



PRACTICE

CLINICAL UPDATES

Quality improvement into practice

OPEN ACCESS

Adam Backhouse *quality improvement programme lead*¹, Fatai Ogunlayi *public health specialty registrar*²

¹North London Partners in Health and Care, Islington CCG, London N1 1TH, UK; ²Institute of Applied Health Research, Public Health, University of Birmingham, B15 2TT, UK

What you need to know

- Thinking of quality improvement (QI) as a principle-based approach to change provides greater clarity about (a) the contribution QI offers to staff and patients, (b) how to differentiate it from other approaches, (c) the benefits of using QI together with other change approaches
- QI is not a silver bullet for all changes required in healthcare: it has great potential to be used together with other change approaches, either concurrently (using audit to inform iterative tests of change) or consecutively (using QI to adapt published research to local context)
- As QI becomes established, opportunities for these collaborations will grow, to the benefit of patients.

The benefits to front line clinicians of participating in quality improvement (QI) activity are promoted in many health systems. QI can represent a valuable opportunity for individuals to be involved in leading and delivering change, from improving individual patient care to transforming services across complex health and care systems.¹

However, it is not clear that this promotion of QI has created greater understanding of QI or widespread adoption. QI largely remains an activity undertaken by experts and early adopters, often in isolation from their peers.² There is a danger of a widening gap between this group and the majority of healthcare professionals.

This article will make it easier for those new to QI to understand what it is, where it fits with other approaches to improving care (such as audit or research), when best to use a QI approach, making it easier to understand the relevance and usefulness of QI in delivering better outcomes for patients.

How this article was made

AB and FO are both specialist quality improvement practitioners and have developed their expertise working in QI roles for a variety of UK healthcare organisations. The analysis presented here arose from AB and FO's observations of the challenges faced when introducing QI, with healthcare providers often unable to distinguish between QI and other change approaches, making it difficult to understand what QI can do for them.

How is quality improvement defined?

There are many definitions of QI (box 1). The *BMJ's* Quality Improvement series uses the Academy of Medical Royal Colleges definition.⁶ Rather than viewing QI as a single method or set of tools, it can be more helpful to think of QI as based on a set of principles common to many of these definitions: a systematic continuous approach that aims to solve problems in healthcare, improve service provision, and ultimately provide better outcomes for patients.

Box 1: Definitions of quality improvement

- Improvement in patient outcomes, system performance, and professional development that results from a combined, multidisciplinary approach in how change is delivered.³
- The delivery of healthcare with improved outcomes and lower cost through continuous redesigning of work processes and systems.⁴
- Using a systematic change method and strategies to improve patient experience and outcome.⁵
- To make a difference to patients by improving safety, effectiveness, and experience of care by using understanding of our complex healthcare environment, applying a systematic approach, and designing, testing, and implementing changes using real time measurement for improvement.⁶

In this article we discuss QI as an approach to improving healthcare that follows the principles outlined in box 2; this may be a useful reference to consider how particular methods or tools could be used as part of a QI approach.

Box 2: Principles of QI

Primary intent—To bring about measurable improvement to a specific aspect of healthcare delivery, often with evidence or theory of what might work but requiring local iterative testing to find the best solution.⁷

Employing an iterative process of testing change ideas—Adopting a theory of change which emphasises a continuous process of planning and testing changes, studying and learning from comparing the results to a predicted outcome, and adapting hypotheses in response to results of previous tests.^{8,9}

Consistent use of an agreed methodology—Many different QI methodologies are available; commonly cited methodologies include the Model for Improvement, Lean, Six Sigma, and Experience-based Co-design.⁴ Systematic review shows that the choice of tools or methodologies has little impact on the success of QI provided that the chosen methodology is followed consistently.¹⁰ Though there is no formal agreement on what constitutes a QI tool, it would include activities such as process mapping that can be used within a range of QI methodological approaches. NHS Scotland's Quality Improvement Hub has a glossary of commonly used tools in QI.¹¹

Empowerment of front line staff and service users—QI work should engage staff and patients by providing them with the opportunity and skills to contribute to improvement work. Recognition of this need often manifests in drives from senior leadership or management to build QI capability in healthcare organisations, but it also requires that frontline staff and service users feel able to make use of these skills and take ownership of improvement work.¹²

Using data to drive improvement—To drive decision making by measuring the impact of tests of change over time and understanding variation in processes and outcomes. Measurement for improvement typically prioritises this narrative approach over concerns around exactness and completeness of data.^{13,14}

Scale-up and spread, with adaptation to context—As interventions tested using a QI approach are scaled up and the degree of belief in their efficacy increases, it is desirable that they spread outward and be adopted by others. Key to successful diffusion of improvement is the adaption of interventions to new environments, patient and staff groups, available resources, and even personal preferences of healthcare providers in surrounding areas, again using an iterative testing approach.^{15,16}

Box 3: Alternatives to QI

Research—The attempt to derive generalisable new knowledge by addressing clearly defined questions with systematic and rigorous methods.¹⁷

Clinical audit—A way to find out if healthcare is being provided in line with standards and to let care providers and patients know where their service is doing well, and where there could be improvements.¹⁸

Service evaluation—A process of investigating the effectiveness or efficiency of a service with the purpose of generating information for local decision making about the service.¹⁹

Clinical transformation—An umbrella term for more radical approaches to change; a deliberate, planned process to make dramatic and irreversible changes to how care is delivered.²⁰

Innovation—To develop and deliver new or improved health policies, systems, products and technologies, and services and delivery methods that improve people's health. Health innovation responds to unmet needs by employing new ways of thinking and working.²¹

Why do we need to make this distinction for QI to succeed?

Improvement in healthcare is 20% technical and 80% human.²² Essential to that 80% is clear communication, clarity of approach, and a common language. Without this shared understanding of QI as a distinct approach to change, QI work risks straying from the core principles outlined above, making it less likely to succeed. If practitioners cannot communicate clearly with their colleagues about the key principles and differences of a QI approach, there will be mismatched expectations about what QI is and how it is used, lowering the chance that QI work will be effective in improving outcomes for patients.²³

There is also a risk that the language of QI is adopted to describe change efforts regardless of their fidelity to a QI approach, either due to a lack of understanding of QI or a lack of intention to carry it out consistently.⁹ Poor fidelity to the core principles of QI reduces its effectiveness and makes its desired outcome less likely, leading to wasted effort by participants and decreasing its credibility.^{2,8,24} This in turn further widens the gap between advocates of QI and those inclined to scepticism, and may lead to missed opportunities to use QI more widely, consequently leading to variation in the quality of patient care.

Without articulating the differences between QI and other approaches, there is a risk of not being able to identify where a QI approach can best add value. Conversely, we might be tempted to see QI as a “silver bullet” for every healthcare challenge when a different approach may be more effective. In reality it is not clear that QI will be fit for purpose in tackling all of the wicked problems of healthcare delivery and we must be able to identify the right tool for the job in each situation.²⁵ Finally, while different approaches will be better suited to different types of challenge, not having a clear understanding of how approaches differ and complement each other may mean missed opportunities for multi-pronged approaches to improving care.

What is the relationship between QI and other approaches such as audit?

Academic journals, healthcare providers, and “arms-length bodies” have made various attempts to distinguish between the different approaches to improving healthcare.^{19,26-28} However, most comparisons do not include QI or compare QI to only one or two of the other approaches.^{7,29-31} To make it easier for people to use QI approaches effectively and appropriately, we summarise the similarities, differences, and crossover between

What other approaches to improving healthcare are there?

Taking considered action to change healthcare for the better is not new, but QI as a distinct approach to improving healthcare is a relatively recent development. There are many well established approaches to evaluating and making changes to healthcare services in use, and QI will only be adopted more widely if it offers a new perspective or an advantage over other approaches in certain situations.

A non-systematic literature scan identified the following other approaches for making change in healthcare: research, clinical audit, service evaluation, and clinical transformation. We also identified innovation as an important catalyst for change, but we did not consider it an approach to evaluating and changing healthcare services so much as a catch-all term for describing the development and introduction of new ideas into the system. A summary of the different approaches and their definition is shown in **box 3**. Many have elements in common with QI, but there are important difference in both intent and application. To be useful to clinicians and managers, QI must find a role within healthcare that complements research, audit, service evaluation, and clinical transformation while retaining the core principles that differentiate it from these approaches.

QI and other approaches to tackling healthcare challenges (fig 1).

QI and research

Overview

Research aims to generate new generalisable knowledge, while QI typically involves a combination of generating new knowledge or implementing existing knowledge within a specific setting.³² Unlike research, including pragmatic research designed to test effectiveness of interventions in real life, QI does not aim to provide generalisable knowledge. In common with QI, research requires a consistent methodology. This method is typically used, however, to prove or disprove a fixed hypothesis rather than the adaptive hypotheses developed through the iterative testing of ideas typical of QI. Both research and QI are interested in the environment where work is conducted, though with different intentions: research aims to eliminate or at least reduce the impact of many variables to create generalisable knowledge, whereas QI seeks to understand what works best in a given context. The rigour of data collection and analysis required for research is much higher; in QI a criterion of “good enough” is often applied.

Relationship with QI

Though the goal of clinical research is to develop new knowledge that will lead to changes in practice, much has been written on the lag time between publication of research evidence and system-wide adoption, leading to delays in patients benefitting from new treatments or interventions.³³ QI offers a way to iteratively test the conditions required to adapt published research findings to the local context of individual healthcare providers, generating new knowledge in the process. Areas with little existing knowledge requiring further research may be identified during improvement activities, which in turn can form research questions for further study. QI and research also intersect in the field of improvement science, the academic study of QI methods which seeks to ensure QI is carried out as effectively as possible.³⁴

Scenario: QI for translational research

Newly published research shows that a particular physiotherapy intervention is more clinically effective when delivered in short, twice-daily bursts rather than longer, less frequent sessions. A team of hospital physiotherapists wish to implement the change but are unclear how they will manage the shift in workload and how they should introduce this potentially disruptive change to staff and to patients.

Before continuing reading think about your own practice—How would you approach this situation, and how would you use the QI principles described in this article?

Adopting a QI approach, the team realise that, although the change they want to make is already determined, the way in which it is introduced and adapted to their wards is for them to decide. They take time to explain the benefits of the change to colleagues and their current patients, and ask patients how they would best like to receive their extra physiotherapy sessions.

The change is planned and tested for two weeks with one physiotherapist working with a small number of patients. Data are collected each day, including reasons why sessions were missed or refused. The team review the data each day and make iterative changes to the physiotherapist's schedule, and to the times of day the sessions are offered to patients. Once an improvement is seen, this new way of working is scaled up to all of the patients on the ward.

The findings of the work are fed into a service evaluation of physiotherapy provision across the hospital, which uses the findings of the QI work to make recommendations about how physiotherapy provision should be structured in the future. People feel more positive about the change because they know colleagues who have already made it work in practice.

QI and clinical audit

Overview

Clinical audit is closely related to QI: it is often used with the intention of iteratively improving the standard of healthcare, albeit in relation to a pre-determined standard of best practice.³⁵ When used iteratively, interspersed with improvement action, the clinical audit cycle adheres to many of the principles of QI. However, in practice clinical audit is often used by healthcare organisations as an assurance function, making it less likely to be carried out with a focus on empowering staff and service users to make changes to practice.³⁶ Furthermore, academic reviews of audit programmes have shown audit to be an ineffective approach to improving quality due to a focus on data collection and analysis without a well developed approach to the action section of the audit cycle.³⁷ Clinical audits, such as the National Clinical Audit Programme in the UK (NCAPOP), often focus on the management of specific clinical conditions. QI can focus on any part of service delivery and can take a more cross-cutting view which may identify issues and solutions that benefit multiple patient groups and pathways.³⁰

Relationship with QI

Audit is often the first step in a QI process and is used to identify improvement opportunities, particularly where compliance with known standards for high quality patient care needs to be improved. Audit can be used to establish a baseline and to analyse the impact of tests of change against the baseline. Also, once an improvement project is under way, audit may form part of rapid cycle evaluation, during the iterative testing phase, to understand the impact of the idea being tested. Regular clinical audit may be a useful assurance tool to help track whether improvements have been sustained over time.

Scenario: Audit and QI

A foundation year 2 (FY2) doctor is asked to complete an audit of a pre-surgical pathway by looking retrospectively through patient documentation. She concludes that adherence to best practice is mixed and recommends: “Remind the team of the importance of being thorough in this respect and re-audit in 6 months.” The results are presented at an audit meeting, but a re-audit a year later by a new FY2 doctor shows similar results.

Before continuing reading think about your own practice—How would you approach this situation, and how would you use the QI principles described in this paper?

Contrast the above with a team-led, rapid cycle audit in which everyone contributes to collecting and reviewing data from the previous week, discussed at a regular team meeting. Though surgical patients are often transient, their experience of care and ideas for improvement are captured during discharge conversations. The team identify and test several iterative changes to care processes. They document and test these changes between audits, leading to sustainable change. Some of the surgeons involved work across multiple hospitals, and spread some of the improvements, with the audit tool, as they go.

QI and service evaluation

Overview

In practice, service evaluation is not subject to the same rigorous definition or governance as research or clinical audit, meaning that there are inconsistencies in the methodology for carrying it out. While the primary intent for QI is to make change that will drive improvement, the primary intent for evaluation is to assess the performance of current patient care.³⁸ Service evaluation may be carried out proactively to assess a service against its stated aims or to review the quality of patient care, or may be commissioned in response to serious patient harm or red flags about service performance. The purpose of service evaluation is to help local decision makers determine whether

a service is fit for purpose and, if necessary, identify areas for improvement.

Relationship with QI

Service evaluation may be used to initiate QI activity by identifying opportunities for change that would benefit from a QI approach. It may also evaluate the impact of changes made using QI, either during the work or after completion to assess sustainability of improvements made. Though likely planned as separate activities, service evaluation and QI may overlap and inform each other as they both develop. Service evaluation may also make a judgment about a service's readiness for change and identify any barriers to, or prerequisites for, carrying out QI.

QI and clinical transformation

Overview

Clinical transformation involves radical, dramatic, and irreversible change—the sort of change that cannot be achieved through continuous improvement alone. As with service evaluation, there is no consensus on what clinical transformation entails, and it may be best thought of as an umbrella term for the large scale reform or redesign of clinical services and the non-clinical services that support them.^{20,39} While it is possible to carry out transformation activity that uses elements of QI approach, such as effective engagement of the staff and patients involved, QI which rests on iterative test of change cannot have a transformational approach—that is, one-off, irreversible change.

Relationship with QI

There is opportunity to use QI to identify and test ideas before full scale clinical transformation is implemented. This has the benefit of engaging staff and patients in the clinical transformation process and increasing the degree of belief that clinical transformation will be effective or beneficial. Transformation activity, once completed, could be followed up with QI activity to drive continuous improvement of the new process or allow adaptation of new ways of working. As interventions made using QI are scaled up and spread, the line between QI and transformation may seem to blur. The shift from QI to transformation occurs when the intention of the work shifts away from continuous testing and adaptation into the wholesale implementation of an agreed solution.

Scenario: QI and clinical transformation

An NHS trust's human resources (HR) team is struggling to manage its junior doctor placements, rotas, and on-call duties, which is causing tension and has led to concern about medical cover and patient safety out of hours. A neighbouring trust has launched a smartphone app that supports clinicians and HR colleagues to manage these processes with the great success.

This problem feels ripe for a transformation approach—to launch the app across the trust, confident that it will solve the trust's problems.

Before continuing reading think about your own organisation—What do you think will happen, and how would you use the QI principles described in this article for this situation?

Outcome without QI

Unfortunately, the HR team haven't taken the time to understand the underlying problems with their current system, which revolve around poor communication and clarity from the HR team, based on not knowing who to contact and being unable to answer questions. HR assume that because the app has been a success elsewhere, it will work here as well.

People get excited about the new app and the benefits it will bring, but no consideration is given to the processes and relationships that need to be in place to make it work. The app is launched with a high profile campaign and adoption is high, but the same issues continue. The HR team are confused as to why things didn't work.

Outcome with QI

Although the app has worked elsewhere, rolling it out without adapting it to local context is a risk – one which application of QI principles can mitigate.

HR pilot the app in a volunteer specialty after spending time speaking to clinicians to better understand their needs. They carry out several tests of change, ironing out issues with the process as they go, using issues logged and clinician feedback as a source of data. When they are confident the app works for them, they expand out to a directorate, a division, and finally the transformational step of an organisation-wide rollout can be taken.

Education into practice

Next time when faced with what looks like a quality improvement (QI) opportunity, consider asking:

- How do you know that QI is the best approach to this situation? What else might be appropriate?
- Have you considered how to ensure you implement QI according to the principles described above?
- Is there opportunity to use other approaches in tandem with QI for a more effective result?

How patients were involved in the creation of this article

This article was conceived and developed in response to conversations with clinicians and patients working together on co-produced quality improvement and research projects in a large UK hospital. The first iteration of the article was reviewed by an expert patient, and, in response to their feedback, we have sought to make clearer the link between understanding the issues raised and better patient care.

Contributors: This work was initially conceived by AB. AB and FO were responsible for the research and drafting of the article. AB is the guarantor of the article.

Competing interests: We have read and understood BMJ policy on declaration of interests and have no relevant interests to declare.

Provenance and peer review: This article is part of a series commissioned by *The BMJ* based on ideas generated by a joint editorial group with members from the Health Foundation and *The BMJ*, including a patient/carer. *The BMJ* retained full editorial control over external peer review, editing, and publication. Open access fees and *The BMJ's* quality improvement editor post are funded by the Health Foundation.

- 1 Jones B, Vaux E, Olsson-Brown A. How to get started in quality improvement. *BMJ* 2019;364:k5408. 10.1136/bmj.k5437 30655245
- 2 Dixon-Woods M, Martin GP. Does quality improvement improve quality? *Future Hosp J* 2016;3:191-4. 10.7861/futurehosp.3-3-191 31098223
- 3 Batalden PB, Davidoff F. What is "quality improvement" and how can it transform healthcare? *Qual Saf Health Care* 2007;16:2-3. 10.1136/qshc.2006.022046 17301192
- 4 Ham C, Berwick D, Dixon J. *Improving quality in the English NHS: A strategy for action*. King's Fund, 2016.
- 5 Øvretveit J. *Does improving quality save money?* Health Foundation, 2009.
- 6 Academy of Medical Royal Colleges. *Quality improvement - Training for better outcomes*. AMRoC, 2016.

- 7 Ogrinc G, Nelson WA, Adams SM, O'Hara AE. An instrument to differentiate between clinical research and quality improvement. *IRB* 2013;35:1-8.24350502
- 8 Reed JE, Card AJ. The problem with Plan-Do-Study-Act cycles. *BMJ Qual Saf* 2016;25:147-52. 10.1136/bmjqs-2015-005076 26700542
- 9 McNicholas C, Lennox L, Woodcock T, Bell D, Reed JE. Evolving quality improvement support strategies to improve Plan-Do-Study-Act cycle fidelity: a retrospective mixed-methods study. *BMJ Qual Saf* 2019;28:356-65. 10.1136/bmjqs-2017-007605 30886118
- 10 Aldenwick H, et al. *Making the case for quality improvement: lessons for NHS boards and leaders*. King's Fund, 2017.
- 11 NHS Scotland Quality Improvement Hub. Quality improvement glossary of terms. <http://www.qihub.scot.nhs.uk/qi-basics/quality-improvement-glossary-of-terms.aspx>.
- 12 Dixon-Woods M, McNicol S, Martin G. Ten challenges in improving quality in healthcare: lessons from the Health Foundation's programme evaluations and relevant literature. *BMJ Qual Saf* 2012;21:876-84. 10.1136/bmjqs-2011-000760 22543475
- 13 Solberg LI, Mosser G, McDonald S. The three faces of performance measurement: improvement, accountability, and research. *Jt Comm J Qual Improv* 1997;23:135-47. 10.1016/S1070-3241(16)30305-4 9103968
- 14 Shah A. Using data for improvement. *BMJ* 2019;364:1189. 10.1136/bmj.1189 30770353
- 15 Massoud MR, Barry D, Murphy A, Albrecht Y, Sax S, Parchman M. How do we learn about improving health care: a call for a new epistemological paradigm. *Int J Qual Health Care* 2016;28:420-4. 10.1093/intqhc/mzw039 27118664
- 16 Horton T, Illingworth J, Warbuton W. *The spread challenge - How to support the successful uptake of innovations and improvements in health care*. Health Foundation, 2018.
- 17 Department of Health. *Research governance framework for health and social care*. 2nd ed. DoH, 2005.
- 18 NHS England. Clinical audit. <https://www.england.nhs.uk/clinaudit/>.
- 19 Healthcare Quality Improvement Partnership. *A guide for clinical audit, research and service review — An educational toolkit designed to help staff differentiate between clinical audit, research and service review activities*. HQIP, 2011.
- 20 McKinsey Hospital Institute. *Transformational change in NHS providers*. Health Foundation, 2015.
- 21 World Health Organization. WHO Health Innovation Group. 2019. <https://www.who.int/life-course/about/who-health-innovation-group/en/>.
- 22 Sheffield Microsystem Coaching Academy. *Final Report Sheffield Microsystem Coaching Academy*. 2016.
- 23 Davidoff F, Dixon-Woods M, Leviton L, Michie S. Demystifying theory and its use in improvement. *BMJ Qual Saf* 2015;24:228-38. 10.1136/bmjqs-2014-003627 25616279
- 24 Taylor MJ, McNicholas C, Nicolay C, Darzi A, Bell D, Reed JE. Systematic review of the application of the plan-do-study-act method to improve quality in healthcare. *BMJ Qual Saf* 2014;23:290-8. 10.1136/bmjqs-2013-001862 24025320
- 25 Dixon-Woods M, Martin G, Tarrant C, et al. *Safer Clinical Systems: evaluation findings. Learning from the independent evaluation of the second phase of the Safer Clinical Systems programme*. Health Foundation, 2014.
- 26 Twycross A, Shorten A. Service evaluation, audit and research: what is the difference? *Evid Based Nurs* 2014;17:65-6. 10.1136/eb-2014-101871 24829302
- 27 University Hospitals Bristol NHS Foundation Trust. Is your study research, audit or service evaluation. <http://www.uhbristol.nhs.uk/research-innovation/for-researchers/is-it-research,-audit-or-service-evaluation/>.
- 28 University of Sheffield. Differentiating audit, service evaluation and research. 2006. https://www.sheffield.ac.uk/polopoly_fs/1.158539!/file/AuditorResearch.pdf.
- 29 Royal College of Radiologists. Audit and quality improvement. <https://www.rcr.ac.uk/clinical-radiology/audit-and-quality-improvement>.
- 30 Limb C, Fowler A, Gundogan B, Koshy K, Agha R. How to conduct a clinical audit and quality improvement project. *Int J Surg Oncol (N Y)* 2017;2:e24. 10.1097/IJ9.0000000000000024 29177218
- 31 Hill SL, Small N. Differentiating between research, audit and quality improvement: governance implications. *Clin Gov* 2006;11:98-10710.1108/14777270610660475.
- 32 Finkelstein JA, Brickman AL, Capron A, et al. Oversight on the borderline: Quality improvement and pragmatic research. *Clin Trials* 2015;12:457-66. 10.1177/1740774515597682 26374685
- 33 Collins B. *Adoption and spread of innovation in the NHS*. King's Fund, 2018.
- 34 Health Foundation. *Evidence scan: improvement science*. Health Foundation, 2011.
- 35 Healthcare Quality Improvement Partnership. *Best practice in clinical audit*. HQIP, 2016.
- 36 Johnston G, Crombie IK, Davies HT, Alder EM, Millard A. Reviewing audit: barriers and facilitating factors for effective clinical audit. *Qual Health Care* 2000;9:23-36. 10.1136/qhc.9.1.23 10848367
- 37 Hillman T, Roueche A. Quality improvement. *BMJ Careers* 2011;342:d2060. 10.1136/bmj.d2060.
- 38 NHS Health Research Authority. Defining research. 2013. <https://www.claehc-ee.nihr.ac.uk/wp-content/uploads/2014/04/defining-research.pdf>.
- 39 Randhawa M. *Is transformation in the NHS really transformational?* King's Fund, 2018.

© Author(s) (or their employer(s)) 2019. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ. <http://creativecommons.org/licenses/by-nc/4.0/> This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

Figure

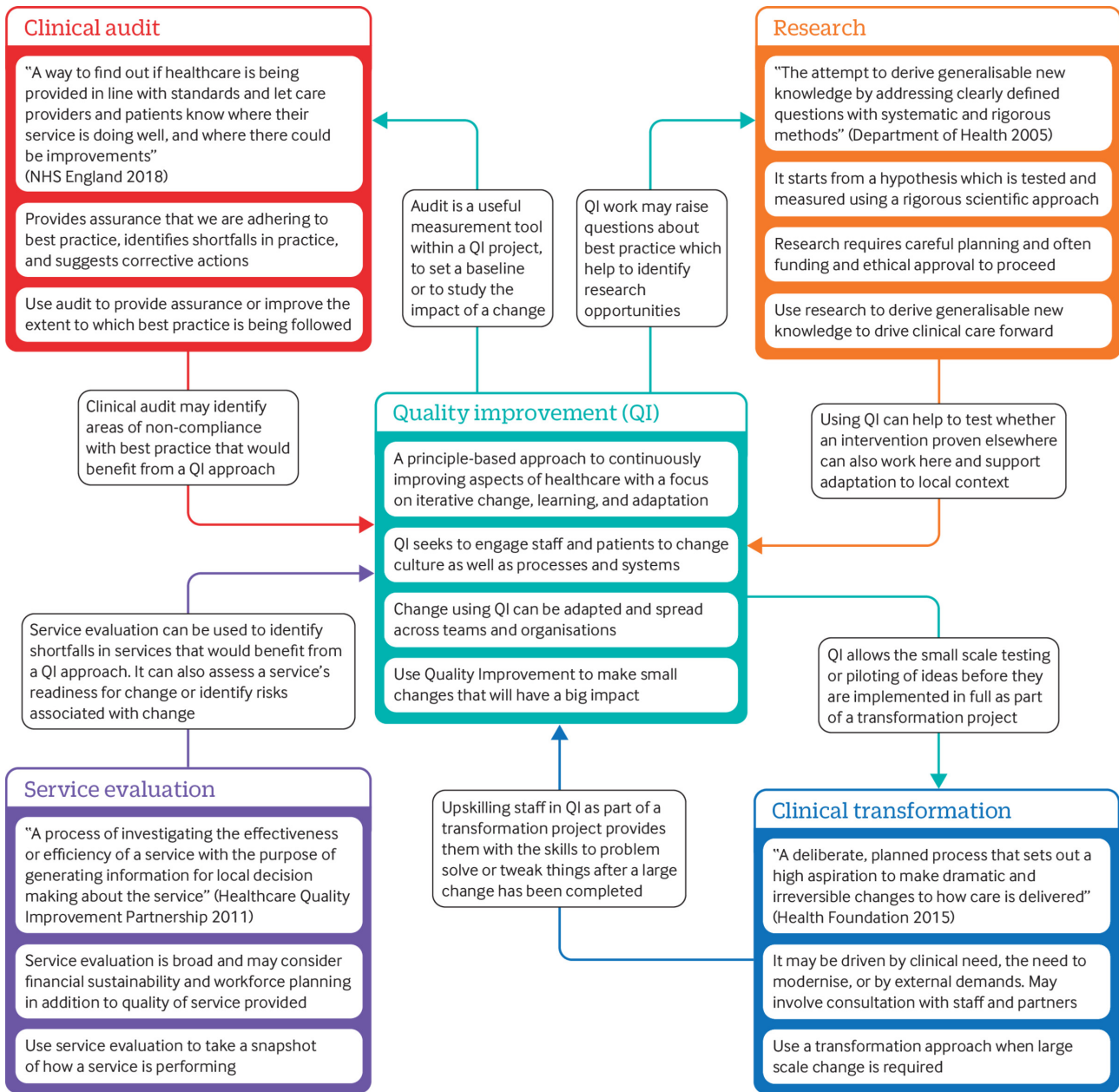


Fig 1 How quality improvement interacts with other approaches to improving healthcare