Ten tips for incorporating scientific quality improvement into everyday work

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ABSTRACT

Healthcare personnel often find it challenging to incorporate disciplined quality improvement into their daily work. Planning, managing and completing improvement projects with sufficient rigour to generate credible evidence and potentially publishable knowledge are even more difficult. Nonetheless, careful set-up and agile leveraging of existing resources and expertise can lead to surprisingly robust results. Project designs that integrate data collection with the work itself are especially helpful. Although the general perception is that top-flight journals are loath to publish the results of quality improvement work, accumulating experience suggests that this hurdle can be overcome. The Standards for Quality Improvement Reporting Excellence guidelines provide a promising framework for crafting publications that can meet the exacting standards of peer-reviewed journals.

Experienced improvers know that a true 'learning healthcare system' can be achieved only by embedding quality improvement (QI) activities in real work, not as a parallel process apart from the work itself. Unfortunately, healthcare providers find it difficult to incorporate improvement activities in their everyday practice. They often feel too harried and preoccupied by their daily tasks to participate in the very systems improvement projects that would make their work more efficient, thereby creating time for their involvement in QI. If routine participation in QI initiatives is so hard, imagine how much more difficult it must be to perform more rigorous quality improvement projects, especially projects that lead to true advances in understanding—and to publication—without additional resources or special staffing.

My three decades of experience in paediatric infectious diseases, epidemiology, health services research and improvement science suggest that rigorous quality improvement projects can be incorporated into the usual work and responsibilities of healthcare providers. This paper provides personal advice (10 'tips') for choosing, designing, implementing and publishing work that improves patient care and advances the field. I have selected a few illustrative examples from my work in the hospital setting to illustrate these tips.

But first, a few cautionary notes. I have been privileged to work in an academic setting where I can readily access deeper expertise in statistics, epidemiology, behavioural science and other disciplines that have facilitated the research that my colleagues and I have performed over the years. I recognise that it may be considerably more difficult for others to obtain such assistance. Since I am an academic, I have tended to favour publication in leading peer-reviewed journals, since this enhances the credibility of the methods and findings, provides a highly visible platform to disseminate new knowledge and helps meet traditional criteria for promotion (although I have seen signs recently that review committees are increasingly willing to consider other evidence of the quality and impact of an individual's work). I understand that there are other suitable vehicles to publicise the results of quality improvement projects, such as white papers; syllabi and curricula for workshops and courses; and internet postings (eg, the Agency for Healthcare Research and Quality's Innovations Exchange at http://www.innovations.AHRQ.gov and the Institute for Healthcare Improvement's website at http://www.IHI.org). However, the following 10 tips will increase the rigour and credibility of quality improvement work regardless of where it is published, taught or posted. The tips also may provide useful guidance for projects that are not intended for a wider audience but are focused primarily on promoting local learning and improving patient care.

TEN TIPS

Select projects that really make a major difference to the patients and healthcare providers who will participate in them

This may seem too obvious to require stating formally, but it is important to distinguish between limited (though useful) QI initiatives that are designed to make small-scale, iterative improvements and those that rise to the level of projects designed to substantially improve key processes of care closely linked to better clinical outcomes. A useful way to think about the magnitude and impact of potential projects is to draft a headline that might appear on the hospital website or in a local newspaper (eg, 'Adherence to gown and glove isolation precautions dramatically reduces the risk of potentially fatal respiratory infections in infants and toddlers').[1]

Set bold, clear, measurable aims and a timeline for achieving them

Many QI projects fail to engage clinical staff because they do not appear to be fundamental advances that will measurably impact care and improve outcomes, or because they have vague completion dates that fail to galvanise immediate action.

Assemble a multidisciplinary team (including providers, stakeholders and methodology experts) tailored to the aim of the project

The role of each team member should be meaningful and clear. Physicians, nurses, pharmacists, administrative assistants and environmental services personnel all may play key roles depending on the nature of the project; these roles should be agnostic with respect to titles and degrees. If publication is anticipated, the roles and authorships should be discussed early in the project's set-up phase. The author has found that putting key professional staff in the role of lead author is empowering and respectful, and does not jeopardise publication, even in leading journals such as *JAMA* and *N Engl J Med*. Lead authors have included microbiology technologists, infection preventionists and infectious diseases fellows.

Be creative in recruiting experts

Ideally, rigorous improvement projects will have access not only to improvement scientists and systems engineers, but also to a broader range of expertise, including behavioural and social scientists, epidemiologists, statisticians, health services researchers, qualitative researchers and mixed methods evaluators. Access to such investigators varies widely depending on the healthcare setting, but even large academic medical centres may find that experts in key disciplines are difficult to identify, not inclined to collaborate or not accustomed to working in clinical settings. Nonetheless, scientists tend to be on the lookout for environments in which they can test their ideas, and their infrequent participation in clinical improvement work may be due to unfamiliarity with these clinical settings. For example, an aerobiologist from the Harvard School of Public Health brought his sulphur hexafluoride generator and detection device to the wards to help understand how chickenpox spread throughout a ward via the air.[2] A sociologist familiar with interrupted time series analysis helped design and analyse a study of the impact of a hospitalist system on cost and quality of care[3] and a project to improve antibiotic prophylaxis in Caesarean delivery in Colombia.[4] A nationally recognised epidemiologist suggested a novel analytic strategy for a study of the effectiveness of isolation precautions in reducing transmission of respiratory syncytial virus (RSV) on a paediatric ward.[1] An infectious diseases fellow determined the frequency of errors in patients seen by the infectious diseases service.[5] Often, scientists can be enticed by the prospect of coauthorship of a peer-reviewed publication. I have found that experts can provide valuable virtual help and mentoring, even if they live and work elsewhere, thanks to the increasing use of videoconferencing and other media.

Develop the most rigorous study design possible without disrupting normal work unduly

In so far as possible, incorporate data collection into the usual activities of professional staff. For example, infection preventionists routinely perform surveillance and education on the wards and can modify their usual data collection relatively easily to accommodate the requirements of a project designed to reduce the rate of a specific type of infection, such as RSV,[1] or efforts to improve adherence to hand hygiene policy.[6] Pharmacists can assist with data collection as part of their required drug-utilisation review activities.[7]

Do everything possible not to sacrifice data quality and completeness

Intermittent or non-standardised data collection and recording processes are among the principal impediments to interpretation, publication and dissemination of improvement work. The same techniques that are used to improve the reliability of critical care processes can be applied to data collection. Effort put into designing easy-to-use data-collection forms or instruments is time well spent.[8] If well designed, such tools can even improve the ease and reliability of charting in usual clinical care. Checklists, such as that developed for inserting central venous catheters, can be especially powerful data-collection devices, both for improvement

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studies and for routine care. Standardised order sets can be used to drive improvement (eg, in the timely administration and discontinuation of prophylactic antibiotics for surgery), as well as collect the data required to demonstrate that improvement has been achieved.[9] Note that I am suggesting a blend of two of Solberg's 'Three Faces of Performance Measurement'[10]—measurement for improvement and measurement for research—in which it is important not to slow down work by obsessing about fastidious measurement while still measuring precisely enough for the results to be credible.

Take advantage of emerging certification requirements for clinical staff, and make improvement academically viable in institutions where promotions matter

As clinical departments start to become accountable for improving the quality of care, and clinicians are required to demonstrate competency in QI to maintain their certification and credentials, it should become easier to engage clinical staff in substantive improvement projects. Some organisations already leverage formal improvement work to satisfy maintenance of certification (MOC) standards. For example, the quality improvement collaborative NICQ (Neonatal Intensive Care Quality), run by the Vermont Oxford Neonatal Network provides MOC credits to neonatologists participating in the collaborative. Clinicians in academic centres may have an additional incentive to engage in substantive improvement work. I often advise young academics to look at 'service' requirements imposed on them by their department chairs as possible curriculum vitae enhancements if the project is done well. For example, an assignment to a clinical practice guideline committee can be seen either as a 'good citizen' task or as a pathway to a publication if the guideline is constructed rigorously and its impact evaluated carefully.[11 12] Non-academicians may find it advantageous to participate in rigorous quality improvement projects to buttress their résumé, achieve professional advancement, gain institutional or local recognition and awards, or receive an opportunity to present their findings at a regional or national quality meeting.

Do not assume that major external funding is necessary to perform credible improvement work

Experience confirms that publishable improvement projects can be completed by leveraging existing institutional resources or with small grants. Some hospitals have established internal small grant programmes to enable staff to perform more rigorous work. Payers increasingly are interested in providing incentives for projects that improve care and reduce costs. Medical industries may provide grants to test the effectiveness of their devices or products.[6] Many professional societies have grant programmes for trainees and young investigators, and local foundations often look for promising projects and investigators doing work consistent with their mission. Look for 'free' minds and hands; institutions that are located near a university almost always have access to graduate students or postdoctoral students looking for a project that meets their degree requirements.

Pay careful attention to the ethics of all quality improvement work, but craft projects that are unlikely to require formal institutional review board (IRB) approval

Randomised controlled trials (RCTs) generally trigger a formal IRB review. Fortunately, RCTs, including cluster-RCTs, usually are not required for credible, informative improvement studies. Quasiexperimental study designs are well suited for most improvement work, but consensus regarding precise criteria to help investigators judge when such studies need to go before an IRB remains elusive. The oft-cited statement that projects with the intent to produce generalisable knowledge or publications are research and require IRB review can have a chilling effect on improvement. The temporary shut-down of the Keystone Project by the Office for Human Research Protections only increased the anxiety of quality improvement investigators.[13] In my opinion, the goal of sound QI is to build and share knowledge about how to improve quality and safety, and it is our ethical obligation to share and publish or disseminate our insights when warranted by the results. Quality improvement departments should work with their IRBs to develop a consensus about which projects need not be presented to the IRB, which can anticipate expedited approval if they pose minimal risk and are compliant with the Health Insurance Portability and Accountability Act and other patient protection standards, and which are likely to require formal review. One possible framework for developing IRB guidelines might be agreement that projects are exempt from IRB review if they are designed to improve care so as to conform more reliably to established or accepted standards (evidence-based or supported by strong consensus). Since evaluation ('study' in the Plan—Do—Study—Act cycle) is intrinsic to improvement, it is counterintuitive to suggest that evaluating QI efforts is research requiring IRB review. In fact, failure to evaluate is incompatible with learning. Feedback of data (both process and outcome data) in real time is essential; withholding data from participants so as not to 'contaminate' the evaluation converts QI to research. It is important to emphasise that relief from IRB oversight does not relieve improvers from identifying and monitoring potential unintended consequences of their project. For example, some studies have

shown that efforts to improve adherence to isolation precautions have deleterious effects on patient monitoring. Moreover, projects of substantial magnitude almost always have clear opportunity costs that should be understood and considered. Ironically, few institutions have a formal process for reviewing the quality of QI projects, including their risk, possible unintended consequences and likelihood of generating new knowledge. Without such oversight, it is likely that the traditional IRB will continue to be seen as the 'default' patient protection body.[14]

Whenever possible, anticipate possible publication

'Publication' need not be in a peer-reviewed journal, as noted earlier. If a peer-reviewed publication is being considered, ignore the naysayers who claim that the best journals will not accept QI studies; this is an unsubstantiated canard, as demonstrated by the publications cited in this paper. The Standards for Quality Improvement Reporting Excellence guidelines provide an excellent framework for designing and writing up an improvement study.[15] I have found it very useful to write an abstract for a publication while designing the study. This forces articulation of clearly stated aims, hypotheses, methods, principal results and conclusions (should the project meet its projected goals). 'Dummy' tables also can be constructed to ensure that important data elements are prespecified and do not slip through the cracks. In addition, writing an abstract facilitates identification of individuals who are likely to be authors. Some project leaders go a step further and create a template for key tables and figures that are likely to be needed to describe the results of the project. Of course, not every project will have positive results, but it is important to learn as much as possible from 'negative' or inconclusive studies. This requires considerable planning, often with the help of qualitative researchers and some of the other disciplines mentioned in tip 3. For example, one of the author's studies failed to demonstrate a meaningful impact of introduction of an alcohol-based gel on hand hygiene compliance, but qualitative enquiry demonstrated that only 45% of intensive care unit staff were satisfied with gel, 53% felt it was sticky and uncomfortable, 57% thought it was conveniently located, 32% felt the promotional posters were effective, 24% knew there was an opinion leader involved in the project, and 68% recalled receiving performance feedback.[6]

These 10 tips are not offered as evidence that it is easy to perform high-quality, even publishable, improvement work without placing a burden on already overworked healthcare providers. I may well be oversimplifying the context and circumstances surrounding my publications. But as I thought about the context and circumstances that affected my own work, I realised that there are a number of questions that everyone doing improvement work may find it helpful to consider. What were the special factors that made this work possible in a particular academic setting? What were the unintended consequences? What were the perceptions of the staff who participated: did they feel that the projects aligned with their own goals, or did they think that the goals of the author trumped their own aspirations? What were the opportunity costs? Sensitivity to these issues will be critical in spreading and sustaining this, or any other, approach to adapting the science of improvement to real-world settings.

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