

Applying Lean Principles and Kaizen Rapid Improvement Events in Public Health Practice

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This case study describes a local home health and hospice agency's effort to implement Lean principles and Kaizen methodology as a rapid improvement approach to quality improvement. The agency created a cross-functional team, followed Lean Kaizen methodology, and made significant improvements in scheduling time for home health nurses that resulted in reduced operational costs, improved working conditions, and multiple organizational efficiencies.

KEY WORDS: Kaizen methodology, lean principles, local public health agency, quality improvement, QI approaches, QI methods in public health, QI tools, rapid improvement

Lean management principles have been applied successfully in manufacturing processes for decades.¹ Lean is an improvement method that focuses on identifying and eliminating non-value-added or wasteful activities.² Value is defined from the customer's or patient's perspective. At its core, Lean is about respect for people and continuous quality improvement. Lean incorporates the notion of freeing up resources and re-deploying them back into the organization to accomplish valuable tasks, allowing organizations to do more with the same resources. Lean is more than just a set of tools or improvement practices—its purpose is to fundamentally change how people within an organization think and what they value and thus can transform how the entire organization behaves and approaches its work.¹⁻³

One of the most successful Lean tools is the Kaizen Event (or rapid improvement event), which typically require 4 to 5 consecutive days of improvement work focused on empowering frontline staff and utilizing their knowledge to create more effective and efficient processes.³ The focus of this article is to demonstrate

how one public health organization embraced the concepts of Lean, adapted Kaizen methodology to be their chosen approach for major problem-solving activities, and changed their culture.

● Background

Established in 1968, Albemarle Home Care (AHC)/Albemarle Hospice is a Medicare- and Medicaid-certified Home Health and Hospice agency serving northeastern North Carolina. With approximately 85 employees, their mission is to provide safe, high-quality, and cost-effective health care for the comfort of patients in 6 counties. The organization provides services that include nursing, occupational therapy, home health aide services, physical therapy, speech therapy, social work, adult day health care, hospice, and case management for the Community Alternatives Program. The AHC provides nursing care and therapy to patients in their own home for more than 1600 patients per year.

In October 2008, a regional Public Health Incubator Collaborative, the Northeastern NC Partnership for Public Health,^{4,5} engaged the North Carolina State University Industrial Extension Service to apply Lean approaches to local health agencies in the region to improve workflow and help processes become more efficient.

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● Methods

The AHC's patients often need health care at home following surgery or a hospital stay. Scheduling these services each day, called the "Morning Shuffle," had become a stressful process. The AHC's 6 counties were separated into 3 areas, scheduled daily by 3 nurse team leaders. The process involved the following:

- Intake team received phone calls and fax information for new patients.
- The nurse team leaders met each morning via phone and spent an average of 60 minutes (up to as much as 120 minutes) to develop the current day's schedule.
- Schedules were developed and handed off to the home health nursing staff to begin their patient visits, sometimes creating a long delay before they could see patients.

In June 2009, the AHC held its Kaizen event with a 9-member cross-functional team. The eight member team included nursing staff, nursing team leaders, the billing coordinator, and patient intake staff. In addition to the internal team members, an outside reviewer, the executive director of the Partnership, joined the team. The Industrial Extension Service provided 2 lean health care specialists to facilitate the 4-day event.

The AHC event was a typical Kaizen event of 4 days' duration, utilizing the Plan-Do-Study-Act cycle to perform small tests of change before making larger-scale changes. The process began with a brief Lean overview training session followed by a team process review walk called a "Gemba walk."³ The Gemba walk is designed so the team directly observes the actual process to gain a common understanding of how the process functions and observe wasteful activities. During the first walk, the team debriefed the waste observed and identified 38 wasteful items. The team then created a value stream map of the scheduling process and listed the wasteful items on their map. The team identified 3 areas to focus improvements:

1. The quality of the information coming into the agency's intake staff
2. Issues and delays faced by the staff in the field who service patients
3. Reducing time required making daily assignments so nursing staff could see patients sooner

Three subteams worked independently on testing changes and validating which ideas worked and which did not. Over the next 2 days, teams met routinely to review with other subteams their tests and findings, working to fine-tune improvements while utilizing the entire team for brainstorming solutions. At the end of each day, the director and key members of her staff met with the team for a debriefing of the work. This

report-out each day opens communication and prevents the team from going down a wrong path.

On day 2, the team brought from home a ladies shoe rack with pockets to create a temporary scheduling board to post finished schedules as soon as they were complete to get nursing staff out on the road and seeing patients sooner. By day 4, the team had worked through challenges and had put a new communication system in place. The team created a new "preshuffle" at 4:30 PM the day before to get a jump on the scheduling process. They revised capturing intake data, presorting information as the phone calls arrived, eliminating the need to sort and search for information during the morning shuffle. The team also consolidated patient paperwork utilized in the field by home health nurses and modified their paperwork process.

Also, on day 4, the team began preparing for a future Kaizen event, including a "5S" (sort, set-in-order, shine, standardize, and sustain)³ approach," and overall workplace organization for their home health medical supply room and storage area. Over the next 90 days, the team met regularly to finalize pending items from the Kaizen.

● Results

The Kaizen produced both intangible and tangible results.

Intangible improvements observed

- Freed up 3 nurse team leaders to better perform supervisor duties
- Staff nurses saw their first patient sooner in the day, could complete their daily work on time, had less after hours computer work, and were more often able to start from home without having to come in to obtain their schedules
- Ultimately gained more time for nurses to spend with their patients
- Greatly improved staff morale
- The organization today is more profitable, seeing more patients, with the same staff
- Streamlined intake process with better resource allocation
- Paper cost and faxing time and expense were reduced

Measured tangible improvements

- Scheduling time reduced from an average 60 minutes to a combined morning shuffle and preshuffle of 20 minutes.
- July 2009–June 2010, the AHC was able to see a 4% growth in the number of patients served while maintaining the same level of permanent staff.

- June 2010–November 2011, the AHC saw an increase of 8% more visits.
- Total nursing dollars spent for the year saw a reduction of 12%.
- In one scheduling region, the number of visits per day increased 18% pre- and postevent (3.79 visits per day in May 2009 vs 4.49 visits per day in October 2010).

Spreading and sustaining lean at the AHC

After the success of its first project, the AHC began incorporating Lean on a regular basis. Kaizen events are now regularly used for problem solving at the AHC. The AHC has adapted the Kaizen approach to meet its needs by setting aside a half day for project definition, a Gemba walk, debriefing waste, mapping the process, brainstorming improvement ideas, and creating a list of Plan-Do-Study-Acts to test. In the weeks that follow, they work on testing ideas and small changes. The team meets again for another half day to review outcomes and revisit discussions on adjustments or next steps. As of June 2010, the AHC has completed 9 projects using this modified Kaizen approach.

Lessons learned from the initial Kaizen experience

Upon reflection after the event, the organization highlighted lessons learned from their experience:

- Take more time to establish the measurements and put them in place before the Kaizen event to make it easy to see overall improvement—capturing improvements after the fact is much more difficult.
- Improve the documentation process to allow for ease of communicating successes.
- Engage those who perform the work (frontline staff) because their solutions are more likely to be sustained for a long term within an organization.

● Conclusion

Lean approaches to improving processes and organizations in health care have resulted in numerous success

stories throughout the past decade.⁶⁻⁸ The story of the AHC and its realized improvements is one of a number of success stories in public health organizations applying Lean in North Carolina. The future of public health as not merely a contributor, but as a leader in population health advances will be greatly facilitated if public health organizations can optimize the use of their increasingly scarce resources. This case study suggests that Lean improvement methods may be one effective approach for public health agencies to optimize their resources.

This study describes a local home health and hospice agency's effort to implement Lean principles and Kaizen methodology, which resulted in reduced operational costs, improved working conditions, and multiple organizational efficiencies.

REFERENCES

1. Womack JP, et al. *The Machine That Changed the World: The Story of Lean Production—Toyota's Secret Weapon in the Global Car Wars That Is Now Revolutionizing World Industry*. New York, NY: Free Press, a division of Simon & Schuster Inc; 1990.
2. Tague NR. *The Quality Toolbox*. 2nd ed. Milwaukee, WI: ASQ Quality Press; 2005.
3. Martin K, Osterling M. *The Kaizen Event Planner: Achieving Rapid Improvement in Office, Service, and Technical Environments*. New York, NY: Productivity Press; 2007.
4. Dickson CW, Alexander JG, Earley BH, Riddle EK. Northeastern North Carolina partnership for public health and health disparities in northeastern North Carolina. *N Carol Med J*. 2004;65(6):377-380.
5. About the Northeastern North Carolina Partnership for Public Health. <http://www.nencpph.net/> and <http://nciph.sph.unc.edu/incubator/partnerships/northeast/index.htm>. Accessed May 9, 2011.
6. Herring L. Lean experience in primary care. *Qual Prim Care*. 2009;17(4):271-275.
7. Kim C, Lukela MP, Parekh VI, et al. Teaching internal medicine residents quality improvement and patient safety: a lean thinking approach. *Am J Med Qual*. 2010;25(3):211-217.
8. Ng D, Vail G, Thomas S, Schmidt N, et al. Applying the Lean principles of the Toyota Production System to reduce wait times in the emergency department. *Can J Emerg Med*. 2010;12(1):50-57.