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**Electronic health record integration: Reducing documentation burden through electronic
screening and registration**

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Electronic health record integration: Reducing documentation burden through electronic screening and registration

Introduction

Poor healthcare access in the outpatient setting has long been attributed, in part, to documentation burden and provider burnout. The purpose of this quality improvement project was to mitigate these factors in a mid-sized family practice clinic in Central Oregon by implementing an electronic registration and screening process. This manuscript describes the challenging attempt to implement this electronic health record (EHR)-based process and concludes with speculations on the implications of these challenges for the healthcare system as a whole.

Background and Significance of Clinical Problem

Access to preventive medicine is an ongoing challenge in modern healthcare. As of 2015, 8% of adults over the age of 35 have received all of the high-priority, evidence-based preventive care services recommended for them, and 87.8% of Americans do not have a usual place to go for preventive health care (Borsky et al., 2018; Centers for Disease Control and Prevention [CDC], 2021). High-quality preventive care contributes to disease and disability prevention, minimization of hospital admissions, health maintenance, decreased healthcare spending, and improved quality of life (Office of Disease Prevention and Health Promotion [ODPHP], 2020). Over 20 million Americans have gained access to health insurance in the last decade with the passage of the Affordable Care Act (ACA) in 2010, which has placed increased demands on the already strained healthcare system. In combination with an aging population and growing numbers of adults living with chronic conditions, these developments highlight the need for

improved healthcare access. Notable contributors to the deficit in healthcare access are the timeliness of care and provider shortage (ODPHP, 2020).

Timeliness of care is one of the Institute of Medicine's (IOM) primary objectives for healthcare improvement (Michael et al., 2013). Timeliness in healthcare describes how quickly patients can access care when needed, and in-clinic wait time is a crucial indicator of care quality in the outpatient setting (Leddy et al., 2003; ODPHP, 2020). Patients who experience short wait times (0-5 minutes) report high overall satisfaction (95%), but patients who wait longer than 30 minutes report lower overall satisfaction with their care (85% or less) (Kovach & Ingle, 2019). Although the total acceptable wait time for a primary care appointment is 30 minutes or less, the average patient waits a total of 41-120 minutes during a routine office visit (Kaplan et al., 2015; Michael et al., 2013; Xie & Calvin, 2017). These long wait times in conjunction with brief face-to-face visits with the provider that average 18.2 minutes decrease patient satisfaction (Anderson et al., 2007; Brandenburg et al., 2015; Kaplan et al., 2015; Michael et al., 2013; Robinson et al., 2020; Xie & Calvin, 2017). Excessive wait times during office visits contribute to significant barriers to care in the forms of decreased patient satisfaction as patients spend extended periods in the office; significant delays in care as clinics run late; and an increase in the number of patients who do not adhere to their treatment plan, follow up with their provider, or present for their subsequent appointments (Brandenburg et al., 2015; Kovach & Ingle, 2019; Leddy et al., 2003; Robinson et al., 2020; ODPHP, 2020). Long wait times in primary care offices are one of the most significant contributors to patient dissatisfaction with their care and perceptions of their providers' inability to provide safe and quality care (Kovach & Ingle, 2019; Michael et al., 2013; ODPHP, 2020; Xie & Calvin, 2017).

Although increased care coverage under the ACA has dramatically increased the demand for primary health care over the last decade, there will be an estimated shortage of 21,400 to 55,200 primary care providers (PCPs) in the United States by 2033, resulting in a stark decline in healthcare access and quality (Association of American Medical Colleges [AAMC], 2020; Brandenburg et al., 2015). This deficit is partially due to increasingly robust administrative and documentation burdens posed by ACA reimbursement models, Meaningful Use mandates, and regulatory requirements as well as EHRs that have not expanded to meet the growing need of clinicians to enter, consume, and interpret patient data (Moy et al., 2021). Between 43% and 61% of outpatient providers report that EHRs increased their documentation burden overall, requiring large amounts of patient information to be manually inputted into the patient record and creating inefficient workflows (Moy et al., 2021). The results of these burdens are low numbers of providers entering or remaining in primary care, poor provider job satisfaction, and burnout and attrition rates as high as 50% (Brandenburg et al., 2015; Erickson et al., 2017; Robinson et al., 2020). In addition to threatening healthcare access and quality, burnout has significant personal consequences, including disproportionately high rates of depression, alcohol abuse, and suicide attempts and completion among PCPs (Shanafelt et al., 2012). Documentation burden is associated with poor quality of care in the forms of low-quality documentation, medical errors, threats to patient safety, and decreased access to care (Moy et al., 2021). Some providers decline to work with specific payers or opt to remain out of compliance with incentive programs due to the associated administrative requirements, threatening healthcare access and quality (Erickson et al., 2017; Moy et al., 2021). Providers report employing time-saving strategies to account for the overwhelming documentation burden, such as copying and pasting from other patients or encounter notes, shortening patient visits, and writing abbreviated encounter notes (Flanagan et

al., 2019). Providers report feeling the need to split their attention between delivering care and charting, even in the exam room (Flanagan et al., 2019). A 2013 survey found that 73% of primary care residents perceive compromises to patient care due to documentation requirements (Erickson et al., 2017). Studies consistently suggest that PCPs spend twice as much time on documentation than direct patient care (Arndt et al., 2017; Erickson et al., 2017; Moy et al., 2021). An average of 11% of documentation occurs outside of regular working hours, with providers spending as much as two to three hours before or after clinic hours writing chart notes (Arndt et al., 2017; Erickson et al., 2017). Consequently, providers are prone to fatigue- or focus-related errors in care and documentation (Erickson et al., 2017; Moy et al., 2021).

The American College of Physicians (ACP) has long advocated for the importance of reducing the administrative and documentation burden on providers, positing that reducing the excessive administrative tasks expected of PCPs will place the time and focus of healthcare back on the patient (Erickson et al., 2017). Additionally, the U.S. Department of Health and Human Services (HHS) released a report in March 2020 outlining three primary goals to reduce EHR-related administrative burden that negatively impacts care: reduce the time and effort required to document health information and meet regulatory requirements and improve EHR ease of use (Moy et al., 2021). With these recommendations in mind, an increasing focus must be placed on redesigning clinic workflow by reducing redundant and inefficient documentation practices and expanding the utility of existing EHR software (Brandenburg et al., 2015; Erickson et al., 2017; Moy et al., 2021).

The focus of this project is the process of intake and registration for all web-enabled patients at a midsized family practice clinic in Central Oregon. According to this clinic's 2020 Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey results, the clinic's

patients are generally dissatisfied with the timeliness of care access, suggesting the necessity of a process change to address areas of potential improvement (Patient-Centered Primary Care Home Project [PCPCH], 2020).

Objectives and Aims

This project aimed to implement an electronic intake and registration procedure to add value to the existing patient cycle time and reduce the administrative burdens on all clinic staff with documentation responsibilities. The standard measure used to address patient flow and wait times in the outpatient setting is Patient Cycle Time which refers to the amount of time elapsed during a patient appointment (Institute for Healthcare Improvement [IHI], 2021a; Robinson et al., 2020). The Patient Cycle Time Tool developed by the Institute for Healthcare Improvement is a validated tool used to assess patient flow and wait times in the outpatient setting (IHI, 2021a; Robinson et al., 2020). Patient Cycle Time can be subdivided into valuable time, such as time spent face-to-face with a nurse or provider, and non-valuable time, such as waiting in the lobby or exam room (Backer, 2002; Robinson et al., 2020). One of the anticipated outcomes of this project is an increase in productive time and a decrease in nonproductive time, with or without a decrease in overall patient cycle time (Robinson et al., 2020). This alteration in the distribution of time during patient appointments can also be understood as an increase in the value of patient cycle time (Robinson et al., 2020). Patients' satisfaction with the wait time during their appointment will improve due to decreased duplicative documentation requirements for providers and staff. Additionally, this project aims to reduce the administrative burden on the clinic staff and consequently improve staff satisfaction with documentation time. The outcome and process measures used to guide the intervention are detailed in Appendix A.

Theoretical Framework

Normalization Process Theory (NPT) underpinned the practice change. NPT is a theoretical framework that takes a sociological approach to translate research into practice in healthcare (McEvoy et al., 2014). NPT focuses on the social aspects of work (implementation), routinizing (or embedding) new processes into everyday practice, and sustaining (or integrating) embedded practices long-term (Gillespie et al., 2018). This theory addresses the factors that promote or inhibit the adoption of a practice change and how people understand, engage with, and appraise the outcomes of process change in the context of their organization (McEvoy et al., 2014). NPT acknowledges how knowledge is created and transferred among a professional group and the work the change agents (i.e., clinicians or administrative staff) must undertake to translate a process change into practice (McEvoy et al., 2014). NPT uses existing structures and interpersonal relationships within an organization to routinize and normalize a process change (McEvoy et al., 2014). NPT has been applied to many practice change initiatives involving technology adoption into healthcare, such as telemedicine, E-health, and patient portals (May et al., 2018). NPT comprises four theoretical constructs that shape the implementation process: (1) coherence refers to the work that the participants must do individually or collectively to understand the practice change; (2) cognitive participation describes the relational work required to engage participants in the practice change in a sustainable way, such as by achieving buy-in; (3) collective action refers to the operational work done by individuals or groups of agents to enact the practice change; and (4) reflexive monitoring describes the appraisal work to assess and monitor the practice change to understand its impact (Gillespie et al., 2018; May et al., 2015; McEvoy et al., 2014).

Innovation and Review of Literature

The effect of reducing documentation burden on improved patient and provider satisfaction is well-supported by the literature, but few organizational interventions to achieve this have been studied. Practice changes that streamline documentation and registration, such as introducing medical scribes, pre-appointment registration procedures, or automating routine screening, are recognized as valuable means to increase clinic efficiency and improve access to care (Brandenburg et al., 2015; Kovach & Ingle, 2019; Michael et al., 2013; Robinson et al., 2020; Young et al., 2014). Studies examining the role that medical scribes play in reducing documentation burden in primary care suggests that eliminating even small amounts of the documentation requirement from a provider's workflow results in improved provider quality of life, burnout, and job satisfaction as well as patient satisfaction with their care (Bates & Landman, 2018; Moy et al., 2021; Overhage & McCallie, 2020; Pozdnyakova et al., 2018). One study that implemented a pre-appointment registration procedure noted fewer delays in relaying screenings and charts from the front desk to clinical staff; improved patient flow and fewer patients in the waiting area at one time; improved patient privacy during registration; fewer interruptions during the check-in process; and fewer registration errors (Michael et al., 2013). Another study, which implemented various methods of automating registration, successfully increased the percentage of patients that saw their provider within 15 minutes of arriving at the clinic from 82% to 95% also saw an increase in patient willingness to "recommend this provider office" from 92.5% to 100% (Robinson et al., 2020). The patients in this study reported spending adequate time with their providers despite decreasing cycle time (Robinson et al., 2020).

With these findings in mind, as well as the recommendations from the IOM, ACP, and HHS, an increased focus must be placed on redesigning clinic workflow by reducing redundant

and inefficient documentation practices and expanding the utility of existing EHR software (Brandenburg et al., 2015; Erickson et al., 2017; Moy et al., 2021). One factor contributing to long office wait times and provider burnout is the antiquated practice of collecting paper-and-pen intake and screening forms at the time of service, which is inefficient and often inaccurate (Brandenburg et al., 2015; Robinson et al., 2020). This practice contributes to documentation burden as providers and staff are required to manually enter data into the EHR during or after the visit, and health information and screenings are not available to the provider for review until after the appointment has begun. The inefficiency of this process provides an opportunity for the elimination of redundant and wasteful documentation practices, which would consequently improve documentation burden, timely access to care, patient and staff satisfaction, and the value of patient cycle time (Anderson et al., 2007; Brandenburg et al., 2015; Erickson et al., 2017; Michael et al., 2013; Moy et al., 2021; Robinson et al., 2020).

The solution is integrating electronic intake and patient registration that is accessible to patients on a smartphone-based mobile application or an online patient portal. The shift of intake and registration from a manual staff-led process to an electronic patient-led process reduces redundant documentation and consequently improves patient and provider satisfaction and the efficiency of the clinic overall (Condon, 2020; Pirasteh et al., 2016).

Methods and Implementation

The goal of this project was to implement electronic screening and registration at a mid-sized family practice clinic to increase efficiency and improve patient and provider satisfaction.

Participants & Participant Recruitment

Participants were recruited via a convenience sample of all providers, ancillary medical staff, and administrative support staff employed by the clinic and all patients who presented to

the clinic for a scheduled appointment during the two-week data collection period. A total of 30 clinic staff participated, including five primary care providers, two behavioral health providers, three massage therapists, one laser aesthetics technician, six medical assistants, and thirteen administrative staff. All participants were over the age of 18 years. The project was approved by the University of Portland Institutional Review Board.

Implementation Plan

The implementation plan was based on the constructs of NPT to support routinization and sustainability of electronic intake and registration. The Doctor of Nursing Practice (DNP) student conducted a thorough microsystems assessment to inform the selection of outcome and process measures. To achieve buy-in, the DNP student collaborated with a multidisciplinary group of stakeholders, including the clinic director and clinical informaticist. These stakeholders completed such activities as participating in software development, advocating for the practice change among other clinic staff, engaging in plan-do-study-act (PDSA) cycles with the DNP student, reinforcing the staff- and patient-centered benefits of the initiative through participant education, troubleshooting issues as they arise, and developing an implementation and sustainability plan (Miech et al., 2018). Operationalization of the project included staff education, software development, and several PDSA cycles. After the implementation period, project results would be disseminated to the clinic staff during scheduled monthly staff meetings.

Project Challenges

The DNP student worked closely with the clinic to develop and implement an electronic screening and registration procedure by optimizing the utility of the clinic's existing EHR. However, significant technical challenges were identified that rendered the original plan for project implementation impossible. These challenges are detailed below in the Lessons Learned

section. The DNP student and stakeholders engaged in multiple rigorous PSDA cycles throughout the process of software development. Ultimately, the clinical informaticist recommended that the program be postponed until the clinic leadership is able or willing to purchase supplemental software packages or switch EHR providers altogether. Due to these insurmountable challenges, the DNP student modified the implementation plan into a format that would more thoroughly investigate the organizational context of the clinic through the lens of patient wait times and provider burnout as a result of the EHR.

Modified Implementation Plan

The DNP student engaged in several PSDA cycles with the clinic stakeholders and University advisors to determine how to maximize the utility of the evidence-based recommendations in the setting of this project's substantial challenges. Participant recruitment and inclusion criteria were unchanged in the revised implementation plan. However, rather than pre- and post-implementation data collection, the revised project included a survey administered to all participants initially included in the work to better understand the staff's current level of burnout, the amount of time spent on documentation, and the staff's satisfaction with the amount of time spent on documentation. Additionally, all adult patients who arrived at the clinic for an in-person appointment during the two-week implementation period were asked to complete a survey detailing the time elapsed during every phase of their appointment and their level of satisfaction with the amount of time they spent waiting during their appointment. The data from these surveys were analyzed as described in the Data Analysis section, and the results were compared to the evidence-based recommendations to better understand the clinic's baseline performance in these areas. This baseline data was used to inform recommendations for practice change. Due to the project's change in focus and the decision to postpone the electronic intake

and registration implementation until the clinic procures adequate resources, patient and staff training was limited to the provision of information sheets provided at the time of survey collection. The project results will be disseminated to the clinic leadership team in the form of a manuscript and poster.

Evaluation Plan

Data Collection

Data collected from patients consists of responses to the Patient Cycle Time Tool survey, subjective satisfaction with their in-office wait times, and which appointment type applied to them (see Appendix B). The survey was accessible via a Quick Response (QR) code at the bottom of the Patient Information Sheet provided to all patients who arrived for scheduled appointments during the data collection period. Staff data consisted of staff responses to the Maslach Burnout Inventory (MBI), estimations and subjective satisfaction with the time spent charting, and free text suggestions for improved clinic processes (see Appendix C). Printed staff surveys were distributed and collected by the DNP student.

Data Analysis

Of the 50 staff surveys that were distributed, 12 were completed and returned. Scores on the MBI were computed for each subsection (emotional exhaustion [EE], depersonalization [DP], and personal accomplishment [PA]), and the mean and standard deviation for each subsection and staff type were calculated. Each score was categorized (low, moderate, high) in their corresponding subsection. The average estimate of time spent on documentation was calculated. The staff's subjective satisfaction was stratified by percentage and staff type. Thematic analysis was used to categorize and assess the staff's free-text responses.

Patient surveys were available for 15 days of clinic operation, and eight were completed and submitted. The average amount of time spent waiting in the clinic lobby and the exam room was calculated. Patients' subjective satisfaction with their wait time was stratified by percentage.

Results

EE and DP were high and PA was moderate among all staff according to the MBI as shown in table 1.

Table 1

Maslach Burnout Inventory response data

Staff Type	Emotional Exhaustion				
	Provider	Non-Provider Healthcare Personnel	Front Desk Support Staff	Other Administrative Staff*	Total Staff
Mean	41.5	45.67	32.67	38.5	39.83
Standard Deviation	5.45	5.86	8.62	9.19	7.76
Categorization	High	High	High	High	High
Staff Type	Personal Accomplishment				
	Provider	Non-Provider Healthcare Personnel	Front Desk Support Staff	Other Administrative Staff*	Total Staff
Mean	36.25	31.33	31.67	32.5	33.25
Standard Deviation	2.50	3.79	3.06	6.36	3.84
Categorization	Moderate	Moderate	Moderate	Moderate	Moderate
Staff Type	Depersonalization				
	Provider	Non-Provider Healthcare Personnel	Front Desk Support Staff	Other Administrative Staff*	Total Staff
Mean	15.5	21.33	20	22.5	19.25
Standard Deviation	3.51	7.23	6.24	9.19	6.00
Categorization	High	High	High	High	High

*Sample size too small to deduce meaningful results

Among all staff, 33.33% rated their satisfaction with the amount of time spent documenting patient encounters as “neither satisfied nor dissatisfied”, 50% were “slightly satisfied”, and 16.67% were “not at all satisfied”, as shown in table 2.

Providers estimated that they spend an average of 24 minutes documenting new patient appointments and 21 minutes on returning patient appointments. Non-provider healthcare

personnel (NPHP) estimate spending 24.7 minutes for new patients and 16.3 minutes for returning patients. Front desk staff estimates spending 8.2 minutes on new patients and 9.8 minutes on returning patients. The sample size of other administrative staff was too small to calculate a usable average time estimate. The average documentation time is described in table 3.

Table 2

Staff satisfaction with documentation time

Overall, how would you rate your satisfaction with the amount of time you spend documenting patient encounters?	Provider	Non-Provider Healthcare Personnel	Front Desk Support Staff	Other Administrative Staff	Total
Not at all satisfied		66%			16.67%
Slightly satisfied	100%		33%	50%	50.00%
Neither satisfied nor dissatisfied		33%	66%	50%	33.33%
Very satisfied					
Completely satisfied					
N/A to my job function					

Table 3

Average staff-reported time spent on documentation

For every new/returning patient appointment, approximately how much time do you spend on documentation (including chart review, inputting orders, and referrals)?	Provider	Non-Provider Healthcare Personnel	Front Desk Support Staff	Other Administrative Staff*
Average (minutes) for new patient appointment	24	24.7	8.2	30
Average (minutes) for returning patient appointment	21	16.3	9.8	23

*Sample size too small to deduce meaningful results

Two clear themes were identified through thematic analysis of the staff's free-text responses to the question: In your opinion, how can patient registration, documentation, and collection of routine screenings be made more efficient at the clinic?. The majority (66.67%) of staff surveyed cited (1) electronic paperwork as the primary option for improvement, while

33.33% of staff cited (2) volume of patient screening forms and Quality Improvement Measures (QIMs) documentation requirements.

Patients spent an average of 36 minutes of nonproductive time during their appointment, including time spent waiting in the lobby and exam room, as shown in table 4. Patients reported an average of 14 minutes of face-to-face time spent with their providers.

Table 4

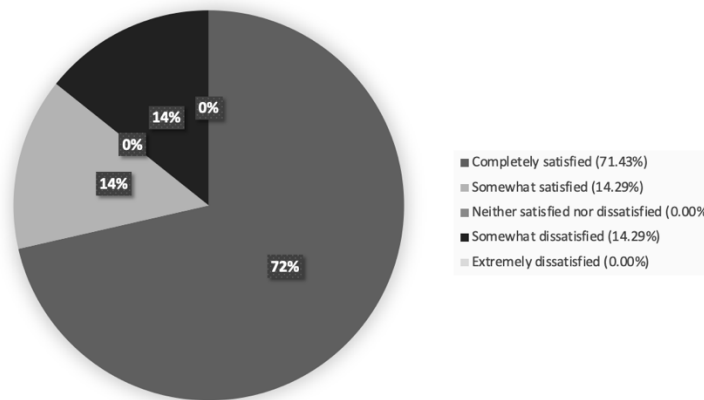
Average patient cycle time

	Mean (Minutes)	Standard Deviation
Nonproductive time	0:36	0.005
Productive time	0:18	0.006
Provider time (FTF)	0:14	0.011

Among all patients, 71.43% were completely satisfied with their wait time, 14.29% were somewhat satisfied, and 14.29% were somewhat dissatisfied (see figure 1).

Figure 1

Patient satisfaction with wait time



Discussion

The outcomes of this project highlight that burnout rates are high among PCPs and healthcare staff. According to the MBI, the total staff scored high on EE and DP and moderate

on PA. However, the NPHP scored the highest and lowest in these subcategories, respectively, which was an unexpected finding. One possible explanation for this finding is that the bulk of manual documentation and administrative tasks are completed by these staff members, such as manually inputting screening forms, submitting prior authorizations, and verifying and inputting patient demographic information. This suggests an association between inefficient or burdensome documentation practices and burnout. Similarly, although the estimates of time spent on documentation were highest and satisfaction scores were lowest among providers and NPHP, the latter reported spending slightly more time documenting on a new patient than providers did. However, both groups exceeded the baseline recommendation of spending 14 minutes or less documenting on a single patient encounter. Nor did the staff report 80% or greater satisfaction with the amount of time spent on documentation overall. Combined with the thematic analysis revealing frustration with manual and time-intensive documentation practices, these findings suggest that staff burnout is at least partially related to documentation burden. This finding is consistent with reports in the literature of documentation- and EHR-related burnout across the healthcare system. As previously discussed, high levels of staff burnout contribute to poor access to care as provider attrition rates rise and the quality of care declines as a result.

According to the Patient Cycle Time tool, the average patient wait time was 36 minutes, which did not meet the criteria for success in this measure (30 minutes or less). Nor did the average of 14 minutes of face-to-face time with the provider meet the criteria for success (18.2 minutes or more). Despite these results, patients report being generally satisfied with their in-office wait times, suggesting that patient satisfaction may be influenced by additional factors that this project did not address. These factors may include the frequency of follow-up with

providers, access to a provider or triage nurse at all hours, or the inclusion of various services within the clinic, such as laboratory services. It must also be considered that long wait times in primary care clinics have been normalized such that patients expect to wait long periods. Though the average patient wait time at the clinic was longer than the evidence-based recommendation, the literature suggests that patients may wait as much as four times longer than patients at this clinic.

The challenges faced during the implementation of this project are reflective of the complex phenomena of profound documentation burden across the healthcare system. The primary causes of the inability to implement electronic screening and registration at this clinic were challenges posed by the clinic's EHR to integrate electronic forms into the existing workflow. Additionally, this project highlighted the need for alignment between the clinic's goals and the functions of its EHR. This finding supports the importance of selecting an EHR that aligns with the recommendations put forth by the IOM, AAMC, and HHS, including:

- A focus on improving timeliness and efficiency;
- Streamlining administrative tasks by developing innovative approaches to existing health information technologies;
- Reducing EHR-related administrative burden by reducing the time and effort required to document patient encounters and meet regulatory requirements and improving EHR ease of use (Brandenburg et al., 2015; Erickson et al., 2017; Moy et al., 2021; Robinson et al., 2020).

The challenges presented through working with this EHR may shed light on a possible lack of alignment with these recommendations industry-wide and across various EHR systems, contributing to staggeringly high levels of burnout and attrition among healthcare staff. A focus must be placed on replacing workflows requiring clinicians to manually enter patient data

collected through external screening forms and other sources. Instead, policymakers should prioritize full integration between health technology systems to maximize provider interaction with patients and patient data (Borsky et al., 2018). As increasing focus is placed on high-quality preventive care in the U.S., the healthcare community should similarly push for innovative change to data collection and management to meet the growing needs of patients and providers. These issues cannot be reasonably addressed until the utility of EHR software is expanded to meet the demands of an evolving healthcare system. In the meantime, clinics should be advised to minimize documentation burden through other means. Clinics should allocate resources such as clinical informaticists to identify inefficient documentation practices based on “regulatory myth” and correcting them (American Medical Association [AMA], n.d.). The American Medical Association developed a “De-Implementation Checklist” to help clinics identify and correct EHR settings that contribute to documentation burden without meaningful contributions to safety or efficiency (AMA, 2021). Clinics should consider adopting a team-based approach to documentation to shift some documentation requirements to other members of the care team, such as by allocating staff to perform intake phone calls or hiring medical scribes (HIT, 2020). Clinics and individual clinicians may also choose to engage with professional organizations to advocate for change in regulatory requirements and the means necessary to achieve them (HIT, 2020). For example, Medicare and Medicaid incentive programs are often misaligned with clinic workflows, and frequent updates require significant time and attention from clinicians to maintain compliance through documentation (HIT, 2020). Additionally, clinics should collaborate with clinical informaticists to address EHR-related inefficiencies and advocate for improvement at the individual and systems levels (HIT, 2020).

Limitations and Lessons Learned

Several insurmountable challenges arose during the planning stage of this project. These challenges included:

- The EHR software was capable of some specificity toward assigning forms to specific appointment types. However, this specificity could only be applied generally when the front desk staff provided additional distinction. For example, the pediatric developmental screening forms were stratified by age, but all pediatric wellness appointments were scheduled as “Well Child Checks” regardless of the child’s age. The front desk staff performs an extra decision-making step to provide the patient with the age-appropriate version of this screening form, which the EHR software cannot.
- The EHR can accommodate forms consisting solely of structured data with no branching logic to populate the encounter note correctly. Consideration must be given to clinical utility and reporting requirements for QIMS and PCPCH. These requirements were highly restrictive, eliminating all but five forms.
- Patients were not consistently receiving SMS or emailed appointment reminders that included the hyperlink to complete screening forms for their specific appointment types. After several rounds of troubleshooting, the causes of this inconsistency remain unclear.
- The SMS challenges contributed to systematic uncertainty regarding which patients had completed the appropriate forms for their appointment type, which ultimately added to the front desk staff’s workload.
- When activating the setting allowing patients to access their screening forms via a hyperlink sent via SMS or mail, all electronic forms were published on the patient portal. The outcome

was that some proactive patients accessed these forms and completed them all, resulting in over-screening and inconsistent collection of information.

Few studies describing specific organizational interventions to reduce documentation burden or maximize the value of patient cycle time have been conducted in the primary care setting. Additionally, there is little available research to inform benchmarks for clinic wait times or provider burnout. The project took place in the setting of the COVID-19 pandemic, which complicated all aspects of planning and implementation. Notable are the potential impacts of the pandemic on staff burnout, time estimates, and satisfaction, which may have led to situational inflation of negative results. Additional limitations include a small sample size and reliance on self-reported objective data.

Quality improvement in the real-world setting is challenging. As previously discussed, the primary lesson learned from this project is the importance of selecting an EHR that aligns with the clinic's goals. Although this project was heavily supported by leadership, backed by a multidisciplinary team of stakeholders, and rooted in change theory, unforeseen challenges led to impassable barriers to implementation. Even the most thoroughly planned quality improvement initiatives are only as strong as the available resources. Thus, a complete understanding of the available resources and products that will facilitate a project is of utmost importance.

Conclusions

Timeliness of care and provider shortage are two significant contributors to poor healthcare access in the United States. In response, various professional organizations, government agencies, and applied healthcare informatics organizations have released recommendations to optimize health information technology to minimize documentation burden on clinicians. A greater understanding of the scope of the issue of documentation burden across

various clinical settings is needed to identify areas of potential improvement. This project was intended to implement an electronic intake and registration system by expanding the utility of the clinic's existing EHR to reduce patient wait time, minimize staff burnout and documentation burden, and improve patient and staff satisfaction. The project proved impossible to implement due to various unforeseen challenges posed by the EHR's available functionalities. However, data collected from patients and clinic staff reflect the need for improved efficiency of documentation practices within the clinic, lending evidence to the system-wide challenges of EHR- and documentation-related burden. Overall, systems-level advancements in health information technology are necessary to meet the demands of a healthcare system that is struggling to modernize in the setting of antiquated technology.

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Appendix A

Outcome and Process Measures

Outcome measures	Indicators of success	Project outcomes
Patient satisfaction with in-clinic wait times as evidenced by responses to Patient Cycle Time Survey	Threshold: 74% of patients rate their satisfaction as “very satisfied” or “completely satisfied” Success: 80% of patients rate their satisfaction as “very satisfied” or “completely satisfied”	85.72% of patients rated their satisfaction as “very satisfied” or “completely satisfied” Outcome: Met
Level of staff burnout as indicated by responses to Maslach Burnout Inventory	Threshold: Total staff burnout categorized as “moderate” in all three subcategories Success: Total staff burnout categorized as “low” in EE and DP, and “high” in PA	Total staff burnout categorized as “high” in EE and DP, “moderate” in PA Outcome: Not met
Value of patient cycle time as evidenced by responses to Patient Cycle Time Survey (see Appendix B)	Threshold: Average patient wait time 30 minutes or less, and average face-to-face time with provider 18.2 minutes or more Success: Average patient wait times are equal to or less than 20 minutes and face-to-face time with provider 20 minutes or more	Average patient wait time 36 minutes, average face-to-face time with provider 14 minutes Outcome: Not met
Staff satisfaction with the amount of time spent on documentation overall as evidenced by responses to All Staff Survey (see Appendix C)	Threshold: 80% of staff are “very satisfied” or better Success: 100% of staff are “very satisfied” or better	0% of staff are “very satisfied” or better Outcome: Not met
Staff perception of the amount of time spent on documentation of patient encounters (including chart review, inputting orders, and referrals) as evidenced by responses to All Staff Survey (see Appendix C)	Threshold: Provider and NPHP report of 14 minutes per new patient, 10 minutes per returning patient Success: Provider and NPHP report of 10 minutes per new patient, 6 minutes per returning patient	Provider: 24 minutes for new patient, 21 minutes for returning patient NPHP: 24.7 minutes for new patient, 16.3 minutes for returning patient Outcome: Not met

Appendix B

Patient Cycle Time Tool



Instructions: To complete this survey, please record the time at each point during your appointment today according to the clock on your cell phone only. If you are unsure about the time at any point during your appointment, please skip the question. Your provider is aware that you will be completing this survey on your cell phone during your visit today.

At the end of this survey, you will have the option to enter a completion raffle for a chance to win a \$100 Visa gift card. Thank you for your participation!

Please direct all questions or concerns to: Emily Elias, DNP-FNP Candidate, BSN, RN (elias@up.edu)

Click the arrow button below to proceed.



Adapted from the Patient Cycle Tool developed by the Institute for Healthcare Improvement

What is your scheduled appointment time?

Time you checked in or entered the clinic

Time you sat down in the waiting room

Time staff came to get you from the waiting room

Time staff member left you in the examination room

Time provider came into the examination room

Time provider left the examination room

Time you left the examination room

Time you checked out or left the clinic

Overall, how satisfied are you with the amount of time you spent waiting (either in the waiting room or in the examination room) during your appointment today?

- Completely satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Extremely dissatisfied

What kind of appointment are you here for today?

- Physical (including Sports Physical)
- Well-Woman Exam
- Obstetrics or Pregnancy-Related Exam
- Well-Child Exam
- Sick Visit or Health Concern
- Procedure Visit
- Aesthetics or Massage
- Mental Health or Counseling
- Routine Follow-Up or Med Check
- Prefer not to answer

Thank you for taking the time to complete this survey. Please click the arrow button below if you wish to enter the raffle for a chance to win a \$100 Visa gift card. Only surveys with 75% or more of the survey completed will qualify for entry. Your responses to this survey will be recorded if you choose not to enter the raffle.



Please indicate your answer with an [X]. Please only select one answer for each question.

For every **new** patient appointment, approximately how much time do you spend on patient registration (including administrative charting, inputting patient demographics, health histories, screenings, etc.)?

- | | |
|--|---|
| <input type="checkbox"/> 0-5 minutes | <input type="checkbox"/> 26-30 minutes |
| <input type="checkbox"/> 6-10 minutes | <input type="checkbox"/> Greater than 30 minutes |
| <input type="checkbox"/> 11-15 minutes | <input type="checkbox"/> Not applicable/this does not pertain to my
job function |
| <input type="checkbox"/> 16-20 minutes | |
| <input type="checkbox"/> 21-25 minutes | |

For every **returning** patient appointment, approximately how much time do you spend on patient registration (including administrative charting, inputting patient demographics, health histories, screenings, etc.)?

- | | |
|--|---|
| <input type="checkbox"/> 0-5 minutes | <input type="checkbox"/> 26-30 minutes |
| <input type="checkbox"/> 6-10 minutes | <input type="checkbox"/> Greater than 30 minutes |
| <input type="checkbox"/> 11-15 minutes | <input type="checkbox"/> Not applicable/this does not pertain to my
job function |
| <input type="checkbox"/> 16-20 minutes | |
| <input type="checkbox"/> 21-25 minutes | |

Overall, how would you rate your satisfaction with the amount of time you spend documenting patient visits (including administrative charting, inputting patient demographics, health histories, screenings, etc.)?

- | | |
|---|---|
| <input type="checkbox"/> Not at all satisfied | <input type="checkbox"/> Completely satisfied |
| <input type="checkbox"/> Slightly satisfied | <input type="checkbox"/> Not applicable/this does not pertain to my
job function |
| <input type="checkbox"/> Neither satisfied nor dissatisfied | |
| <input type="checkbox"/> Very satisfied | |

In your opinion, how can patient registration, charting, and the collection of routine screenings be made more efficient within Weeks Family Medicine?

Thank you for completing this survey. Please direct all questions or concerns to:

Emily Elias, DNP-FNP Candidate, BSN, RN (elias@up.edu)

