



Using Time Limits to Improve Patient Visits & Clinic Flow at a Student-Run Free Clinic

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Abstract

Background: Student-run free clinics often have difficulties with long visits, which are associated with patient dissatisfaction. LionCare, a free clinic run by Pennsylvania State University College of Medicine medical and physician assistant students, experiences similar difficulties. This study sought to gather baseline data on the duration of each step of a patient visit and to evaluate whether implementing a time limit on the longest step would improve clinic flow and affect patient satisfaction.

Methods: Data was collected from LionCare's General and Neurology clinics. Each step of a patient's visit was recorded, including Time of Arrival and Departure as well as duration of Waiting Room; Vitals; History and Physical (H&P); Presentation to Physician; Seeing Patient with Physician; Medications, Vaccines, Tests, Other. In order to gauge patient satisfaction, short surveys based on select Press Ganey questions were administered at the end of each visit before and during the intervention.

Results: Five months of baseline data from 44 visits indicated that H&Ps took the longest of all the steps of a patient visit at 30 minutes. Over 19 visits, a time limit of 25 minutes reduced H&P duration by 10 minutes ($p < 0.001$); duration of Presentation to Physician by 6 minutes ($p = 0.002$); Medications, Vaccines, Tests, Other by 4.5 minutes ($p = 0.03$); and Total Patient Visit by 20 minutes ($p = 0.002$). Patient Satisfaction remained stable before ($n = 10$) and after ($n = 13$).

Conclusions: A 25-minute time limit reduced the duration of H&Ps, subsequent steps in the visit, and the overall visit more than expected, thus improving clinic flow. Importantly, patient satisfaction scores remained steady. Thus, at LionCare, placing a time limit on H&Ps was an effective way to improve clinic flow without sacrificing quality.

Introduction

Free clinics, especially student-run free clinics, often have difficulties with patient waits, long patient visits, and slow clinic flow.^{1,2} At student-run free clinics, as visit durations increase, patient satisfaction decreases.³ Poor patient satisfaction is often related to nonadherence with medical recommendations and makes follow-up less likely.^{4,5} Additionally, patient vulnerability, time restrictions, and sensitivity to healthcare access barriers make free clinics especially prone to poor adherence and follow-up.^{4,5} However, interventions directed at improving visit durations by reducing specific steps of a patient visit, such as

time spent in the waiting room or time spent waiting for overbooked physicians in the exam room, have been successful at other student-run free clinics and might improve patient satisfaction and thus adherence.⁶

LionCare is a non-profit student-run free clinic in Harrisburg, Pennsylvania that is entirely run by Pennsylvania State University (Penn State) College of Medicine medical (MD) and physician assistant (PA) students and is affected by these same difficulties. LionCare operates ten clinics on different days, each comprising different specialties, which occur in six clinic rooms located in the Bethesda Mission, a homeless men's shelter. Prior to this study, no data had been collected on clinic

flow or durations of patient visits at LionCare, limiting understanding of how the clinics ran to anecdotal experience.

This study had two main objectives. The first objective was to collect baseline data on the duration of each step of patient visits to better understand clinic flow. It was predicted that the time patients spent in the waiting room and with students taking the History and Physical (H&P) would take the longest. The baseline data was used to identify a time limit on H&Ps as an intervention to improve clinic flow, which was hypothesized to proportionately decrease the duration of patient visits as well as slightly increase or not change patient satisfaction.

Methods

Prior to data collection, the project was reviewed and determined to be non-human subject research by the Penn State College of Medicine Institutional Review Board. No potentially identifying patient information, such as chief complaint, past medical history, demographics, or protected health information, was included in data collection.

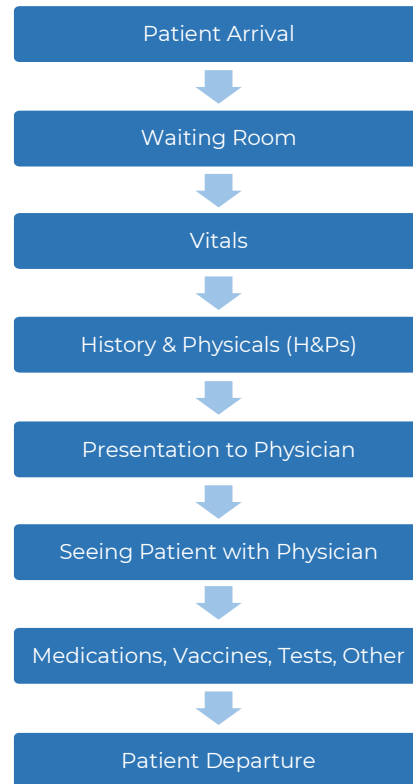
Baseline Data Collection

The study took place at the LionCare Student-Run Free Clinic during the General and Neurology clinics, in the Bethesda Mission in Harrisburg, Pennsylvania from April 2018 to January 2019.

The General Medicine clinic has the highest patient volume of LionCare's ten clinics and also shares the same six clinic rooms with the Neurology clinic. There are three to four pairs of student volunteers, typically first and second year MD or PA students, and one to three resident or attending physicians, who are responsible for seeing 10-14 patients each clinic.

Each step of a patient visit (Figure 1) was timed and recorded by researchers and student volunteers (Online Appendix). Variables included Patient Arrival and Departure time; durations of Waiting Room; Vitals; H&P; Presentation to Physician; Seeing Patient with Physician; Medications, Vaccines, Tests, Other; and Total Patient Visit duration. Study data were collected and managed using Research Electronic Data Capture (REDCap) tools hosted by Penn State College of Medi-

Figure 1. Steps of a patient visit



cine.^{7,8} REDCap is a secure, web-based software platform designed to support data capture for research studies.

Placing a Time Limit on H&Ps

After baseline data analysis, a time limit of 25 minutes per H&P, consistent with year 1 Objective Structured Clinical Exams (OSCEs) taken by many MD students, was placed beginning in September 2018. This was enforced by administering a warning knock on the door at 20 minutes and again at 25 minutes. No action was taken if students exceeded the time limit. Data on each step of the patient visit was collected during the intervention from December 2018 to January 2019.

Patient Satisfaction

To gauge patient satisfaction, short surveys were administered at the end of each patient visit by student volunteers not involved in patient care before and during the intervention. The questions from these surveys were modeled after the Press Ganey Satisfaction Survey, the most widely

used outpatient satisfaction tool, using the questions most applicable to the free clinic setting.¹² Patients were asked to read three questions and score their experience on a scale of one to five, with one being lowest satisfaction and five being highest satisfaction⁹: (1) Amount of time the providers spent with you; (2) Your confidence in the care the providers gave you; (3) Concern providers showed for you and your questions.

If patients could not read the questions, the questions were asked verbally. It was emphasized that this survey was anonymous and that their responses would in no way impact their future care.

Data Analysis

The baseline data and post-intervention data were analyzed using Microsoft Excel. The mean duration and standard deviation of each step in the patient visit were calculated and tested. The duration of each step and Total Patient Visit duration, as well as patient satisfaction scores before and after the intervention, were averaged. We used the Kolmogorov-Smirnov Test of Normality to assess for a normal distribution. Then, we used a two-tailed t-test with unequal variance to check for differences in mean values before and after the intervention. A threshold of $p < 0.05$ was used to determine statistical significance.

Results

Baseline results over 44 visits indicated that H&Ps took the longest of all the steps at an average of 30.6 ± 10.4 minutes and that the average Total Patient Visit duration was 94.2 ± 4.1 minutes (Figures 2, 3). As the longest step and the one controlled most directly by students, H&Ps were identified as the best option for a time limit. After implementing a 25-minute time limit over 19 visits, the average H&P duration decreased to 19.8 ± 1.3 minutes, a reduction of 10.4 minutes ($p < 0.001$). Other steps after H&Ps also decreased in duration, leading to the Total Patient visit duration dropping to 74.1 ± 4.4 minutes, a reduction of 20.1 minutes ($p = 0.002$) (Figure 3). These steps included Presentation to Physician which dropped to 7.6 ± 1.0 minutes from 13.7 ± 1.4 minutes ($p = 0.002$) and Medications, Vaccines, Tests, Other which dropped to 7.2 ± 1.6 minutes from 11.8 ± 1.4 minutes ($p = 0.03$) (Figure 2). Although the Waiting Room

duration decreased and the duration of Seeing Patient with Physician increased, neither was statistically significant. The duration of Vitals remained relatively constant.

Finally, over the course of 10 patient encounters before the intervention compared to 13 patient encounters during, there was a non-statistically significant increase in patient satisfaction. The average score for all three categories, "Time with Providers", "Confidence in Providers", and "Concern Providers Showed" increased from approximately 4.7 to 5 (Figure 4).

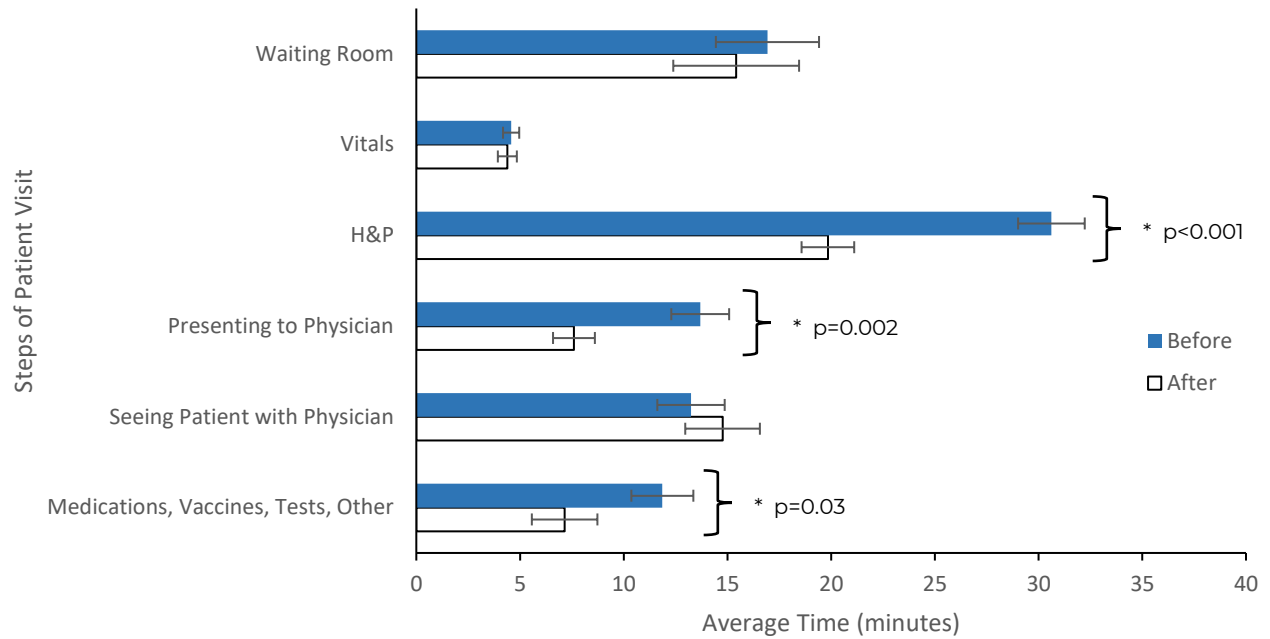
Discussion

Placing a Limit on H&Ps

H&Ps were identified as the rate limiting step in improving patient visit durations and clinic flow as they took by far the longest. Placing a time limit on H&Ps reduced the total visit duration and did not negatively affect patient satisfaction. We do not believe the time limit affected quality of care because physicians are generally the best judge of the time and method they use in seeing patients. Thus, limiting or altering steps like Presenting to and Seeing Patients with the Physician would be dangerous and likely to reduce quality of care.^{9,10} When compared to H&Ps taken by experienced clinicians, students take much more time, have limited clinical knowledge, and are not as efficient. It takes years to fully develop these skills.

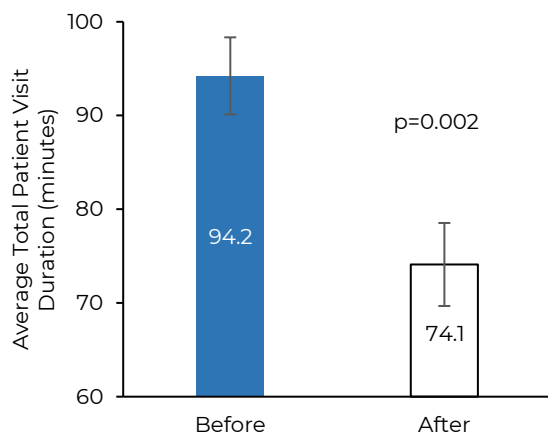
OSCEs are taken by medical students at many schools which help develop H&P skills. They expose students to an undifferentiated standardized patient scenario with a set time limit. Nationally and at Penn State College of Medicine, OSCE exams done in the first of medical school usually allot 25 minutes, while third and fourth year OSCEs usually allot 15 minutes.¹¹ Thus, a time limit of 25 minutes is reasonable. Students were informed that there would be a time limit of 25 minutes per H&P at the beginning of each clinic day but that this time limit would only be enforced by knocking at the door at 20 minutes for a 5-minute warning and again at 25 minutes. For instance, if a student had a complicated patient or one that required translation services, the student would hear knocks at 20 and 25 minutes but would be able to use more time if needed. Thus,

Figure 2. Average time spent during steps of patient visit before and after intervention



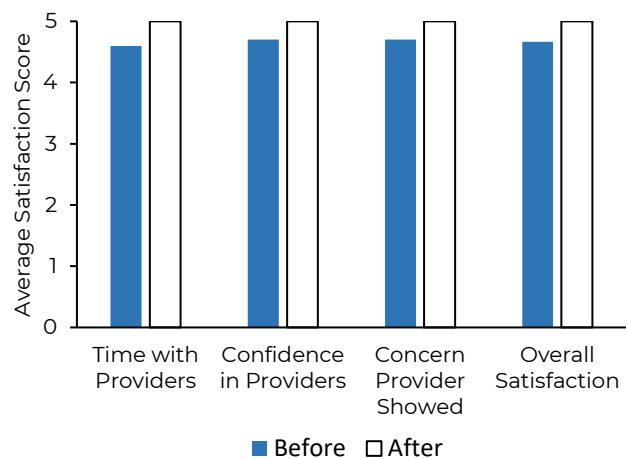
The time limit significantly reduced the duration of H&Ps; Presentations to Physicians; and Medications, Vaccines, Tests, Other. H&P duration decreased by ~10 minutes after the intervention (30.6 minutes versus 19.8 minutes) ($p<0.001$). Presentations decreased by ~6 minutes (13.7 minutes versus 7.6 minutes) ($p=0.002$). Medications, Vaccines, Tests, Other decreased by ~4.5 minutes (11.8 minutes versus 7.2 minutes). P-values were determined using two-tailed T-tests of unequal variance; $n=44$ for the baseline assessment and $n=19$ during the intervention.

Figure 3. Average Total Patient Visit duration before and after intervention



Total Patient Visit duration decreased by an average of 20 minutes, and the reduction was statistically significant ($p=0.002$). Before the intervention, the duration was 94.2 minutes ($n=44$), and after it was 74.1 minutes ($n=19$).

Figure 4. Average patient satisfaction scores before and after intervention



Average patient satisfaction slightly increased but was not statistically significant. Satisfaction increased by ~0.3 in Time with Providers ($p=0.2$), Confidence in Providers ($p=0.3$), Concern Provider showed ($p=0.3$), and overall, before ($n=10$) to after ($n=13$) intervention.

in addition to minimizing any adverse impact on quality of care, potentially improving patient satisfaction and the duration of a patient visit, a time limit of 25 minutes would have the added benefit of providing students some level of practice for OSCEs.

Improved Clinic Flow & Patient Visit Duration

Limiting H&Ps saved more time than anticipated. H&Ps previously took over 30 minutes so it was anticipated that a time limit of 25 would only save five minutes. However, the average H&P duration was reduced by 10 minutes. Besides being good practice for OSCEs, student volunteers reported anecdotally that they actually enjoyed the time limit because it gave them a benchmark or goal to aim for and made their H&P more organized. This translated into many students finishing their H&Ps well before the time limit.

The reduction in H&Ps led to subsequent reductions in Presenting to the Physician and Medications, Vaccines, and Tests, thus improving clinic flow. At the beginning of clinic, physicians had little to do as students were meeting patients, taking their vitals, and doing an H&P. Once the first students finished their H&Ps, the physicians became busy. Due to the limited number of physicians available, after taking an H&P, many students often had to wait to present until the physician was done with other students or seeing a patient. Similarly, students often had to wait for physicians to become available for writing prescriptions, dispensing medications, and performing tests. Once students finished H&Ps more quickly, physicians were able to start their work earlier and less backup was caused downstream by students waiting for physicians to become available. The combined duration reduction of H&Ps; Presentations; and Medications, Vaccines, Tests, Other was approximately 20 minutes, consistent with the 20-minute reduction seen in the Total Patient Visit duration. Thus, by simply limiting H&P duration, two subsequent steps, patient visit duration, and clinic flow all improved.

Quality of Care and Patient Satisfaction

There was no measure to directly determine if quality of care was impacted by the time limit. However, a promising indication that quality was not detrimentally impacted was that the time

spent Seeing Patient with Physician actually slightly increased by about 1.5 minutes. While this increase was not statistically significant, perhaps due to a small sample size (n=19), the time patients spend with their physician is related to clinical outcomes.^{9,10} The slight increase does not show that quality of care or outcomes improved, but it likely indicates that they did not decline.

It was important to ensure that a time limit did not reduce patient satisfaction. Questions derived from the Press Ganey Satisfaction Survey were employed to compare satisfaction before and after.¹² Before baseline data was collected, it was hypothesized that patient satisfaction scores would improve. After baseline data indicated a relatively high score of 4.7 with the highest possible score of 5, the hypothesis was adjusted to predict satisfaction scores to remain constant or improve slightly. Overall and in all three categories, Time with Providers, Confidence in Providers, and Concern Providers Showed, there was a slight, but not statistically significant, increase in satisfaction. There are several possible explanations for this lack of statistical significance. First, the total sample size of the patient satisfaction surveys was 23, so it is possible that the surveys lacked statistical power to distinguish between having an effect on patient satisfaction and having no effect. Patients, particularly returning patients who had never been asked to fill out a survey before, frequently left without properly checking out at the front desk where the survey was administered. This limited patient participation and survey sample size. The limited statistical power is a likely explanation because after the intervention, patients actually spent slightly more time with physicians. As the Press Ganey survey is a patient satisfaction survey and includes a question about the amount of time spent with providers, it would be reasonable to assume that more time with the physician is associated with higher patient satisfaction. Another explanation is that there is still a lot of waiting and repetition in the patient visit which still lasts over 75 minutes. Thus, it is possible that a 20-minute reduction was not enough to generate a significant improvement in patient satisfaction. Regardless of the impact of limited statistical power or the degree of waiting that remains, our baseline and post-intervention data is consistent with studies at similar student-run

free clinics.³ While this data certainly does not prove that patient satisfaction improved, similar to quality of care, it is likely enough to show that it did not decline.

Limitations

No-shows, patients requiring translators, and physician attendance are three variables that could not be explicitly controlled. While we did not track the number of no-shows per clinic, variable rates of no-shows can have a large impact on clinic flow.¹³ Additionally, patients that require translation generally take more time than patients who do not.¹⁴ LionCare employs an online translator service and relies on family members or student volunteers who are fluent in both languages to make the visit as smooth as possible. As this study could not collect any potentially identifying information, we did not include any information on which patients required translation services. Finally, anywhere between one and three physicians attend each clinic. Physicians only volunteer when their schedules allow, and they often have sudden obligations that cause them to miss clinic. Sometimes, there is only one physician available to see patients with students. On these days, after collecting an H&P, students often have to wait for the physician to finish with other students and patients in order to present. Particularly when their effects are combined, these variables can make a large impact on patient visits and clinic flow.^{13,14} It was assumed that these variables did not change in their frequency or impact before and after the intervention, and thus the fact that the duration of each step was averaged across the clinic days before or during should have minimized their impact.

The sample size, especially of the patient satisfaction data as discussed above, was small. Towards the end of data collection, the LionCare board was undergoing its annual turnover as students transitioned from second year to clerkships. The new researchers and new board were eager to move on and start new projects, so the sample size on patient visits after the intervention (n=19) was smaller than ideal as well. Nonetheless, other studies done within similar student-run clinics have reported similar results with small sample sizes, so the data gathered from this study may still be considered useful.³

Applicability to Other Clinics

Placing a time limit on H&Ps is relatively easy and takes little effort. Using our method of enforcement of knocking on doors, it simply involves notifying students that there is a time limit, keeping track of the time students are spending with patients, and knocking on the door at 20 and 25 minutes. This method could be adapted as is or altered for other student-run free clinics that run differently. Other LionCare clinics have already implemented time limits, in addition to coming up with their own ways to improve patient visits in their own clinics.

Conclusions

Prior to this study, there was no data on patient visits for any LionCare clinics, so the initial objective was to understand how long each step of the patient visit takes. After collecting baseline data, the ultimate objective was to create interventions to increase efficiency and provide high quality care to as many patients as possible. By placing a 25-minute time limit on H&Ps, we were able to shorten patient visits and improve clinic flow while not sacrificing patient satisfaction. These reductions in the Total Patient Visit duration will allow more patients to be seen in future clinic days. Future directions include addressing Waiting Room duration, the second longest and most variable step of a patient visit, and expanding data collection to other LionCare clinics.

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Disclosures

The authors have no conflicts of interest to disclose.

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