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Case Studies in Clinical Practice Management: Characteristics of Durable Quality Improvement: A 6-Year Case Study

John-Paul J. Yu^{1,2,3,4,§}, Anthony D. Kuner¹, and Tabassum A. Kennedy¹

¹Department of Radiology, University of Wisconsin School of Medicine and Public Health, Madison, WI 53705, USA

²Department of Biomedical Engineering, College of Engineering, University of Wisconsin–Madison, Madison, WI 53706, USA

³Neuroscience Training Program, Wisconsin Institutes for Medical Research, University of Wisconsin–Madison, Madison, WI 53705, USA

⁴Department of Psychiatry, University of Wisconsin School of Medicine and Public Health, Madison, WI 53705, USA

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DESCRIPTION OF THE PROBLEM

Quality improvement processes are central to efforts to deliver higher quality healthcare [1]. Despite the dynamic political and economic forces reshaping paradigms of healthcare delivery and reimbursement [2], high quality – and high value – healthcare remains a common denominator and underscore the vital role practice quality improvement will play in realizing our collective quality and value goals [1,3]. Towards these ends, prompted by the American Board of Medical Specialties (ABMS) [4–6] and by changes to the American Board of Radiology CORE examination [7–9], quality improvement and other systems-based practices are now routinely incorporated into the radiology residency training programs. These system-based learning opportunities ensure that radiologists are introduced to and are well versed to a critical facet of their future practice [7,10] and a major component of their Maintenance of Certification.

Quality improvement work, however, is not easy. To assist and fulfill efficiency and patient care goals, many individuals and organizations have begun incorporating process

[§]To whom correspondence should be addressed: John-Paul J. Yu, MD, PhD, Department of Radiology, Division of Neuroradiology, University of Wisconsin School of Medicine and Public Health, 600 Highland Avenue, Madison, WI 53792-3252, jpyu@uwhealth.org, Phone: +1-608-265-4792, Fax: +1-608-263-0140.

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methodologies adopted from business and industry including Lean Six Sigma, and the Model for Improvement [11–14], which have been applied with varying degrees of success as have more scientific and methodological approaches [15]. Despite these efforts, lax accountability, scope creep, poor auditing, and low levels of stakeholder engagement often undermine the implementation and sustainability of many quality improvement projects [16] where the realized gains from quality improvement initiatives are also largely short lived with only approximately a third of quality improvement projects found to be sustained 1-year post implementation [3,13,17]. Challenges related to durability and sustainability of quality improvement changes are especially important to address. Value-based payments with the 2015 passage of the Medicare Access and CHIP (Children's Health Insurance Program) Reauthorization Act (MACRA) represent the first step towards a system linking payment to value with a stated goal of linking 90% of Medicare payments to quality and value by 2018 [1,2]. It is on this background that practice quality improvement emerges as a critical component of high-value and high-quality healthcare. To model and highlight the salient features of a successful, durable, and sustainable quality improvement program, we present herein a single-institution case study demonstrating the achievement and endurance of a quality improvement program over a 6-year period that now serves as a template for other quality improvement programs in our department.

WHAT WE DID

This HIPAA compliant study was granted an Institutional Review Board exemption as a quality improvement initiative.

On the basis of the National Institute of Neurological Disorders and Stroke (NINDS) recombinant tissue plasminogen activator (rt-PA or tPA) trial, intravenous (IV) tPA is now a mainstay of acute ischemic stroke (AIS) treatment. Recognizing that the time sensitive and complex nature of treating patients with AIS required an organizational approach to patient care [18], The Joint Commission (TJC) developed Advanced Disease-Specific Care Certification standards for Primary Stroke Centers (PSCs) and since 2012, with the growing complexity of stroke care now involving many new treatments and technologies, have coordinated new standards for Comprehensive Stroke Center (CSC) certification. One standard, for patients who are candidates for treatment with tPA, is to complete the non-contrast CT examination within 25 minutes of arrival at the ED, with the study interpreted within an additional 20 minutes (door-to-interpretation time of 45 minutes) [19,20].

To meet these neuroimaging standards, beginning in 2012, we initiated a group practice quality improvement project that included Neuroradiology faculty, clinical instructors, ACGME-accredited fellows, diagnostic radiology residents, and administrative staff with a stated goal of meeting the 20-minute study interpretation metric. Baseline 13-month pre-intervention communication data (defined by time in minutes measured from the time of examination completion to the time of communication as dictated in the radiology report) were collected. Thereafter, a PDSA (Plan-Do-Study-Act) quality improvement (QI) program was then undertaken, which led to multiple PDSA workflow iterations and communication interventions including, but not limited to, placement of a dedicated stroke pager in the reading room, the definitive labeling of stroke studies in PACS, and continuous in-service

education for all diagnostic radiologists, CT technologists, and members of the referring clinical services including neurology, neurosurgery, neurointerventional radiology and the development and formation of a dedicated clinical Stroke Service. Process mapping for the identification of workflow disruptors was also undertaken [21–23]. Following the primary and throughout all subsequent PDSA cycles, continuous monthly stroke communication audits were performed.

RESULTS

A 6-year retrospective, consecutive analysis of all patients with an acute stroke diagnosis was performed where for the study period, the rate of compliance with the Comprehensive Stroke Center 20-minute noncontrast head CT communication guideline was calculated on a monthly basis. For the 13-month pre-intervention period, the mean monthly compliance rate for reporting noncontrast head CT findings within the 20-minute window was 53% (range: 0–100%) (Figure 1). Following the first PDSA cycle, the mean monthly compliance rate rose to 89% over the first four months with significantly less variability (82–93%) (Figure 2). Ongoing monitoring of reporting compliance demonstrated continued improvement throughout the subsequent 5-year post-intervention period with a mean monthly compliance rate of 96% and a compliance rate of nearly 99% over the past 12-months.

There were several keys to the success of our quality program, chief among them were the large number of PDSA cycles that this quality (reporting) program went through in an effort to iteratively refine and improve on our gains. These included process mapping efforts (Voice of Customer [VOC], Walk Your Process, Critical to Quality [CTQ] Variables) to understand root causes and barriers to our stated reporting goals. These efforts led to interventions including the highlighting and easy identification of stroke studies from the study list after being performed (study name change), improved communication standards/report statements (a dictation macro was deployed system wide), and accountability and highly visible auditing metrics (monthly emails, Grand Rounds, CSC certification). Many of the tools employed in our successful and durable quality improvement project have been previously reviewed [16]. But to the best of our knowledge, there are few reported examples in the literature that demonstrate the long-term feasibility of these approaches and tools and how efficaciousness they are in their ability to impart sustainable, long-term, durable quality improvements in a busy clinical practice. In particular, our work highlights the importance of human factors in sustaining agents of change. While process methodologies such as Lean, Six Sigma, and other quality improvement methods are essential to the execution of a quality initiatives [8,11], human factors including leadership support, wide participatory engagement, and consistent project advocacy were found to be vital features to the success and longevity in our quality initiative. In addition, a continuing focus on education (Grand Rounds, Resident Lectures, on-service training), high visibility of results, short data/auditing periods (to capture problems early and often), and promotion of interdepartmental communication and involvement ensured that we consistently captured and communicated the ongoing goals and significance of our project.

CONCLUSIONS AND FUTURE DIRECTIONS

Quality improvement processes are central to efforts to deliver high quality healthcare. With a growing emphasis on delivering high-quality and high-value care in a system linking payment to value, implementing and incorporating sustainable and durable quality processes into clinical practice grows in importance. We report one of the first long-term case examples of a radiology quality improvement project quantitatively demonstrating the success of our quality improvement initiative and clear-eyed outcome metrics that reflect the impact and utility of process improvement methodologies to impart durable long-lasting agents of change. Finally, we present anecdotal insights gleaned over the past 6-years and the importance of human factors in the success of quality programs. The success of our project has spurred the development of other quality projects in our department and presents a template with which we are building a more comprehensive quality program in our department to involve not only faculty physicians but clinical trainees as well. We anticipate that our experiences will translate into an efficient quality platform to pursue a wide-range of quality improvement projects to improve patient care as well as increase the value of care that we provide.

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Figure 1. 13-month pre-intervention analysis for monthly percent compliance with the CSC 20-minute noncontrast head CT communication guideline.

Figure 2.

13-month pre-intervention (gray) and 5-year post-intervention analysis for monthly percent compliance with the CSC 20-minute noncontrast head CT communication guideline.

Following the implementation of the first PDSA cycle, the mean monthly compliance rate rose to 89% over the first four months with significantly less variability (82–93%). Ongoing monitoring of reporting compliance throughout the subsequent 5-year post-intervention period with a mean monthly compliance rate of 96% and a compliance rate of nearly 99% over the past 12-months.