



Prepared for the Non-Executives of the East London NHS Foundation Trust

## The Role of the Board in Building and Sustaining Quality: Part 3

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06 Jan 2015



# How will we know that a change is an improvement?

- 1. By <u>understanding the variation</u> that lives within your data
- 2. By making good management decisions on this variation (i.e., don't overreact to a special cause and don't think that random movement of your data up and down is a signal of improvement).
- 3. By <u>creating a transparent data culture</u> (i.e., sharing your data with staff, patients and families and the public).

### **But beware of the Measurement Paradox**

### "You can't fatten a cow by weighing it"



- Palestinian Proverb

Improvement is <u>NOT</u> just about measurement!

However, without measurement you will never be able to know the answer to question #2 in the MFI.

# Why are you measuring?





## **Improvement?**

The answer to this question will guide your entire quality measurement journey!

### "The Three Faces of Performance Measurement: Improvement, Accountability and Research"

by Lief Solberg, Gordon Mosser and Sharon McDonald Journal on Quality Improvement vol. 23, no. 3, (March 1997), 135-147.

"We are increasingly realizing not only how critical measurement is to the quality improvement we seek but also how <u>counterproductive</u> it can be to mix measurement for accountability or research with measurement for improvement."

### **The Three Faces of Performance Measurement**

Aspect	Improvement	Accountability	Research
		(Judgement)	
<u>Aim</u>	Improvement of care (efficiency & effectiveness)	Comparison, choice, reassurance, motivation for change	New knowledge (efficacy)
Methods: • Test Observability	Test observable	No test, evaluate current performance	Test blinded or controlled
• Bias	Accept consistent bias	Measure and adjust to reduce bias	Design to eliminate bias
Sample Size	"Just enough" data, small sequential samples	Obtain 100% of available, relevant data	"Just in case" data
<ul> <li>Flexibility of Hypothesis</li> </ul>	Flexible hypotheses, changes as learning takes place	No hypothesis	Fixed hypothesis (null hypothesis)
Testing Strategy	Sequential tests	No tests	One large test
Determining if a change is an improvement	Analytic Statistics (statistical process control) Run & Control charts	No change focus (maybe compute a percent change or rank order the results)	Enumerative Statistics (t-test, F-test, chi square, p-values)
<ul> <li>Confidentiality of the data</li> </ul>	Data used only by those involved with improvement	Data available for public consumption and review	Research subjects' identities protected

## **Example of Data for Judgement**

Legend for Status of Goals (Based on Annual Goal) Goal Met (GREEN) Goal 75% Met (VELLOW)		FY 2009 Hospital System-Level Measures								
		Goals		FY 2007	FY 2008		Y 2009 Q1	FY 2009 Q2	FY 2009 Q3	
Goal Not Met (RED)	Good	FY 09 Goal	Long Term Goal							
Patient Perspective										
1. Overall Satisfaction Rating: Percent Who Would Recommend (Includes inpatient, outpatient, ED, and Home Health)	1	60%	80%	37.98%	48.98%		57.19%	56.25%	51.69%	
2. Wait for 3rd Next Available Appointment: Percent of Areas with appointment available in less than or equal to 7 business days (n=43)	<b>↑</b>	65%	100%	53.5%	51.2%		54.3%	61.20%	65.1%	
Patient Safety										
3. Safety Events per 10,000 Adjusted Patient Days	↓ I	0.28	0.20	0.35	0.31		0.31	0.30	0.28	
4. Percent Mortality	Ļ	3.50	3.00	4.00	4.00		3.48	3.50	3.42	
5.Total Infections per 1000 Patient Days	$\rightarrow$	2	0	3.37	4.33		4.39	2.56	1.95	
Clinical										
6. Percent Unplanned Readmissions	↓	3.5%	1.5%	6.1%	4.8%		4.6%	4.1%	3.5%	
7. Percent of Eligible Patients Receiving Perfect CareEvidence Based Care (Inpatient and ED)	<b>^</b>	95%	100%	46%	74.1%		88.0%	91.7%	88.7%	
Employee Perspective										
8. Percent Voluntary Employee Turnover	↓	5.80%	5.20%	5.20%	6.38%		6.10%	6.33%	6.30%	
9. Employee Satisfaction: Average Rating Using 1-5 Scale (5 Best Possible)	1	4.00	4.25	3.90	3.80		3.96	3.95	3.95	
Operational Performance										
10. Percent Occupancy	1	88.0%	90.0%	81.3%	84.0%		91.3%	85.6%	87.2%	
11. Average Length of Stay	Ļ	4.30	3.80	5.20	4.90		4.60	4.70	4.30	
12. Physician Satisfaction: Average Rating Using 1-5 Scale (5 Best Possible)	1	4.00	4.25	3.80	3.84		3.96	3.80	3.87	
Community Perspective										
13. Percent of Budget Allocated to Non-recompensed Care		7.00%	7.00%	5.91	7.00%		6.90%	6.93%	7.00%	
14. Percent of Budget Spent on Community Health Promotion Programs		0.30%	0.30%	0.32%	0.29%		0.28%	0.31%	0.29%	
Financial Perspective										
15. Operating Margin-Percent	1	1.2%	1.5%	-0.5%	0.7%		0.9%	0.4%	0.7%	
16. Monthly Revenue (Million)-change so shows redbut sp cause good related to occupancy	1	20.0	20.6	17.6	16.9		17.5	18.3	19.2	

### How Is Error Rate Doing?



Source: Provost, Murray & Britto (2010)



### How is Perfect Care Doing?





# 20-20 Hindsight

"Managing a process on the basis of monthly (or quarterly) averages is like trying to drive a car by looking in the rear view mirror."



D. Wheeler Understanding Variation, 1993.



**NHS Foundation Trust** 

### **REPORT TO THE TRUST BOARD**

#### 6th November 2014

Title	Performance and Compliance Report: September 2014/Month 6				
Author(s)	Mohit Venkataram, Director of Business Development Steve Pilkington, Associate Director, Performance and Informatics				
Accountable Executive Director	Dr Kevin Cleary, Medical Director				

### Purpose of the Report:

This report aims to provide assurance to the Trust Board and Executive Directors on Trustwide performance and compliance matters for the period 1st April 2014 to 30th September 2014.

### Summary of Key Issues:

Data gathered for the reporting period so far indicates that Trust's second of return to MONITOR can expect to report:

### How do these **Governance Risk** Ratings make you

- a) Monitor Assurance indicators all on track
- b) Continuity of Service Risk Rating 4 (Target 4)
- c) Governance Risk Rating GREEN
- d) Contract Compliance no significant risks to terms of authorisation

### Strategic priorities this paper supports:

Improving service user satisfaction	Via reporting progress on national/local performance and contractual targets
Improving staff satisfaction	Via reporting progress on delivery of national and local workforce targets
Maintaining financial viability	Via confirming delivery of MONITOR Risk Assessment Framework requirements

### Committees/Meetings where this item has been considered:

Date	Committee and assurance coverage						
By 17 <sup>th</sup> October	Exceptions or adverse variances are reviewed with DMT Performance Managers prior to publication and at separate meetings.						
22 <sup>nd</sup> October 2014.	An expanded version of this report was received by the Trust						

#### **Compliance And Governance Update** 4.0

The Trust is required to submit Quarterly returns to MONITOR in line with the Risk Assessment Framework established for 2014/15.

#### Results of Monitor assessment of next/previous submission 4.1

The results of Monitor's assessment of the Trust's Q2 2014/15 position are expected to be as follows:

TABLE 2: ELFT Risk Rating	2013/14	2013/14	2013/14	2014/15	2014/15 (Expected)	Risk Rating Key
Assessment at	Q2	Q3	Q4	Q1	Q2	
Continuity of Service Risk	4	4	4	4	4	Assessed on a scale of 1 = high; 4 = low
Governance Risk	Green	Green	Green	Green	Green	Green = Low; Amber-Green = Emerging ; Amber-Red = Escalating or realised; Red = High

The Quarter 2 sturn is due on 51st October and will be signed off by the chief Executive before submission to MONITOR.

feel?

prernance return comprises two areas: performance against wonnor targets and indicators, and compliance with Care Quality Commission compliance. The Trust must also declare any issues that risk breaching the Terms of Authorisation.

### Targets and indicators

nance retur

A summary of the Trust's performance against Monitor targets and indicators is set out in the main report - there are no current risks to their achievement for Quarter 2.

### Care Quality Commission compliance

The Trust does not have any CQC compliance actions outstanding.

### Risk of breaching the terms of the Provider License

The Q2 Board Assurance Framework is also provided at Appendix 5 this document sets out identified risks and their mitigating actions. Content was reviewed by the Quality Assurance Committee on 7th October.

Three red rated risks are identified as follows:

### R/Y/G approaches to measurement usually lead to accountability or judgement. With mostly **GREEN** on this report what actions do you take? What do you do with the one **RED** measure (Readmission Rate)?

Trust Board Scorecard 2014/15							
Trust Board Main Scorecard, Graphs and Tables - 2014/15			Prior periods			Sep-14	
Summary Score Card	2014/15 Target	Sep-14	Aug-14	2014/2015 (Q1 Values) Actual	Trend since las Month	t	. KPI Basis
CPA Inpatient discharges followed up within 7 days (face to face and telephone)	95%	98.9%	97.9%	96.3%	2	Trust wide figure excluding Children's, Older Adult and Secure, Mental Health Services	In Quarter
Mental Health Patients occupying beds with delayed transfer of care - Adult & Older Adult (Only CAMHS excluded)	7.5%	4.70%	4.50%	2.9%		Based on bed-days lost/total occupied bed-days. Does not include Community Health Newham beds (0.0%)	In Quarter
Admissions made via Crisis Resolution Teams (end of period)	95%	100.0%	99.3%	100.0%	-		In Quarter
Number of adult CPA patients meeting with care-coordinator in past 12 months	95%	95.9%	95.8%	96%	4	Current Month based on August MHLDDS data that will be refreshed in October. Reporting is via national datasets and thus one month in arrears.	In Quarter
Access to healthcare for people with a learning disability – report compliance to CQC	Completion of self assessment and declaration	19	19	19		Current declaration is as reported to Trust Board 31st March 2014, LD Strategy and improvement plan led by Director of Operations.	In Quarter
Newly diagnosed cases of first episode psychosis receiving Early Intervention Services	176	129	114	72	1	Includes contribution for Children and Adolescent Mental Health Services	YTD
Completeness of Mental Health and Learning Disabilities Data Set (MHLDDS) - IDENTIFIERS	97%	99.2%	99.2%	99.2%	2	Current Month based on August MHLDDS data that will be refreshed in October.	Monthly
Completeness of Mental Health and Learning Disabilities Data Set (MHLDDS) - OUTCOMES	50%	92.9%	93.2%	02 29/	~	Reporting is via national datasets and thus one month in arrears.	worthing
Referral to treatment time within 18 weeks (non-admitted patients)	95%	100.0%	100.0%	95.3%		As above.	Monthly
Maximum time of 18 weeks from point of referral to treatment (patients on incomplete pathways)	92%	100.0%	100.0%	99%	3	rigules are for consultant led services in community realth Newham only (CDC and Paediatrics)	In Quarter
A&E Clinical Quality - Waiting time in A&E	95%	99.6%	99.7%	100%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	For Newham Urgent Care Centre - National datasets Secondary Uro Service (SUS) for Ouerter 3	in Quarter
Reduction in Clostridium Difficile - reported instances	0	0	0	0		i or Newman orgent care centre - National datasets secondary ose service (503) for quarter 2	In Quarter
Monitor Targets - Community Information Data Set (CIDS - Data Completeness)		A CONTRACTOR OF THE					in Quarter
Community Referral to treatment information	50%	100.0%	100.0%	100.0%			In Quarter
Referral information	50%	77.8%	79.4%	80.5%	1	Based on first attendance performance figures.	In Quarter
Care Contact Activity Information	50%	88.7%	88.0%	90.5%	1	Based on both Face to Face and non face to face contacts	In Quarter
Other National/CQC Targets - formerly used in CQC Annual Assessments	S. School Street	Stellow Street	all a case of a			Retained for continuity pending any further internal review of KPIs	in quarter
Completeness of Ethnicity Coding – PART ONE (Inpatients in MHLDDS - Year to date)	85%	97.2%	97.0%	97.3%	4	Current Month based on August MHLDDS data that will be refreshed in October.	Monthly
Completeness of Ethnicity Coding - PART TWO (Inpatient FCEs HES - Year to date)	85%	100.0%	98.7%	98.7%	8	Current Month figure is for August 2014.	Quarterly
Patterns of Care – assignment of Care Co-ordinator within Mental Health Minimum data set	80%	95.9%	95.8%	92.8%		Current Month based on August MHLDDS data that will be refreshed in October.	Monthly
Drug Misusers in effective Treatment	85%	97.1%	96.8%	93.7%	-	neporting is via national datasets and thus one month in arreats.	Monthly
Number of Learning Disabilities Inpatients with in date care plans	100%	100.0%	100.0%	100%	4		Monthly
Workforce Performance Measures							
Sickness and Absence Levels	3.5%	3.9%	3.6%	3.6%	2	Reported one month in arrears, Current month shows data for August 2014	Monthly
Non-Medical Staff Supervision (Clinical) – compliance rate	90.0%	83.7%	81.8%	81.5%	2	In month figure only, 70% = Amber	Monthly
Medical Staff Supervision (Clinical) – compliance rate	90.0%	88.6%	83.2%	89.5%	1	As above	Monthly
All Staff Supervision (Management) - compliance rate	90.0%	79.5%	77.5%	80.7%	1	As above	Monthly
Compliance rate for all designated Statutory and Mandatery Technics Courses	0.000					NOTE - Over 80% Compliance = GREEN; Over 70% Compliance = AMBER	
Compliance rate for an designated statutory and Mandatory Training Courses	Over 80%	/8.4%	79,6%	77.3%	+	Delivery of 80% target led by the Director of Nursing and DMTs.	Monthly
Exception reporting if a man and a woman share either a Bedroom or a Bed hav	-						
Author of neople under 18 admitted to adult innational words	0	0	0	0	1		Monthly
Total Assertive Outreach caseload	479	494	493	487		Includes contributions from clinically relevant teams. 10 C&H CMHT held patients confirmed/included by DMT as	Monthly
arly Intervention Services Caseload	500	497	405	507		valid AOT cases	Shapshot
Number of patients receiving Adult Crisis Resolution Services (Episodes for Year to date)	2 280	1 349	485	507	T	Includes CAMHS Contribution and manual additions for Tower Hamlets	Snapshot
Jumber of Service Users in employment	N/A	1,546	1,147	/8/	T	Networker	YTD
Jumber of Service Users in settled accommodation	N/A	86 7%	99.6%	99.00/		No target set	YTD
pecialist Addiction Service - Proportion of new Service Users receiving General Healthcare Assessment	100%	00.7%	00.6%	100%			YTD
atient Experience - Inpatient	10078	29.370	99.0%	100%	<u> 2</u>	Data as per National Drug Treatment Monitoring System	Monthly
npatient Bed Occupancy Rate - Adult	90%	79.0%	79.0%	84.9%		One Month Data 90% is reported contract target (Trust assistion is 95%)	Ma and
npatient Bed Occupancy Rate - Older Adult (Functional)	90%	73.4%	70.4%	74 7%		One Month Data, 30% is the contract target (Trust aspiration is 65%).	Monthly
leadmission rate (28 days) - Adult	7.5%	8.2%	10.2%	10.4%	L.	Only Newham Adult cardinac (12,1%) in breach of the 7.5% target (margared from edge and the 10.1%)	Monthly
Readmission rate (28 days) - Older Adult	7.5%	1.5%	3.5%	1.5%	Í	Targets agreed with the Commissioners	YID
Iverage Length of Stay - Adult	N/A	26.6	26.1	26.3	4	Rolling 12 months data	Polling 12 month
verage Length of Stay - Older Adult (Functional)	N/A	71.8	59.8	60.3		Rolling 12 months data This measure is for Functional Older Adult heds only	Rolling 12 months
						and the medality is for runctional older Addit Deus Only,	Nothing 12 months

### The way you present data makes a difference!



### **The Three Faces of Performance Measurement**

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### So, how do you view the Three Faces of Performance Measurement?



Or,



## Relating the Three Faces of Performance Measurement to your work



The three faces of performance measurement should not be seen as mutually exclusive silos. This is not an either/or situation.

All three areas must be understood as a system. Individuals need to build skills in all three areas.

organisations need <u>translators</u> who and be able to speak the language of each approach.

The problem is that individuals identify with one of the approaches and dismiss the value of the other two.

# Dialogue #7 Why are you measuring?

- How much of ELFT's energy is aimed at improvement, accountability and/or research?
- Does one form of performance measurement dominate your journey?
- Do you think the three approaches can be integrated or are they in fact separate and distinct silos?
- How many "translators" exist within ELFT? Are people being developed for this role?

### So, the Question of the Day

How can we design a set of measures that will guide our improvement work and show meaningful results *without wasting everyone's time*?



# The key is having a plan to guide your quality measurement journey!

## Milestones in the Quality Measurement Journey



Source: R. Lloyd. Quality Health Care: A Guide to Developing and Using Indicators. Jones and Bartlett Publishers, 2004.

# **The Quality Measurement Journey**

**AIM** – To create a harm-free environment for patients Concept – reduce inpatient falls (is this a measure?) Measure – Inpatient falls rate (falls per 1000 patient days) **Operational Definitions - # falls/inpatient days** Data Collection Plan – monthly; no sampling; all IP units Data Collection – unit submits data to Quality Improvement Dept. for analysis Analysis – control chart

## Milestones in the Quality Measurement Journey



As Board members, part of your job is to interpret data appropriately and use it to make decisions that lead to action

### **Building a Cascading System of Measures**

# Look

## your system

### of measures

## as a cascade!

## At what level are you measuring?



Adapted from Cliff Norman, Profound Knowledge Products & API



## Which way do your measures flow?

The key question, however, is do you fully understand your measurement system and which aspects of the system you want to improve?

If you do start drilling down from the...



...then make sure there are ways to percolate the measures and the learning back up

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### **A Cascading Approach to Measurement**



### **A Cascading Approach to Measurement**

Percent inpatient mortality

Hospital Acquired Infection rates

-

Percent compliance with "bundles"

### VAP bundle

### CL bundle

Pressure ulcer bundle Hand washing bundle

### **A Cascading Approach to Measurement**

Hospital Acquired Infection rates

### CAUTI rate 🦟

(#CAUTIs per 1000catheter days)

% of patients with appropriate catheter placements

% of catheter insertions ~ with all insertion bundles in compliance

% of catheter placements with all daily maintenance bundle elements in compliance

Average catheter duration (days)

## Don't Ignore the Pace of Work & Change<sup>slide</sup>#30



Adapted from Cliff Norman, Profound Knowledge Products & API



# **The Planning Horizon**



Adapted from Cliff Norman, Profound Knowledge Products & API



## Quality Dashboard organisation-level view

### November 2014







## Safety



### Serious incidents and unexpected deaths for October 2014

 42yr old male: Suspected Suicide - Strangulation
 27yr old male: Unexpected - Cause known
 72yr old female: Pressure Ulcer

 27yr old male: Breach of security
 54yr old male: Absence without leave
 72yr old male: Pressure Ulcer

 69yr old male: Unexpected - Cause unknown
 88yr old male: Pressure Ulcer
 56yr old female: Pressure Ulcer

 4yr old female: Treatment / Procedure
 56yr old female: Pressure Ulcer
 56yr old female: Pressure Ulcer

## **Clinical Effectiveness**





## **Patient Experience**















### Trust wide Friends and Family Survey - October 2014

F&F Survey	Responses	Percentage	Sample Size
Extremely Likely	36	51%	71
Likely	27	38%	/1
Neither Likely or Unlikely	4	6%	
Unlikely	2	3%	Net Score
Extremely Unlikely	2	3%	Net Store
Don't Know	0	-	39
N/A	0	-	



### Friends and Family Response Distribution


## **Our Staff**





## **The Quality Measurement Journey**



Source: R. Lloyd. Quality Health Care: A Guide to Developing and Using Indicators. Jones and Bartlett Publishers, 2004.

# *"If I had to reduce my message for management to just a few words, I'd say it all had to do with reducing variation."*

W. Edwards Deming



## **The Problem!**

Aggregated data presented in tabular formats or with summary statistics, will not help you measure the impact of process improvement efforts.

Aggregated data can only lead to judgement, not to improvement.

## **Thin-Slicing!**

"Thin-slicing refers to the ability of our unconscious to find patterns in situations and behavior based on very narrow slices of experience." Malcolm Gladwell, blink, page 23



When most people look at data they thin-slice it. That is, they basically use their unconscious to find patterns and trends in the data that fit their view of reality. They look for extremely high or low data points and then make conclusions about performance based on limited data. *R. Lloyd* 

#### Percent of A&E patients Seen by a Physician within 10 min

Week	Date	Percent
1	3-Oct	88%
2	10-Oct	88%
3	17-Oct	94%
4	24-Oct	71%
5	1-Nov	88%
6	8-Nov	73%
7	15-Nov	78%
8	22-Nov	67%
9	29-Nov	69%
10	6-Dec	87%
11	13-Dec	83%
12	20-Dec	68%
13	3-Jan	83%
14	10-Jan	70%
15	17-Jan	73%
16	24-Jan	76%
17	31-Jan	78%
18	7-Feb	79%
19	14-Feb	84%
20	21-Feb	89%
21	28-Feb	95%
22	6-Mar	95%
23	13-Mar	91%
24	20-Mar	95%

Week 1 - 12		
Avg	80%	
Max	94%	
Min	67%	
Week 13	- 24	
Week 13 Avg	- <b>24</b> 84%	
Week 13 Avg Max	- <b>24</b> 84% 95%	

#### **Did we improve?**

#### What will happen next?

Should we do something?

#### Percent of A&E patients Seen by a Physician within 10 min

Week	Date	Percent
1	3-Oct	88%
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8	22-Nov	67%
9	29-Nov	69%
10	6-Dec	87%
11	13-Dec	83%
12	20-Dec	68%
13	3-Jan	83%
14	10-Jan	70%
15	17-Jan	73%
16	24-Jan	76%
17	31-Jan	78%
18	7-Feb	79%
19	14-Feb	84%
20	21-Feb	89%
21	28-Feb	95%
22	6-Mar	95%
23	13-Mar	91%
24	20-Mar	95%



#### **Did we improve?**

What will happen next? Should we do something?

## The average of a set of numbers can be created by many different distributions



## **The Stages of Data Acceptance**

1. The Data Are WRONG!

2. The data are right but it's not a problem.

- 3. The data are right, it's a problem, but it's not *MY* problem.
- 4. The data are right, it's a problem, it's *MY* problem but I have no idea how to improve the results
- 5. The data are right, it's a problem, it's *MY* problem and we will start to work on improving the results today!

Sources: D. Berwick, B. Jarmen, R. Lloyd & R. Scoville.







## If you don't understand the variation that lives in your data, you will be tempted to ...

- Deny the data (It doesn't fit my view of reality!)
- See trends where there are no trends
- Try to explain natural variation as special events
- Blame and give credit to people for things over which they have no control
- Distort the process that produced the data
- Kill the messenger!

## **Distorting the Data!**



"You'll be happy to see that I've finally managed to turn things around!"

## And, if you do not understand variation Deming's Cycle of Fear will occur



Source: William Scherkenbach. The Deming Route to Quality and Productivity. Ceep Press, Washington, DC, 1990, page 71.



#### **Dr. Walter A Shewhart**

W. Shewhart. *Economic Control of Quality of Manufactured Product*, 1931

"A phenomenon will be said to be controlled when, through the use of past experience, we can predict, at least within limits, how the phenomenon may be expected to vary in the future"

#### "What is the variation in one system over time?" Walter A. Shewhart - early 1920's, Bell Laboratories



## **Types of Variation**

#### **Common Cause Variation**

- Is inherent in the design of the process
- Is due to regular, natural or ordinary causes
- Affects all the outcomes of a process
- Results in a "stable" process that is predictable
- Also known as random or unassignable variation

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#### **Special Cause Variation**

- Is due to irregular or unnatural causes that are not inherent in the design of the process
- Affect some, but not necessarily all aspects of the process
- Results in an "unstable" process that is not predictable
- Also known as non-random or assignable variation

## **Common Cause Variation**



- Points equally likely above or below center line
- There will be a high data point and a low, but this is expected
- No trends or shifts or other patterns

Courtesy of Richard Scoville, PhD, IHI Improvement Advisor

## **Two Types of Special Causes**

#### <u>Unintentiona</u>l

When the system is out of control and unstable



Intentional When we're trying to change the system





<u>Common Cause</u> does not mean "Good Variation." It only means that the process is <u>stable</u> and <u>predictable</u>. For example, if a patient's systolic blood pressure averaged around 165 and was usually between 160 and 170 mmHg, this might be stable and predictable but completely unacceptable.

Similarly <u>Special Cause</u> variation should not be viewed as "Bad Variation." You could have a special cause that represents a very good result (e.g., a low turnaround time), which you would want to emulate. Special Cause merely means that the process is <u>unstable</u> and <u>unpredictable</u>.

#### **Appropriate Management Response to Common & Special Causes of Variation**



Source: Carey, R. and Lloyd, R. *Measuring Quality Improvement in Healthcare: A Guide to Statistical Process* Control Applications. ASQ Press, Milwaukee, WI, 2001, page 153.

#### Making the wrong choice!

#### The Solutions?

#### The Situation!









#### 1. Is the process **stable**? If so, it is **predictable**.

#### 2. Is the process capable?

The chart will tell you if the process is stable and predictable.

You have to decide if the output of the process is capable of meeting the target or goal you have set!

## Attributes of a Leader Who Understands Variation

Leaders understand the different ways that variation is viewed.

They explain changes in terms of common causes and special causes.

They use graphical methods to learn from data and expect others to consider variation in their decisions and actions.

They understand the concept of stable and unstable processes and the potential losses due to tampering.

Capability of a process or system is understood before changes are attempted.

## Exercise Understanding Variation

- Select several measures you regularly review.
- Do you and the rest of the board evaluate these measures according the criteria for common and special causes of variation?
- If not, what criteria do you use to determine if your measures are improving or getting worse?





## **Understanding Variation Statistically**





#### **DYNAMIC VIEW**

Run Chart Control Chart (plot data over time) Statistical Process Control (SPC)

## **Annotated Time Series** (the minimum standard for QI projects)









How do we analyze variation for quality improvement?

By using Statistical Process Control (SPC) methods and tools. <u>Run</u> and <u>Control Charts</u> are the best tools to determine:

- 1. The variation that lives in the process
- 2. If our improvement strategies have had the desired effect.

#### 1. Make process performance visible



# Three Uses of SPC Charts



## 2. Determine if a change is an improvement



3. Determine if we are holding the gains



### **Elements of a Run Chart**



Four simple run rules are used to determine if special cause variation is present

#### First, you need to determine the number of Runs

#### What is a Run?

- One or more consecutive data points on the same side of the Median
- Do not include data points that <u>fall on the Median</u>

#### How do we count the number of runs?

- Draw a circle around each run and count the number of circles you have drawn
- Count the number of times the sequence of data points (the line on the chart) crosses the Median and add "1"
- The two counts should be the same!

#### Run Chart: Medical Waste Determine the number of runs on this chart



#### Then apply the Run Chart Rules to Identify Non-random Patterns in the Data



Source: The Data Guide by L. Provost and S. Murray, Jossey-Bass Publishers, 2011.



#### % of patients with Length of Stay shorter than six days



#### % of patients with Length of Stay shorter than six days





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#### **Analyze this Run Chart**



#### Test #3: Analyze this Run Chart



# Why are Shewhart Charts preferred over Run Charts?

#### **Because Control Charts...**

- 1. Are more sensitive than run charts:
  - A run chart cannot detect special causes that are due to point-topoint variation (median versus the mean)
  - Tests for detecting special causes can be used with control charts
- 2. Have the added feature of control limits, which allow us to determine if the process is stable (common cause variation) or not stable (special cause variation).
- 3. Can be used to define process capability.
- 4. Allow us to more accurately predict process behavior and future performance.

### Elements of a Shewhart Control Chart



### **Types of Quantitative Data**



#### **Attributes Data**

#### **Defectives**

(occurrences plus non-occurrences) <u>Nonconforming Units</u>



**Defects** (occurrences only)

*Nonconformities* 

## **There Are 7 Basic Control Charts**

Source: R. Lloyd. Quality Health Care: A Guide to Developing and Using Indicators. Jones and Bartlett, 2004, Chap.6

### **Variables Charts**

- X & R chart (average & range chart)
- X & S chart (average & SD chart)
- XmR chart (individuals & moving range chart)

### **Attributes Charts**

- p-chart (proportion or percent of defectives)
- np-chart (number of defectives)
- c-chart (number of defects)
- u-chart (defect rate)

### **The Control Chart Decision Tree**



#### Control Chart Rules for Detecting Special Causes

A single point outside the control limits



Eight or more consecutive points above or below the centerline



Six consecutive points increasing (trend up) or decreasing (trend down)



Two our of three consecutive points near a control limit (outer one-third)



Fifteen consecutive points close to the centerline (inner one-third)



#### ELFT is already using Control Charts Safety Dashboard

Self Harm c Chart







Oct Dec Feb

11 11 11 11 11 12 12 12 12 12 12 13 13 13 13 13 13 14 14 14 14 Period

Oct

Oct Dec Feb







#### Serious incidents and unexpected deaths for September 2014

JD 1: Cause unknown	UD 2: Cause unknown	UD 3: Cause unknow	SI 5: Pressure Ulcer
JD 4: Suspected Suicide - Strangulation	UD 5: Cause unknown	SI 1: Pressure Ulcer	SI 8: Pressure Ulcer
51 2: Pressure Ulcer	SI 3: Pressure Ulcer	SI 4: Pressure Ulcer	SI 10: Suspected
51 9: Treatment / Procedure	SI 6: Pressure Ulcer	SI 7: Pressure Ulcer	Suicide - Strangulation

#### Using a Control Chart (Wait Time to See the Doctor)



#### Using a Control Chart (Wait Time to See the Doctor)



#### Using a Control Chart (Wait Time to See the Doctor)



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## The Charts Don't Tell You...

- The reasons(s) for a Special Cause.
- Whether or not a Common Cause process should be improved (is the performance of the process acceptable?)
- How the process should actually be improved or redesigned.

### **A Simple Improvement Plan**

- 1. Which process do you want to improve or redesign?
- 2. Does the process contain common or special cause variation?
- 3. How do you plan on actually making improvements? What strategies do you plan to follow to make things better?
- 4. What effect (if any) did your plan have on the process performance?

SPC methods and tools will help you answer Questions 2 & 4. YOU need to figure out the answers to Questions 1 & 3.

### **Simple Hints To Improve Measurement**

From a presentation by Don Berwick, M.D., Quality Management Network Meeting, Boston, July 28, 1995.

Graph data over time Local collection/local use Develop knowledge of "tampering" Use "fast feedback" Develop views of the whole Use the entire range of data Foster immediate recovery Create an environment for reflection Encourage the public posting of results Make predictions and see how well they work Use small samples vigorously

# So, How will you know...

- If the change(s) you have made signal a true improvement? If you have sustained improvement?
- 2. If it is the right time to implement the change(s)
- 3. If it is time to spread the change(s) to other areas?
- 4. If it is time to stop measuring?

The answers to these questions can be found in Appendix C



### Which takes us full circle to the Sequence of Improvement



# This brings us full circle Questions Guiding Today's Workshop

**Question 1**: What is the difference between a quality improving Board, and a Board that is looking for assurance? How do we strike the balance between assurance and improvement?

**Question 2**: How can we make sure that QI is part of all strategies that the Board signs off? How do we make QI our business strategy?

**Question 3**: How do we get everyone to have a basic knowledge of the science of improvement? What is the role of the Board in building capacity and capability for QI?

**Question 4**: How can the Board be assured that we are moving towards our improvement aims?

<u>Question 5</u>: How do we use all of this data we have to make an impact on our QI efforts? How do analyse the data from a QI perspective and what questions do we ask about the results?

Question 6: How do we scale up all of this local improvement work to something that is meaningful at Trust-level? What are the big dots, and how do we aggregate all the work up to move the big dots?

### **Questions Guiding Today's Workshop**

### Given what we have talked about today please indicate your assessment of our progress on each question.

Question	We have a lot of work to do here	We are making some progress here	We are embedding this in daily practice
<b>Question 1</b> : What is the difference between a quality improving Board, and a Board that is looking for assurance? How do we strike the balance between assurance and improvement?			
<b>Question 2</b> : How can we make sure that QI is part of all strategies that the Board signs off? How do we make QI our business strategy?			
<b>Question 3</b> : How do we get everyone to have a basic knowledge of the science of improvement? What is the role of the Board in building capacity and capability for QI?			
Question 4: How can the Board be assured that we are moving towards our improvement aims?			
<b>Question 5</b> : How do we use all of this data we have to make an impact on our QI efforts? How do analyse the data from a QI perspective and what questions do we ask about the results?			
<b>Question 6</b> : How do we scale up all of this local improvement work to something that is meaningful at Trust-level? What are the big dots, and how do we aggregate all the work up to move the big dots?			

### **Appendices**

- Appendix A: General References on Quality
- Appendix B: References on Measurement
- Appendix C: So How Will You Know...
  - When a change has occurred?
  - When it is time to implement?
  - When it is time to spread?
  - When it is time to stop measuring?



# "Quality begins with intent, which is fixed by management."

W. E. Deming, Out of the Crisis, p.5

#### Appendix A General References on Quality

- The Improvement Guide: A Practical Approach to Enhancing organisational Performance. G. Langley, K. Nolan, T. Nolan, C. Norman, L. Provost. Jossey-Bass Publishers., San Francisco, 1996.
- Quality Improvement Through Planned Experimentation. 2nd edition. R. Moen, T. Nolan, L. Provost, McGraw-Hill, NY, 1998.
- The Improvement Handbook. Associates in Process Improvement. Austin, TX, January, 2005.
- A Primer on Leading the Improvement of Systems," Don M. Berwick, *BMJ*, 312: pp 619-622, 1996.
- "Accelerating the Pace of Improvement An Interview with Thomas Nolan," Journal of Quality Improvement, Volume 23, No. 4, The Joint Commission, April, 1997.

#### Appendix B References on Measurement

- Brook, R. *et. al.* "Health System Reform and Quality." *Journal of the American Medical Association* 276, no. 6 (1996): 476-480.
- Carey, R. and Lloyd, R. Measuring Quality Improvement in healthcare: A Guide to Statistical Process Control Applications. ASQ Press, Milwaukee, WI, 2001.
- Lloyd, R. Quality Health Care: A Guide to Developing and Using Indicators. Jones and Bartlett Publishers, Sudbury, MA, 2004.
- Nelson, E. *et al*, "Report Cards or Instrument Panels: Who Needs What? *Journal of Quality Improvement, Volume* 21, Number 4, April, 1995.
- Solberg. L. *et. al.* "The Three Faces of Performance Improvement: Improvement, Accountability and Research." *Journal of Quality Improvement* 23, no.3 (1997): 135-147.

#### Appendix B References on Measurement (cont.)

- Brook, R. *et. al.* "Health System Reform and Quality." *Journal of the American Medical Association* 276, no. 6 (1996): 476-480.
- Carey, R. and Lloyd, R. Measuring Quality Improvement in healthcare: A Guide to Statistical Process Control Applications. ASQ Press, Milwaukee, WI, 2001.
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- Nelson, E. *et al*, "Report Cards or Instrument Panels: Who Needs What? *Journal of Quality Improvement, Volume* 21, Number 4, April, 1995.
- Solberg. L. *et. al.* "The Three Faces of Performance Improvement: Improvement, Accountability and Research." *Journal of Quality Improvement* 23, no.3 (1997): 135-147.

### Appendix C So, How will you know...

- If the change(s) you have made signal a true improvement? If you have sustained improvement?
- 2. If it is the right time to implement the change(s)
- 3. If it is time to spread the change(s) to other areas?
- 4. If it is time to stop measuring?



# So, How will you know...

# 1. If the change(s) you have made signal a true improvement?

- 2. If you have sustained improvement?
- 3. If it is the right time to implement the change(s)
- 4. If it is time to spread the change(s) to other areas?
- 5. If it is time to stop measuring? SPSP

#### Run Chart Rules are used to determine if a change has occurred



- Use the run chart rules to determine if a change has occurred
- A shift = 6 or more data points above or below the baseline median (centerline)
- A trend = 5 data points constant going up or down



### **Random Variation (common cause)**?<sup>202</sup>



#### Has anything changed here!

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# So, How will you know...

1. If the change(s) you have made signal a true improvement?

#### 2. If you have sustained improvement?

- 3. If it is the right time to implement the change(s)
- 4. If it is time to spread the change(s) to other areas?
- 5. If it is time to stop measuring? SPSP

#### Sustained Improvement

First identify a shift or a trend in the data



# So, How will you know...

- 1. If the change(s) you have made signal a true improvement?
- 2. If you have sustained improvement?
- 3. If it is the right time to implement the change(s)
- 4. If it is time to spread the change(s) to other areas?
- 5. If it is time to stop measuring? SPSP

#### **Degree of Belief When Making Changes to Improve**

Source: The Improvement Guide, Langley, J. et al, Jossey-Bass, 2009: 145.



# **Implementing a Change**



Note that when you move to full implementation things may actually get worse for a little bit.

### Conditions for Implementing a Change

Current Situation		Resistant	Indifferent	Ready
Low Confidence that current change idea will lead to Improvement	Risk of not succeeding large	Very Small Scale Test	Very Small Scale Test	Very Small Scale Test
	Risk of not succeeding small	Very Small Scale Test	Very Small Scale Test	Small Scale Test
High Confidence that current change idea will lead to Improvement	Risk of not succeeding large	Very Small Scale Test	Small Scale Test	Large Scale Test
	Risk of not succeeding small	Small Scale Test	Large Scale Test	Implement

Note the conditions for Implementing a change!
# So, How will you know...

- 1. If the change(s) you have made signal a true improvement?
- 2. If you have sustained improvement?
- 3. If it is the right time to implement the change(s)
- 4. If it is time to spread the change(s) to other areas?
- 5. If it is time to stop measuring? SPSP

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#### Spreading a Change

- First identify a shift or a trend in the data.
- Then look to see if <u>6 or more data point</u> have stayed at the new level.
- This indicates that you are 'holding the gains.'



# So, How will you know...

- 1. If the change(s) you have made signal a true improvement?
- 2. If you have sustained improvement?
- 3. If it is the right time to implement the change(s)
- 4. If it is time to spread the change(s) to other areas?

#### 5. If it is time to stop measuring? SPSP

## **Two Simple Rules for Measuring**

## **Outcome Measures – always!**

### **Process Measures – it depends!**

## How often do you need to measure?

It is not uncommon for a team to want to stop collecting data, especially after they have been at it for a year or two!

The <u>reliability of the process</u> and your <u>need to know</u> how the process is functioning should drive the frequency of data collection and analysis.

# **A Simple Rule for Outcomes**

#### **Outcome Measures – Always!**

As long as you are concerned about the quality and safety of the care that you deliver, you should continue to track the outcomes!

#### For example, how long should these outcomes be measured?

- When do you stop measuring your financial results?
- When should a diabetic patient stop tracking his or her blood glucose?
- How long should we monitor the vital signs of an ICU patient ?
- When should airport security stop assessing passengers for weapons?
- How long does a local water authority need to measure the quality of the water going through its pipes?
- When should schools stop measuring the progress of students?

# **A Simple Rule for Processes**

### **Process Measures – it depends!**

- Process measures usually demonstrate improvement before outcome measures.
- Process measures may be revised during an improvement project; new data will then need to be collected and tracked.
- A process measure should demonstrate improvement (against the run chart rules) and then <u>STAY at the new level</u> of performance for at least 3 reporting periods to be considered "sustained."

# **Frequency of Process Measures**

#### Regularly (daily, weekly or monthly)

Done to improve a specific measure (reduce variation or shift the centerline of process performance)

#### Periodically (once every 2 - 3 months)

Done when statistical improvement has been noted, sustained AND the process is highly reliable (audit approach can be used here)

#### Once or twice a year (why bother?)

#### **Stop measuring!**

Done when performance is so reliable, stable and capable that it is time to move on to measure something new.