



Collaborative quality improvement

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Purpose of review

Quality improvement collaboratives were developed in many medical and surgical disciplines with the goal of measuring and improving the quality of care provided to patients. The aim of this review is to provide an overview of surgical quality improvement collaboratives, and in particular those aimed at improving urological care.

Recent findings

Quality improvement collaboratives collect high-quality data using standardized methodologies, and use the data to provide feedback to physicians and practices, and then implement processes to improve patient outcomes. The largest regional collaborative in urology is the Michigan Urological Surgery Improvement Collaborative (MUSIC). Recent efforts by this group have been focused at understanding variation in care, improving patient selection for treatment, reducing treatment morbidity and measuring and optimizing technical skill. The American Urological Association has also recently launched a national quality registry (AQUA), with an initial focus on prostate cancer care.

Summary

By understanding factors that result in exemplary performance, quality improvement collaboratives are able to develop best practices around areas of care with high variation that have the potential to improve outcomes and reduce costs. These developments have been made possible by the unique model offered by the collaborative structure with the goal of improving patient care at a population level.

Keywords

collaboratives, outcomes, quality improvement

INTRODUCTION

Quality improvement collaboratives have been formed across numerous medical and surgical disciplines. The common goal of these collaboratives is not only to measure but also to improve the quality of patient care. They could be considered as the intervention arm of Health Services Research, as they serve to impact change for practicing clinicians and their patients. Strategies employed by quality improvement collaboratives involve four key principles. First, they collect high-quality data using standardized definitions and methodologies. Second, the data are analysed and used to provide feedback to individual physicians and practices. Third, collaboratives' participants identify and implement processes of care, procedures and techniques that result in better patient outcomes. Fourth, results of these interventions are distributed across the entire collaborative with the goal of improving care at a population level (Fig. 1) [1].

HISTORY OF COLLABORATIVE QUALITY INITIATIVES

An example of a pioneering quality improvement collaborative is the Northern New England

Cardiovascular Disease Study Group, a voluntary consortium composed of 23 cardiothoracic surgeons and hospital administrators from five hospitals in Maine, New Hampshire and Vermont hospitals that perform coronary artery bypass grafting (CABG) surgery [2]. They found that collaborative interventions that included feedback of outcome data, training in continuous quality improvement techniques and site visits led to a 24% reduction in mortality after CABG surgery. Following the success seen with this initiative, in 2004, Blue Cross Blue Shield of Michigan (BCBSM) – an insurance payer in the state of Michigan – started a regional collaborative improvement programme with physicians and hospitals from across Michigan, to improve patient care and reduce costs. One aspect includes Collaborative

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KEY POINTS

- Quality improvement collaboratives share data to develop best practices around areas of care with high costs and variation.
- Investment in high quality data, and coalescing around a shared vision that focuses on improving patient care and value, are hallmarks of CQIs.
- Recent work by collaboratives to decrease practice and physician-level variation for prostate cancer care includes reducing inappropriate imaging for men with newly diagnosed low risk cancer, and developing Appropriateness Criteria to increase rates of active surveillance.
- The unique structure of CQIs has allowed them to measure and improve surgical skills through video peer-review and surgical skill coaching.
- The AQUA is a nationwide quality registry that will provide feedback on performance and allow urologists to work towards quality improvement within their own practices.

Quality Initiatives (CQI), wherein hospitals and physicians share data to develop best practices around areas of care with high costs and variation. Hospital and physician performance are not judged, and the data are used to identify areas of opportunity for participating hospitals and physicians.

SURGICAL QUALITY IMPROVEMENT COLLABORATIVES

The Michigan Surgical Quality Collaborative (MSQC) was the first general surgical CQI in the state of Michigan, launched in 2005. To date, it consists of 73 hospitals, and is focused on improving long-term and short-term morbidity and mortality for a range of diseases including colorectal cancer and appendicitis [3,4]. Both hospital-level and collaborative-wide data are provided to participating hospitals every 3 months; quarterly meetings also allow discussion of best practices, facilitating more rapid dissemination of quality improvement projects. During the first 4 years of this collaborative, participating hospitals had greater improvements in morbidity than nonparticipating hospitals. In one study, this CQI was found to have reduced payments associated with adverse outcomes by approximately \$20 million annually, far exceeding the cost of administering the programme [5].

The American College of Surgeons National Surgical Quality Improvement Programme (ACS-NSQIP) collaboratives are made up of 13 regional collaboratives, as well as multiple system wide

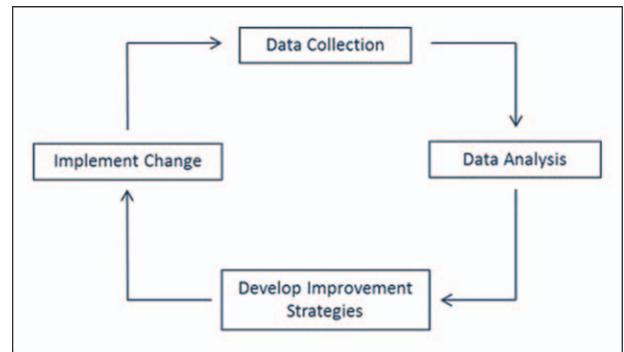


FIGURE 1. Schematic representation of quality improvement collaboratives. Collaborative wide data are collected and analysed. Areas of variation and potential areas for improvement are identified. Improvement strategies are developed, and the changes are implemented.

collaboratives, which use a dedicated clinical registry. The goal of NSQIP is to provide participating hospitals with detailed reports of risk-adjusted mortality, morbidity and length of stay for index procedures. Hospitals participating in NSQIP have been found to have improving surgical outcomes overtime [6]. However, in a recent study by Osborne *et al.* [7[¶]] using a difference-in-differences approach to compare NSQIP participating hospitals with propensity score matched nonparticipating hospitals, enrolment in NSQIP was not associated with improved patient outcomes. This study demonstrates that measurement alone may not be enough to drive significant improvements in patient care.

Despite the increasing popularity and growth of quality improvement collaboratives, the optimal design of an effective CQI and the determinants of their success are not fully understood [8]. Figure 2 provides an example of a recently proposed conceptual model that has been used to facilitate the development, implementation and evaluation of the Illinois Surgical Quality Improvement Collaborative [9]. In this model, in order for a CQI to lead to change on a systematic basis, it must impact on three key areas, the hospital, the surgical team and the perioperative microsystem, which are all interrelated and influence one another.

COLLABORATIVES IN UROLOGY

One of the initial urology collaboratives in the United States was the Urological Surgery Quality Collaborative (USQC) that was focused at improving the quality of care for patients with urologic cancer [10]. In many ways, the USQC was the precursor to the largest urology collaborative in the United States, the Michigan Urological Surgery Improvement Collaborative (MUSIC). MUSIC was founded in 2011, and is a

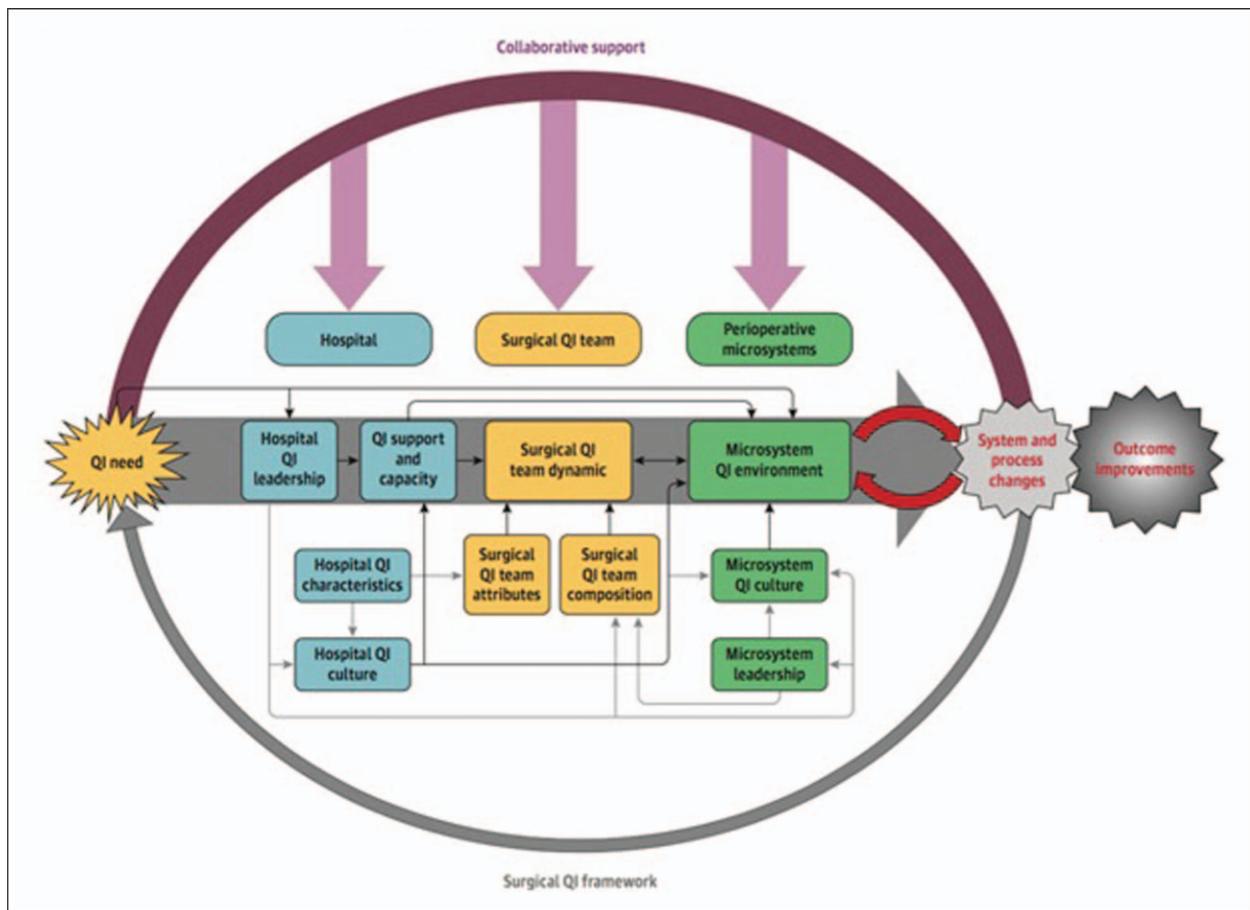


FIGURE 2. The overarching influence of the collaborative is depicted as operating on the hospital, surgical QI team and perioperative microsystem levels of surgical QI. Reproduced with permission from [9].

physician-led consortium involving 45 urology practices and approximately 90% of urologists in the state of Michigan [11]. MUSIC aims to improve the quality and cost-efficiency of care for patients with prostate cancer, although recently it has begun to expand efforts to patients with kidney stones and renal tumours.

Practices within MUSIC have trained personnel who enter data into a web-based clinical registry. Each practice has a urologist that serves as a clinical champion, responsible for delivering the organizational commitment needed from their practice. Statewide meetings are held wherein members are expected to attend and participate in discussions around quality improvement initiatives, which are then finalized and integrated into their clinical practice. Numerous patient advocates provide guidance on various quality improvement initiatives and ensure that projects are meaningful for patients. Priorities for measurement and quality improvement in MUSIC have included morbidity related to prostate biopsy [12^{***}], appropriate imaging for men with newly diagnosed prostate cancer [13], increased use of appropriate active surveillance [14], measuring

and improving patient outcomes after radical prostatectomy [15] and surgical skill assessment and improvement for surgeons performing robot-assisted radical prostatectomy (RARP) [16[■]]. Witnessing the success of initiatives in MUSIC, urologists in Pennsylvania established the Pennsylvania Urologic Regional Collaborative (PURC), with the similar aim of improving prostate cancer care.

In general, members of CQIs work together to understand strategies employed by high performing surgeons and practices, which then serve as a framework for providing care to all patients [1]. Targets for improving care center around themes such as variation in care, treatment appropriateness, surgeon performance and healthcare value. The most recent developments in these areas are covered in the following sections.

VARIATION IN CARE

Perhaps nowhere is variation in care more evident than in the treatment of men with localized prostate cancer [17]. One of the earliest areas for tackling variation within MUSIC was the performance of CT

and bone scan for patients with low-risk prostate cancer, which was also the target of an American Urological Association Choosing Wisely campaign. By collecting data, MUSIC demonstrated that there was wide variation among practices in the ordering of bone and CT scans when they were not indicated. To reduce this variation, MUSIC implemented a multidimensional quality improvement intervention that included imaging guidelines, patient and physician education materials, and tool-kits to all practices. Following this intervention, practice-level variation was reduced and inappropriate bone and computed tomography (CT) scan use decreased from 11 to 6.5%, and 14.7 to 7.7%, respectively [13].

MUSIC also found that initial use and enrolment of active surveillance for men with low-risk prostate cancer varied widely across practices, ranging from 27 to 80% even after adjusting for patient age, comorbidity and tumour biopsy characteristics [12²²]. Following this, MUSIC analysed the variation in practice patterns for patients enrolled in active surveillance. The proportion of patients who underwent repeat prostate biopsy and Prostate specific antigen (PSA) testing for follow-up, in accordance with national comprehensive cancer network guidelines, was only 26.5% (range 10–67.5%) [18]. These results have led to development of a roadmap for the management of patients with favourable-risk prostate cancer that aims to better standardize aspects of care in this area across the state.

TREATMENT APPROPRIATENESS

One method for understanding the appropriateness of treatment is to determine how well aligned clinical practice is with guideline-based care. With

the changes in PSA screening in the United States, urologists in MUSIC assessed the use of prostate biopsy in men with limited life expectancy. In an evaluation of 3035 men aged at least 66 years undergoing initial biopsy, nearly 20% of biopsies were performed for men with a calculated life expectancy of less than 10 years [19]. This finding suggested the need for pragmatic tools to determine point-of-care life expectancy estimates to inform clinical decisions surrounding the appropriateness of prostate biopsy [20].

Using a collaborative working model, urologists have also been able to develop Appropriateness Criteria for patients considering active surveillance. A MUSIC panel consisting of 13 urologists (drawn from academic and community practices) evaluated 160 clinical scenarios based on tumour characteristics, PSA density, race, life expectancy and patient preferences for sexual function. Panelists were asked to use the best-available evidence and clinical judgement to rate every scenario for active surveillance, ranging from highly appropriate to highly inappropriate, using established RAND/Delphi methodology. The panelists ultimately categorized low-volume Gleason 6 as highly appropriate for active surveillance, whereas high-volume Gleason 6 and low-volume Gleason 3+4 were classified appropriate to uncertain. Overall, the majority of scores favoured active surveillance for low and low-intermediate risk prostate cancer (Fig. 3). By providing a systematic and consensus-driven approach for making recommendations based on tumour and patient preference profiles, the aim of this initiative is to improve the consistency of counselling of patients and thereby increase rates of active surveillance and reduce practice and physician-level variation [14].

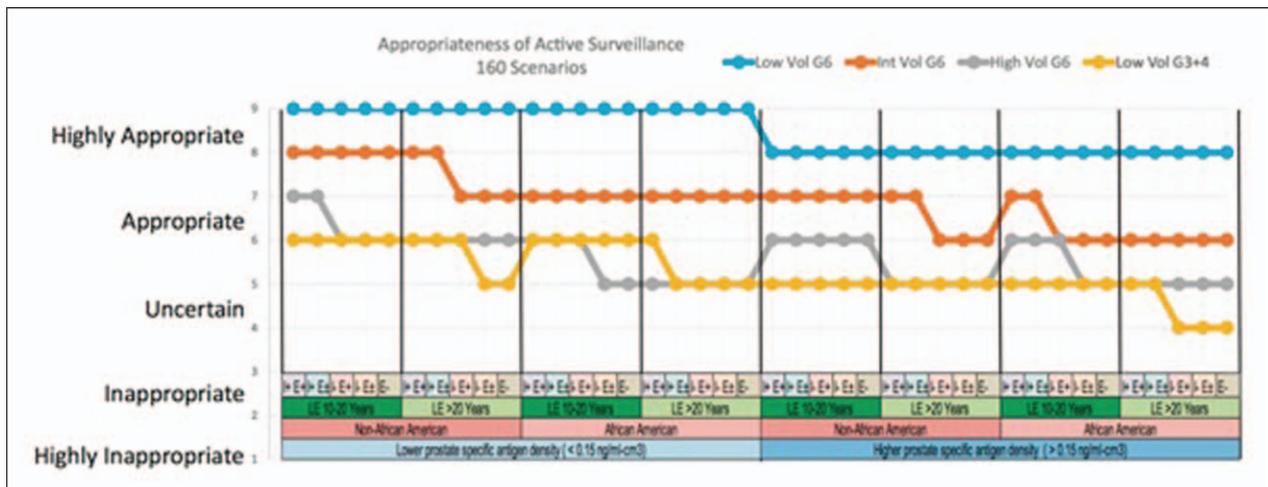


FIGURE 3. Appropriateness of active surveillance according to 13 MUSIC panelists. Displayed are median round 2 scores for 160 clinical scenarios based on biopsy tumour burden, Gleason score, PSA density, race, life expectancy and sexual importance/function. E, erections; I, important. Reproduced with permission from [14]. PSA, Prostate specific antigen.

SURGEON PERFORMANCE

CQIs also drive improvement by providing surgeons feedback regarding postoperative outcomes. The MUSIC Notable Outcomes and Trackable Events after Surgery (NOTES) is an objective reporting system developed by MUSIC to identify deviations in care from an ideal recovery pathway following radical prostatectomy. Deviations from the expected recovery include metrics such as rectal injury, excess blood loss, prolonged length of stay, prolonged drain placement, catheter replacement, hospital readmission and mortality. In an initial analysis of 2245 radical prostatectomies performed by 100 MUSIC surgeons, there was a significant variation in NOTES metrics across practices, ranging from 0 to 46.1%. In addition, the majority of care deviations were secondary to an anastomotic or gastrointestinal event [15]. The information gleaned from this investigation suggests that preventing anastomotic and gastrointestinal events may help reduce many deviations, thereby providing an actionable target for reducing readmissions after radical prostatectomy.

As demonstrated in the last example, the clinical data collected by CQIs should be actionable, with the focus on effectiveness. In contrast, administrative claims data may have limited value in measuring surgical performance. This was demonstrated recently following release of a 'Surgeon Scorecard' by Propublica, an investigative journalism group, with publication of surgeon outcomes based on Medicare data. When comparing the accuracy of the publicly available Scorecard outcomes for radical prostatectomy in surgeons also in the MUSIC registry, Scorecard complication rates had no correlation with risk-standardized, surgeon-specific MUSIC metrics such as blood loss, surgical margin status, pelvic complications, 30-day readmissions and mortality [21[¶]]. This finding supports a prevalent concern that claims based datasets provide an incomplete, if not inaccurate, assessment of surgeon performance.

COLLABORATIVE QUALITY INITIATIVES AND SURGICAL SKILL IMPROVEMENT

Because of the unique relationships and trust that physicians in collaboratives have been able to build, one novel area of surgical performance that CQIs have been able to explore is technical skill QI. In particular, CQIs serve as a network for surgeons to undertake surgical video review, with the aim of improving technical skills and patient outcomes. The pioneering work in this area was performed by the Michigan Bariatric Surgery Collaborative (MBSC), a CQI of bariatric surgeons in the state of Michigan. In an innovative study, videos of 20

surgeons performing laparoscopic gastric bypass underwent blinded review by surgeons in MBSC. Peer review demonstrated a significant association between surgeons with lower skill ratings and higher risk-adjusted rates for complications, length of stay and mortality [22]. This work established the background for video-based coaching, where surgeons are matched with a surgical colleague who has been trained to coach. A recorded operation is then evaluated for technical, cognitive and interpersonal skills in a series of 1-h sessions, with the view to improve technique and outcomes [23].

Inspired by their bariatric colleagues, MUSIC surgeons evaluated whether peer and crowd-sourced (i.e. lay person) reviewers were able to evaluate the technical skill of surgeons performing RARP using video review. Peer and crowd ratings demonstrated strong correlation for both global robotic and anastomotic skills [16[¶]]. Importantly, peer surgeons and the crowd demonstrated high levels of agreement for identifying lower scoring surgeons. This study demonstrated the large-scale feasibility of assessing the technical skill of practicing robotic surgeons, and suggests a potential role for crowd-sourced methodology in the assessment of surgical performance. The relationship of patient outcomes with technical skill was not assessed, and forms the basis of future study for this group.

VALUE OF CARE

Patient outcomes and the cost of care should improve through reducing complications and improving the quality of care delivered to patients. The Michigan Value Collaborative (MVC) is a partnership between Michigan hospitals and BCBSM that assesses the relationship between patient outcomes and cost. Using MVC data, urologists have been able to assess the variation in the cost of radical prostatectomy among 42 hospitals in Michigan. This analysis revealed that hospitals in the top quartile of costs had significantly higher payments for readmissions and postacute care [24]. Similar work done by the MSQC demonstrated increased costs with surgical complications for general, vascular and gynaecologic surgery for both hospitals and payers [25]. These recent studies highlight the ability of CQIs to identify areas of high cost and variation, with the aim to lower these costs and increase the value of care for patients.

AMERICAN UROLOGICAL ASSOCIATION QUALITY REGISTRY

The American Urological Association (AUA), understanding that many other national urologic

societies had developed clinical registries [26], established the American Urological Association Quality Registry (AQUA) in 2014, to serve as a nationwide quality registry for urologists. In 2016, AQUA was approved by the Centers for Medicare and Medicaid Services (CMS) as a Qualified Clinical Data Registry (QCDR). A QCDR is a registry that collects information for the Physician Quality Reporting System, which uses incentive payments and payment adjustments to encourage practices and practitioners to report quality measures to Medicare. Using the data collected, AQUA aims to support guideline-informed physician practice and evidence-based decision making. In addition, AQUA will provide individual urologists feedback on their individual and practice performance compared with their peers at a regional and national level. To date, AQUA has 692 urologists representing 75 practices enrolled. The practice sizes range from 1 to 62 providers, and a total of 31 states are represented [27*]. AQUA serves as an opportunity for urologists across the country to obtain individual feedback and work towards quality improvement within their own practices.

CONCLUSION

CQIs utilize a ‘measuring to improve’ philosophy consisting of core principles – quality data collection, feedback to individual physicians and practices, dissemination and implementation of strategies amongst collaborative members – with the goal of improving variation in care, treatment outcomes and costs. Consequently, regional collaborations between hospitals and physicians may be more effective than either selective referral or pay-for-performance in improving the quality of healthcare at the population level.

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Conflicts of interest

K.R.G. received Intuitive Surgical Grant (Primary Investigator). D.C.M. and A.N.L. do not have any conflict of interest.

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