TH12- Unleash the Power of Performance Improvement in Your Facility by Stopping the Madness of Data Insanity

Thursday, March 22
1:30 PM - 5:00 PM

Session Description

Never before have PA/LTC facilities been held more accountable or more scrutinized internally as well as publicly. Yet, many facilities have little or no experience in analyzing data. Using data to identify, and impact, areas of performance improvement is a major function of quality assurance and performance improved (QAPI) success. Unfortunately, staff get stuck wasting time, and money, comparing this month’s measures to numbers last month or last quarter, because they don’t know what to do differently. This session is going to be an eye-opening, no holds barred expose of what we are doing wrong with data and how to make it right. We will delve deeper into the data facets of QAPI using real facility examples to demonstrate how to use data for sustainable process improvement. This will be an interactive session with participation opportunities and clear guidance on strategies for change. It’s time we solve long-standing problems in our facilities for good, and for the greater good.

Learning Objectives

- Recognize the futility and unintended misleading effects of common analyses like bar graphs, trend lines, rankings, and benchmarking and more importantly, what to do differently.
- Demonstrate how process-oriented thinking is crucial to every improvement effort.
- Explain common cause and special cause variation, and how this knowledge will transform improvement efforts.
- Discuss how to choose the right improvement strategy based on the type of variation identified.

Presenter(s): Leonard Gelman, MD, CMD; Paige Hector, LMSW, MSW

Presenter(s) Disclosures: All speakers have reported they have no relevant financial relationships to disclose.
Unleash the Power of Process Improvement in Your Facility by Stopping the Madness of Data Insanity

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No Financial Disclosures to Report

Objectives

1. Recognize the futility and unintended misleading effects of common analyses like bar graphs, trend lines, rankings, and benchmarking and more importantly, what to do differently.
2. Demonstrate how process-oriented thinking is crucial to EVERY improvement effort.
3. Explain common cause and special cause variation, and how this knowledge will transform improvement efforts.
4. Learn how to choose the right improvement strategy based on the type of variation identified.
5. Employ a Pareto analysis.

Quality Improvement
What if we were to tell you that this was not medication error data but .................

Coin Flip Data

Quality Improvement

“It is easy but fatal in management to confuse coincidence with cause and effect.”

“The world is drowning in information but is slow in acquisition of knowledge.”

W. Edwards Deming

- DATA — tons of it
- INFORMATION — a lot
- KNOWLEDGE — some
- WISDOM — pretty rare

Why do we resist using data in planning and problem solving?

Traditionally taught math and statistics scare or bore people to death.

Too often there are plenty of data that are useless and ignored or useful and still ignored.

DEMING

What does quality mean?
How to achieve it?

American management have resorted to:
- mass assemblies for crash courses in statistical methods,
- employing hacks for teachers,
- being unable to discriminate between competence and ignorance.

The result is that hundreds of people are learning what is wrong.

If you learned that you were doing something wrong:

Would you stop?
Could you stop?
Statistical **Thinking**, A “New” Concept

A philosophy of learning and action based on the following fundamental principles:
- All work occurs in a system of interconnected processes,
- Variation exists in all processes, and
- Understanding and reducing variation are keys to success.

What is the Current State of Affairs in Nursing Homes?

- Change is happening quickly
- Demand for “accountability”
- Value Based Purchasing
- Frustration at high medical costs
- Revised Requirements of Participation
- “This outcry has resulted in a well-meaning tendency for performance goals to be imposed from external sources and for outcome data to be made public with increasing specificity.”
- Quality Assurance and Performance Improvement (QAPI)
- Merit-based Incentive Payment System (MIPS)
- Accountable Care Organizations
- Publicly reported tragedies

**Current Management**

Doing its best BUT “Simple...obvious...and wrong!”

- Crisis driven, knee-jerk reactions (*sometimes*)
- Whack-a-mole
- Acting on a perceived difference when none really exists OR
- Failing to detect a real change and taking no action
- Using (*alleged*) statistics: data tables, rankings, variances, arbitrary goals, “trends”
- No progress on results? Set TOUGHER goals!

**Just Keep Putting Out Fires...**

Just because you successfully put out the fire in the building doesn’t improve the building.
Are you DROWNING in data?
Continuous recording for administrative purposes
Continuous recording of administrative procedures

If you’re not careful, here’s what you’ve got...
Continuous Recording for Administrative Purposes
Continuous Recording of Administrative Procedures

Average Number of Deficiencies per Certified Nursing Facility (Kaiser Permanente)

...“Red...Yellow...Green...”

Abaqis

Falls: Past 12-months and Trend
Dec 2011
March 2012
Nov 2012
Above average
RCAs
Safety fair
Overall Trend
Bad trend
ZEROI
"Last year we done good. This year we gonna do better"

Chris Amaroso, MD

**How Many Meetings?**

- Senior management meeting time with data
  - 50% is WASTE
- Middle managers time to review unimportant performance data
  - 1 hour a day is WASTE
- Which produces pounds of published performance reports
  - 80% is WASTE
- Published monthly corporate financial reports
  - 80% is WASTE


**What You DON'T Want**

- "Vague" problems that generate
- "Vague" data which yield
- "Vague" questions and
- "Vague" solutions and
- "Vague" results

"When I die, let it be in a meeting; the change will be almost imperceptible."

Anonymous

**Vague, Vague, Vague...**

High incidence of residents with Urinary Tract Infections

- Management jumped to the conclusion that it must be a hand washing problem and inservice everyone
  - Hand washing is certainly important
  - Poor hand washing wasn’t the problem in this case
- Tried reducing catheters
  - Good intervention but still not the problem
- Reviewed C&S lab results, found an abundance of E Coli
- Turns out that the problem was peri-care and fecal matter was getting into the urinary system

How Much Are You Willing To Pay for "Vague"?
**What’s the biggest line item in your budget that’s MISSING?**

Executive Director  
Director of Nursing  
Business Manager  

$77,984 - $107,234

TOTAL Annual Cost of Quality Meetings

**VAGUENESS Plagues our Nursing Homes**

Taking action on the EFFECT and not the CAUSE
- Getting upset at nursing assistants for not answer call lights sooner
- Implementing new infection control protocol because there are “too many infections”

Or...

**How much control does a worker have in the organization?**

15% (Joseph Juran, famous statistician)

Which left 85% responsibility of management for changing the system (processes)

W. Edwards Deming later changed it to 6% and 94% (another famous statistician)

Closer to his death, Deming changed it again - 2% and

This concept is not related to Pareto...

**What’s Missing?**

2% Control

Theory of Management for Process Improvement
Statistical Thinking or THEORY

A "mindset," NOT a "tool set"

A method for dealing with variation

A common "language" to:
- Use a process-oriented approach to define and analyze improvement opportunities;
- Routinely use simple charts for data display and analysis;
- Recognize poor and useless data displays and analysis;
- Ask better questions to take more appropriate actions

“What’s YOUR Theory?”

In other words, why do you do what you do?

How do you know what you know?

There’s an “if-then” with a theory

Don’t take things on faith or trust. Understand the reasons! (Deming)

Purpose of Theory

TO PREDICT
- Prediction helps us improve the future

The past is gone. We can learn from it, of course — with the aid of theory. (Neeve)

A Story...

New Onset Orthostatic Hypertension

We:
- Reassess the resident, repeat the blood pressure, gather additional information, contact the provider
- Provider assesses the resident
- Ask questions to figure out WHY the symptom is happening

We would NOT:
- Order medication for a symptom without knowing why the symptom occurred
- Take action on one blood pressure reading
So, Why Do We Think It’s Acceptable to Take Action on Data Alone?

- Pressure ulcers
- Outstanding accounts receivable
- Falls
- Weight loss
- Incidents and accidents
- Safe work days
- Antipsychotics
- Infections
- Pain
- Readmissions

Quality Improvement - Donald Berwick
Process Breakdowns

"Each system is perfectly designed to get the results it is already getting."

- Do you ever waste time waiting?
- Do you ever redo your work?
- Do the procedures you use waste steps, duplicate efforts, or frustrate you through their unpredictability?
- Is information that you need ever lost?
- Does communication ever fail?

We installed quality control."

"No. You can install a new desk, or a new carpet, or a new dean, but not quality control. Improvement of quality and productivity must be a learning process, year by year, top management leading the whole company."

Quality Improvement

Beyond "projects" to an integrated strategy

- Organizational transformation is needed, not a parallel add-on organizational universe that is known as "quality improvement" disconnected from the "real work"
- Quality and continual improvement need to be a formal part of an integrated organizational management package
- Executive commitment to quality
- Can not overlook the cultural/psychological issues of quality improvement

Medical Director can not do this alone

- More later!

Quality Improvement - Data Analysis

"How do we keep people from drawing incorrect conclusions from data?"

"I am drowning in a sea of data. How do I begin to learn from it?"

"Where do I focus to get the most out of my improvement efforts?"

"I have made some changes, but how can I really know that they are improvements?"

"How do we get people to draw correct conclusions from data?"
Quality Assurance vs. Quality Improvement

**QA** - focus on activities required to satisfy regulators and identify outliers
- Quality by inspection
- Prevent outliers
- Zero defects

**QI** - focus on continuous efforts to meet consumer needs
- Customers’ needs must be met
- Interdepartmental, cross-functional team approach is often most effective

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Quality Assurance vs. Quality Improvement

**QA** - collects data to identify “perceived” individual negative variation and to correct outliers
- Results oriented thinking
- Failures, attribute blame – “incompetence”

**QI** - collects data to expose process variation, discuss it, and reduce that which is unintended and inappropriate
- Process oriented thinking
- Process breakdowns
- Finding hidden opportunities for improvement

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Quality Assurance vs. Quality Improvement

**QA** - climate of defensiveness and a lack of cooperation
- Focus shifts to the “negative” end of performance

**QI** - potential of high achievers to influence the process
- Focus shifts to the “positive” end of performance

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Quality Assurance vs. Quality Improvement

The statistical framework needed for quality improvement is generally not taught as part of medical education
*(or to anyone else in long term care!)*

More later...

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\[ QA + PI = QAPI \]

<table>
<thead>
<tr>
<th>Quality Assurance</th>
<th>Performance Improvement</th>
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<tr>
<td>• Compliance with standards</td>
<td>• Continuously improving processes</td>
</tr>
<tr>
<td>• Inspection</td>
<td>• Prevention</td>
</tr>
<tr>
<td>• Reactive</td>
<td>• Proactive</td>
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<tr>
<td>• Remove outliers</td>
<td>• Processes/Systems</td>
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<td>• Narrow</td>
<td>• Systemic</td>
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<td>• Involves only a few</td>
<td>• Involves entire IDT</td>
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Clinical Trials vs. Everyday Needs

Clinical trials are useful to providers who need to know that their medical treatments are founded on solid basic research
- Create a stable population where outside variation is strictly controlled
- Clinical trial research statistical methods make assumptions and control variation in ways that cannot be replicated in the unstable environment of the real world

Organizational Dysfunction
The Universal Process Flowchart

Clinical Trials vs. Everyday Needs

Goal is to expose the variation between individual use and the research use of the protocol – not ignore it

And not just to “reduce variation,” but:

To reduce any inappropriate and unintended variation

Clinical Trials vs. Everyday Needs

SUMMARY
- Basic research
  - Efficacy of procedures or treatments
- Statistical Process Control
  - Effectiveness under everyday clinical conditions
  - Improvement of processes and outcomes
  - Monitoring performance

So how do we move ahead?

“We can’t solve problems by using the same kind of thinking we used to create them.”
Albert Einstein
“We measure things for two basic reasons.”

1. To see how things are going
   (Just how hot did it get today?)

2. To predict the future
   (What are the chances of it being cooler tomorrow?)

(Scholtes)

What’s Important to Predict in Your Facility?

- How much money to spend
- What to spend it on
- Staffing decisions
- Areas that need improvement

Prediction is NOT Explanation

“Prediction requires knowledge; explanation does not.” (Don Wheeler)

“Management ... is action based on prediction.” (Deming)

Prediction is CRUCIAL to Improvement

“The combination of legitimate data and confirmed theories may allow you to make realistic forecasts — not guesses, not hunches, but data-based and theory-based projections of future performance.

90% knowledge
10% statistics

“Management is ... understanding measures, among other things, an understanding of your current capabilities and a theory on how to improve.” (Scholtes)
How Should Managers Make Predictions?

Apply continual improvement methods for even better prediction.

Use knowledge:
- Stable and unstable processes
- Common and special causes
- Interpreting run and control charts
- Statistical theory of improvement

MORE LATER...

So, as his Mom... what am I supposed to **DO** with those scores?

- Decide whether to ground him or not?
- Remember, *data are a basis for action*.

The Big Question

What do these scores **allow me to predict**?

What is a Process?

*Sequence of tasks transforming inputs into outputs*

Think of all the steps it takes...
- Transcribing a provider’s order
- Labs
- Resolving a grievance
- Changing a dressing
- Preparing monthly resident statements
- Completing advance directives
The Big Picture

System

Process

People

- Group of related, interdependent processes working together to achieve a common goal
- Made up of a culture, structure and boundary
- Sequence of tasks aimed at accomplishing a goal
- Produce data which can be analyzed
- Have beliefs, values, interests, needs
- Have roles which are made up of functions and tasks

Variation: “Gap” between truth and fiction

LEADER: “How would you like to think things work... or SHOULD work” Just do it!

“Gap” between ‘REALLY’ and ‘SHOULD’ = VARIATION

FRONT LINE: How things REALLY work

Undocumented

Confusion... Conflict... Complexity... Chaos

Worker controllable problems

People need to have the means:

- For knowing what they were supposed to do
- For knowing what they were actually doing
- To close the loop between what they were doing and what they should be doing

It’s processes not people

Process oriented questions:
1. Was this a unique event or an event waiting to happen?
2. Could this just as easily have happened to another person (or group of people)?
3. If we fired and replaced everyone, not just this person, could this happen again?

Without a Process View

- Difficult to understand the problem and individuals’ roles in the solution
- Difficult to define the scope of the problem
- Difficult to get to (true) root causes
- People get blamed when the process is the problem
- Process management is ineffective

“You can’t improve a process that you don’t understand.”
(or measure)

Lynne Hare

Human Variation

People look at a graph or chart of numbers and mentally compare it to what they think it should be

A gap between what it is and what “it should be”? Then, they draw a circle around it!

Then, they argue their perspective of the variation
Process analysis

The most serious problems in service processes result from variation caused by:

The lack of **agreed-upon** processes

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Process Oriented Thinking

- Concentrating on the process inherent in any improvement situation leads to:
  - Greater cooperation due to a common language
  - Elimination of blame
  - Simpler, more effective solutions

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Process-Oriented Improvement

**Principle 1**

Your current processes are perfectly designed to get the results they are already getting, and will continue to get

Even if things “shouldn’t” happen, you might be “perfectly designed” to have them happen!

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Process-Oriented Improvement

**Principle 2**

The current processes are perfectly designed to take up more than 100 percent of the people’s time working on them

- It is amazing how much waste can be disguised as useful work

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**Unfortunately...**

People say things like...

“i’m too busy!”
“i don’t have time for this.”

Hence, the perception exists that no time can be found for process improvement.

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“**Lack of**” is only an option because the current culture has made it an option

**Lack of time...**

So, substitute priority for time

**Lack of priority...**

Then ask...

“What else is it going to take?”
Process-Oriented Improvement
Principle 3

Improving **quality** = Improving **processes**

**It’s a Given...**

People think they are already doing a “quality” job and do not have time for improvement

*Working hard is NOT improvement!*

“**What is it going to take to attain unprecedented levels of quality and productivity?**”

W. Edwards Deming

*By everyone doing his or her best!*

“**They already are – and that’s the problem!**”

-Deming

Management by Objectives (MBO)
Management by Results (MBR)

**Arbitrary** goals and targets foster conflict and competition between people and sometimes whole departments

“Sure we want good results. But if you manage by results, quality goes down, morale goes down.”

(Deming)

“A goal without a method is cruel!” (Deming)
What Happens When Numbers are Different?

“Congratulations! Good job! When do you want the pizza party?”

Or...

“I don’t like it. Fix it!” or “I’m disappointed.”

WRONG Management Action

Interpreting every month’s figure “in its own right”
- Sometimes it’s bad news which “resulted” in immediate action, probably expensive too
- Sometimes it’s good news and staff could “breathe easily again.”

Driving a car by watching the white line through the rear view mirror.
(Mike Dickinson)

Are we trying to just **reduce (or increase) the number**

or

**improve the process** that produced number in the first place?

When numbers are different, ask **THIS** question instead...

What did you do differently?

In other words, what happened that caused the process to shift, something different to happen?

We NEED goals, just not **arbitrary** goals

“Of course, a company needs budgets and forecasts for planning and allocation of resources – but they must also not be arbitrary numerical goals, nor should they become such.” (Neave)

Do NOT let the number become the objective
Theory of Variation or Statistical Theory

“Many people will agree that they have never studied anything about the theory of variation.” (Nolan and Provost)

Basic Statistical Lesson
Key Concept - Variation

The usual way data is presented in your nursing home:
- The 1-point Curve
- The 2-point Curve
- The 3-point Curve

Basic Statistical Lesson
Key Concept - Variation

The 1-point Curve

Basic Statistical Lesson
Key Concept - Variation

The 2-point Curve
- Common practice
  - Last month to this month
  - Last year to this year
  - Last quarter to this quarter

Basic Statistical Lesson
Key Concept - Variation

The 3-point Curve – “Trends”
- Given three points in time, there are six different ways they can appear
  - False explanations given to each “trend” resulting in false solutions that increase variation and increase costs.

Today – yesterday
This month – last month
This quarter – last quarter
This year – last year
This shift – that shift
Given 3 numbers:
- "Upward Trend" (?)
- "Downturn" (?)
- "Rebound" (?)
- "Setback" (?)
- "Turnaround" (?)
- "Downward Trend" (?)

Basic Statistical Lesson #1

- Given two different numbers, one will be larger
- Or, two numbers that are not the same are different

Basic Statistical Lesson 2
Key Concept - Variation

Walter Shewhart- 1920’s
- There is always variation in anything that is being measured
- In statistical thinking terms: there are inputs causing variation that are always present and conspire in random ways to affect a process’s output.

Basic Statistical Lesson 2
Key Concept - Variation

We learn nothing of importance by comparing two or three results when they all come from a stable process

Most data of importance to management are from stable processes

Every Aspect of Life (and Work) Has Variation

Number of falls, electrical bill, gas mileage, weight, crime rates, rehospitalizations, number of incident reports

Every day we make decisions based on our interpretation of variation

Whether we THINK the variation WE observe indicates a change or not

Understanding Variation

- Managers understand some of the basic statistical concepts needed to interpret variation
- Managers must be able to determine whether the patterns of variation that are observed are indicative of a trend or random variation that is similar to what has been observed in the past
- This distinction between patterns of variation is necessary to minimize the losses resulting from the misinterpretation of the patterns.
Variation

Flip a coin 50 times and count # Heads. Will all of you get the same number?

So, how many heads do you have?

There are NO differences:
Reacting to the variation will add more complexity...and NO VALUE!

Profound truths:
• Half of you will
• Half of you will
• 25% of you will be the “top quartile” (we could “benchmark” you)
• 25% of you will be the “bottom quartile”
• 10% will be the top 10% -- let’s benchmark you to see what you do differently.

Essential for Management

If the system is stable then relatively high or low values just cannot be “explained”

There is then no justification for blaming or indeed praising anybody for such values.

It’s the same kind of “random variation” as you get when throwing dice or shuffling and dealing playing cards. High or low is just a matter of luck.

Should you praise or blame people merely for being lucky or unlucky?”

Two Types of Variation

Common Cause
Systemic issues from a stable process

Special Cause
Specific issues from an unstable process

Treating one as the other generally makes things worse (certainly not better)

Common Cause Variation

Each source (input) contributes a random, small amount of variation

Cannot predict which source (input) will affect the process at any given time

However, the range of resulting outputs can be predicted

Drive Time Common Causes

• Time you leave your house
• Traffic lights
• Stop signs
• School buses, crosswalks
• Minor crashes
Falls - Process-Oriented Thinking

Studying the number of falls tells us how many falls there were.

Studying the process of defining, assessing, monitoring, intervening, reassessing and communicating about falls tells us about the process that allows the falls to happen and to help reduce the number of falls.

Common Causes for Falls

- Medication change
- Change of condition (mental or physical)
- Trip hazards
- Wet floor
- Forgetting to use call light
- Choosing to not use call light
- New room or furniture arrangement

Special Cause Variation

Indicates a different process at work, even if unintended or desirable

Special causes are UNSTABLE, they are unpredictable

Being able to explain something after the fact does NOT make “The week from Hell” is probably still well within the common cause limits

Drive Time Special Causes

- Major road construction
- Leave house 1 hour earlier or later
- Major accident, roads closed, lengthy detour
- You have to pick up bagels for a meeting and the bagel shop is swamped
- Government builds a special highway just for...
Possible Special Causes for Falls

- Open a new unit for people with dementia or Parkinson’s
- Admit a resident with schizophrenia who throws herself on the floor when she’s mad
- Facility purchases a new floor wax and it’s as slick as an ice skating rink
- Restraint reduction intervention and all seat belts, lap buddies, and concave mattresses are d/c’ed

Understanding Variation by
Henry Neave

- “…while we continue to obtain such outputs which are within the process limits, it is illogical and impractical to claim that anything specific “caused” any particular outcome.”

- Special cause is **Unpredictable**!
  - Caused by something or somethings
  - Can be good or bad but it must be addressed

Special Cause Variation
and the Coin Flip

**Common cause** – Inherent, “systemic”
1. Flip a coin 50 times and count the # Heads
2. Do this 50 times

**Special cause** – Different process enters the picture
1. Flip a coin 50 times and count the # of **two heads in a row**
2. Do this 10 times
3. Plotting this data over time will show a **distinct ‘bump’**

Summary of Differences
Special Cause vs. Common Cause

<table>
<thead>
<tr>
<th>Common Cause</th>
<th>Special Cause</th>
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<tbody>
<tr>
<td>Uppy and downy</td>
<td>Unpredictable</td>
</tr>
<tr>
<td>Wibble wobble</td>
<td>Disruptive</td>
</tr>
<tr>
<td>Boring!</td>
<td>UNSTABLE</td>
</tr>
<tr>
<td>Predictable!</td>
<td>In our facilities, RARE</td>
</tr>
<tr>
<td>Useful</td>
<td></td>
</tr>
<tr>
<td>STABLE</td>
<td>Think of common cause as “noise” and special cause as a “signal!”</td>
</tr>
</tbody>
</table>

Special Causes
Not All Systems Have Them

…and we prefer that they don’t: for, without them, we can predict that the variation will continue to be very similar to what we’ve been seeing recently – and that’s very useful.

Two Critical Points About Variation

1. “…while we continue to obtain such outputs which are within the process limits, it is illogical and impractical to claim that anything specific “caused” any particular outcome.”

2. Special cause is **Unpredictable**!
  - Caused by something or somethings
  - Can be good or bad but it must be addressed
**Human Tendency?**
Treat ALL Variation as Special Cause
Solving the same problems repeatedly

"You burn, I'll scrape."

**Treating common cause as special cause is harmful**
- It increases overall variability
- Worsens quality
- Worsens reliability
- Worsen predictability of what will happen in time to come

**GOAL?** Study the theory! Don’t argue about the results!

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"To misunderstand the concepts of common and special causes of variation is to risk economic and psychological losses."

**Losses** include:
- **Blaming people** for problems beyond their control
- **Spending money** for new equipment that is not needed
- **Wasting time** looking for explanations of a perceived trend when nothing has changed
- **Taking action** when it would have been better to do nothing

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"Variation is indeed the enemy of quality." (Deming)

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**Reducing Variation**
Results in better prediction of the capability of a process

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**Process Thinking and Variation**
Process inputs are always present and cannot be predicted ahead of time but a *range of variation* that act on the system/process can be predicted!
You Don’t Have to Like the Number!

“...if the process is in statistical control but you don’t like the amount of variation it is producing, the only way to reduce that variation is to improve the process itself.” (Neave)

Basic Statistical Lesson 2
Key Concept - Variation

_We learn nothing of importance by comparing two or three results when they all come from a stable process_

Most data of importance to management are from stable processes

Basic Statistical Lesson 2
Key Concept - Variation

Walter Shewhart- 1920’s

- Two kinds of mistakes
  - **Mistake 1.** Treating a fault, complaint, mistake, accident as if it came from a special cause when in fact there was nothing special at all, i.e. it came from the system: from random variation due to common causes – _Tampering_
  - **Sounding a false alarm**
  - **Mistake 2.** Treating a fault, complaint, mistake, accident as if it came from a common cause, when in fact it was due to a special cause
  - **Missing a signal in the data**
You’re at a meeting...

Staff Member #1: “After that trend in improvement over the past three years, why did we go back up?”

Staff Member #2: “Yes, but what’s the overall trend?”

You tell me...

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So, WHAT am I supposed to do?

As requested in the session, information on how to compute run and control charts was added to the end of this slide deck.

Follow this cardinal rule:

PLOT THE DOTS!

Create a Run Chart

A simple, time-ordered plot of a set of data in its naturally occurring order with the median drawn in as a reference line

THE MOST IMPORTANT initial analysis of a set of data

Transition to More Advanced Skills

From Human Variation (WAG/SWAG)
- Data tables, drawing circles, traffic lights, bar graphs, “trends” / trend lines, variance from goals

To Reducing Variation (based in common theory):
- Counting up to 8
- Simple addition and multiplication
- Subtracting two numbers
- Sorting a list of numbers

“Plot the dots!”
Reacting appropriately to variation
Common cause vs. special cause response
Changed conversations: Asking better questions
Switch from inappropriate graphical displays to appropriate displays...

Purpose of a Run Chart

To determine if there is more than one process in the data (to find special cause)

If there is a “bump” in the process (more than one average), it must be handled differently than a stable process (common cause)

Two Tests to Identify Potential Special Cause

1. Statistically defining a trend
2. Clump of 8 (process shift)

Statistical Definition of a Trend

A sequence of SEVEN or more points continuously increasing or continuously decreasing

Special Cause: Upward Trend
Special Cause: Downward Trend

Is there a trend in this data?

**BUT...** What are you led to believe with this graph?

**Clump of 8 (process shift)**
A run of 8 consecutive points either all above or all below the median (based in theory)

**What is a Median?**

Rationale for Using the Median

If special causes are observed in the run chart, then it makes no sense to use the average because the average of all these data doesn’t exist.
Think of different processes (different averages) this way...

If I put one foot in ice water and the other in boiling water, on the average, I should be pretty comfortable, right?

The purpose of the run chart is to determine if you have boiling water or ice water

If you have both, you cannot calculate the average!

Trend or Clump
Ask, “Was either rule triggered?” or “Was there a signal?”

Indicates at least one significant shift in the process

From what it was “perfectly designed” to get with its old inputs to what it is now “perfectly designed” to get with its new inputs

“Something” happened!

That’s all we know at this point...that something happened

Special Cause Identified. What’s Next?

Ask Questions!
- Was there a policy change?
- Did new staff get hired?
- Did the regulations change?
- Did the process of data collection change?
- Did the facility open a
Crucial Points About Transitions

- After the start of the partnership, all regions were in transition

- Transitions eventually even out and become common cause, a new level is reached with new control limits

- The needle bumps and then it stabilizes again

Crucial Points for the Antipsychotic Use Data

Were facilities trying to improve or just get better numbers?

If fear (e.g. deficiencies) is a “motivator” then the impetus is likely to just get better numbers without actually improving the process/system

- We’ll know when we see what happens over the next several quarters

Every good analysis spurs the next set of questions

- Is the number where it should be?

- Can we improve the system even more?

- Are some regions doing better than others?
  - Beware of the benchmarking trap

- Do we have something we can share?
What Do The Data Tell Us?

Is there any special cause?

How about common cause?

What do we do next?

We use strategies to REDUCE variation!

The Next Step: Converting a Run Chart into a Control Chart

Control charts are also called:
- I-chart (individual's chart)
- X-MR chart
- Process behavior chart

What is a Control Chart?

A time plot of the data (run chart) that includes lines added for the average and natural process variation.

“The techniques of ...control charts...are neither arcane nor obvious; they require study but they can be learned.” (Berwick)

If special cause is present on the run chart, DO NOT covert the data to a control chart

There is NO average of these data (because there was a shift)

Common Cause Limits (Upper and Lower Control Limits)

What is a reasonable departure from the average?

“Even when people get to understand the concept of common-cause variation, they almost always tend to hopelessly underestimate how large it is, often by a factor of two or three times or even more.” (Navey)
How FAR Up or Down?

“...greater attention needs to be paid not to whether the figure goes up or down but to how far the figure goes up or down.” (Neave)

Think of common cause limits as the space between her hands.

Control Charts - Important Points

Control limits are calculated from the DATA

Demonstrate what the process is capable of achieving

- “Voice of the process”
- Control limits have absolutely NOTHING to do with our hopes, wishes or desires (in terms of how the data can or should be different)
- “I want the goal to be...” or “Why didn’t you achieve ___% like last month?”
- They are factual and indisputable

Abaqis

People respond to the colors instead of the underlying processes and causes of variation
Common cause limits likely encompass green, yellow and some red

Administrator said...

“We have a real problem with falls.”

Anyone willing to bet?
Falls for 2015 and 2016

So much time in meetings.
So many root cause analyses.
So much energy and money wasted.

Average number of falls per month = 6
UCL = 13   LCL = 0
Common cause band of variation is between 0 and 13
Any data point between those bands is THE SAME

Two Critical Questions

When calculating the control limits, how did we take into account the customer’s or patient’s needs?

The facility’s needs?

**ANSWER: We did not!**

- Why not? The numbers are the numbers, there are no goals or wishes. The numbers don’t care what you want!

Data Collection

A Forgotten Component

Ask, “What’s 'wrong' with the data?”

Finding answers would improve subsequent collection, which enables more appropriate analysis and comparisons.
**What is an Operational Definition?**

“A definition which reasonable persons can agree on and do business with.” (Deming)

**CRITICAL** for process improvement

Without an agreed upon definition, the process cannot be improved

---

**Definition of a Fall**

(F323, PP436, under Resident Vulnerabilities)

Unintentionally coming to rest on the ground, floor, or other lower level but not as a result of an overwhelming external force (e.g., resident pushes another resident). An episode where a resident lost his/her balance and would have fallen, if not for staff intervention, is considered a fall. A fall without an injury is a fall. Unless there is evidence suggesting otherwise, when a resident is found on the floor, a fall is considered to have occurred.

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So, we have a common definition of falls....

*Is that enough?*

---

Discrepancies in how that definition is operationalized?

New staff? Trained on definition of a fall?

Is it conceivable that falls occur but do not get reported (not maliciously)?

Could the discrepancies affect MDS data which is then submitted to CMS and produces the CASPER report?

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**Statewide training on new regulations and survey process**

Phoenix, Arizona
September 2017

Presentation titled, "**PROVIDER ENGAGEMENT: Reducing Complaints in Licensed/Certified Long Term Care Facilities**"

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**“There are too many complaints.”**

Presenter from Health Care Institution Licensing in AZ

Wants facilities to “fix it”
- Sounds reasonable, right?!
- Yep. Sounds logical and appears to make sense. If we have too much of something, just reduce it!

**Management by Results**

“Improvement in General”
“Eliminate common causes of complaints.”
Same presenter

“How can providers do that when they don’t know what the common causes truly are?!”

NOTE: The use of the phrase “common causes” in this directive was meant in the same way as “typical causes”, not anything related to common cause variation.

“ADHS gets too many complaints.”
Same presenter

Most likely, ADHS (and the nursing homes) are completely unaware of a large number of complaints on any given day.

If the directive is to “reduce complaints” how can success be measured if they don’t even know what number they’re dealing with?

Let’s Consider Process Components

Staff often does not know when to complete a complaint/grievance form

Difficulty explaining the process in their facility

Incomplete grievance forms

No operational definition of “complaint” or “grievance”

What is the Exact Nature of the Problem?

- Does your facility have a problem with complaints?
- Why or why not?
- What evidence do you have to support that position?

What do the data tell you?

“Common” Complaints

Timeliness to call light
Lost items
Cold food
Continuity of care
Interactions with staff

“Everyone has a role in managing complaints.”
Same presenter

May Sound Reasonable But Is It?
“Managing” a Complaint?

- How does a nurse manage a complaint?
- What exactly does a CNA do to manage a complaint?
- What does “manage complaints” even mean?
- Does it mean the employee followed the grievance process?
- Does it mean the complaint is resolved “on the spot?”
- Has staff been trained?
- Is “managing complaints” a true measure of success?
- Why manage? Why not prevent?

How does your facility DEFINE a complaint?

How To Define a Complaint?

Definition of complaint:
1: expression of grief, pain, or dissatisfaction
2: a bodily ailment or disease.
3: a formal allegation against a party.

Merriam-Webster

“Reducing Complaints”

Not So Simple Anymore...
Actually, It Never Was

- Is it conceivable that different facilities (in this room) would define complaints differently?
- How does a resident/family define a complaint? Important?
- Are complaints only those issues recorded according to the grievance policy?
- Does a complaint include a concern that is discussed with a staff member but not written up?
- If an incident report was completed (e.g. fall) but the family member is upset, does that constitute a complaint?
- Do complaints from discharged residents/patients count in the total?

If an issue is resolved right away, does it count as a complaint?

If a resident complains that dinner is cold but is provided another tray and is satisfied, does that count as a complaint?

If a family member complains about the wait time to answer Mom's call light but is satisfied when Mom's needs are met, does that count as a complaint?

Consider the processes...

Just because a hot tray was successfully delivered the second time and the call light eventually answered could there be an underlying process issue that allowed those complaints to surface in the first place?
The Presenter used graphical displays...

Presenter Sees *Seasonality*
- More complaints around the holidays and during the summer

Seems to “makes sense” and “sounds reasonable.”
Presenter is in a position of power.

Let’s switch from an inappropriate graphical display to an appropriate display...

Do You See Seasonality?

What are you led to believe with this graph?

What is the alleged trend supposedly doing?
Are Complaints Decreasing?

Studying the NUMBER of complaints will tell us how many complaints were reported.

Are we trying to reduce the number of complaints or improve the process that allowed the complaints to arise in the first place?

Ready for Process IMPROVEMENT?!

Study the process of defining, investigating, reporting, follow-up, communicating and resolving complaints to help reduce the number of complaints.

Human Tendency?

Treat ALL Variation as Special Cause

Solving the same problems repeatedly

Doing a RCA on each incident is treating each one like special cause.

Root Cause Analyses

“You burn, I’ll scrape.”
"Our hard work of 149 root cause analyses had to make a difference!"

Really?

How Much Does It Cost to do a RCA?

- 2080 work hours per year
- Median wage for an RN is $68,400 or $33/hour
- 1 hour to do a RCA
- 2 incident reports per day

$17,160 per year on RCAs

What happens with all those RCAs?

How about doing a root cause analysis on all your root cause analyses?

3 Levels of Fixes to Address Undesirable Variation

Level 1 Fix (Incidents and Accidents)

Reacting immediately to the undesirable output to "make it right."
- "Damage control and cleaning up the aftermath"
  - Finding the resident with dementia who left the facility
  - Tending to an injury
- Sadly, this fix is often followed by blaming an individual due to "lack of accountability"
  - The 5 "Why's"
Let’s Be Clear

- Direct action after an incident or complaint is absolutely necessary
  - Apologies, investigation, replacement, etc.
- This type of action is not in question

What we are questioning is the appropriate action for preventing or reducing the chance of trouble in the future. (Neave)

Level 2 Fix (Process)

Fix the process that produced the incident
- Two nurses aides did not follow protocol for a Hoyer transfer

Level 3 Fix (System)

Fix the system that tolerates this and similar processes
- Is this the only process that causes harm to residents?
- Is there a problem with the way we are implementing the protocol?

Beware

- Don’t get stuck at Level 1
- Put the fires out
- But, an extinguished fire doesn’t improve the building
- Level 1 just gets the process to where it should have been already, to what it was capable of doing
- Then, and only then, can process improvement begin

Why Different Strategies?

FUN
Strategies for Reducing Variation!

Common cause and special cause variation require different managerial approaches if we are going to be effective.
Jumping to a Solution is a HUGE Problem (Balestracci)

Usually lack of a clear problem definition which is further complicated by:

- Poor understanding of how the process really works
- Lack of good baseline data
- Presence of unexposed special causes
- Reliance on poorly planned data collection

Management Naively... (Balestracci)

...jumps to the most aggressive data strategy

Which results in:

- Major inconvenience to staff
- Major inconvenience to the work culture

Both are really hard in a culture that thrives on predictability

- Especially if it’s perceived as being forced on them

Vague, Vague, Vague...

High incidence of residents with Urinary Tract Infections

- Management jumped to the conclusion that it must be a hand washing problem and inserviced everyone
  - Hand washing is certainly important!
  - Poor hand washing wasn’t the problem in this case
- Tried reducing catheters
  - Good intervention but still not the problem
- Reviewed C&S lab results, found an abundance of E Coli
- Turns out that the problem was peri-care and fecal matter was getting into the urinary system

Why does this happen rather than that?

Think About Your Credibility (Balestracci)

Apply the right solution to the right process

Gain substantial political credibility:

- Consider staff’s feelings
- Respect the use of people’s time during a project or experiment
- Demonstrate competence in the improvement process
- Involve members of the workforce at appropriate times

“I guess it’s because we have all been brought up to “Do.” Doing is “productive,” whereas Planning, Checking, and Studying are “nonproductive.” By Doing we feel we are getting somewhere, whereas while Planning – thinking, talking, studying – we feel we haven’t yet made a start. There is strong influence here from our results-oriented society – one can easily produce some measures of what has been Done, but not so easily of what has been Planned.” (Neave)
Improving a Stable Process:

**IN THIS ORDER**

1. Exhaust in-house data
   The more you know what’s wrong with it, the more useful it becomes

2. Stratification
   “What is the 20% of the process that’s interesting?”
   Helps find special cause hidden in common cause

3. Disaggregation (process dissection)
   “Let’s dig deeper... on this 20%”

4. Formally designed experimentation
   “What changes do 1, 2 and 3 above suggest we test?”

---

Common Cause Strategy #1

**Exhaust In-House Data**

- Plot the dots you’ve got!
- Create run charts – identify variation
- Can we get a baseline to ask better questions?
- Changes are **not made** based on this baseline data
  - Just provides insight into further data collection projects

---

Common Cause Strategy #2

**Stratification**

Aggregate data (combine it) from any stable period
- Take the past two years of any metric in your facility
- Example: 17 months worth of data for a total of 162 falls to work with!

Stratify
- Sort data into groups based on different factors
  - Unit, time of day, personnel, day of week, type of infection, type of injury, age, location, diagnoses

---

Pareto Principle

**A TOOL to Stratify Data**

80% of the variation is generally caused by only 20% of the process inputs

Examples:
- 80% of the readmissions are associated with 20% similar diagnoses
- 80% of the facility’s “complaints” are from 20% of the issues
- 20% of the residents take up 80% of staff time

---

Think of Pareto This Way...

What are the 20 percent of the organizational processes causing 80 percent of your problems?

*Or....*

What 20% of the numbers cause 80% of the “sweat”?
Pareto Analysis

Tool to find hidden special cause that when the data come together give the appearance of common cause on a run chart

This is a MUST HAVE in your tool belt!

Common Cause Strategy #3
Disaggregation

Dissect the overall process into subprocesses
• Only done after a significant source of variation has been identified (using a Pareto matrix)

Focus on very specific aspects of the process
• The 20% of the process causing 80% of the problem

Stratification of Falls Data (Pareto analysis)

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Unit A</th>
<th>Unit B</th>
<th>Unit C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>24</td>
<td>2</td>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>Wheelchair</td>
<td>6</td>
<td>2</td>
<td>25</td>
<td>33</td>
</tr>
<tr>
<td>Toileting</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Found on Floor</td>
<td>0</td>
<td>8</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Rolled from Bed</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Transferring</td>
<td>18</td>
<td>15</td>
<td>18</td>
<td>51</td>
</tr>
<tr>
<td>Totals</td>
<td>57</td>
<td>33</td>
<td>72</td>
<td>162</td>
</tr>
</tbody>
</table>

Disaggregation of Falls Data

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Unit A</th>
<th>Unit B</th>
<th>Unit C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>24</td>
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<td>Wheelchair</td>
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<td>33</td>
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<td>2</td>
<td>13</td>
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<td>8</td>
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<td>Rolled from Bed</td>
<td>4</td>
<td>0</td>
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<td>12</td>
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<td>51</td>
</tr>
<tr>
<td>Totals</td>
<td>57</td>
<td>33</td>
<td>72</td>
<td>162</td>
</tr>
</tbody>
</table>

Falls Matrix Analysis

1. Unit (C) has a high TOTAL number (72), but the falls are further concentrated involving wheelchairs (25 falls)

Key point
• Unit (C) could have a different process input that no one else has

2. The number of falls while transferring is high (51) with all three units relatively the same
• This would indicate that the WHOLE SYSTEM is perfectly designed to tolerate this type of fall
• Telling people to "be more careful" won’t do it!
• It will need systemic analysis/intervention

Matrix Analysis cont.

3. The TOTAL number of falls while walking (34) is high but without the matrix, one could conclude that ALL STAFF need help on this type of accident (inservices, new form, etc.)
• That would be treating special cause as common cause...and make a lot of people unnecessarily mad!
• When actually, Unit (A) has a high number (24) for falls while walking so the improvement effort should be focused there
• You’ve focused the work ("dissection") to Unit A
Which type of manager would do the better job for the organization?

The one who understood something about Statistical Thinking

or,

the one who didn’t?

And which one would you rather work

Data Sanity
Putting it all together

Quality Improvement

• Creating a culture of cooperation, support, and collaboration to eradicate poor processes

• Declare war on waste

• To the point where it become an obsession

Getting Frontline Staff to Understand Their Work as a Process

• Not only as a series of tasks

• Getting staff to think deeper about waste

• Having a system with an aim that employees know about, understand, and actually work towards
Putting It All Together

- How do we operationalize this in LTC?
- How do we know what to evaluate?
- What is the role of the medical director?
- What is the role of the IDT?
- How will this improve care?

What to Evaluate

- “80% of being successful in life is showing up”
- QI/QM
- Survey
- MDS 3.0
- Ask your customers
- Ask your employees

Projects

- Diagnostic Journey
  - Symptom to Cause
- Remedial Journey
  - Cause to Remedy

- DO NOT JUMP FROM SYMPTOM TO REMEDY

Medical Care Delivery Process

- Recognition/Assessment
- Problem Definition
- Diagnosis/Cause-effect analysis
- Identify goals and objectives of care
- Selecting and agreeing to interventions and plan of care
- Monitoring

JAMDA. 2009;10(8):520-529

CAP-Do

- Check
  - What is going on? Why are we doing this?
  - Actual vs. Created Standard
- Act
  - Reconcile
  - Diagnose
- Plan
  - Create Solutions
  - Define the process moving forward
  - How and what are we going to measure?
- Do
  - Train
  - Implement

CAP-Do Round Two!!

- Check
  - Results
  - Process improvement
- Act
- Plan
  - Do - STANDARDIZE
Checklists

- Precise
- Efficient
- Easy to use/implement
- Provide reminders for complex processes
- DOES NOT Dictate Practice of Medicine

Problems with “QAPI-at-a-Glance”

States facilities must take a “systematic, comprehensive, data-driven, proactive” approach to QAPI.

Yet, a majority of the document instructs facilities to:
  - Tamper (treat common cause as special)
  - Do more RCAs (step 12 on page 19 says, “identifying root cause is only the first step in improving performance...”)
  - Benchmark (repeatedly)
  - Use targets, thresholds, and trends
  - Use satisfaction surveys

More Problems with “QAPI-at-a-Glance”

The grand finale? “All identified problems need attention.”

- Medical Director
  - Tread lightly
  - Become politically alert and astute
  - Fight battles that you can win when countering a CMS directive
  - Facilities are very sensitive (with good reason) in this regard

Leadership Mantras

As a leader, you will encounter resistance.

Mantras will help you calm down and redouble your efforts to overcome the resistance.

Mantra #1

Given: People don’t really object to change; they just hate being changed themselves.

“Change would be easy if it were not for all the people.”

“Those darn humans, God bless ’em. They’re acting just like ‘people.’”
Mantra #2

After you calm down, ask yourself, “How do I change to get them to want to volunteer to change?”

Everyday processes are happening to these very stressed, very human people

Jim Clemmer from Firing on All Cylinders

Mantra #3

“As a leader, I must learn to swallow my ego 10 times before breakfast and another dozen times before lunch.”

Two things to get a quantum leap in cultural morale
  • Blame processes, not people
  • Zero tolerance for blaming people

Paperboy Wisdom

Dale Dauten, www.dauten.com

Every 10th person is a jerk

The other nine are jerks 10% of the time

Leadership Mantra?

Allow 10% Jerk Time!

“Onion Patch Strategy” (Scholtes)

“I’m a lonely little petunia in an onion patch, an onion patch, an onion patch. I’m a lonely little petunia in an onion patch and all I do is cry all day.”

Learn everything you can, at least it may be useful in your next job
Identify the area over which you have influence
Identify some priorities
Recruit allies
Have data — “By implication, anyone who disagrees with you should do so on the basis of better data.”
“Don’t argue with those who disagree. Don’t even seek to persuade those who resist. Be clear about what you want to do and move ahead as far as you can as rapidly as you can. Your success will attract a following.”

No More Waste!

Staff Trust

Other Resources
Resources

- Data Sanity 2nd Edition - Davis Balestracci
  Fourth Generation Management, How The Evolution of Management and the Revolution of Quality are Converging - Brian Joiner
- Understanding Variation - Nelson and Provost
  http://www.amstat.org/understandingvariation.pdf (Direct link to a free copy)
- Health care from the perspective of a patient: Theories for improvement by Heero Hacquebard
- Improving Healthcare with Control Charts - Raymond Carey Ph.D.
- Understanding Variation, The Key to Managing Chaos - Donald Wheeler
- The Denning Dimension - Henry Neave
- Understanding variation: The springboard for process improvement – Henry Neave
- Making Sense of Data, SPC for the Service Sector - Donald Wheeler
- Out of the Crisis - W Edwards Deming
- Fixing on All Cylinders - Jim Clemmer

---

Creating Run Charts

*Easy as...*

![Pie chart](image)

---

You’re at a meeting...

![Graph](image)

---

We could have...

*(but thank goodness we didn’t!)*

- Stopped with the bar chart
- Applied special cause strategy by...
  - Pouring over 162 root cause analyses
  - Considering every month in isolation

---

How To Construct a Run Chart

1. Get a sequence of data in their naturally occurring time order
2. Draw a chart
   - Variable (e.g. infections, ulcers, complaints, falls) on the vertical axis ($Y$ axis)
   - Time goes on the horizontal axis ($X$ axis)
   - Plot the dots!

Best to have at least 16–25 data points
- But, even if fewer than 16, plot the dots you’ve got!
Step 1. Time Ordered Sequence

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>12</td>
</tr>
<tr>
<td>Feb</td>
<td>12</td>
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<td>Mar</td>
<td>12</td>
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<td>12</td>
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<td>May</td>
<td>11</td>
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<td>Jun</td>
<td>5</td>
</tr>
<tr>
<td>Jul</td>
<td>3</td>
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<tr>
<td>Aug</td>
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<td>Sep</td>
<td>3</td>
</tr>
<tr>
<td>Oct</td>
<td>3</td>
</tr>
<tr>
<td>Nov</td>
<td>14</td>
</tr>
<tr>
<td>Dec</td>
<td>15</td>
</tr>
</tbody>
</table>

Step 2. Draw the Chart “Plot the Dots!”

3. Look for Trends

A sequence of SEVEN or more points continuously increasing or continuously decreasing

4. Calculate the Median

The median divides the data so that half the numbers are larger than the median and the other half are smaller than the median

Calculating the Median

A. Sort the data from the smallest value to the largest

B. Count the number of data points (that number is referred to as “N”)

C. If N is odd, calculate [(N+1) / 2]. Begin counting at the smallest value from Step A. When your count reaches [(N+1) / 2], stop. That data point is the median.

D. If N is even, calculate (N/2). Begin counting at the smallest value from Step A. When your count reaches (N/2), stop. Calculate the average of this data point and the next number in the list from Step A. This average is the median.

Median cont.

N=17 (17 is an odd number)
So, [(N+1) / 2] = median
[(17+1)/2] = 9
Count from the top (or bottom) 9 numbers to find the median

Median = 11
How To Construct a Run Chart cont.

5. Draw the median line on the time plot of the data

6. Draw circles around each run
   - A run is a series of points that do not cross the median
   - A run is complete when a subsequent point in the current sequence crosses the median
   - A run can have a length of 1
   - A point exactly on the median should be ignored in the run analysis; it neither adds or breaks the current sequence of the current run

Look for “Clumps of 8”

7. An individual run of length 8 or greater (eight or more consecutive points either all above or all below the median) indicates the presence of at least one special cause

The Next Step: Converting a Run Chart into a Control Chart

Control charts are also called:
- I-chart (individual’s chart)
- X-MR chart
- Process behavior chart

How to Create a Control Chart
(converting a Run Chart into a Control Chart)

1. Plot the dots in their naturally occurring time order, and, if there are no obvious special causes, find the median and apply the run chart rules

2. If there are special causes at this time (trends, shifts, too few or too many runs), try to identify the reasons for them
   - Unaccounted special causes may invalidate the rest of the steps

3. Compute the moving ranges (MRs) between naturally occurring adjacent points in time

4. Rank these moving ranges in ascending order and determine the median moving range (MRmed) (or find the average moving range (MRavg), esp. if you have <20 data points)

5. Multiply MRmed by 3.865 (or MRavg by 3.268)
   - If any individual moving range exceeds this value, chances are your process exhibited a significant shift (special cause) at that point.
   - Two consecutive special cause moving ranges typically signal the presence of an outlier. (If this happens using the MRavg, it is highly advisable to redo the calculations using the MRmed.)

6. Only if the runs analysis showed no special causes, calculate the average of all the data. Otherwise, calculate the appropriate average of the data based on your runs analysis
How to Create a Control Chart
(converting a Run Chart into a Control Chart)

7. Multiply MRun by 3.14 (MRAvg by 2.66) and:
   - Add this quantity to the average calculated in Step 6 (this is the upper control limit for common cause), then
     - UCL (upper control limit) = AVG + (MRun x 3.14)
   - Subtract this quantity from the average calculated in Step 7 (this is the lower control limit for common cause)
     - LCL (lower control limit) = AVG – (MRun x 3.14)
   - These limits represent a common cause range around the average where individual data points may be expected to fall if the underlying process does not change.

8. Look for any obvious patterns or peculiarities in the pattern such as cycles, clusters close to the limits, or any other direct process influences such as known interventions.

9. Keep using runs analysis when subsequent data points are plotted.

7. (cont.) Draw the upper and lower control limits on the time plot of the data
   - The area between these two limits represents the region where you expect your data to fall if only common cause is present
   - They are based on 3 standard deviations – calculated correctly
   - Any point outside of these limits represents a special cause acting on the system.
Process Improvement – Ideas for Next Steps

This document is designed as a supplement as you embark on a thinking and learning journey. It is not intended as a next steps guide but instead a compilation of ideas to consider as you continue your education on improvement statistics and achieve a level of comfort that will allow you to begin transformation in your organization.

Remember, improvement statistics is a mind-set, not a skill set. Do not make the mistake of returning to your facility and announce a plan to “do data differently.” First, YOU must understand why this shift is important. Then, you can teach staff WHY such changes are critical to achieving sustainable process improvement. Hopefully you are inspired to commit to this work and not let it become just the next great idea to try. Making premature changes, throwing out a bad practice without something to replace it will create a vacuum. Anything can come in, usually more detrimental since now staff has an element of mistrust. Consider, “Is my organization capable of learning something new?”

_The first step is to get right in your mind. Study. Think._

**Helpful quotations from leaders in the improvement world:**
- _The first step in learning is curiosity._ (Deming)
- _A gradual awakening, a transformation! Be patient, be persistent, be humble, be inelegant._ (Scholtes)
- _This process is not short-term. This is not a quick fix. Think long-term but START._ (Neave)
- _Management needs to start to develop some right things (“good practice”) before it can safely start to dispose of wrong things (“bad practice”)._ (Scholtes)
- _In a world without data, opinion prevails. Where opinion prevails, whoever has power is king._ (Scholtes)
- _It is possible that managers who wish to hold on to the illusion of power may resist a statistical view of their work._ (Scholtes)
- _People don’t need statistics, they need to know how to solve their problems._ (Balestracci)
- _Learn how to ask better questions._ (Balestracci)
- _Teaching and learning about constructing control charts is training. Teaching and learning how to interpret the control chart is education._ (Neave)

**Commit to learning and truly understanding how and WHY to incorporate these principles into your improvement processes:**
- Recognize the futility and unintended misleading effects of common analyses like bar graphs, trend lines and benchmarking and more importantly, what to do differently
- Use process-oriented thinking as the basis for every improvement effort
- Determine the type of variation and choose the correct improvement strategy
- Use all your resources wisely and facilitate sustainable process improvement

**Decide what is important to focus on in your facility:**
What metric is causing you to lose sleep? Choose something that will “move a big dot in the board room.” Quietly solve a problem and let other people take the credit. (Balestracci)

**Questions to ask as you consider data and improvement:**
What problem are you trying to solve?
How do you know it’s a problem?
What data do you have?
What do the data tell you?

**When you identify an area for improvement, do the following:** (Balestracci)
- Plot the dots
- Identify the type of variation
- Engage in discussion, ask more questions - Are you ‘perfectly designed’ to get this result?
- Focus, focus, focus – find the 20 percent causing 80 percent
- Choose the appropriate improvement strategy
In his book *The Leader's Handbook*, Peter Scholtes wrote an excellent section on change. Below are brief excerpts:

**Two common approaches to change that are the least effective. Strive to understand and use Change Strategy 3.**

**Change strategy 1: Coercion** – “Coercion is adversarial and creates cynicism, grudges, distrust and demotivation. Management through fear and coercion is not a style of leadership. It is the abandonment of leadership, the abdication of leadership.”

**Strategy 2: Rationality** – “Reason and logic may indeed be necessary, more for some than for others. But they are certainly not sufficient to bring about change. There is an obvious difference between intellectually understanding something to be right or wrong and doing something about it. Explaining why change is important will not make the change happen. We are often disappointed, however, when our efforts to train and educate people do not result in people changing.”

**Change Strategy 3: The Socialization of Change** “Change is generally not a rational process.” People change because:

- They become aware of some conditions, factors, or circumstances that make them less content.
- They experience these conditions, factors, circumstances as occurring outside their current ability to control.
- They become aware that others, whom they respect, are experiencing this discontent and inability to control the events.
- They also become aware that someone or some group whom they respect has a proposed way to deal with this shared experience of discontent and inability to control.
- They become aware of a groundswell of support, especially among people whom they respect, for this new approach.
- They join their respected peers in support of this new approach.
- Rationality will be used as the process of change unfolds.
- It is seldom logical.

**What to say to a Surveyor, Administrator or Director of Nursing**

Explaining improvement statistics may seem daunting. After all, it is unlikely most people have knowledge of critical issues like variation and the correct strategies for improvement based in theory. As you become more comfortable and confident in your learning process, these conversations will get easier. Here are a few responses to get you started in conversations. Mix and match and then create your own responses.

“We are committed to process improvement based in the theory of variation which guides us to have intelligent discussion on what issues we need to address and how to proceed with an appropriate improvement strategy.”

“We use run charts to analyze our processes over time. The main strategy is to reduce the amount of variation which we accomplish by using correct data improvement strategies based in the theory of variation.”

**These next responses incorporate strategic excerpts from the QAPI-at-a-Glance Guide...**

“Just like CMS recommends in the QAPI-at-a-Glance Improvement Guide, we set our improvement priorities based on a data-driven approach. We focus on systems improvements. We accomplish this by [fill in].”

“Just like CMS recommends in the QAPI-at-a-Glance Improvement Guide, we prioritize improvement projects by using our data to inform us of the correct intervention. We accomplish this based on the theory of variation.”

“Just like CMS recommends in the QAPI-at-a-Glance Improvement Guide, we choose interventions and actions that are tightly linked to the root causes. The way we accomplish this is by using the theory of variation to identify if the process shows common or special cause. Then, we choose the appropriate intervention strategy.”

**Thought to Ponder:**

“In summary, improving quality is not just looking at past or present events. Rather, it involves predicting what actions will lead to a better future. Such prediction is effective only when the theory of medicine is combined with the analysis of data that has been conducted in the light of an appropriate theory of variation – a theory that distinguishes between common and special causes. Clinical practice and health care management should not be guesswork, trial and error, nor experience based on the repetition of the errors of those who have come before. Rather, it should be prediction based on theory.” (Heero Hacquebord)