

Quality Improvement Community of Learning

April 3, 2023

2:00 – 4:00 pm ET



Welcome!

Thank you for joining the call! We will get started shortly.

- You may be muted upon entry to the call so please unmute yourself to talk
- We encourage you to listen, ask hard question, share information, speak your truth, stop blaming, and surface mistakes for learning.
 - Source: Beyond Measure: The Big Impact of Small Changes (2015)

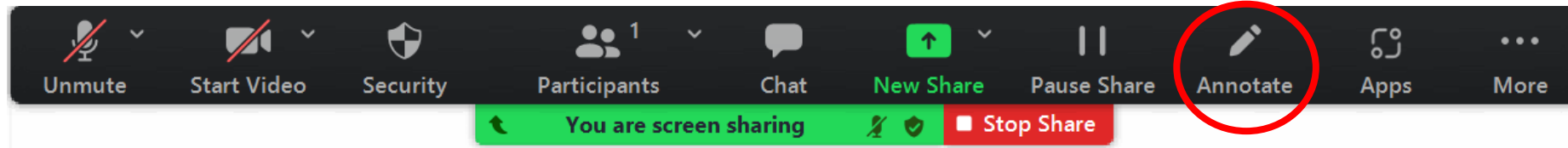


This presentation will be recorded

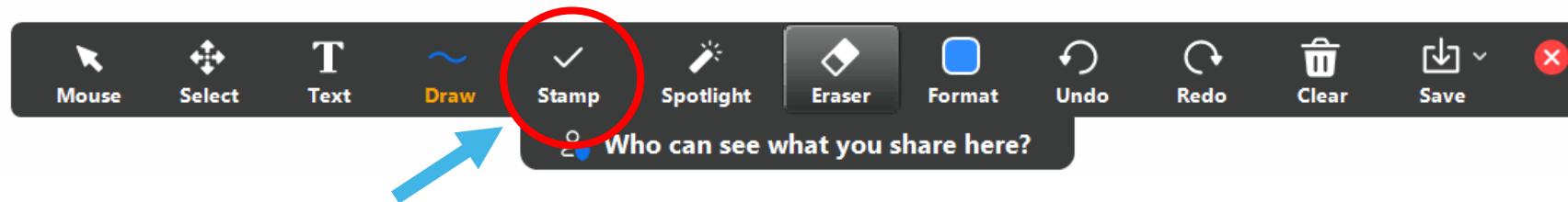
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Tell us where you're from!

- Take a moment to find the “annotate” button on your zoom tool bar



- Now, locate the “stamp” feature



- Pick your favorite stamp and let us know where you're joining from!





Washington

Montana

North Dakota

Minnesota

New Hampshire

Vermont

Massachusetts

Maine

Oregon

Idaho

South Dakota

Wisconsin

Michigan

New York

Wyoming

Nebraska

Iowa

Pennsylvania

Rhode Island

Connecticut

Nevada

Utah

Colorado

Kansas

Missouri

Illinois

Indiana

Ohio

New Jersey

Delaware

California

Arizona

New Mexico

Oklahoma

Arkansas

Tennessee

Kentucky

Virginia

Washington, DC

West Virginia

North Carolina

South Carolina

Texas

Mississippi

Alabama

Georgia

Alaska

Hawaii

Florida

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The NICHQ Team



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The faculty have nothing to disclose.



Objectives of the 4 QI Workshops

Support those new to quality improvement (QI) in:

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



Methods: What to Expect from this Community of Learning Series

- Four Workshops
- Pre-work assignments for next workshop for action learning
- Action learning to make learning practical and concrete
- Use of SharePoint and Jam Board for shared learning



**Before we
move on . . .**

Photo by [Yeshi Kangrang](#) on [Unsplash](#)



Pre-work

- Plan for a PDSA and execute if you are able
 - Post to the Shared Drive
- Time permitting, consider a driver diagram for your work
 - Go on a search to see if one already exists

What was your experience?



PDSA Worksheet



PDSA Worksheet

Objective of this cycle:

Team Name:

Date:

PLAN: Describe the change you are testing:

What questions does this test seek to answer?

Plan for the test: who, what, when, where

Data collection plan to learn if the test is successful: who, what, when, where

What do you predict the result will be?

What tasks are needed to prepare for and carry out the test?

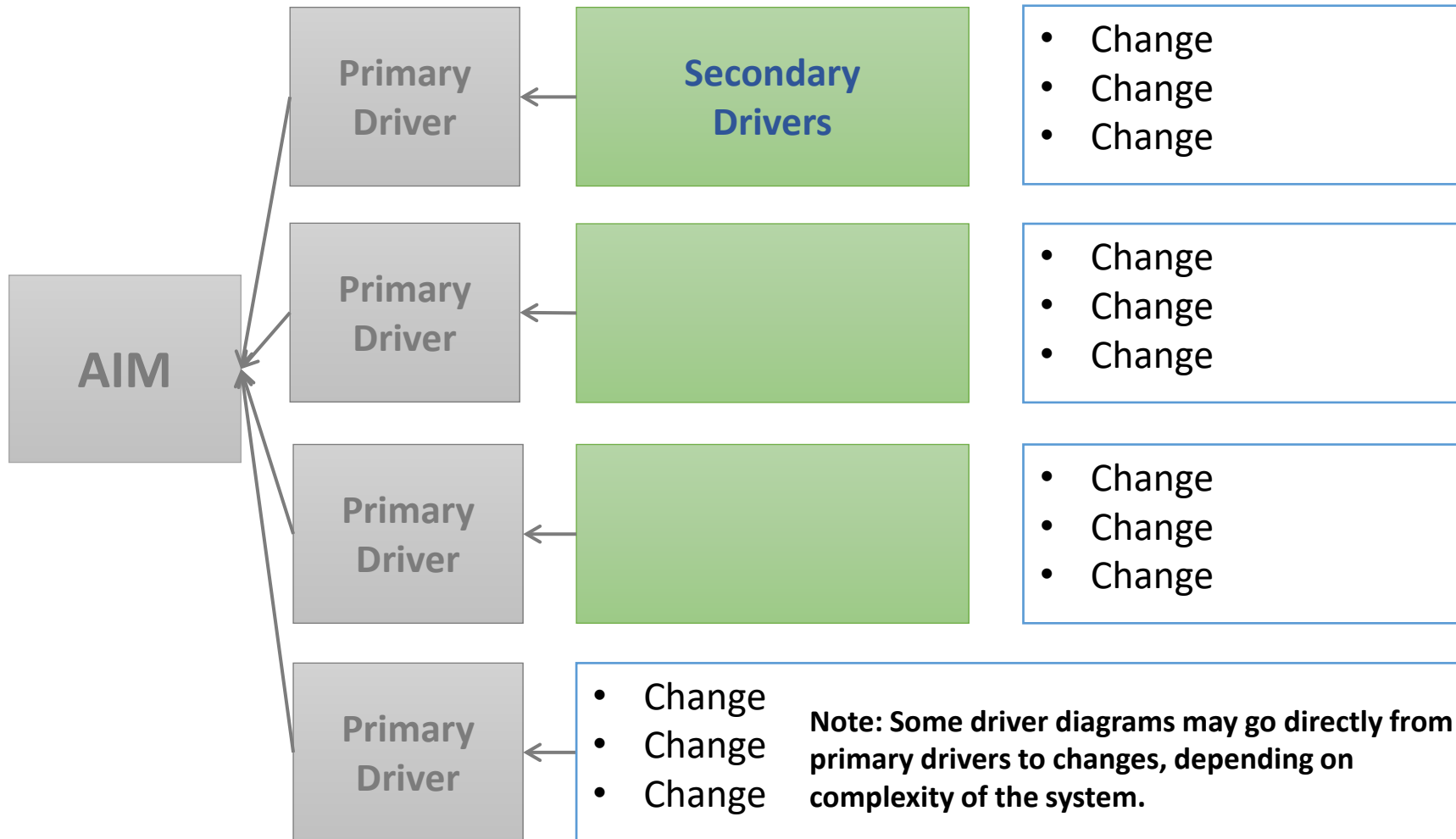


DO: Report what happened when you carried out the test. Describe observations, findings, problems encountered, special circumstances.

STUDY: Compare your results to your predictions. What did you learn? Any surprises?

ACT: What will you do next? Adopt, adapt, or abandon the change?

What it looks like...



- Plan-Do-Study-Act (PDSA) cycles are a disciplined inquiry and learning approach about how these changes will work in your state
- How a state customizes good ideas, ready for use to their unique context

Today's Discussion Questions

As we move through the workshop today, please consider and participate in discussing these questions:

1. How can I set up a useful set of measures for my project or improve upon an existing set of measures; make them more sensitive to change?
2. How could putting my data on a run chart be more useful than looking at my data in a table?
3. What is the right action to take based on what patterns I am seeing in my data?



QI Community of Learning Overview

Session Title	Date and Time
Quality Improvement: What and Why? Foundations of Improvement	Tuesday, January 31 st 1:00 – 3:00 PM ET
Activating the How Using PDSA Cycles to Learn and Improve	Tuesday, February 21 st 1:00 – 3:00 PM ET
Measurement for Improvement Collecting, Displaying, and Analyzing Data for Learning and Improvement	Monday, April 3 rd 2:00 – 4:00 PM ET
Holding the Gains Sustaining Improvement and Cohort Learning	Monday, May 1 st 2:00 – 4:00 PM ET

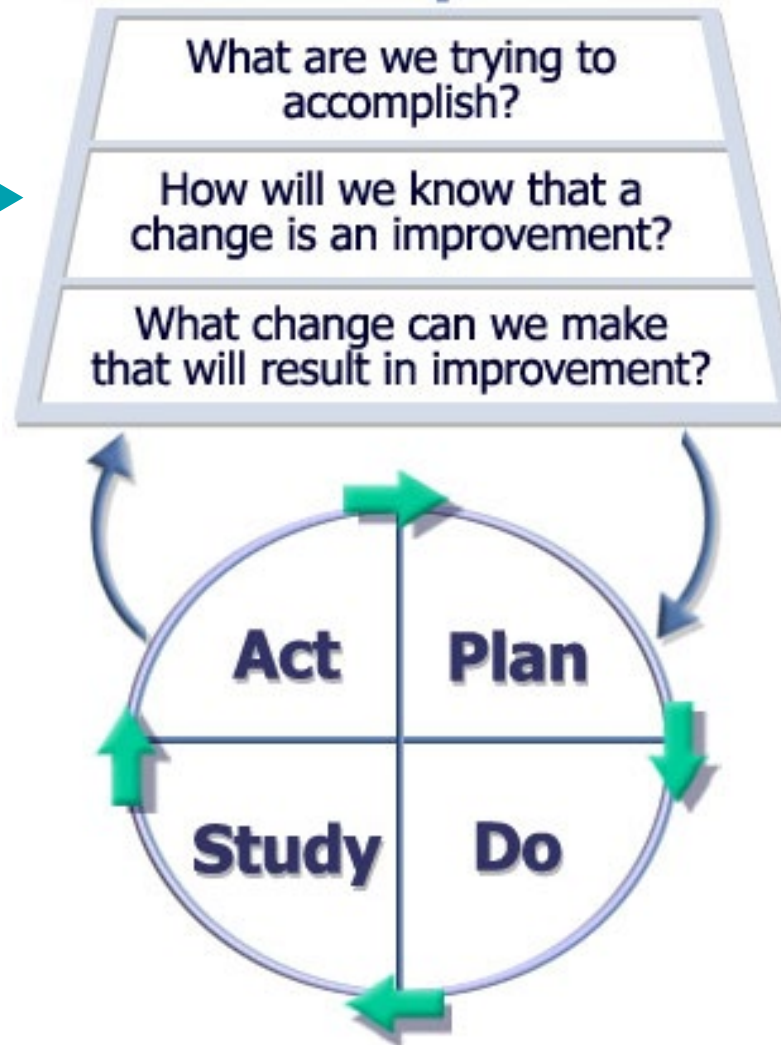


Be sure to add all webinars to your calendar if you have not already done so!

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Model for Improvement

Measures



Cycle of Improvement

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

Selecting Useful Measures



Measurement



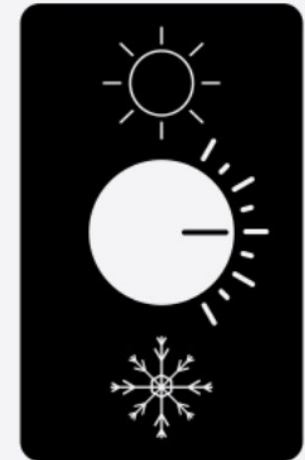
Photo by [Dennis Eusebio](#) on [Unsplash](#)



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Created by David Christensen
from Noun Project

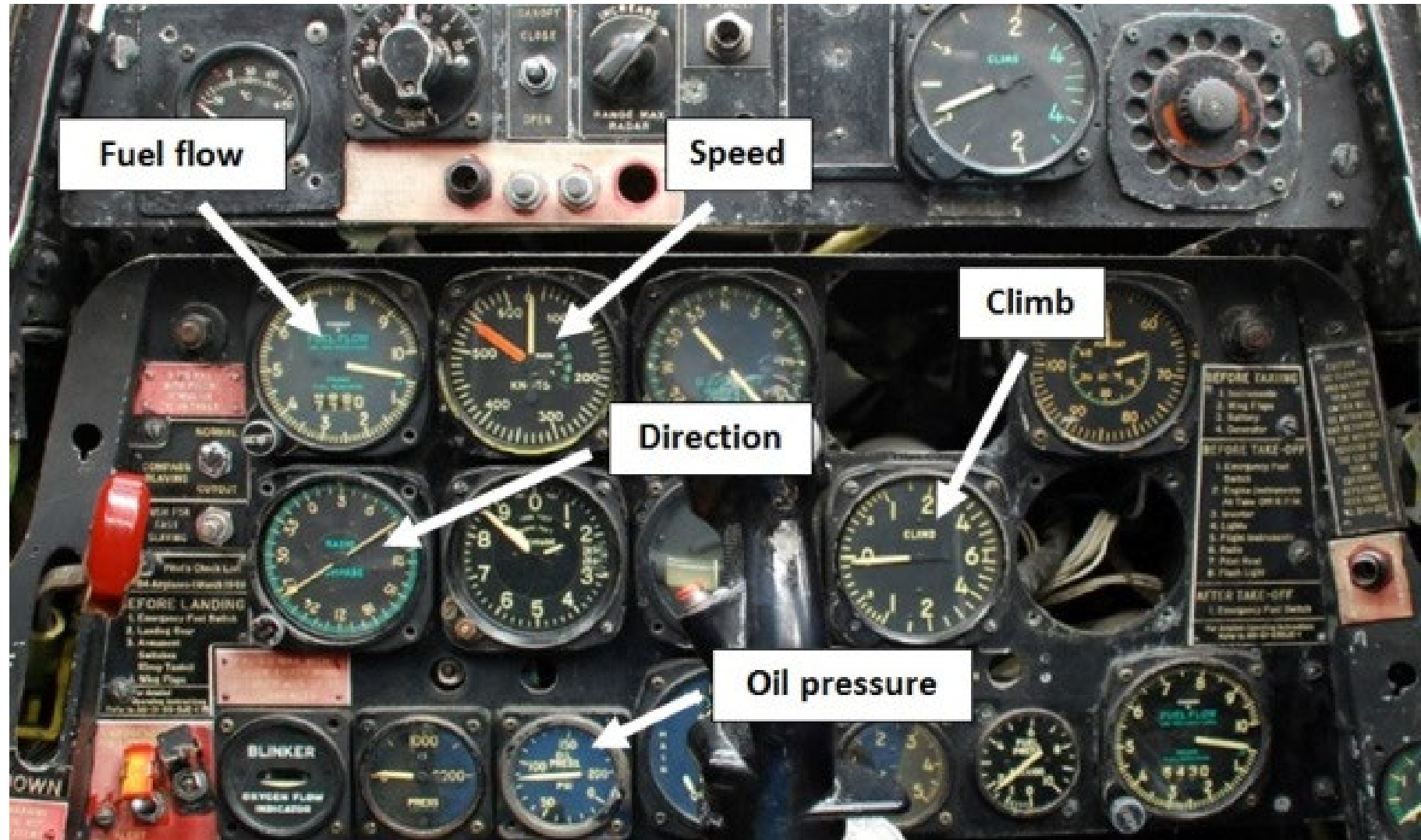


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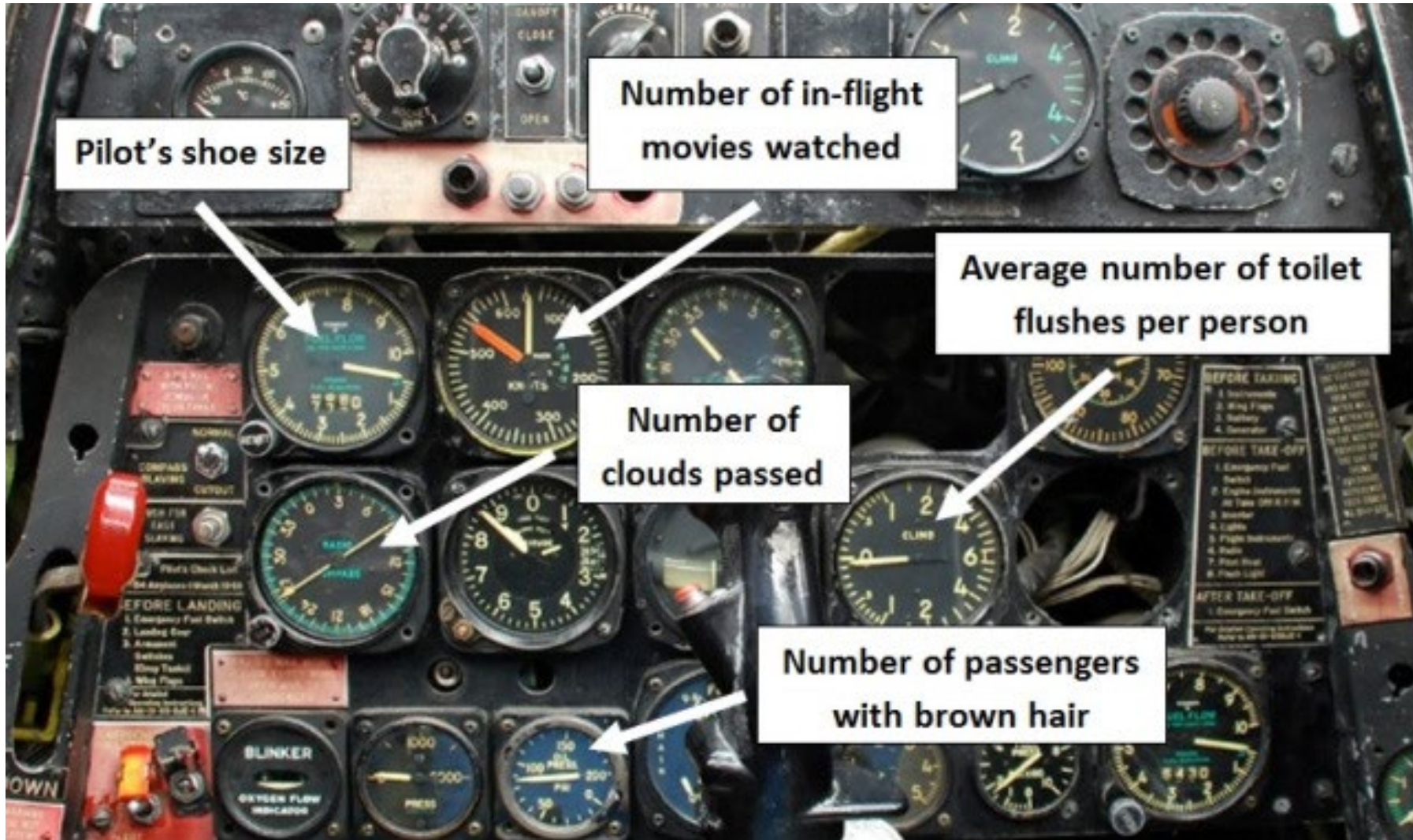


Simon Guilfoyle, 2013

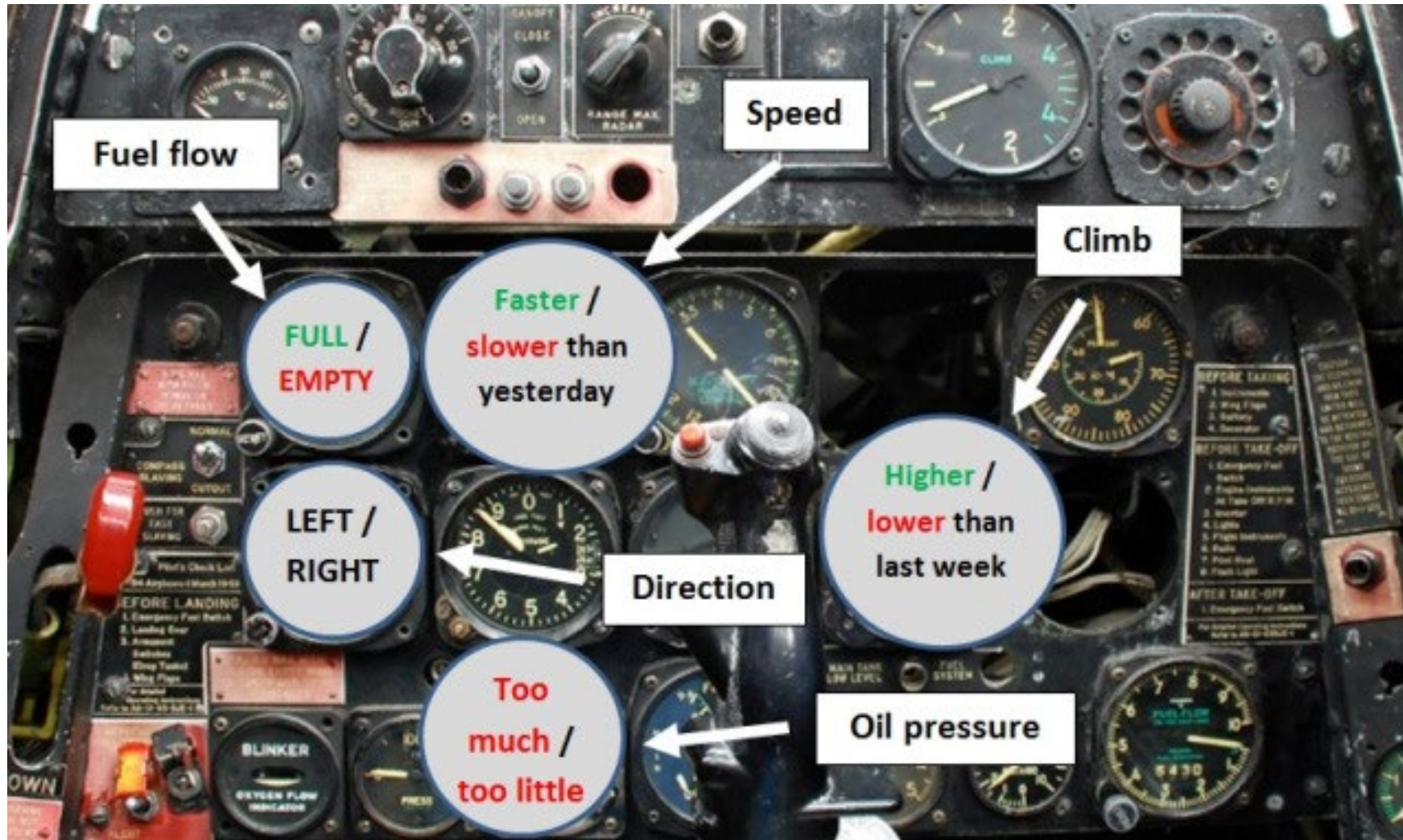
The right measures are the ones derived from purpose...



What if you use the wrong measures?



What if you measure the “right” things, but in the “wrong” way?



And, what if we didn't measure anything?



Measurement Assumptions

- **All measures have limitations**
 - Limitations do not negate their value
- **Measures are an important “voice” of the system**
 - Hearing the voice of the system gives us information on where to work and focus efforts
- **Measures tell a story**



Data for Improvement, Accountability and Research in Health Care

Aspect	Improvement	Accountability or Judgment	Clinical Research
Aim:	Improvement of care processes, systems and outcomes	Comparison for judgment, choice, reassurance, spur for change	New generalizable knowledge
Methods:	Test observable	No test, evaluate current performance	Test blinded
Confounders:	Accept consistent	Measure and adjust to reduce	Design to eliminate
Sample Size:	“Just enough” data, small sequential samples	Obtain 100% of available, relevant data	“Just in case” data
Flexibility of Hypothesis:	Hypothesis flexible, changes as learning takes place	No hypothesis	Fixed hypothesis
Testing Strategy:	Sequential tests	No tests	One large test
Determining if a Change is an Improvement:	Run charts or Shewhart control charts	No focus on change	Hypothesis, statistical tests (t-test, F-test, chi square, p-values)
Confidentiality of the Data:	Data used only by those involved with improvement	Data available for public consumption	Research subjects’ identities protected
Frequency of Use:	Daily, weekly, monthly	Quarterly, annually	At end of research

Source: [The Health Care Data Guide](#): Provost and Murray, 2011. Developed from Solberg, Leif I., Mosser, Gordon and McDonald, Susan. “The Three Faces of Performance Measurement: Improvement, Accountability and Research.” Journal on Quality Improvement. March 1997, Vol.23, No. 3.

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



Structural Measures (Donabedian)

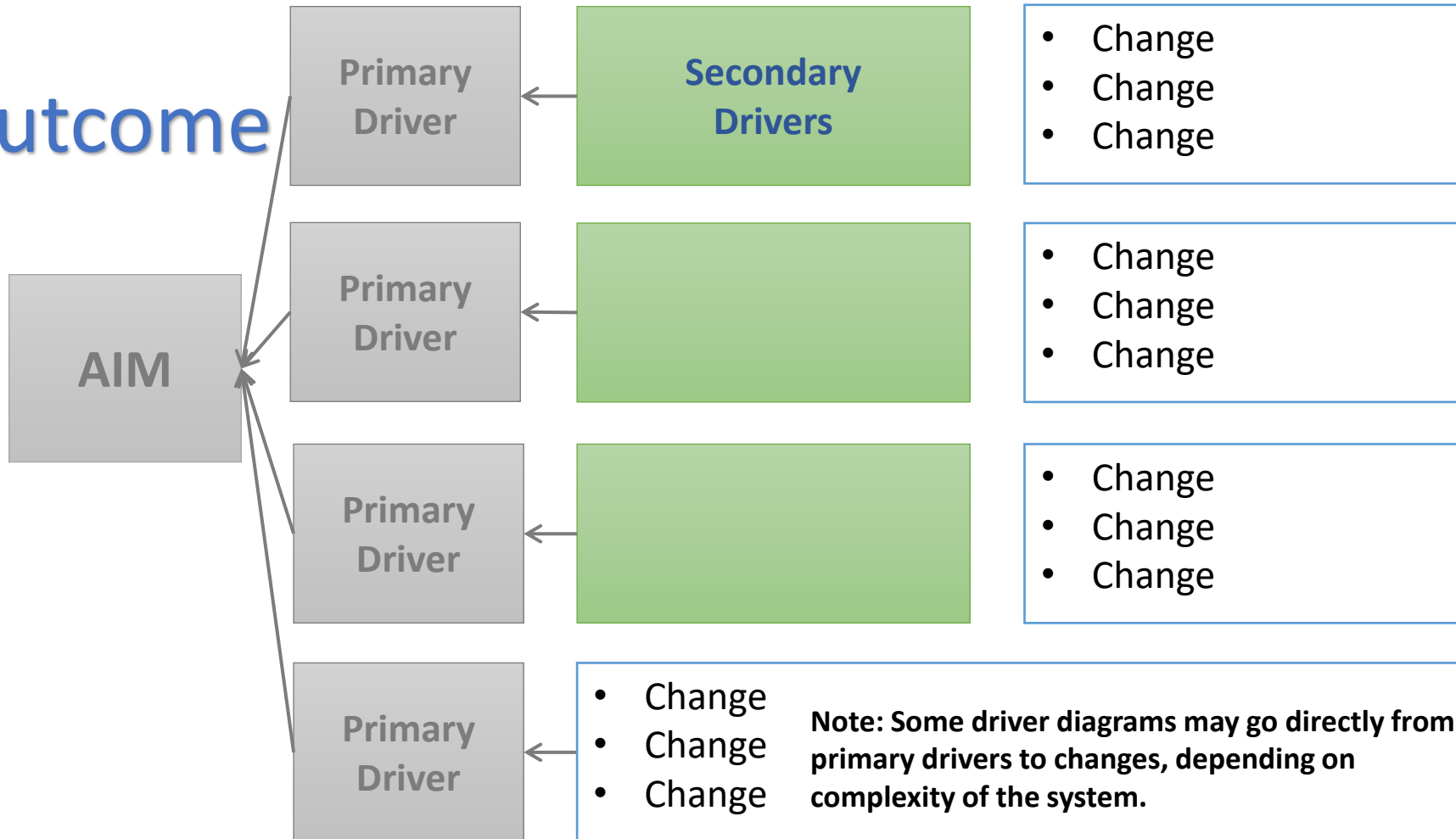
- A measure meant to designate the conditions under which care is provided:
 - Material resources (such as equipment and facilities)
 - Human resources (such as the number, variety and qualifications of professional and support personnel—educated or not)
 - Organizational characteristics (such as the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



What directs measure development?

Process

Outcome



- Plan-Do-Study-Act (PDSA) cycles are a disciplined inquiry and learning approach about how these changes will work in your state
- How a state customizes good ideas, ready for use to their unique context

Aim: By Feb. 2023, we will recognize and treat obstetric hypertension (HTN) during pregnancy and up to six weeks postpartum to reduce severe maternal morbidity (SMM) by 25% and achieve 80% or higher compliance of the HTN recognition tool and OB HTN emergency pathway.



Primary Drivers

Assessment/
Recognition

Response/Treatment

Clinical Collaboration
to avoid 3 D's delay,
deny, dismiss

Equity in Care

Secondary Drivers

In ED
Upon admission
At first acute HTN
onset
In clinical setting

At second HTN reading
Medication
administration

At discharge

Change Ideas

Know risk factors
Use proper BP technique
Prioritize 2nd reading
Use a timer as reminder
Think, "This is an emergency" (like a stroke)
Use preeclampsia early recognition tool
Utilize blue band

Use standing orders / HTN order sets to avoid delay
Over-ride Pyxis for urgent HTN meds
Make 2nd reading within 15 min after initial HTN
Treat HTN within 15 min if BP elevation lasts 15 min or more
Follow HTN Medication Admin Guide
Follow OB HTN Emergency Pathways
Use Preeclampsia VS Guide
Use eclampsia algorithm
Treat severe BP
Check stat lab results
Use and practice SBAR
Swarm and debrief all failures, look for system and process failures
Develop clear rapid escalation
Implement Team-Stepps
Drill & simulate HTN emergencies

Schedule f/u PP visit w/in 72hrs if on meds or 3-10 days if not on medications

Use run and control charts to analyze data monthly. Stratify by race and ethnicity
Include women of color on your improvement team.
Set universal goals and develop targeted approaches so all groups achieve universal goals

JAT

IHI HTN Better Maternal Outcomes: Reducing Harm from Hypertension During Pregnancy Workbook IHI.org

28

Aim: Reduce Hypertension-related severe maternal morbidity from (x/1,000 deliveries to y/1,000 deliveries) for individuals delivering in the labor and delivery unit at ABC hospital by November 1, 2021.

Measure Type	Measure	Measure Definition
Outcome	Hypertension-related Severe Maternal Morbidity (SMM)	Denominator: All mothers during their birth admission, excluding ectopic pregnancy and miscarriages Numerator: Among the denominator, all cases with any non-transfusion SMM code - Stratify data by race and ethnicity and language
Process	Percent of delivering patients with elevated blood pressure who receive treatment within 60 minutes of elevated blood pressure reading.	Denominator: Number of patients with persistent (twice within 15 minutes) new-onset Severe HTN (Systolic: = 160 or Diastolic: = 110) Numerator: Number of patients among denominator who were treated within 60 minutes with IV Labetalol, IV Hydralazine, or PO Nifedipine - Stratify data by race and ethnicity and language
Process	Percent of patients who can teach back postpartum warning signs to their care team upon discharge	Denominator: Total number of patients delivering on the unit Numerator: Number of patients who, at the time of discharge, could teach back the symptoms of when they should seek postpartum emergency care - Stratify by race and ethnicity and language
Process	Percent of deliveries where a complication occurred that had a team debrief after the event	Denominator: Total number cases where a complication occurred Numerator: Number of cases where a complication occurred that had a team debrief within one week of the adverse event
Structural	Organization has a system in place for conducting debriefs	- Yes/No - Lickert Scale
Balancing	Fetal Distress (in response to medication)	Denominator: Total number of cases where anti-hypertensives were given Numerator: Number of cases where fetal distress was observed (as measured by system criteria) due to low blood pressure

JT

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.

Case Study: You be the “Measure Developer”

Background: A friend has come to you and asked you to help develop measures to track progress of the group she is working with

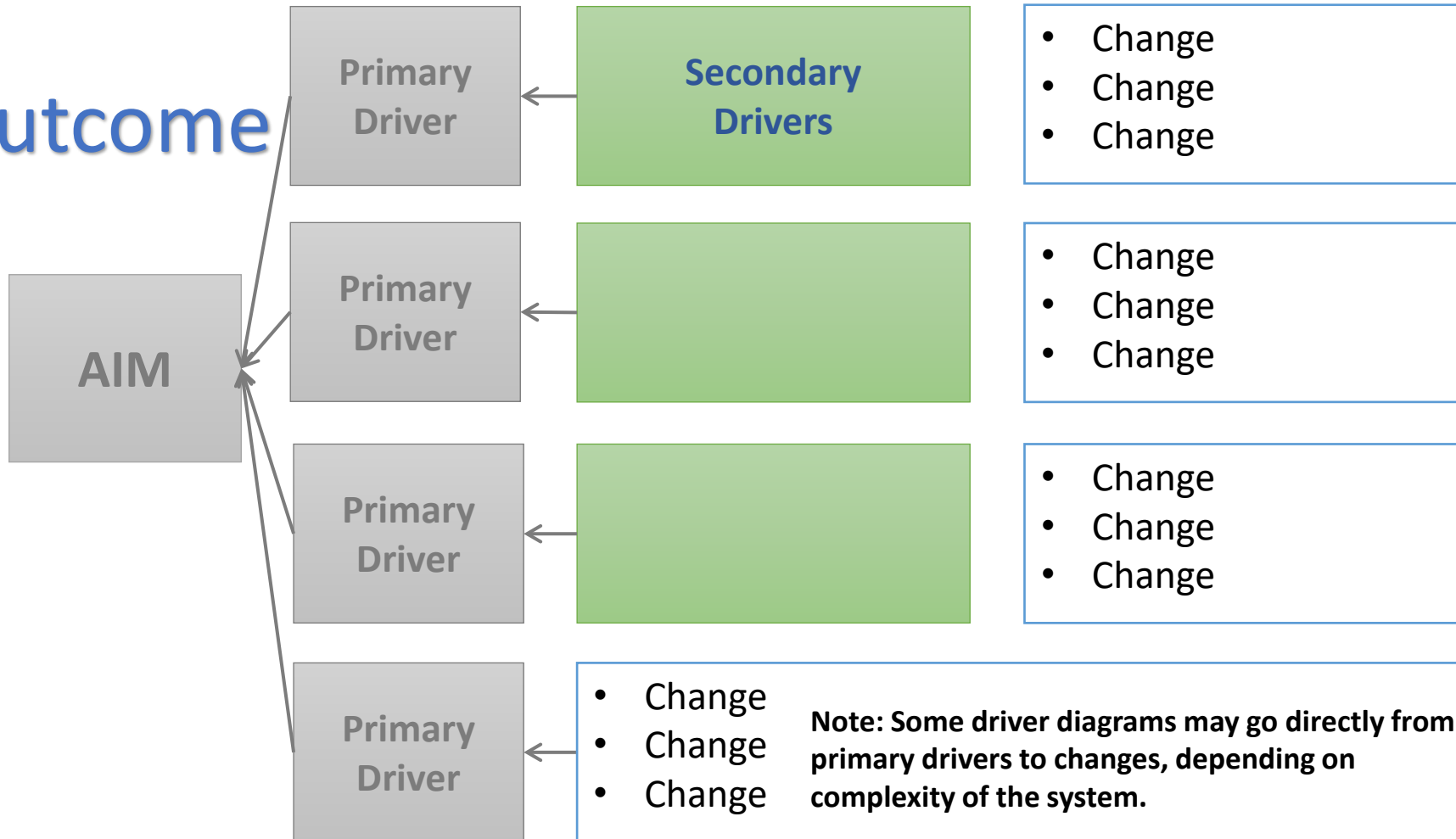
- They have a driver diagram
- Group Aim: The aim of the improvement project is for participants to lose weight. **She wants to tell how group is doing—not just each individual**
- With your group, develop a Family of 5 measures that could be reported each week for the project:
 - Outcome Measures – 1 measure
 - Process Measures – 2 measures
 - Balancing Measures – 1 measure
 - Structure Measure – 1 measure
- Use the worksheet that is provided in your Jamboard area
- Get as far as you can in 15 minutes



What directs measure development?

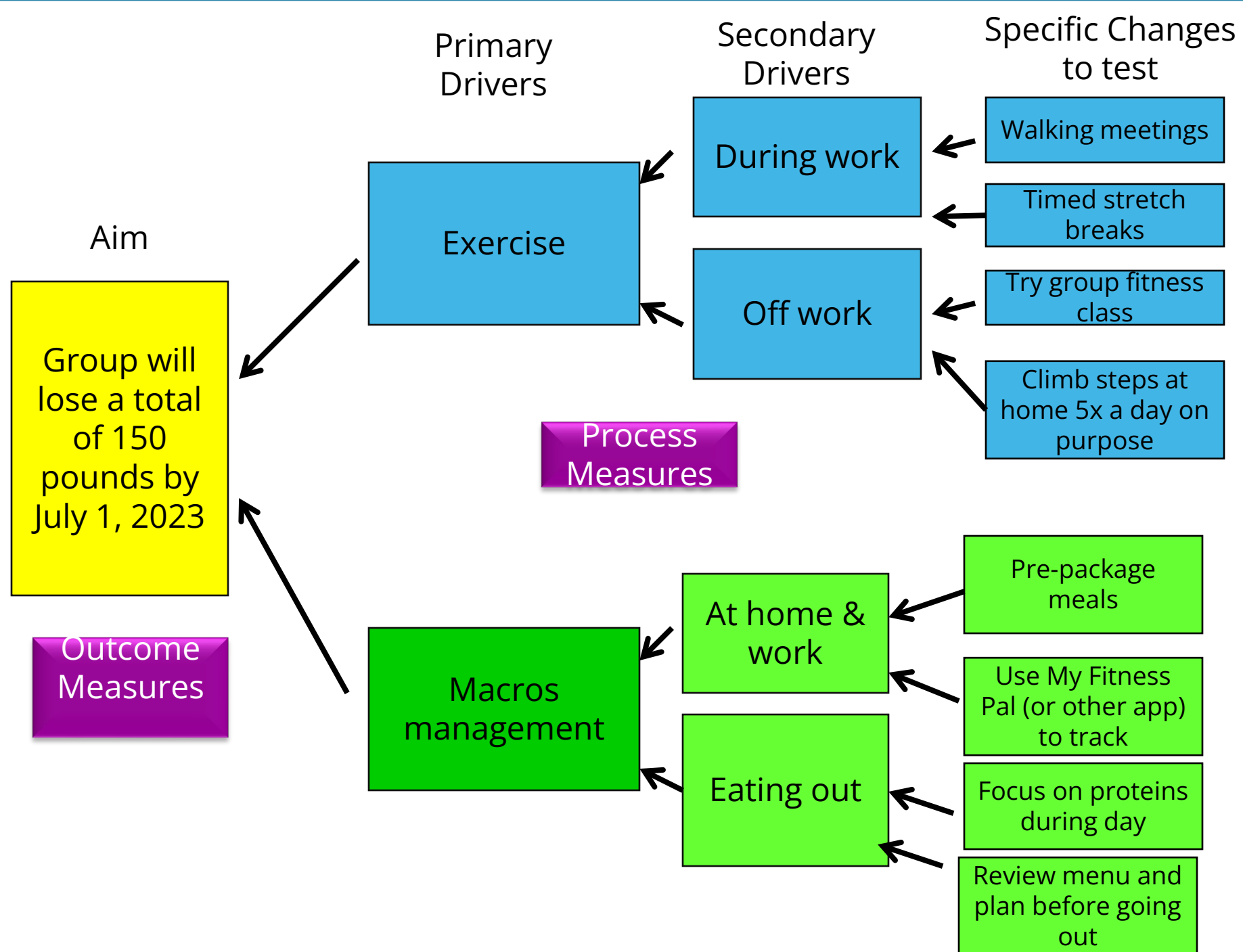
Process

Outcome



- Plan-Do-Study-Act (PDSA) cycles are a disciplined inquiry and learning approach about how these changes will work in your state
- How a state customizes good ideas, ready for use to their unique context

Balance and Structure Measures



Worksheet

Type	Name of Measure	Definition, how to collect data (e.g., frequency, who: source numerator/denominator, etc.)	Weekly summary statistic (e.g., rate, %, count)
Outcome Measure			
Process Measure			
Balancing Measure			

Breakout Logistics and Links

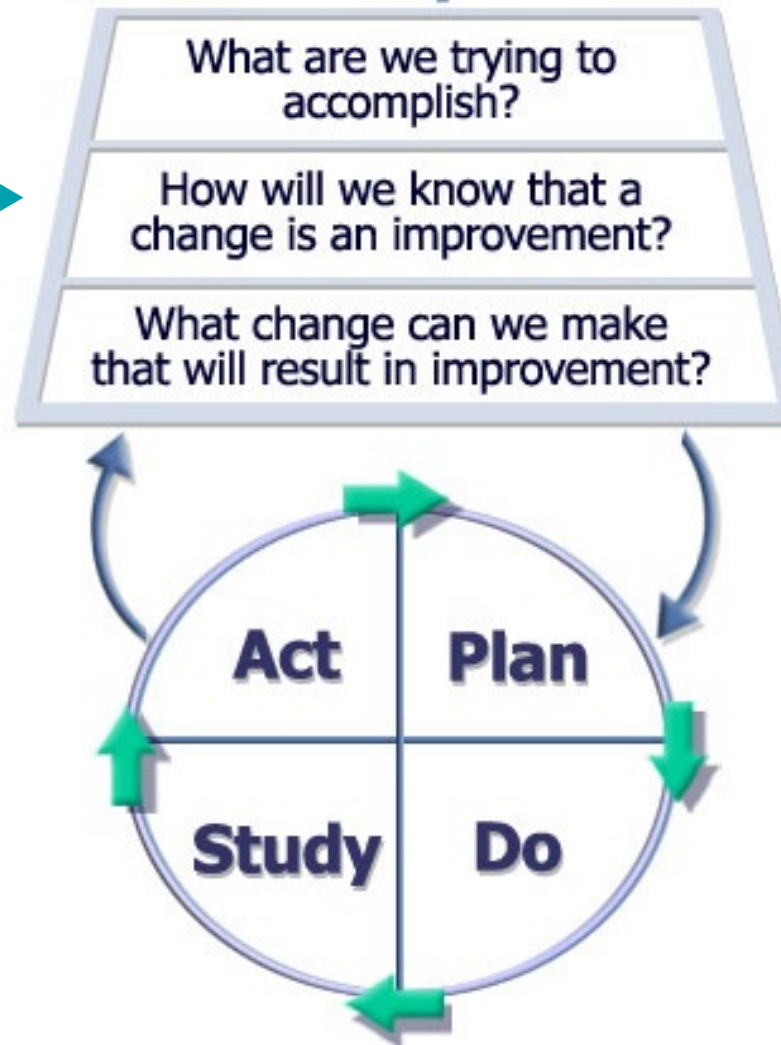
- We will place you in random breakout groups
- Join the Jamboard that corresponds with your breakout group number (1 join Jamboard 1; 2 join Jamboard 2, etc.)

- Group 1: <https://jamboard.google.com/d/15t2H56TiacIE89SZvB2SrDgUpzL0iov16BnU8mzJq1k/edit?usp=sharing>
- Group 2: <https://jamboard.google.com/d/1ZZUtE9WR6D7YP9e-KCCebrBELMEvYT2p12QRo7pfVc/edit?usp=sharing>
- Group 3: https://jamboard.google.com/d/1r6a-Il_wz2ygFM02Xnc2f7bsl2X27WCQLEJ2SJklQ_E/edit?usp=sharing
- Group 4: https://jamboard.google.com/d/1XYs8lVpE5ti_ct4lzJK7juPKDrJhCgNvgZBXp4ky1cE/edit?usp=sharing
- Group 5: <https://jamboard.google.com/d/11FxGuUtRobZp9NeMSXVNCRRs4wZoX367-7xbn8325r8/edit?usp=sharing>
- Group 6: <https://jamboard.google.com/d/1oUXsNuhKzLPMzDIhphCGiDGfmw46PMpHmvvDhBKDsLQ/edit?usp=sharing>
- Group 7: <https://jamboard.google.com/d/1vx04Va9W0hgmE3THExig8msHdyYE0d3qMuacKMSrUYM/edit?usp=sharing>
- Group 8: https://jamboard.google.com/d/1jwGchI2PpsPSpSHSBCCPJwTuEUfqP5_O_Tj2LENI57Y/edit?usp=sharing
- Group 9: <https://jamboard.google.com/d/1DYlYvtvnrNXkaQcyIB0nSIGsINUNUtptwgMJjw-ee1c/edit?usp=sharing>
- Group 10: <https://jamboard.google.com/d/1G1O16sPYviK0ZWswWAnIVkByG6bMYX5cIIISChxM7xrE/edit?usp=sharing>



Model for Improvement

Measures



Data is not just numbers, or “quantitative data”, but “qualitative data” as well, More on qualitative data at next session.

Cycle of Improvement

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

Enumerative (Static) Statistics

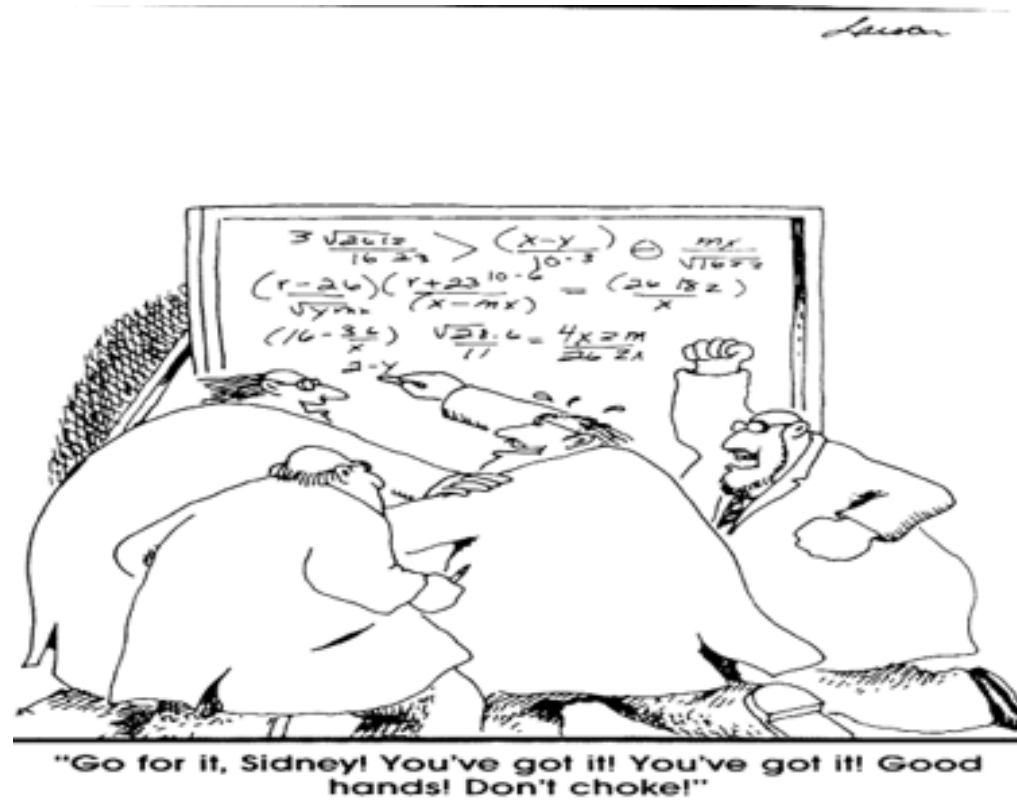


Analytic Statistics...

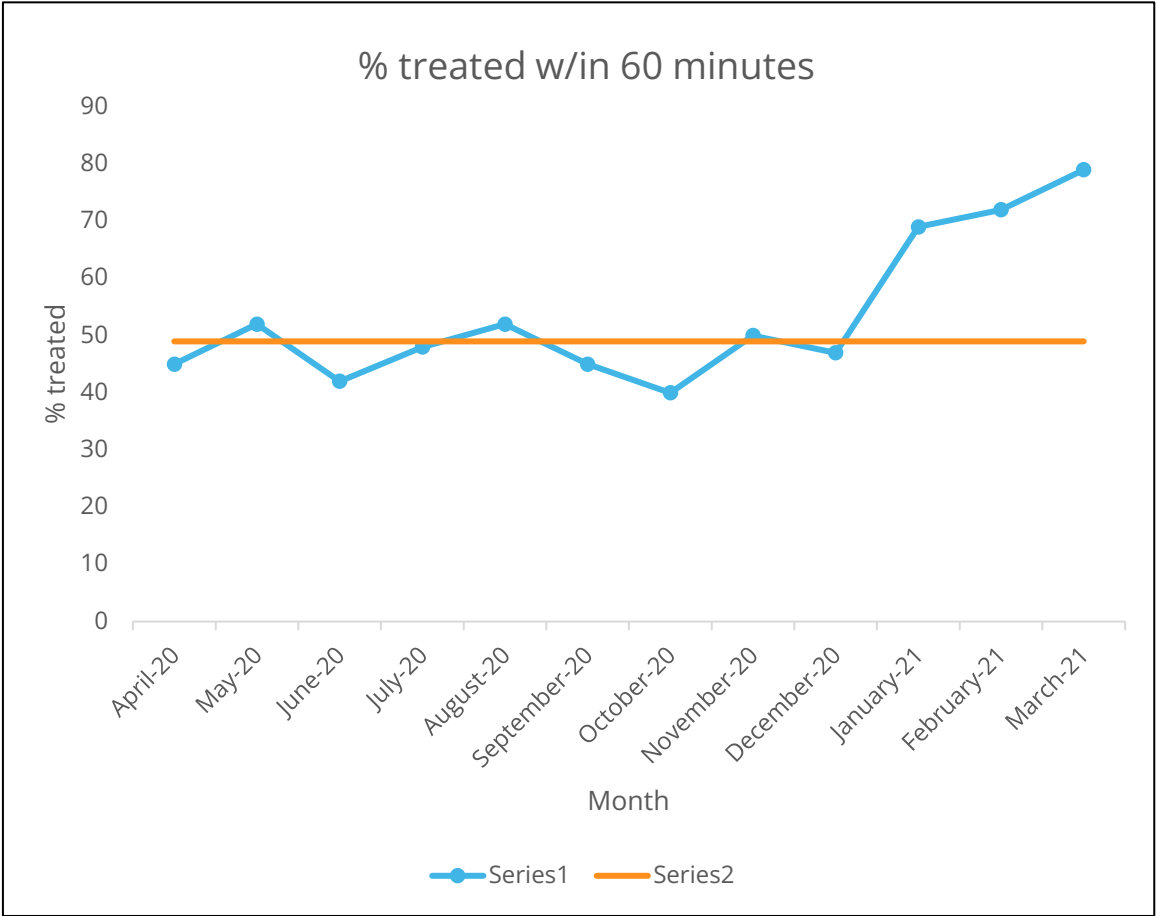
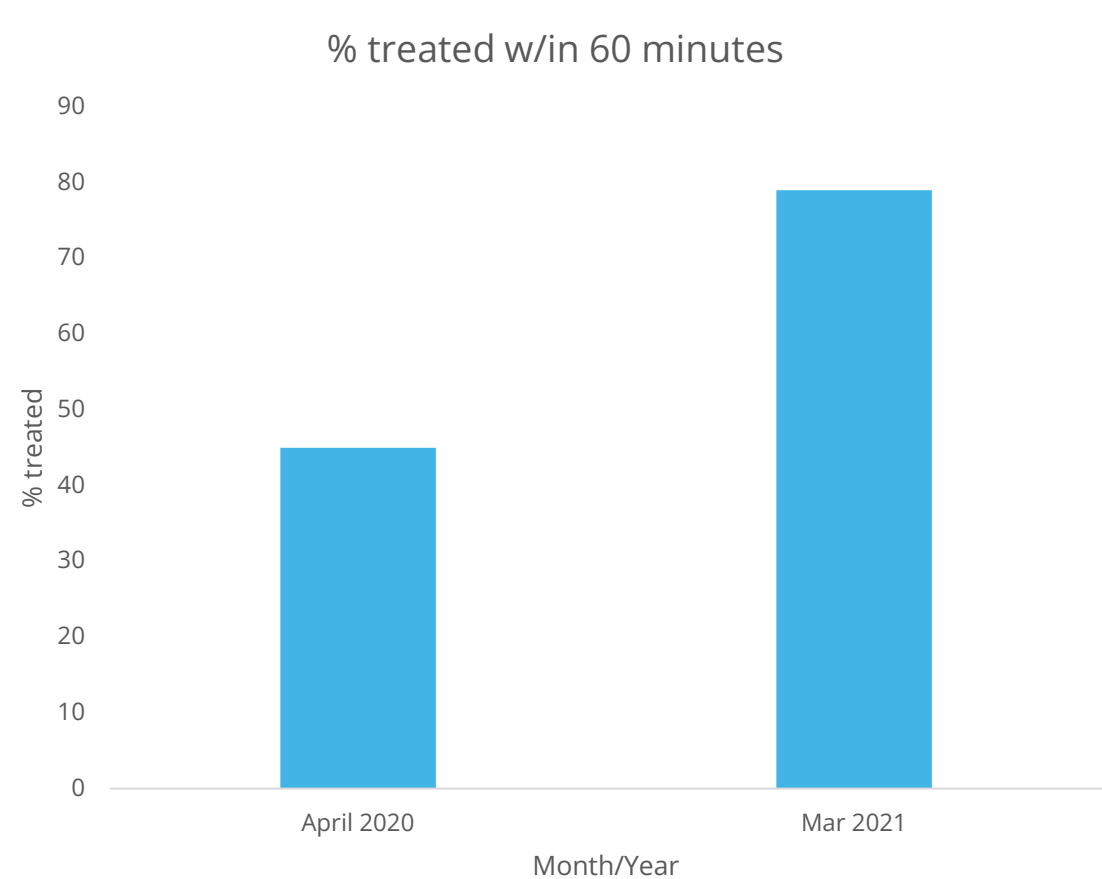


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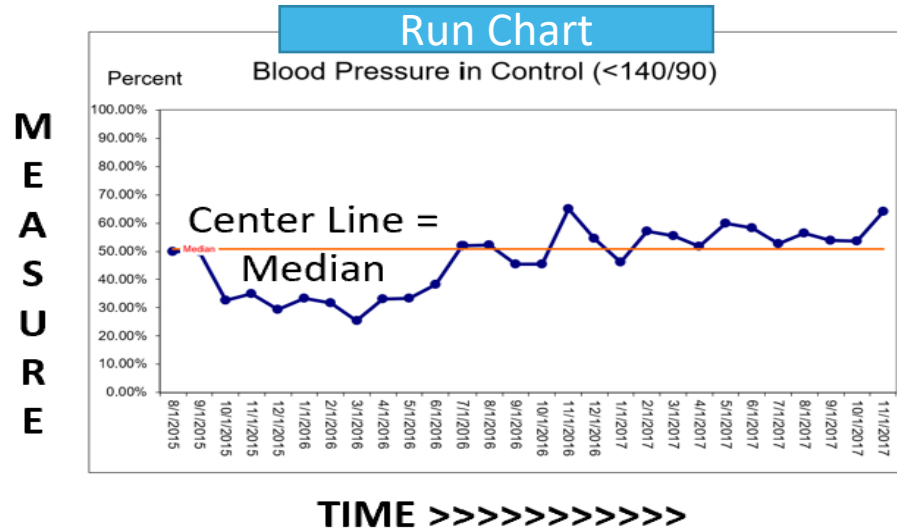
Displaying Data



Over Time rather than Before/After

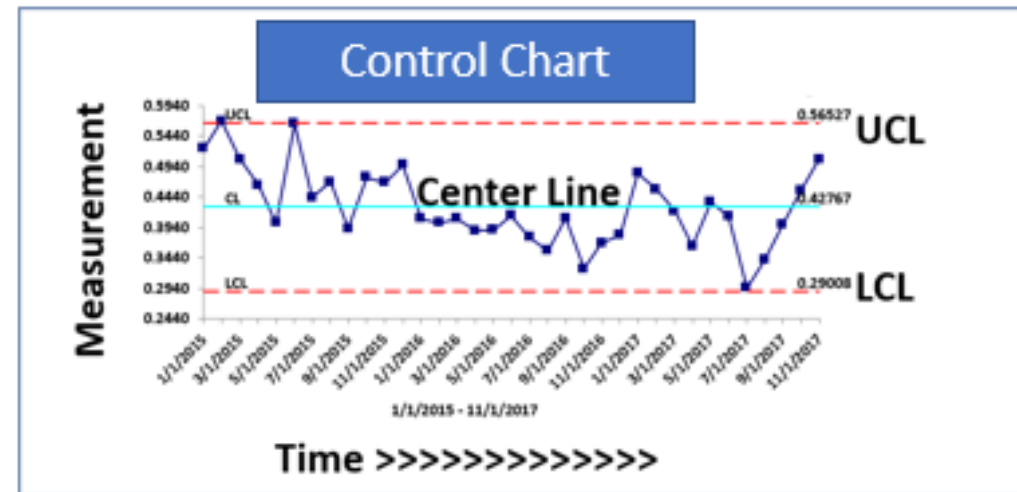


Two key tools helps us to uncover and understand variation in our data



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

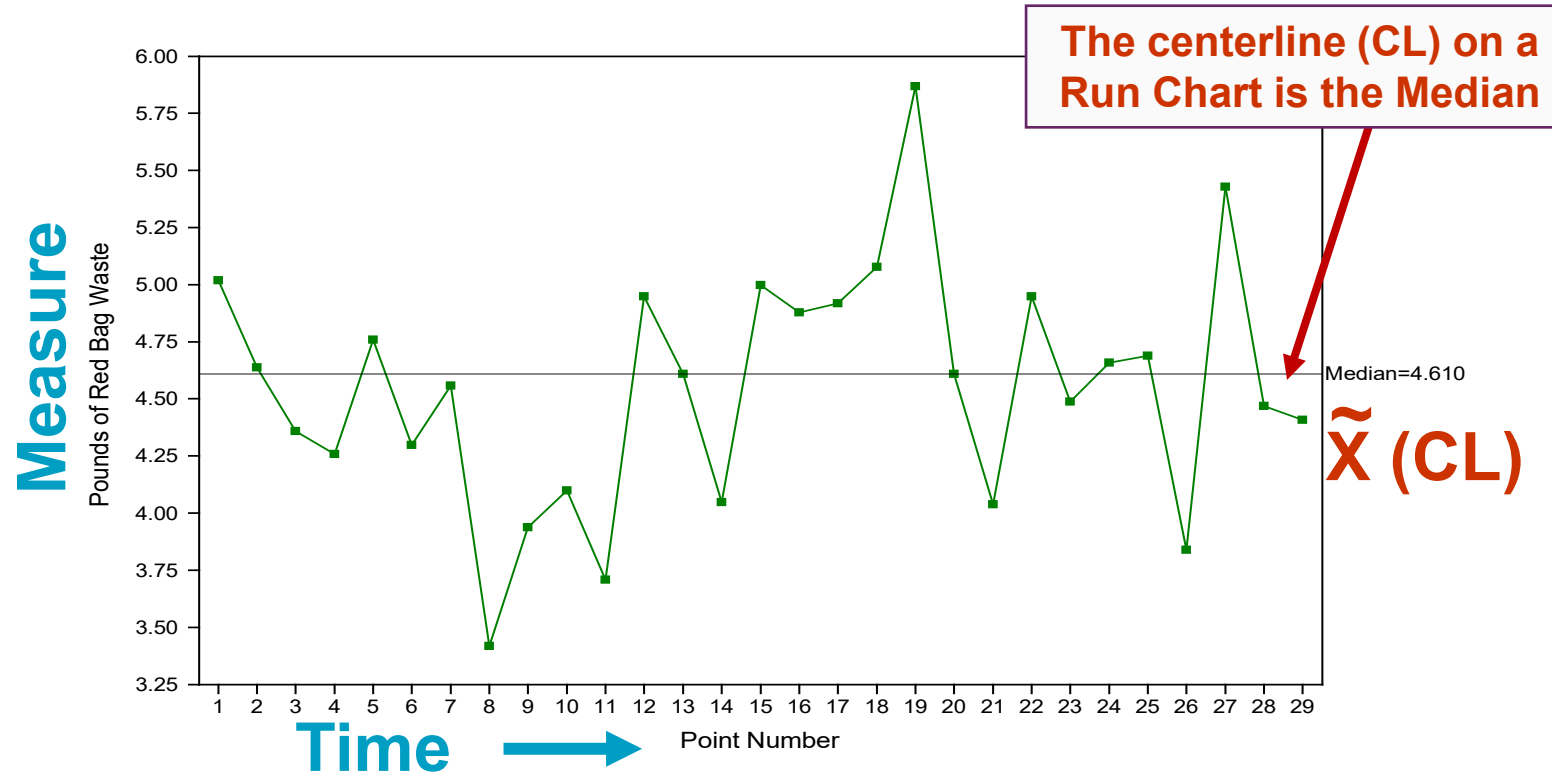
- ✓ Can be for any type of data
- ✓ No calculations are required.
- ✓ Can easily make by hand
- ✓ Show behavior at-a -lance
- ✓ They are easily understood
- ✓ **3 Elements: Measurement, Time, & Median**



Run Charts

Finding the story in our data...

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



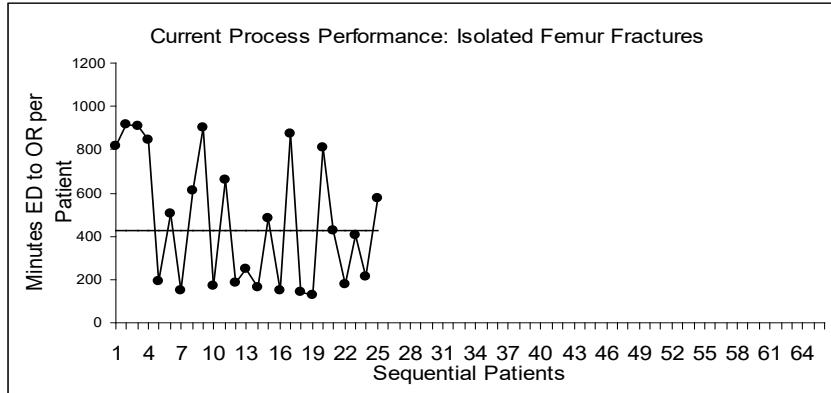
Frequently Asked Questions

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

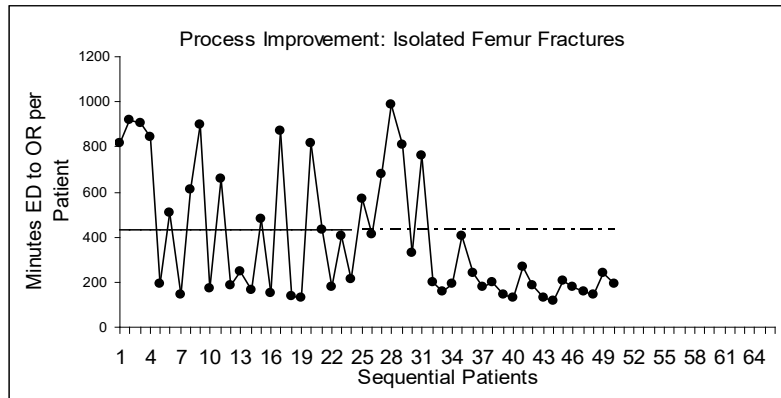
Photo by [Museums Victoria](#) on [Unsplash](#)



1. Make process performance visible

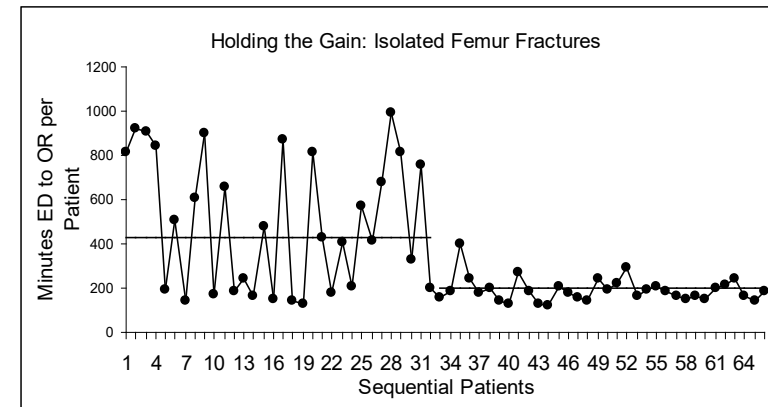


Three Uses of Run Charts



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 between 10 – 15 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

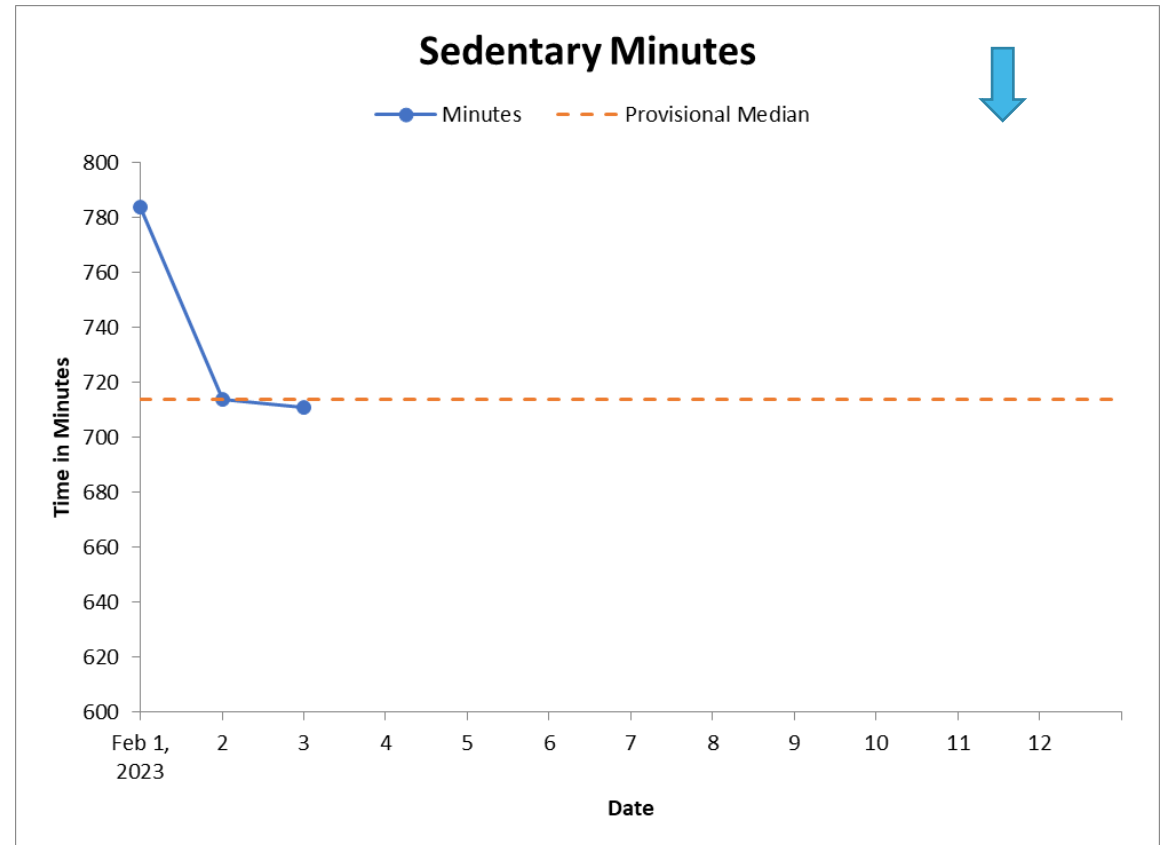
10 – 15 quarters

- *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, that is add in median*



Practically, you can . . .

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



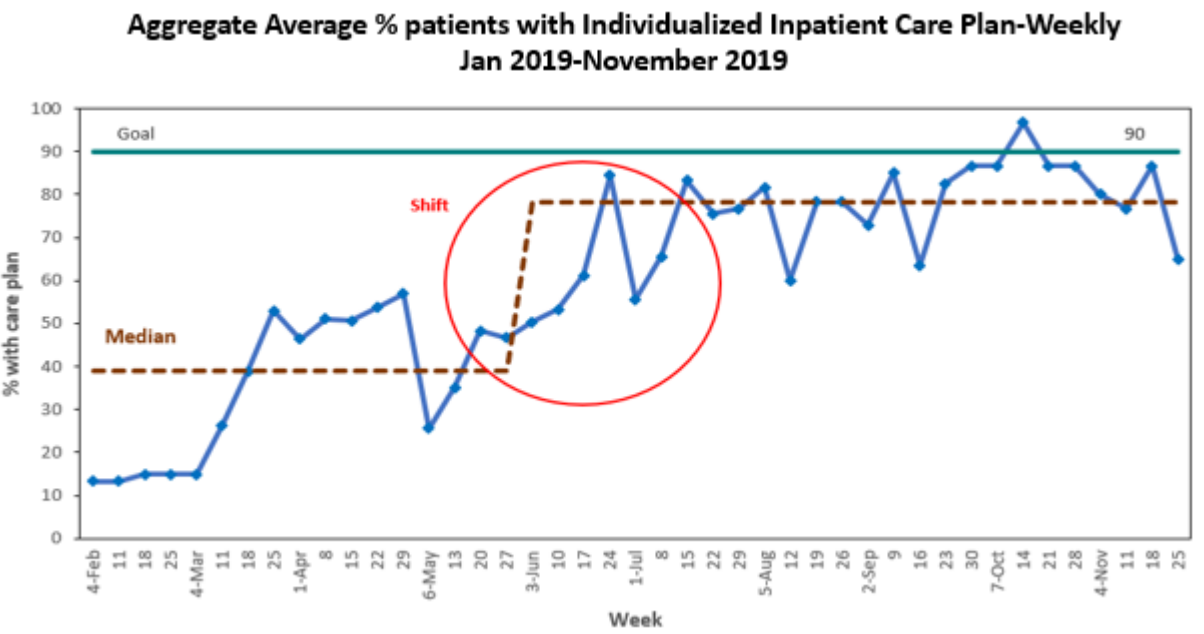
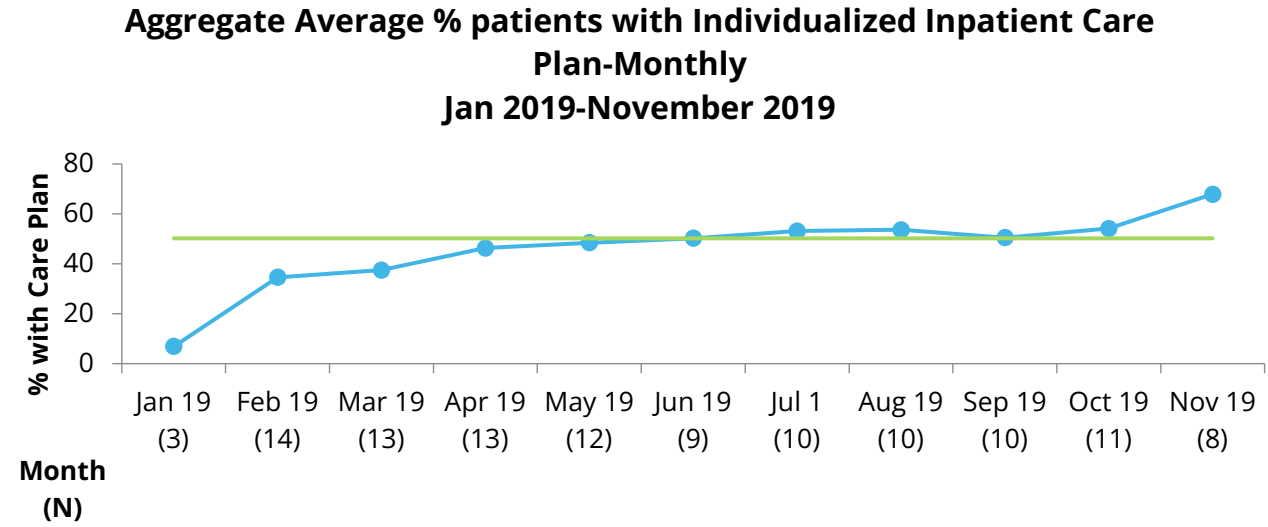
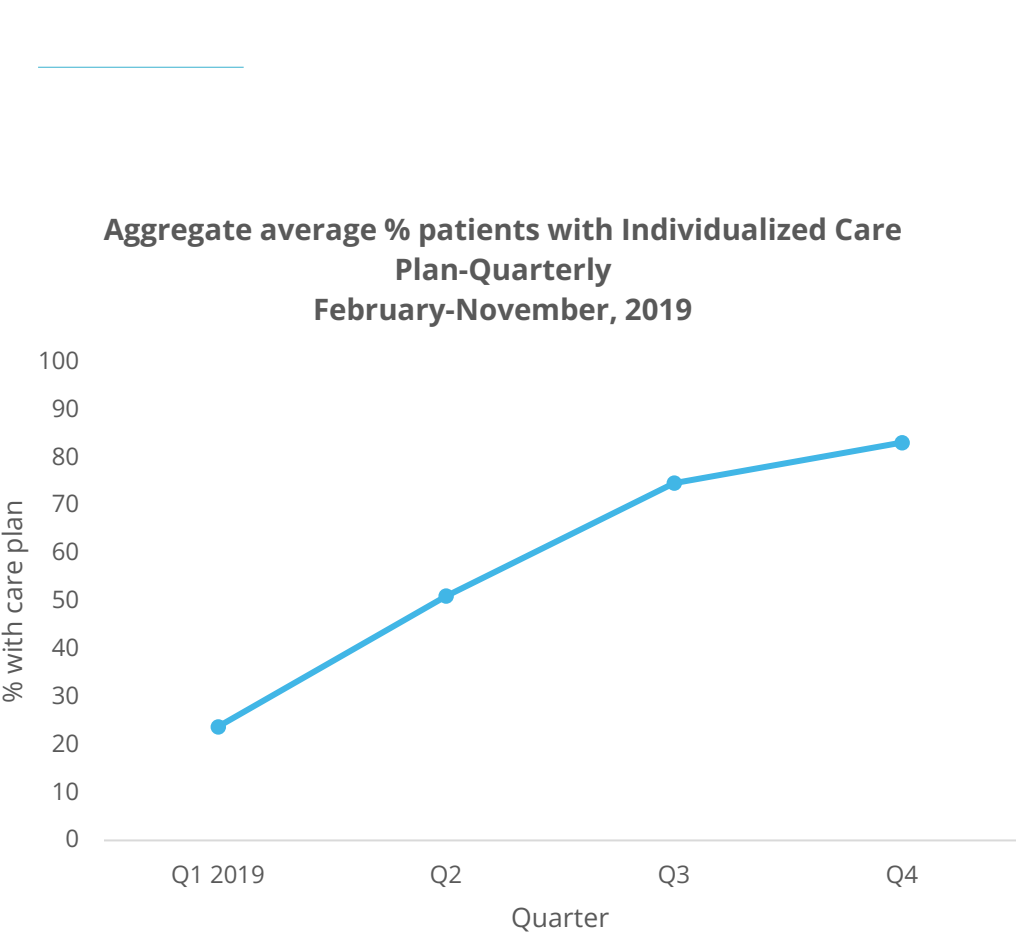
Frequently Asked Questions

3. How often should we collect data for improvement?

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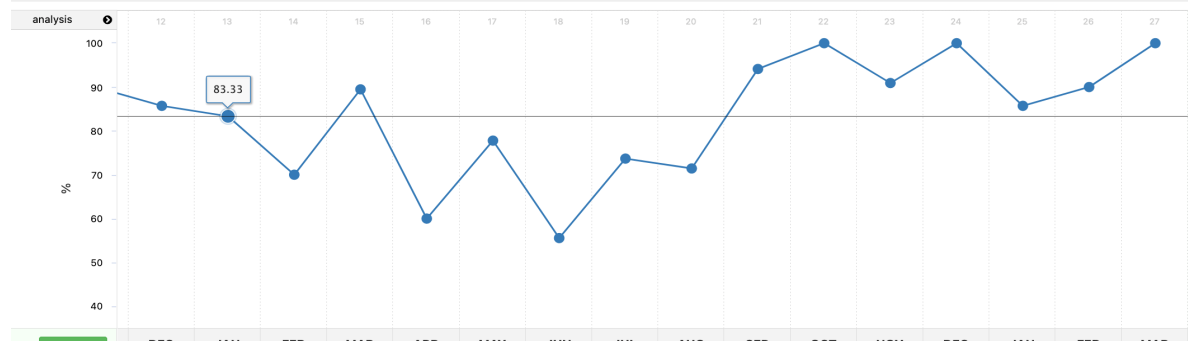
Measure Frequency-Monthly Minimum (Mock Data)



Source: Butts-Dion Consulting, Inc.

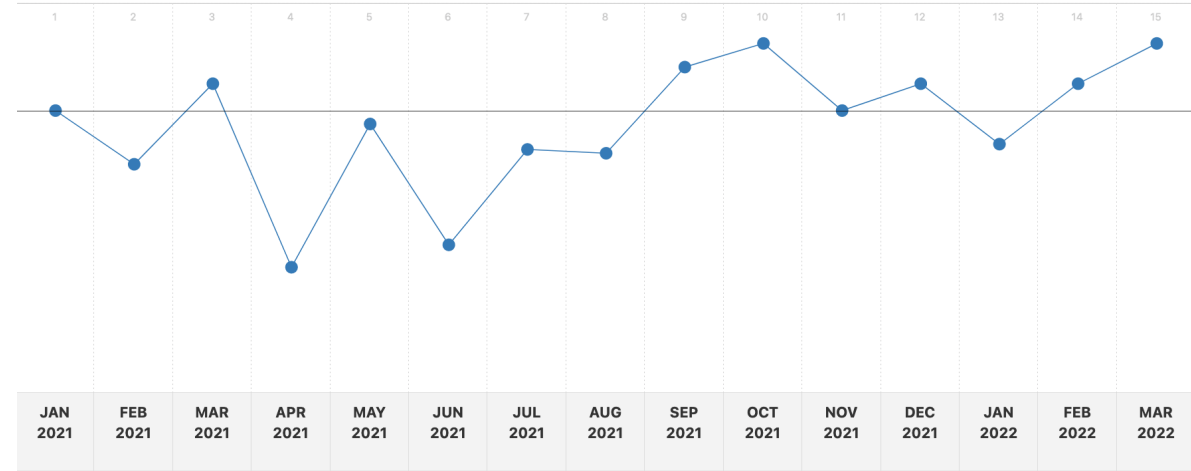
Percentage treated within 60 minutes

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

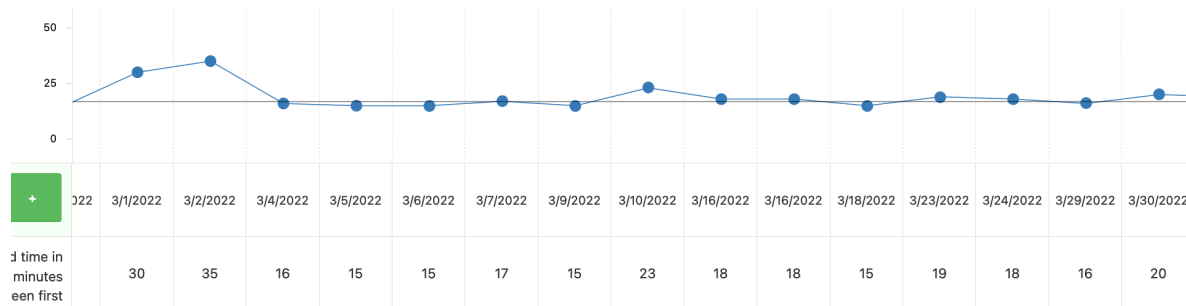


Family of Measures for HTN

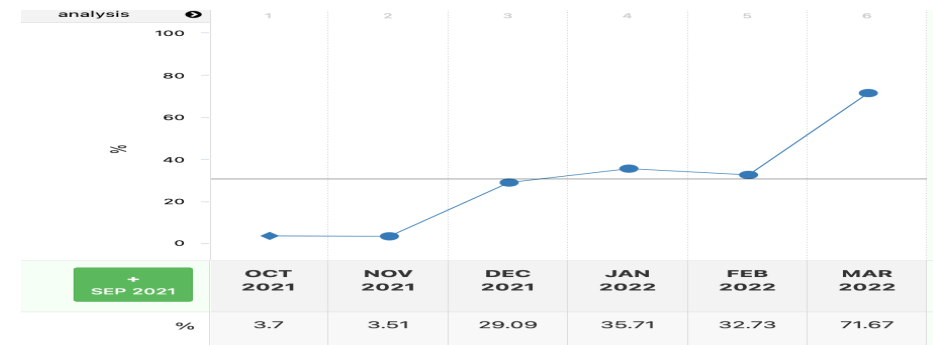
Compliance with OB HTN Pathway – “All Entries”



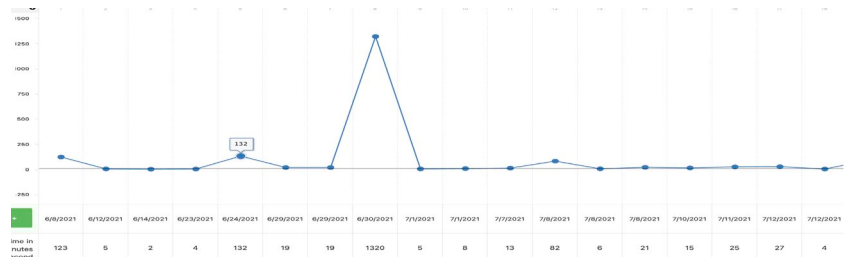
Lapsed minutes between first and second



% with HTN Disorder d/c with blood pressure cuff



Lapsed minutes between confirmation and treatment



NICHQ

Now What?

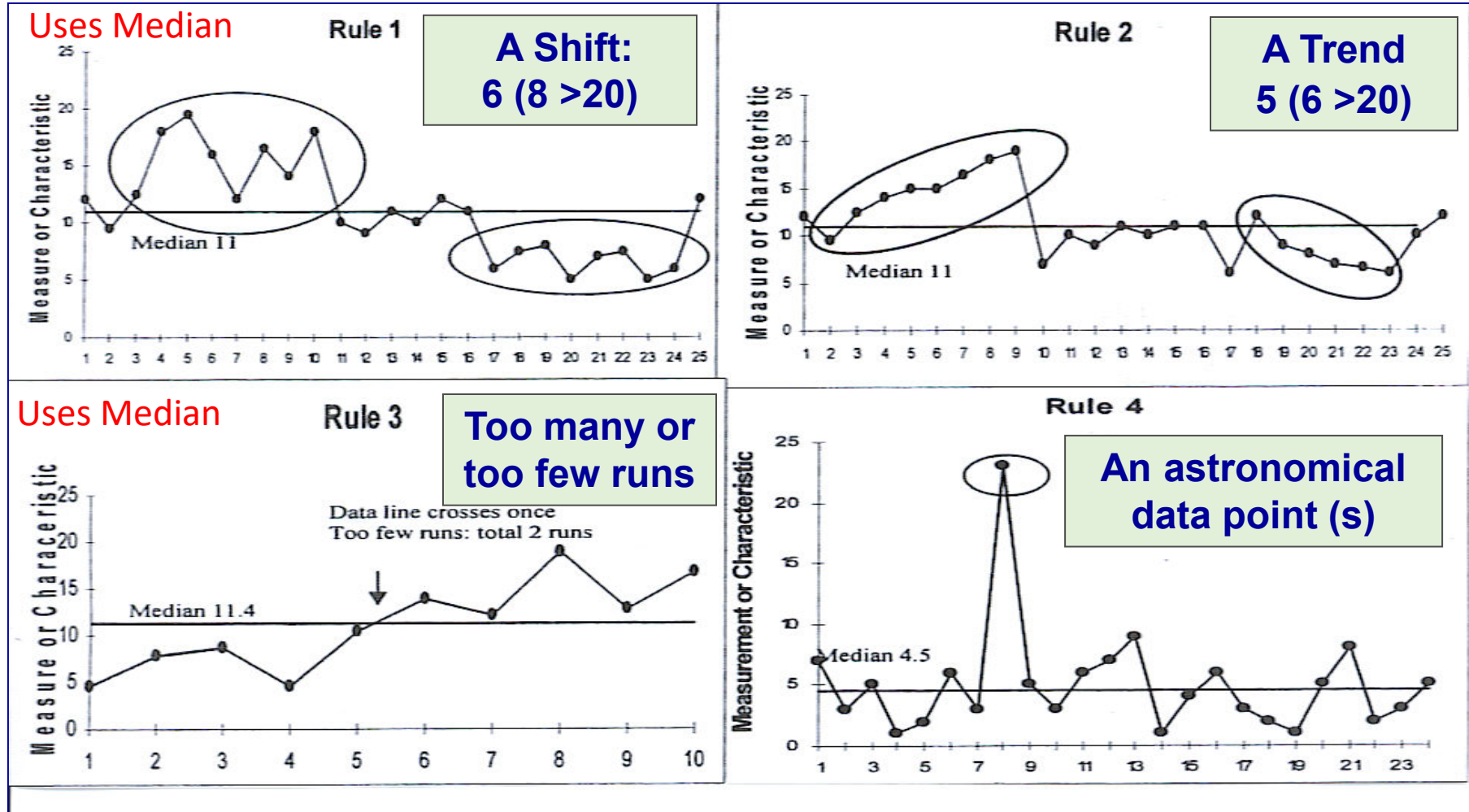
Using Run Chart Rules to Analyze the Story in Our Data
and to Inform Action

Using Run Charts to Understand Variation

A: Create Chart B: Apply the 4 Rules C: Analyze Results D: Identify Strategies

1. **Shift?** (6 or more in a row all above or all below median, use 8 or more points if you have > 20 points, values on the median do not break a shift)
2. **Trend?** (5 or more in a row all going up or down, use 6 or more if you have > 20 data points, consecutive like values are counted as one)
3. **Number of Runs?** (Too many? Too few? Just enough?)
 - A. Count the number of runs on the chart (a run consists of one or more consecutive points on the same side of the median)
 - B. Count the total number of useful observations (data points not sitting on the median)
 - C. Consult Number of Runs Table (Identify the range – Too Few? Too Many? Just Enough?)
4. **Astronomical Point(s)?** (extreme points far beyond data range, all agree)

4 Run Chart Rules are used to identify non-random signals



Rule 3: Counting the Number of Runs (Fluctuation Around Mean)

Too Many Runs? Too Few Runs? Just enough?

- A. Count the number of runs on the chart** (a run consists of one or more consecutive points on the same side of the median) There are two ways to count runs:
1. Draw a circle around each run and count the number of circles you have
 2. Count the number of times the line crosses the median and add “1”
- B. Count the total number of useful observations** (data points not sitting on the median).
- C. Consult Number of Runs Table** (ID range for number of useful observations) Too many runs? Too few runs? Just enough?

Consulting Number of Expected Runs Table

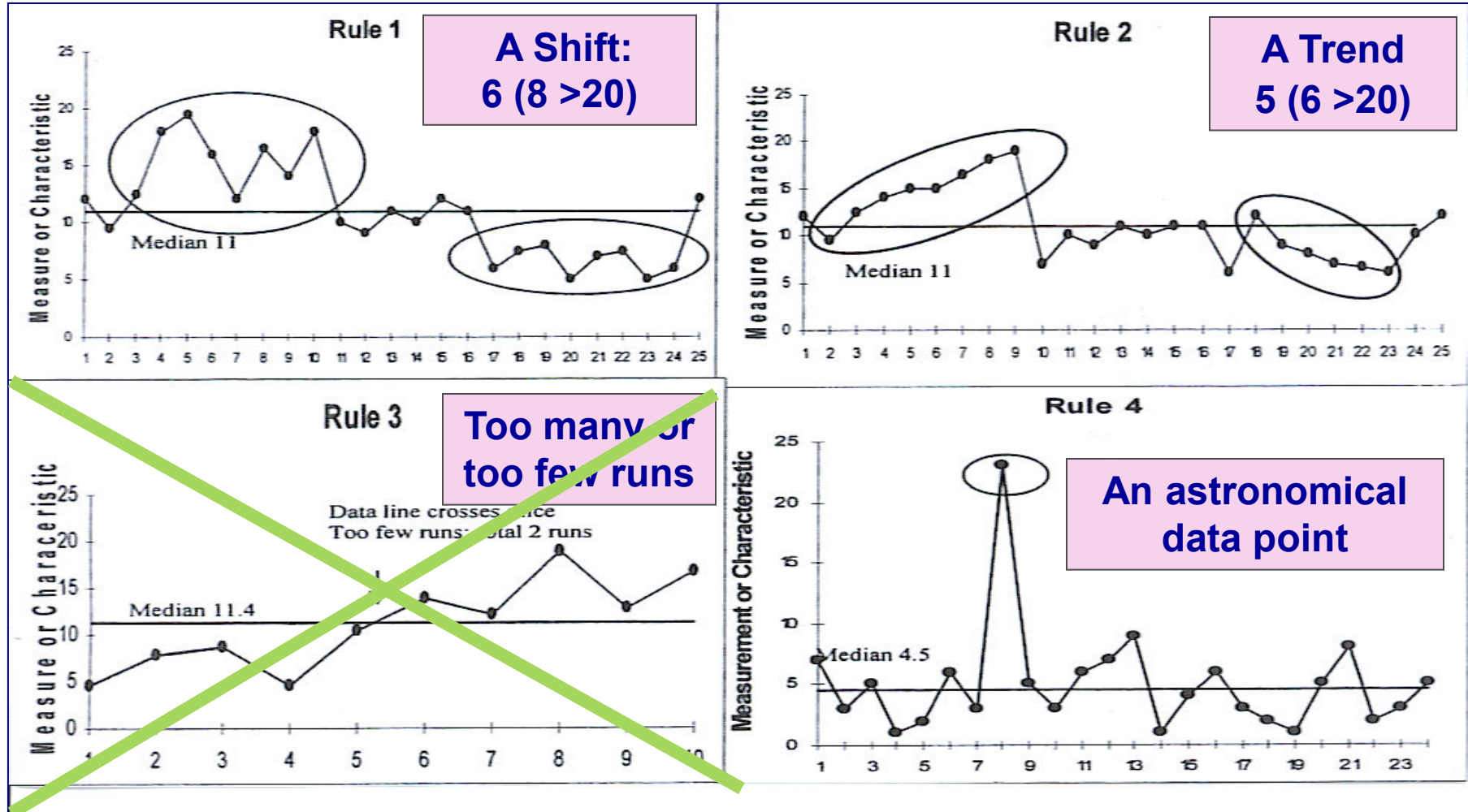
Expected Runs Table											
Count Useful Observations Only – Ignore Points on Median!											
Useful Obser.	Lower # Runs	Upper # Runs	Useful Obser.	Lower # Runs	Upper # Runs	Useful Obser.	Lower # Runs	Upper # Runs	Useful Obser.	Lower # Runs	Upper # Runs
10	3	9	23	7	17	36	13	25	49	19	32
11	3	10	24	8	18	37	13	25	50	19	33
12	3	11	25	8	18	38	14	26	51	20	33
13	4	11	26	9	19	39	14	26	52	20	34
14	4	12	27	10	19	40	15	27	53	21	34
15	5	12	28	10	20	41	15	28	54	21	35
16	5	13	29	10	20	42	16	28	55	22	35
17	5	13	30	11	21	43	16	28	56	22	36
18	6	14	31	11	22	44	17	29	57	23	36
19	6	15	32	11	23	45	17	30	58	23	37
20	6	16	33	12	23	46	17	31	59	24	38
21	7	16	34	12	24	47	18	31	60	24	38
22	7	17	35	12	24	48	18	32			

Source: The Data Guide by L. Provost and S. Murray, Austin, Texas, February 2011, page 80.

Table is based on about a 5% risk of failing the run test for random patterns of data.
Adapted from Swed, Feda S. and Eisenhart, C. (1943). "Tables for Testing Randomness of Grouping in a Sequence of Alternatives. Annals of Mathematical Statistics. Vol. XIV, pp.66 and 87, Tables II and III.

Table for Checking for Too Many or Too Few Runs on a Run Chart

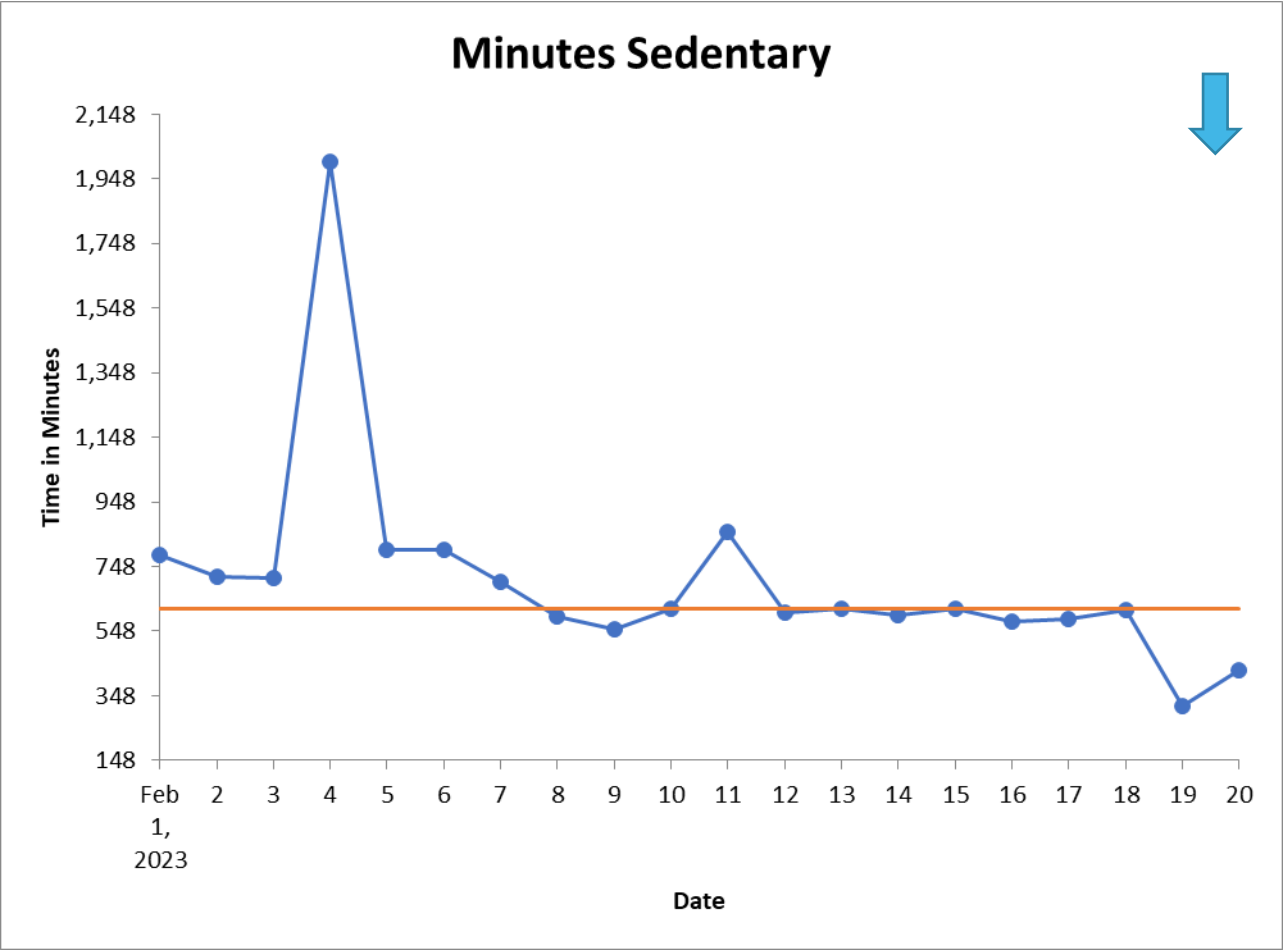
4 Run Chart Rules are used to identify non-random signals



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

Insights?
Questions?
Suggestions?
Action?

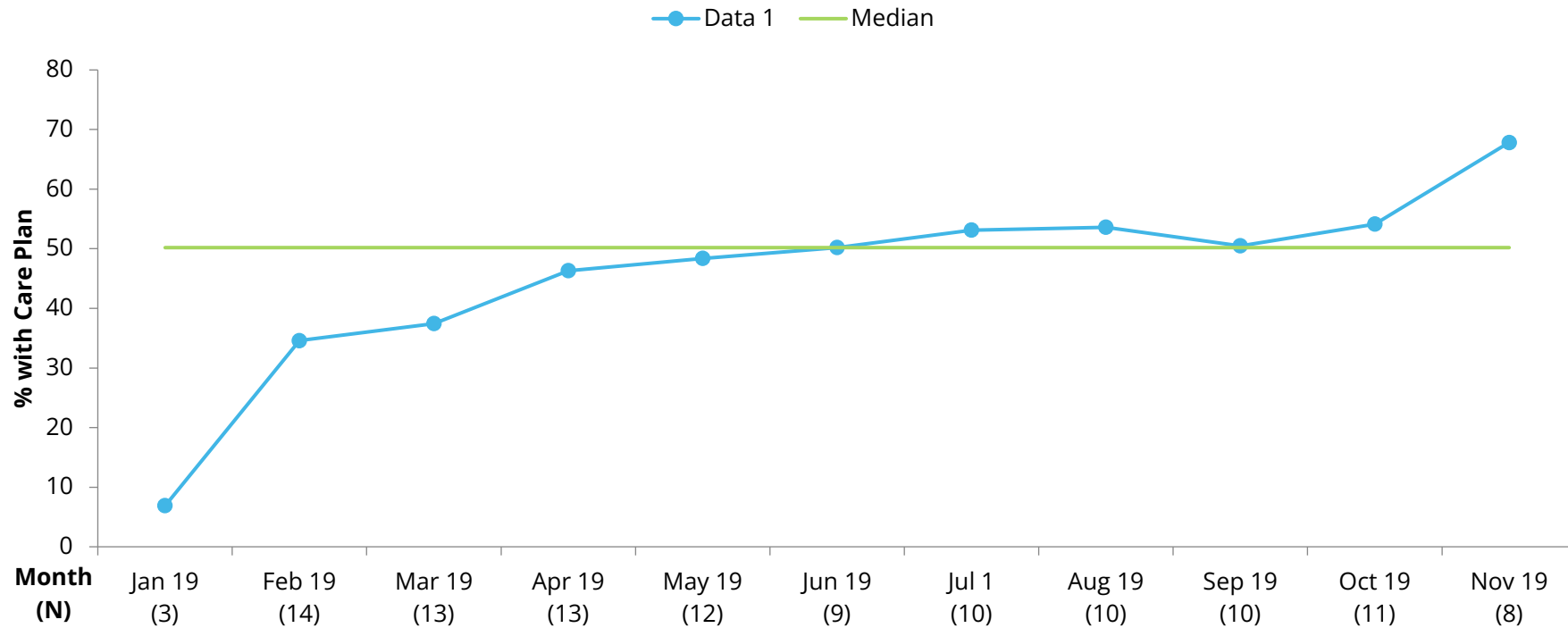
Date	Data 1	Median
Feb 1, 2023	784.0	615.5
2	714.0	615.5
3	711.0	615.5
4	2000.0	615.5
5	800.0	615.5
6	800.0	615.5
7	700.0	615.5
8	591.0	615.5
9	555.0	615.5
10	616.0	615.5
11	855.0	615.5
12	605.0	615.5
13	617.0	615.5
14	598.0	615.5
15	615.0	615.5
16	577.0	615.5
17	584.0	615.5
18	614.0	615.5
19	316.0	615.5
20	426.0	615.5



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

Insights?
Questions?
Suggestions?
Action?

Aggregate Average % patients with Individualized Inpatient Care Plan-Monthly
Jan 2019-November 2019



Run Chart Maker Demonstration

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.

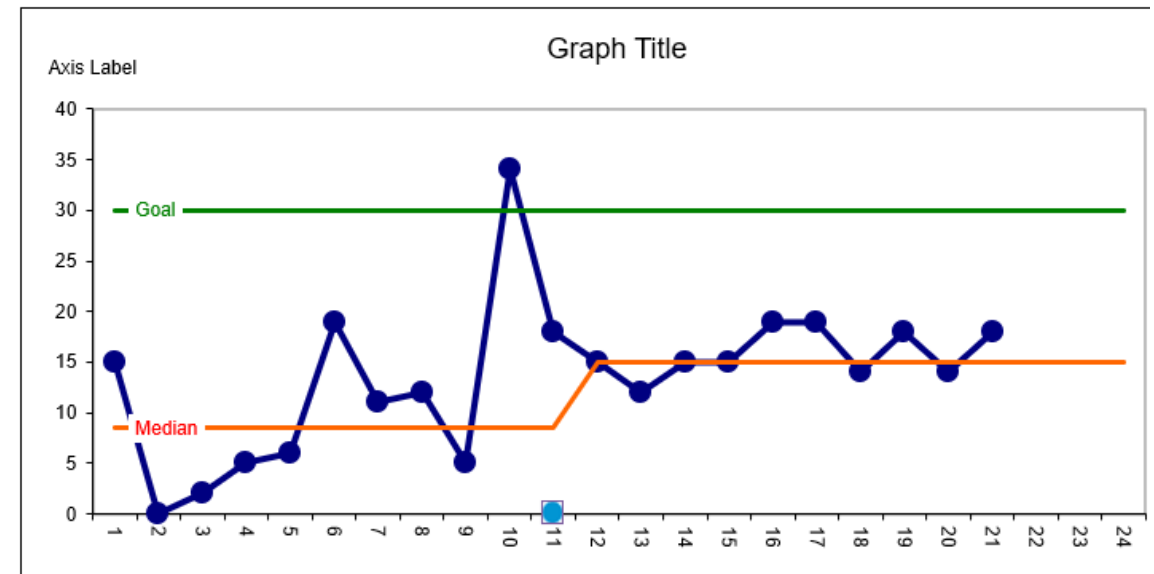
Don't leave any blank cells in the Date/Observation column.

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	



Run Chart Tool | IHI - Institute for Healthcare Improvement

NICHQ
SBD

Exercise

- Join your team's breakout room
- Select one member to share their screen
- Use the data and run chart maker worksheet (attached to the meeting invite and also in the chat) to create your run chart
 - Cut and paste the two columns of data from the "Fantasy Data" tab into columns B and C of the Run Chart tab
- Interpret your run chart using run chart rules on tab in IHI run chart maker (DON'T NEED TO APPLY RULE 3 THAT REQUIRES THE TABLE—ONLY APPLY SHIFT, TREND AND ASTRONOMICAL POINT RULES)
- Select one member of the team for brief report back on your findings and experience making the run chart



Taking Action on Variation

Random variation only, no signal (**act on process/system**)

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

Signal of non-random variation: Shift, Trend, Too Many/Few Runs, Astro (**act on points**)

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



What are the two types of variation and what is the appropriate action?

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

Frequently Asked Questions

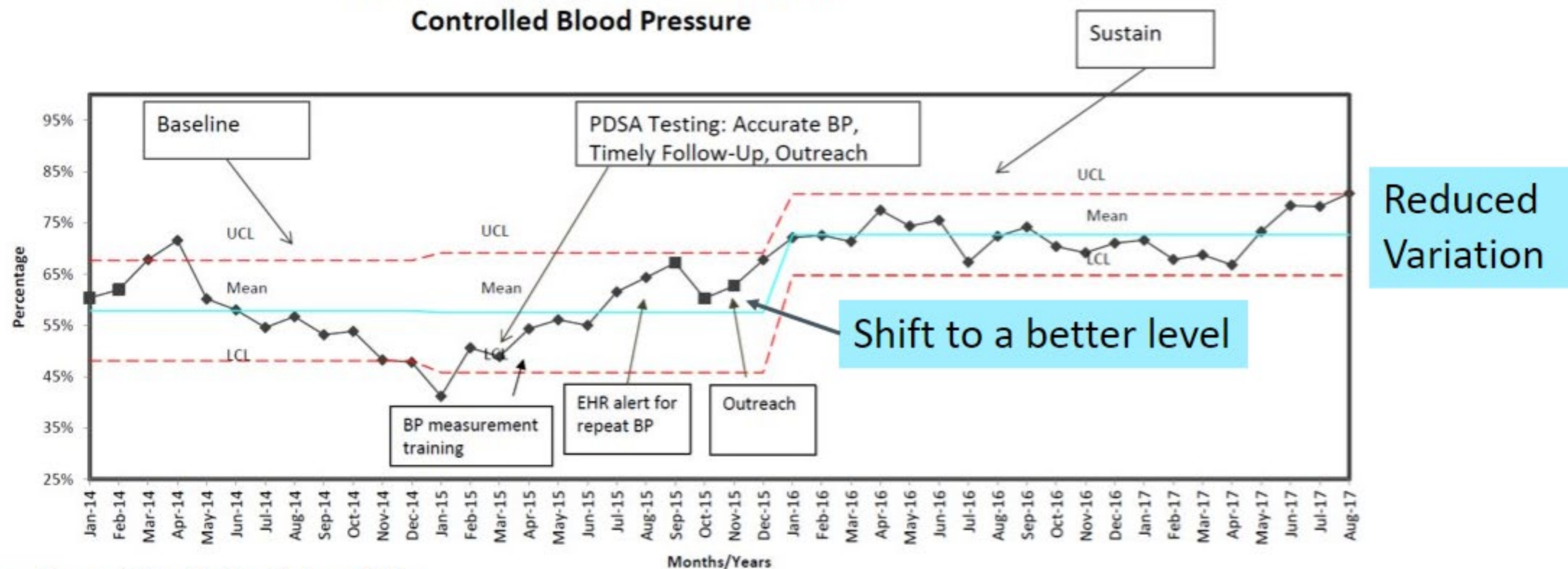
4. What can a control chart show me that a run chart doesn't?



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



Percentage of Hypertensive Patients with Controlled Blood Pressure



Source: Metro Health, Cincinnati Ohio

What other
important things
might I need to
know about
data?



JAT

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



Lead and Lag Measures

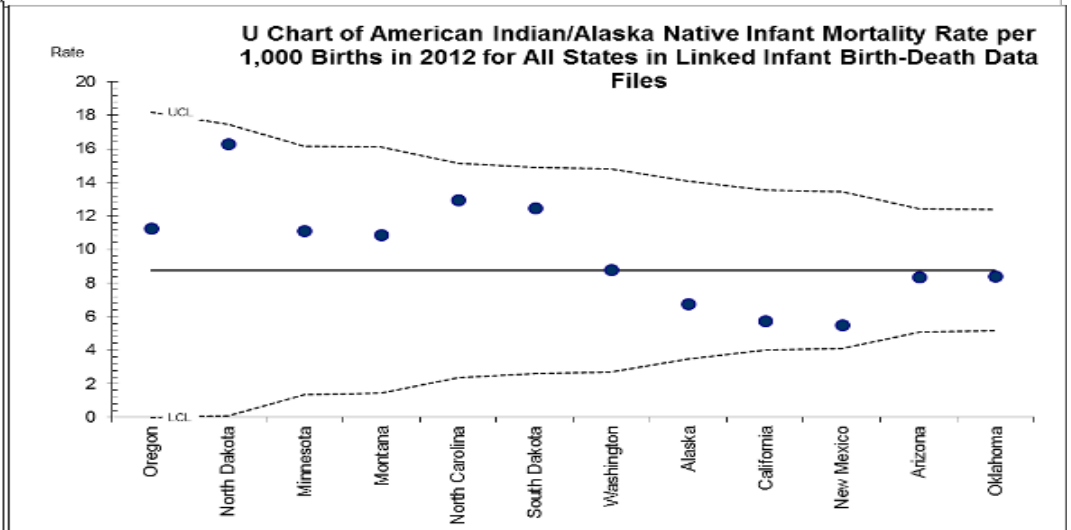
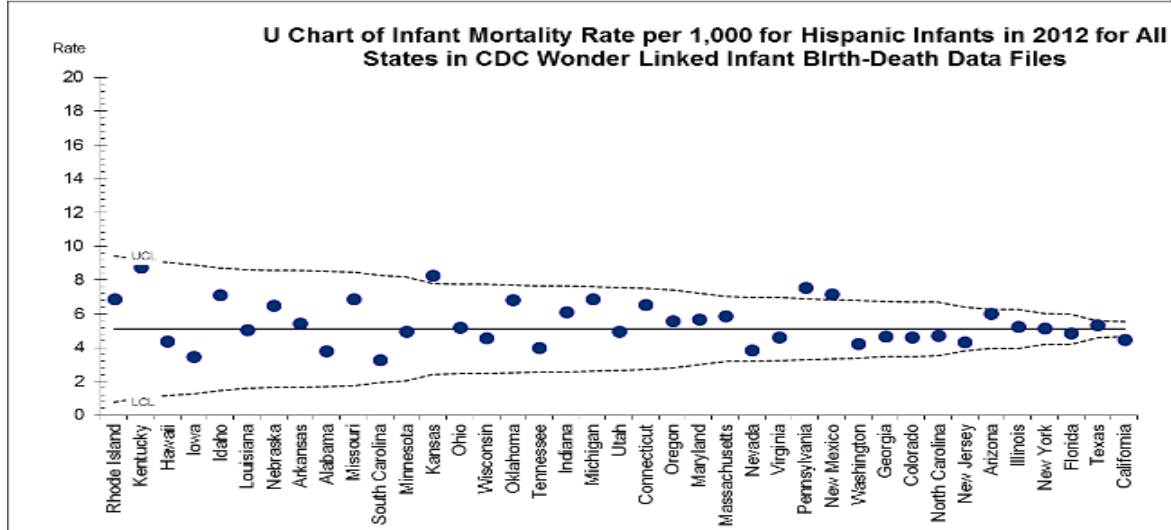
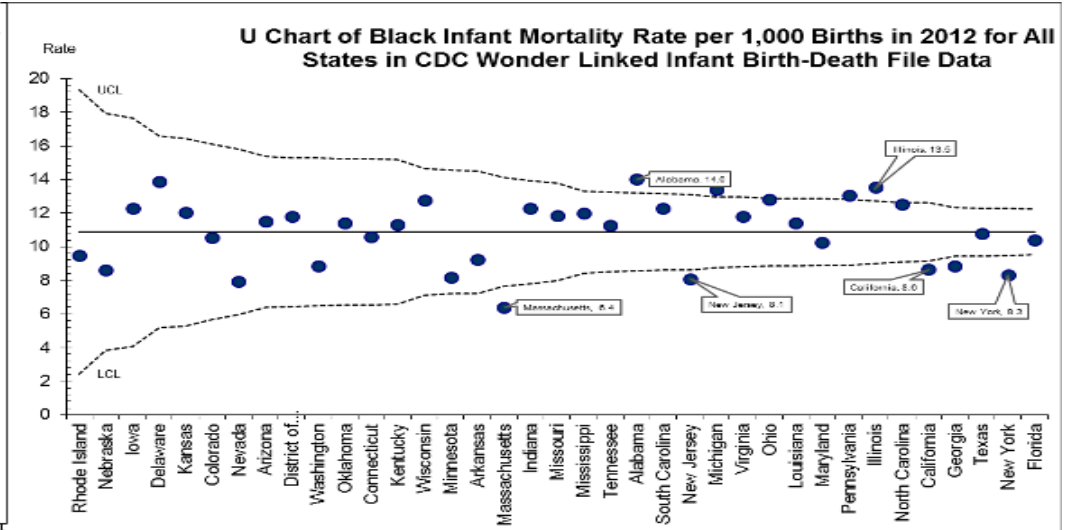
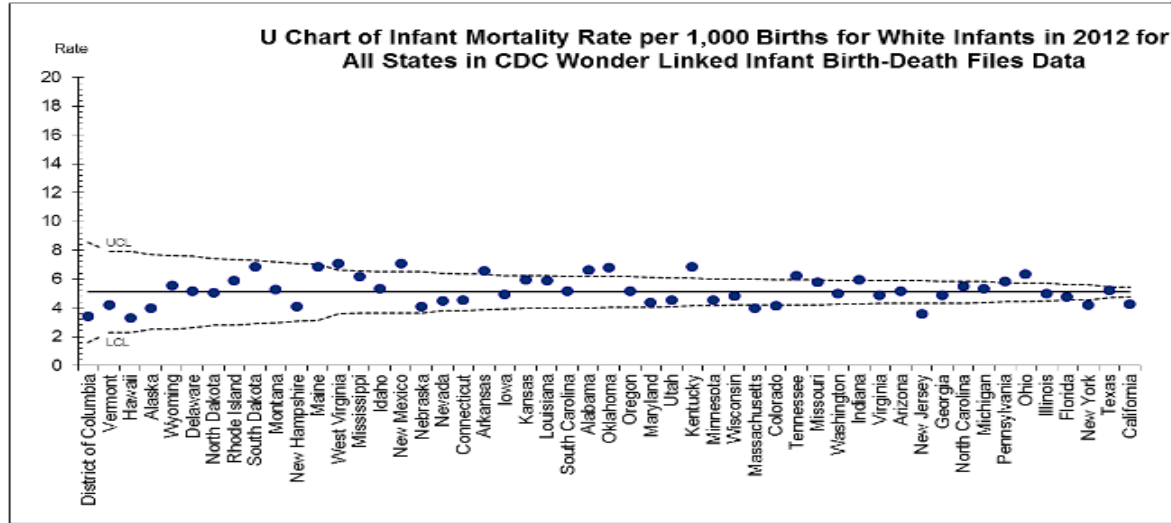
	Lag	Lead
Purpose	Reflect what we want to improve Mortality and Morbidity data	Reflect key processes and changes that contribute to achieving the aim of a related lag measure % of those with HTN with BP cuff @d/c
Responsiveness	Time delay between tests of change and the desired improvement	Provide earlier 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

Stratification by race

Example from infant mortality data



More than 20% of data points at 0 or 100%?

- Time [days, hours, minutes] between
- Number between (e.g., cases, patients, units, visits etc.)
 - Both use the same set of run chart rules
 - UP is the direction of goodness



Industry uses them a lot!

- Most are familiar with the time between measures ...



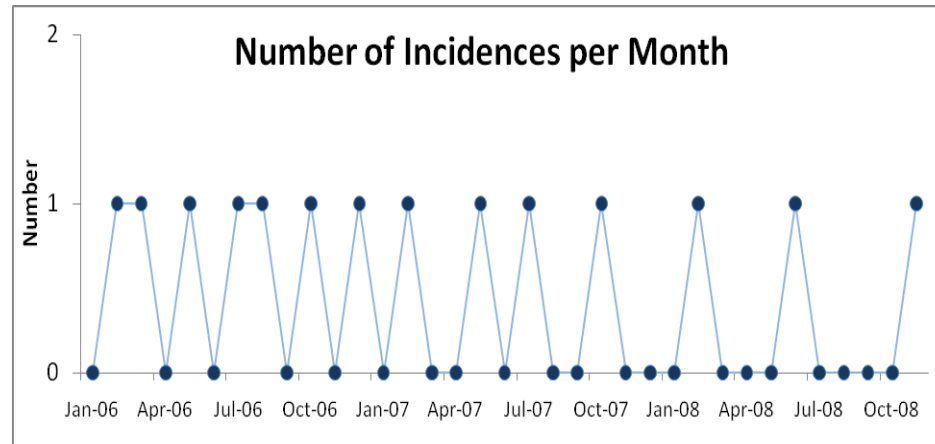
Plotting Rare Events (over 20% of data are at zero)

- Can result in too many zeros to make run chart useful
- Makes interpretation difficult and chart of little value for learning
- Useful alternative is to chart time or cases ***between*** undesirable events
 - Up is always good for these charts

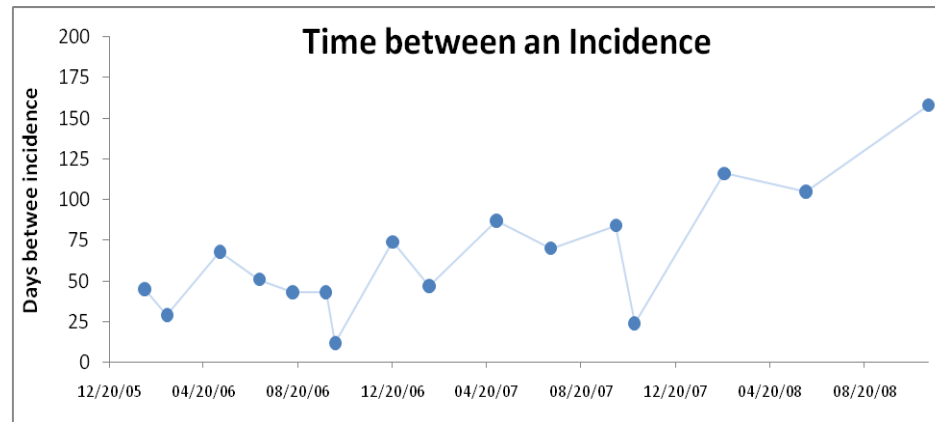
Time or Number Between Rare Events

- A time (or number) between measure is an alternative to a standard run chart when the incident of interest is relatively rare and a measurement of time (or number) between each occurrence of the incident can be obtained.
- The time (or number) between run chart allows the evaluation of each incident to be evaluated as it occurs rather than having to wait to the end of a standard time period before the data point is plotted.

Time Between Rare Events



Instead of plotting the number of incidences each month, plot the time (or number of cases, patients, visits, etc) between incidences.



Plot a point each time an incidence occurs

Cases Between Rare Events

FIGURE 3.28 Run Chart Resulting in Too Many Zeros

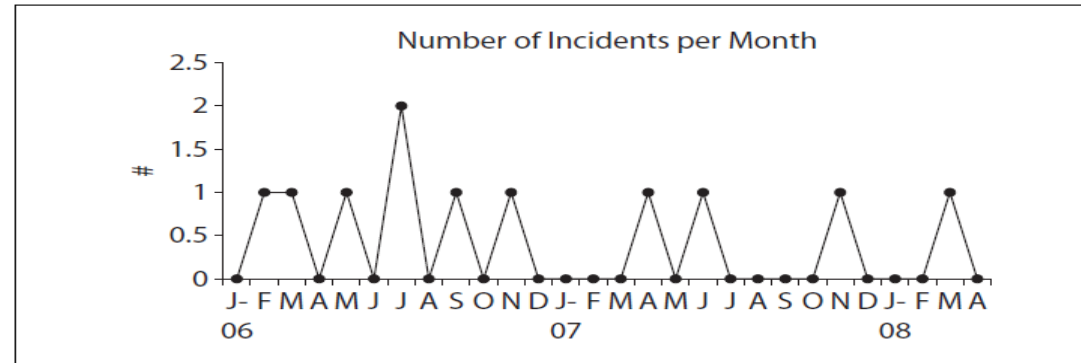
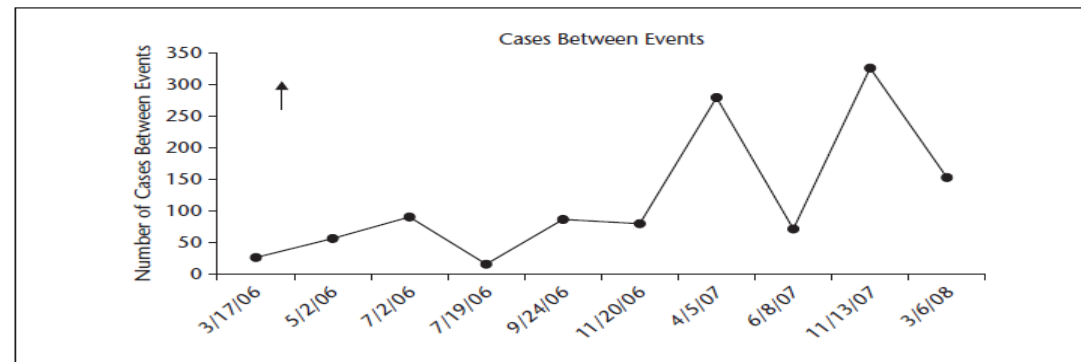


FIGURE 3.29 Run Chart of Cases Between Undesirable Events



A photograph of a person with long hair, wearing a brown jacket and dark pants, jumping over a dark, jagged rock formation. The person is captured mid-air with arms and legs spread wide. A large, white, stylized silhouette of the person's jumping pose is overlaid on the right side of the image, extending from the top left towards the center. The background is a clear, light blue sky.

Leaving in Action

- Practice developing a family of measures for a personal or work improvement project (or review an existing set for usefulness)
- Practice putting data in the run chart template (can be work related or personal data such as # steps/day)
- Practice applying the run chart rules to your run charts
- Based on the story in your data, what is the appropriate action?
- Upload anything you would like us to see and/or review to the Shared Folder!

Next Call & Office Hours

- Monday, May 1st, 2023 2:00-4:00 pm EDT
 - Qualitative Data
 - Holding the Gains
 - Sustaining Improvement and Cohort Learning



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](#)



Thank you!

We are improvers at heart.

We want to hear and learn from your experiences during these sessions.

Please take a moment to complete the brief evaluation before signing off!



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