

## Abstract

**Introduction:** Clinic process inefficiencies cause lengthy visit and wait times, which frustrate patients and providers and limit clinic capacity

**Objective:** To identify process inefficiencies and assess process flow interventions

**Methods:** Prospective, consecutive series of resident clinic visits over a 3-week period after transferring refraction from tech to resident. Personnel recorded the time spent waiting for and undergoing each clinic process. The clinic also piloted a “Fast Track” from registration to resident for appropriate established patients.

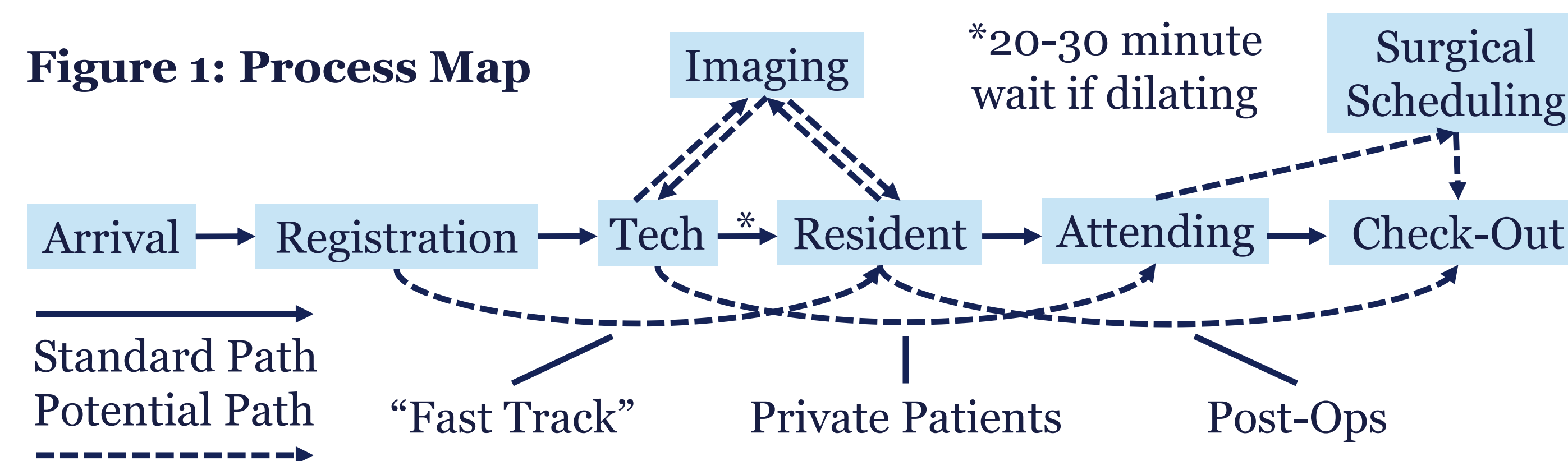
**Results:** Patients spent 53% of the visit waiting, primarily for the tech. Transferring refraction from tech to resident decreased the wait for tech and tech duration without increasing resident duration. There was no significant reduction in total visit or wait times. “Fast Track” decreased total visit time by 38% but comprised only 3.5% of visits that may have been appropriate.

**Conclusion:** Reallocating a task from the slowest process decreased that process’s wait and duration but had no effect on total visit or wait times. Process flow analysis identifies inefficiencies and assesses interventions. Automated data collection is crucial for iterations.

## Background

- The Wills Eye Hospital Cataract and Primary Eye Care (CPEC) resident clinic serves over 20,000 patient visits annually
- Visit duration can vary widely based on visit type; need for dilation, imaging, and surgical scheduling; number and experience of personnel; and patient show rate
- Lengthy visit and wait times frustrate patients and providers and limit clinic capacity

**Figure 1: Process Map**



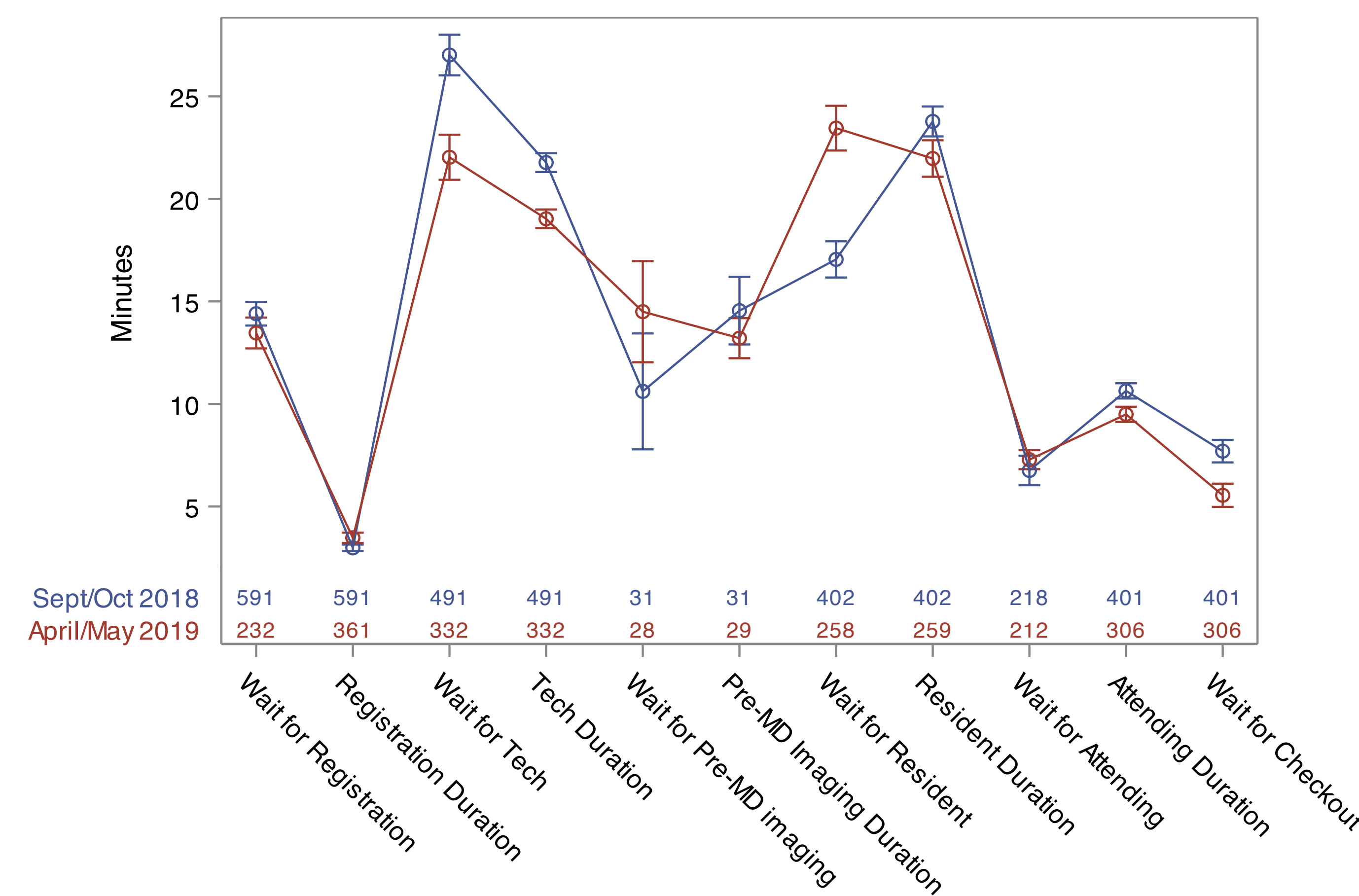
## Methods

- Prospective, consecutive series of all CPEC resident clinic visits over a 3-week period in September/October, 2018 (baseline) and April/May, 2019 (post-intervention)
- Intervention: transferring refraction (glasses prescription) from tech to resident
- Additional pilot: “Fast Track” from registration directly to resident without tech
- Outcomes: total time and time spent waiting for and undergoing each clinic process
- Personnel recorded the times they started and stopped their respective process on a sheet that traveled with the patient folder
- Sheets complete with times for all processes in the “standard path” were included in the summary statistics for the individual processes and the calculation of wait times
- Sheets with missing technician, resident, or attending times were included only in the summary statistics for the individual processes

## Results

- There were 957 patients included: 591 in the baseline (September/October) group and 366 in the post-intervention (April/May) group
- The median number of patients per tech and resident was 10.0 and 16.6 for baseline and 11.3 and 19.2 for post-intervention ( $p=0.95$ ,  $p=0.02$ ), respectively
- The overall median total visit time was 105 minutes for baseline and 101 minutes for post-intervention ( $p=0.43$ )
- For “standard path” patients (40% of total), the median percentage of the visit spent waiting was 53% for baseline and 54% for post-intervention ( $p=0.71$ )
- The longest wait was registration to tech, with a median of 22 minutes for baseline and 16 minutes for post-intervention ( $p<0.001$ )
- The longest processes were the tech and resident encounters, both with a median of 20 minutes for baseline and 18 minutes for post-intervention ( $p<0.001$ ,  $p=0.01$ )
- “Fast Track” visits ( $n=5$ ) had a median total visit time of 62 minutes, median wait for resident of 14 minutes, and median resident encounter of 18 minutes

**Figure 2: Mean Minutes of Each Process by Group**



**Table 1: Median Minutes of Each Process by Visit Type Overall**

Visit Type	Overall	New	Annual Revisit	Short Revisit	Fast Track	Urgent	Wills ER Follow-Up	Cataract Evaluation	Post-Op	P-value
Wait for Registration	10	13.5	7.5	10	7	15	12.5	9	8	0.136
Registration Duration	2	3	4	2	3	3	3	3	2	<0.001
Wait for Tech	19	21	23	19	--	21	17	16.5	20	0.239
Tech Duration	19	23	20	16	--	19	19	24	16	<0.001
Wait for Pre-MD Imaging	7	23	--	5.5	--	8	21	5	49	0.480
Pre-MD Imaging Duration	12	9	--	10	--	9	10	15	14	0.308
Wait for Resident	14	13	17	13	14.5	14	11	19	17.5	0.022
Resident Duration	19	22	16	19	18.5	22	19	23	15	<0.001
Wait for Attending	4	5	6	5	3	7	4	4.5	4	0.585
Attending Duration	9	10	10	9	8	8	7	9	8	0.044
Wait for Checkout	4	3	3.5	4	3	5	3	32	4	<0.001
Total Visit Time	103	121	82	98	62	115.5	102	165.5	83.5	<0.001

## Discussion

- Patients spent 53% of the visit waiting and only 27% with a physician
- Transferring refraction from tech to resident significantly reduced the wait for tech and tech duration without increasing resident duration, but there was no significant reduction in total visit or wait times
- “Fast Track” decreased total visit time by 38% (from comparable Short Revisits) but was underutilized, comprising only 3.5% of visits that may have been appropriate
- Cataract evaluations had the longest total visit and wait times, partly from imaging performed in clinic
- Process flow analysis identifies inefficiencies and assesses interventions, but manual data collection and entry is time-prohibitive

Limitations:

- Process path variations and incomplete time records may have inflated wait times for some patients. Therefore, only patients that followed the “standard path” were included for wait time calculations.

## Potential Future Interventions

- Increasing the registrants, techs, and utilization of other providers (e.g. Optometry)
- Maximizing the identification and scheduling of patients for “Fast Track”
- Obtaining pre-ordered imaging (e.g. for cataracts) before clinic in Diagnostic Center
- Decreasing movement and task redundancy by increasing the number of rooms and tech support for each resident
- Optimizing care continuity by scheduling patients for a specific resident rather than a pool of residents
- Adopting a different electronic medical record system to improve scheduling, emergency room and inpatient record access, and clinic process data collection

## Resources

- Goldstein IH, et al. Association of the Presence of Trainees With Outpatient Appointment Times in an Ophthalmology Clinic. *JAMA Ophthalmology*, vol. 136, no. 1, 2018, p. 20., doi:10.1001/jamaophthalmol.2017.4816.
- Han DP, Suneja A. *Make Your Clinics Flow with Synchrony: a Practical and Innovative Guide for Physicians, Managers, and Staff*. ASQ Quality Press, 2016.
- Hribar MR, Read-Brown S, Reznick L, Chiang MF. Evaluating and Improving an Outpatient Clinic Scheduling Template Using Secondary Electronic Health Record Data. *AMIA Annu Symp Proc*. 2018;2017:921–929. Published 2018 Apr 16.

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