Start with Stories, Then the Data:

Engaging Hearts Before Minds in Healthcare Improvement

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BalladHealth™
It's your story. We're listening.

THA TENNESSEE HOSPITAL ASSOCIATION

Be okay with failure and learn from it.



"Fall down seven times, get up eight."



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Daruma Doll Stages

1) Set Your Intention

2) Display with Purpose

3) Celebrate Achievement

4) Honor the Cycle



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Lesson One: Focus on the patient. Everything else will follow.

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Meet Ty



EAST TENNESSEE Children's Hospital

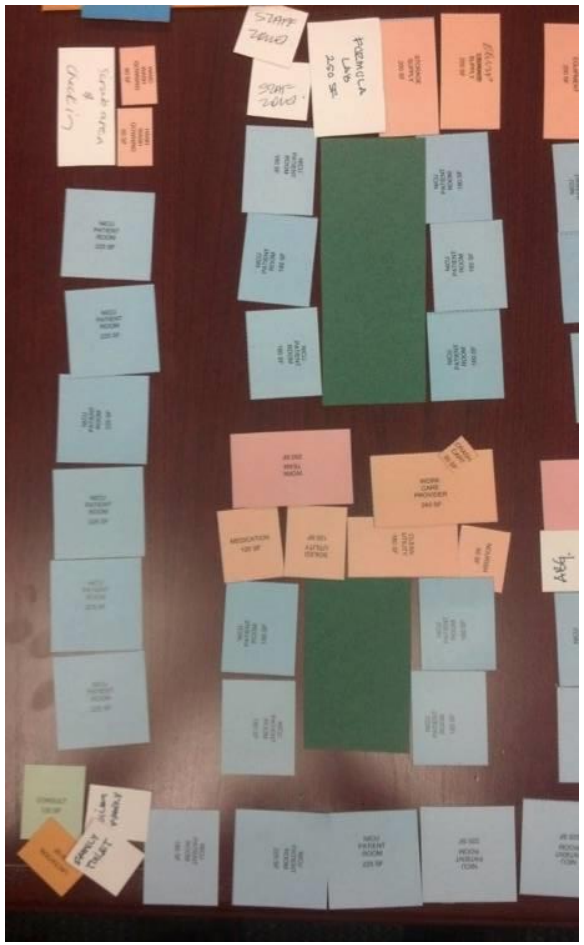
East Tennessee Children's Hospital from Concept to Creation





EAST TENNESSEE Children's Hospital

“We have to travel to 5 floors & walk 3 blocks for surgery.”







EAST TENNESSEE Children's Hospital

"They kept asking us the same question over and over…"

Go See, Ask Why, Show Respect

520

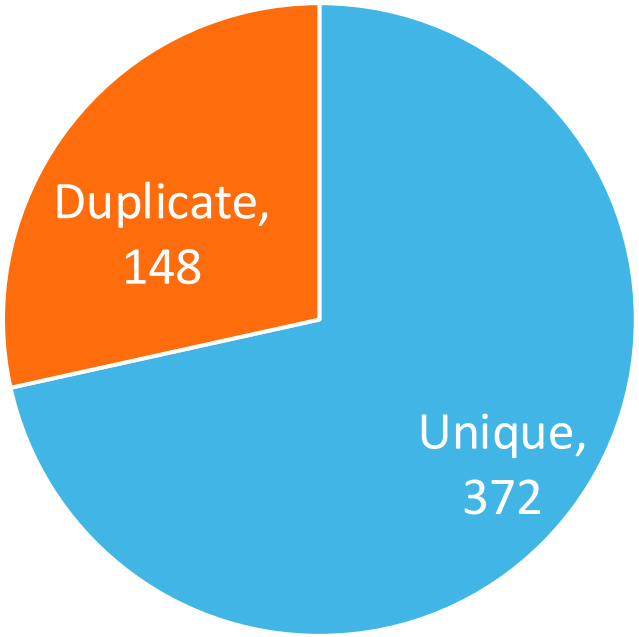
possible questions being asked of patients/families prior to surgery

EAST TENNESSEE Children's Hospital

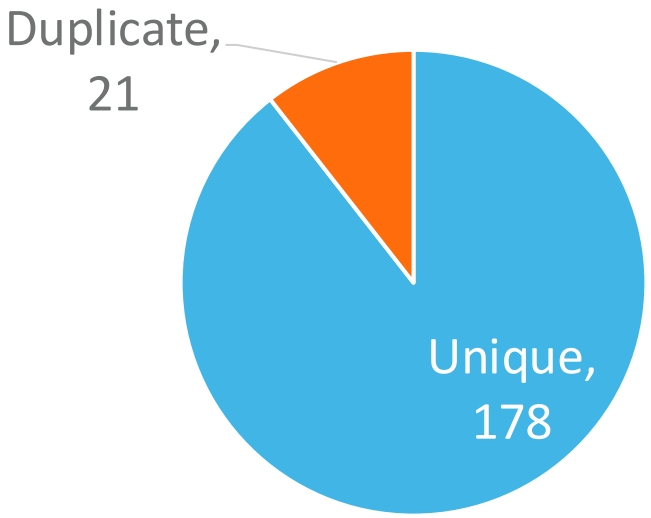
Inpatient vs. Outpatient System Design

Seek to understand, not judge.

Current State EMR Fields



Future State EMR Fields



36%

- Total items decrease

85%

- Duplication decrease*

*Purposeful duplication of items that benefit from verification

EAST TENNESSEE Children's Hospital

"Some patients were having a great experience, but we were not."

Date: Tuesday, February 25, 2014
Time: 12:30
Cases: 58

Notes:

Utilization				
Reg.	P/P	PACU	Pro.	OR
33%	43%	67%	50%	22%

Reg.	Wait
P-57	P-54
EGD	EGD
	P-55
	EGD

Procedure Pre/Post

P/P 1	P/P 2	P/P 9	P/P 10
P-52			P-48
EGD			EGD
P/P 3	P/P 4	P/P 11	P/P 12
P/P 5	P/P 6	P/P 13	P/P 14
P-46	P-49		
EGD	EGD		
P/P 7	P/P 8	P/P 15	P/P 16
P-50	P-56	P-53	
EGD	EGD	EGD	

Surgical Pre/Post (West)

P/P 17	P/P 19	P/P 21	P/P 23
P/P 18	P/P 20	P/P 22	P/P 24
P-47			
URO			
P/P 25	P/P 27	P/P 29	P/P 31
P-35			P-38
ENT			Tubes
P/P 26	P/P 28	P/P 30	P/P 32
	P-36		P-34
	ENT		ENT

Surgical Pre/Post (East)

P/P 33	P/P 35	P/P 37	P/P 39	
P-20	P-13	P-28	P-22	
Eye	Eye	Eye	Gen	
P/P 34	P/P 36	P/P 38	P/P 40	
			P-21	
			Ortho	
PACU 3	PACU 4	PACU 5	PACU 6	PACU 7
P-27	P-30	P-33	P-37	
T&A	Gen	Ortho	Eye	
PACU 2	PACU 1		PACU 9	PACU 8
P-26	P-25			
Dent	Dent			

Procedure ORs

Pro. 1	Pro. 2	Pro. 3	Pro. 4
P-42			P-40
Dent			Dent

Surgical ORs (West)

OR 2	OR 3	OR 4
	P-29	
	T&A	
OR 1		OR 5

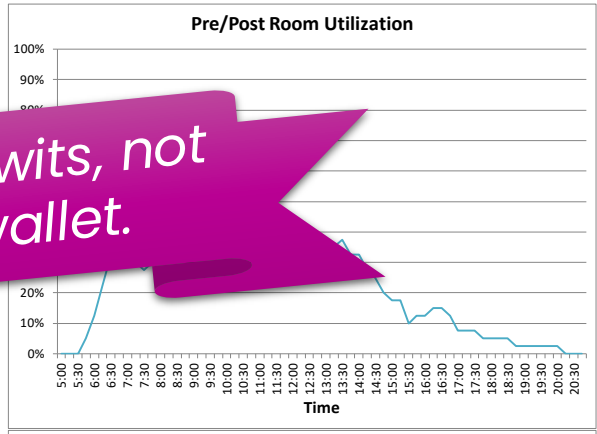
Surgical ORs (East)

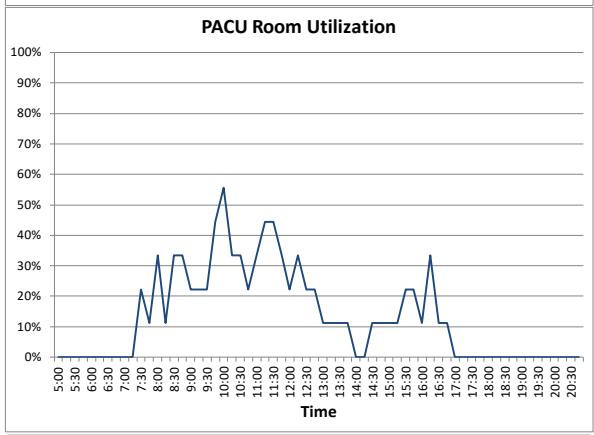
OR 7	OR 8	OR 9
P-44		
Ortho		
OR 6		Future OR

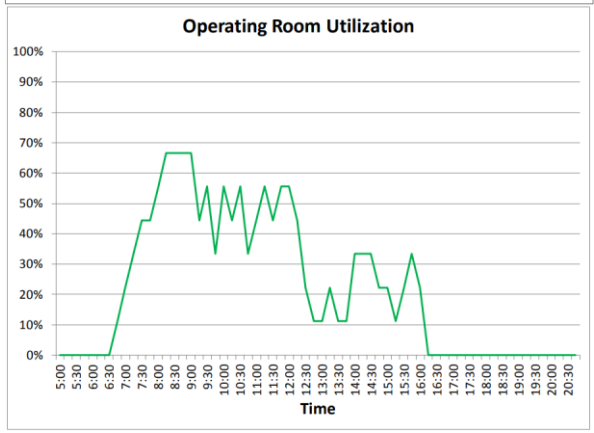
Waiting Room Occupancy			
2 Fam.	3 Fam.	4 Fam.	5 Fam.
29	59	89	119

			24
		-31	
Eye	Gen	EGD	
P-2	P-17	P-32	
Bronch	EGD	ENT	
P-3	P-18		
T&A	Dent		
P-4	P-19		
Tubes	T&A		
P-5			
Ortho			
P-6			
Tubes			MRI
P-7			
T&A			
P-8	P-23		
Eye	T&A		
P-9	P-24	P-39	
T&A	EGD	EGD	
P-10			
EGD			
P-11			
T&A			
P-12			
T&A			
		P-43	
		EGD	
P-14			
ENT			
P-15			
T&A		MRI	

Use your wits, not your wallet.



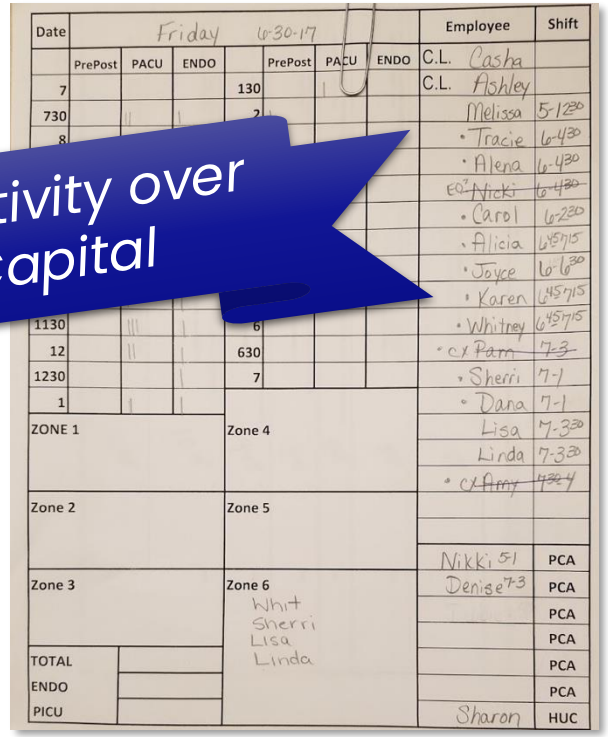




EAST TENNESSEE Children's Hospital

"The staff are doing their best with the resources they have. They're stressed!"

Creativity over Capital



Home > LeanMgmt > OrStaffingPredictor

Surgery Date	7/15/2015	Case Types	Allergy, Anesthesia, C
Registration Patient/Staff	1	Nurse Pre Patient/Staff	8
PCA Pre Patient/Staff	10	OR Nurse Patient/Staff	1
OR Tech Patient/Staff	1	RECOVERY Patient/Staff	1
Nurse Post Patient/Staff	8	Pca Post Patient/Staff	10
Include Inpatient	No		

1 of 1 | 100% | Find | Next

Registration Staff	1	1	1	2	3	1	0	0	0	0
Nurse Pre	2	2	1	1	1	1	1	1	1	1
Pca Pre	2	1	1	1	1	1	1	1	1	1
OR Nurse	6	8	6	7	7	5	7	6	5	4
OR Tech	6	8	6	7	7	5	7	6	5	4
Recovery Nurse	5	4	5	5	2	3	4	4	4	3
Nurse Post	2	2	2	2	3	2	2	2	2	2
Pca Post	1	2	2	2	2	2	2	2	2	2

EAST TENNESSEE Children's Hospital

What our patients experience today.

62% ↓	• Reduction in pre-op questions
84% ↓	• Reduced average time to get a patient ready for surgery from 287 minutes to 47 minutes
90%	• Patients experience our pre-op goal of 60 minutes
18% ↓	• Reduction of Operating Room turnover time
$560K ↓	• Reduction in new facility equipment needs
$812K ↓	• Cost avoidance of two fewer planned ORs while still meeting patient demand.
$3.2M ↓	• Overhead cost reduced by running the same volume through 6 ORs vs 9 ORs.

"We're now only collecting essential information from our patients and families. I now have time to build relationships with my patients. This is why I went into nursing."

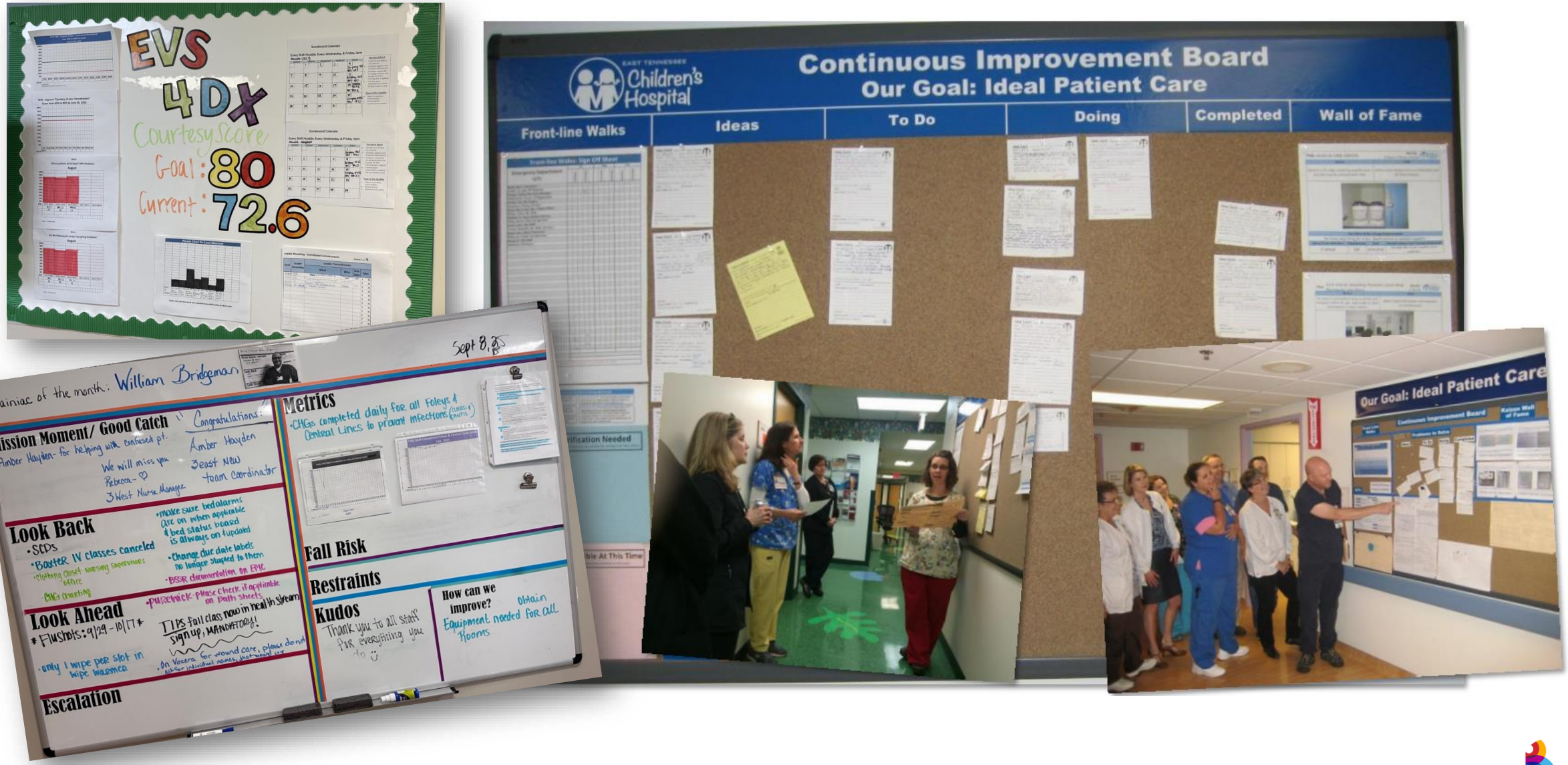


"I called my husband on the day of surgery and couldn't believe the improvements made in the reduction of repetitive questions and the improvement of staff working in tandem. It was a night and day difference."



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Building an improvement culture starts with the frontline.

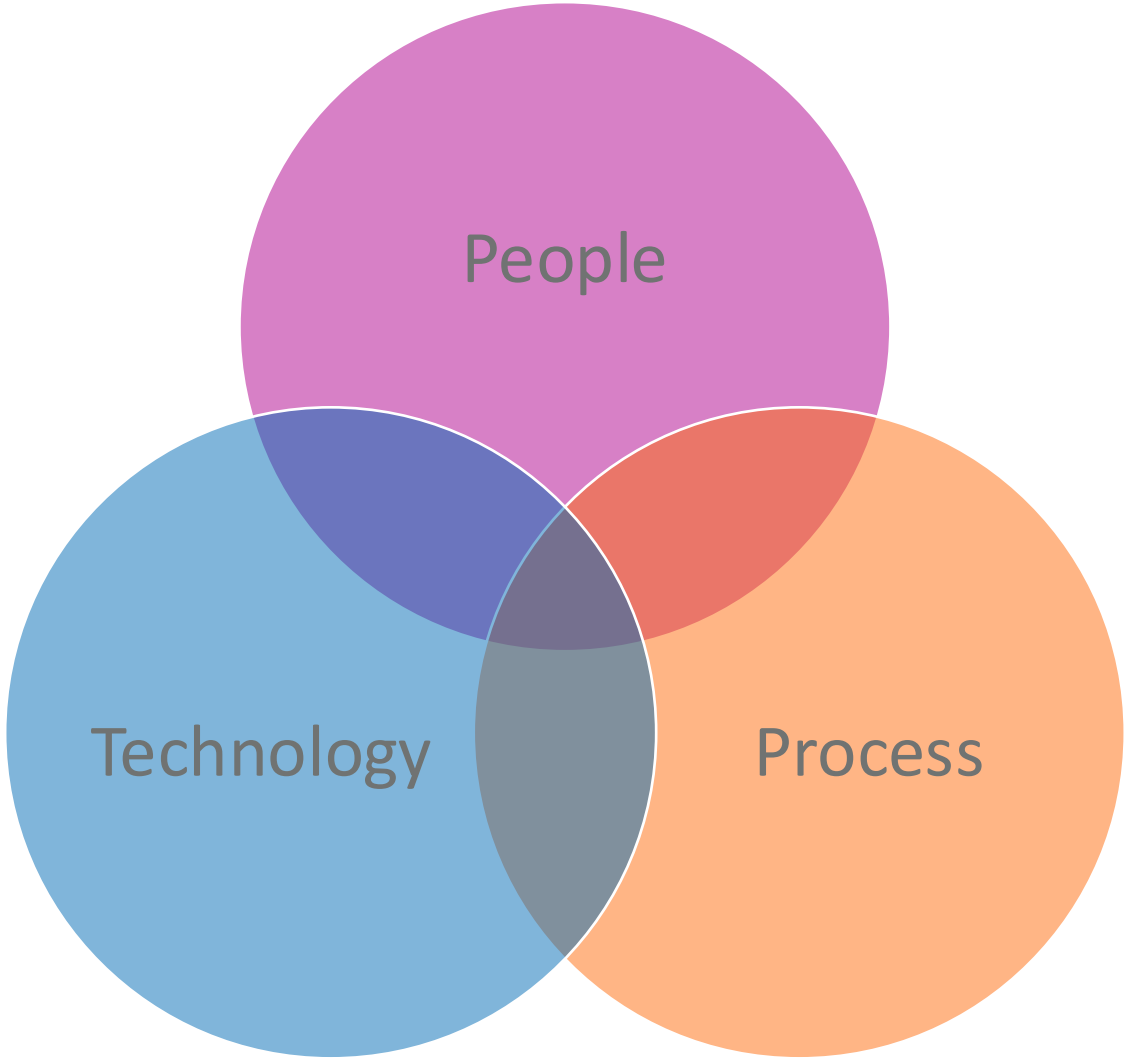


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Lesson Two:
Technology is not a silver bullet solution in healthcare.

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Design with Lean Principles: Improving one without the other is not improvement.



Go to Gemba. Seek to Understand.







Hospital – 1st Pump

- $50-125 per day per pump
- Lost pumps
- Inconsistent billing

Transition – 2nd pump

- Transition Pump ($600-900)
- Additional dressing change
- Delay in Discharge ($800-5000 per night)
  - 3 hrs – 3 days

Post Acute – 3rd pump

- Device Change

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KFF Health News

"Nobody is responsible for coordinating care…that's the dirty little secret about health care."

Health Care's 'Dirty Little Secret': No One May Be Coordinating Care

By Roni Caryn Rabin

APRIL 30, 2013

REPUBLISH THIS STORY

This KHN story was produced in collaboration with The Washington Post

Betsy Gabay saw a rotating cast of at least 14 doctors when she was hospitalized at New York Hospital Queens for almost four weeks last year for a flare-up of ulcerative colitis. But the person she credits with saving her life is a spry, persistent 75-year-old with a vested interest — her mother.



Illustration by Arthur Giron

Alarmed by her daughter's rapid deterioration and then by her abrupt discharge from the hospital, Gabay's mother contacted a physician friend who got her daughter admitted to Mount Sinai Medical Center in Manhattan.

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Systems Thinking: The ability to see how one thing is part of a larger, connected system.

Deming's System of Profound Knowledge



Theory of Knowledge: How do we know what we believe we know?



Theory of Variation: How do we analyze and understand what we know?



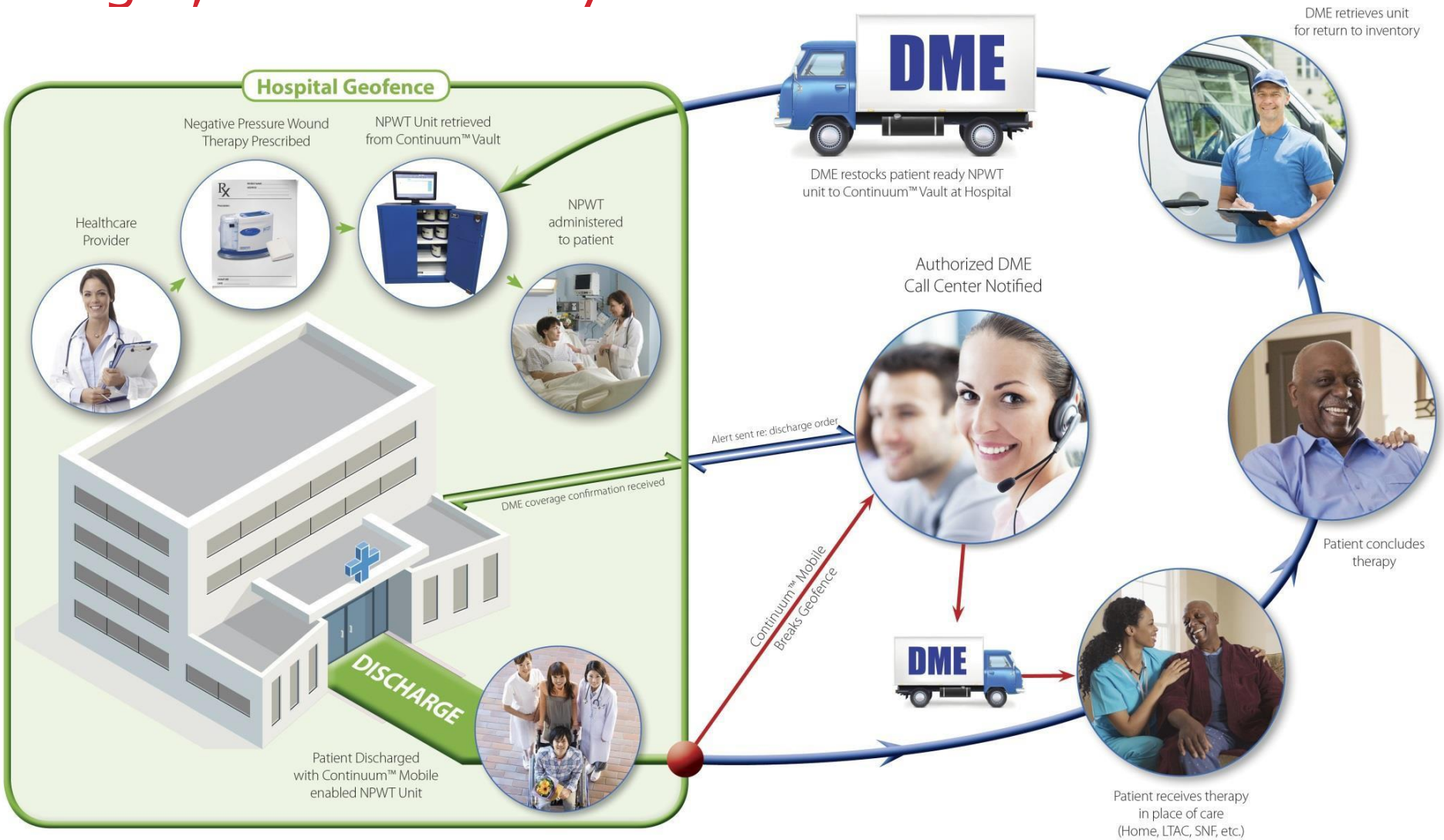
Theory of Psychology: How do we account for human behavior



An Appreciation of Systems/ Systems Thinking: Are we seeing the bigger picture?

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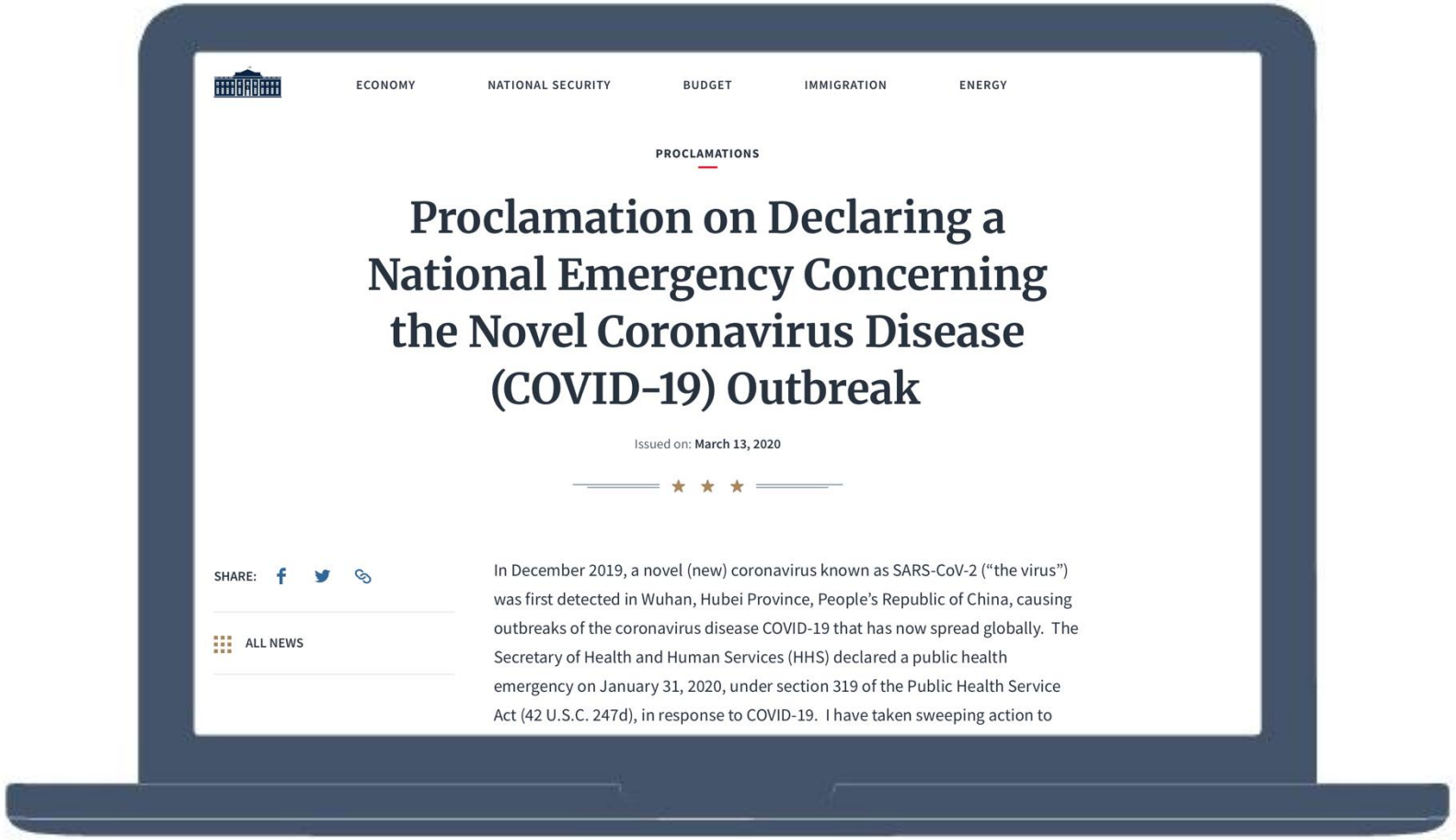
Systems Thinking: The ability to see how one thing is part of a larger, connected system.



- **28m** — Reduction in discharge time
- **90%** — Elimination of "extra" dressing changes
- **$30K** — Cost of Lost Units
- **$500K** — Annual Operating Cost Savings

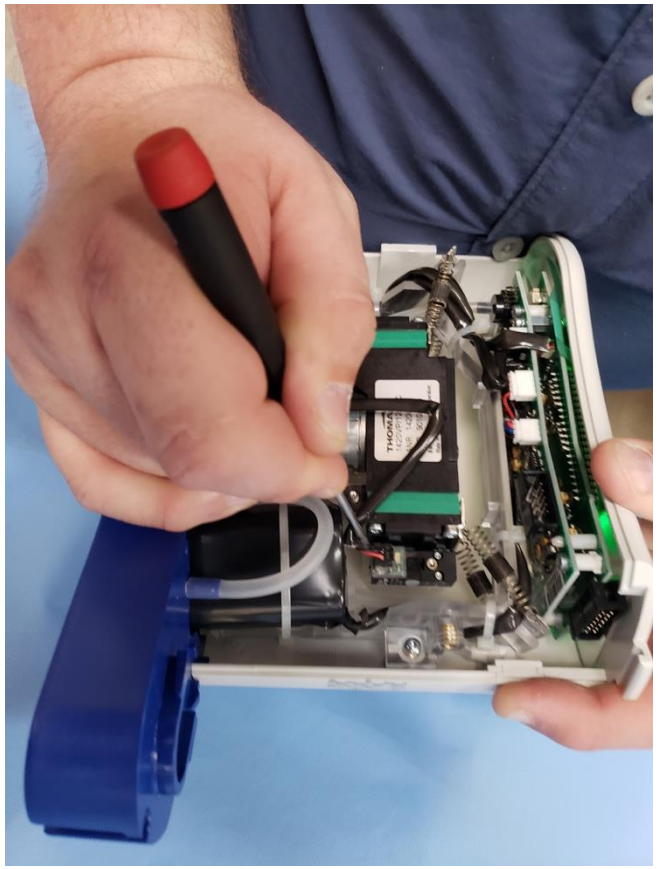
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The world changed overnight, and so did we.



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Sunk Cost Fallacy: Focus on the right problem to solve.





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Special Note on AI

I'm an AI optimist. AI isn't coming for your job; it's coming for the jobs of people who refuse to adapt. Master the tools or fall behind.

	Roles											
	Operational Excellence						EPMO					
AI & Automation Requirements / Skillsets	OE Specialist 1	OE Specialist 2	OE Specialist 3	OE Consultant	OE Engineer / Sensei	System Director	EPMO Coordinator	Junior Program Manager	Project Manager	Program Manager	Senior Program Manager	Director
Utilize Copilot in M365 for Minutes, Action Items & Summaries	R	R	R	R	R	R	R	R	R	R	R	R
Build Structured Prompts for A3 Problems & VSM Process Analysis	P	R	R	R	R	R	-	-	-	-	-	-
Build structure prompts to prepare for upcoming meeting	R	R	R	R	R	R	R	R	R	R	R	R
AI management of Project Management Artifacts	-	-	-	-	-	-	P	R	R	R	R	R
Identify Automated Flows Suitable for AI/Automation	-	P	R	R	R	R	-	P	R	R	R	R
Build Automated Flows Suitable for AI/Automation	-	-	-	R	R	R	-	-	-	R	R	R
Lead Departmental Teams Channels Adoption & Training	-	-	P	R	R	R	-	-	P	R	R	R
Identify AI opportunity with Business Owner (AI Scout)	R	R	R	R	R	R	R	R	R	R	R	R
Manage AI Program Lifecycle (Pilot to Scale)	-	-	-	P	R	R	-	-	-	P	R	R
Align AI Investments with Ballad Strategy	-	-	-	-	-	R	-	-	-	-	-	R
Required	R											
Preferred	P											

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Special Note on AI

Lesson Three: Stop reacting to “noise” with Process Behavior Charts

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How many people have Red/Green traffic light or "Bowling Charts" at work?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Falls per 1,000 days	3.6	3.1	3.9	3.4	3.7	3.0	3.8	3.5	3.3	3.9	3.2	3.6
CLABSI rate	0.8	1.1	0.9	1.4	0.7	1.0	0.9	1.6	0.8	1.1	0.9	1.0
30 day readmissions	14	15	14	13	15	14	16	15	14	13	15	14

Twelve months of a quality board. Almost all green, so almost nothing gets discussed.

Green hides real change

- A measure can drift up or down for months and still sit under the target every single month.
- The color reports the goal, not the system or process.

Small numbers swing hard

- Falls, infections, and mortality involve small monthly counts.
- A red month followed by a green month usually means nothing changed at all. The same system produced both results.
- Healthcare counts are small enough for noise to dominate.

Explanation theater

- Teams burn review meetings justifying noise and writing action plans for random variation, which leaves no time to improve the process.

Tampering makes it worse

- Adjusting a stable process after every red month adds variation instead of removing it. Deming demonstrated this with the funnel experiment.

Seven Basic Quality Tools



Cause-and-Effect Diagram (Fishbone/Ishikawa): Identifies all potential root causes of a specific problem.



Check Sheet: A structured form used to collect and organize real-time data or defect frequencies.





Control Chart: Monitors process stability and variations over time using upper and lower control limits.



Histogram: A bar graph showing the frequency distribution of data to reveal variations.



Pareto Chart: A bar and line graph prioritizing problems based on their frequency or impact (the 80/20 rule).



Scatter Diagram: Graphs pairs of numerical data to identify relationships or correlations between two variables.



Flowchart (or Stratification): Maps out the sequential steps of a process or categorizes data to identify bottlenecks and pattern

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What is a Process Behavior Chart?

- A Process Behavior Chart (PBC) is also referred to as a XmR chart, control chart, or Shewhart chart, plots your data in time order against limits calculated from eh data itself.
- The limits are not a goal, a target, or a wish. They are the "voice of the process" or what your process is actually capable of doing right now.
- In addition to the charts, there is a list of rules to indicate if the data is just inherent variation "noise" or a clear signal that there is something we need to investigate, a change in the system, or a potential problem to solve.

Specification Thinking

- Compares this month to a target, budget, or last year.
- Treats every up-tick or down-tick as meaningful
- Leads leaders to chase noise and to miss real signals

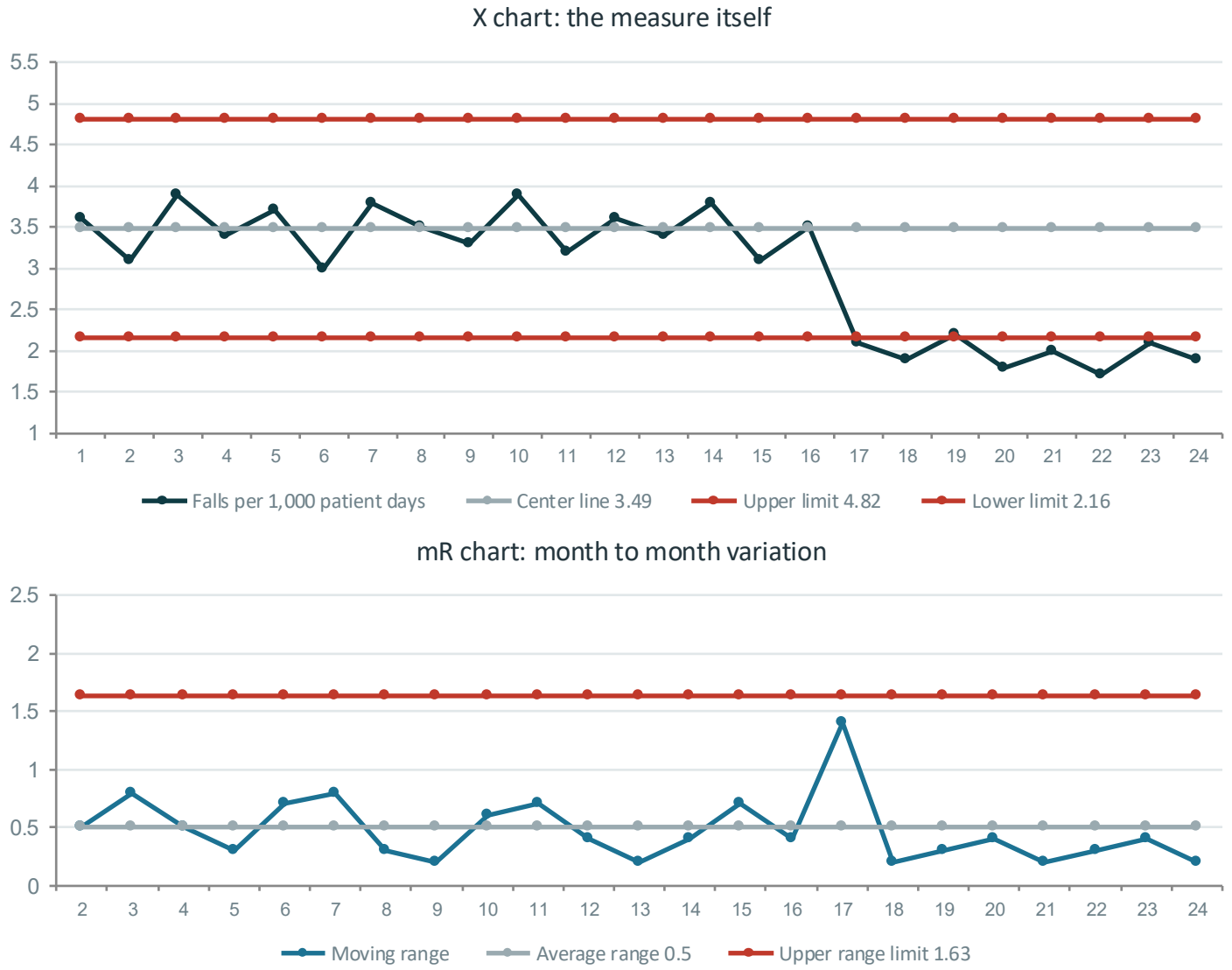
Process Behavior Thinking

- Compares today's data to what the process has done over time
- Separates routine variation "noise" from a real change "signal"
- Tells you exactly when to act and when to leave it alone

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Anatomy of an XmR Chart

- **X Chart (top):** the individual values you're tracking over time (falls, wait times, infections, whatever matters)
- **Moving Range chart (bottom):** tracks consistency or how much each point differs from the one before it. This is what generates the limits.
- **Works on small numbers:** Rates built on small monthly denominators are exactly where eyeballing red and green fails, and where calculated limits earn their keep.



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Sane Data, Two Very Different Stories

Red and Green Bowling Chart

- Compares one point to a target someone chose
- Treats every miss as a problem and every hit as success
- Reacts to noise, then loses credibility when the reaction changes nothing
- Tells you the color, never the cause

XmR Process Behavior Chart

- Compares performance to what the system actually does
- Separates routine variation from genuine signals
- Signals are defined in advance. Everything else is noise and needs no explanation
- Confirms whether an improvement held or faded
- Tells you when to investigate, so effort lands where it matters

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Creating and Calculating Process Behavior Charts

1) Get the Initial Baseline Data

- Ideally, we'd have 20 historical data points for the initial average and Natural Process Limits

2) Calculate the Central Line for the X Chart

- Mean or average of our base line data points

3) Draw a Run Chart

- In Excell this is a called a line chart.

4) Calculate the Moving Ranges and Average Moving Range

- Absolute value of Point 2 - Point 1

5) Calculate the Natural Process Limits

- Lower NPL = Average - 3 * (MR-bar)/1.128. or Average – 2.66 * (MR-bar)
- Upper NPL = Average + 3* (MR-bar)/1.128 or Average + 2.66 * (MR-bar)

6) Create and Review the Initial X Chart

- Add the Upper and Lower Limits to the X Chart
- Look for signals based on the Four Rules

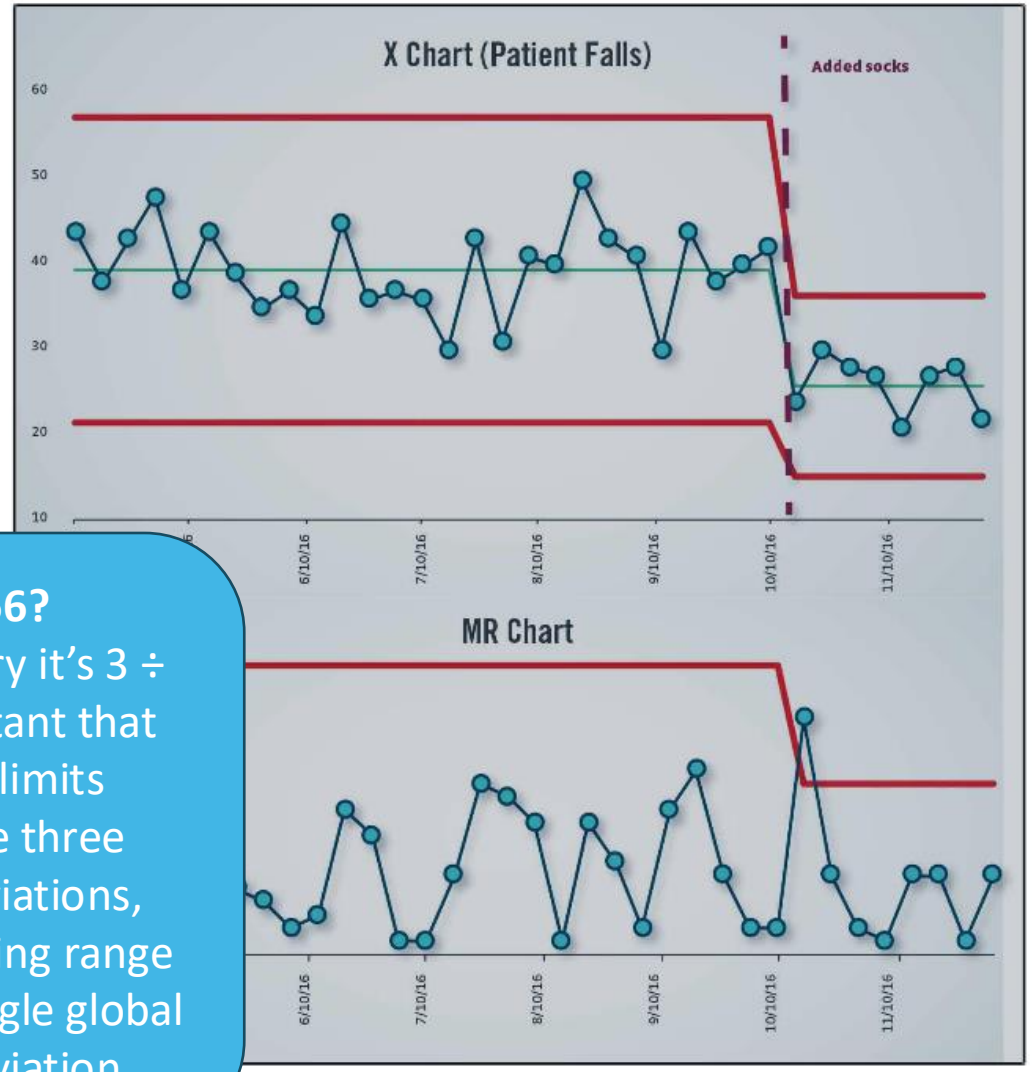
7) Create and Review the MR Chart

- MR Upper Range Limit = MR Bar * 3.268
- Look for signals

8) Add data points over time, look for signals, and continue to improve

- Do not continually recalculate the average the limits

9)Shift the Limits, when Appropriate.



Why 2.66?

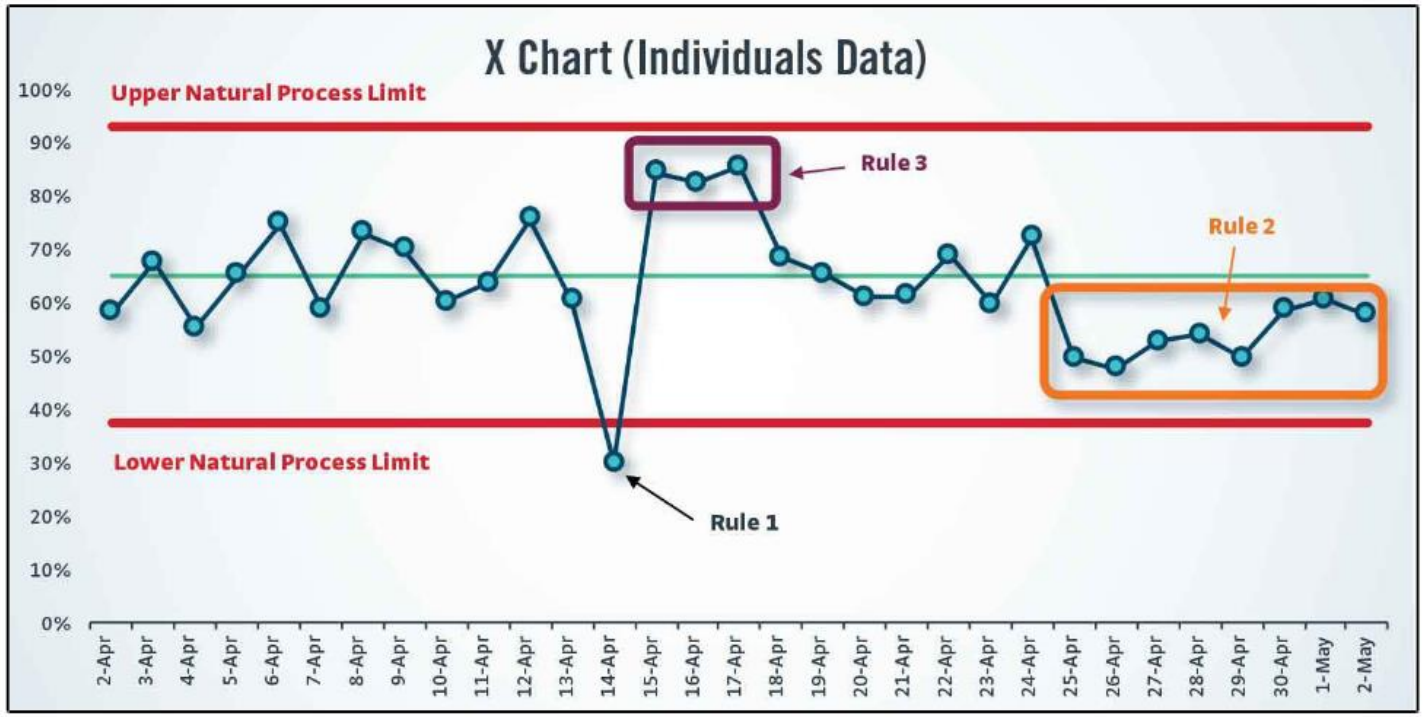
It isn't arbitrary it's 3 ÷ 1.128, a constant that makes the limits approximate three standard deviations, using the moving range instead of a single global standard deviation.

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Rules for Finding a Signal*

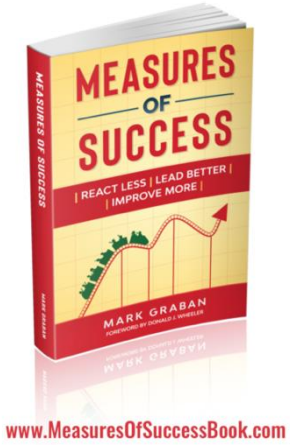
Three Rules to identify Signal in the X Chart of BPCs:

1. **Rule 1:** Any data point outside of the limits.
2. **Rule 2:** Eight Consecutive points on the same side of the central line.
3. **Rule 3:** Three out of four consecutive data points that are closer to the same limit that they are to the central line.



There is an additional rule for the MR Chart that we use to identify signals"

1. **Rule 4:** Any data point above the MR Upper Range Limit



*© Mark Graban, 2018

www.MeasuresofSuccessBook.com

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When should you recalculate the mean?

1) During Initial Baseline Establishment

- **Provisional phase:** When starting a new chart, you can calculate a temporary mean with as few as 5 to 10 provisional data points.
- **Locking the baseline:** You should recalculate and "lock" the baseline mean once you collect 20 to 30 data points from a period where the process is operating in statistical control.

2) When a Statistical Signal Detects a Process Shift

- **A sustained shift (Rule 2):** 8 or more consecutive data points fall entirely above or entirely below the current baseline average.
- **A structural trend:** 6 or more data points steadily increasing or decreasing in a row, indicating a continuous drift in the process.
- **Clustering near the limits:** 3 out of 4 consecutive points fall closer to the upper or lower natural process limits than to the center line.

3) After Intentional Process Improvements

- **Planned changes:** If you deliberately alter the system—such as upgrading equipment, changing a workflow, or retraining staff—recalculate the limits after the modification is completed.
- **Verify before updating:** Do not change the mean immediately upon deploying a fix. Extend your old limits forward until the new data visibly breaks those limits (proving the change actually worked). Then, recalculate using only the data points collected *after* the change.

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When should you **NOT** recalculate the mean?

In Response to Common Cause Variation

- **Routine noise:** Do not recalculate when data bounces randomly around the average.
- **Expected bounds:** Variation within the upper and lower natural process limits is normal.
- **System capability:** This noise represents the inherent capability of your current system.

2. For Fleeting Special Causes

- **One-time spikes:** Do not recalculate if a single data point shoots past a limit due to an isolated event.
- **Identifiable disruptions:** Events like a temporary power outage, an explicit clerical error, or a brief weather delay do not represent a new normal.
- **Action required:** Investigate and fix the isolated root cause, but leave your baseline mean alone.

3. Out of Convenience or Habit

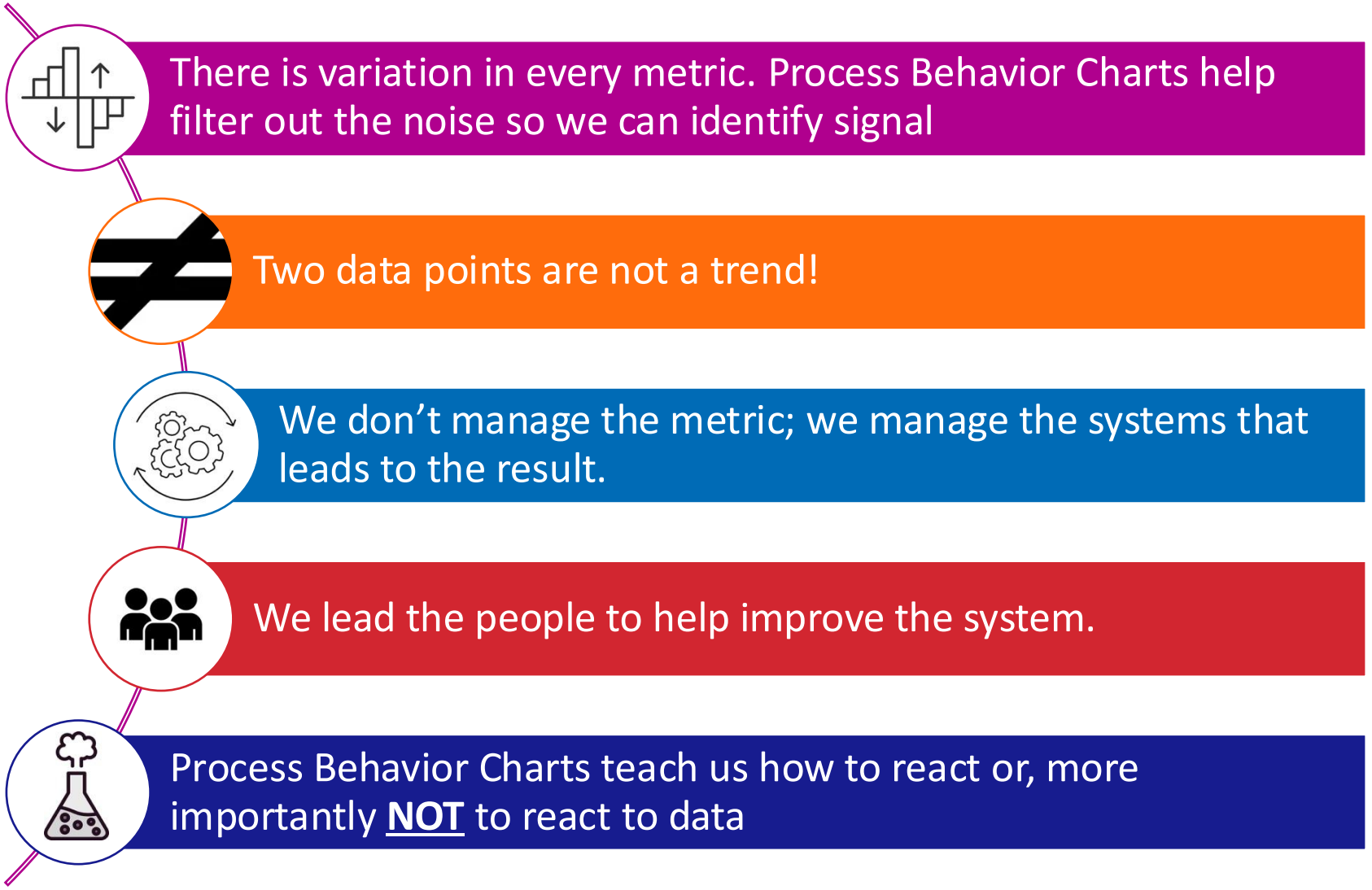
- **Calendar schedules:** Do not recalculate simply because a new month, quarter, or fiscal year started.
- **Continuous rolling averages:** Never recalculate by adding the newest data point and dropping the oldest point daily or weekly.
- **Goal chasing:** Do not alter the mean to force the chart to align with arbitrary management targets or KPIs.

4. Before a Process Change is Proven

- **Premature updates:** Do not change the baseline the exact day you launch a new process improvement.
- **Hypothesis stage:** You must keep the old mean and limits in place to see if the new data actually breaks the old patterns.
- **Proof period:** Only recalculate after you possess statistical proof (like 8 points in a row above or below the line) that the change worked.

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Process Behavior Chart Key Points



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Why this matters most in healthcare?

Rare events, small denominators

- A unit with two pressure ulcers in March and five in April has almost certainly not tripled its risk.
- Monthly counts this small are dominated by chance, and two colors cannot tell you otherwise.

Improvement work needs proof it worked

- A chart shows whether the new bundle, huddle, or protocol actually shifted the system, or simply coincided with a quiet month, and whether the gain held six months later

Targets change behavior, not care

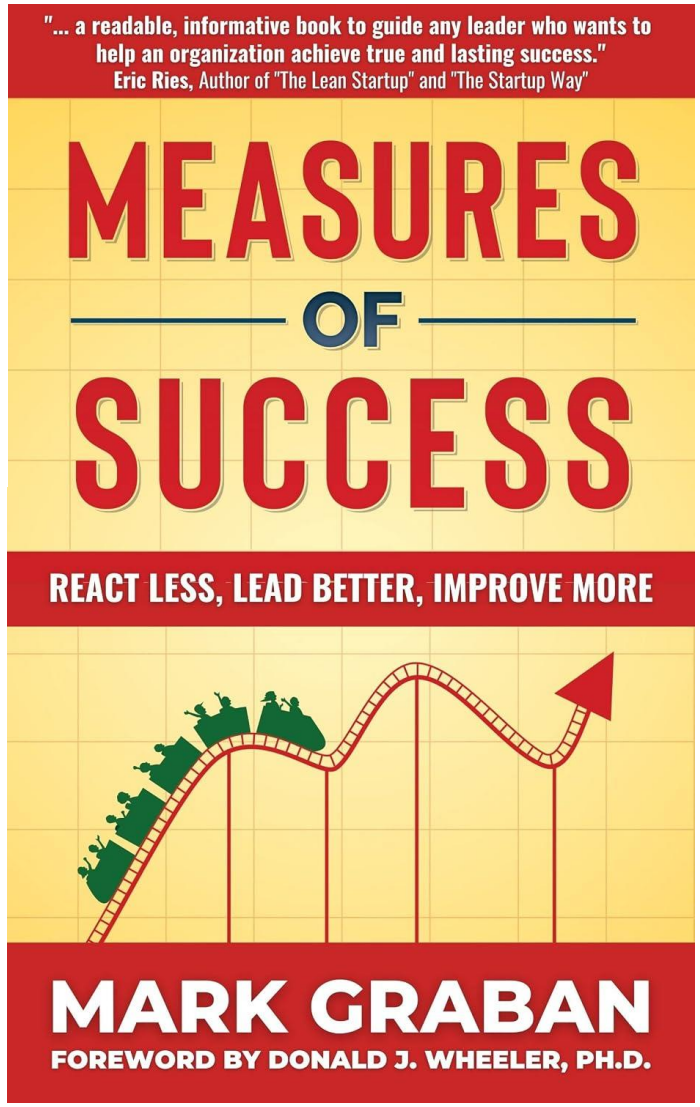
- When green is the goal, documentation, coding, and timing of measurement move first.
- Limits calculated from the data remove the incentive to manage the color.

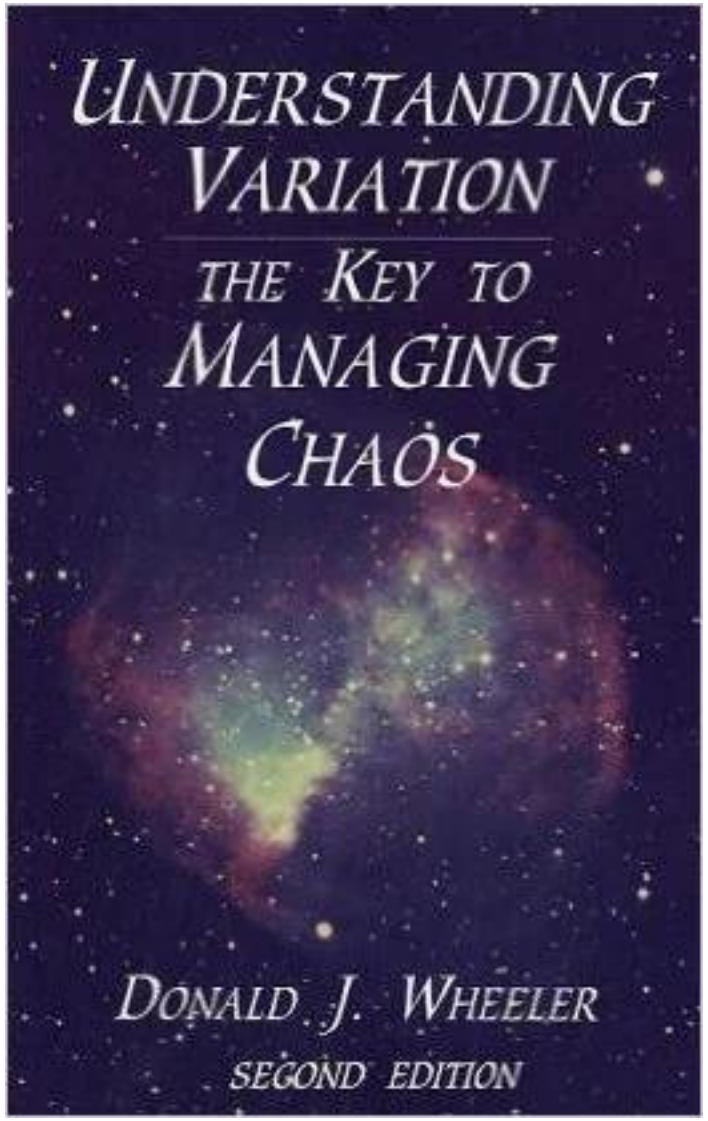
Noise is not a performance problem

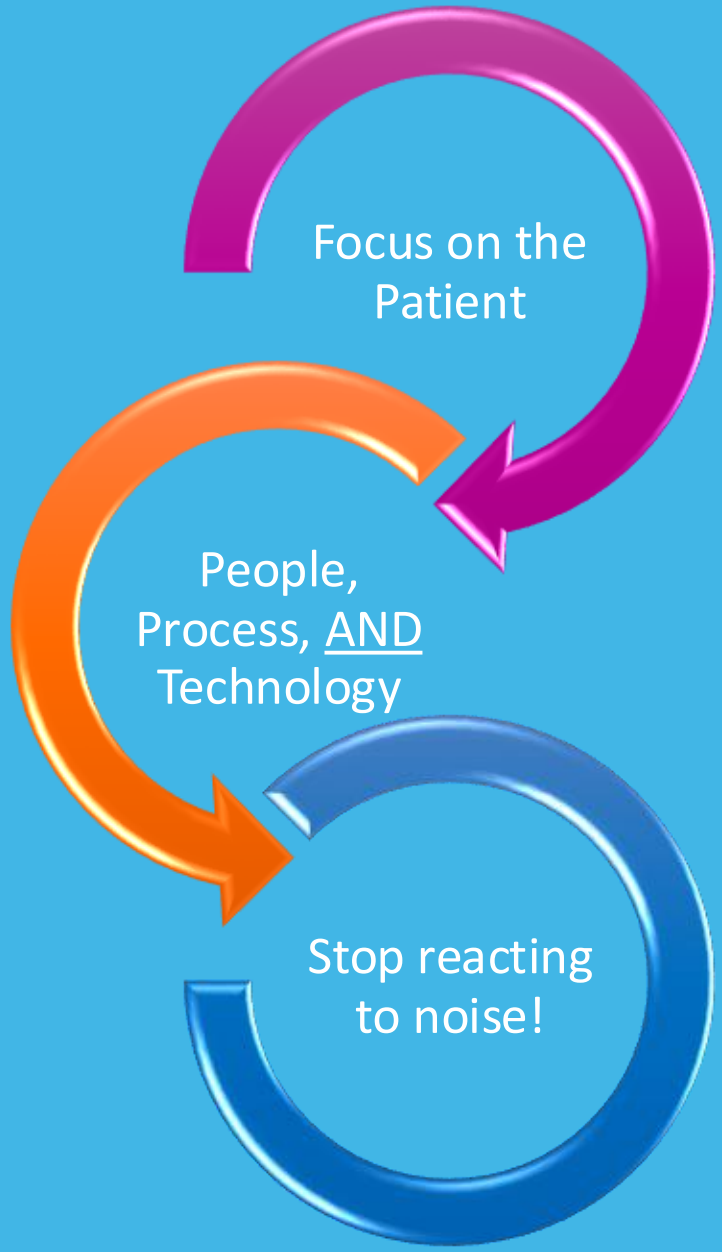
- Census, case mix, and seasonality produce red months that no action plan can fix.
- Chasing them costs credibility with the clinical teams you need on side.
- Change the meeting. Review signals only. Recalculate limits after a confirmed shift, never after a single bad month.

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My Two Favorite Books on Process Behavior Charts







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Golden Opportunities for Authentic Growth

Celebrate imperfections rather than hiding them.

- Kintsugi is the art of repairing broken pottery with gold.
- Wabi-sabi is finding beauty in imperfection and change over time



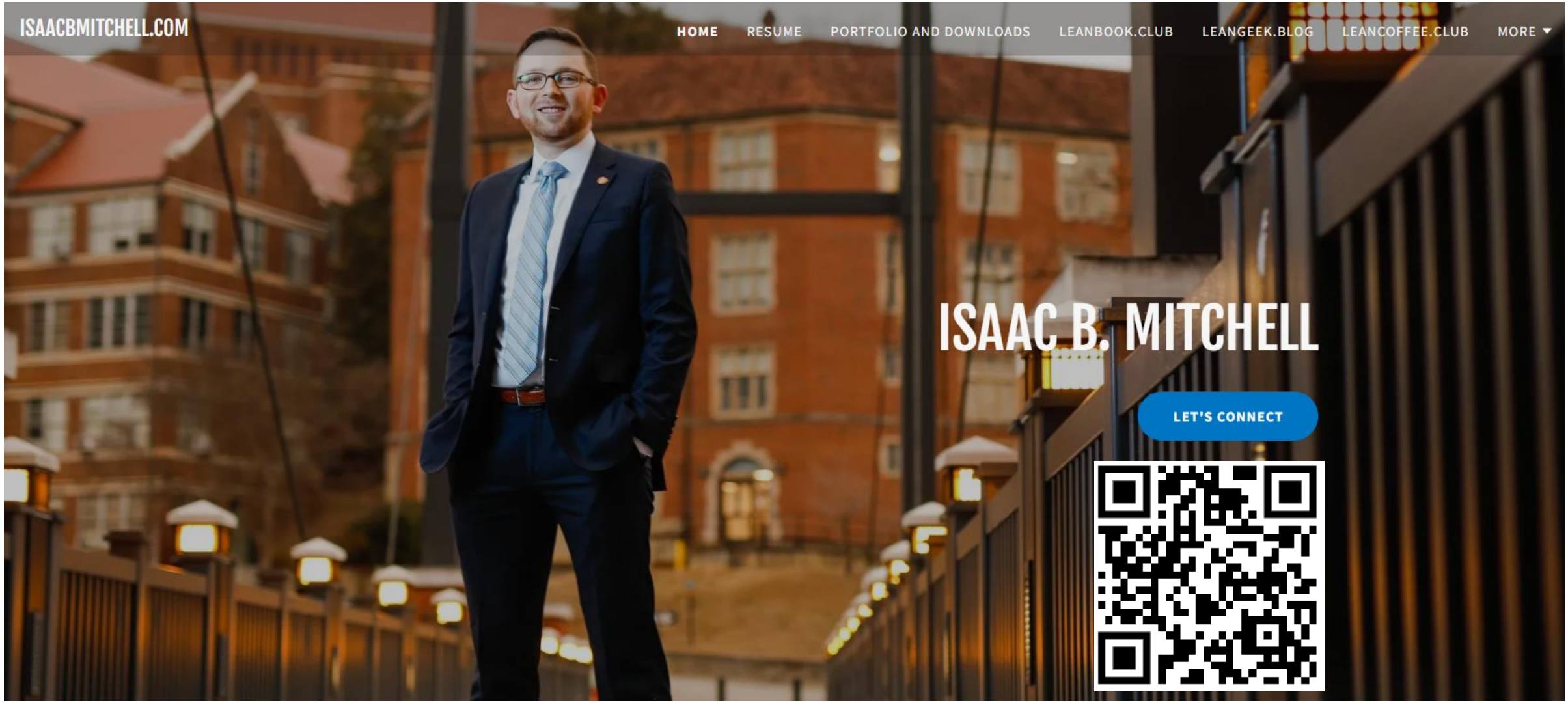
Hansei: The Power of Self-Reflection



What is the one thing you will start on Wednesday Morning as a result of our time together?

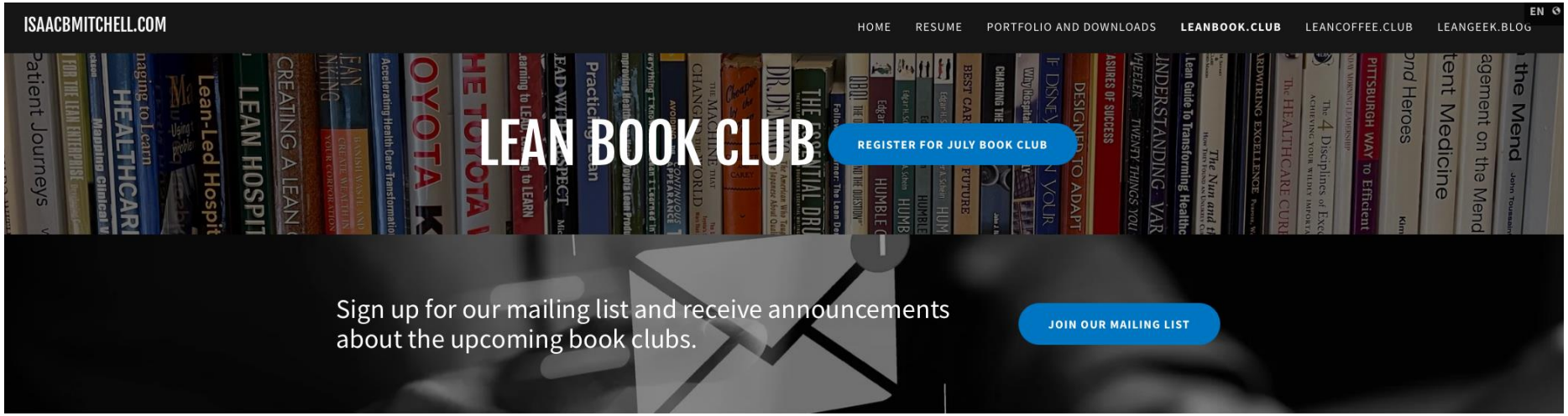
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Questions?

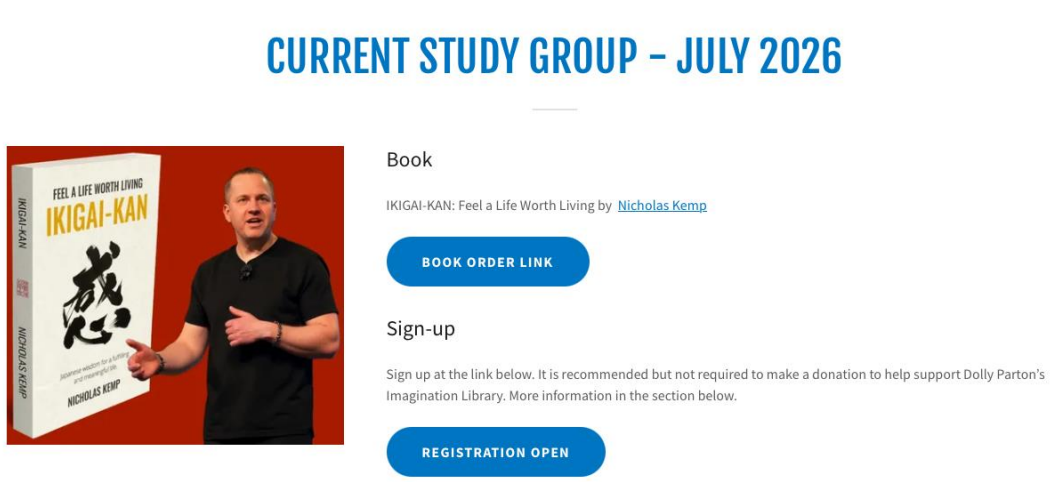


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