The Lean Approach to Health Care: Safety, Quality, and Cost

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More than a decade ago, the board of directors and executive leaders of Virginia Mason (VM) Health System in Seattle, WA, held a series of meetings to determine the future direction of the organization. It was a new century, we had a new CEO, and the Institute of Medicine report *Crossing the Quality Chasm* had just been published.¹ We knew we had to make fundamental, even radical, changes in how we managed the medical center. We focused on three things: 1) the safety of patients while in our care; 2) the quality of the care we provided; and 3) the cost of delivering care. These three elements were, we knew, inextricably tied together. We would have to concentrate on all three to make Virginia Mason the place we knew it could and should be.

The first step was to make a real commitment to our patients—their needs and desires would guide us in everything we do. We constructed our strategic plan around this commitment. Next, we realized that we would have to revisit old, long-standing assumptions and therefore developed new “compacts” with our physicians, leadership, and board. These compacts identified explicit reciprocal obligations between the organization and its physicians, leaders, and boards. Finally, we searched for the tools that would enable us to transform our organization, a management method that we could deploy across the entire organization.

We found the necessary tools in the Toyota Production System (TPS). TPS is often referred to as a “Lean” management method, because it focuses on reducing waste while improving quality. We call our version the Virginia Mason Production System, or VMPS.

Can manufacturing methods be adapted to health care? Definitely. Both health care and manufacturing products like automobiles and airplanes require complex systems with a multitude of processes that must align and mesh perfectly to deliver optimal products and services of high quality and reasonable cost. While Toyota has understood and pursued a rational method for making cars for more than 60 years, health care has never had a true management method and there has been little change in how care delivery is organized, managed, and paid over many decades.

The result is health care costs that continue to rise, placing tremendous burden on families across our country and threatening the global competitiveness of American companies. This is coupled with suboptimal quality and safety. Our processes are full of defects and waste.

VMPS is our management method and integral to daily work at Virginia Mason. All leaders attend mandatory VMPS leadership training.

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¹Contributor to the Learning Health System Commentary Series of the IOM Roundtable on Value & Science-Driven Health Care.
training, are required to lead formal improvement events each year, and are expected to routinely coach and train staff about how to improve their work using VMPS tools and methods. VMPS activities range from small-scale ideas tested and implemented immediately to long-range strategic planning and workshops that redesign new workspaces and processes.

Using VMPS, we redesign all of our processes by engaging the team members who actually do the work, including frontline staff, along with physicians, nurses, and managers. These improvement teams analyze the current state of the activity being reviewed to find waste in the form of defects, lost time, unnecessary motion, overprocessing, excess inventory, overproduction, and unnecessary transportation. The group redesigns the process to eliminate waste and then tests the new process at the actual work location. Adjustments are made in real time and tested again. New improved processes are implemented immediately. Workshops last from 2 to 5 days, and improvements are measured and reported at 30, 60, and 90 days following the workshop. Virginia Mason has held 1,280 of these continuous-improvement activities involving staff, patients, vendors, and other guests.

Learning to use VMPS consistently and effectively is part of changing the culture and takes many years. This is really not unexpected. A Lean system like VMPS requires deep organizational changes—changes that challenge long-held beliefs and accepted practices. Our results have been gratifying and propel us to work even harder to deploy these methods and tools deeply within our organization. A few examples follow.

**Nursing cells.** In 2005, VM nursing teams used VMPS workshops to redesign the flow of work so they could focus more on patient care. Instead of caring for patients throughout a unit, nurses now work as a team with a patient-care technician (PCT) in “cells” (groups of rooms located near each other). The cell model made it easier for nurses to monitor patients and quickly attend to needs; communication among nurses, PCTs, and rounding physicians improved. Steps walked per day fell from 10,000 to roughly 1,200. The VMPS workshops also evaluated nurses’ duties and reassigned work, such as room setup, to other staff, thereby increasing the nurse–patient time from 35 percent to more than 90 percent.

**The Health Maintenance Module (HMM).** We developed this evidence-based protocol to provide a mistake-proofing checklist for screening tests and disease management tests for every patient when his or her chart is opened or at “touch points,” such as calling in for an appointment. For example, the HMM shows whether you are due for a pap smear, a mammogram, a lipid profile for your cardiovascular risk, or an A1C for your diabetes. Use of the HMM is standard work during the rooming process for all primary care visits, even if just for episodic care. Primary care financials and patient satisfaction results have improved during this 5-year effort, and no new staff have been required to operate this system of “pull production.”

**Other results from VMPS activities:**

- **Saved $11 million in planned capital investment by using space more efficiently and freed an estimated 25,000 square feet of space by using better space designs.**
- **Reduced the time it takes to report lab test results to the patient by more than 85 percent.**
- **Reduced inventory costs by $2 million through supply chain expense reduction and standardization efforts.**
- **Reduced nurse walking distance in the hospital by 750 miles per day, freeing up**
more than 250 hours of time spent walking for direct patient care.
- Reduced labor expense in overtime and temporary labor by $500,000 in just 1 year.
- Increased productivity by about 93 percent in targeted areas by moving the most common supplies to point of use and creating kits containing frequently-needed supplies.
- Reduced premiums for professional liability insurance by 56 percent.

Can our experience be scaled up and replicated more broadly? I believe it can, and there is emerging evidence that it can work in health care organizations of varying sizes and complexity. A specific approach to eliminating defects and reducing waste is critical while ensuring that everything we do adds value for the patient. The methods of VMPS are applicable to any organization—and we know that waste in health care is omnipresent. Much change is required in the overall health care system in the United States. Each of us in the provider community can make a real difference and contribute to creating a higher-quality, safer system of care while also being better stewards of precious resources. Our patients and communities will be the ultimate beneficiaries.

For more information about our ongoing work to improve our work, please visit https://www.virginiamason.org/VMPS.

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Reference:

Note: Authored commentaries in this IOM Series draw on the experience and expertise of field leaders to highlight health and health care innovations they feel have the potential, if engaged at scale, to foster transformative progress toward the continuously improving and learning health system envisioned by the IOM. Statements are personal, and are not those of the IOM or the National Academies.

In his commentary, Gary Kaplan describes Virginia Mason Health System’s successful implementation of Toyota’s Lean process approach to increase patient safety, improve care quality, and lower costs. His discussion touches on several concepts central to continuously improving care, including the importance of:

- Visible leadership commitment and guidance to the change process;
- Providing the tools necessary to facilitate change;
- Team-based education on how best to use these tools in the clinical care setting;
- Team member engagement in all phases—design, implementation, monitoring, and re-design of new processes in real time.

Information on the IOM’s Learning Health System work may be found at www.iom.edu/learninghealthsystem.