

Quality Improvement Community of Learning

Measurement for Improvement

July 10th, 2023

3-4 PM ET



Welcome!

Thank you for joining the call! We will get start at top of the hour

You are muted upon entry to the call; please unmute yourself to talk - we want to hear from you!

We encourage you to listen, ask hard question, share information, speak your truth.

This presentation will be recorded



NICHQ

The NICHQ Team



Stacey C. Penny, MSW, MPH
Senior Project Director



Callie Rowland, MPH
Project Manager



Rinka Murakami, MPH
Analyst, Applied Research & Evaluation



Sue Butts-Dion
Improvement Advisor



Jane Taylor, EdD
Improvement Advisor

The faculty have nothing to disclose.



Objectives of the QI Workshop Series

Introduce you to quality improvement basics for those new to quality improvement (QI) and offer you an opportunity to practice improvement skills and receive feedback and engage deeper with office hours. We are supporting your learning in

- Laying a foundation for learning and improving
- Developing improvement capability for your PQC, and other state or hospital-based teams
- Applying QI principles to your existing projects



What to Expect from this QI Basics Learning Series

- So far, we covered: setting aims, testing changes and today we focus using data for improvement and learning. Final workshop will address Holding the Gains and Spread
- Pre-work optional assignments for next workshop for action learning
- Targeted coaching, feedback, support and assistance in office hour calls



Discussion Questions

As we move through the workshop today consider:

How will you advise your team to use data to facilitate learning?

How will you coach your team(s) to avoid jumping to conclusions about whether and how they are improving?



Preworkshop Poll (True or False)

- Run chart rules provide signals of special or common cause variation
- Run charts are frequently displayed in the sequence of time
- Run charts can start with one data point



QI Community of Learning Overview

Session Title	Date and Time
Quality Improvement: What and Why? Foundations of Improvement	Thursday, May 25 th 2023 3:00 – 4:00 PM ET
Activating the How Using PDSA Cycles to Learn and Improve	Monday, June 12 th 2023 3:00 – 4:00 PM ET
Measurement for Improvement Collecting, Displaying, and Analyzing Data for Learning and Improvement	Monday, July 10 th 3:00 – 4:00 PM ET
Holding the Gains and Spread Sustaining Improvement and Cohort Learning	Monday, August 21 st 3:00 – 4:00 PM ET



Be sure to add all webinars to your calendar if you have not already done so!

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Agenda for Session 2

- Welcome
- Review a PDSA (homework from Session #2)
- Using data for learning whether and how much improvement occurs from testing changes and implementing changes
- Surface questions and discussions about data or measures for improvement



Welcome and Review

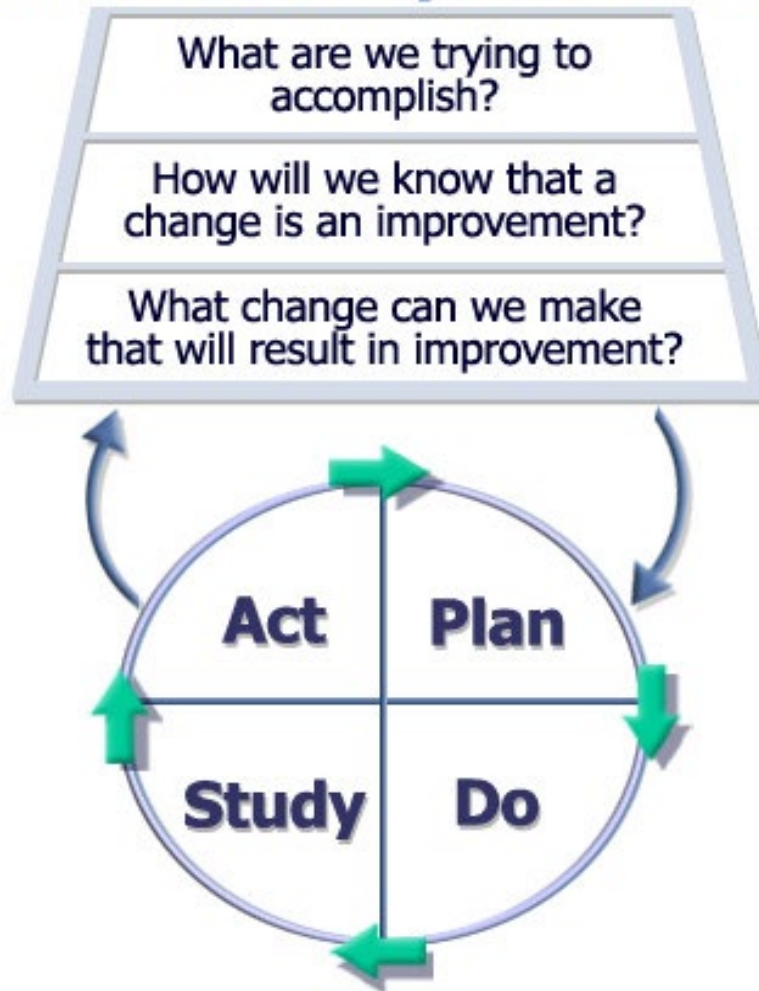
Let's share Leah's Sanchez's PDSA cycle



Thank you to those who
attended office hours
and those who
submitted PDSA cycles



Model for Improvement



Use data in run charts to foster learning about improvement



Source: Langley, et al, The Improvement Guide, 2009

SBD

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Selecting Useful Measures



Measurement



Photo by [Dennis Eusebio](#) on [Unsplash](#)



Photo by [Elisa Ventur](#) on [Unsplash](#)



Photo by [patricia serna](#) on [Unsplash](#)



Created by David Christensen
from Noun Project



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A Family of Measures for Quality Improvement

Outcome measures

- Did our changes impact the aim as predicted?
- Are we getting results and seeing improvement based on our aim?
- The “what” of the QI project
- Limit to a small set of measures

Process measures

- How did we make the changes?
- Reflects key steps required for improvement
- The “how” of the QI project
- Limit to a few measures

Balancing measures

- Unintended consequences of improving the system
- May be positive or negative
- May be something else your team wants to monitor
- Limit to one or two measures



Aim employs Structural Measures (Donabedian)

- A measure meant to designate the conditions under which care is provided:
 - Material resources (such as equipment and facilities)
 - Human resources (such as the number, variety and qualifications of professional and support personnel—educated or not)
 - Organizational characteristics (such as the organization of the staff—staffing models, presence of teaching functions, supervision and performance review, methods of paying for care, etc.)





Severe Hypertension in Pregnancy Patient Safety Bundle (2022)

Core Data Collection Plan
Version 1.0 June 2022



Process

Metric	Name	Description	Notes
P1	Timely Treatment of Persistent Severe Hypertension	Report N/D Denominator: Pregnant and postpartum people with acute-onset severe hypertension that persists for 15 minutes or more, including those with preeclampsia, gestational or chronic hypertension Numerator: Among the denominator, those who were treated within 1 hour with IV Labetalol, IV Hydralazine, or PO Nifedipine. The 1 hour is measured from the first severe range BP reading, assuming confirmation of persistent elevation through a second reading.	• Disaggregate by race/ethnicity, payor • Full measurement specifications can be found in this SMFM Special Statement

An Operational Definition...

Puts communicable meaning to a concept by specifying how the concept will be applied within a particular set of circumstances.

- It gives communicable meaning to a concept
- Is clear and unambiguous
- Specifies measurement methods and equipment
- Identifies criteria for measurement

Operational Definitions



**What does
“clean” mean?**



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Organizing Your Measures Worksheet©

Topic for Improvement:

Aim/Driver Concept	Potential Measure(s)	Outcome	Process	Balancing	Structure



Adapted from: R. Lloyd. *Quality Health Care: A Guide to Developing and Using Indicators*. 2nd Edition, Jones & Bartlett Learning, 2017.



Example

Organizing Your Measures Worksheet

Topic for Improvement: Severe Maternal Hypertension (HTN)

Concept	Potential Measure(s)	Outcome	Process	Balancing	Structure
Harm	Maternal morbidity and mortality rates	✓			
Timely treatment	Percent of birthing people with severe range BP treated within 60 minutes		✓		
Readmissions	Percent of birthing people readmitted w/ complications from severe maternal HTN			✓	
Staff Education	Percent of staff fully trained in identifying and treating severe maternal HTN				✓

Adapted from: R. Lloyd. *Quality Health Care: A Guide to Developing and Using Indicators*. 2nd Edition, Jones & Bartlett Learning, 2017.

Operational Definition Worksheet

Measure Name: _____

(Remember this should be specific and quantifiable, e.g., the time it takes to..., the number of..., the percent of... or the rate of...)

Operational Definition

Define the specific components of this measure. Specify the numerator and denominator if it is a percent or a rate. If it is an average, identify the calculation for deriving the average. Include any special equipment needed to capture the data. If it is a score (such as a patient satisfaction score) describe how the score is derived. When a measure reflects concepts such as accuracy, complete, timely, or an error, describe the criteria to be used to determine "accuracy."

Can you develop good Operational Definitions?

Data Collection Plan Worksheet

Project: _____

Measure Name	Is Stratification appropriate? If Yes, list the levels of stratification	Will you use sampling? If Yes, describe the sampling method you will use	Frequency of data collection (e.g., hourly, daily weekly?)	Duration of data collection (i.e., how long do you plan to collect the data?)

Source: R. Lloyd. *Quality Health Care: A Guide to Developing and Using Indicators*. 2nd edition, Jones and Bartlett, 2017

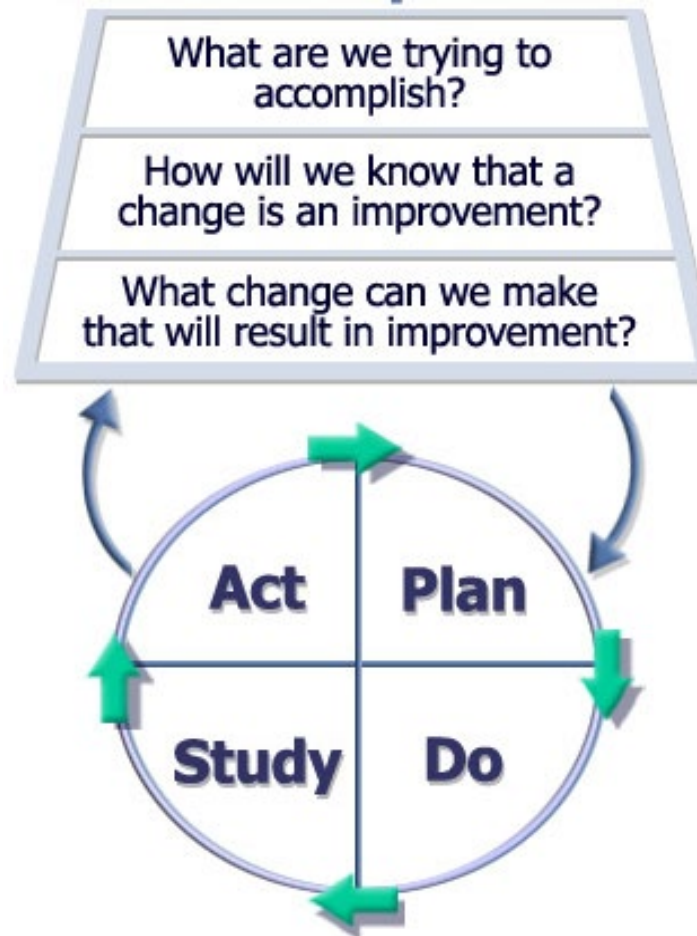
Measurement Dashboard Worksheet©

<u>Measure Name</u> (Be sure to indicate if it is a count, percent, rate, days between, etc.)	<u>Operational Definition</u> (Define the measure in very specific terms. Provide the numerator and the denominator if a percentage or rate. Be as clear and unambiguous as possible)	<u>Data Collection Plan</u> (How will the data be collected? Who will do it? Frequency? Duration? What is to be excluded?)	Goal

Adapted from: R. Lloyd. *Quality Health Care: A Guide to Developing and Using Indicators*. 2nd Edition, Jones and Bartlett, 2017.

Model for Improvement

Measures



Data is not just numbers, or “quantitative data”, but “qualitative data” as well.

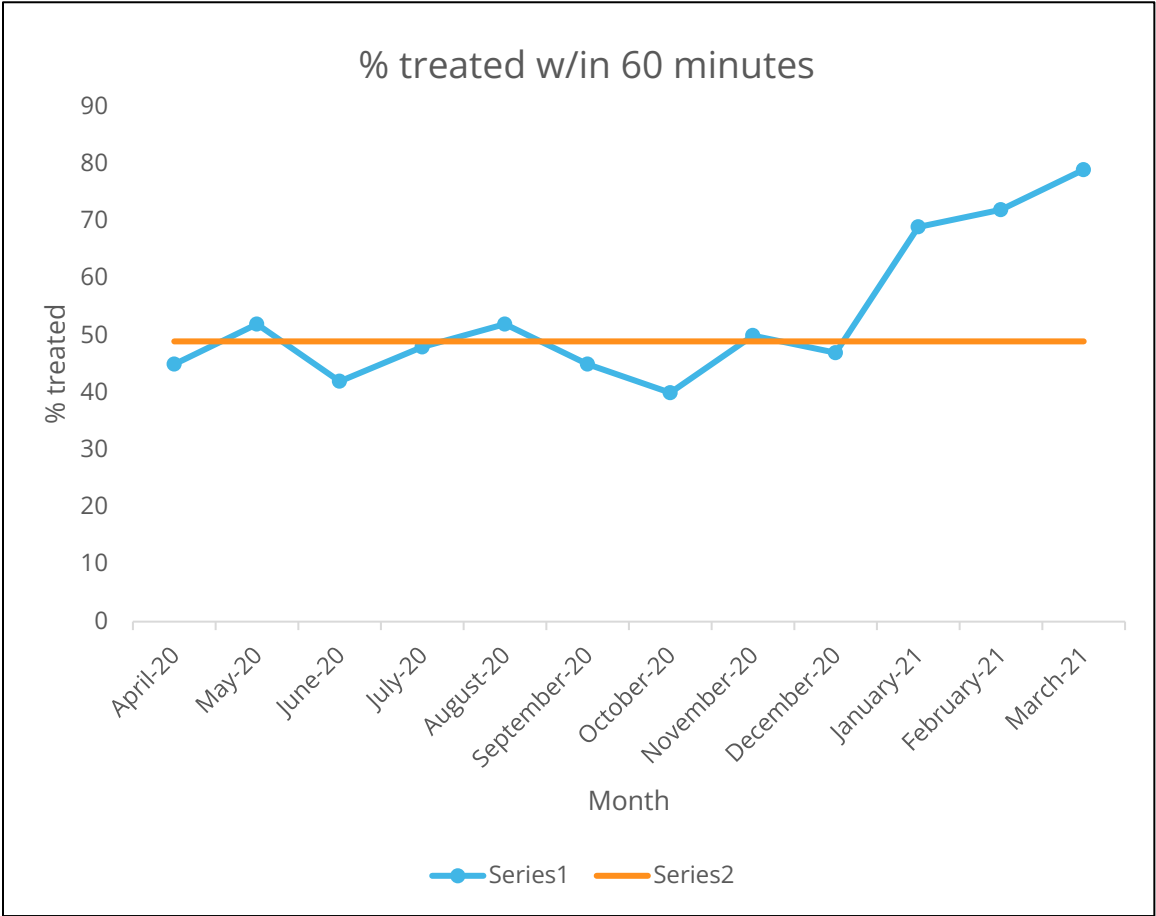
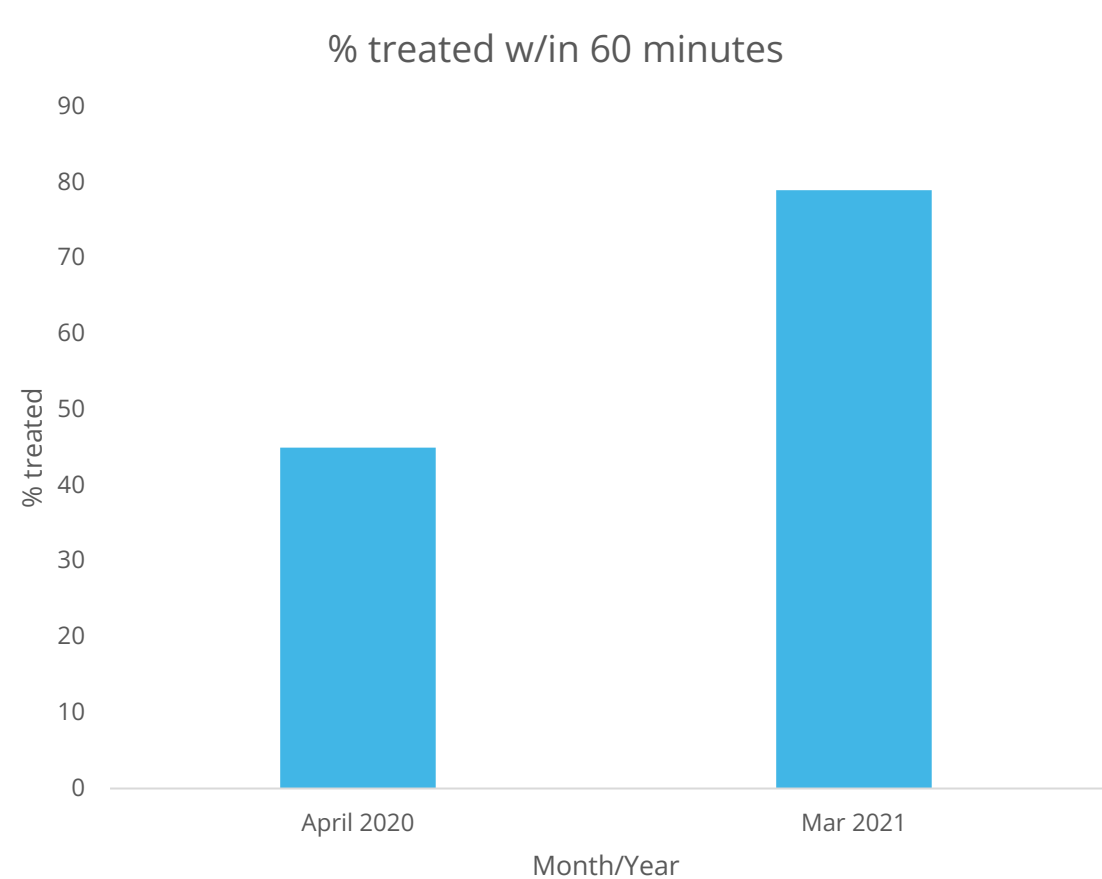
Cycle of Improvement

- Rapid Testing
- Think **BIG** and Start **SMALL**

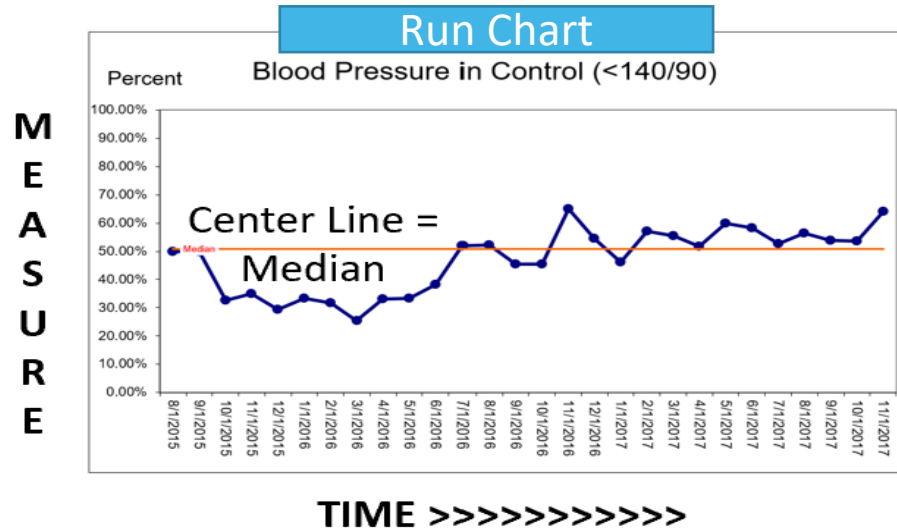
Displaying Data



Over Time rather than Before/After

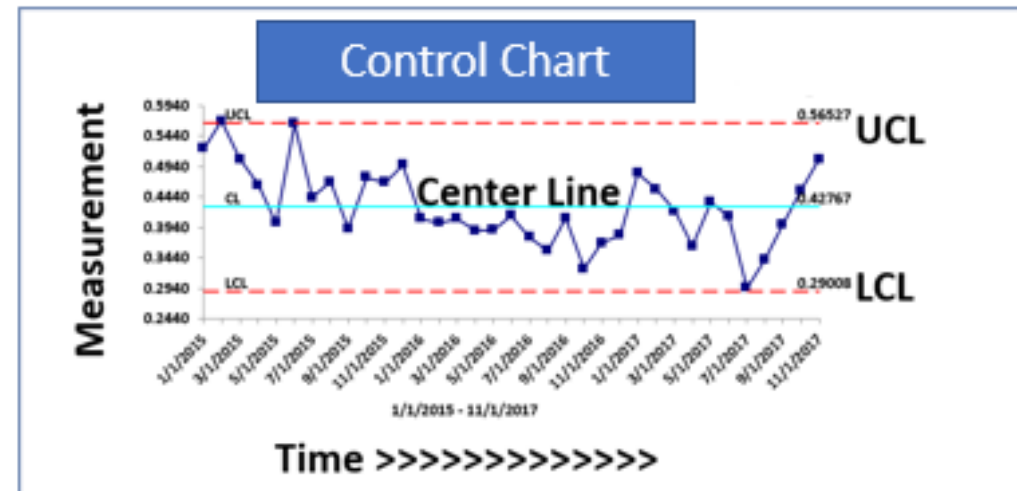


Two key tools helps us to uncover and understand variation in our data

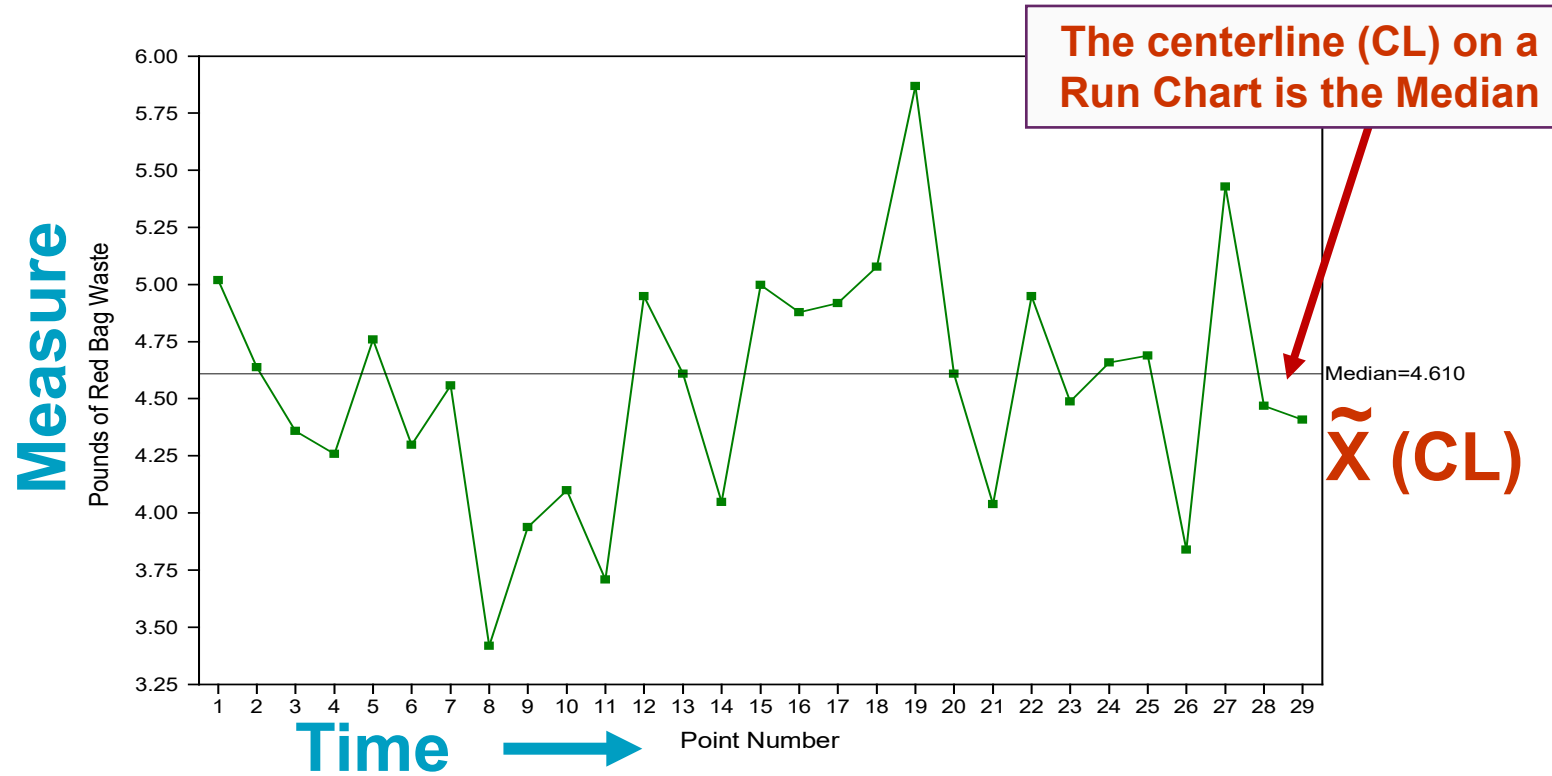


- **Adds limits (4th element)**
- More sensitive
- Center Line = Mean
- But more complex
- Need software

- ✓ Can be for any type of data
- ✓ No calculations are required.
- ✓ Can easily make by hand
- ✓ Show behavior at-a -lance
- ✓ They are easily understood
- ✓ **3 Elements: Measurement, Time, & Median**



Elements of a Run Chart



Median vs. Mean

Median = Middle value of ordered data
Mean = Arithmetic average of data

- 8,10,11,14,16,18,20

Mean = 13.8

Median = 14

-
- 8,10,11,14,16,18,20,35

Mean = 16.5

Median = 15



Frequently Asked Questions

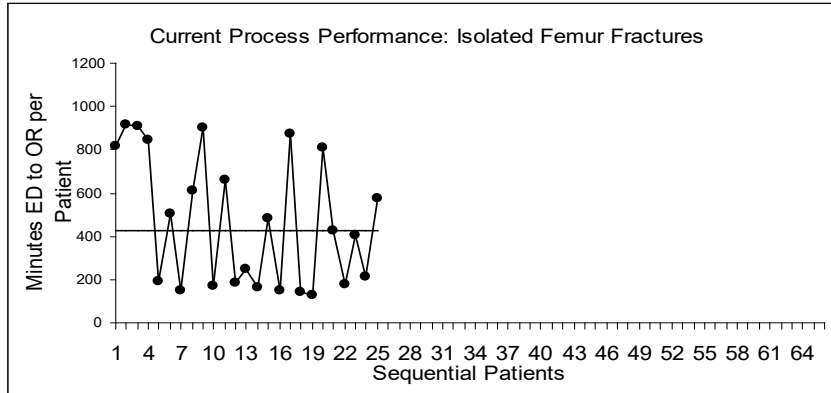
1. Why do we use run charts for improvement projects?



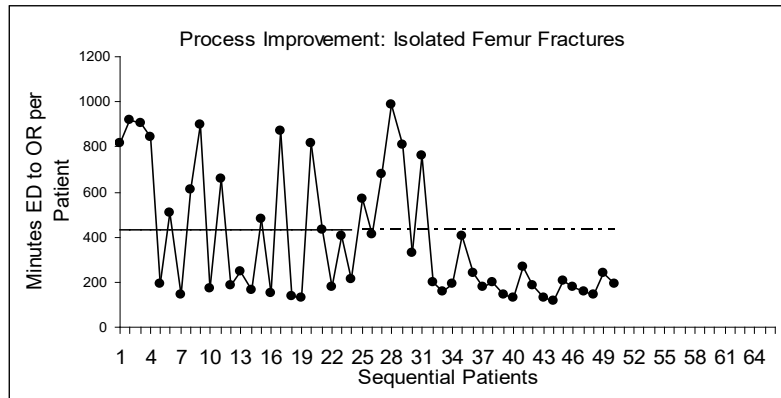
Photo by [Museums Victoria](#) on [Unsplash](#)



1. Make process performance visible

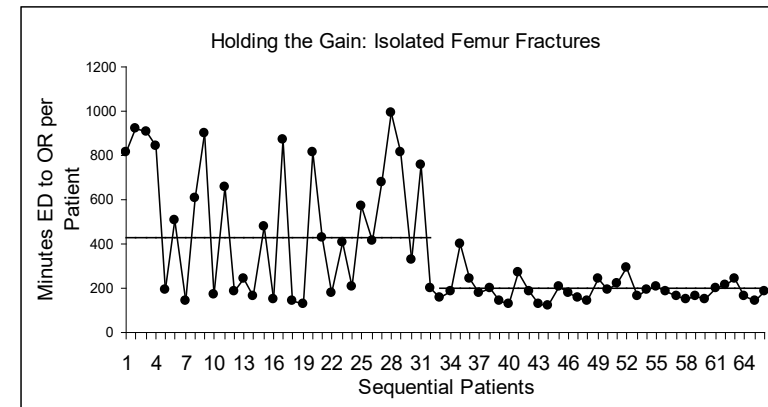


Three Uses of Run Charts



2. Determine if a change is an improvement

3. Determine if we are holding the gains



Frequently Asked Questions

2. How many data points do we need for a run chart?



Photo by [Museums Victoria](#) on [Unsplash](#)



- ***Ideally*** you should have more than 8 data points before constructing a run chart.
- May start a line graph with just two points

10 – 15 patients

10 – 15 days

10 – 15 weeks

10 – 15 months

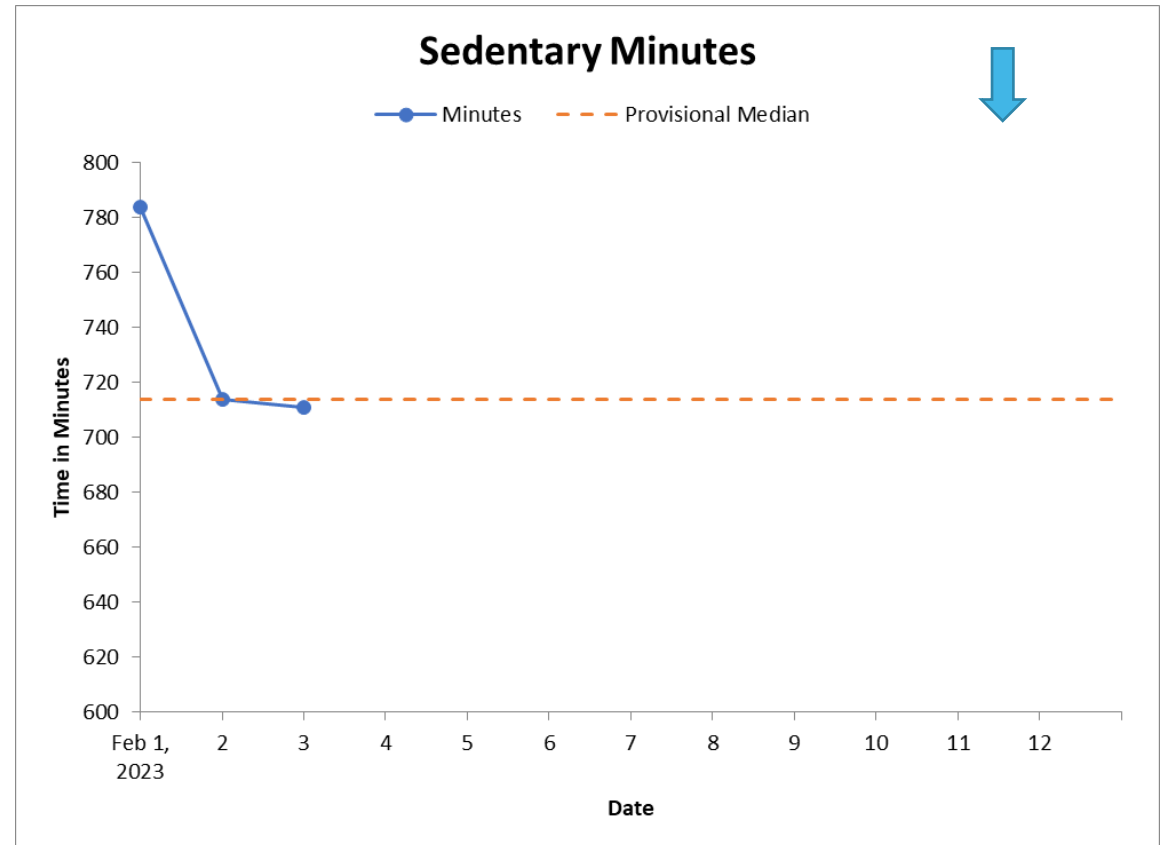
10 – 15 quarters

- *If you are just starting to measure, plot the dots and make a line graph.*
- *Once you have 8-10 data points make a run chart, by adding in median*



Practically, you can . . .

- Just start; plot the dots
- Add a “temporary” or “provisional” median
- After 10-12 points, establish a median
- Apply rules, rephrase as needed when suggested by rules and you understand changes that led to improvement



Frequently Asked Questions

3. How often should we collect data for improvement?



Photo by [Museums Victoria](#) on [Unsplash](#)



Lead and Lag Measures

	Lag	Lead
Purpose	Reflect what we want to improve Mortality and Morbidity data	Reflect key processes and changes that contribute to achieving the aim of a related lag measure % of those with HTN with BP cuff @d/c
Responsiveness	Time delay between tests of change and the desired improvement	Provide earlier signals of improvement when tightly linked to lag measure of improvement
Collection	Data may lag due to complexities related to data collection, assessment, and frequency reported	May be collected locally, i.e., at point of service; more frequently; more sensitive to change than a lag measure



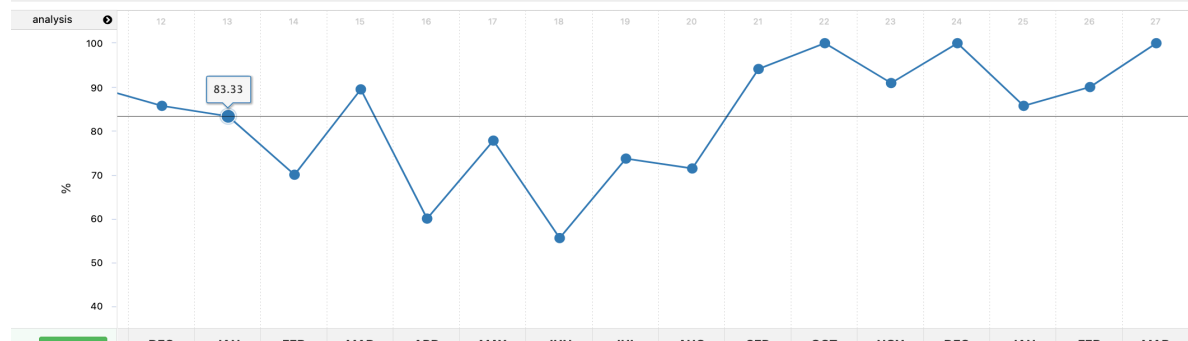
Source: Jane Taylor, EdD, Improvement Advisor

JAT

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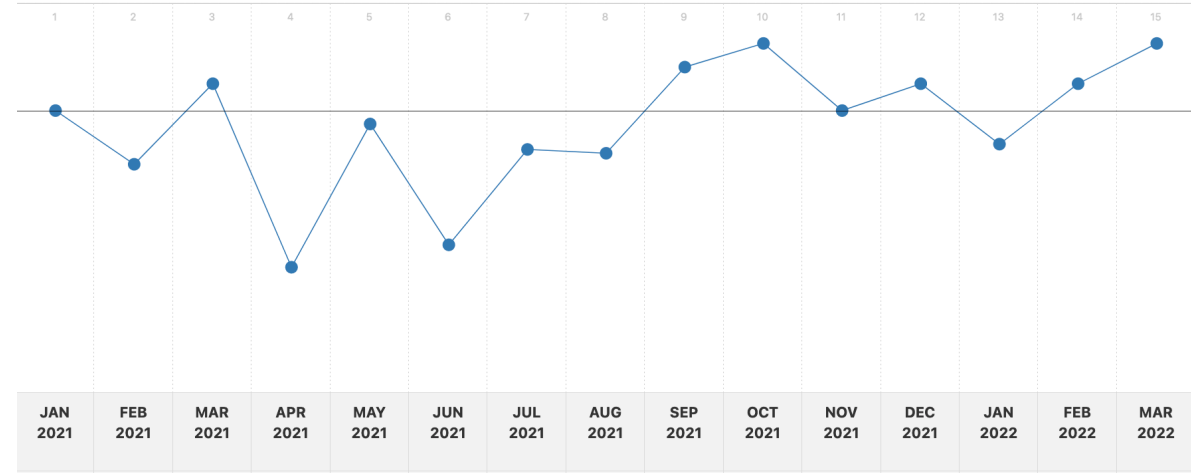
Percentage treated within 60 minutes

1. Percent of birthing people with severe range BP treated w/in 60 minutes

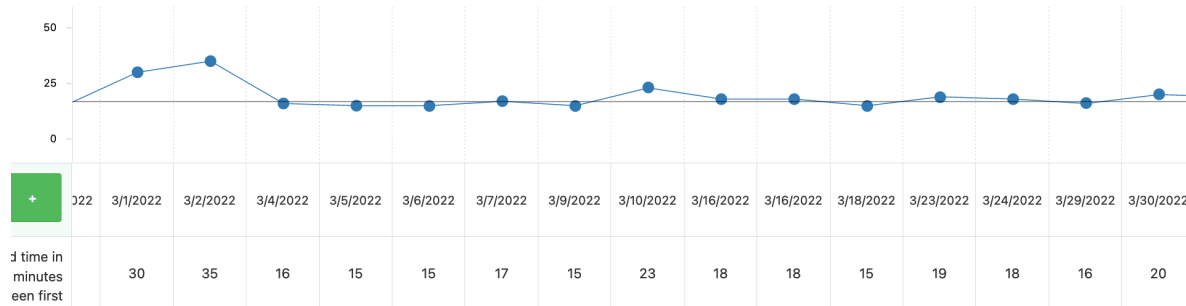


Family of Measures for HTN

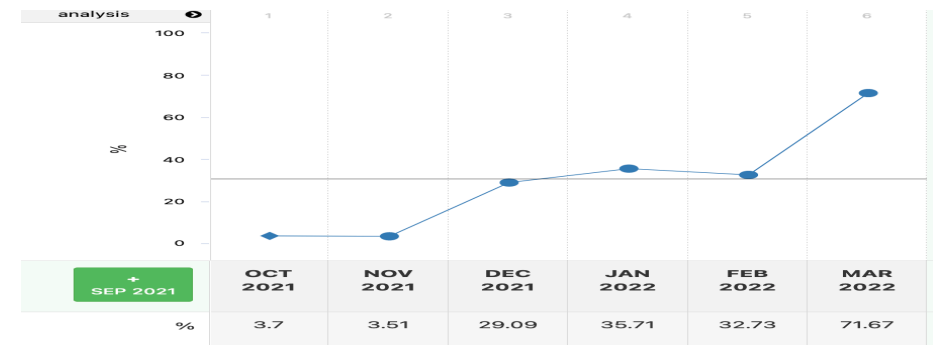
Compliance with OB HTN Pathway – “All Entries”



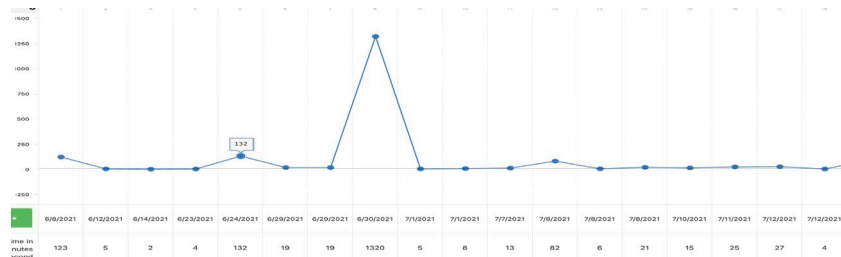
Lapsed minutes between first and second



% with HTN Disorder d/c with blood pressure cuff

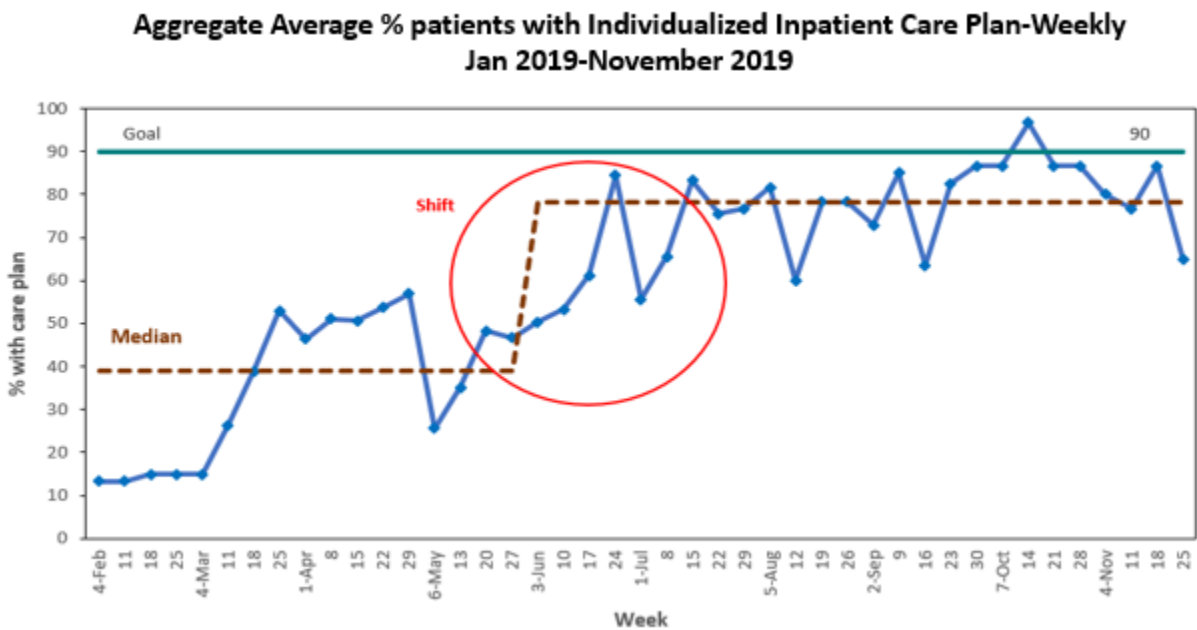
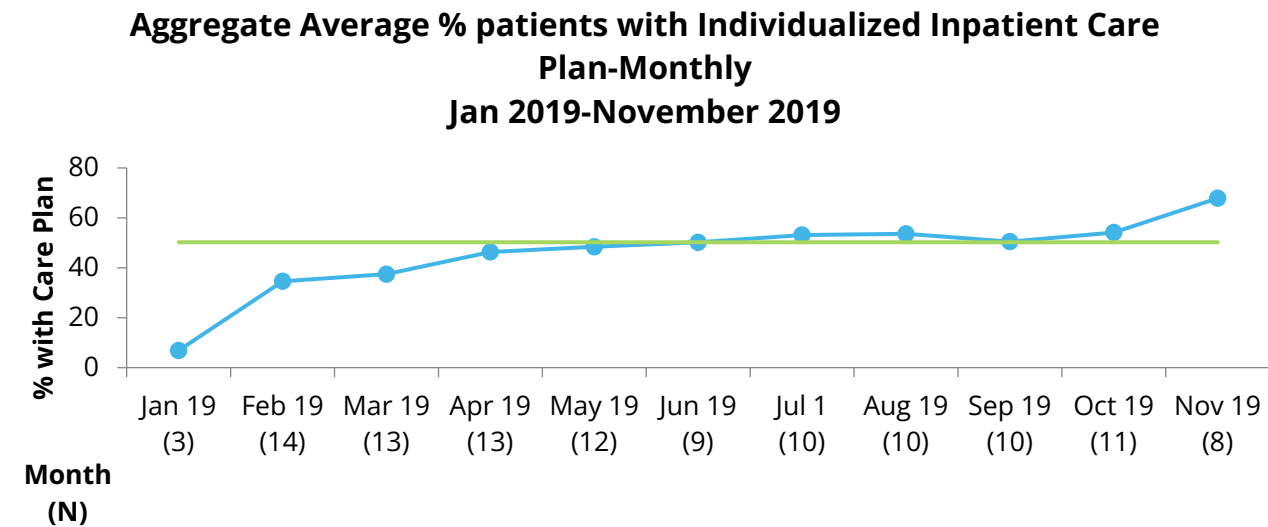
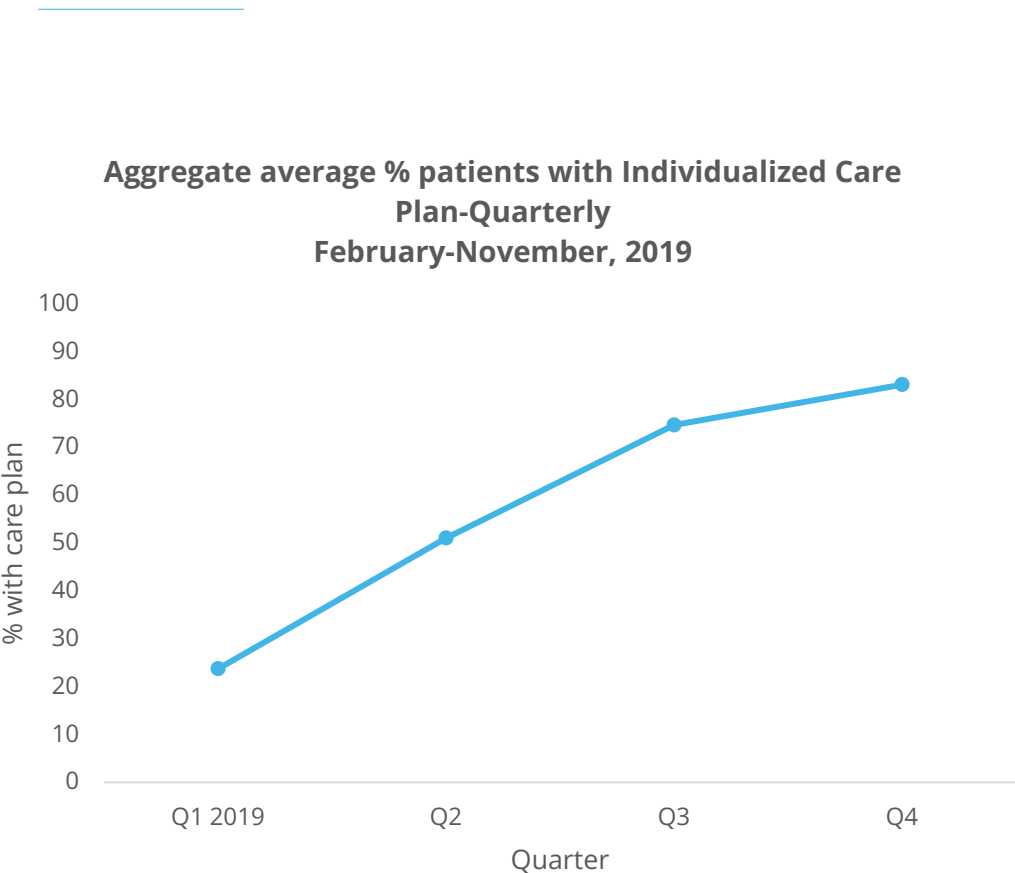


Lapsed minutes between confirmation and treatment



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Measure Frequency-Monthly Minimum (Mock Data)



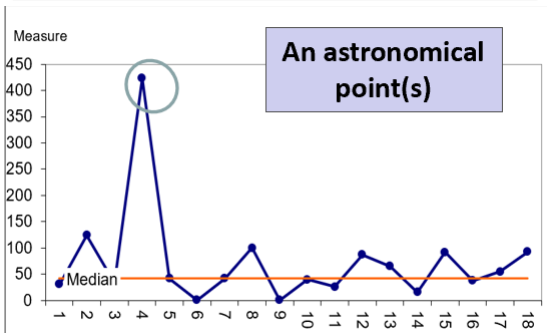
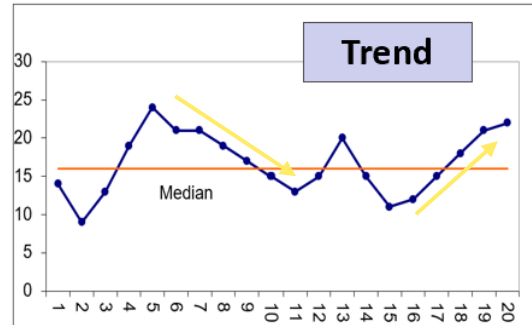
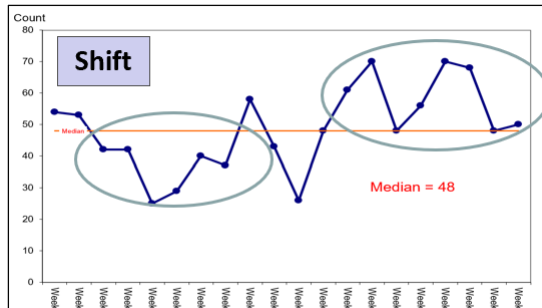
Now What?

Using Run Chart Rules to Analyze the Story in
Our Data and to Inform Action



Three simple run chart rules identify signal(s) in our data

Only one needs to be present!



A Shift

- **Six (6) or more consecutive points either all above or all below the median.**
- Skip values that fall on the median and continue counting

A Trend

- **Five (5) or more consecutive points in a row, all going up or all going down.**
- Consecutive like values are counted only once

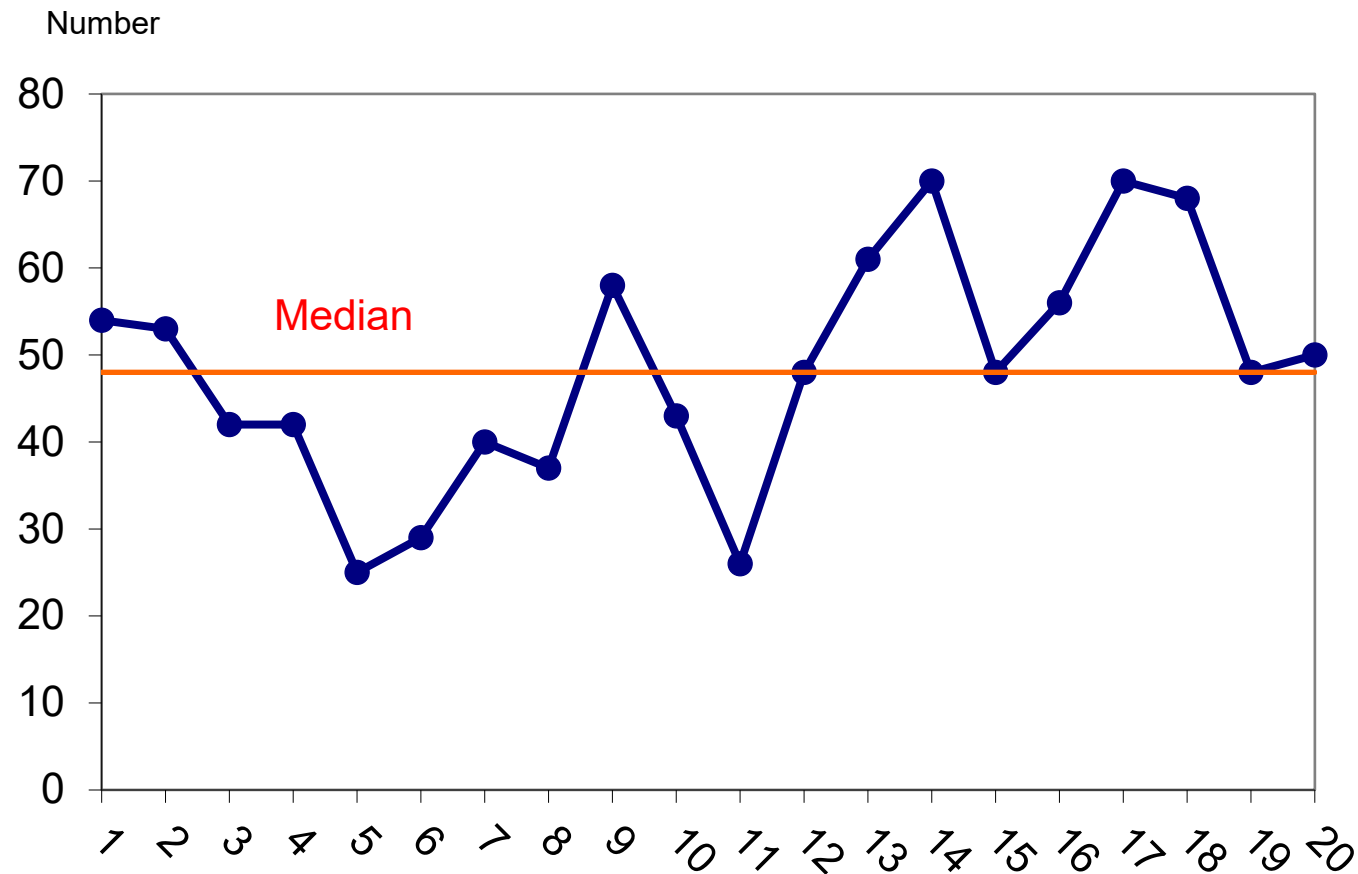
An Astronomical Point

- **A blatantly different value.**
- Extreme point(s) far beyond data range, all agree



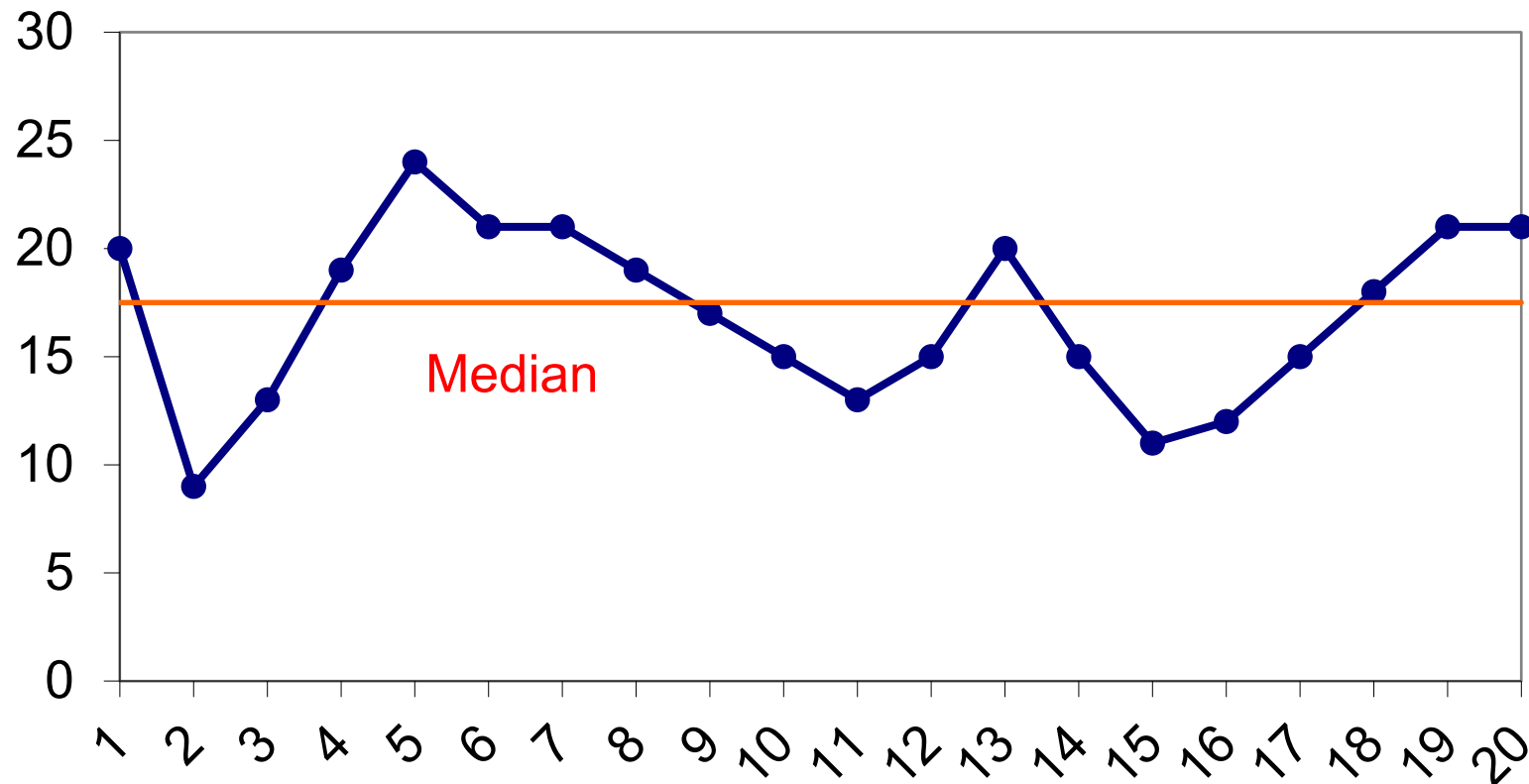
A Shift

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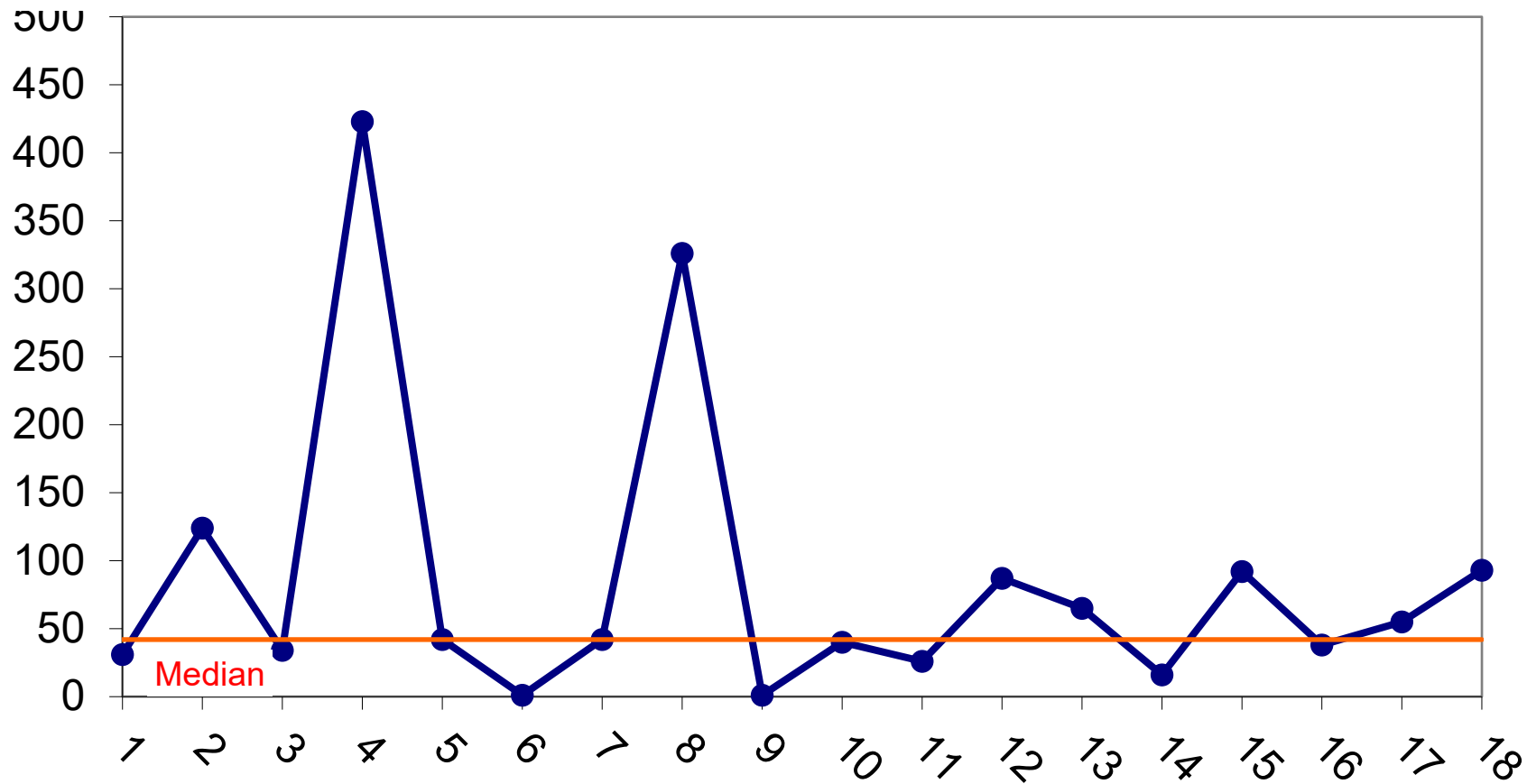
A Trend

- **Five (5) or more consecutive points in a row, all going up or all going down.**
- Consecutive like values are counted only once



An Astronomical Point

- **A blatantly different value.**
- Extreme point(s) far beyond data range, all agree



Sue Butts Dion and Phyllis M. Virgil



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Obs.	Value
1	26.0
2	20.0
3	15.0
4	20.0
5	23.0
6	19.0
7	16.0
8	16.0
9	12.0
10	20.0
11	26.0
12	14.0
13	19.0
14	15.0
15	6.0
16	11.0
17	8.0
18	11.0
19	19.0
20	7
21	17
22	7
23	3
24	5
25	7
26	7
27	11
28	10
29	6

RC Rules: 1. Shift? (6/8>20) _____ 2. Trend? (5/6>20) _____
 3. Astro? _____

Insights?
 Questions?
 Suggestions?
 Action?

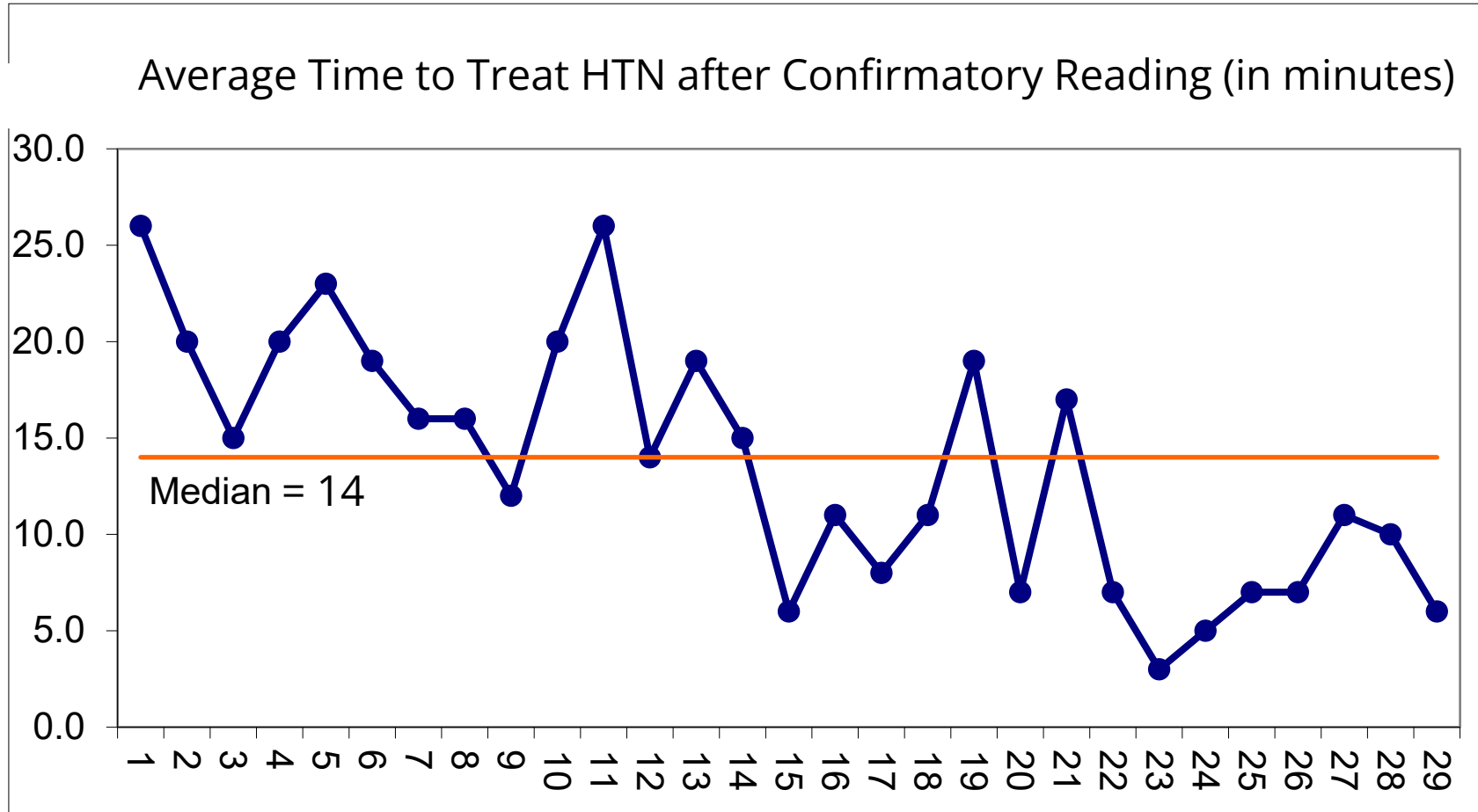
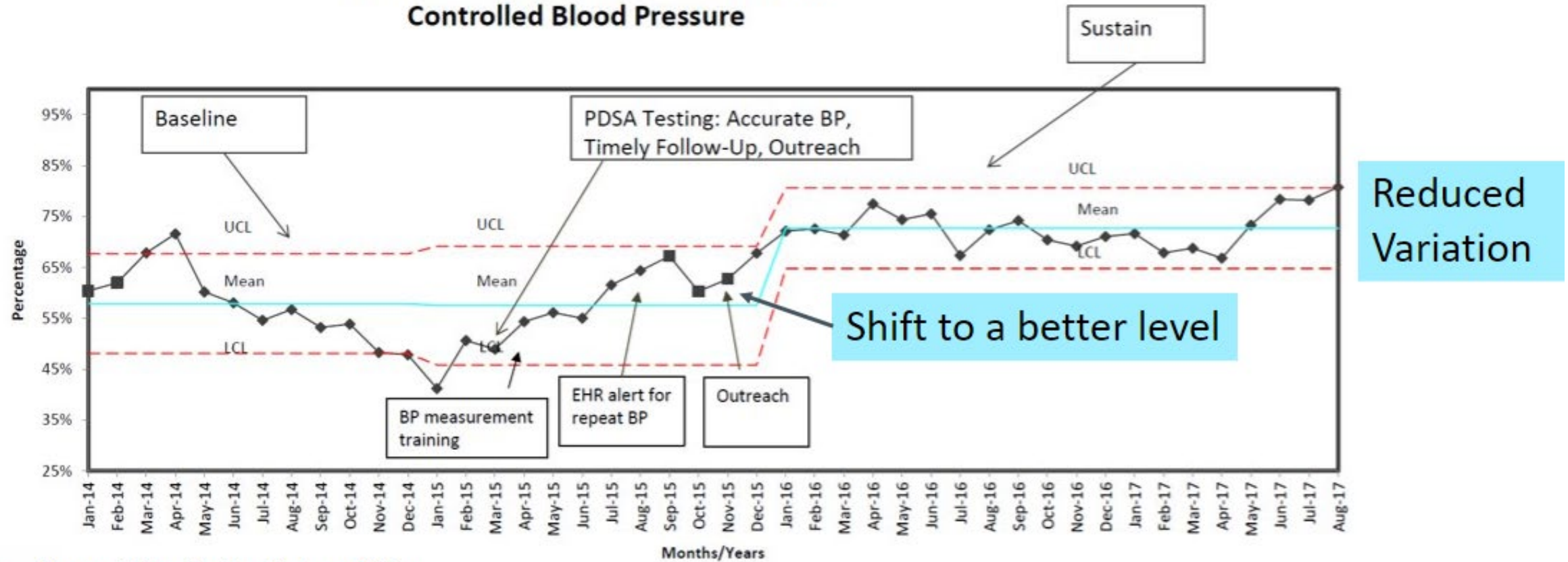


Chart Source: adapted from slide by Phyllis M. Virgil

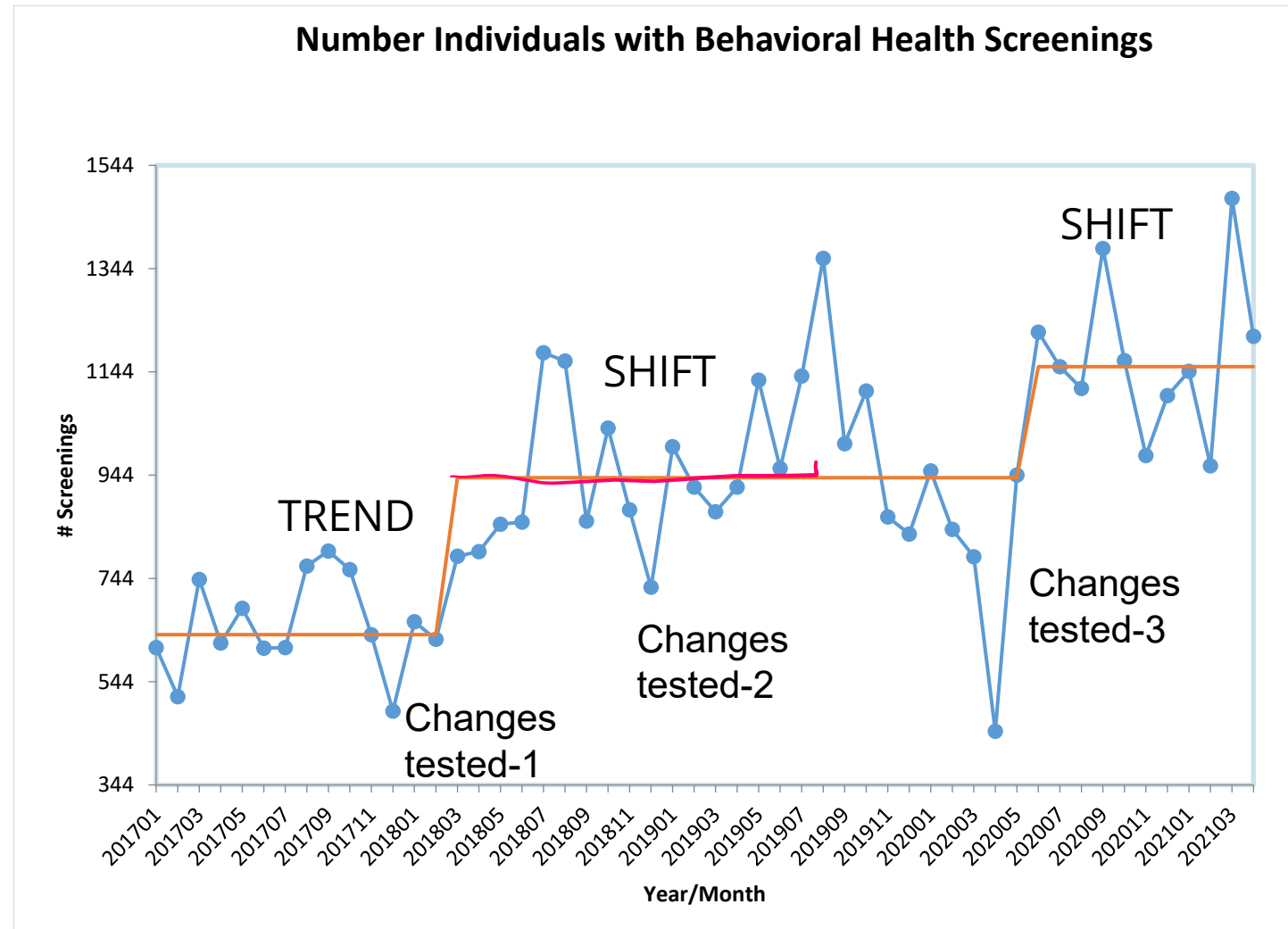
Percentage of Hypertensive Patients with Controlled Blood Pressure



Source: Metro Health, Cincinnati Ohio

In improvement, we want to see favorable signals

We are trying to introduce favorable signals (via change ideas) and then make it sustainable over time – a new process or system



Preworkshop Poll (True or False)

- Run chart rules provide signals of special or common cause variation
- Run charts are frequently displayed in the sequence of time
- Run charts can start with one data point



Using Run Charts for Improvement



All data exhibit variation



Run charts facilitate simple tracking of data over time



Application of run chart rules identify type of variation present and guide us in what action to take

Understanding Variation leads to Appropriate Action

Random Variation Only, No Unusual Signal Seen (Act on system)

- Develop and test ideas that might result in improvements to the system

Non-Random Variation, Unusual Signal Seen (Act on the unusual event or pattern)

- If positive: investigate and propagate
- If negative: investigate and eliminate

No signal



Photo by [Victor Sánchez Berruezo](#) on [Unsplash](#)

Signal



Photo by [Iwona Castiello d'Antonio](#) on [Unsplash](#)



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Understanding Variation and Taking Appropriate Acting

Type of Variation	Random Variation	Non-Random Variation
Appropriate Action	Change the Process (if improvement needed)	Investigate and • Propagate if positive • Eliminate if negative
Inappropriate Action	Treat each (or any) data point as a special occurrence (aka tampering)	Ignore
Consequences of Inappropriate Action	Increased variation Frustration Waste of money	If positive – lost opportunity If negative – make things worse

Adapted from John S. Dowd, Deming Collaborator and Consultant in Continual Improvement



Without knowing what type of variation is present, teams...

See	trends where there are no trends. Shifts where there are no shifts.
Blame	and give credit to people for things over which they have no control.
Spend	a lot of wasted time trying to explain natural variation as special events.

Run Chart Template

v. 2.0 • 5-30-2016

Developed by Richard Scoville, PhD. (richard@rscoville.net)

Vertical Axis Label
 Graph Label

Enter dates or observation numbers into the green cells at right. (clear the sample data before you begin)

Enter your data values into the blue cells. Goal values are optional.

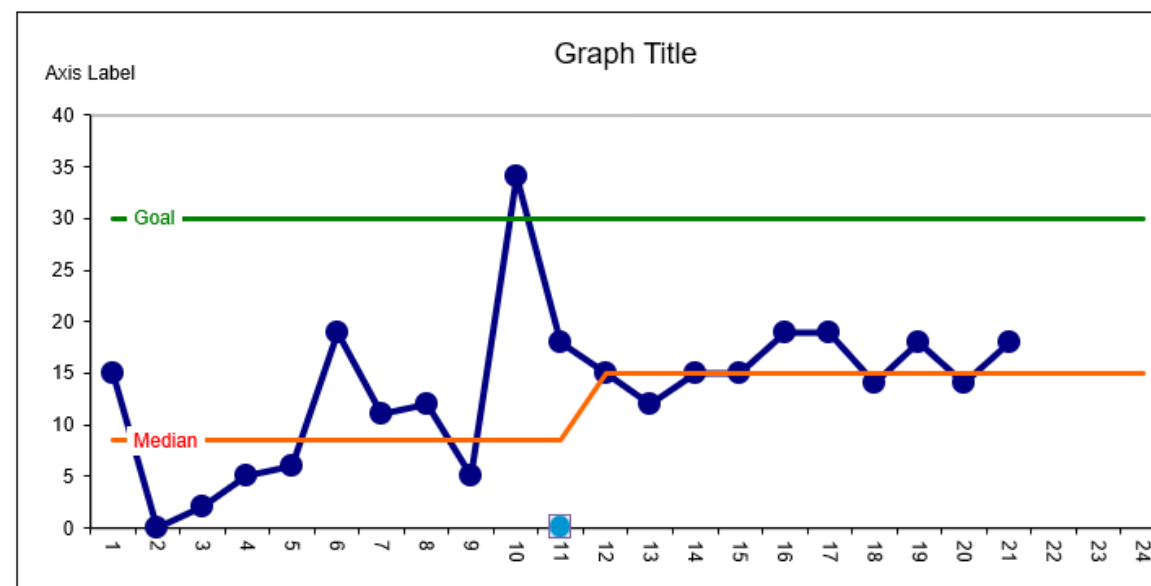
Don't leave any blank cells in the Date/Observation column.

Enter an 'X' into the orange column to freeze and extend the median

Enter a 'N' into the orange column to create a new median (phase)

Enter your graph title and y axis label into the cells

Date / Observation	Value	Median	Goal	Extend Phase = 'x' New Phase = 'n'
1	15	8.5	30	
2	0	8.5	30	
3	2	8.5	30	
4	5	8.5	30	
5	6	8.5	30	
6	19	8.5	30	
7	11	8.5	30	
8	12	8.5	30	
9	5	8.5	30	
10	34	8.5	30	
11	18	8.5	30	n
12	15	15	30	
13	12	15	30	
14	15	15	30	
15	15	15	30	
16	19	15	30	
17	19	15	30	
18	14	15	30	
19	18	15	30	
20	14	15	30	



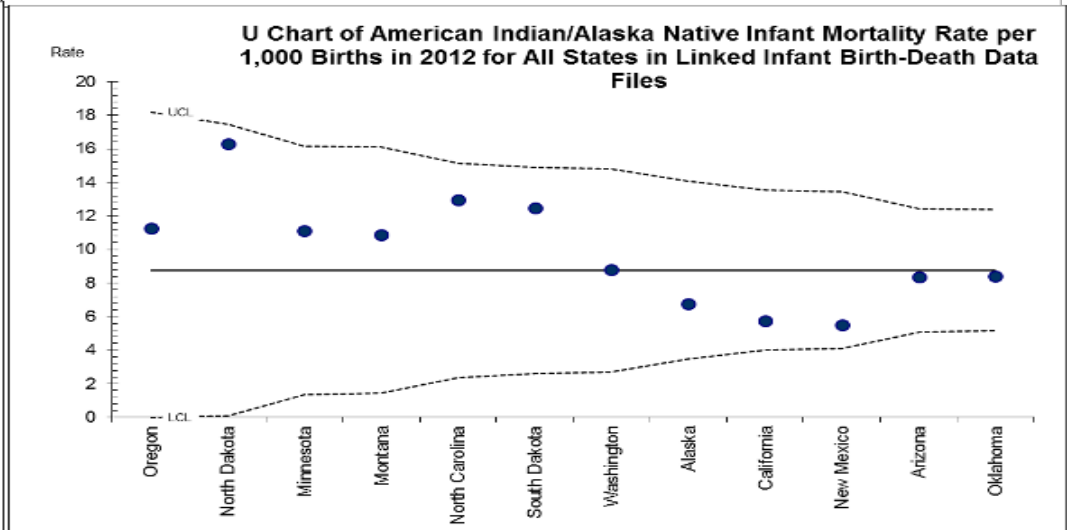
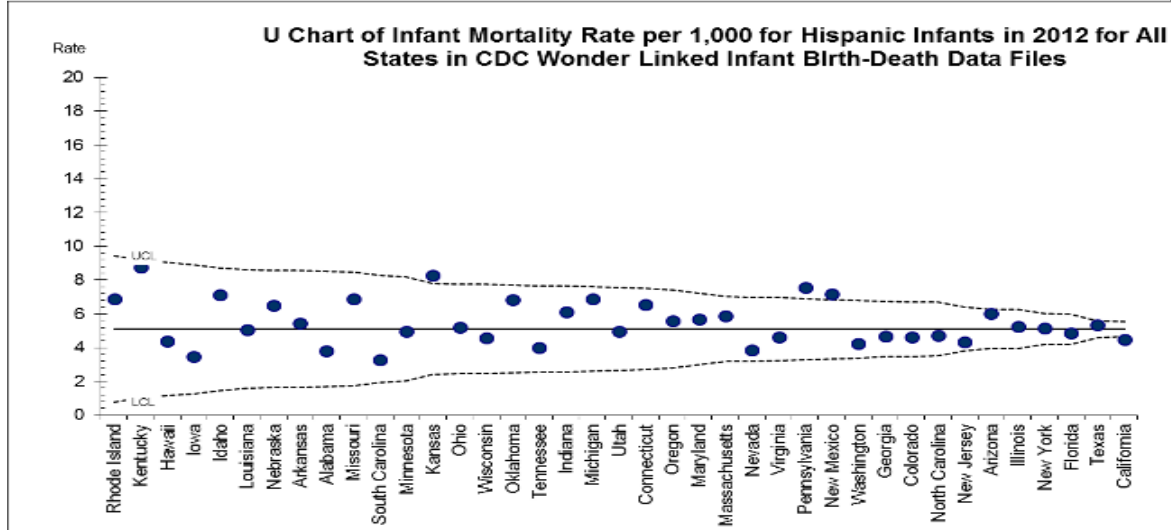
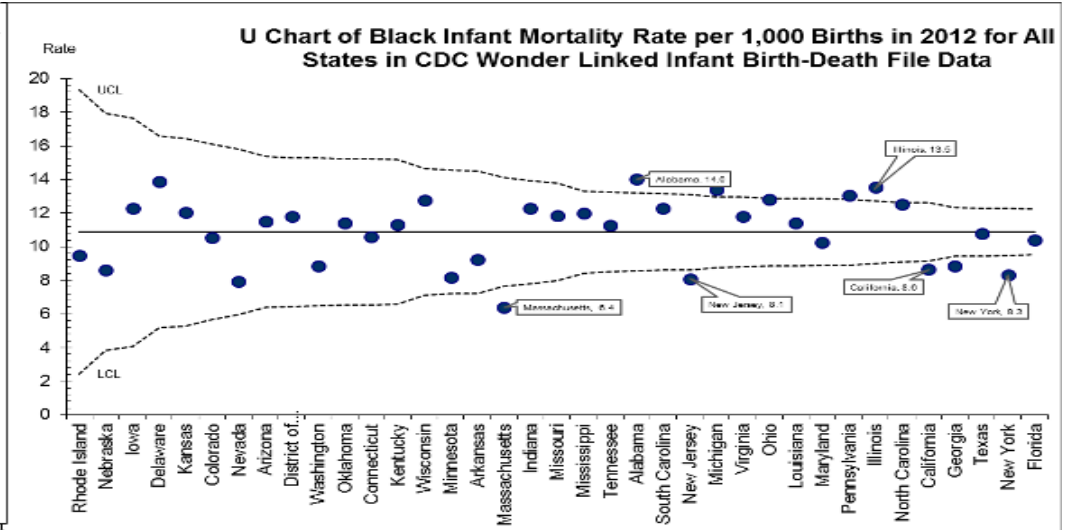
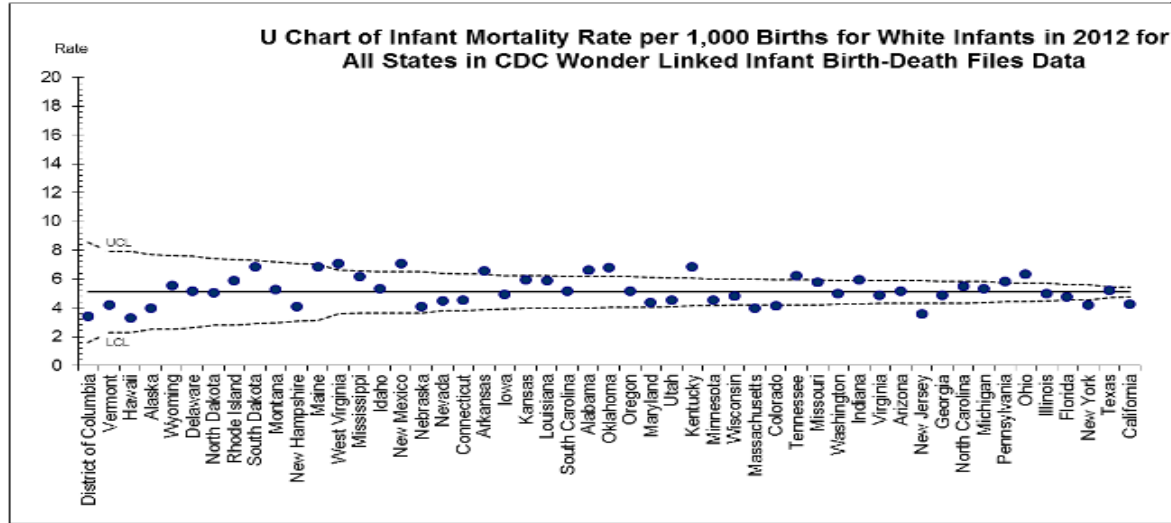
Stratifying Data by Race, Ethnicity and Language (REaL)

Deeper Analysis of Data



Stratification by race

Example from infant mortality data



Next Steps

- Submit a run chart from one of your improvement project(s). Include annotations of changes and which run chart rules you used to analyze the data, Submit by Wednesday, August 9th.
- Mark calendar for next workshops
August 21, 2023 3:00 – 4:00 PM ET
- If you want Q I technical assistance or time with Sue and/or Jane sign up for office hours
 - July 20th, July 26th, August 7, August 16th
- If you have not done so already, register for all QI COL sessions and download them to our calendar: <https://nichq.zoom.us/meeting/register/tJMtf-2vrjlvHNeOQsssPR1jeVR-E2PVgn8z>



Reminder: TA Sessions

- Sign up for a TA session at link in the chat and email
- Complete this TA request form to set up a session with Jane or Sue when you're ready!
- One person from your state, if joining as a state, should fill this out.





Session Evaluation

Resources

- NICHQ:
 - <https://www.nichq.org/resource/quality-improvement-101>
 - <https://www.nichq.org/resource/quality-improvement-102>
- The Improvement Guide (2007). Langeley et al. Jossey Bass.
- The Health Care Data Guide: Learning from Data for Improvement, Lloyd P. Provost, Sandra K. Murray, Jossey Bass
- [Run Charts \(Part 1\) | IHI - Institute for Healthcare Improvement](#)
- [Run Charts \(Part 2\) | IHI - Institute for Healthcare Improvement](#)
- [Control Charts \(Part 1\) | IHI - Institute for Healthcare Improvement](#)
- [Control Charts \(Part 2\) | IHI - Institute for Healthcare Improvement](#)

Resources

- Youtube video on PDSA Univ. of Cincinnati:
<https://www.youtube.com/watch?v=YOq4KXBahM&t=121s>
- Use of PDSA as a personal life example, Domestic Goddess.
<https://www.youtube.com/watch?v=jsp-19o5vU&t=5s>
- How to Improve, IHI Website www.ihl.org How to Improve | IHI - Institute for Healthcare Improvement

