

Focused Process Improvement Events: Sustainability of Impact on Process and Performance in an Academic Radiology Department

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Abstract

Purpose: To evaluate sustainability of impact of rapid, focused process improvement (PI) events on process and performance within an academic radiology department.

Methods: Our department conducted PI during 2011 and 2012 in CT, MRI, ultrasound, breast imaging, and research billing. PI entailed participation by all stakeholders, facilitation by the department chair, collection of baseline data, meetings during several weeks, definition of performance metrics, creation of an improvement plan, and prompt implementation. We explore common themes among PI events regarding initial impact and durability of changes. We also assess performance in each area pre-PI, immediately post-PI, and at the time of the current study.

Results: All PI events achieved an immediate improvement in performance metrics, often entailing both examination volumes and on-time performance. IT-based solutions, process standardization, and redefinition of staff responsibilities were often central in these changes, and participants consistently expressed improved internal leadership and problem-solving ability. Major environmental changes commonly occurred after PI, including a natural disaster with equipment loss, a change in location or services offered, and new enterprise-wide electronic medical record system incorporating new billing and radiology informatics systems, requiring flexibility in the PI implementation plan. Only one PI team conducted regular post-PI follow-up meetings. Sustained improvement was frequently, but not universally, observed: in the long-term following initial PI, measures of examination volume showed continued progressive improvements, whereas measures of operational efficiency remained stable or occasionally declined.

Conclusions: Focused PI is generally effective in achieving performance improvement, although a changing environment influences the sustainability of impact. Thus, continued process evaluation and ongoing workflow modifications are warranted.

Key Words: Radiology, radiology practice, process improvement, performance metrics

J Am Coll Radiol 2015;12:75-81. Copyright © 2015 American College of Radiology

INTRODUCTION

A radiology department is a highly complex environment [1]. A wide variety of individuals, including radiologists, technologists, nurses, licensed independent practitioners, schedulers, registrars, billers, research coordinators, and administrators work together to provide a comprehensive spectrum of high-quality imaging services to a large number of patients in a safe, timely, and reliable manner while taking advantage of numerous sophisticated medical and

information technologies. These processes must be responsive to a complex and frequently changing regulatory environment in such areas as compliance, billing, and reimbursement. Furthermore, ongoing reform in health care payment systems, including declining reimbursements, creates strong pressures for radiology departments to increase their efficiency and optimize workflows. If achieved, such efforts will not only improve departmental operations, but also enhance employee engagement and patient care.

Process improvement (PI) is well established in the business community as a formal approach to achieving operational efficiency and is now considered a critical component of organizational competitiveness and survival [2-4]. Key aspects include the following: representation of all constituents involved in the process undergoing change; collection and analysis of data as a basis for change; empowerment of frontline workers to devise

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and implement changes; use of IT systems to facilitate change; and ongoing iterative evaluation of results, with continued implementation of further process refinement as warranted. PI has been applied effectively throughout various specialty areas in medicine and is documented to lead to improvements in diverse settings such as intensive care units [5], pharmacies [6], nutrition services departments [7], and billing departments [8].

PI is often performed using a broad and disruptive approach that potentially entails use of a large amount of organizational resources. For instance, within our institution, a robust Lean Six Sigma office conducts extensive re-engineering processes that involve multiple departments and constituents. Projects typically entail at least 1 week of daily 8-hour meetings, although they sometimes run for considerably longer, as well as financial costs to support the office's operations.

We believe that PI can also be effectively performed in a focused fashion at the individual departmental level, entailing far less resource utilization. In particular, we have independently conducted internal PI events that involve essentially no cost and a much lower time commitment for the entire team in comparison with institution-led re-engineering. With this approach, the improvement process is rapidly completed within a narrow time span in hopes of achieving prompt "breakthrough" change [9]. For instance, we have previously described a successful effort to apply focused PI to produce immediate performance improvements within our MRI division [3].

Although PI has demonstrated strong potential to generate early effective change, the continued sustainability of a PI event's impact is not well understood. Such insight is important given the potential to be misled by an emphasis on the immediate impact of process improvement. One report observed that the long-term impact of PI is influenced by such factors as the handling of activities that do not add value and optimization of IT support [10], suggesting that the results of PI are not guaranteed to endure. This concern regarding lack of sustainability is of particular importance for rapid, focused PI processes, such as those we have conducted in our department, given that they have a briefer and narrower initial scope.

In the time since our department completed its initial focused PI in MRI, we have conducted additional focused PI events using a similar structure in ultrasound, CT, breast imaging, and research billing. At least 1 year has elapsed since completion of these focused PI events, providing an opportunity to investigate their continued effectiveness. Thus, the current study was designed to evaluate the sustainability of the impact of focused PI events on process and performance within an academic radiology department.

METHODS

This retrospective HIPAA-compliant study used aggregate departmental performance data collected as part of

quality-improvement initiatives; protected health information related to individual examinations was not used for purposes of this study, and thus, institutional review board approval was not required. Our department conducted PI over the course of 2011 and 2012 within the 5 previously noted areas. Although the PI process differed among areas, owing to unique issues and workflows, we believe that several common elements of the PI process contributed to its success. Each implementation of PI entailed participation from all stakeholders, including physicians, technologists, nurses, licensed independent practitioners, schedulers, registrars, billers, research coordinators, and IT representatives (total range of participants: 8-13), and was led and facilitated by the department chair with assistance from the senior administrator who had previously received formal training in PI methodology.

An initial meeting determined which data were relevant and necessary for the PI process. These data were then collected over a period of 2-3 weeks; the content of a sample data-collection form is shown in Table 1. Approximately 1 week following the start of data collection, PI participants began meeting several times a week, analyzing and understanding the data, identifying potential areas for improvement, as well as suggesting and discussing potential changes and solutions to identified problems. A key element of the PI process was the empowerment of all individuals involved to criticize existing processes and workflows and suggest new ideas and solutions without fear of retribution from supervisory personnel. To achieve this context, the chair clearly articulated this goal at the beginning of each PI initiative and strongly advocated for a culture of change. The PI meetings were generally held over a

Table 1. Content of sample data-collection form used by focused process improvement team in CT

| |
|---|
| Date |
| Patient name |
| Examination scheduled |
| Time examination scheduled |
| Time of patient arrival in department |
| Time of completion of registration |
| Time of oral contrast administration |
| Time of patient assessment by physician assistant |
| Time of IV placement |
| Time patient entered examination room |
| Time examination completed |
| Time patient left examination room |
| Scanner on which examination scheduled |
| Scanner on which examination completed |
| Problems encountered |

Note: IV = intravenous. Staff completed items for all patients imaged during a 1-day period, and the data were then used to identify bottlenecks, inefficiencies, and commonly encountered workflow problems.

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