Journal of Student-Run Clinics
Descriptive Report

A Quality Improvement Intervention Aimed to Reduce Patient Cycle Time at a Student-Run Clinic

Implementation of a Triage System

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Published: August 4, 2025

Abstract

Background: The Equal Access Clinic Network offers free primary and specialty care services to underinsured or uninsured individuals. Literature highlights overall patient satisfaction with experiences at Student-Run Free Clinics (SRFCs) with the exception of long wait times. The Seventh Day Adventist Equal Access Clinic, one clinic within the network that focuses on a predominantly Spanish-speaking patient demographic, currently experiences an average appointment time of 115 minutes. This project aimed to reduce appointment times from 115 to 90 minutes, approximately a 20% decrease, over a 5-month period.

Methods: The intervention used was a Plan-Do-Study-Act (PDSA) cycle, a method for continuous improvement that involves planning a change, testing it on a small scale, studying the results, and then acting based on the findings. This PDSA cycle focused on optimizing the order of patient visits based on complexity. A triage system was implemented, allowing patients with simpler concerns to be seen sooner to establish a more efficient workflow.

Results: The main outcome measure of this project was average appointment time. At the end of the intervention, the average visit time was around 124 minutes which was an unwanted increase from the baseline of 115 minutes. Several other variables confounded the results such as number of patients, number of volunteers, arrival time of providers, and physicians' familiarity with the operations of the SFRC.

Conclusion: The aim was not achieved throughout the implementation of PDSA cycle 1. Several factors contributed to both the success and failure of the intervention on appointment time during specific clinic nights. Regardless, a triage system may still be beneficial and investigated further in the future. This paper explores how to approach quality improvement in a SFRC which can serve as a model to benefit other clinics.

Introduction

Description of Equal Access Clinic Network

The Equal Access Clinic Network (EACN), based in Gainesville, Florida, provides free medical care to patients who are uninsured. Patients do not require a referral, and many come from local emergency departments and health fairs. The Monday night clinic is run within a Seventh Day Adventist Church and is the focus of this paper. The Seventh Day Adventist Equal Access Clinic (SDA EAC) primarily sees Spanish-speaking patients, requiring interpreters in-person or over the phone.

Visits begin with intake by undergraduate Health Outcomes and Quality Improvement Officers (HOQIs), followed by examinations by University of Florida (UF) medical or physician assistant students. HOQI officers refers to undergraduate students that serve as administrative interns at the clinic; these students contact patients to make appointments, check-in and room patients during

clinic, and follow-up on plans. Findings are presented to volunteer attendings and residents to form management plans. The clinic functions primarily by appointment, with limited walk-in availability. Patients unable to be seen are offered an appointment at a later date.

At each clinic, a director oversees operations, supported by officers who facilitate clinic flow, manage volunteer assignments, and use a Clinic Tracker spreadsheet to document patient visit stages. The Clinic Flow Officer manages patient timing, which makes this role key in implementing efficiency interventions. This position requires that the Flow Officer understand the timing of frequently encountered chief complaints. The director and clinic officers are senior medical students who volunteered extensively at their respective clinic sites before their selection for these roles.

Problem Description

The length of clinic appointment time from patient arrival to departure is a standard quality metric utilized to measure clinic efficiency. Lengthy appointment times are deterrents for patients with unreliable transportation, irregular work hours, or responsibilities such as childcare. At the SDA EAC, patient appointment time averages 115 minutes. While the healthcare provided is volunteer dependent and free of cost, the quality of care must be maintained, particularly for patient populations that may experience distrust in the current healthcare system or are disproportionately disadvantaged. Reducing long appointment times is crucial for maintaining an efficient clinic workflow and a consistent presence of medical student volunteers, improving the quality and continuity of care for patients.

Available Knowledge

Current literature notes lengthy appointment times and late hours of operation as an area of improvement for Student-Run Free Clinics (SRFCs).[1] Some, like the University of Central Florida's KNIGHTS clinic and Pennsylvania State University College of Medicine's LionCare, have shortened visits by recruiting more volunteers or setting time limits on exams.[2,3] Other clinics, such as the Midwestern University College of Veterinary Medicine Health Outreach clinic, have adopted triage-like categorization systems to prioritize cases by complexity, which has helped optimize clinic efficiency.[4] This paper will describe how the SDA EAC attempted to shorten appointment times through a triage system.

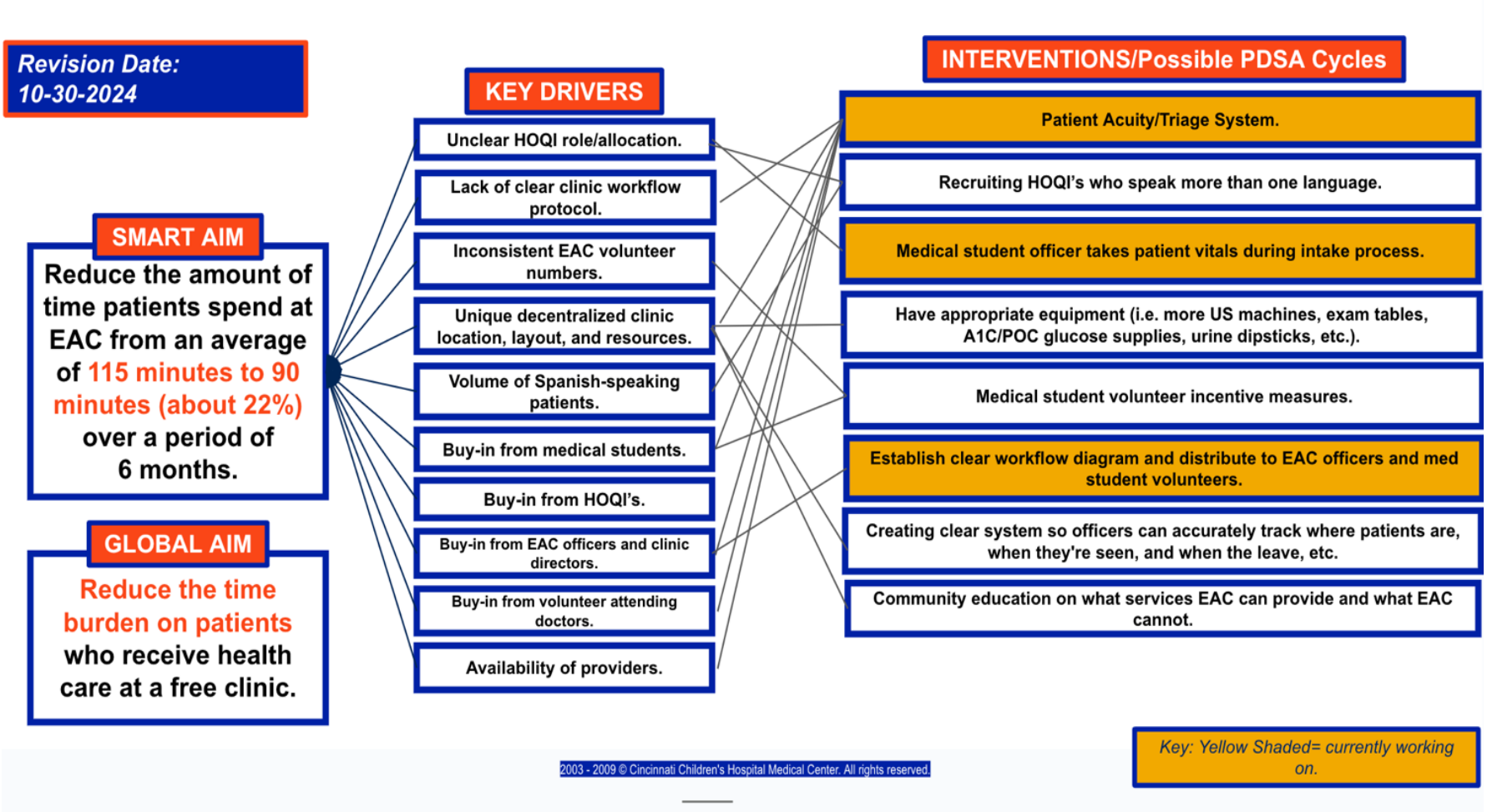
Rationale

A triage system was selected as the intervention after clinic officers created a key driver diagram, a visual tool used to outline the primary factors (key drivers) that influence a goal (Figure 1). Once potential causes of increased patient appointment time were identified, various interventions to target these key drivers were proposed as possible PDSA cycles. An intervention that had the potential to influence several key drivers was selected as the initial PDSA cycle for this quality improvement project. This project is Institutional Review Board exempt as a quality improvement project. It was submitted to the Quality Improvement Project Registry and granted a certificate of approval.

Specific Aims

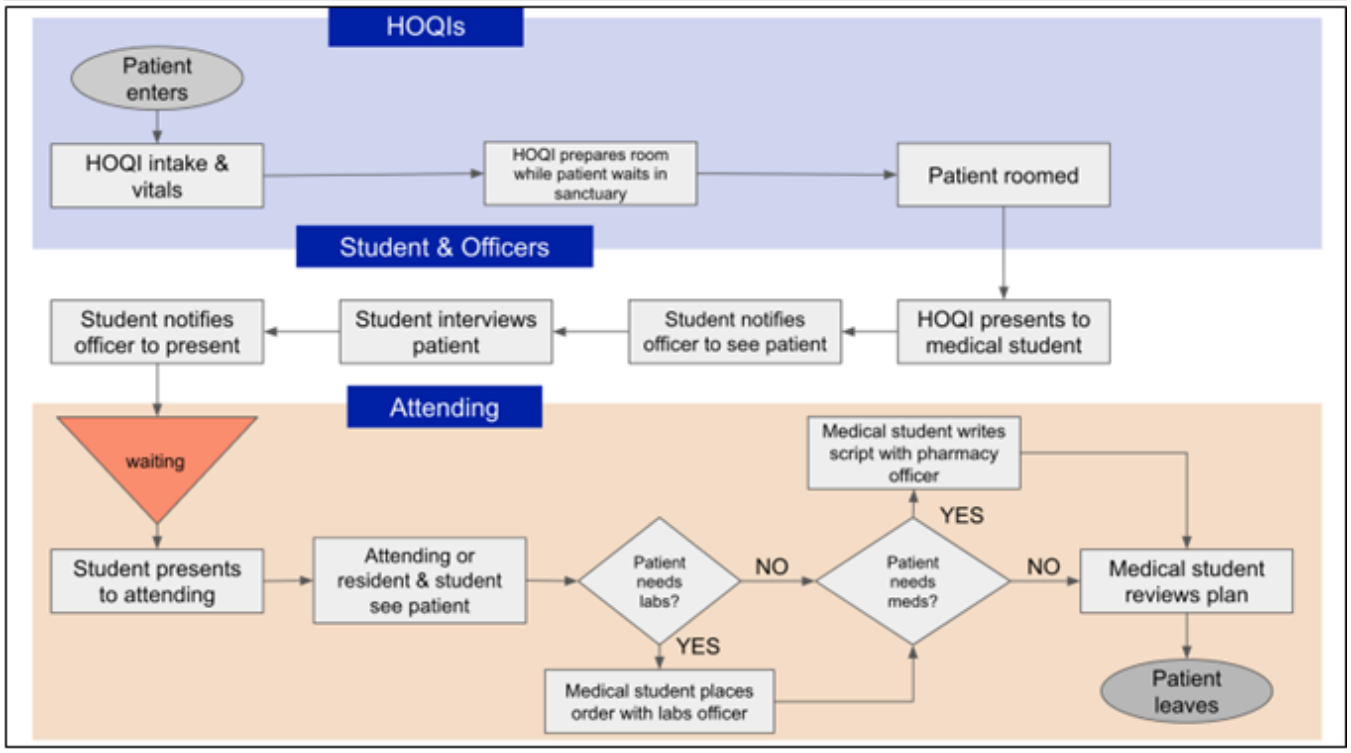
The goal of this project was to decrease appointment times from an average of 115 minutes to 90 minutes, an approximate 20% decrease, over a 5-month period by implementing a clinic triage system, with a global aim to reduce the time burden on patients who receive health care at the SDA EAC.

Figure 1. Driver diagram



A description of the key drivers utilized to identify actionable interventions to reduce patient wait time adapted from Cincinnati Children's Hospital Medical Center.[5]
HOQI: Health Outcomes and Quality Improvement; EAC: Equal Access Clinic; PDSA: Plan-Do-Study-Act; POC: point of care; US: ultrasound.

Figure 2. *Clinic flow chart*



Graphic delineating the path of a patient and their various interactions with the care team throughout a regular clinic visit. HOQI: Health Outcomes and Quality Improvement

Methods

Context

A process flowchart (Figure 2) was created to identify a patient's entire course during a typical clinic night. Important contextual elements regarding the transfer of a patient from one stage of a clinic visit to another were delineated. Patient appointment times were collected using the Clinic Tracker for three months prior to any intervention and averaged 115 minutes.

Study of the Intervention(s)

Patient length of stay data was collected from the SDA EAC Clinic Tracker. Times prior to and after implementation of the intervention were compared to establish whether the observed outcomes were due to the intervention and whether there was a positive response (reduction in recorded visit times).

Measures

The primary outcome measure for this project was the average length of appointment for patients, quantified using the Clinic Tracker. Each stage of a visit—from arrival, to being seen by a volunteer, etc.—was recorded in the Clinic Tracker, and these data were retrospectively reviewed at the end of the cycle. This measure was chosen because the infrastructure for measuring it (the Clinic Tracker) was already in place and no additional training had to be given to officers. Literature shows that time spent in clinic is a measure that has meaningful impact on the quality of a patient's experience during a clinic visit.[1]

Table 1. Equal Access Clinic Seventh Day Adventist clinic triage tiers

Tier 1: 10-15 minutes	Tier 2: 15-30 minutes	Tier 3: 30+ minutes
Labs follow-up	Urinary tract infection	Abdominal Pain
Medication refill	Musculoskeletal pain	Neurological complaints
Referrals to specialty nights	Sore throat	Chest pain/palpitations
	School physical	
	Dermatology complaints	

Example given to clinic officers to guide them in the patient triage intervention.

Analysis

Each week, the timestamps for patient clinic visits were compiled into a spreadsheet which also included a description of each patient's chief complaint. At the end of the intervention, averages for each week were calculated and used to produce a run chart to display the quantitative data, the average patient appointment time at each clinic night. A journal was maintained by the Quality Improvement (QI) team describing any difficulties with the project or any irregularities with the clinic flow so that explanations were possible for outliers in the data.

Ethical Considerations

A primary ethical concern of using a triage-based system was that higher-acuity, complex cases might be seen later. To mitigate risk, EACN protocols ensured that emergent cases were immediately referred to the emergency department. This approach allowed medical students more time to gather detailed histories and research complex cases, which enabled physicians to receive a complete picture of these patients and focus on nuanced diagnostic situations without feeling rushed. With flexible clinic hours, providers could dedicate sufficient time to Tier 3 cases at the end of the night, minimizing potential effects to quality of care.

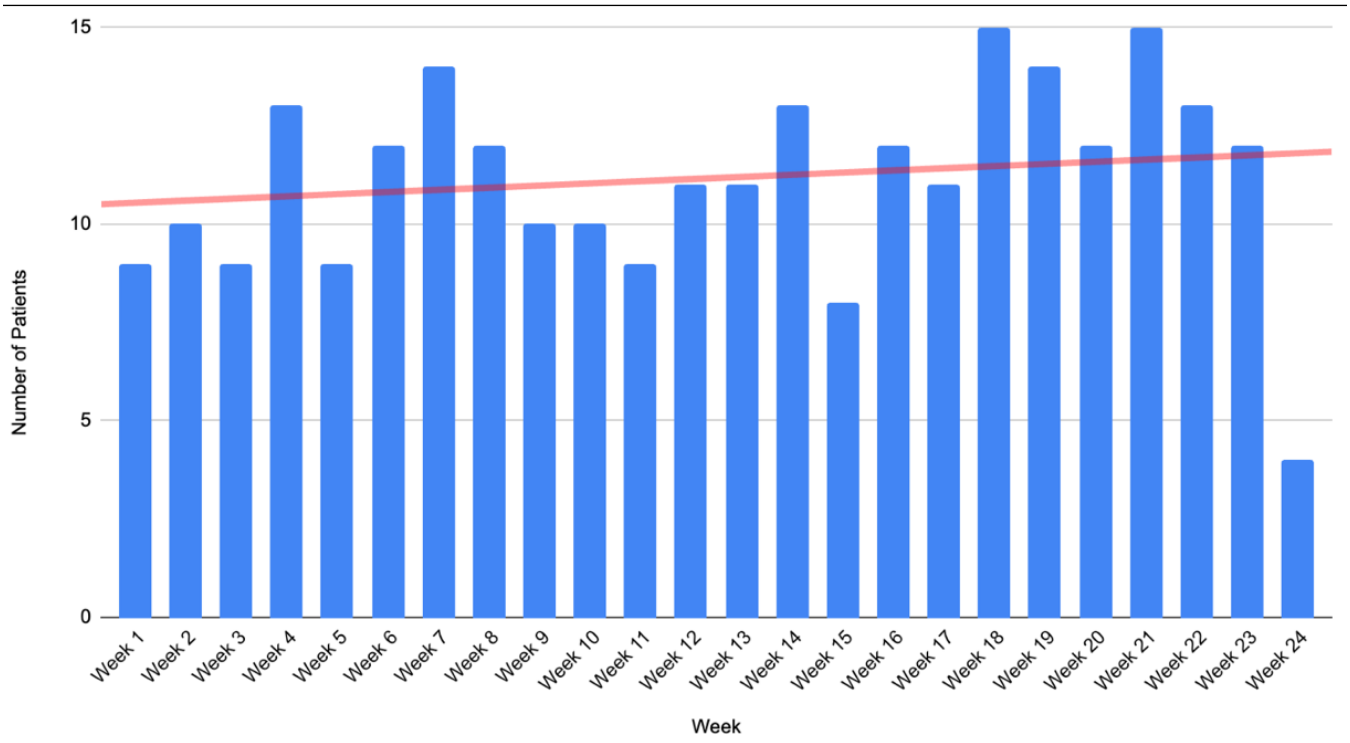
Results

The PDSA cycle was implemented from Week 15 (10/10/2022) to Week 24 (12/12/2022). These weeks were named according to our academic year and were a helpful framework since SDA EAC only takes place once a week. Initially, appointment times rose, likely due to factors unrelated to the intervention, as triaging and tracking times were mainly accomplished by the Clinic Flow Officer, who is not directly involved in patient care. Contributing factors to varying appointment times included inconsistency in the number of clinic providers and the fluctuating number of patients seen per clinic night as shown in Figure 3. Two to three providers were available for students to present and develop care plans. Providers included at least one attending each night. Usually, the other provider was a resident of any level; patients do not have to be seen directly by an attending to receive services as long as an attending is present to staff.

By Weeks 21-24, average appointment time decreased to approximately 80 minutes, which may reflect increased comfort with the protocol among staff. At the cycle's end, average visit time was around 124 minutes with patient volume rising from 11 to 13 per night, suggesting improved throughput efficiency.

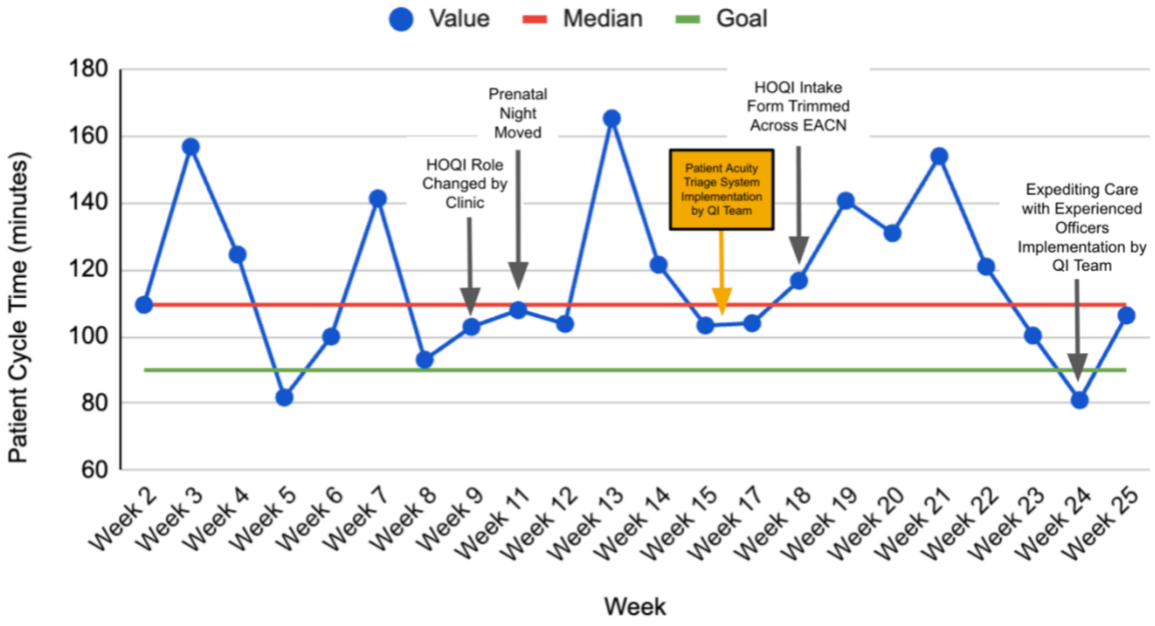
When comparing the average patient cycle time (Figure 4) to the corresponding week's number of providers, there is an increase in patient appointment time from an average of 107 min (two physicians) to an average of 128 min (3 physicians); however, the number of patients seen also increased from 9 patients (2 physicians) to 13 patients (3 physicians). Collection of data for PDSA Cycle #1 ended Week 24, for it was at this point that the officers for the SDA EAC clinic changed over to new

Figure 3. Number of patients seen per clinic night



Patient Tracker: The total number of patients seen at the Seventh Day Adventist Equal Access Clinic during the Plan-Do-Study-Act Cycle each clinic day.

Figure 4. Seventh Day Adventists Equal Access Clinic (SDA EAC) run chart



Run Chart: A chart displaying average wait times for patients at the SDA EAC before and during the Plan-Do-Study-Act (PDSA) Cycle. The PDSA was implemented during week 15 and continued until week 24, at which point a second PDSA cycle was added. EACN: Equal Access Clinic Network; HOQI: Health Outcomes and Quality Improvement; QI: Quality Improvement

medical students who then had to be trained in their roles as clinic staff as well as on the quality improvement initiative.

Discussion

Statement of Principle Findings

The goal of this project was to reduce patient appointment times below 115 minutes; however, this aim was not achieved consistently throughout the implementation of PDSA cycle 1. Thus, we are unable to conclude whether the implementation of patient triage successfully reduced total patient appointment time at the SDA EAC. Several factors contributed to both the success and failure of the intervention in reducing appointment time during specific clinic nights, as discussed below. We initially anticipated that this project would be a straightforward change yielding noticeable improvements in patient appointment times. While it did not consistently achieve this goal, another equally important outcome emerged: the identification of multiple obstacles inherent in the clinic's structure that impact appointment efficiency. Recognizing these obstacles laid crucial groundwork for future quality improvement initiatives at the clinic. As the first quality improvement project implemented at our clinic, this intervention offered valuable insights that future initiatives can build upon.

Interpretation Within the Context of the Wider Literature

Our findings add depth within the context of the wider literature by highlighting how structural and operational challenges—such as variability in provider availability, patient complexity, and relative volunteer experience—must be addressed to sustain improvements in clinic efficiency. Since this project was our clinic's first quality improvement initiative, it serves as a foundational model that can inform similar student-run clinics of both expected barriers and benefits when launching their own quality improvement efforts. By identifying structural inefficiencies, our study underscores the importance of adapting interventions like triage systems to each clinic's specific needs, offering a starting point for iterative improvements over time. This positions our project as both an applied effort to improve immediate patient flow and as a steppingstone that can shape broader quality improvement protocols in student-run free clinics.

Strengths and Limitations

A strength of the project was the simplicity of the intervention, allowing officers to triage patients without adding extra steps on the part of the volunteer students. Triaging patients allowed for clinic officers to exert more control over the flow of the clinic; after discussing the PDSA cycle and its outcomes with the officers, it was decided that this intervention benefitted the clinic and should be retained as part of the clinic procedure in the future. Stratifying appointment times by triage category would provide valuable insights into the effectiveness of the system in optimizing time spent for different patient needs. As this level of detail was not captured in the current QI cycle, it would be important to incorporate such stratified data collection in future iterations.

We identified several limitations to the implementation of this project. Arrival delays of volunteer providers due to their main clinical duties affected patient appointment times, and the higher volumes of complex cases on certain days significantly delayed patient turnover. Relative student experience played a significant role as students in their first year have much less knowledge in patient care compared to students at the end of their training. Patients often check in an hour or more before their scheduled appointment times in the hope of being seen sooner which can cause their arrival to be time-stamped much earlier than they can realistically be seen. To minimize and adjust for limitations, a member of the QI project was present at each clinic night to note unique circumstances that could negatively or positively alter times outside of the intervention.

Implications for Policy, Practice, and Research

The intervention to reduce appointment times at SDA EAC was specific to the clinic's flow and may not fully translate to other settings lacking similar structures, such as clinics without undergraduate interns or those with restricted volunteer roles. A key takeaway for practice is the necessity of an independent, reliable system to track patient arrival and departure times, as technical issues with the current system led to imprecise data. For future quality improvement efforts, more accurate time tracking and the use of medians rather than averages can reduce the impact of outliers on results.

This project also highlights several external factors affecting appointment times, with implications for policy and scheduling. Adjusting clinic start times could be considered to address provider arrival delays, though this may impact volunteer availability and would likely reduce the number of patients able to be seen per night. Identifying these structural challenges provides a foundation for future research, offering insights that can inform broader policies aimed at improving clinic efficiency and patient experience in similar settings.

Conclusion

Assessing efficiency and investigating methods to improve quality of care concerns should be an ongoing process for any clinic providing health care services. Established interventions must be regularly assessed for utility, as the professional sphere of medicine is always evolving. Because the intervention sought to lessen the overall time patients wait to be seen, it may be beneficial for future cycles to focus on the period during which patients are solely waiting and not being evaluated. The triage process was kept as simple as possible to be reliably utilized by clinic officers who are early in their medical education. By documenting and sharing the challenges faced while designing and implementing this triage system, similar free clinics can benefit from and potentially generalize our work to improve the experience for their patients.

Disclosures

The authors have no conflicts of interest to disclose.

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