The Money is in your Mea$ures- Measures for QI

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With credit and appreciation to:

Ann Lefebvre MSW, CPHQ

Objectives

- Identify at least 3 types of measures for QI.

- Describe the use of run charts and control charts in QI.

"In God we trust, all others must bring data."
W. Edwards Deming

"What if we don't change at all ... and something magical just happens?"

Test Q- Prior experience with data for either QI or research?

Yes **A**

No **B**

Things I know for sure…. *For sure*….

- Improvement = positive change… you cannot improve without changing something

- Data is necessary - You have to measure it to know it improved…

- You will **never** be satisfied with your data

- If you want to find something wrong with your data…… **YOU WILL**

- Part of your project will be improving the data collection

- This is **NOT** Research…. Consistent data is much more important than entirely, specifically, accurate data. But your data should be appropriate and good.

- We will need to revisit the above bullets again and again and again and…

Distinction: Data for Research vs QI

	Research Project	**Quality Improvement Project**
Purpose	To discover new knowledge	To bring new knowledge into daily practice
Tests	One large "blind" test	Many sequential, observable tests
Biases	Control for as many biases as possible	Stabilize the biases from test to test
Data	Gather as much data as possible "just in case"	Gather "just enough" data to learn and complete another cycle
Duration	Can take long periods of time to obtain results	"Small tests of significant changes" accelerates the rate of

http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementEstablishingMeasures.aspx

Types of Measures for QI

Outcome measures

Process measures

Balancing measures

Outcome Measures

- How does the change impact the patients or care provided? Which end-results will best represent success of your changes?

    - For diabetes: Average hemoglobin A1c level for population of patients with diabetes
    - For critical care: Intensive Care Unit (ICU) percent unadjusted mortality

    - For medication systems: Adverse drug events per 1,000 doses

    - BUT– these are all "BIG" outcomes– most projects do not start with this level of outcome measures

Outcome Measures

- How does the change impact the patients or care provided? Which end-results will best represent success of your changes?
  - Examples for projects of smaller scope- a <u>project</u> outcome can be improvement in a process (it depends on the specific aim):

    - What % of patients received notification of their lab results within two weeks?
    - By how many days was the wait time shortened for a visit?
    - For what % of visits did patients respond "satisfied" or "very satisfied" with the care received?

Process Measures:

Are the parts/steps in the system, project, or change attempt performing as planned? Are we on track in our efforts to improve the system?

- For diabetes: Percentage of patients whose hemoglobin A1c level was measured twice in the past year
- For critical care: Percent of patients with rounding completed on schedule.
- For conducting education: how many sessions were provided? How many staff attended?
- For a new protocol: Which steps were being done correctly?

Balancing Measures:

Are changes designed to improve one part of the system causing new problems in other parts of the system?

- For a chart reminder system: too many pop-ups and more ignored prompts
- For emphasis on colon cancer screening: drop in rates of other screening
- For increasing flu immunization: patient requests for vaccine exceeding supply resulting in having to return for extra visit

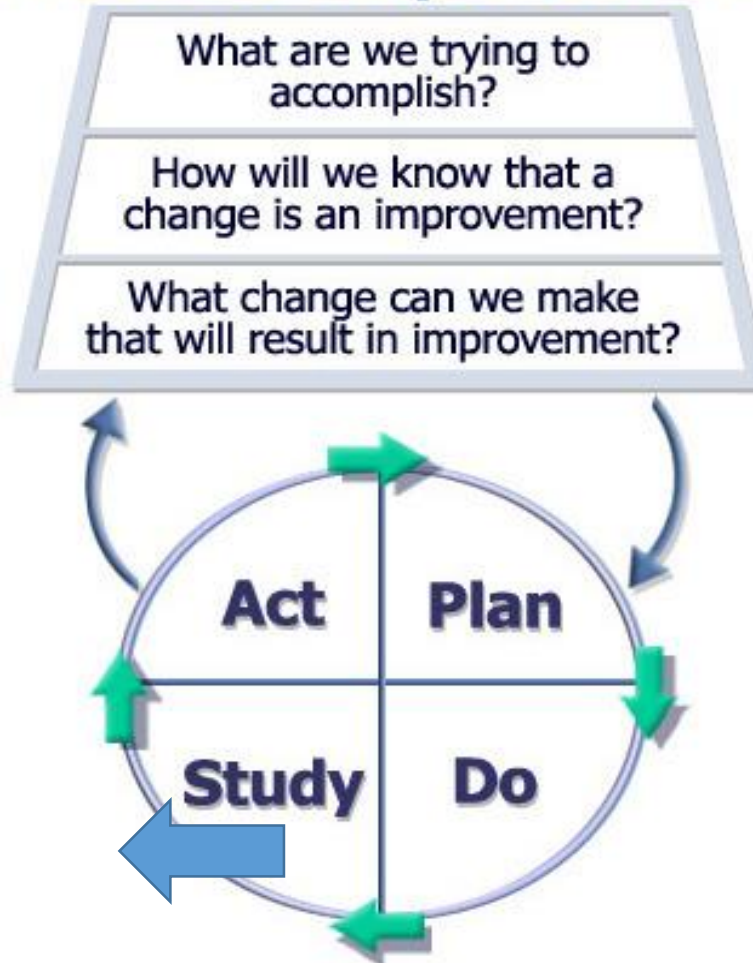# What type of measure(s) should be planned from the start of a QI project?
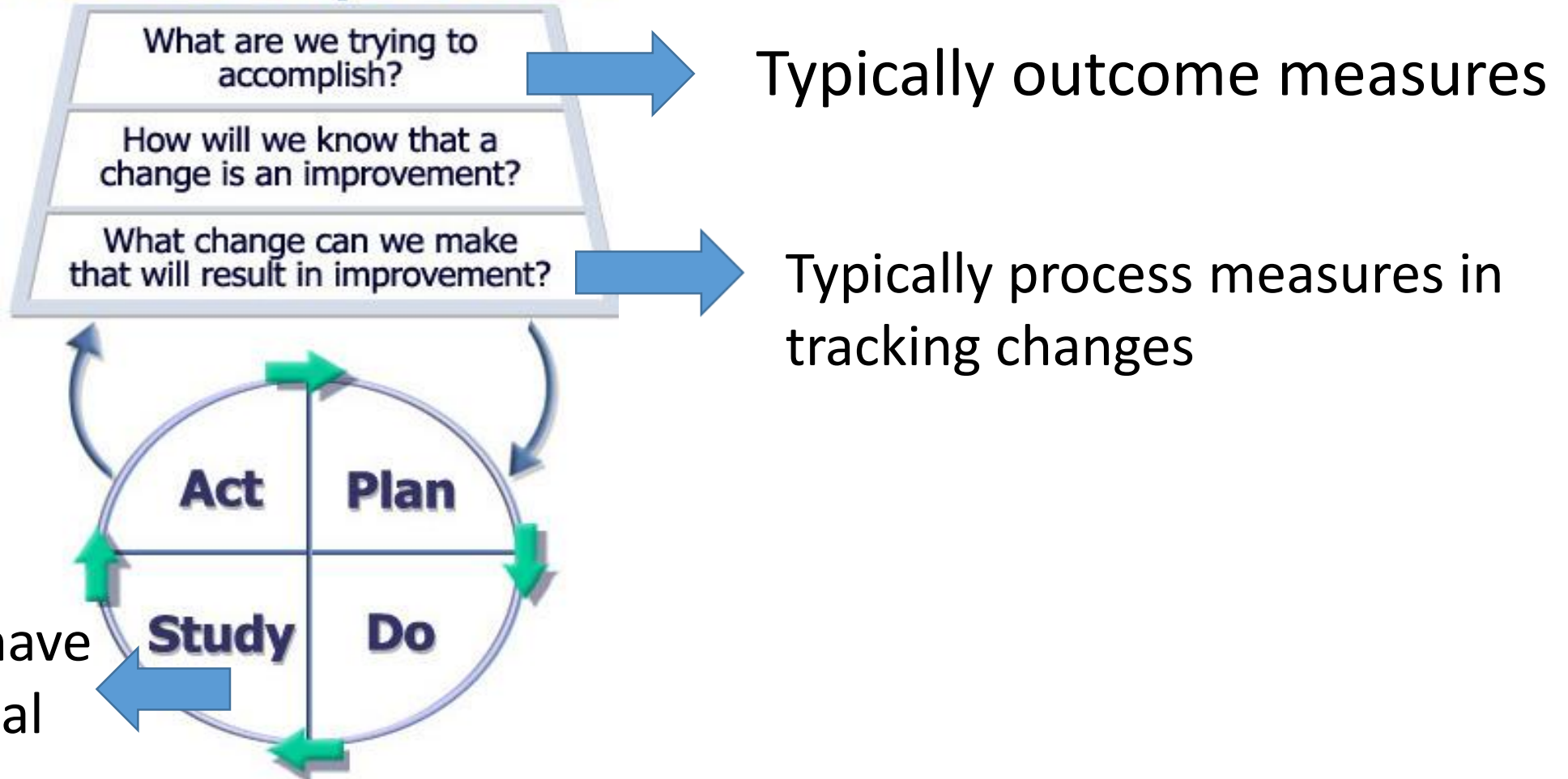
Outcome

Process

Balancing

All of the above

How will you know what data to use for your QI Project Measures?

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act | Plan

Study | Do

How will you know what data to use for your QI Project Measures?

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Typically outcome measures

Typically process measures in tracking changes

Act | Plan

Study | Do

Does not have to be formal

Let's build a project....

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act | Plan
Study | Do
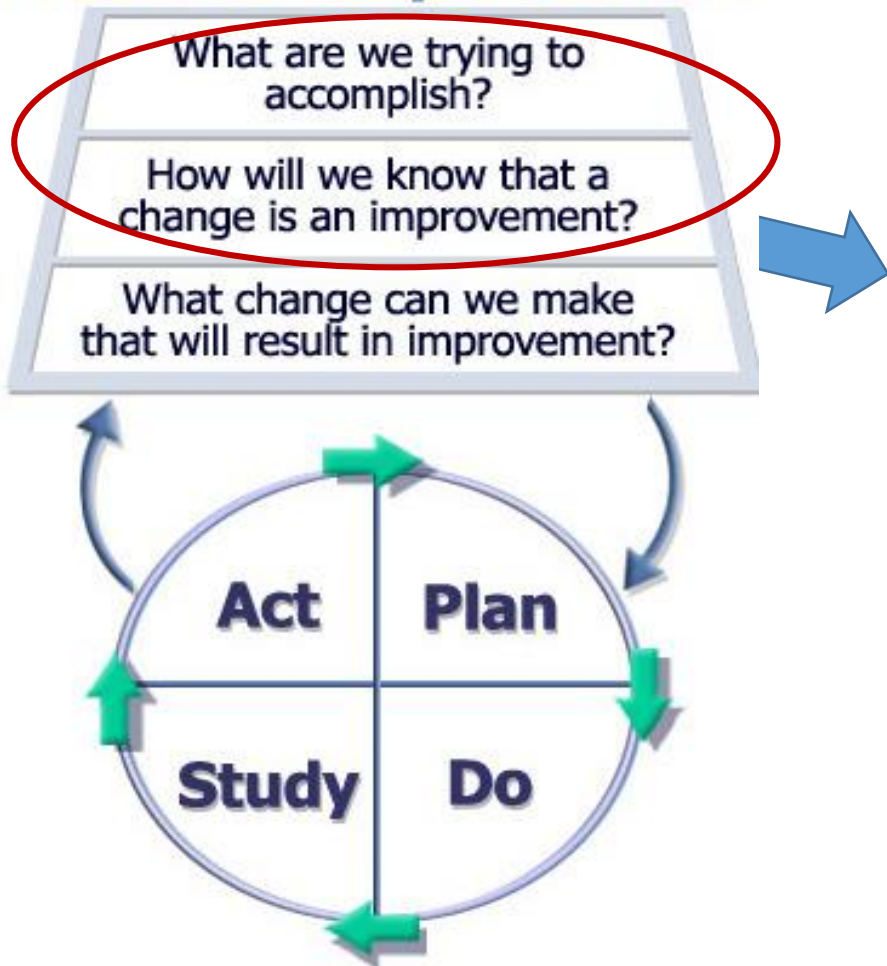
Intended Outcome
(AIM Statement)

Increase the percentage of patients aged 18 through 85 who had a dx of hypertension and whose blood pressure was adequately controlled (< 140/90 mmHg) by 10 % within the next 12 months.
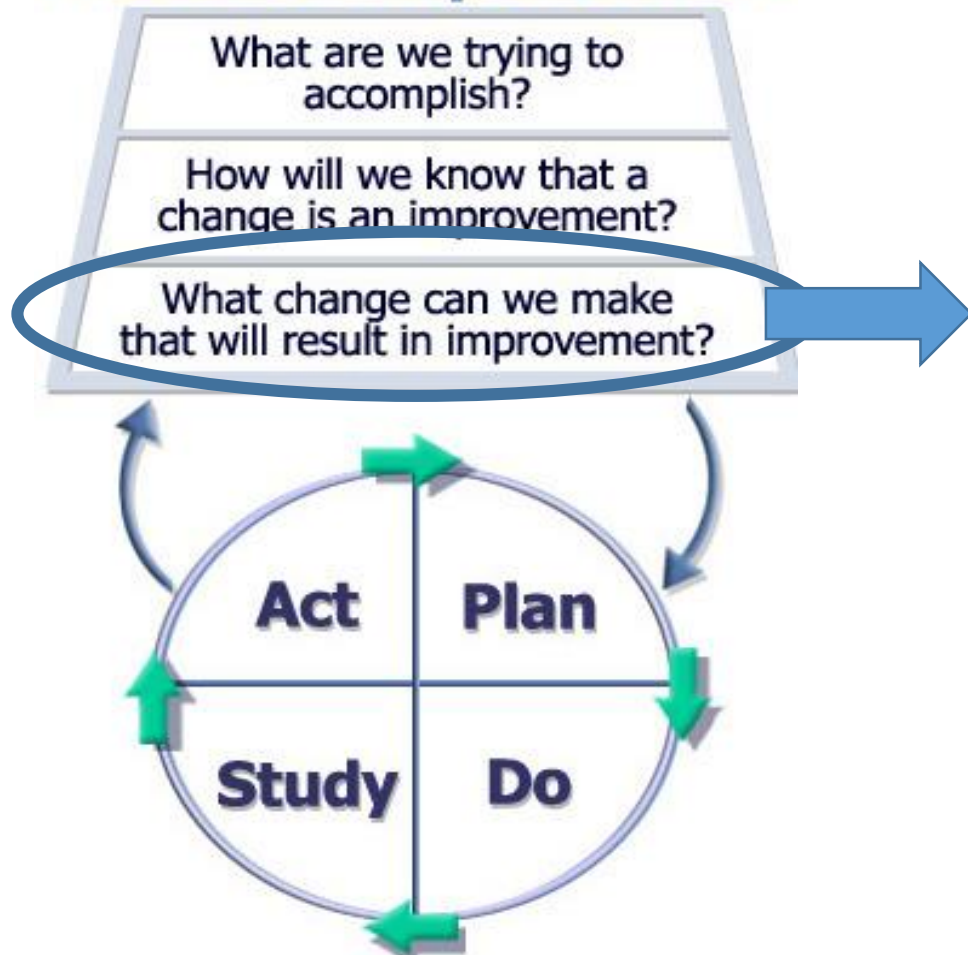
The measure is: % patients with BP controlled
Numerator: # with BP < 140/90
Denominator: total # pts with dx of Htn

Project: Increase % of pts with Htn in control

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act | Plan

Study | Do

- What do we want to target in our practice that will improve Htn control?

- What processes impact this outcome?

- Hunches and ideas are welcome from everyone!
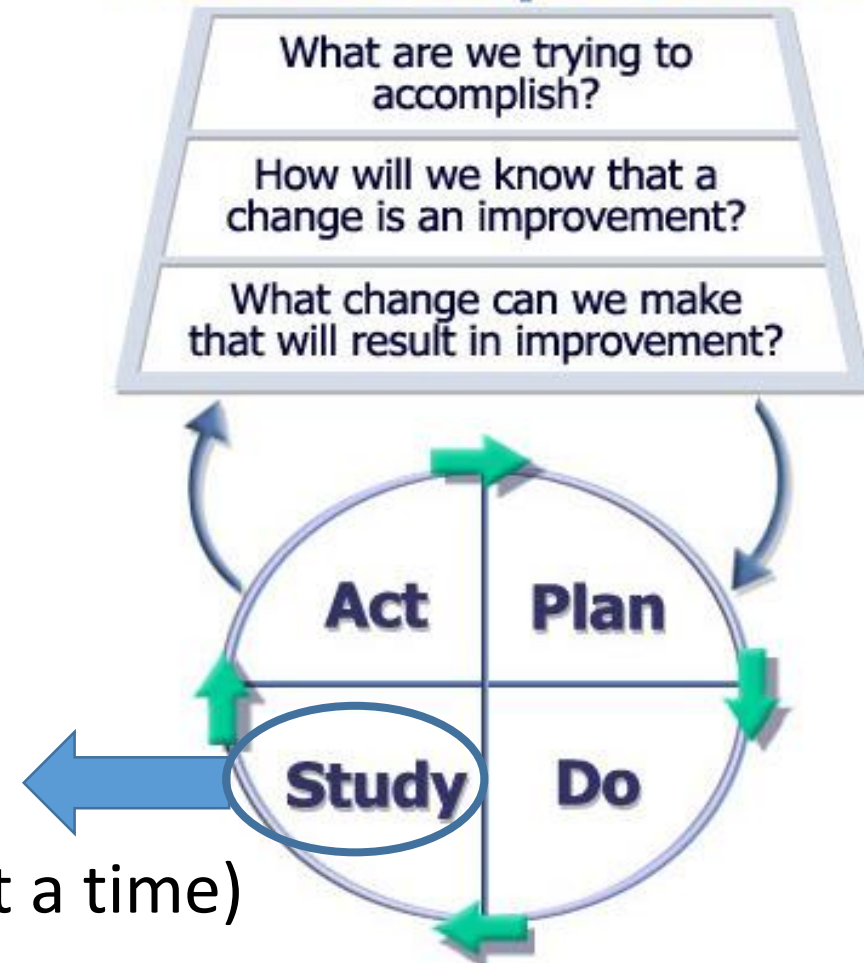
Project: Increase % of pts in HTN Control

Once it is decided what change we
will try first-

What data are needed to know if
the idea in this PDSA might be working?

Often this will be informal,
back of the envelope data……
Quick and accessible are key
(can proceed with more than one PDSA at a time)

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act | Plan

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Building Your Outcome Measures:

Take time to define your measures

- What <u>specifically</u> will best tell you if the change is resulting in an improvement?
- Where can you get this information?
- Which patients or charts will be included?
- How will the data be obtained? By whom? When? How often?
- If the measure is a frequency- what is the time period for collection?
- If the measure is a %- what are the criteria for inclusion in the denominator and the numerator? Be specific!

- Suggestion: Use your team- Have someone else review the measures to see if they are clear, easily understandable, and make sense
- Revise over time as needed

Tips for Effective Measures:

- Plot data over time
- Seek usefulness, not perfection
- Use sampling
- Integrate measurement into the daily routine
- Use qualitative and quantitative measures

Which of the following is NOT important when designing a process measure?

It can be collected without a lot of time or expense

It can be collected for every patient that is relevant for the QI effort

All team members and stakeholders will understand how it relates to the QI effort

What type of measure(s) CANNOT be revised or added over the course of a QI project?
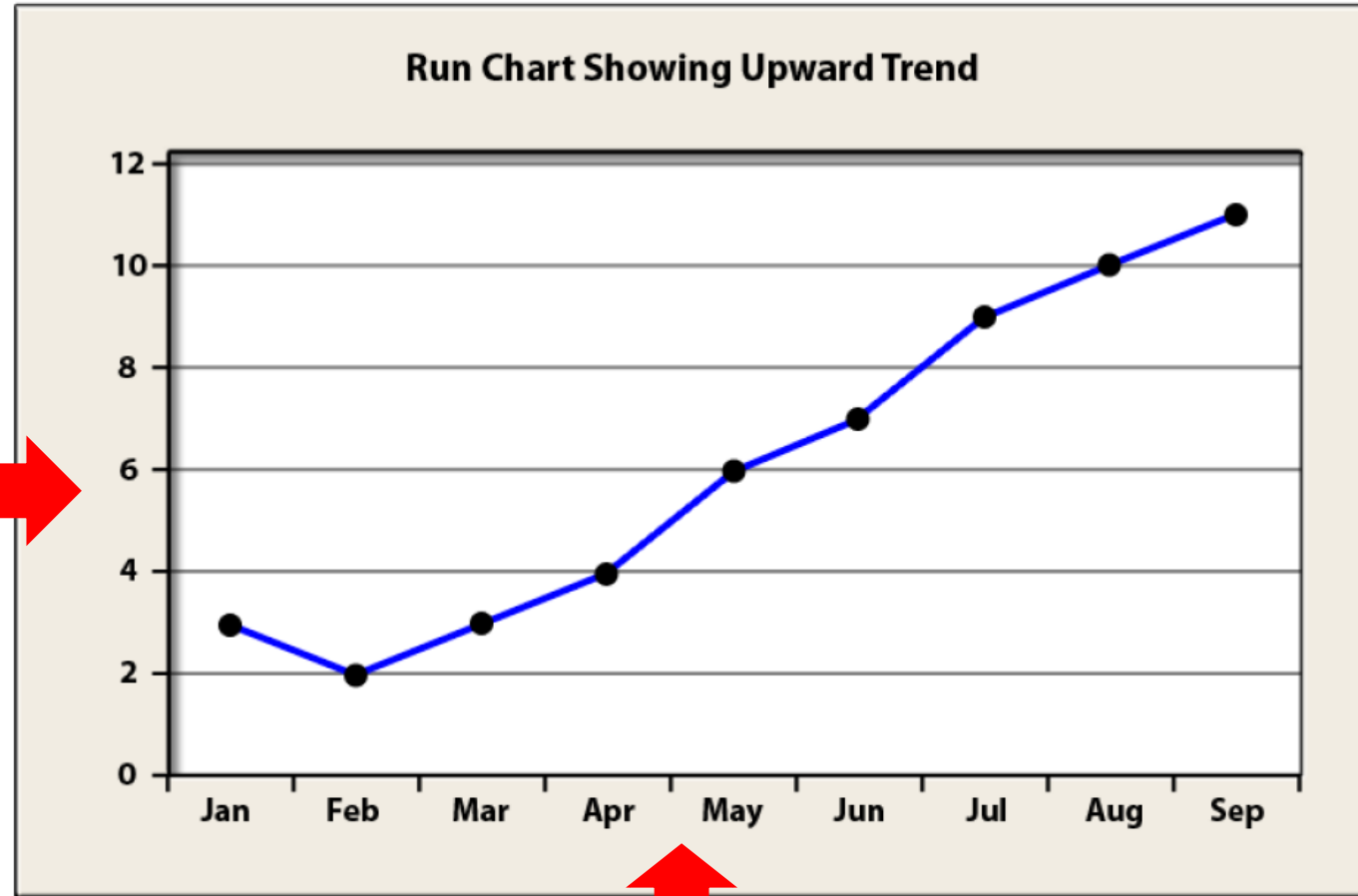
Outcome

Process

Balancing

None of the above

Questions about measures?

Two Common Tools for Displaying Data in QI:

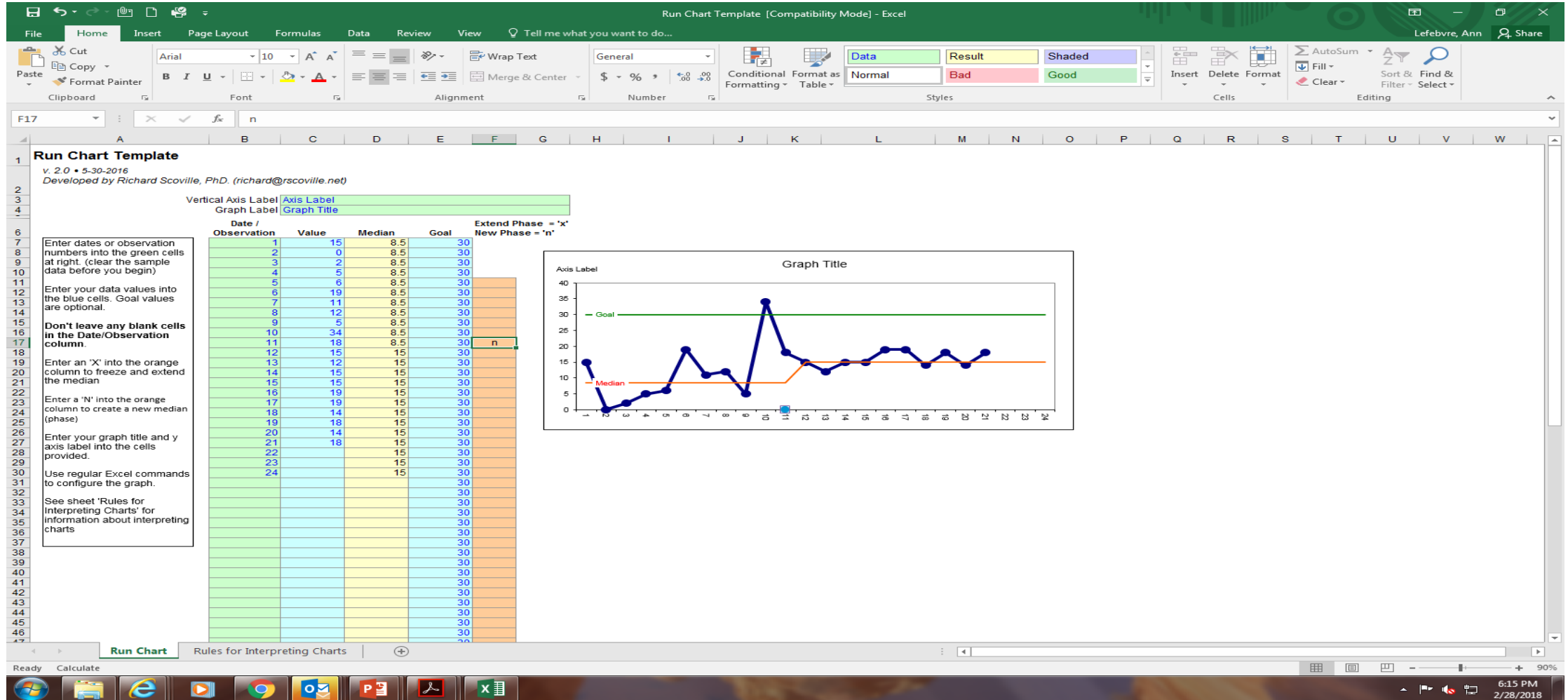- Run charts
- Annotated run charts
- Control charts

Run Chart Showing Upward Trend
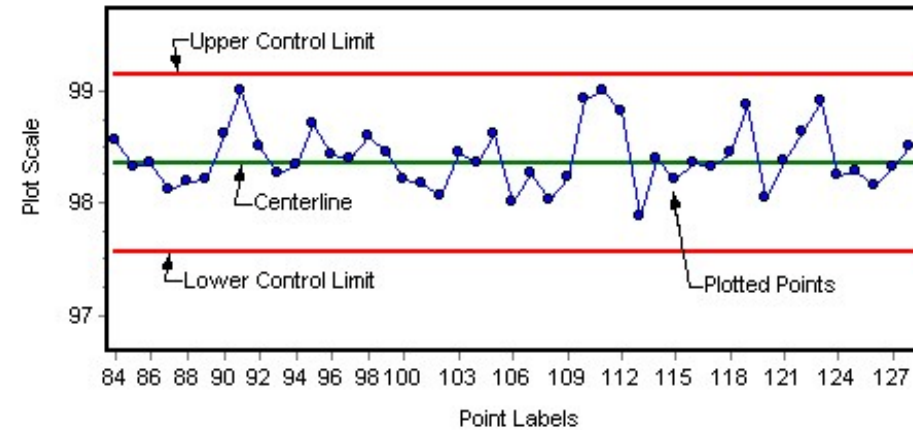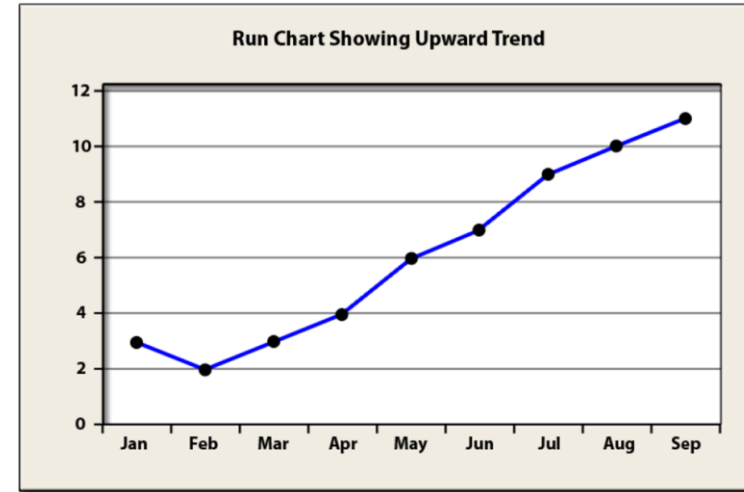
A Run chart is simply your outcome measure over time….
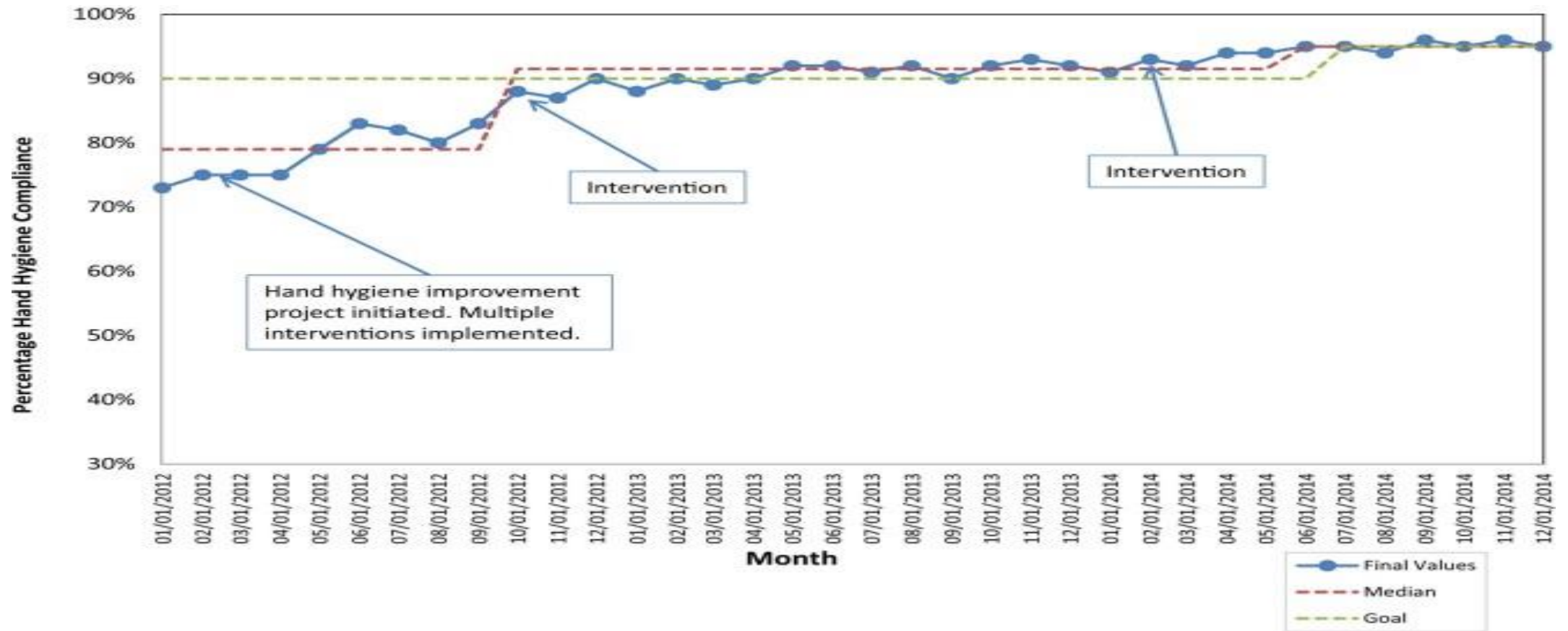

Run Chart Showing Upward Trend

Your measure of interest goes here on y-axis
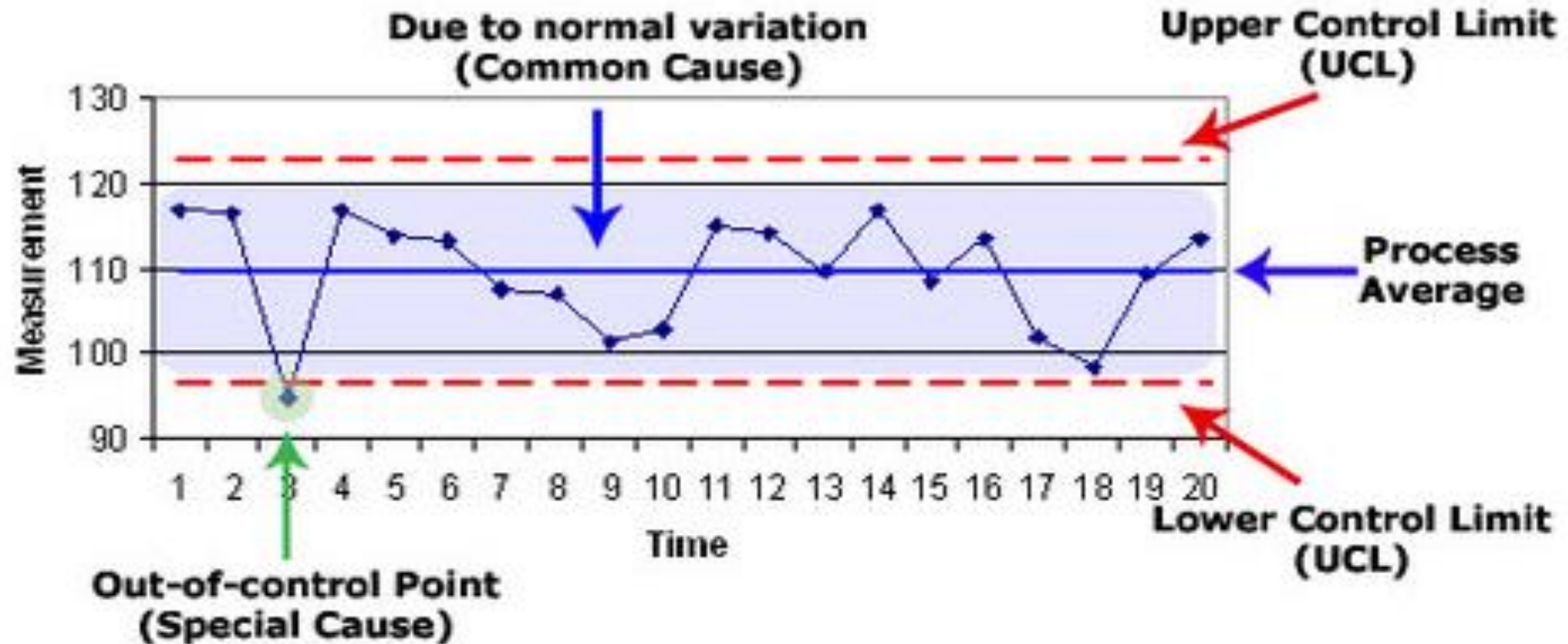
TIME goes here on x- axis

Excel can be used, and also IHI has a great run chart tool

Annotated Run Chart shows when you made a change/PDSA that could impact your data.

Control Charts include statistically calculated upper and lower control limits to indicate what you expect to be a normal process.

Run Chart vs. Control chart

Run Chart	Control Chart
Used to easily measure improvement	Used to monitor processes or quality control
Quick and easy, no statistical calculations	Statistical calculations (upper and lower control limits)
Compares to the median	Compares to the mean
Can be made with very few points of data	Needs at least 20 data points for stable mean

Common Cause vs. Special Cause Variation

Use of control charts helps to differentiate between the Common Causes and the Special Causes of Variation making the process of making changes and amends easier.
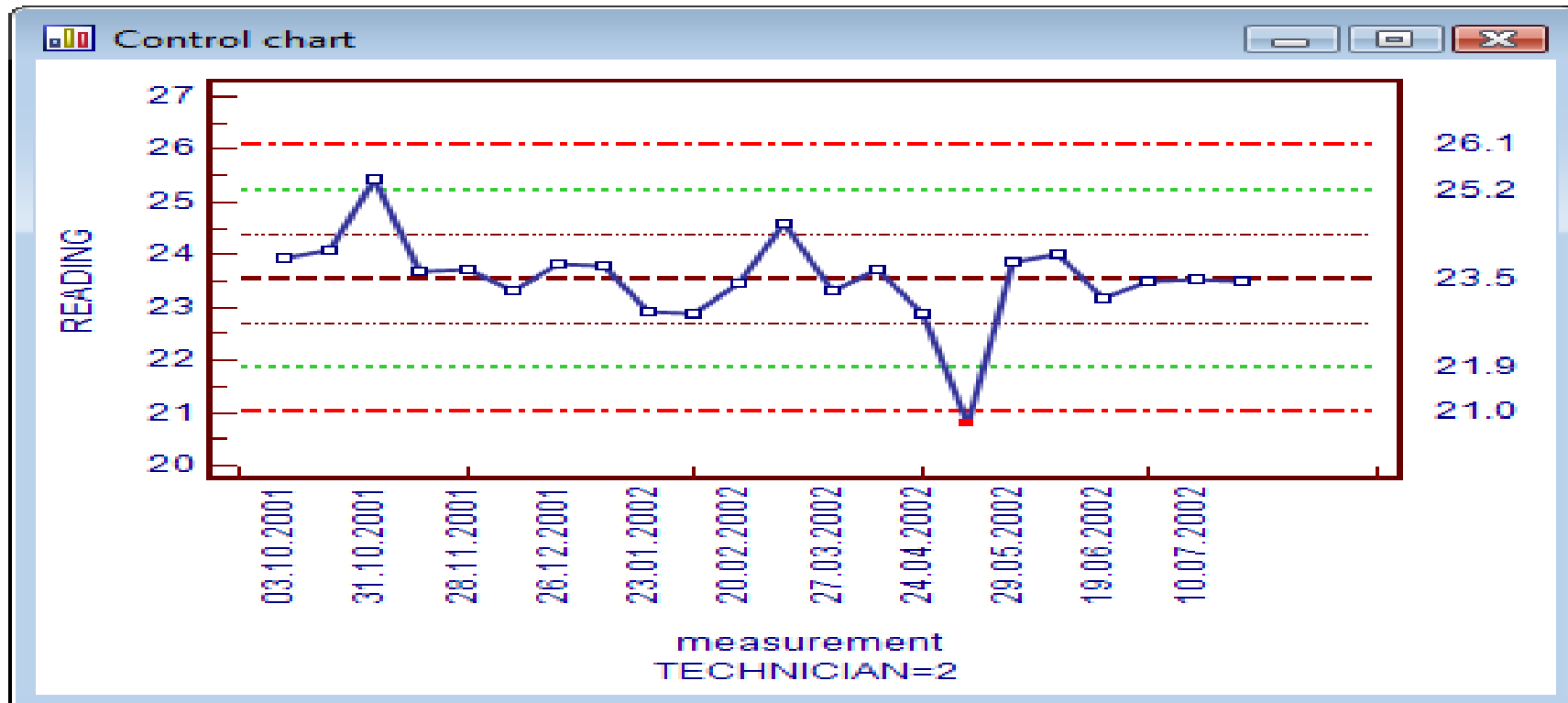
Trend vs. statistical significance

Run Chart Showing Upward Trend
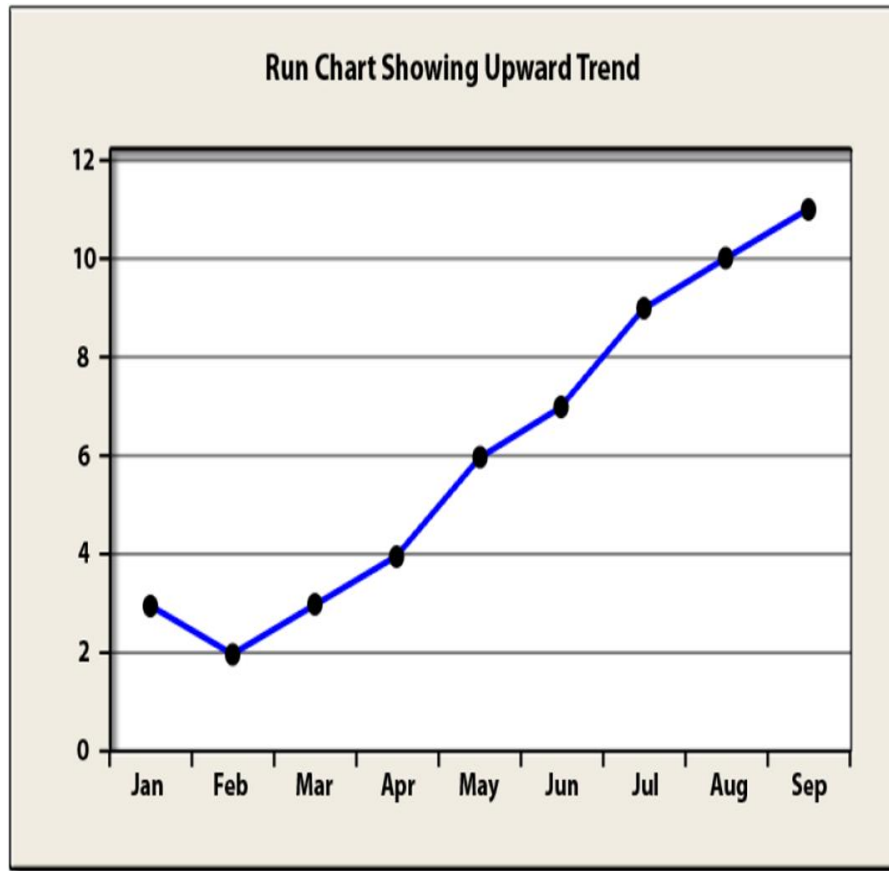
Important:

$$Pr(observation \mid hypothesis) \neq Pr(hypothesis \mid observation)$$

The probability of observing a result given that some hypothesis is true is *not equivalent* to the probability that a hypothesis is true given that some result has been observed.

Using the p-value as a "score" is committing an egregious logical error: **the transposed conditional fallacy.**
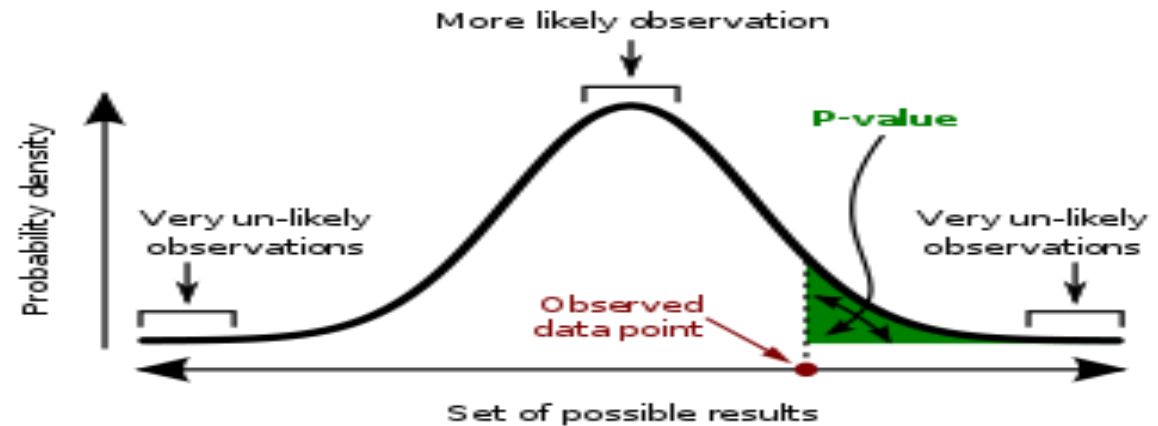
A **p-value** (shaded green area) is the probability of an observed (or more extreme) result assuming that the null hypothesis is true.

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- We will need to revisit the above bullets again and again and again and……

This is not research- but If you want to publish your work in QI...

- Consider if IRB review is needed- complete the checklist provided by the IRB

- Start with publication in mind

- Review the SQUIRE criteria

- Review the literature

- Be extra careful, and document, all your steps along the way- especially in defining your measures and collecting your data.

- Use your project team members and leaders, resources at Vidant, BSOM, etc.

In order to publish your QI project you have to be able to show statistical significance?

True

False

Why is the Money in your Mea$ures?

Because measures are
expensive

Because the institution
bottom line will depend on
your project measures

Because if you don't measure
it you can't prove it

Use your whole team. They are your best asset!!

Questions …. Discussion

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Tools and resources…

- Handout- guide for building your measures
- Comparison of data for research and QI
- Guide to statistical process controls
- The SQUIRE criteria; publications about publishing QI work
- Checklist from the IRB to distinguish QI from research projects
- Local QI leaders have lists of journals that focus on or publish QI work
- The IHI website

Sources used for presentation content

- TQA 3.0 presentation by Ann Lefebvre, MUSC, formerly at NC AHEC
- IHI website: http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementTipsforEffectiveMeasures.aspx