

# Grab a post-it or piece of paper!



- Everyone needs a single, square post-it note or piece of paper
- We'll be using it in a brief exercise later in the session

**Evaluating QI Capability Building  
using the Kirkpatrick Model:  
*Case example of the  
Lean Fundamentals MOOC***


**Dr Iain Smith**

(Associate Director of Planning and Business Development)

# Publication

Quality education report

## Building lean improvement skills at scale: an evaluation of a massive open online course in the English NHS

Iain M Smith  1,2

- [bit.ly/Imooceval](https://bit.ly/Imooceval)

### WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Massive open online courses (MOOCs) have been proposed as a means of training health and care professionals in systematic quality improvement (QI) methods at scale. MOOC evaluations have often been limited to participant reaction and calls for assessment of impact and cost-effectiveness have been made.

### WHAT THIS STUDY ADDS

⇒ An evaluation of a Lean QI MOOC covering all levels of the Kirkpatrick framework including its reach and reaction from participants; impact on participants' knowledge and confidence to apply Lean techniques; examples of impact and overall return-on-investment.

### HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ A concrete example that demonstrates that MOOCs can be effective and efficient methods for building impactful improvement knowledge and skills at scale.

# About The Lean QI MOOC

- An action oriented massive-online courses that could be applied immediately to improve processes
- Developed practical skills to make improvements to a specific part of a process
- Comprised six modules accessed over an eight-week period and was free to access
- Five cohorts delivered between Feb 2021 and Sep 2022



# About Kirkpatrick

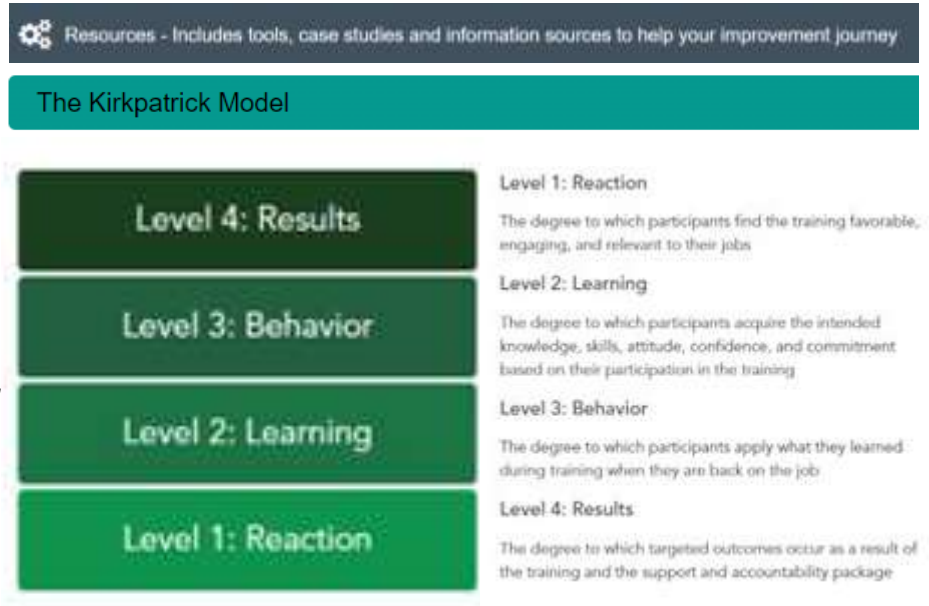
Framework initially developed to evaluate training and development programmes over four levels:

- **Reaction** - participants' attitudes towards the programme
- **Learning** - participants' acquisition of knowledge and skills
- **Behaviour** - confidence to translate knowledge into practice
- **Results** - success in achieving organisational goals

Also proposed as useful for evaluating improvement initiatives

# NHS Impact Resources

- Includes tools and case studies to help evaluate your improvement work
- Proposes Kirkpatrick's model to evaluate impact of training and development programmes.



<https://future.nhs.uk/NHSIMPACT>

# Evaluation strategy



ROI

Cost Benefits / Cost Inputs

Results

Participant Impact Case Studies

Behaviour

Before and After Confidence Assessment

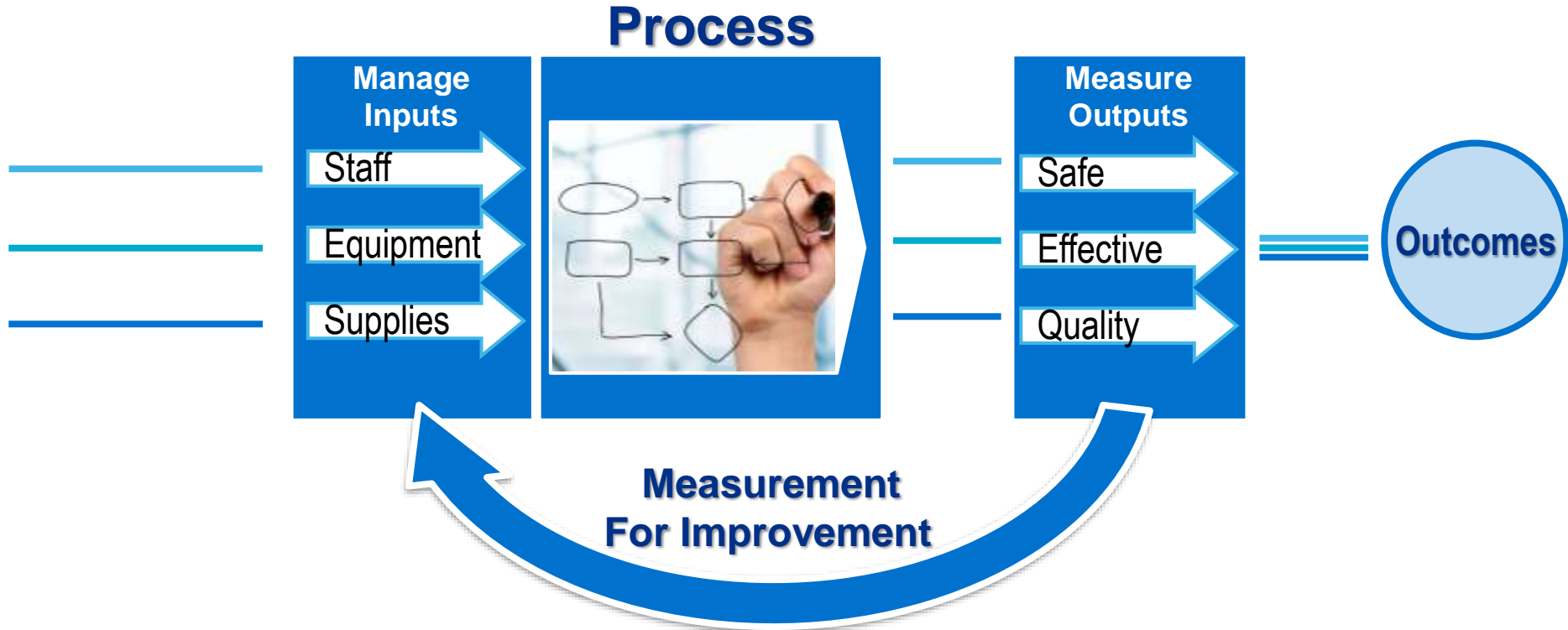
Learning

Before and After Knowledge Assessment

Reaction

Rating and Recommendation

# Practical Exercise - Process variation





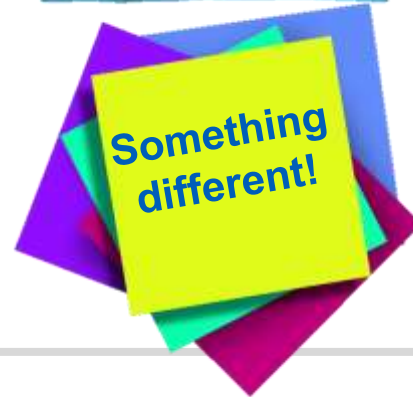
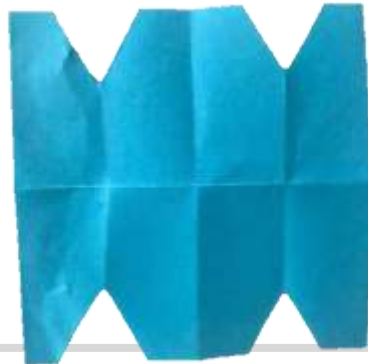
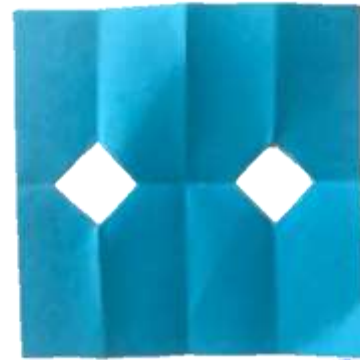
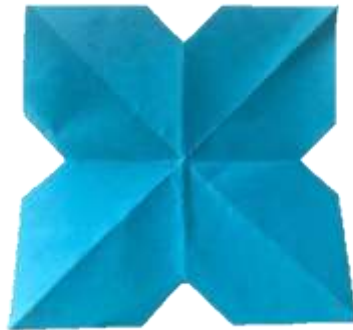
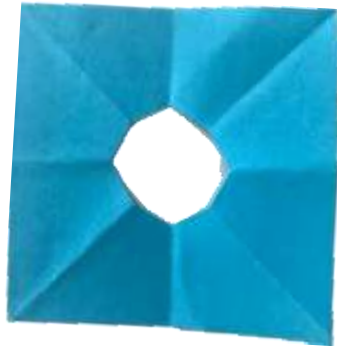
# Practical exercise

## Post-it note challenge

- Everyone needs a single, square post-it note
- We'll all carry out the same, simple process
- The process will be described using verbal instructions



# Use the pointer tool to show which one you created...



# Case example – Lean Fundamentals

Topic	Topic Description
<b>0 .Course Induction</b>	Oriented participants to the learning platform functionality, course objectives and learning compact. Helps participants consider their improvement project scope.
<b>1. Improvement Kata</b>	Provided a structured, four-step routine for learning and applying improvement science and helps participants establish and communicate their project.
<b>2. Setting improvement aims and determining scope</b>	Supported participants to assess the scope of their proposed improvement and create an aim statement for a tightly scoped project with clear boundaries.
<b>3. Introduction to Lean (value, waste and PDSA)</b>	Introduced the principles of Lean and helped participants to consider: how value is defined; how waste manifests within processes; how to improve using the model-for-improvement and PDSA.
<b>4. Creating standard operations for processes</b>	Demonstrated the effect of process variation and helped participants to design it out and document processes through observation and waste elimination.
<b>5. The flows of healthcare</b>	Introduced participants to seven flows that comprise healthcare processes and how to observe, document and process map them.
<b>6. Workplace organisation</b>	Helped participants apply a five-step process to organise workplaces and use visual methods to design more effective, efficient and reliable processes.

# Reach

## *Enrolments, participants and course survey rates*

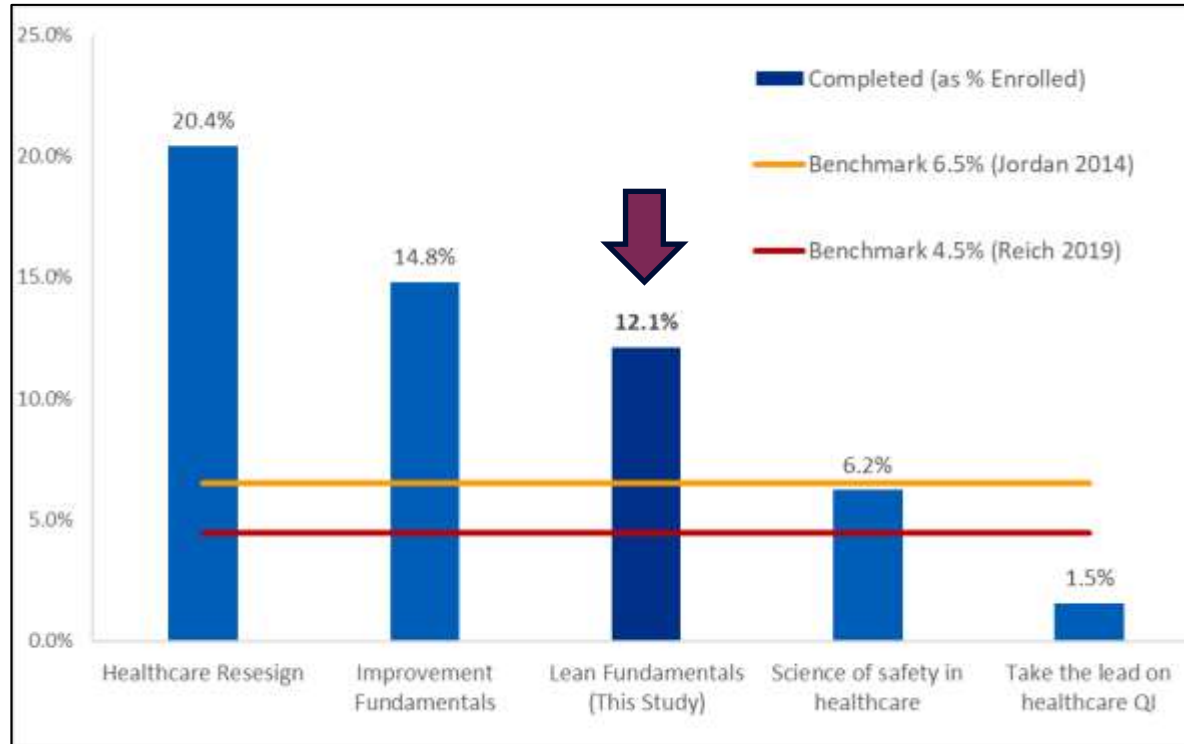
Cohort	Number of Enrolments	Number of Participants	Participation Rate (as % of Enrolments)	Evaluation responses (Pre-course)	Response rate (Pre-course as % of Participants)	Evaluation responses (Post-course)	Response rate (Post-course as % of Participants)
1	43	30	69.8%	22	73%	10	33.3%
2	626	281	44.9%	147	52%	46	16.4%
3	1487	771	51.8%	509	66%	212	27.5%
4	1790	963	53.8%	608	63%	250	26.0%
5	2671	1417	53.1%	776	55%	339	23.9%
<b>Total across all cohorts</b>	<b>6617</b>	<b>3462</b>	<b>52.3%</b>	<b>2062</b>	<b>60%</b>	<b>857</b>	<b>24.8%</b>

*Cohort 1 operated as a small private online course (SPOC) targeted at Covid-19 vaccination processes*

*Cohort 2 operated as a massive open online course (MOOC) targeted at Covid-19 vaccination processes*

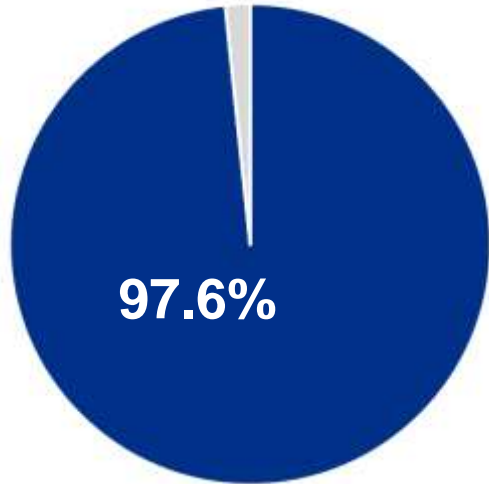
*Cohorts 3 to 5 operated as massive open online courses targeted at operational priorities*

# Completions as % of enrolments



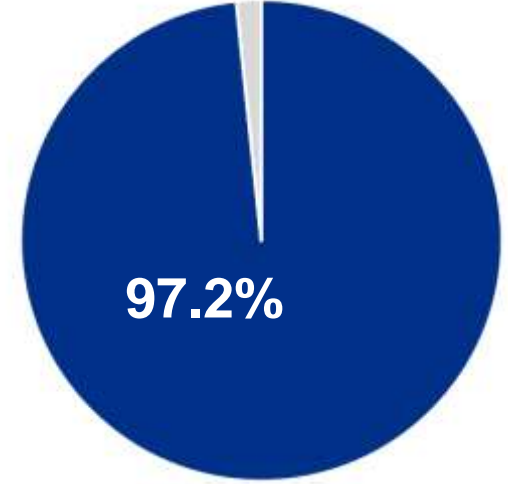
# Reaction – *Rating & Recommendation*

Lean Fundamentals  
**met expectations**

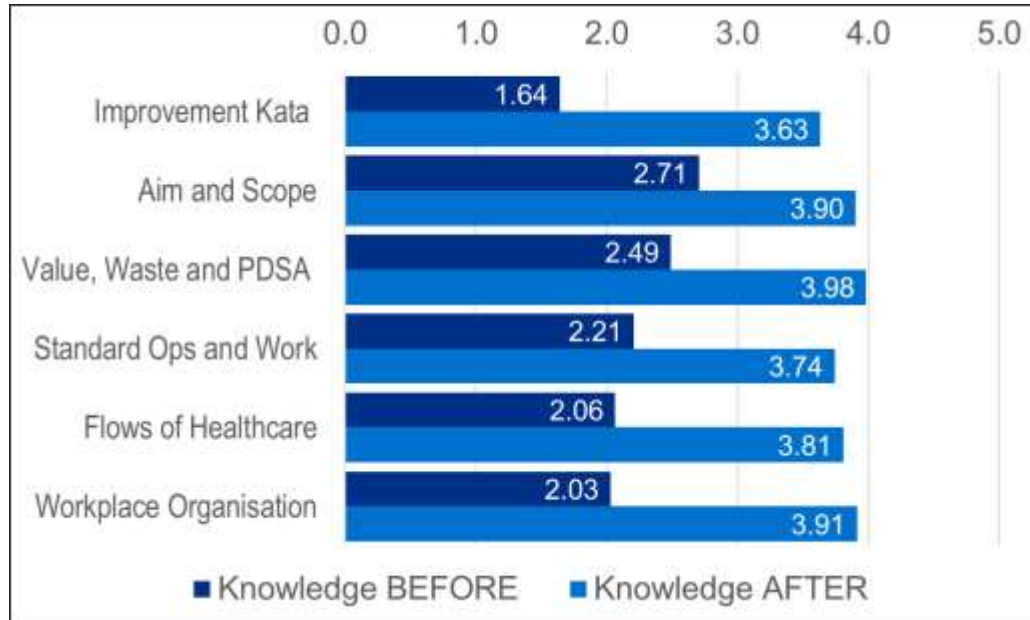


“It is brilliant and I have recommended it to so many people”

Likely to recommend to  
colleagues



# Learning – *Change in knowledge*

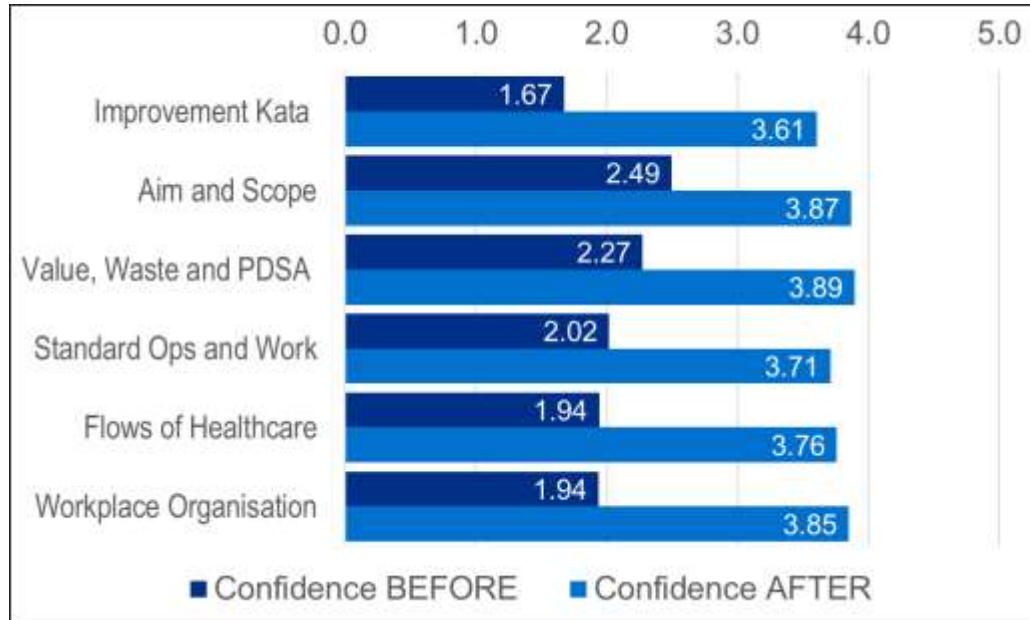


*Analysed using Wilcoxon signed-rank test and significant at  $P < 0.001$*

**“Through the exercises and applying the processes in the workplace, I feel I have gained valuable knowledge to support my current project and leadership skills”**

*Clinical Lead for Covid Vaccinations*

# Behaviour – *Change in confidence*



*Analysed using Wilcoxon signed-rank test and significant at  $P < 0.001$*

**“This has given me the tools to apply this to the changing situations I work within and allows me to ensure efficiency and productivity”**



*Head of Clinical Governance & Operations*



# Results – *Impact case examples*

- 511 project improvement reports(PIRs) uploaded
- Two PIRs developed for publication



Project Focus	Overview
<b>Service Recovery</b> 	Waiting list reduced from 1,109 to 212 and waiting time reduced from an average of over 12 months to an average of two to three months
<b>Covid-19 Vaccination</b> 	Improving throughput generated capacity equivalent to opening an additional mass vaccination centre with no additional resources

# Return on investment

- Training cost avoidance

**£1.7m** to **£3.4m**

- Return on investment

**£11** to **£23** per pound spent



# Key Points

## Massive-online can:

- help large numbers of participants to develop improvement skills
- avoid costs associated with commercial training and generate ROI
- be an effective and efficient method for building improvement skills at scale.

## Kirkpatrick framework

- remains a useful model for evaluating training and development
- has been proposed for evaluating improvement programmes



# References

- Buzachero, V. V., Phillips, J., Phillips, P. P. and Phillips, Z. L. (2013) Measuring ROI in Healthcare: Tools and Techniques to Measure the Impact and ROI in Healthcare Improvement Projects and Programs. New York, NY, USA: McGraw-Hill.
- Guest, C., Wainwright, P., Herbert, M. and Smith, I. M. (2021) '[Driving quality improvement with a massive open online course \(MOOC\)](#)', BMJ Open Quality, 10, (1), pp. e000781.
- Jordan, K. (2014) 'Initial trends in enrolment and completion of massive open online courses', The International Review of Research in Open and Distributed Learning, 15, (1).
- Kirkpatrick, D. L. (1959) 'Techniques for evaluation training programs', Journal of the American Society of Training Directors, 13, pp. 21-26.
- NHS Institute for Innovation and Improvement. (2010) The Handbook of Quality and Service Improvement Tools. Coventry: NHS Institute for Innovation & Improvement.
- Parry, G. J., Carson-Stevens, A., Luff, D. F., McPherson, M. E. and Goldmann, D. A. (2013) 'Recommendations for Evaluation of Health Care Improvement Initiatives', Academic Pediatrics, 13, (6), pp. S23-S30.
- Reich, J. and Ruipérez-Valiente, J. A. (2019) 'The MOOC pivot', Science, 363, (6423), pp. 130-131.
- Smith, I. M. (2023) '[Building lean improvement skills at scale: an evaluation of a massive open online course in the English NHS](#)', BMJ Open Quality, 12, (4), pp. e002357.
- Smith, I. M. and Bayliss, E. (2022) '[Recovering staff, recovering services: massive-online support for recovering a paediatric service using Lean and compassionate communication](#)', BMJ Open Quality, 11, (2), pp. e001914.
- Smith, I. M., Bayliss, E. and Mukoro, F. (2021a) '[Capability building for large-scale transformational change: learning from an evaluation of a national programme](#)', BMJ Open Quality, 10, (1), pp. e000980.
- Smith, I. M., Bayliss, E., Salisbury, H. and Wheeler, A. (2021b) '[Operations management on the front line of Covid-19 vaccination: building capability at scale via technology enhanced learning](#)', BMJ Open Quality, 10, (1), pp. e001372.
- Smith, I. M. and Smith, D. T. L. (2021) '[Mass production methods for mass vaccination: improving flow and operational performance in a COVID-19 mass vaccination centre using Lean](#)', BMJ Open Quality, 10, (3), pp. e001525.
- SMMT Industry Forum. (2003) PA Productivity Toolkit. Newcastle upon Tyne: One NorthEast.

