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How to embed quality improvement into medical training

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What you need to know

- Identification of problems, analysis of why they happen and testing change needs to be integrated within medical training from the start.
- Enable interprofessional learning through engagement of trainees with other front-line staff.
- Support requires clinical and educational leadership with individual coaching.

Training was recognised as a 'bridge to quality' 20 years ago[1] and QI is now integrated into appraisal for doctors in training[2] and outcomes for undergraduate medical education.[3] In the UK, expectations for training of doctors in their first two years since graduation are set by the UK Foundation Year (FY) curriculum, which states that FY2 doctors are required to contribute significantly to at least one quality improvement project and report their work in their e-portfolio.[4]

Two systematic reviews from Boonyasai[5] and Wong[6] found that teaching quality improvement and patient safety to trainees frequently resulted in changes in clinical processes. Subsequently a realist review[7] and a systematic review[8] have focused specifically on the characteristics of QI training that are associated with a positive, sustained impact on patient care outcomes and system performance improvement.

However, previous articles in this series have raised concerns that trainees are on short rotations, have limited time or support and may perceive that they lack authority to persuade colleagues that there is a problem that needs to be tackled[9 10] This article describes an approach which applies evidence about successful QI training (Table 1) to a curriculum on healthcare improvement for doctors in their first two years of training drawing on the authors' experiences and recommends principles to help integrate QI into medical training.

Integrate QI projects with clinical audit and service evaluation

QI education is more likely to report impact on clinical processes or patient outcomes when a QI project is an explicit part of the curriculum.[7] However, identifying meaningful projects that can be completed within a short time is challenging. Near misses are an important source of information about system errors.[7] Encouraging trainees to report weaknesses in the system and involving them in analysis of individual cases enables them to evaluate delivery of care and to critique themselves and their peers within clinical teams.[7]

QI is an approach to change which has great potential to be used together with other approaches such as audit and service evaluation.[11] These may identify areas of non-compliance with best practice or shortfalls in services that would benefit from a QI approach. QI can also assess a service's readiness for change or identify risks associated with change.

In NHS Tayside the FY2 QI project is preceded by training in problem finding of analysis and is part of a connected curriculum of workplace based learning in QI for medical students and FY doctors (Figure 1). From 2022 this training will be completed by all 160 medical school graduates and all 92 FY2 doctors.

Build capacity for QI projects

Studies of QI education are more likely to report impact on clinical processes or patient outcomes when there is evidence of inter-professional involvement.[8] Interprofessional teams may include administrative, finance and management as well as clinical staff.[7]

Successful approaches to QI include learners participating in a clinical QI team involving more than one learner or individual projects. Challenges that must be overcome are ensuring clearly allocated time to complete QI work, competing priorities and short time periods in which the work must be completed.[7]

The FY 2 year is a rotation through three posts. The UK Foundation Programme requires that FY2s should have three hours per week of non-clinical professional self-development time. The intended use of this time will include time for preparing for specialty application as well as developing skills in quality improvement, teaching and leadership.[12]

In the early years of our programme we focused on Acute Care (Acute Medicine, Anaesthetics and Emergency Medicine) because the high throughput of patients facilitated QI projects in the limited time available . In addition these were priority areas in the Scottish Patient Safety Programme, which built capacity for engagement of front line staff with improvement methods. Over eight years we have built capacity for QI projects across the range of services where FY2 doctors work.

In the first three years of the programme the majority of FY2 QI projects focused on problems identified by the FY doctors. Some of these projects resulted in structural changes that have been sustained since.[13] [14] However, it was often difficult to sustain change that was perceived as increasing workload for other team members.[15] We learned from QI projects with students that involving them in problems identified by the clinical teams enables them to design and test solutions,[16] which can then be sustained and spread by the clinical teams. We still support projects focused on burning issues identified by FY doctors but the majority of projects now focus on problems identified by clinical teams.[17] This facilitates interprofessional learning from the start of the project (Box 1).

Support QI training

QI education is more likely to impact on clinical processes or patient outcomes when learners are supported by coaching.[8] This requires commitment from academic, administrative and clinical leadership.[7] Ideally learners should be embedded in clinical environments where continuous improvement cannot be disentangled from daily work.[18] It is essential that they join a department that is primed, ready and welcoming given the short duration of their attachment. At an organisational level it is therefore important to know where this expertise exists and commit to growing this resource.[18] Within each clinical specialty our FY doctors have access to a named QI coach who is an Improvement Advisor.   In addition to improvement methods, the coaches help the FYs with forming a multi-

disciplinary team, which includes a finance representative and a sponsor with links to executive level for leadership support.

The Scottish Quality and Safety (SQS) Fellowship Programme[19] has increased capacity for improvement methods in clinical services. It has been important to have a clinician (ST) appointed to a lead management role with responsibility for QI in the organisation. Alignment of senior clinical leadership with the undergraduate and FY programmes enables trainee and student improvement to be targeted to areas of greatest need rather than towards vanity projects. Coordination allows the targeted use of trainees and students as an additional resource that can help stretched clinical teams.[20] This allows the organisation to connect with ideas being generated by frontline teams and with ideas from service users in a way that would not otherwise be possible. The knowledge gained from those closest to the point of delivery is vital when looking to improve a complex system.[21 22]

The key learning outcomes are behavioural

Evidence about QI education shows a lack of clarity around the relative importance of educational and clinical outcomes and a focus on assessment of knowledge, with only 3% of studies in one systematic review assessing impact on learner behaviour.[8] A recent evaluation of a QI training programme reported that 62% of participants had implemented QI projects at 6 months and 48% reported leading other QI projects at 18 months after the programme.[23] Developing strategies to capture downstream QI behaviour change is important because knowing something or even being skilled at doing something does not of itself lead to improvement.[24] In addition to leading QI projects learners should recognise how an isolated problem could be an opportunity for broader QI and take steps towards leading change.[18]

In the UK assessment of successful progression through QI training is part of the Annual Review of Competency Progression (ARCP) process and relies on objective measurable information from a number of sources including workplace-based assessment of e-portfolio and supervisors' assessments.[2] In addition individual Royal Colleges are introducing exit assessment from training through national postgraduate examinations.[25] Existing assessment tools enable trainees to build evidence of progression in QI, with the input of educational and clinical supervisors. This can be supported using tools such as a structured guide to good practice in reporting the QI project (Box 2). Encourage trainees to present their work to their peers, trainers, and clinical colleagues or to submit it for publication.[13-15 26-29]

Conclusions

Training in identification and analysis of problems should precede QI projects. A structured approach to QI that includes inter-professional team working is critical. Portfolios should be used to track progression of QI behaviours through training into practice.

Education into practice

In order to enable doctors in QI in their first years of training, consider asking:

1. How will you explain the concept of QI in an engaging manner that encourages trainees to reflect critically on the service being provided in their area?

2. How will you connect trainees with QI experts, so they have support when designing their project, interpreting data and presenting results?

3. How will you ensure that the efforts of the trainee and their team are recognised to encourage future involvement and spread good practice?

How patients were involved in the creation of this article

The authors have drawn on their experience in partnering with patients in the design and delivery of multiple healthcare improvement activities. Patients were not directly involved in writing this article.

Declaration of interests

We have read and understood the BMJ Group policy on declaration of interests and declare the following interests: none

Recommended resources/further reading

Realistic Medicine. Shared decision making, a personalised approach to care, reduce harm and waste, reduce unwarranted variation, managing risk better, becoming improvers and innovators. https://www.realisticmedicine.scot

Institute of Healthcare Improvement. Patient safety, leadership and person centred care—free access for students and trainees (trainees need to register as a resident to get free access). http://www.ihi.org/education/ihiopenschool/courses/Pages/SubscriptionInformation.aspx

Quality improvement zone. Improvement Journey, project charter, model for improvement and quality improvement tools. https://learn.nes.nhs.scot/1262/quality-improvement-zone/qi-tools

Figure 1: Workplace based learning programmes on Healthcare Improvement in the undergraduate and Foundation Year (FY) curriculum. Foundation Years are the first two years of postgraduate training.

Year 2
Problem finding & analysis:
Patient shadowing and patient experience interview

Years 2 & 3
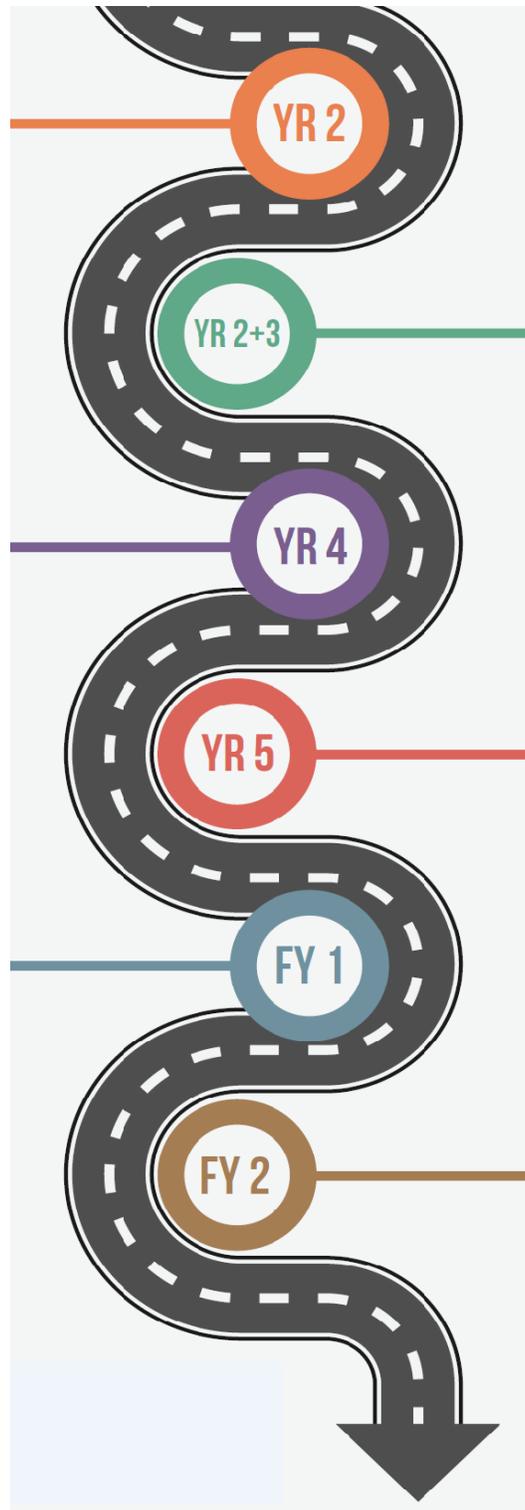**QI project themes:**
Design for improvement;
Health inequalities;
Realistic medicine;
Sustainable healthcare

Year 4
Problem finding & analysis:
Significant event analysis in General Practice

Year 5
Problem finding & analysis:
Adverse Event review
QI project themes:
Patient safety
Medication safety

Foundation Year 1
Problem finding & analysis:
FY safety checklist;
Handover of care;
Adverse event reporting

Foundation Year 2
Supported QI project

Medical students and Foundation Year doctors are now equipped with the knowledge and skills to improve healthcare

YR 2
YR 2+3
YR 4
YR 5
FY 1
FY 2

Table 1: Evidence about the impact of training in Qi for healthcare professionals on patient care outcomes or system performance improvements. The systematic review included a quantitative analysis of three pre-specified factors. The odds ratios (OR) in the systematic review are for association between three pre-specified curricular features and changes in clinical care processes or outcomes.

Factor	Realist review[7] (39 studies of physician education in QI)	Systematic review[8] (99 studies of QI education for health professionals)
Project	Identifying educational and clinically relevant project topics is challenging Consider having trainees choose their own project Choose topics of clinical importance Use near misses as a way to identify system errors	QI project in the curriculum OR 13.60 CI 2.92-63.29
Learners	Trainees are front-line providers and have deep insights into the clinical processes and the knowledge for improvement within the system QI projects create opportunities for interprofessional engagement and education	Inter-professional learning OR 6.55 CI 2,71-15.52
Support	Successful QI teaching in the clinical setting requires support from both educational and care delivery leaders and the work of the trainees Programs can be successful by either engaging all faculty around QI or by having dedicated QI faculty for teaching QI within the clinical setting	Coaching OR 4.38 CI 1.79-10.94
Learning outcomes	There is lack of clarity around whether educational and clinical outcomes are of equal importance Sustainability is important for the clinical setting and the trainee.	Most studies only assessed knowledge. A minority of studies reported impact on attitudes (13%) and behaviour change (3%).

Box 1: example of sustained improvement enabled by an interprofessional learning team[27]

Problem
Unreliable implementation of the COUGH bundle in a Surgical High Dependency Unit
Problem identification
Surgical HDU team
Project leaders
FY2 trainee doctors
Interventions
Four interventions were implemented sequentially. Improvement only occurred after the fourth intervention
1. Education through staff emails
2. Two posters about risk scoring and steps detailing steps for junior doctors to take
3. Moving observation charts from filing cabinets to wall spaced dedicated to QI projects
4. Sticker placed in the admission notes by ward clerks

Lessons learned
Lessons learnt from this project included the importance of encouraging and motivating all members of the team. The most successful intervention was the sticker and this involved team work from the ward clerk, junior doctors, anaesthetists, physiotherapists and nursing staff. New junior doctors rotate throughout the unit on a 4 monthly basis; therefore, it is vital that permanent members of the team are engaged so that the project can be sustainable.

Box 2: Guidance on writing up a QI project for FY doctors and their assessors, based on the assessment approach that we have developed and evaluated with medical students (ADD REF).

Structure for writing up QI work for e-portfolio could include:
- Project Aim
- Planned changes tested
- Predictions
- Measures- outcome, process and balancing
- Summary of results including run charts
- Analysis of data
- Project significance on local system and generalisable findings
- Reflections including factors that promoted success, barriers to success, learning from project and reflections on the role of the team
- Conclusions – outcome of the project including project sustainability

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