Improving Patient Flow at UMN Masonic Children's HEALTH **Hospital Pediatric Rheumatology Clinic** MEDICAL SCHOOL UNIVERSITY OF MINNESOTA UNIVERSITY OF MINNESOTA Bayardo Garay¹, Denise Erlanson², RN, BSN, Danielle Bullock², MD, MPH **Driven to Discover®**

Introduction & Background

In the last 5 years, our program has grown to a current total of 6 MDs, 1 Fellow, 2 RN Coordinators, and 1 Research Coordinator. We have increasingly complex patients, and our involvement with research has grown substantially, along with an increased number of resident trainees. As a group, we have identified that patient flow through our clinic often feels inefficient, leading to wasted time and frustration for care providers (MDs, RNs, rooming staff, etc.) and families. In this project, we are using the %Non-value-added time (NVAT) as an indicator of time that the patient is not interacting with anyone from the health care team during their clinic visit.

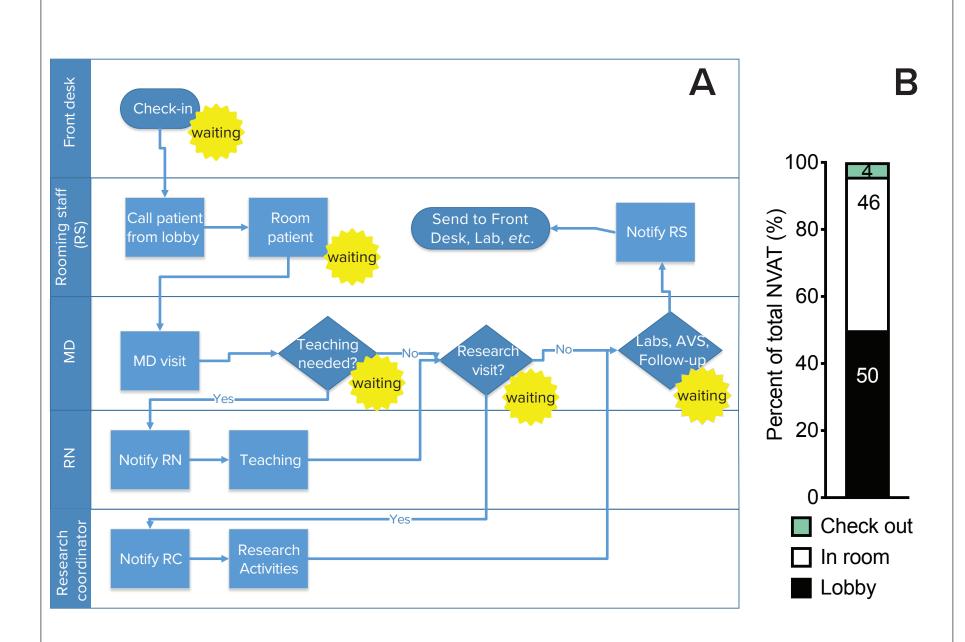


Fig. 1A. Process map. Patients spend time waiting (NVAT) at many steps during their visit, and standard work is not well-defined in our clinic, particularly at certain steps in the process such as after the MD leaves the room. This results in time wasted looking for staff and communicating and implementing a plan. **1B. What are the major** contributors to NVAT? 50% of the time was in the lobby, 46% of the time was waiting inside the room for the physician, and 4% of the time was checking out.

Aim Statement

To reduce the mean % non-value-added time (NVAT) from a baseline of 29% to 20% by August of 2019.

First Intervention (PDSA #1)

Rooming Staff 🗆 Labs

- Throat swab
- □ EKG Echocardiogram
- Influenza immunizati
- □ After Visit Summary
- Printed Referrals Printed Materials

□ Teaching (Per instructions in AVS)

Child Family Life □ Meet with CFL abou

Research Coordinator □ Meet with Research Coordinator With the implementation of a new check-out sheet, the goal is to **improve** communication and standarize the check-out process. This new process allows the MD to move on to the next patient without interruption, therefore reducing the time the next patient spends waiting in the room.

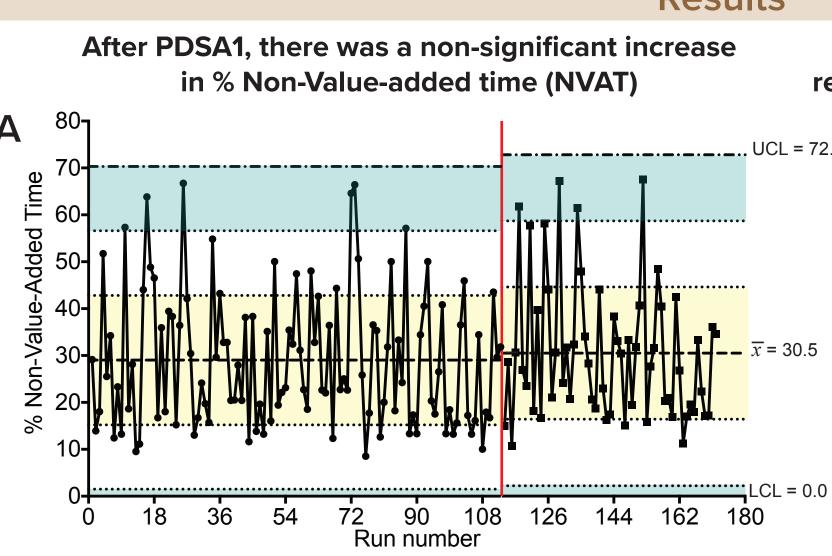


Fig. 2. Major outcomes of implementing a check-out sheet. A. *Control chart*¹, showing on the y-axis the %NVAT, a measure of time patients are waiting, which has been normalized to the visit duration to plot both new and return patients in a single graph. On the x-axis, is a chronological progression of patients seen over time, with each dot representing an individual patient visit. The red line marks the time when PDSA1 was implemented. B. Violin plot, showing on the y-axis the time, in minutes, patients are waiting in the room for the MD. The outer shape of the violin plot represents all possible results, with thickness indicating the probability density. C. Box plot, showing physician-patient time during clinic visit at baseline and after intervention 1. N = 113 (baseline), 59 (PDSA1). Data shown is mean \pm SEM.

Baseline Data Acquisition During the two-week baseline data acquisition period, a total of 116 patient visits were recorded over the months of February and April 2018 at the University of Minnesota Masonic Children's Hospital in the Department of Pediatrics. A worksheet was used to manually record the time, comments, and satisfaction of the patient's visit duration and flow. A similar procedure was carried out for PDSA1; we collected data two weeks after implementation of intervention to allow for adjustment period in the clinic staff.

Analysis

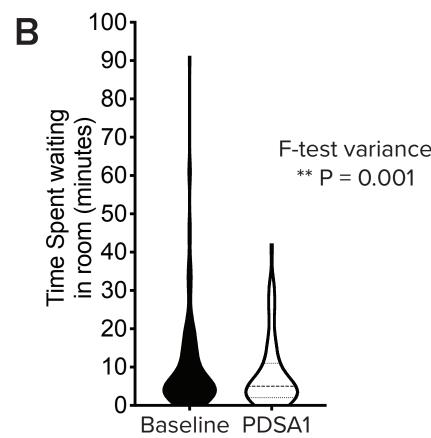
Statistical analyses were performed with GraphPad Prism (version 7.0d) for student t-tests, one-way ANOVA, Normalization test, and linear regression. R (R foundation for Statistical Computing, 2018) was used to correct for multiple comparisons. *Post hoc* tests were conducted with the Bonferroni-Holm method to control for a family-wise error rate at α = 0.05. Error bars represent SEM, and null hypotheses were rejected at or below a p-value of 0.05.

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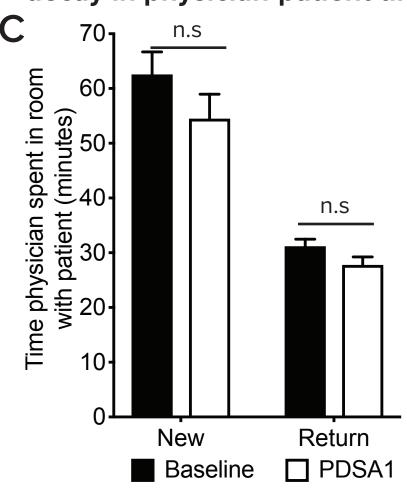
Results

Methods

Implementation of PDSA1 resulted in 54% reduction of variation in waiting periods in room

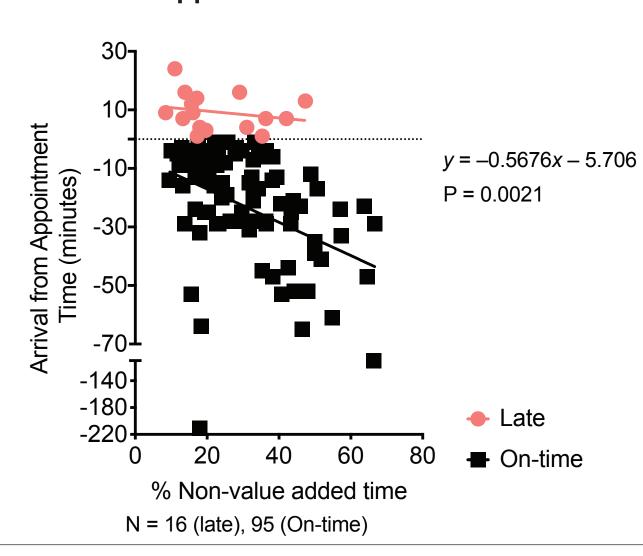


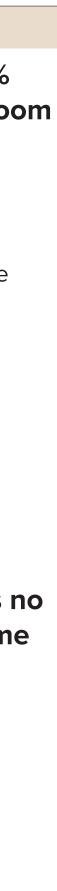
Balancing measure: There was no decay in physician-patient time



Insights

Patients who arrive later to their appointments wait less





Future Directions • Our next PDSA cycle will involve creating a standard work protocol for the entire visit, patient check-in through visit completion. Once this protocol is finalized, all staff will be trained. • Define what an appointment time means, which we think may help with the observation we have made that about 20% of patients arrive late. • We discovered that the **physical space** in our clinic is not ideal². The spaghetti diagram below shows the pathways our rooming staff walk, which is approximately 2.5 miles per week just to room patients per person. MAs Waiting Waiting | weigh workarea height area MDs room **Summary & Conclusions** • Barriers to efficiency stem from process issues rather than from problems with individuals involved in the process. • Although our first PDSA cycle did not reduce the mean %NVAT, it resulted in a significant 54% reduction in variation in the targetted area. • There is no correlation between age of patient and visit duration as we originally thought that younger patients would require more care than older patients. • 20% of the patients arrive late and this population, on average, experiences less %NVAT than those patients that arrive early. **Acknowledgements** • Coach: Ken Madden, MS. • Sponsors: Rich Vehe, MD; Allison Hudson, RN, BSN. • Explorer Clinic rooming staff • Pediatrics Rheumatology MDs, RNs, and research coordinator. • The MHealth QI Collaborative. • This research was partially funded by NIH 5T32GM008244-30 (Ruth L. Kirschstein Institutional National Research Service Award) References

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2. Chand S, Moskowitz H, Norris JB, Shade S, Willis DR. Improving patient flow at an outpatient clinic: study of sources of variability and improvement factors. Health Care Manag Sci. 2009 Sep;12(3):325-40.