Pearls for Quality Improvement

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UVA HEALTH

Disclosures

I have nothing to disclose.

Objectives

- Define quality improvement in health care and how it relates to pharmacists
- Outline quality improvement tools and how pharmacists can use these tools
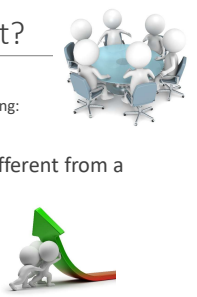- Identify strategies for pharmacists to use data for quality improvement

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What is Quality Improvement?

In small groups – take 5 minutes to consider the following:

"How is a quality improvement project different from a research project, or is it?"

Images: https://www.canstockphoto.com/

Quality Improvement (QI)– a definition

"Quality improvement (QI) consists of ***systematic* and *continuous*** actions that lead to <u>measurable</u> improvement in health care services and the health status of targeted patient groups"

Quality improvement (Revised)   Accessed 8/17/2022
Images: https://www.canstockphoto.com/

QI- definitions

"Improvement in patient outcomes, ***system performance***, and professional development that results from a ***combined, multidisciplinary approach*** in how change is delivered"

Batalden PB. Qual Saf Health Care 2007;16:2-3.

QI- definitions

"The delivery of healthcare with improved outcomes and lower cost through *continuous redesigning* of work and *processes and systems*"

Improving quality in the English NHS: A strategy for action.
King's Fund, 2016

QI - definitions

"To make a difference to patients by improving safety, effectiveness, and experience of care by using *understanding of our complex healthcare environment*, applying a *systematic approach*, and *designing testing*, and implementing changes using *real time measurement* for improvement".

Academy of Medical Royal Colleges. *Quality improvement - Training for better outcomes.*
AMRoC, 2016

Why is QI important for Oncology Pharmacists?

- Faulty system design and system performance are primary root causes for patient safety incidences
- Front line health care staff have intimate knowledge of these systems
- Best practices in system redesign depend on the involvement of front line health care workers

Institute of Medicine (IOM). (2001). *Crossing the quality chasm: A new health system for the 21st century.* National Academies Press. Institute of Medicine (IOM). (2010). *The future of nursing: Leading change, advancing health.* National Academies Press.

How do we find a solution to a problem?

Problem

Solution

Process

Data

ASCO Quality Training Program, 2020
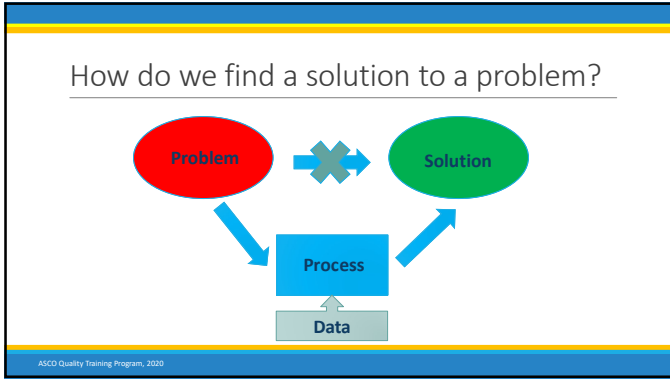
QI models

Care Model
◦ a system promoting high-quality disease and prevention management

Lean Model
◦ value from the customer (patient) point of view

Framework for improvement

Model for improvement (PDSA)
◦ Plan, Do, Study, Act – tests changes on a small scale

FADE
◦ Focus, analyze, develop, execute

Six Sigma
◦ DMAIC – define, measure ,analyze, improve, control
◦ DMADV – define, measure, analyze, design, verify

Monitor results of measures

Quality Improvement (five ways) Accessed 8/17/2022

Continuous Improvement

Images: https://www.canstockphoto.com/

QI tools and data

Process maps

Cause and effect diagrams

Pareto charts

Priority matrix

Statistical process control charts

## QI tools/data are different from research

Research	Quality
•Aim to generate new knowledge via a structured protocol	•Aim to improve a patient-care or health-care **process**
•Fixed hypothesis is tested	•**Hypothesis is flexible**, changes with learning
•Test is blinded or controlled	•Test is **observable**
•Designed to eliminate bias	•**Accept** consistent bias
•May collect "just in case data"	•**Small sequential** samples (collect just enough)
•Strategy is a single test	•Strategy is to conduct **sequential tests**
•Data analysis – statistical tests for significant differences	•Data analysis – **control charts to measure** QI metrics

Al-Surimi K. Glob J Qual Saf Healthc 2018;1:25-7

Understand the process

•Break downs in the process are often responsible for errors or inefficiencies, not individuals

•If you want to improve the process, first you need to understand it

•Understand what is actually happening (not just what is supposed to be happening)

Process Map

Green = "value add." Yellow = "value enabling." Red = "waste."
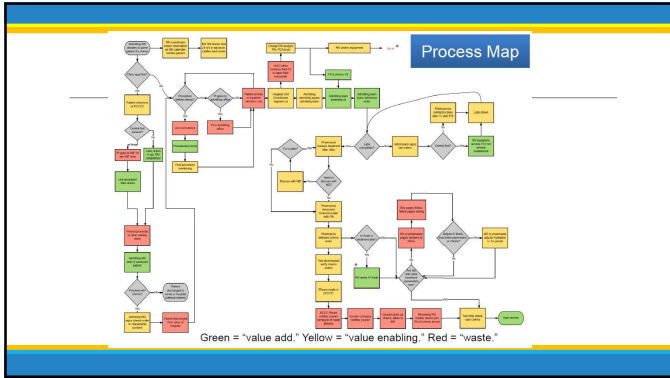
Data

What is Data?   Data = Information

Measurements

Pass/Fail

Counts

Quantitative vs Qualitative

very satisfied
satisfied
neutral
dissatisfied
very dissatisfied

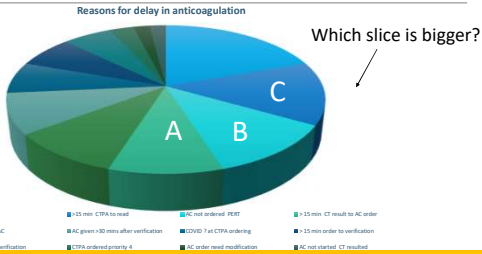Images: https://www.canstockphoto.com/

Collecting data

- Get just enough to **learn**
- Use **systems in place** if possible
- **Why** do we want data?
  - Understand variation in the process
  - Monitor process over time
  - Observe the effects of change
  - Provide a common reference point
  - Provide an accurate basis for prediction

Displaying Data

◦ Enables analysis that builds knowledge
◦ Helps to tell a story
◦ Summary statistics are static (they don't paint a picture of the variation)

No pie for me, thank you

Reasons for delay in anticoagulation

Which slice is bigger?

- AC not STAT
- >15 min CTPA to read
- AC not ordered PERT
- > 15 min CT result to AC order
- Heparin gtt for AC
- AC given >30 mins after verification
- COVID ? at CTPA ordering
- > 15 min order to verification
- No wt at order verification
- CTPA ordered priority 4
- AC order need modification
- AC not started CT resulted

Pareto charts

Frequency of reasons / Categories / Cumulative contribution

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.

Examples of variation in data

The Average:

Does it tell the whole story about your data set?

Variation

Most processes have some kind of variation
◦ Common cause – natural variation
◦ Special cause variation – unnatural variation – events changes or special circumstances

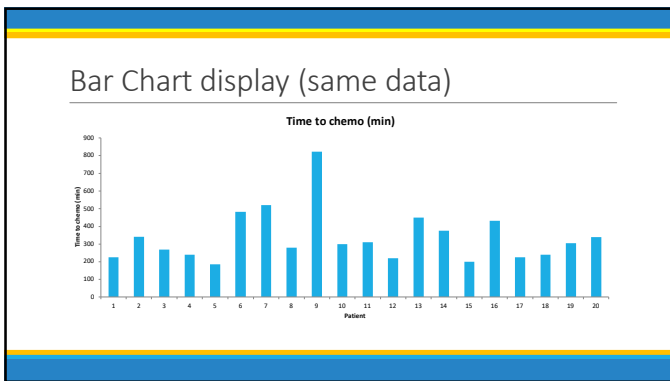Two kinds of mistakes
◦ Ascribe a variation as special cause when it is common cause
◦ Ascribe a variation as common cause when it is special cause

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.

Table display, Time to Chemo data

Patient	Time to chemo (min)	Patient	Time to chemo (min)
1	226	11	310
2	342	12	220
3	268	13	450
4	240	14	375
5	185	15	200
6	482	16	431
7	520	17	225
8	280	18	240
9	823	19	305
10	300	20	340

Bar Chart display (same data)

Time to chemo (min)

Run charts (same data)

Display data over time – chronological order

Examine the variation

Time to chemo (min) - Run Chart

CL = 338
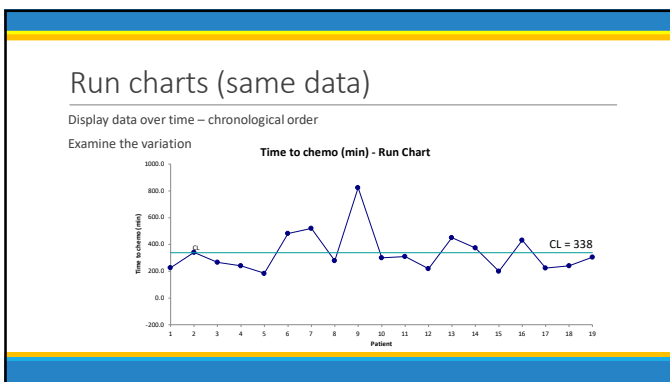
Statistical Process Control (SPC) charts

Also referred to as Shewhart charts

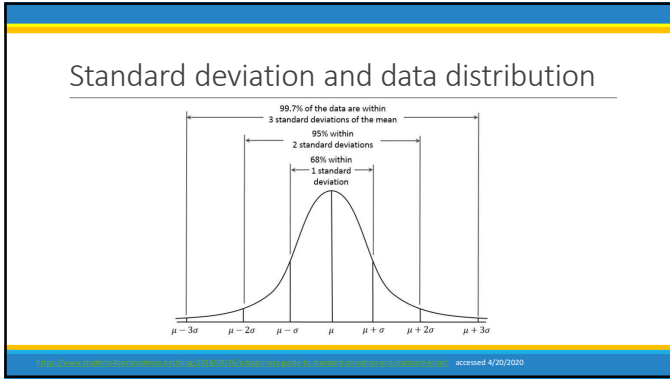A branch of statistics that combines
◦ Time series analysis statistical methods
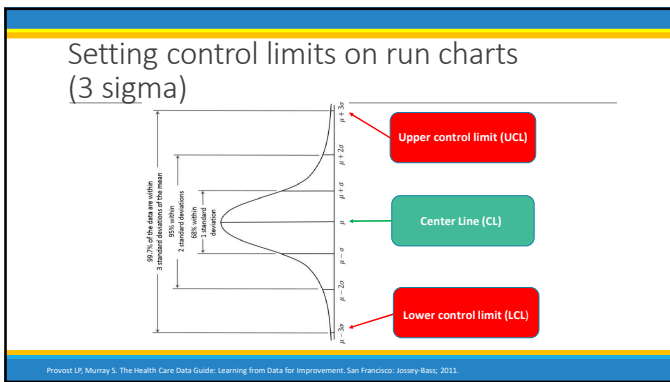◦ Graphical presentation

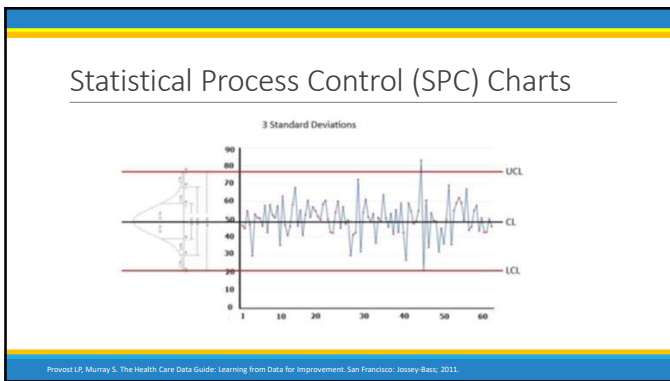Yield faster insights into process improvement efforts

Detects process changes and trends earlier

Enables **non-statisticians** to understand complicated statistical analysis!!

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.

Standard deviation and data distribution

99.7% of the data are within
3 standard deviations of the mean
95% within
2 standard deviations
68% within
1 standard
deviation

$\mu - 3\sigma$ $\mu - 2\sigma$ $\mu - \sigma$ μ $\mu + \sigma$ $\mu + 2\sigma$ $\mu + 3\sigma$

accessed 4/20/2020

Setting control limits on run charts (3 sigma)

Upper control limit (UCL)

Center Line (CL)

Lower control limit (LCL)

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.

Statistical Process Control (SPC) Charts

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.

SPC Chart

Time to chemo (min) - X Chart
3 sigma

Special Cause Variation

UCL 764.5

CL = 338

LCL 0.0

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.

SPC to interpret data – post intervention

Time to chemo (min) - X Chart
3 sigma

UCL 764.5

CL = 338

450.2

CL = 274.9

LCL 0.0 0.0

Interpreting SPC data

Rules for determining special Cause
- Outlier - Single point outside control limits
- Shift – a run of 8 or more points above or below centerline
- Trend – six or more consecutive points above or below center line
- Two out of three consecutive points near a control limit (outer 1/3)
- 15 consecutive points close to center line (inner 1/3)
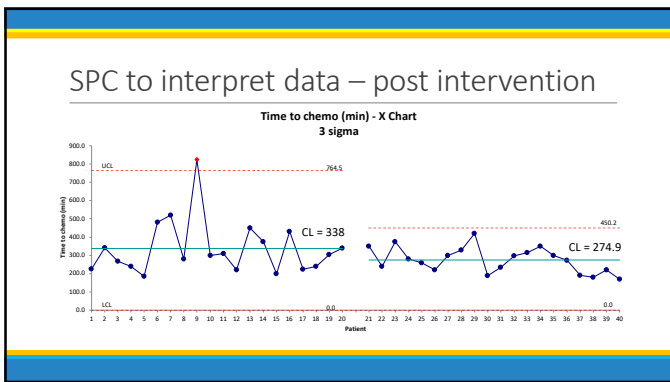
UCL 368.2

CL 276.5

LCL 184.8

Provost LP, Murray S. The Health Care Data Guide: Learning from Data for Improvement. San Francisco: Jossey-Bass; 2011.
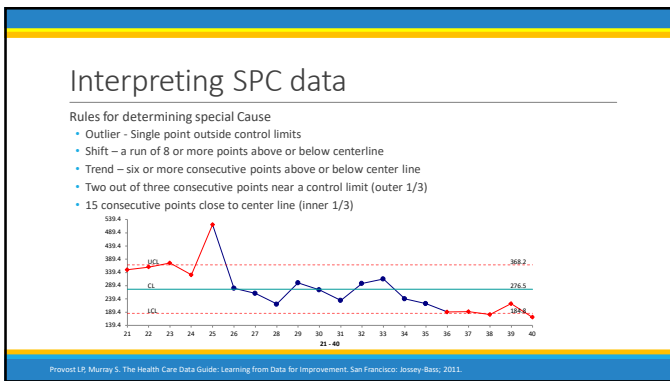
Problem/Aim statements

Understanding your process and data, allows you to define the problem and set your Aim.

Problem Statement: 5 W's	AIM statement: Make it SMART
Who is this happening to?	Specific
What is happening (or not happening)?	Measureable
Where is this happening?	Achievable
When- over what time frame did we observe?	Relevant
Why is this a problem for patient care?	Time bound

Microsoft Word - Worksheet for 5s propdef_2016_072_74.docx (liberatingstructures.org)   Accessed 8/28/22
p21692_aim_statement_worksheet-1.pdf

Problem/Aim examples

Problem:

From January to June 2017, patients admitted to the inpatient oncology unit for planned chemotherapy at University Hospital experienced a **338** minute delay from admission to administration of chemotherapy. Delays lead to increased length of stay and a decrease in patient satisfaction.

Aim:

We aim to decrease the time to chemotherapy start for patients admitted to the inpatient oncology unit for planned chemotherapy at University Hospital to **270** minutes by January 2018 to potentially decrease length of stay and improve patient satisfaction.

SPC to interpret data – post intervention
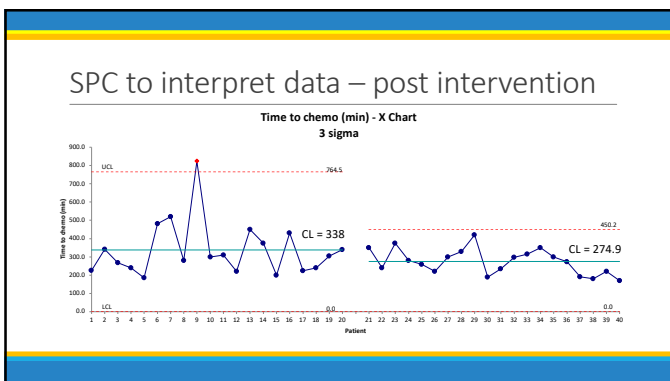
Starting the QI journey

SKILLS!
- Enthusiasm
- Optimism
- Curiosity
- Perseverance
- Collaboration (teams)
- Understanding of systems
- Understanding of measurement for the improvement model

GETTING STARTED!
- Find a mentor or coach
- Recruit the team
- Work the QI process
  - Understand the problem
  - Diagnose
  - Brain storm
  - Develop an intervention and implement
  - Did you achieve the result you wanted?
  - What changes should be made?

Jones B, Vaux E. BMJ 2019; k5408
Images: https://www.canstockphoto.com/

Audience response #1

Common themes included in definitions of Quality Improvement include which of the following:

A. Measurements to assess change
B. Continuous redesign
C. Evaluating processes and systems
D. All of the above are common to QI definitions

Audience response #2

Which of the following statements are true about models for quality improvement:

A. The focus is on small incremental changes
B. A single hypothesis is tested in a controlled manner to see if quality improves
C. Summary statistics that are static are crucial for demonstrating significant improvement over the standard of care
D. Data is displayed in a dynamic manner to illustrate the variation in data and change over time
E. A & D
F. B & D

Audience response #3

Statistical Process Control (SPC) charts are valuable for displaying QI data because:

A. They indicate if your improvement meets statistical significance

B. They display data over time to observe variation in the data set

C. You need a statistician with proper training on your team and that will facilitate the team's decision making

D. Rules can be applied to determine if the observed variation is due to special cause or common cause

E. A & C

F. B & D

Conclusions

Quality Improvement is defined by a dynamic process of making small, incremental, measurable changes designed to improve systems or processes.

QI tools are designed to measure and monitor the system over time and to facilitate designing, testing, and implementing changes using real time measurement for improvement.

QI data differs from research. QI Data is displayed in a manner that assists with analysis and the observation of the effects of change over time.

Oncology pharmacists are uniquely positioned as front line team members to play a valuable role in improving care and outcomes for our patients.

Images: https://www.canstockphoto.com/

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