Why quality improvement is hard, and how to get it to work

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Variations in healthcare

- Over 70 amputations a week in England, of which 80% are potentially preventable.
- You are twice as likely to have your foot amputated if you live in the Southwest compared with the Southeast.

Variations in healthcare

- These variations have no basis in clinical science.
- Gaps exist between what is known to be effective and what happens in practice.
- If all NHS organisations were performing as well as the top 25% , it would yield a productivity gain of about £7billion a year – and the lives of many patients would be better.

What tends to happen in quality improvement

- Bright idea /recommendation from an RCA/policy push/ “latest thing”
- Theory of change not explicit
- Not clear what process is being targeted
- No attempt to expose to systematic challenge or understand how it works
- No search for unanticipated consequences or toxic effects
- Poorly described or at wrong level of specification, so impossible to reproduce

Evaluation of Health Foundation's Safer Patients Initiative

Brief background

- Commissioned and supported by Health Foundation, a major independent charitable foundation
    - £775K invested in each SPI1 hospital
    - £270K in each SPI2 hospital

- Intervention led by Institute for Health Improvement (Boston)

- 4 hospitals (1 English) in first phase (2005-2006),
  20 (10 English) in second phase (2007-2008)

- Aimed for 50% reduction in adverse events among other goals

Complex organisational intervention

Work Area	Change Package Element
Critical Care	**Establish infrastructure** **–Daily goal sheets** **–Daily multi-disciplinary rounds** **Infection Prevention** **–Ventilator bundle** **–Central line bundle** **–MRSA** **–Glucose control (ITU then to HDU)**
General Ward	**Risk Identification and Response** **–Rapid response teams** **–Early warning scores system** **Infection Prevention** **–MRSA** **Communication and Teamwork** **–Safety briefings** **–Communication tools (e.g. SBAR)**
Leadership and organisational change	**Infrastructure to support safety** **Strategic placement** **WalkRounds** **Hand hygiene**
Medicines Management	**Medicines reconciliation on admission** **High Hazard Medications - Anticoagulation** **Conduct a Failure Modes and Effects Analysis on a high risk medication process**
Perioperative	**Surgical Site Infection bundle** **Culture of safety** **DVT Prophylaxis** **Beta Blocker – dropped from SPI2**

SPI components

- Training, coaching, web-support, know-how from IHI
- Collaborative learning sessions
- Use of PDSA cycles, leadership walkrounds and other techniques

Our design

- Controlled before and after multi-method (qualitative and quantitative) study
- SPI1:
  - 4 intervention hospitals
  - 18 control hospitals (9 SPI2 hospitals + 9 matched controls)
- SPI2:
  - 9 English hospitals + 9 matched controls
- “Difference in difference” approach used in analysis

Case note review

- Patients aged 65+ admitted with acute respiratory disease
- Review was explicit (criterion-based) and implicit (holistic)
- Criterion-based review conducted by two qualified pharmacists

What we found: SPI1

- Lots of enthusiasm for the SPI at the “blunt end” of hospitals; harder to find the same at the sharp end of medical wards

- Small improvement in staff attitudes towards organisational climate in SPI1 hospitals

Observations in SPI1

Table 5 | Vital signs and routine investigations before (epoch 1) and after (epoch 2) phase one of Safer Patients Initiative (SPI1). Figures are percentage compliance (binomial standard error (SE)) and odds ratios

	Control hospitals		SPI1 hospitals		OR (99% CI), P value	
	Epoch 1 (n=236)	Epoch 2* (n=240)	Epoch 1 (n=381)	Epoch 2* (n=380)	Changes in controls	Effect of SPI1†
On admission						
Temperature	98 (1)	99 (1)	99 (1)	99 (1)	5.1 (0.3 to 89.5), 0.144	0.2 (0.01 to 8.5), 0.289
Respiratory rate	96 (1)	99 (1)	91 (2)	98 (1)	4.7 (0.6 to 36.5), 0.052	1.5 (0.2 to 16.0), 0.677
Cyanosis/oxygen saturation	99 (1)	99 (1)	98 (1)	99 (1)	1.7 (0.2 to 18.2), 0.578	2.7 (0.1 to 55.2), 0.385
Confusion/mental state	58 (3)	65 (3)	67 (2)	69 (2)	1.2 (0.7 to 2.1), 0.307	1.2 (0.6 to 2.6), 0.437
Pulse	99 (1)	99 (1)	99 (1)	>99 (<1)	3.3 (0.2 to 68.7), 0.306	0.5 (0.01 to 23.7), 0.614
Blood pressure	99 (1)	99 (1)	99 (1)	>99 (<1)	3.3 (0.2 to 68.7), 0.306	0.5 (0.01 to 23.7), 0.614
At 6 hours						
Temperature	62 (3)	74 (3)	76 (2)	86 (2)	1.7 (1.0 to 2.9), 0.008	1.0 (0.5 to 2.2), 0.976
Respiratory rate	44 (3)	73 (3)	43 (3)	82 (2)	3.6 (2.1 to 6.2), <0.001	2.0 (1.0 to 4.2), 0.015
Pulse	67 (3)	77 (3)	83 (2)	88 (2)	1.7 (1.0 to 3.0), 0.012	1.0 (0.4 to 2.3), 0.973
Oxygen saturation	61 (3)	75 (3)	77 (2)	88 (2)	1.9 (1.1 to 3.3), 0.002	1.3 (0.6 to 2.8), 0.425
At 12 hours						
Temperature	59 (3)	70 (3)	71 (2)	82 (2)	1.8 (1.0 to 3.0), 0.005	1.3 (0.6 to 2.8), 0.314
Respiratory rate	40 (3)	69 (3)	37 (3)	78 (2)	3.7 (2.2 to 6.2), <0.001	2.1 (1.0 to 4.3), 0.008
Pulse	62 (3)	74 (3)	75 (2)	83 (2)	1.9 (1.1 to 3.2), 0.002	1.2 (0.5 to 2.5), 0.618
Oxygen saturation	56 (3)	73 (3)	64 (3)	82 (2)	2.3 (1.4 to 3.9), <0.001	1.4 (0.7 to 2.9), 0.234
Routine investigations						
Urea and electrolytes	>99 (<1)	99 (1)	99 (1)	99 (1)	0.6 (0.02 to 14.1), 0.665	0.8 (0.02 to 39.5), 0.865
Chest x ray	97 (1)	98 (1)	95 (1)	94 (1)	2.4 (0.5 to 11.8), 0.164	0.5 (0.1 to 3.0), 0.291
Full blood count	99 (1)	98 (1)	99 (1)	98 (1)	1.2 (0.1 to 10.5), 0.789	0.2 (0.01 to 5.4), 0.223

*After intervention.
†OR >1 favours SPI1.

Improvement in both epochs and both control and SPI hospitals.
Difference between SPI and controls only significant for respiratory rate at 12 hours

What we found: SPI2

- Staff survey: one change, but it favoured control hospitals
- Case note review in respiratory patients showed many practices improved over time, but did not improve more in SPI hospitals
- No significant change in error rates over time or between SPI and control hospitals
- Peri-operative care: already good at baseline; little room for improvement
- Intraoperative temp monitoring improved but not more in SPI hospitals
- Dramatic increase in use of hand-washing materials and falls in MRSA and Cdiff, but no additional effect in SPI hospitals

Observations in SPI2

- Once again compliance with obs at 6 and 12 hours improved in both groups
- Again effect most pronounced for respiratory rate
- Point estimates for six of the 8 standards for monitoring vital signs in the first 12 hours after admission favoured SPI2 hospitals, but no differences were significant

What we found: SPI2 outcomes

- Mortality rates in case-note reviews:
  - control hospitals increased from 17.3% to 21.4%,
  - SPI2 hospitals fell from 10.3% to 6.1%.
  - Result significant at the 0.05 level (p=0.043), but not at the predetermined 0.01 level.
- Fewer than 8% of deaths could have been avoided.
- No significant difference in the rate of change in ICU mortality across control and SPI2 hospitals.
- Patient satisfaction improved over the study period in both control and SPI2 hospitals on all dimensions; no significant differences between them.

Interpretation

- Many aspects of care good or improving in English hospitals over period of study
- Likely to be due to policy pushes and growing sophistication of hospital governance systems
- Emergence of professional consensus on some important areas
- Contemporaneous improvement made it hard to detect an additive effect of SPI
- May have been impacts on areas we did not measure (e.g. VAP and CVC-BSIs)

What does this mean for organisational interventions?

- Seen as daunting and demanding of resource: need support for middle managers and data collection systems
- Challenges of multiple competing priorities and clinician engagement
- Perceptions of “elite status” of some SPI colleagues did not help
- May be much more difficult to achieve “spread” than anticipated
- Need to understand what mechanisms of change are and keep them under review throughout programmes

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An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

Success of Michigan project

- infection control in insertion and management is major factor in CVC-BSIs

- Evidence based intervention in 103 ICUs in Michigan; included checklist for CVC insertion and management

- Sustained reduction of CVC-BSI rate:

Baseline: mean **7.7** CVC-BSIs per 1000 catheter days

18 months: mean **1.4** CVC-BSIs per 1000 catheter days

Michigan

- **Clinical community** approach, led by community insiders
- Flexible, evolved over time
- Became a “learning community”
- Impetus and momentum came from within the community
  - role of peer pressure
  - importance of social network
  - redefinition of problem as more than technical
  - recognising symbolic functions of activities
  - judicious use of harder edges
  - use of data as feedback and stimulus
- Gradually more participant-led
- Best understood as a culture change intervention that made patient safety a priority and helped destabilise unhelpful hierarchies

Door to balloon studies in patients with ST-segment elevation myocardial infarction

- Prompt treatment increases chance of survival – need to get to balloon within 90 mins
  - ED physician activates the cath lab
  - Single-call activation system activates the cath lab
  - Cath lab team is available within 20–30 minutes
  - Prompt data feedback
  - Senior management commitment
  - Team based approach

D2B studies

- Identified characteristics of high performing hospitals
  - Explicit goal
  - Visible support of senior management
  - Innovative, standardised protocols
  - Flexibility in implementation
  - Clinical leadership
  - Collaborative interdisciplinary teams
  - Data feedback
  - Organisational culture that fostered persistence in face of challenges and setbacks

EWS and Rapid Response

- Ethnographic study identified benefits of EWS:
  - Scrutiny of ward practices
  - Formalising understandings of deterioration, helped in prioritisation
  - Empowered staff to summon help

  - BUT nurses did not always use score when communicating with doctors
  - Sometimes forgot about tests/careful monitoring for patients who were scoring low
  - Could be harder to get help for some patients

    - Mackintosh N, Rainey H, Sandall J. Understanding how rapid response systems may improve safety for the acutely ill patient: learning from the frontline. BMJ Quality and Safety (online first)

EWS and rapid response

- Benefits
  - Outreach team helped coordinate care
  - Safety net
- BUT variability in response and risk of a “pass the problem” effect

An overview of organisational barriers to quality improvement

The Health Foundation
Inspiring Improvement

What seems to be important in getting organisational interventions to work?

- Multiple strategies that work in different ways
- Offer relative advantage and make things easier, not harder to do
- Are clear about what cannot be changed, but mobilise “endowment effects” where possible
- Capable of producing demonstrable change
- Monitor and manage unintended consequences

10 lessons

- Convince people there's a problem
- Convince people of the solution
- Invest in data collection and feedback systems
- Avoid projectness and excess ambitions
- Assess organisational, culture, and capacities
- Find ways of dealing with tribalism and lack of staff engagement
- Have the right kind of leadership
- Incentivise participation and make judicious use of hard edges
- Think about sustainability from the start
- Try to find the side-effects of change

Free report available soon from the Health Foundation website or Email info@health.org.uk

Conclusions

- Now seeing a maturing of methods for studying patient safety
- Interesting studies starting to appear that contribute to improvement science
- Many challenges still to be addressed