scheduling systems. In this section, the evidence is synthesized around the

following challenges with scheduling: (a) access to care, (b) scheduling per diagnosis, and (c) wait time and patient flow.

Access to Care

Specialty clinics have unique scheduling constraints compared to primary care, due to the limited number of specialists and high volume of referrals. Performance measurements, including delays in appointment scheduling and delays in clinic wait-times are tracked as indicators of patient access and patient satisfaction (Bard et al., 2016). Studies show that the longer the patient wait time is from their requested appointment date, the higher the rates of cancellations and patient no-shows (LaGanga, 2011). Eliminating low-risk patients from the schedule is shown to not only reduce costs associate with specialty care visits, but also increase clinic access for higher-risk patients. Multiple studies have referred low-risk/need patients to advanced practitioners or primary care providers, which accelerated clinic visits for patients with more urgent needs (Singh & Watve, 2015, Tuot et al., 2014).

Scheduling per Diagnosis

Timely access to care that is based on specific diagnoses is vital, yet a challenge for optimizing medical outcomes (Gupta & Denton, 2008). Often records are not transferred, patients are unaware of their correct diagnosis, and appointment availability creates an ineffective scheduling process (Mehrotra, Forrest, & Lin, 2011). If new patients are scheduled with the wrong specialists based on their diagnosis, surgeons experience frustration because it is a missed opportunity to book a surgery. Patients experience frustration because they often leave without a treatment plan and require a referral to another provider. When patients are incorrectly scheduled, they typically have to arrange a future appointment with the correct specialist for

further evaluation (Gupta & Denton, 2008). This error results in patients accumulating additional travel costs, time off work, and a further delay in executing a plan of care.

Wait Time and Patient Flow

Patient flow involves the "movement between activities, each requiring a unique set of resources and consuming time" (Bard et al., 2016, p. 175). Many factors are associated with delays in patient flow, including patient tardiness, paperwork delays, inconsistencies in protocols, and clinic constraints, such as available patient exam rooms (Bard et al., 2016). Patient wait time at appointments is common, with studies reporting up to 64% of patients experience unsatisfactory wait times, as well as patients attributing long wait times as an elected reason to forgo follow-up appointments (Rohleder, Lewkonia, Bischak, & Duffy, 2011). Achieving a balance between patient wait time and provider idle time is a challenge. The cost associated with provider idle times is high, and therefore it is prioritized from a cost-utilization perspective (Chew, 2011). Specialty clinics are particularly driven to minimize provider idle time because compared to primary care, the specialists' time is more-costly and appointment availability a more limited resource (Gupta & Denton, 2007). Employing a targeted scheduling approach, based on each clinic's individual resources, patient population, staff ratio, and system process design, can maximize clinic utilization (Huang & Verduzco, 2015).

Methods

The Pronovost Model served as the framework for this DNP scholarly project, which utilized a staged approach to translating the innovation into practice (White, Dudley-Brown, & Terhaar, 2016). To evaluate the effect of utilizing a nurse navigator on scheduling efficiency, a pre-post intervention study was conducted at a single site, located in the Mid-Atlantic region of the United States. Pre-intervention data was prospectively collected, followed by an intervention

period of 90 days, during which post-intervention data was collected. Between May 14, 2018, and August 3, 2018, baseline data was collected on 15 clinic days with 218 patients seen. During implementation conducted September 17, 2018 through December 7, 2018, a total of 213 patients were seen on 15 clinic days. A pre-posttest design was also utilized to measure provider satisfaction. A pre-test assessment was conducted within two weeks of the project implementation, and a post-test conducted within two weeks following the 90-day intervention period. This quality improvement (QI) project was reviewed and acknowledged by the Johns Hopkins Institutional Review Board. There was no recruitment or randomization, and no conflicts of interest identified.

Sample

The project involved two samples. The first sample was urology providers whose patients were involved in the project. The second sample was the patient target population, which included a convenience sample of adult urology patients seen at the outpatient urology clinic of interest. There was no control group. Inclusion criteria included: 1) two urologists, and 2) all adult urology patients of the two urologists on scheduled clinic days at the clinic of interest. Exclusion criteria included: 1) other urologists or providers, and 2) pediatric patients or patients scheduled for clinic procedures.

Intervention

Beginning in September 2018, a new scheduling system was implemented, whereby a nurse, prior to patients' scheduled clinic visits: 1) identified patients who were low risk and eligible for either discharge to primary care (PCP) or phone follow-up, 2) identified patients scheduled with the wrong specialist based on diagnosis and/or visit type, 3) identified patients with missing or incomplete records, and 4) identified patient with incomplete tests/imaging needed prior to clinic

visit. A new procedure for gathering patient health histories was also implemented as part of the intervention to increase clinic flow and provider satisfaction. Urology check-in staff were educated pre-intervention to administer a kidney stone specific health history questionnaire to new patients for completion prior to the clinical encounter.

Measures and analytical strategy

The primary outcomes measures were: 1) number of patients scheduled with the wrong specialist based on diagnosis and/or visit type, 2) number of patients identified as eligible for follow up by phone or discharge to PCP, 3) number of patients missing records at clinic visit, 4) number of patient with incomplete imaging and/or laboratory tests required for completeness of clinic visit, and 5) number of patients requiring follow up to complete their plan of care. These measures were recorded as total number of patients per clinic date. The average number of patients per day was used to compare pre-intervention and post-intervention to determine if significant differences in scheduling inefficiencies existed with utilization of a nurse navigator.

A secondary measure was provider satisfaction ratings. A 3-question measure was developed to determine provider satisfaction pre- and post-intervention. The survey was adapted from the Overall Job Satisfaction measure, developed by Cammann, Fichman, Jenkins, and Klesh in 1983 (Fields, 2013). Items pertaining to satisfaction were rated on a 7-point Likert scale (7, strongly agree; 6, agree; 5, slightly agree; 4, neither agree nor disagree; 3, slightly disagree; 2, disagree; 1, strongly disagree). Response scores from each provider was transformed with a possible range of 3 to 21, with 21 representing highest level of satisfaction.

Statistical Analysis

A chi-squared test was used to assess the effect of implementing a nurse navigator on scheduling inefficiency measures. The analyses were grouped according to aims. There were no

missing values.

Aim one was to increase patient access to care over 12-weeks. Desired outcomes included: 1) to reduce the number of patients seen by the wrong specialist based on diagnosis and/or visit type by 10%, and 2) to reduce the number of unnecessary follow up visits by 10%. Aim two was to increase clinic efficiency and flow over 12-weeks. Desired outcomes included: 1) to reduce the number of patients with incomplete records at clinic visit by 10%, 2) to reduce the number of patient with incomplete tests and/or imaging at clinic visit by 10%, and 3) to reduce the number of patients requiring follow up to complete their plan of care by 10%.

Aim three was to increase provider satisfaction by 10% with utilization of a nurse navigator. The responses were anonymous; therefore, the median and interquartile ranges pre and post-intervention were compared. No statistical analysis was performed due to the small fixed sample size of two urologist and the survey being administered anonymously.

Results

Table 1 shows characteristics of the sample collected during baseline and intervention periods. A total of 30 clinic days were held during the collective 180 days. During the entire time period, a total of 431 patients were seen by two urology providers. Provider 1 saw 62% of patients (n=266), and Provider 2 saw 38% (n=165) of patients. On average, each provider saw 14 patients (SD 2.83) per clinic day.

Aim 1: To Increase Patient Access to Care Over a 12- Week Period

Scheduled with the wrong specialist. There were 9 (of 218) patients scheduled with the wrong provider before the intervention, and 0 (of 213) patients schedule with the wrong provider after the intervention. The intervention significantly reduced the number of patients scheduled with the wrong specialist ($p < .05$, Fisher's exact test), as presented in Table 2.

Eligible for safe discharge. Pre-intervention 12% (*n*=27 of 218) patients were identified as low-risk and eligible for follow up by phone or with their PCP, compared to 11% (*n*=23 of 213) of patients post-intervention. The effect was not statistically significant (χ^2 = 0.26, *p* = .61).

Aim 2: To Increase Clinic Efficiency and Patient Flow Over a 12-Week Period

Missing records. Comparing the frequency of patients missing records at clinic visits, the effect was statistically significant (χ^2 = 8.52, *p* < .01). Patients were more likely missing records pre-invention (10%, *n*=21 of 218) than post-intervention (3%, *n*=6 of 213).

Incomplete tests and/or imaging. There was a statistically significant effect for patients with incomplete tests and/or imaging (χ^2 = 18.81, *p* < .01). It was observed that 14% (*n*=30 of 218) of patients pre-intervention were missing tests and/or imaging, compared to 2% (*n*=5 of 213) of patients post-intervention.

Require follow up. A statistically significant effect was found comparing the frequency of patients requiring follow up to complete their plan of care (χ^2 = 9.21, *p* < .01). Patient pre-intervention were more likely to require follow up (28%, *n*=60 of 218) than post-intervention (15%, *n*=22 of 213).

Aim 3: To Increase Provider Satisfaction Scores by 10 percent, Measured by Pre- Post-Intervention Survey

Baseline median satisfaction score for both providers was 10.5 points out of 21 total points. When both providers were surveyed again post-intervention, the median satisfaction score increased by two points, to 12.5 out of 21 total points.

Discussion

Strengths

This QI project demonstrated over 12-weeks that utilizing a nurse navigator in an outpatient urology clinic significantly reduced patients: 1) scheduled with the wrong specialist based on diagnosis and/or visit type, 2) missing records, 3) with incomplete tests and/or imaging, and 4) requiring follow up to complete their plan of care. The findings of this project are significant for generating new scheduling processes that increase scheduling efficiency, as well as developing recommendations for future research. This study extended prior literature by evaluating safe patient discharge as a means to increase access to care (Singh & Watve, 2015; Tuot et al., 2014). There are potential explanations for this being the only effect that was not significantly significant, such as variations in clinic characteristics and provider preferences. It makes it apparent that what may be ideal scheduling strategies for one organization may not translate to other settings. Compared to prior literature, this study addressed scheduling processes across multiple measures and was an initiative specifically evaluating a nurse to improve processes.

Limitations

The small sample size of two urologists made it difficult to show meaningful change. There was also risk of response bias. Provider satisfaction surveys were anonymous; however, the urologists were aware of the study aims. Expanding the scope to include all urologists in the department would be beneficial to demonstrate a more substantial impact and reduce risk of bias.

Comment and Recommendations

Clinic scheduling is a complex process due to variations in clinic characteristics, such as number of providers, services provided, timing of patient arrival, and rate of no-shows.

Variations in provider preferences is also a limitation in creating a streamlined process. Each specialist has distinct rules in regards to overbooking patients, seeing patients on non-clinic days, and working through lunch or staying late to accommodate urgent needs (Gupta & Denton, 2007). Currently, scheduling processes must be designed based on the specific conditions of each organization. Future research should focus on discovering a streamline process that organizations can utilize despite variations in clinic characteristics. Potential areas for research include replicating utilizing a nurse navigator in other settings, performing cost-benefit analyses, measuring patient satisfaction, as well as alternative methods to increasing scheduling efficiency.

Dissemination

The first step in disseminating the study findings is presenting to departmental and organizational stakeholders. It is critical for stakeholders to understand the complexities of scheduling and the benefits of a nurse navigator in specialty practice. Stakeholder support is also needed for future QI initiatives, such as performing a larger scale study including all urology providers. This work will also be shared with the healthcare community via publication and professional conferences. It intends to serve as a model for other departments seeking to improve scheduling processes, as well as stimulate alternative approaches for scheduling system design.

Conclusion

Overall, there are many variables that impact the challenges, accuracies, and efficiencies with patient scheduling (Cayirli & Veeral, 2003; Gupta & Denton, 2006; Kaandorp & Koole, 2007). Local key performance indicators and national guidelines exemplify the need to maximize healthcare scheduling systems to optimize patient outcomes. Specialty clinics have unique challenges, due to high physician costs, increasing patient referrals, and the need for

timely access to care. The review of literature helped generate the presented scholarly project based on the Pronovost Framework, which utilizes a staged approach to translating the innovation into practice. While there was improvement of efficiency measures with utilization of a nurse navigator, additional research is needed to find a streamlined approach that can be utilized by diverse settings to create a more efficient scheduling system.

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Table 1
Data collection characteristics

Characteristics	Baseline data collection phase May-July, 2018 (#)	Intervention data collection phase September-December, 2018 (#)	Both data collection phases (#)
Providers involved in the project	2	2	2
Weeks data collected	12	12	24
Clinical encounters	15	15	30
Patients seen in clinic	218	213	431
Patients seen by Provider 1	128	138	266
Patients seen by Provider 2	90	75	165

Table 2
Scheduling Inefficiency Indicators: Baseline and Intervention Data Comparison over 12-weeks

Scheduling Inefficiency	Number of Patients at Baseline (*N*=218) *n* (%)	Number of Patients at Intervention (*N*=213) *n* (%)	*p*-value
Wrong Provider for Dx/Visit Type	9 (4%)	0 (0%)	<0.05
Eligible for Phone or PCP F/U	27 (12%)	23 (11%)	0.61
Missing Records	21 (10%)	6 (3%)	<0.01
Incomplete Lab/Imaging Tests	30 (14%)	5 (2%)	<0.01
Require F/U for Plan of Care	60 (28%)	33 (15%)	<0.01

Note. Abbreviations: Dx, diagnosis; PCP, primary care provider; F/U, follow up