The Arrive-Register-Room-Care (AR²C) Initiative: Designing Reliable Processes at HCA

Kayla Tremblay, MBA and James Heckman, MD

Introduction

Variation occurs in any large health care organization when local teams adapt workflows. Some variation is good and results in improved processes that should be spread. Conversely, too much variability can lead to poor outcomes and an inconsistent experience for patients, providers, and staff. Hence, large organizations must strike a balance between standardization and local autonomy. Healthcare Associates (HCA) is an academic primary care practice where over 300 dedicated professionals care for greater than 40,000 patients. HCA is divided into four suites - Atrium, North, Central, and South – each serving as a local care team with unique culture and physical space. As is true in many large practices, standardization and reliability is a challenge for HCA.

In Fall 2017, HCA leadership identified variation in the check in and rooming process. The check in and rooming process is defined as all tasks occurring during a period beginning when a patient arrives at the practice and ending when they are seen by a provider in an exam room.Tthis process occurs for every patient at every visit. Multiple interactions take place that have the potential to positively impact outcomes at the patient, practice, and system level. The Arrive-Register-Room-Care (AR²C) Initiative was formed to identify opportunities for improvement and spread best practices.

Aim

To usea rigorous improvement methodology to design a highly reliable process for check-in and rooming which will improve the health of our patients, lead to better days for everyone, and improve flow while maintaining high levels of patient centeredness.

The Team

- ➤ Tobie Atlas, Patient and Family Advisory Council Co-Chair
- ➤ Nisha Basu, MD, MPH, former Director of Population Health
- ➤ Angela Coppola, Practice Representative and Medical Assistant
- ➤ Leonor Fernandez, MD, Physican Lead for Patient Engagement and PFAC Co-Chair
- ➤ Stephanie Fryman, former Medical Assistant
- ➤ Mathilda Ganjoli, Medical Assistant
- ➤ Whitney Griesbach, former Practice Manager
- ➤ James Heckman, MD, Assistant Medical Director
- ➤ Brendan Murray, MBA, Practice Operations Manager
- ➤ Kayla Tremblay, MBA, Senior Project Manager
- ➤ Heather Wathey, Practice Administrator
- ➤ Lauren Wemple, MPH, Population Health Manager

Problem Identification

To better understand the challenges and opportunities in the check in and rooming process, the AR²C team created process maps, hosted simulation sessions, and collected baseline data.

Process mapping

Each team participated in process map development at their suite team meetings. The process maps were refined with observation in each suite. The final process maps visualized variation in processes between the suites (see Figure 1).

Figure 1: Process maps visually represented significant variation between the suites (Click to enlarge)

Simulations

To further engage staff in identifying opportunities for improvement, the AR²C team organized five simulation sessions. The sessions took place after hours and simulated the check in and rooming process. Staff from all of the suites and a variety of roles participated. Patients were recruited from the HCA Patient and Family Advisory Council. Each simulation ended with a debrief to share lessons learned and opportunities for improvement (see Figure 2). Practice leadership paid staff overtime and supplied pizza for dinner to encourage participation. The simulations allowed the team to truly understand the challenges facing frontline staff and dive deep into issues without interrupting day-to-day operations. This facilitated trust and mutual respect across the disciplines.
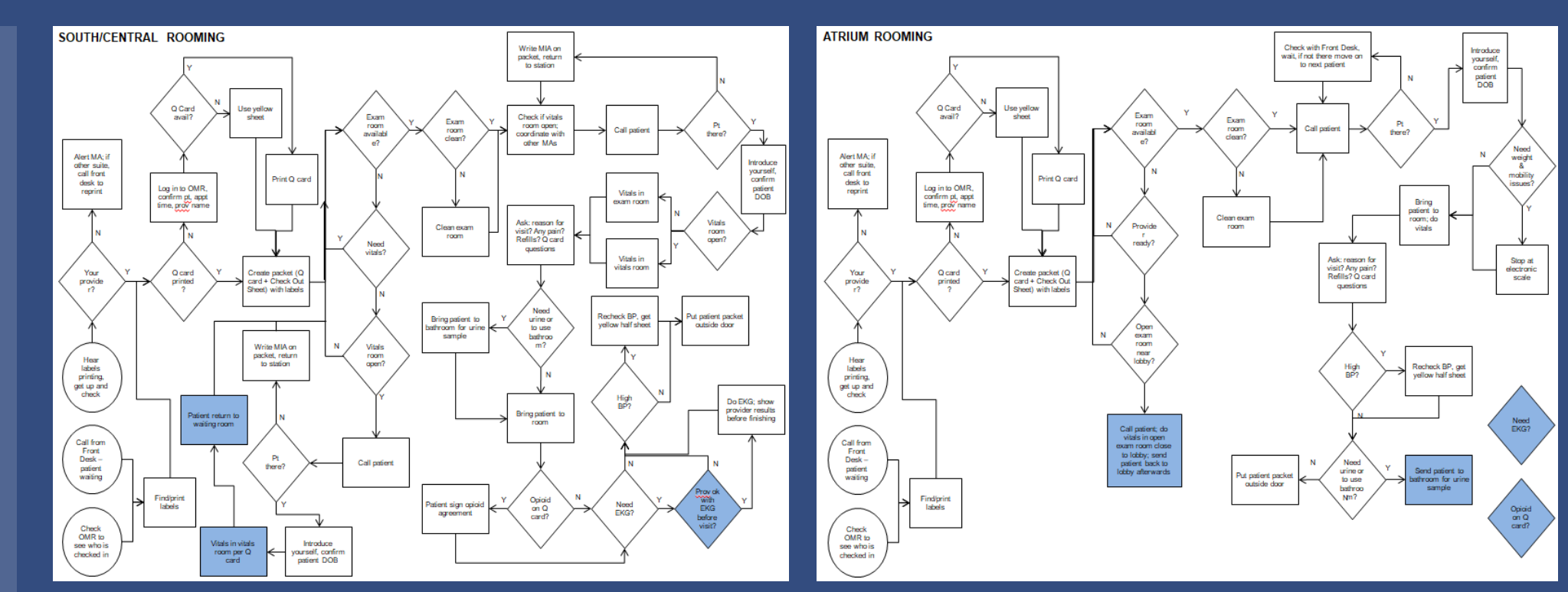

Figure 2: Team debrief after a simulation session.

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Problem Identification (Continued)

Baseline Data
Over four weeks in summer 2018, the AR^{2}C team collected baseline data to understand the performance of the current check in and rooming process (see Figure 3). The data identified opportunities to improve communication, prioritization, and flow.

Figure 3: Measures for the ARC Initiative

Measure (click for definition)	Format	Type
Throughput time	Paper sheet that follows patient	Process
Care Gap Closure	Chart reviews	Outcome
Staff Experience	Paper or e-survey	Balancing
Provider Experience	E-survey every 2 weeks	Balancing
Patient Experience	Paper e-survey at check out	Balancing

Figure 4 (right):

Stoneman Residents developed a tool to capture throughput time.(click to enlarge)
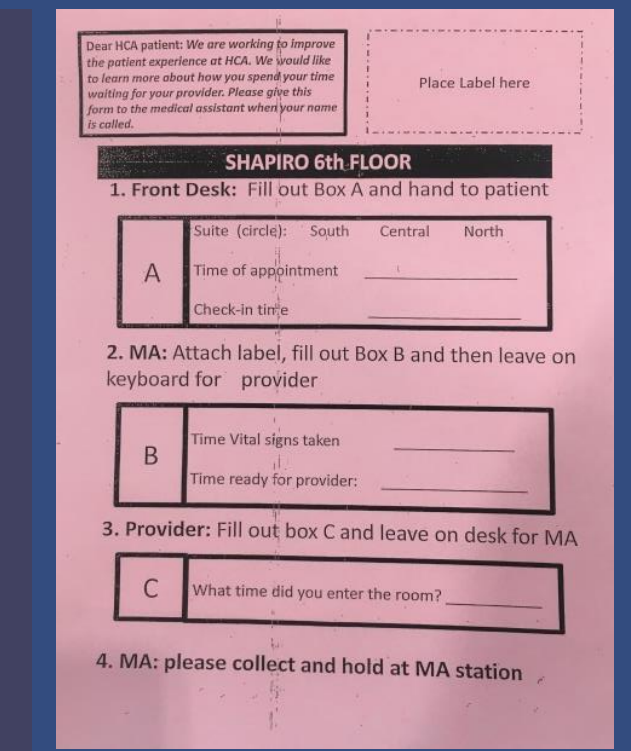
Intervention

The AR^{2}C team met with HCA Lead Medical Assistants to understand how they currently manage flow and priorities within the suites. Several local bright spots were identified. Furthermore, the Lead MAs suggested re-instating a whiteboard system that was piloted in the past but not sustained or spread due to staffing challenges. Using this information, the AR^{2}C team developed a prototype of a flow management system.

The initial prototype answered the questions, "What needs to get done?" and "In what order should I do it?" To determine if the prototype worked, the team ran over 12, PDSAs touching each of the HCA suites. See the PDSAs section for details on the types of tests and improvements made to the system.
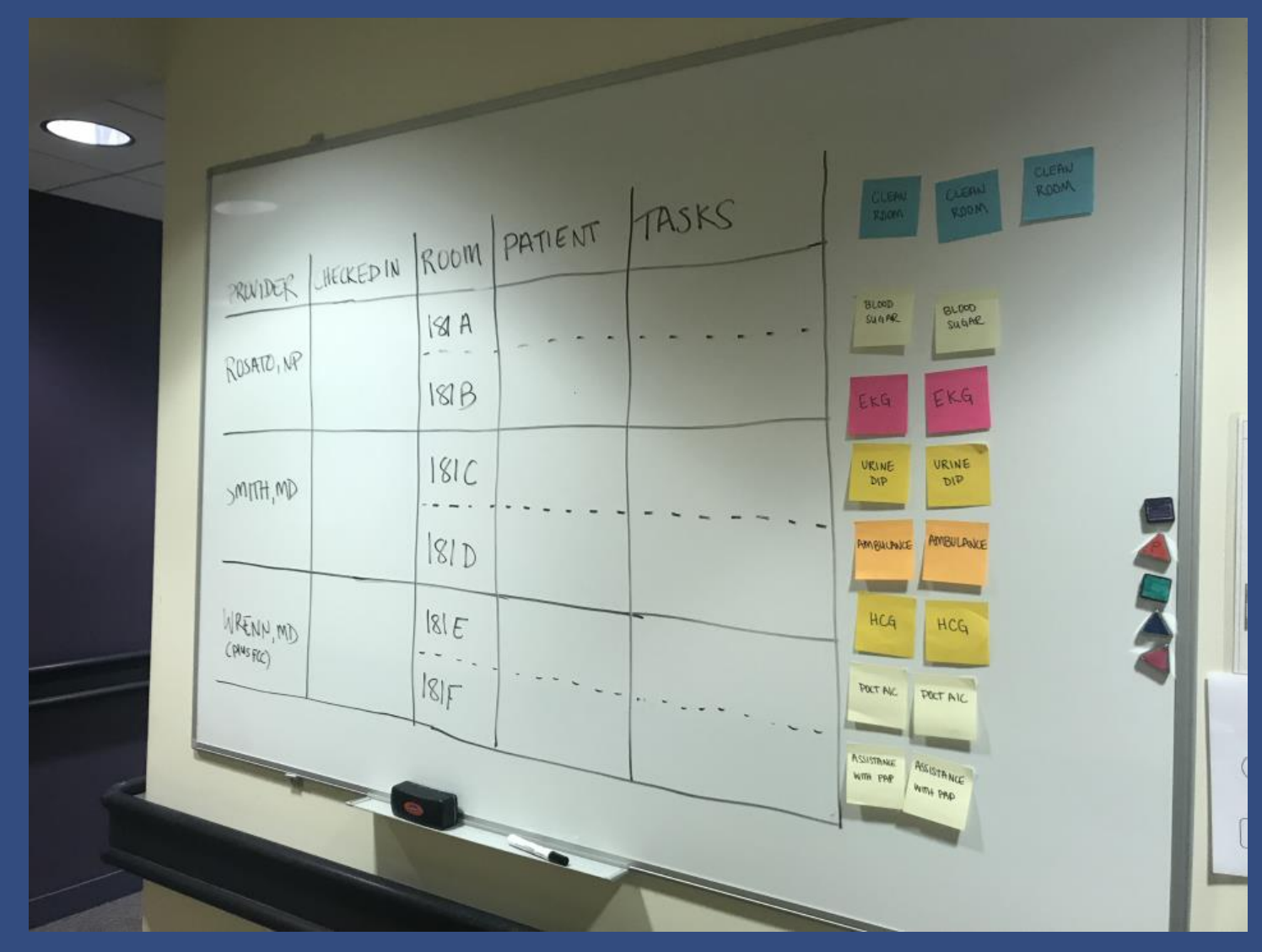

Figure 5 (above): *the first PDSA of the flow management system.* **(click to enlarge)**

PDSAs

The original concept for the flow management system evolved with each PDSA by incorporating feedback from providers and staff (see below). A flag system was added to address provider feedback from the PDSAs. The final system incorporated a whiteboard, algorithm, and flags.

PDSA	Description	Learnings & Improvements
1-5, 8	Test whiteboard and algorithm in each suite for 1 session	• Removed scheduled patients column • Maintain HIPPA compliance by writing patients initials and time of visit on board • Need a signal that room is empty and ready for next patient • Use magnets to indicate tasks needed during visit • Use markers with clicky tops • Some providers have a long walk to the board from their rooms • Location of whiteboard needs to be convenient for team
6-7, 9	Test whiteboard and algorithm with residents for 1 session	• Consider a signal to indicate when residents are precepting and almost done with their visit
10-12	Test a flag system to indicate when rooms are open and when residents are precepting	• Flag system reduced burden on providers • Residents happy with precepting flag and impact on flow

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The Flow Management System answers two questions:

What needs to be done?

In what order should it be done?

Flow White Board Anatomy

Provider	Checked In	Rooms	In Room	Tasks
Tremblay (NP)	A.C. 9:40	101A	V.S. 9:00	🟧
Tremblay (NP)		101B	A.B. 9:20	🟪
Heckman (MD)		101C		
Heckman (MD)		101D	C.D. 8:20	
Murray (MD)	D.B. 8:40	101G	E.A. 8:00	

Room numbers

Magnets indicate tasks needed

Providers in clinic

Patients who are checked in

Patients who are in a room
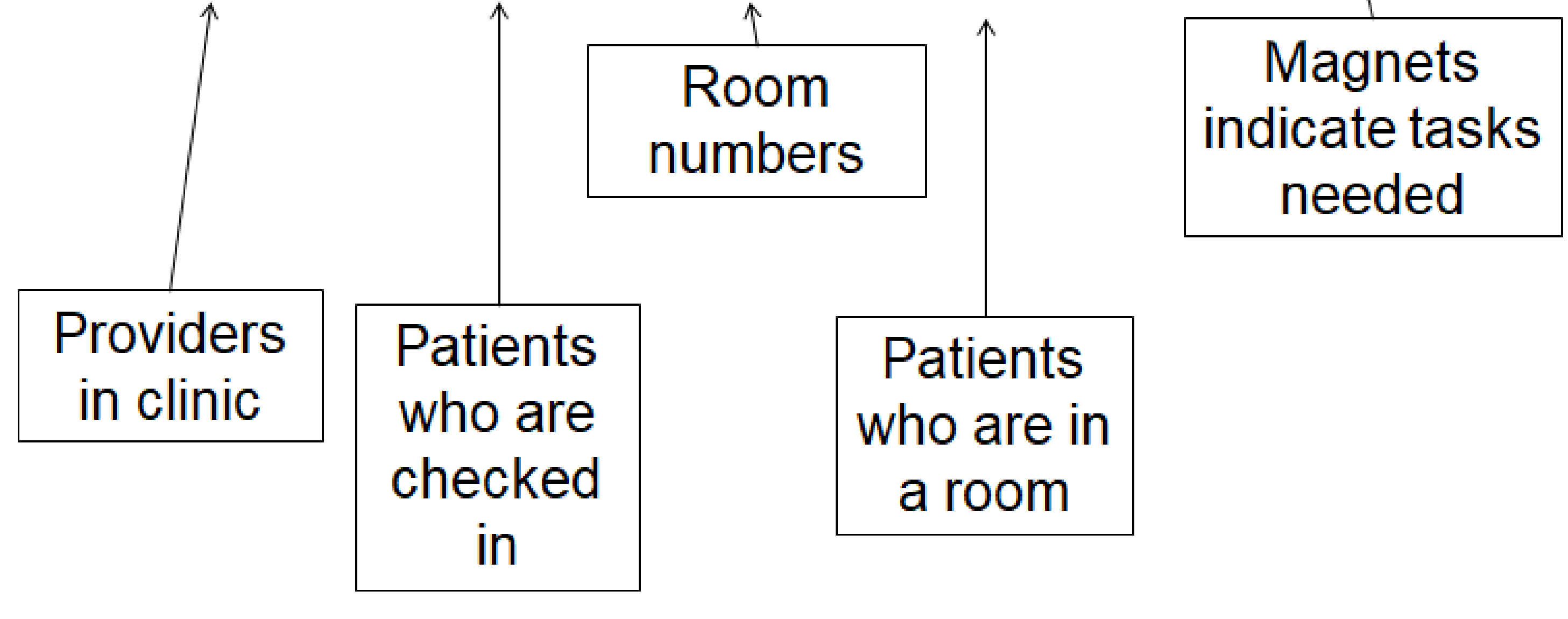
Figure 6: *A whiteboard, displayed near the MA station, visually shows which rooms are open and where patients are in the practice. Medical Assistants update the board as patients check in and arrive for their visit. Providers can communicate with Medical Assistants for needed tasks using magnets in the far right column*
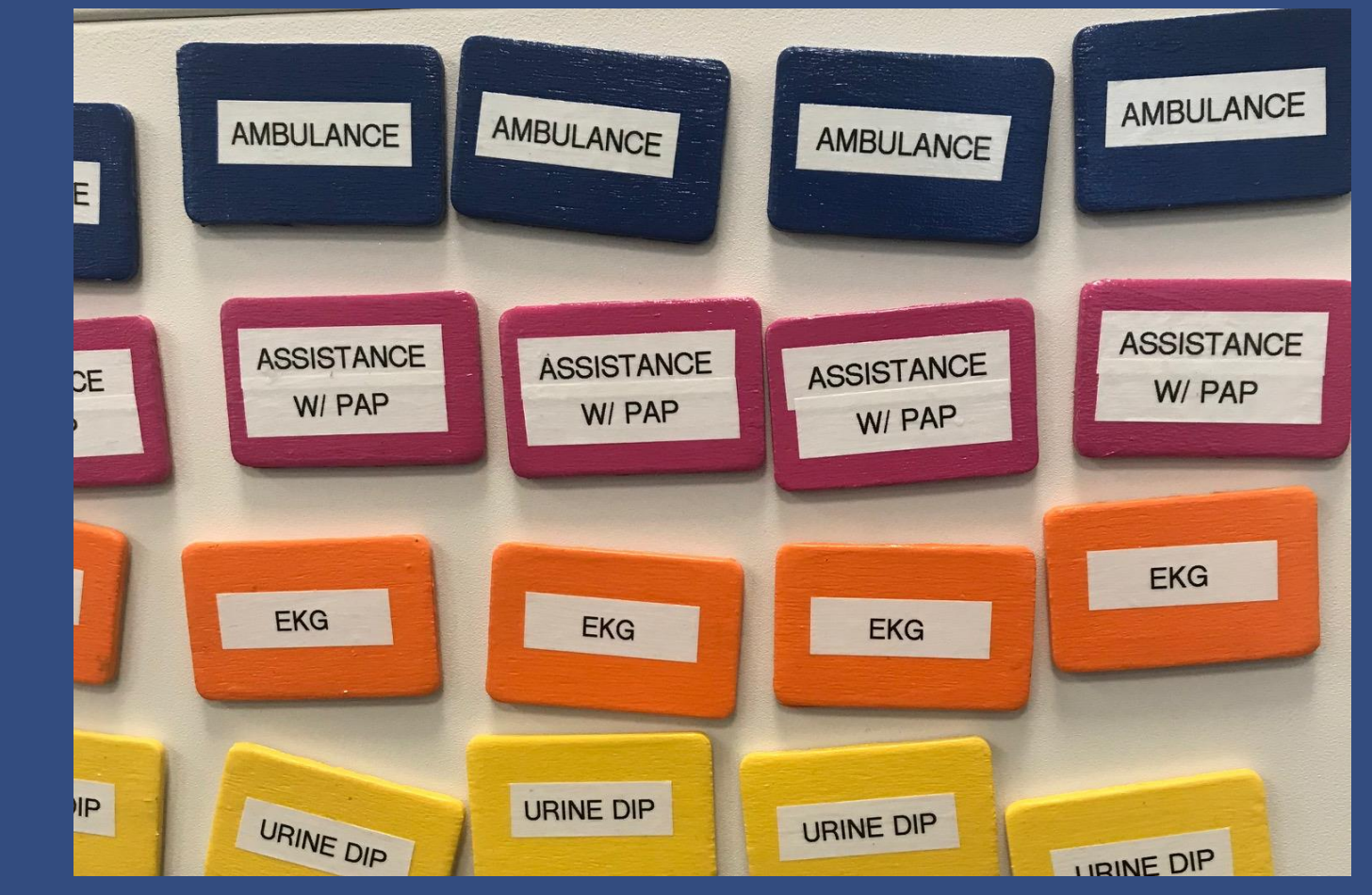
Figure 7: *Color coded magnets correspond with frequently requested tasks.*

Figure 8: *Flags for each exam room are visible from the whiteboard, and indicate when a room is open (green) or when a resident is precepting (red).*
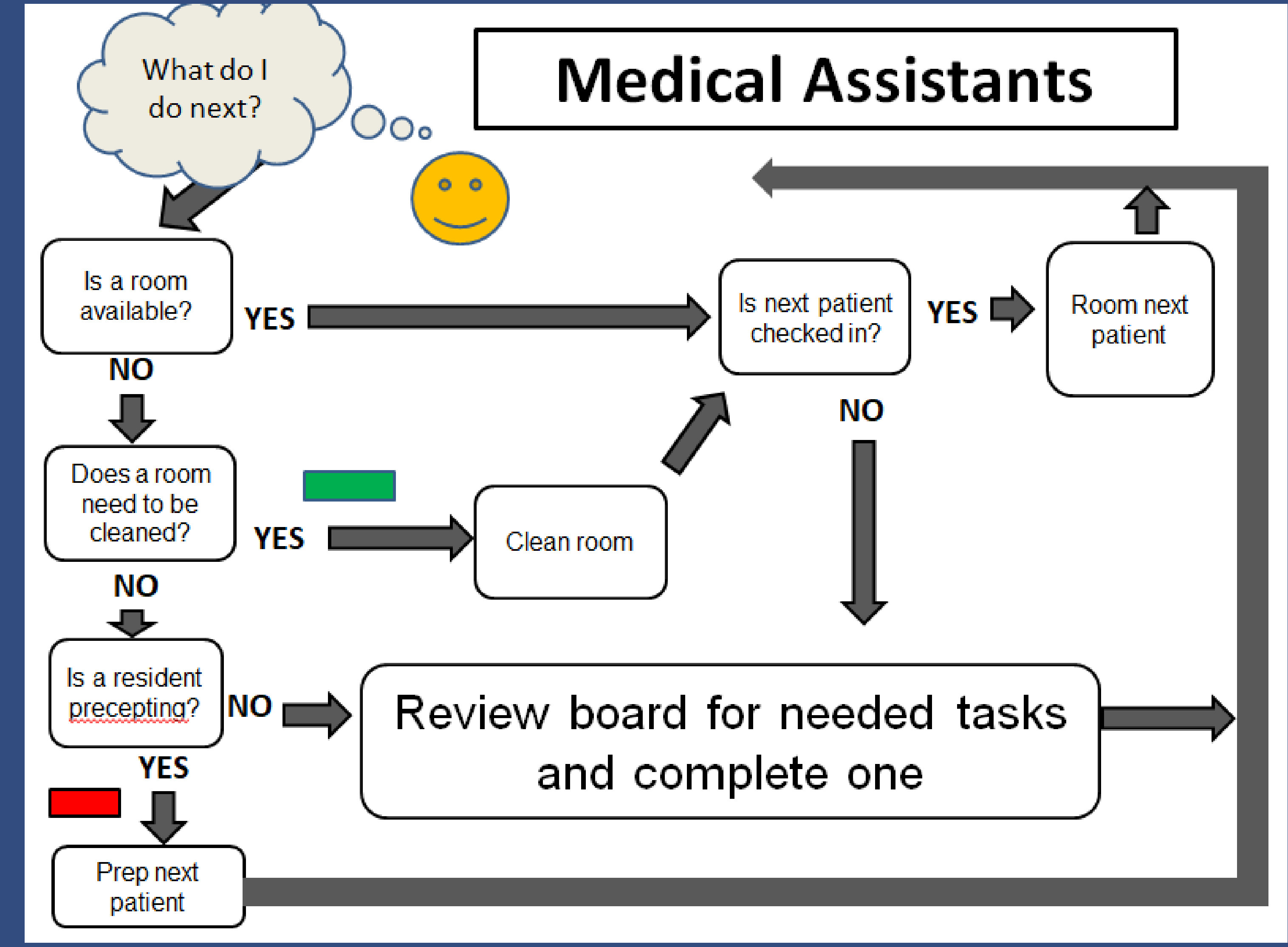
Figure 9: *The flow management system is built on an algorithm that Medical Assistants use to prioritize tasks. The algorithm prioritizes rooming patients over other tasks to optimize flow. After completing a task, Medical Assistants return to the board to determine what task to do next.*

For more information, contact:

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Roll Out and Continuous Improvement

The flow management system was rolled out first in the South and Central Suites. To prepare for the roll out, the AR²C team led a primary care practice flow game at suite team meetings to help illustrate the flow management theory behind the system. Each team member was invited to take a survey monkey training that quizzed team members on how the board works and how to use it in different scenarios.

To encourage continuous improvement, a poster was hung next to the whiteboard where team members could identify issues or opportunities for improvement. The AR²C team reviewed the list each day and made adjustments or changes to the whiteboard to improve operations. Changes were shared with the whole team in an end of the week email.

In parallel to the AR²C rollout, the operations management team held basic competency training with the other two suites. The emphasis was on what work needed to be completed prior to each visit but there was not explicit instruction given on how they should complete the work.

CLICK HERE TO TAKE OUR ONLINE TRAINING MODULE

Results

Post intervention data was available for the two intervention suites and one control. Preliminary results indicate that there was a practice wide trend towards increased care gap closure (figure 8). This trend persisted when data was stratified by suite and provider type, with the exception of resident providers in south suite. We observed an increase in wait times in control suites and a reduction in wait times in intervention suites(figures 9a & 9b). These trends persisted when data was stratified by suite and provider type. Intervention suites also demonstrated a reduction in first recorded systolic and diastolic blood pressures (fig 10). Post intervention surveys of providers, staff and patients were ongoing at the time of abstract submission.

Results (cont)

Figure 8: Average care gap closure rates (click to enlarge)
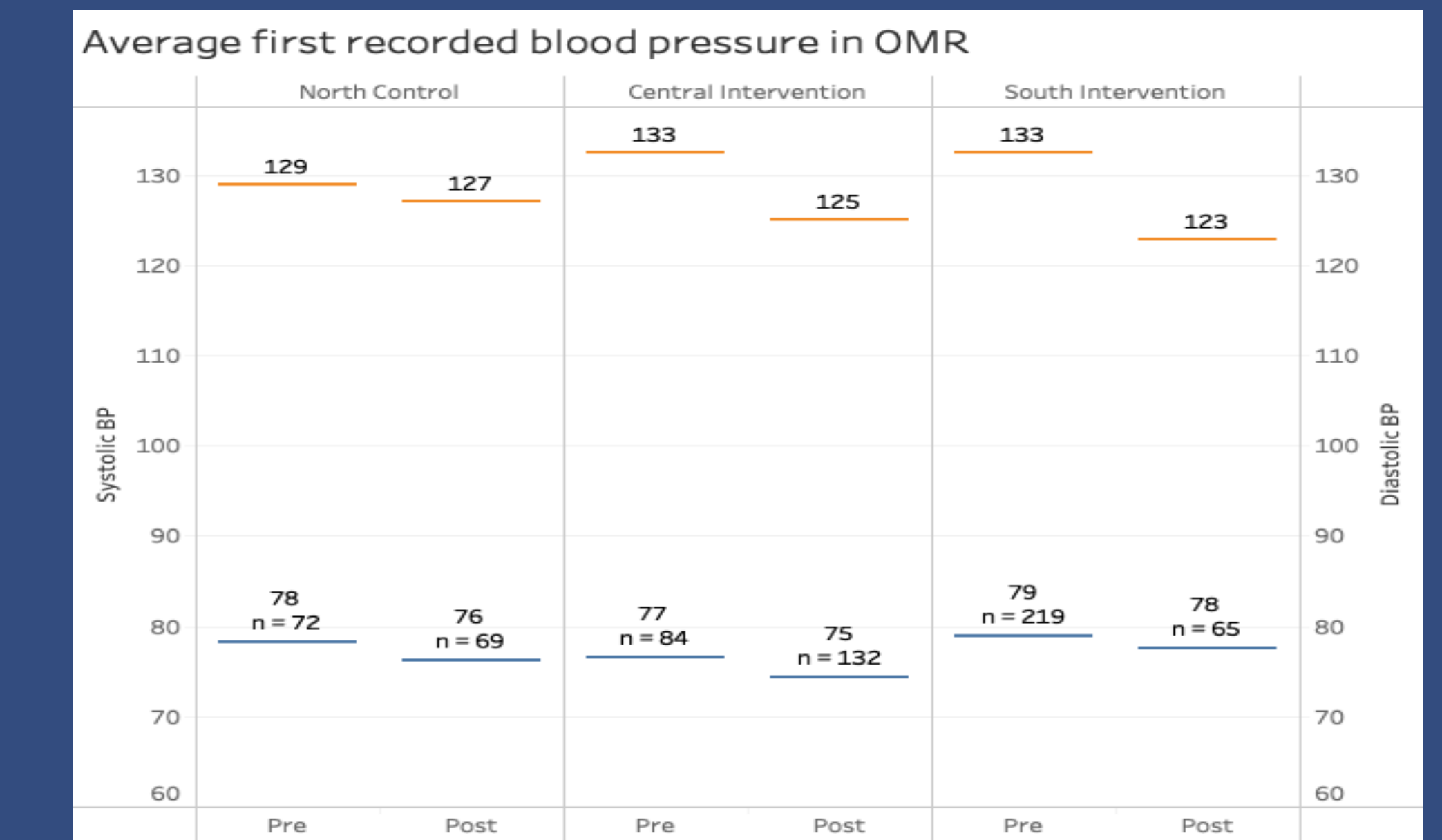
Figure 10: Average 1st recorded blood pressure (click to enlarge)
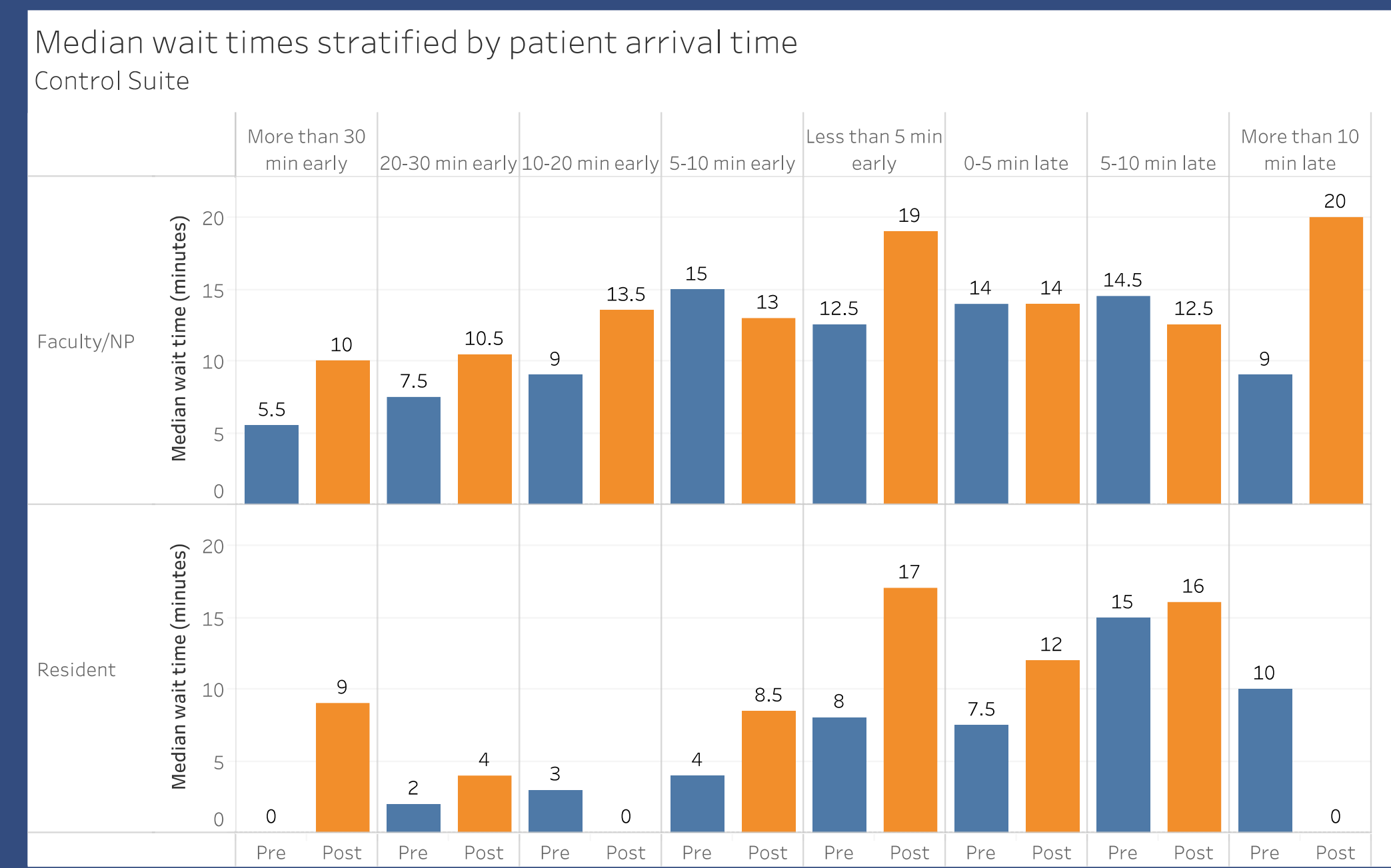
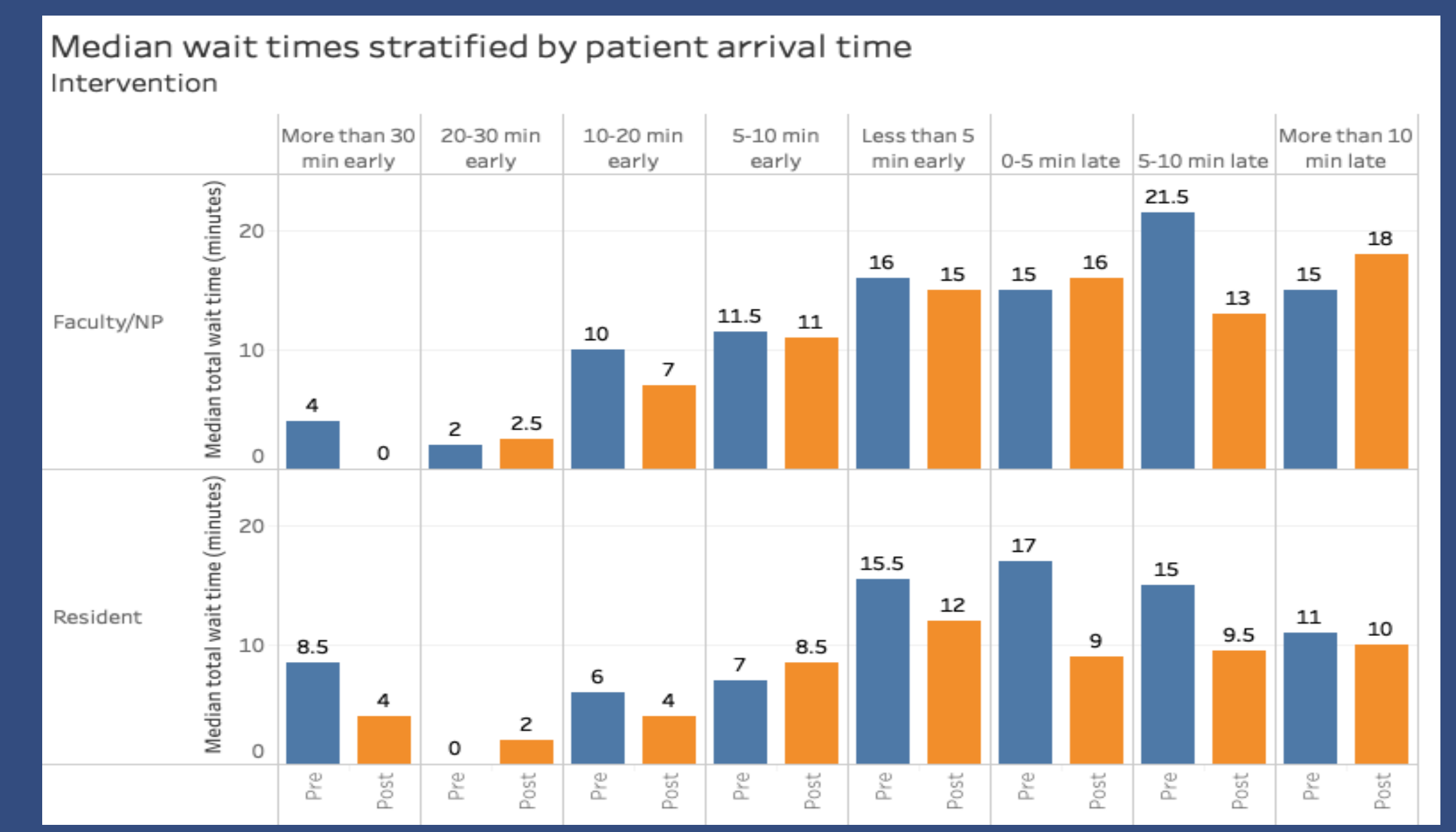*Figure 9a: Wait times in control suites stratified by arrival times (click to enlarge)*

Figure 9b: Wait times in intervention suites stratified by arrival times (click to enlarge)

For more information, contact:
Kayla Tremblay, MBA, ktrembl1 @bidmc.harvard.edu | James Heckman, MD, jheckma@bidmc.harvard.edu

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Lessons Learned

➢ **Track your learning from PDSAs.** We used an excel spreadsheet to ensure we captured everything.

➢ **Start with a prototype to test feasibility.** Our prototypes were inexpensive and easy to start with, and we refined our design over time.

➢ **An inexpensive low-tech tool, implemented effectively, can generate results.** Whiteboards, flags, and some arts and craft supplies were all we used in this project. Using PDSA to test ensured that our design was effective.

➢ **Engage the team in testing and implementation.** The system would not have been successful without a lot of feedback from the team directly using the tool.

Next Steps

➢ Roll out in North and Atrium Suites
➢ Conduct statistical analysis on results
➢ Complete provider, staff and patient experience surveys
➢ Collect more data on South Suite residents
➢ Investigate ways to automate the system

➢ Repeat experience surveys for Medical Assistants
➢ Identify additional opportunities for improvement in the check-in and rooming process
➢ Use lessons learned to improve other processes in the practice

Acknowledgments

➢ Thank you to everyone who made this project a success including: Blair Bisher, Marc Cohen, Eileen Reynolds, all HCA Medical Assistants, all HCA faculty, residents, and Nurse Practitioners,The Office of Healthcare Quality.

➢ Study data were collected and managed using REDCap electronic data capture tools hosted at BIDMC[1] REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

➢ [1]Paul A. Harris, Robert Taylor, Robert Thielke, Jonathon Payne, Nathaniel Gonzalez, Jose G. Conde, Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support, J Biomed Inform. 2009 Apr;42(2):377-81.

Figure 11: White Board in use in South Suite(click to enlarge)

For more information, contact:
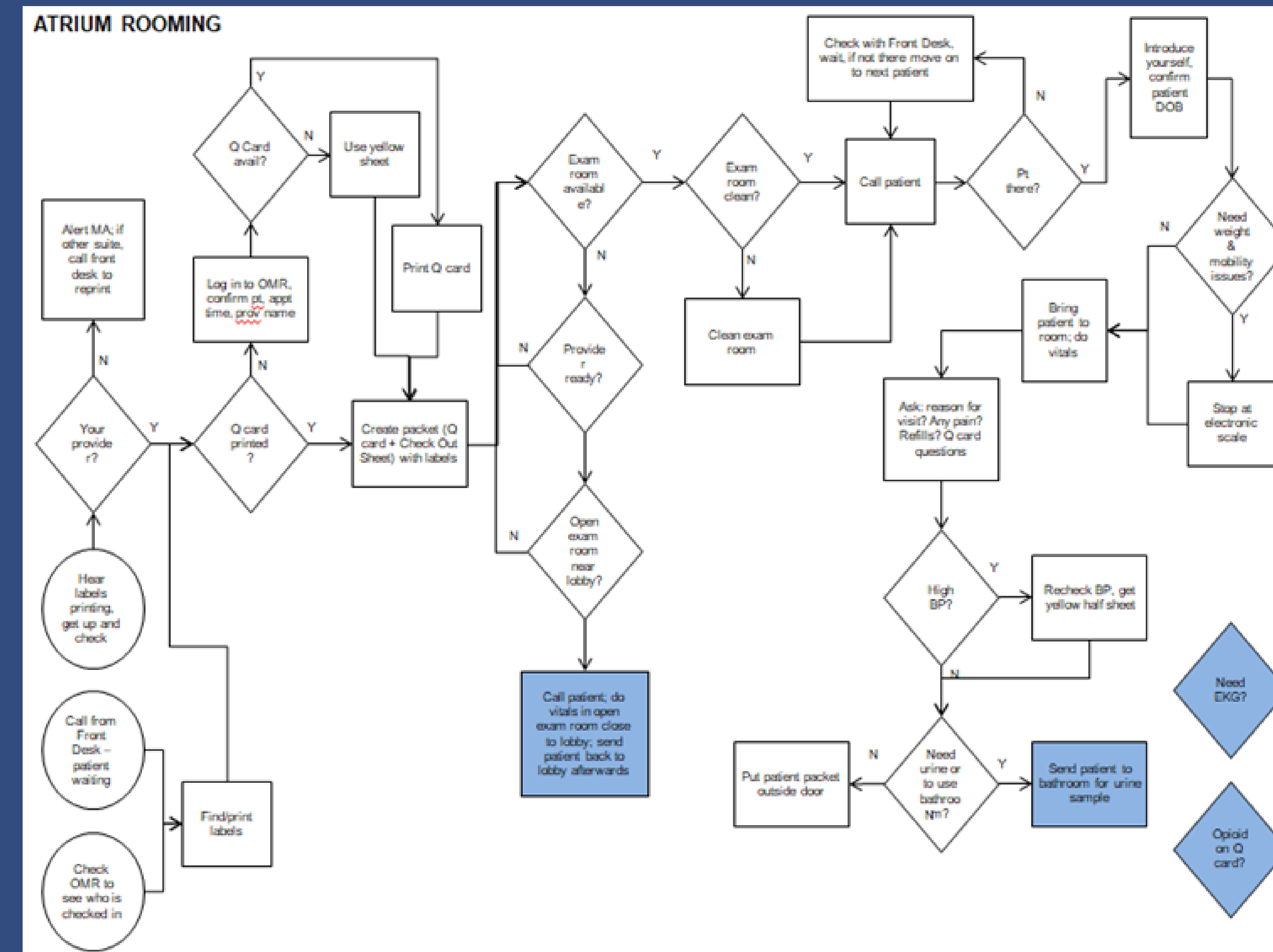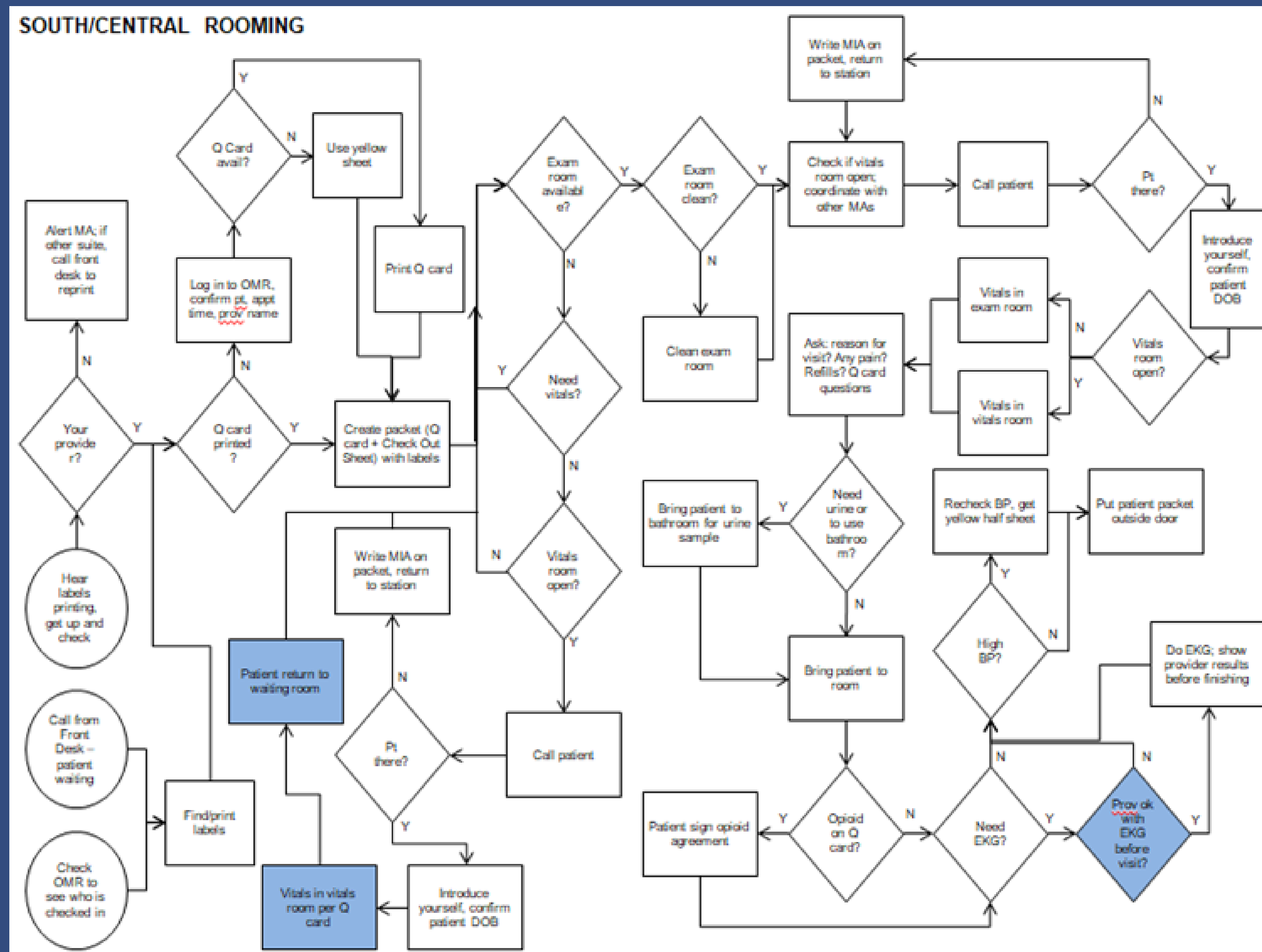
Figure 1: Process maps visually represented significant variation between the suites

Figure 4 (right):

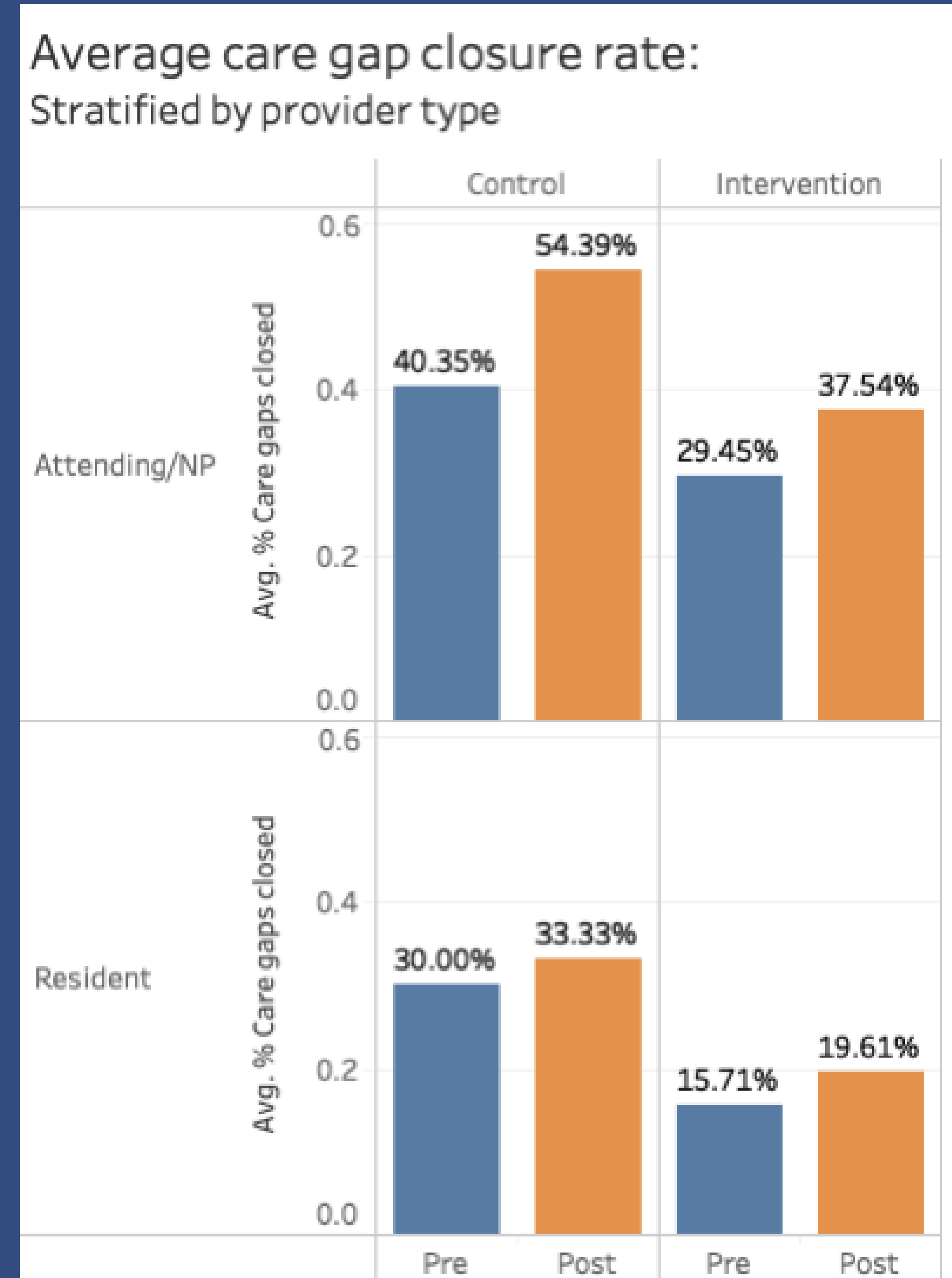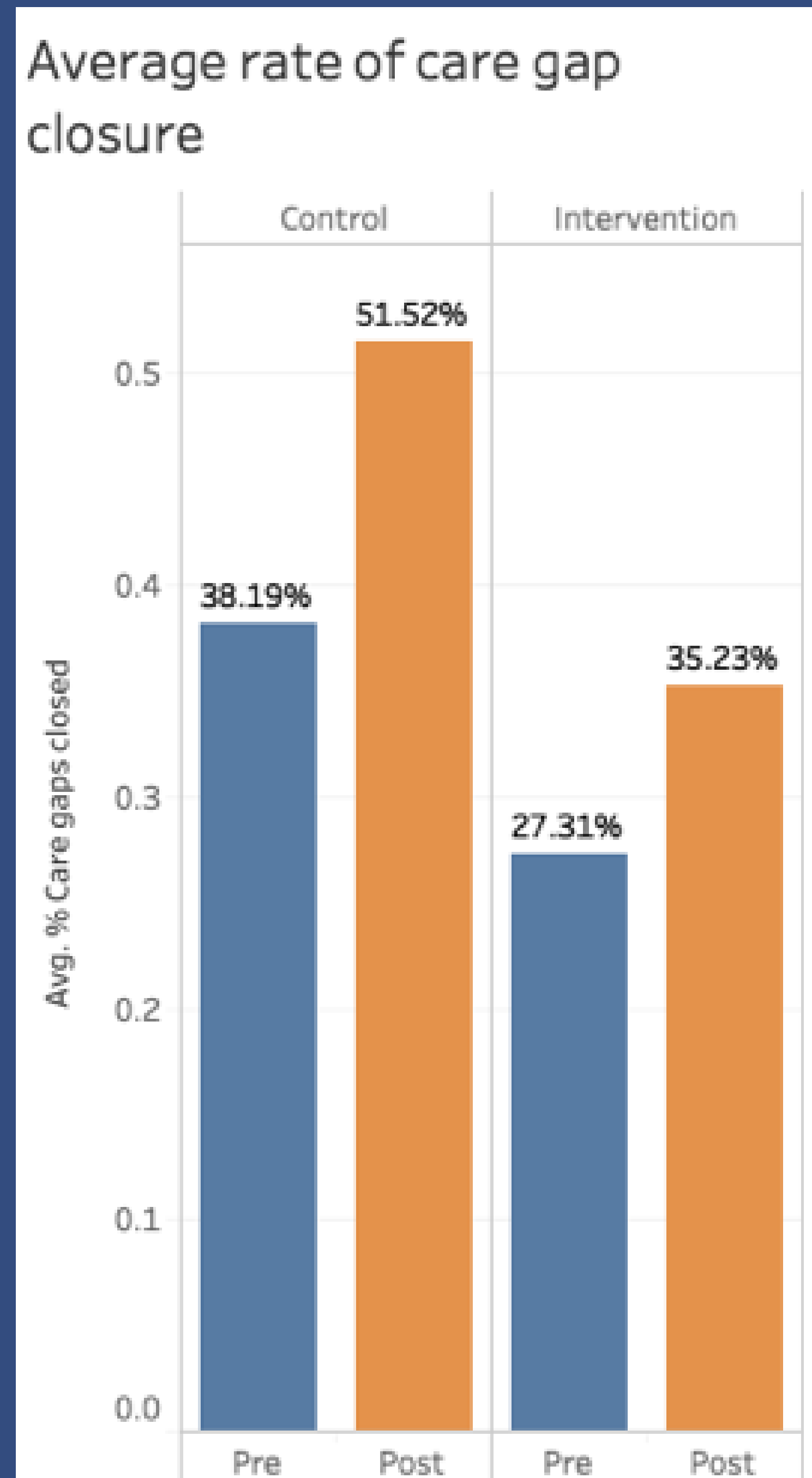*Stoneman Residents developed a tool (right) that captured throughput time for over 90% of HCA visits.*
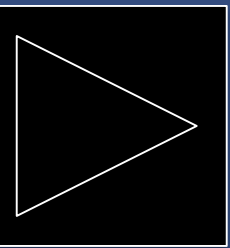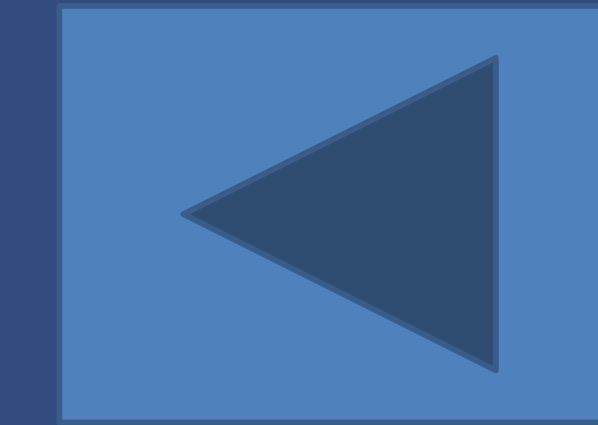
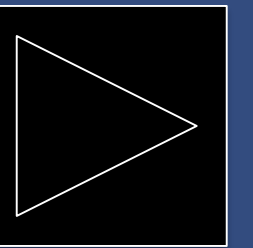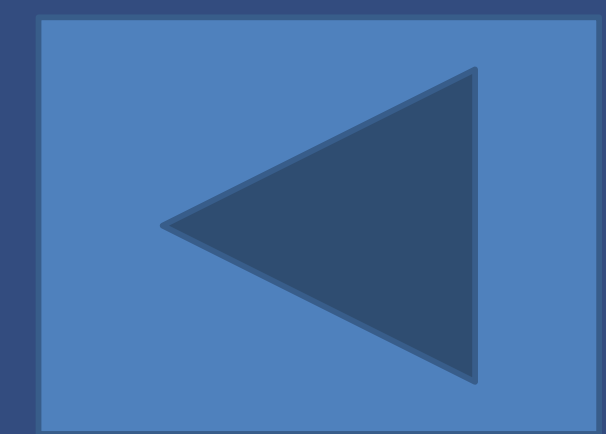**Figure 5:** *The first PDSA of the flow management system.*
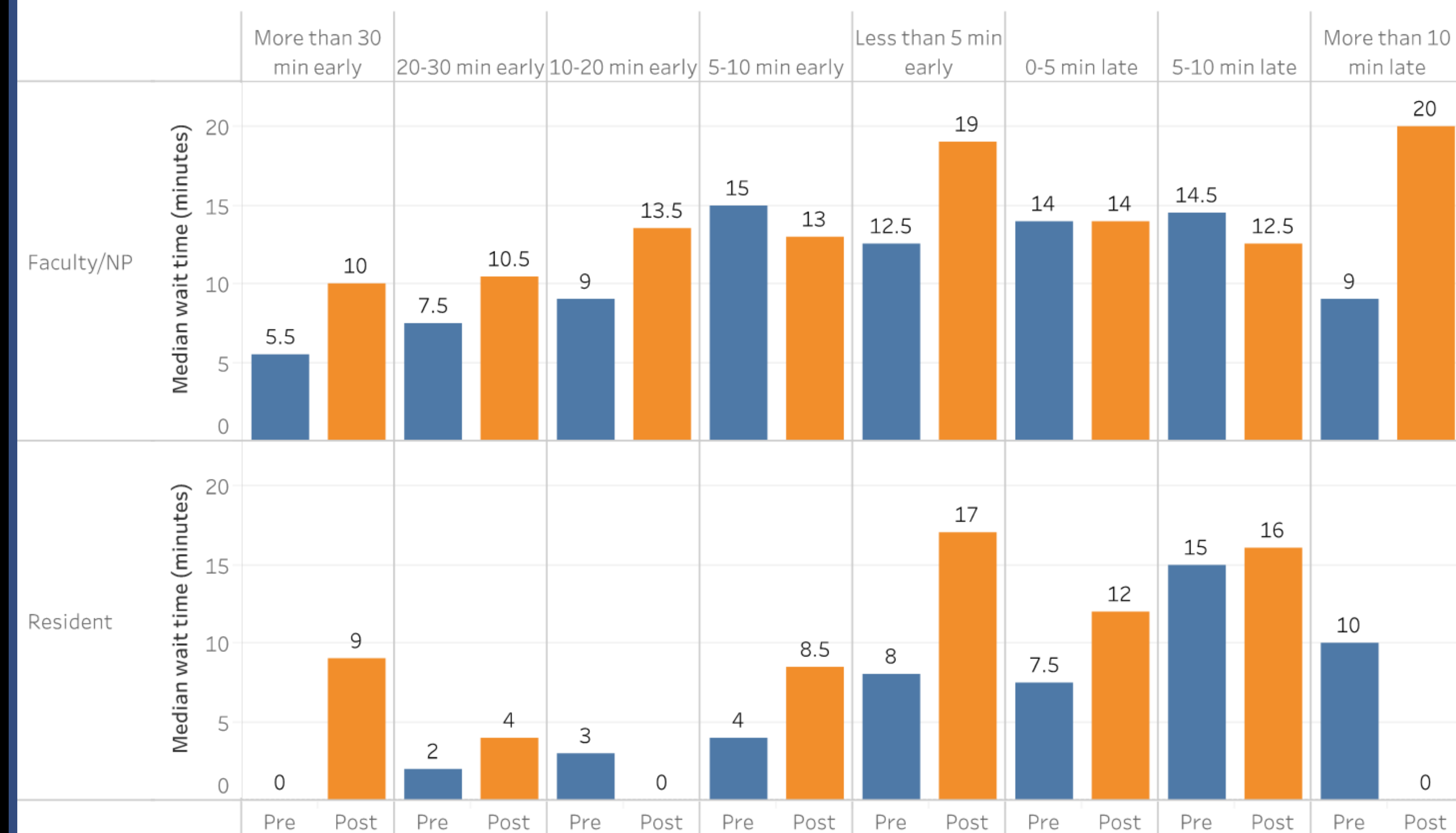
Care gap closure rates
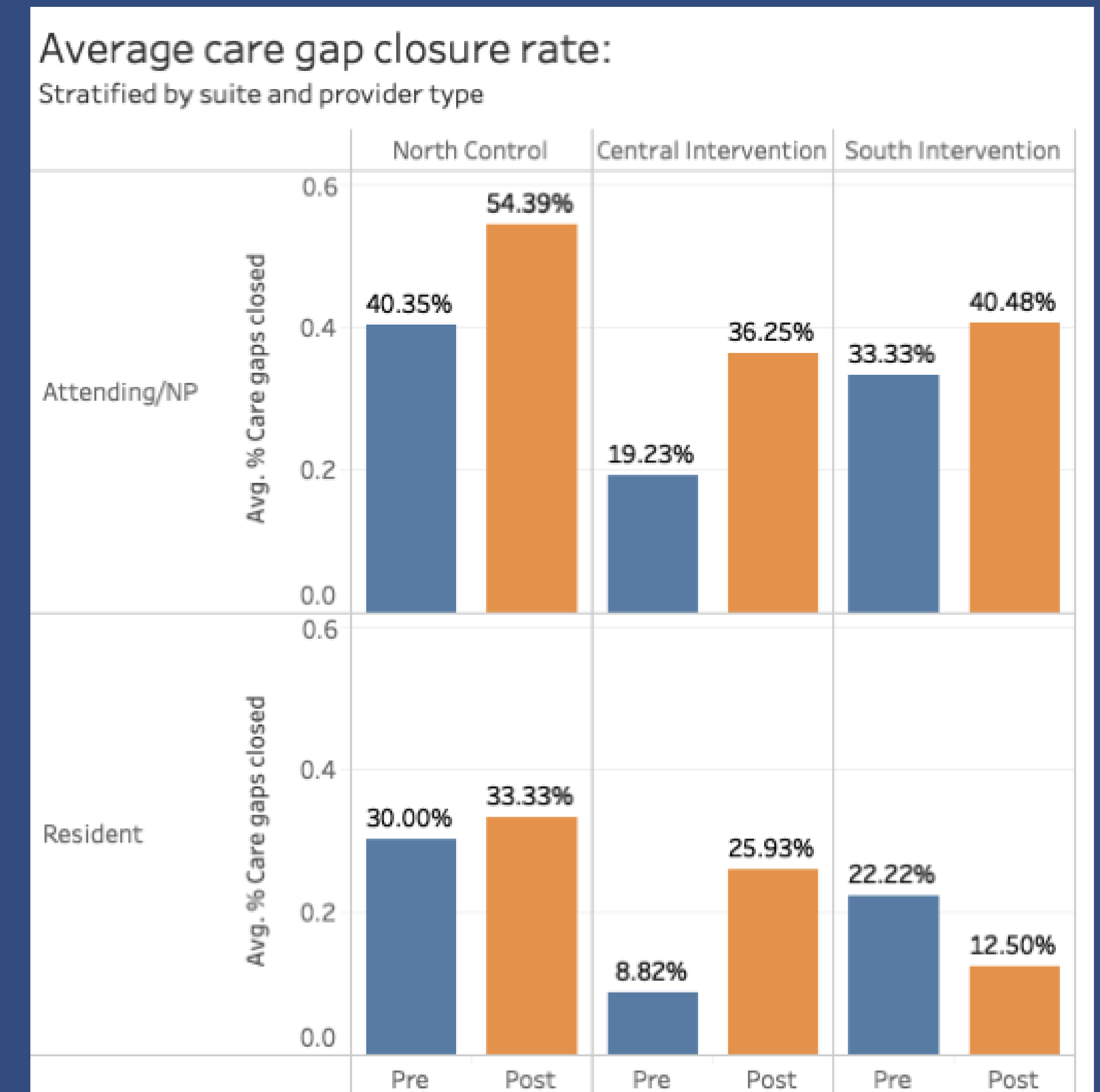
Care gap closure rates increased practice wide. This trend was evident at the provider and suite level with the exception of south suite resident patient vists.
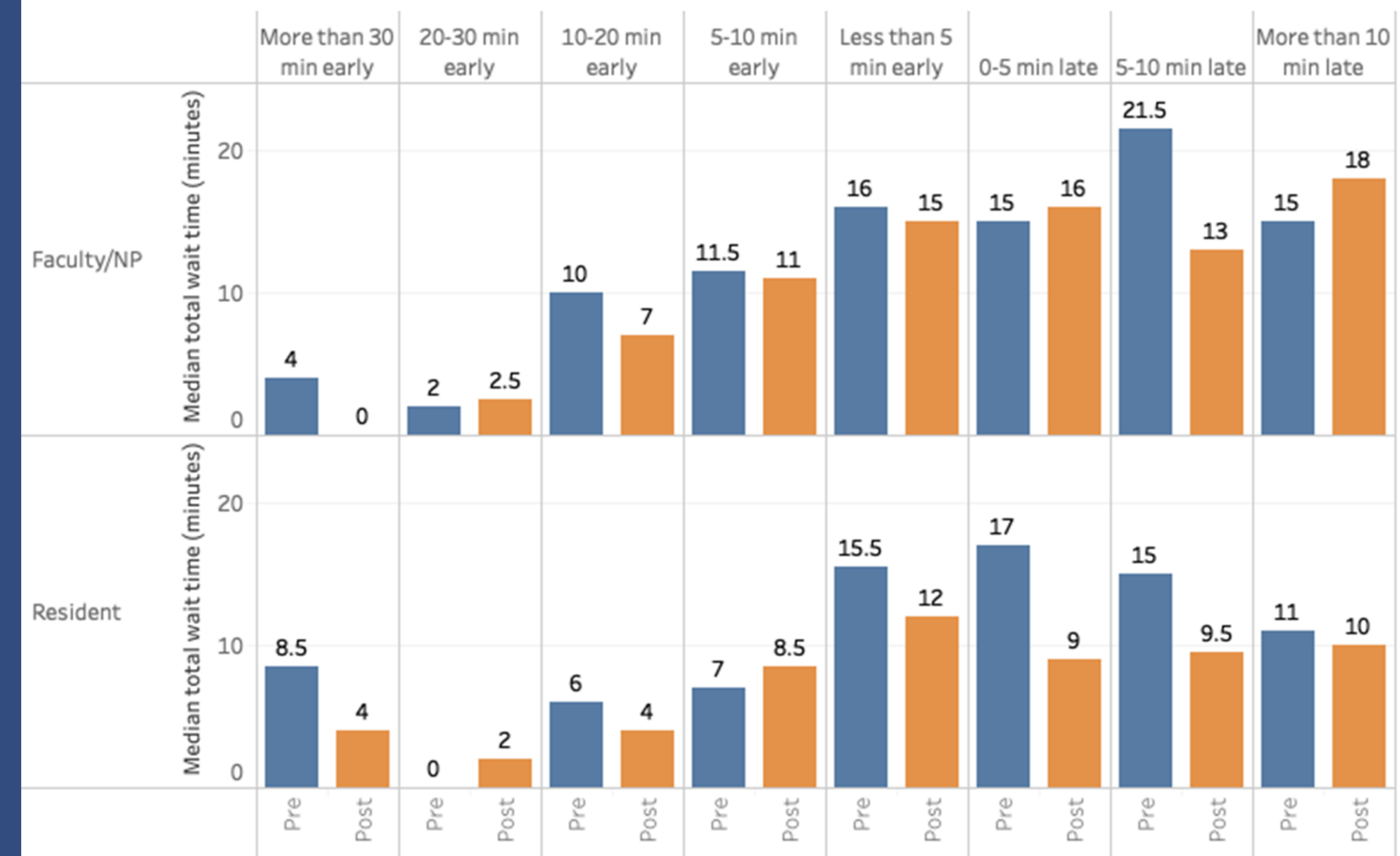
Wait times stratified by patient arrival time

Median wait times stratified by patient arrival time
Control Suite

Median wait times stratified by patient arrival time
Intervention

In the control suite we observed an increase in median wait times. In the intervention suite we observed reductions in median wait times.
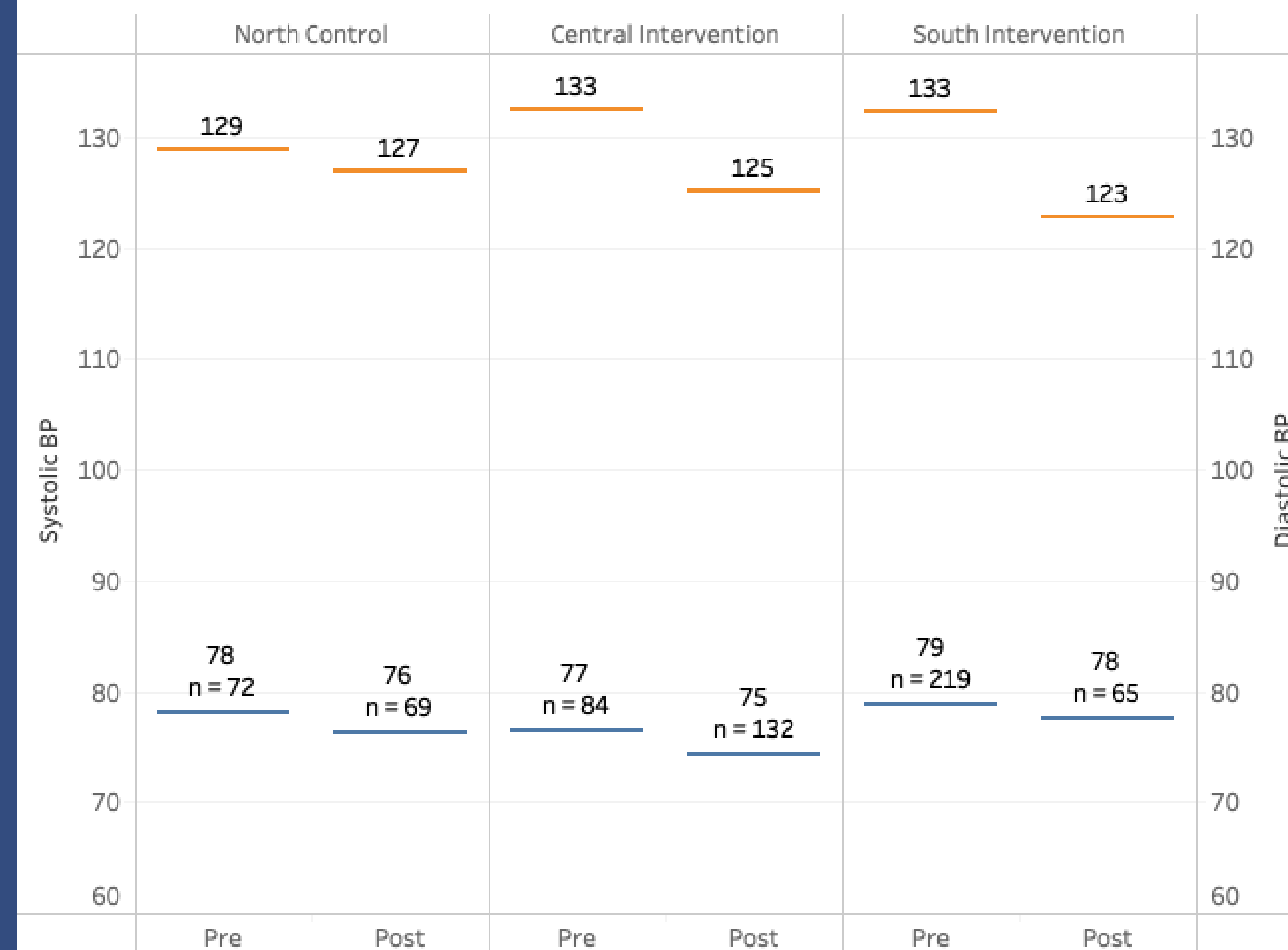
First Recorded Blood Pressure
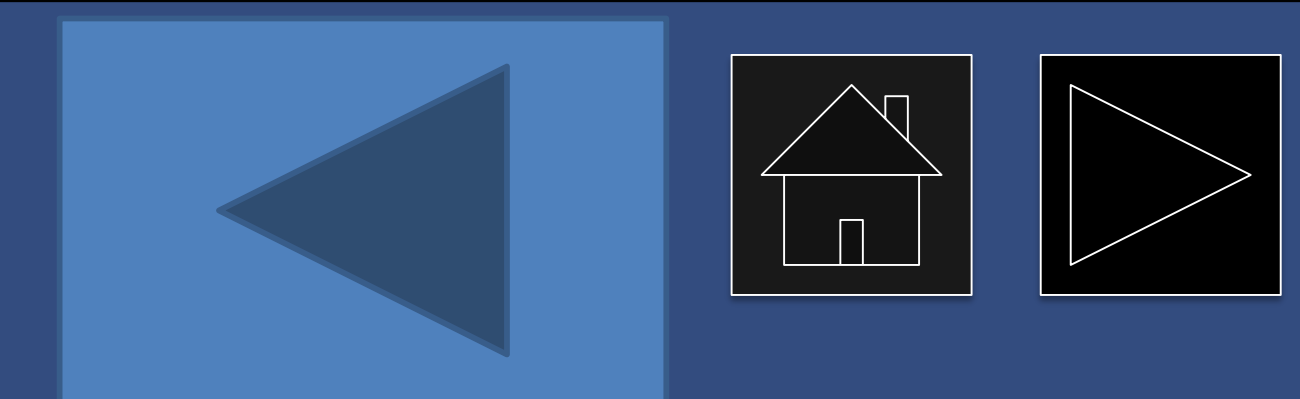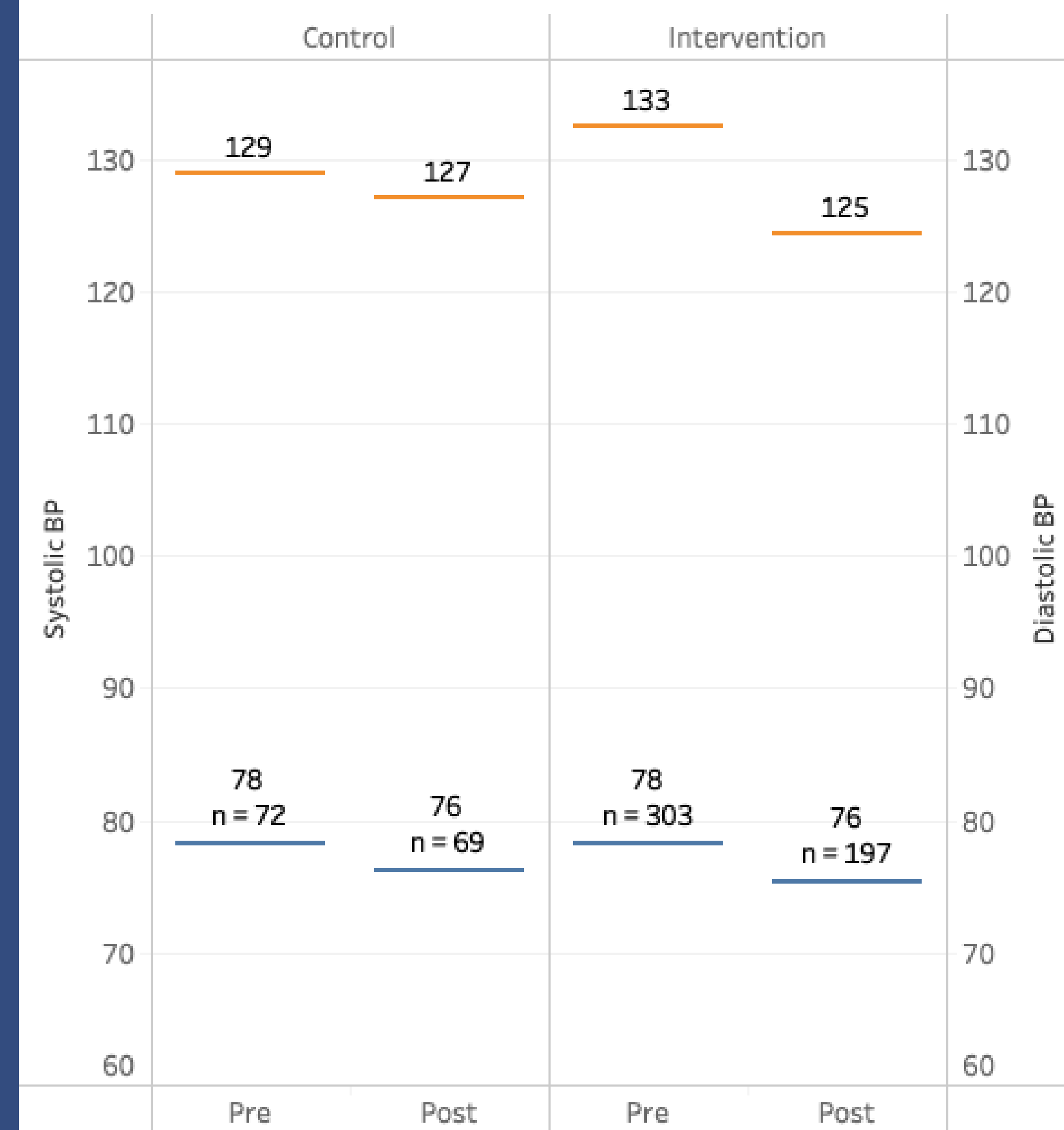
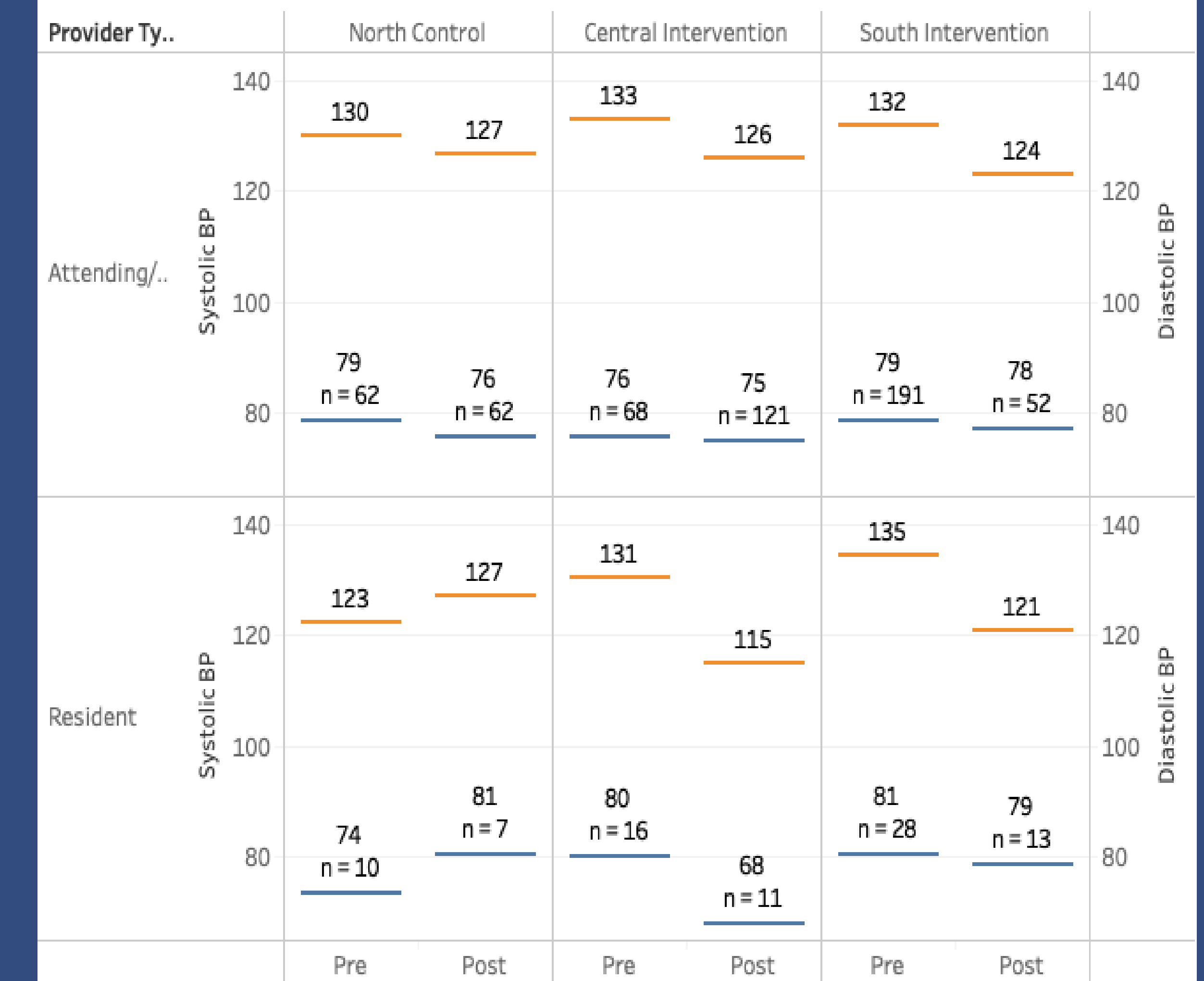We observed a trend towards reduced first systolic blood pressure among patient seen in an intervention suite. This trend persisted when stratified by suite and provider type.
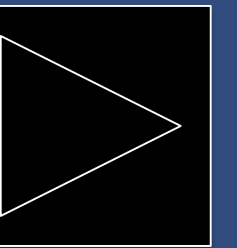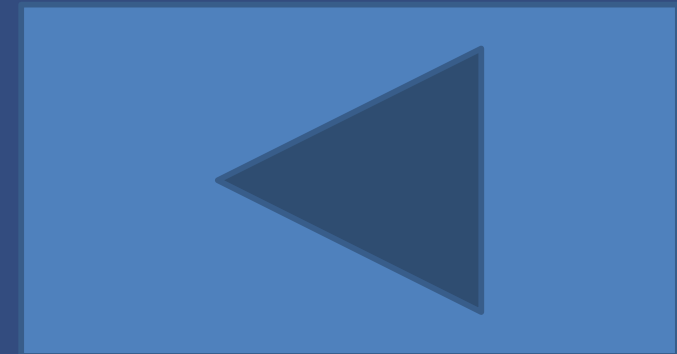
AR²C Flow Management System Whiteboard in use in South Suite 4/12/2019

Measures defined

Measure	Definition
Wait time	The time a patient is waiting for their provider. This period begins at the time of check in or the time of appointment, which ever is later, and ends when the provider enters the room to see the patient. Example: If Patient A arrives at 8:30 am for an 8:50 appointment and is seen by the provider at 9:10 then the wait time is calculated to be 20 minutes.
Care Gap Closure	Patient specific tasks that must be completed by an MA prior to seeing a provider: Examples: • PHQ2-Depression questionnaire • Tobacco Screening • Fall Screening • Point-of-care Hemoglobin A1c testing
Staff Experience	Staff were given a 10 question survey that measured their experience of job stress, team work, provider interaction, and patient interaction.
Provider Experience	Faculty and Residents were given a 9 question survey that measured their experience of job stress, team work, provider interaction, and patient interaction.
Patient Experience	