Making data count
– the why, the how and the experience so far

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collaboration    trust    respect    innovation    courage    compassion
Where are we now?

Making data count
Where are we now?

Is an increase from 95.36% to 95.76% important or distracting narrative?

One month trend......
Poll 1

What best describes your current integrated performance for the board:
• Mainly RAG charts
• A mixture of RAG and time series data/spark lines
• Presence of SPC charts
## Improving Access to Psychological Therapies – performance against target

<table>
<thead>
<tr>
<th>Metric</th>
<th>Target</th>
<th>Jan-17</th>
<th>Feb-17</th>
<th>Mar-17</th>
<th>Apr-17</th>
<th>May-17</th>
<th>Jun-17</th>
<th>Jul-17</th>
<th>Aug-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAPT Treatment 18 weeks</td>
<td>95%</td>
<td>99.8%</td>
<td>99.5%</td>
<td>99.9%</td>
<td>99.8%</td>
<td>99.4%</td>
<td>99.7%</td>
<td>99.6%</td>
<td>99.7%</td>
</tr>
<tr>
<td>IAPT Treatment 6 weeks</td>
<td>75%</td>
<td>86.3%</td>
<td>84.1%</td>
<td>83.3%</td>
<td>80.9%</td>
<td>74.9%</td>
<td>79.5%</td>
<td>81.1%</td>
<td>81.2%</td>
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<tr>
<td>IAPT Recovery Rate</td>
<td>50%</td>
<td>59.3%</td>
<td>57.0%</td>
<td>54.0%</td>
<td>55.3%</td>
<td>53.6%</td>
<td>52.2%</td>
<td>55.3%</td>
<td>54.8%</td>
</tr>
<tr>
<td>EIS First Episode Psychosis</td>
<td>50%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>83.0%</td>
<td>62.5%</td>
<td>100.0%</td>
<td>89.5%</td>
<td>100.0%</td>
<td>85.0%</td>
</tr>
</tbody>
</table>
Did green provide true assurance?
Scenario

We’re going to simulate some **real data** in a healthcare setting.

We’ll be thinking about **how people react to patterns and trends** in data.

Can you spot an **improvement or decline** when it occurs? We’ll begin plotting our data in a **run chart**.
Reducing serious incidents

Has the improvement idea been successful?
Are you worried you might have seen this pattern before?
Now five days below the baseline median...
More confident you’re seeing an improvement?
Now six days below the baseline median...
Who will commit to this improvement?
Now seven days below the baseline median...
We could go on… when should we recognise a trend?
The data that created this scenario

Prime ministers birthday's - random variation

Birthday day number
Birthday month number

Any patterns at these points were randomly generated, then I changed the rules of the scenario….
Anatomy of a SPC chart

Time series line chart with 3 reference lines

20 plus data points for a robust analysis

≈ 99% of data
SPC rules

Average wait per breach (crowding)

- Upper process limit
- Mean line
- Lower process limit

A single point above or below the process limits

Initial assessment times

- Upper process limit
- Mean line
- Lower process limit

Runs of consecutive points both above and below the mean line

Breach admitted

- Upper process limit
- Mean line
- Lower process limit

A long run of consecutively decreasing points

Making data count
Why is 7 significant?

A trend of 2 has the probability of 25% occurrence (one in four)

A trend of 4 has the probability of 6.25% occurrence (one in sixteen)

A trend of 7 has the probability of 0.8% occurrence (one in one hundred and twenty-eight)
Evidence base

Bristol, Shipman, and clinical governance: Shewhart’s forgotten lessons

Mohammed A Mohammed, K K Cheng, Andrew Rouse, Tom Marshall

During the past century, manufacturing industry has achieved great successes in improving the quality of its products. An essential factor in this success has been the use of Walter A Shewhart’s pioneering work in the economic control of variation, which culminated in the development of a simple yet powerful graphical method known as the control chart. This chart classifies variation as having a common cause or special cause and thus guides the user to the most appropriate action to effect improvement. Using six case studies, including the excess deaths after paediatric cardiac surgery seen in Bristol, UK, and the activities of general practitioner turned murderer Harold Shipman, we show a central role for Shewhart’s approach in turning the rhetoric of clinical governance into a reality.

During the past century, manufacturing industry has achieved great success in improving the quality of its products. In industry, the definition of quality is “on target with minimum variation”. Reduction of variation is also a core concern in clinical governance; however, there are fundamental and profound differences between the ways in which health services and industry make sense of variation. We begin with an illustration of the industrial approach to understanding and controlling variation, followed by application of this approach to healthcare, using six clinical governance case studies: mortality rates after paediatric cardiac surgery in Bristol, UK; mortality rates in older women treated by the general practitioner and convicted serial killer Harold Shipman; success rates of in-vitro fertilisation (IVF) treatment; neonatal deaths; prevalence of coronary heart disease in primary care; and mortality after fractured neck of femur.

Common-cause and special-cause variation

Ford used a process such as writing a signature. Five of MAM’s signatures are shown in the left of figure 1. Although these signatures were produced under the same conditions and by the same process, they are not identical. However, although they show variation, the signatures on the left are identical. No signature is better or worse than the others. If we want to reduce the variation between signatures, we must change the way we write all signatures, not just the ones that fail an adequate test. Thus, conventional approaches to understanding variation from a stable system can misguide us to act on individual failures rather than acting on the underlying process.

Now consider the sixth signature, on the right. It is clearly different from the others. A casual look suggests that there must be a special reason this is so. If we want to address this kind of variation, we need to identify this special cause and prevent it from interacting with an otherwise stable process. (In this case, the signature is a forgery, attempted by TM under the same essential conditions).

This approach categorises variation according to the action needed to reduce it. Common-cause variation is intrinsic to the process. To decrease common-cause variation, we need to act on the process. Special-cause variation is the result of factors extrinsic to the process, and its reduction therefore requires identification of and action on the special causes. The originator of these fundamental concepts was a physicist and engineer—Walter A Shewhart.1 His pioneering work at
CQC – signs of a mature QI approach

3. The Board looks at data as time series analysis, and makes decisions based on an understanding of variation.¹

¹ data are presented as run or control charts, instead of bar graphs, pie charts or RAG rated. Narrative analysis describes system quality and performance using terminology of common cause and special cause variation.

If there is ‘special cause’

A single point outside the control limits
Unacceptable variation

Redesign the system
## Everything is failing?

### Table: Training Compliance

<table>
<thead>
<tr>
<th>Domain</th>
<th>Indicator</th>
<th>Jul-17</th>
<th>Aug-17</th>
<th>Sep-17</th>
<th>2017-2019</th>
<th>Jul-17</th>
<th>Aug-17</th>
<th>Sep-17</th>
<th>2017-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>Mandatory training compliance (Target: &gt;90%)</td>
<td>85.4%</td>
<td>85.1%</td>
<td>85.5%</td>
<td>84.8%</td>
<td>85.2%</td>
<td>85.5%</td>
<td>85.7%</td>
<td>85.1%</td>
</tr>
</tbody>
</table>

### Combined Trust Performance

<table>
<thead>
<tr>
<th>Domain</th>
<th>Indicator</th>
<th>Jul-17</th>
<th>Aug-17</th>
<th>Sep-17</th>
<th>2017-2019</th>
<th>Jul-17</th>
<th>Aug-17</th>
<th>Sep-17</th>
<th>2017-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trust data 13 months</td>
<td>85.4%</td>
<td>83.5%</td>
<td>69.7%</td>
<td>84.8%</td>
<td>85.4%</td>
<td>86.2%</td>
<td>85.6%</td>
<td>84.8%</td>
</tr>
</tbody>
</table>

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Presentation influences discussion
Are things improving?

**Patient Experience Dashboard**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Indicator</th>
<th>Combined Trust Performance</th>
<th>Trust data 13 months</th>
<th>Trend charts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friends and Family</td>
<td>FFT: A&amp;E recommend % (Target: &gt;90%)</td>
<td>Jul-17</td>
<td>84.7%</td>
<td>!</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aug-17</td>
<td>83.5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sep-17</td>
<td>84.4%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2017-2018 Q2</td>
<td>84.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2017-2018</td>
<td>84.8%</td>
<td>!</td>
</tr>
</tbody>
</table>

**Friends and Family Test - A&E recommend %**

The recommend rate **improved** from the previous month however remains below the 90%.
SPC changes the narrative

No signs of improvement - signs of decline
Serious incidents as a % of clinical incidents

- TOTAL Serious Incidents reported in month
- SIs as a % of clinical incidents
- Linear (TOTAL Serious Incidents reported in month)

Graph showing the number of serious incidents over time from February 2017 to February 2018.
Poll 2

The number of serious incidents occurring is:
- Improving
- Declining
- Staying the same
Level of variation acceptable?
Will the target always be achieved?

≈ 99% of data
Thinking outside the box

University Hospital

A & E 4 hour performance

Variation Indicators

Assessment and Treatment

NHS Improvement

Special Cause

Special Cause

Consort

Data Investigate

Higher

Low

High

Low

Is the indicator showing statistical improvement or decline?

How stable in the system and how reliably will we hit the target?

Making data count
SPC Appendix

A&E 4 hour performance (%)

Supporting contextual commentary
What is changing?

SPC charts

Highlighting special cause

Supporting narrative

During April one violent incident on staff incident was a moderate incident on Haven Ward and will be subject to a lasting incident investigation. A staff member was assaulted by a patient following a decision 130 from Police custody. The staff member has since returned to work, well supported by wider team management. The rest were low or no harm incidents. Haven and St Ediths were the top two reporters with Haven reporting 93 incidents and St Ediths 59. SPC analysis for St Ediths showed that April’s figure is within predicted range of variation (10 to 29.9%). On St Thalassus Ward one patient was involved in seven incidents, the same patient was involved in three of the patient on incident reports as well.

SPC analysis for patient on staff violent incidents on Haven shows that this is special cause variation (part run of 6 above mean).

During April two patients on Haven were involved in 26 incidents. The majority of incidents were caused by three patients who were frequently severely. The rest of the violence towards staff was one off incidents by individual patients. Following the weekly incident reviews in place on Haven, the team identified the individuals concerned, conducted RCA’s and organised risk buddy with all team members to create behaviour support plans in order to...
Dorset Healthcare’s SPC Journey

https://youtu.be/6aexdLqGqag
Advice to others

Making data count
Don’t forget the PORC

In the excitement of introducing SPC and putting control limits on your charts don’t lose sight of the utility and accessibility of the ‘Plain Ole Run Chart’ (PORC)
Top table exclusive

The top table at the feast always used to get the best food. Are SPC and Run Charts seen as rich fare only for the nobS on the top table? Are they routinely used in the front-line?
New hammer syndrome

To someone with a new hammer everything looks like a nail! Not everything is appropriate for SPC or a Run Chart
Cargo Cults

Measure it and something will happen. More about Cargo Cults here: https://en.wikipedia.org/wiki/Cargo_cult
Cargo cults – an example

Suspected suicide

NHS Improvement
Where’s Wally?

Just how many charts can you cram onto an A4 page? If you cannot even read the legend without a magnifying glass then what is the point? How do you identify the chart(s) that indicate significant change in that crowd?
How many angels on the head of the SPC pin?

Watch the newly minted SPC experts start to argue about how many points constitute a shift, a trend, a run – how many points to calculate control limits, sampling etc.
Making data count
Poll 3

Which statement best describes how you feel about your performance report:

• I am confident that my report supports effective decision making
• I am concerned that my report may not focus discussion on the most important issues
• I need time to reflect on today’s session
Poll 4

Please rank the following in order of priority – which of these will be most helpful?

• Test a different approach to regulation
• Implement a regional train the trainer programme
• Establish regional networks
• Facilitate mechanisms to share learning
• Providing analytical products to aid decision making