

Innovation and Lean Thinking: Mutually Supportive Partners in the Transformation of Health Care

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Perspective

"We want to make sure we are in existence 100 years from now? and that requires being willing to look at things differently." (Mark Hutcheson, Former Virginia Mason Medical Center Board Chair).

Introduction

Virginia Mason Medical Center is a nonprofit regional health care system in the Seattle/Puget Sound area. It comprises a 336-bed acute care and teaching hospital, a primary and specialty care group practice of more than 450 employed physicians in over 45 fields, 5000 associates, and a network of clinic locations.

Innovation at Virginia Mason

Innovation is in the genes of Virginia Mason and is displayed in a rich pattern of "firsts" over its 93-year history. However, the innovation with the most pervasive impact on the entire medical center has been the 2002 adoption of the Toyota Production System principles (also known as lean). The effect of the Virginia Mason Production System (VMPS) can be seen in indicators of clinical outcomes, safety, patient satisfaction, process indicators, staff engagement, and economics.

In contrast to many other health care organizations that are focusing on innovation, Virginia Mason maintains a minimal infrastructure that supports, facilitates, and teaches others, rather than creating a separate, centralized structure where innovative thinking occurs mainly outside the daily work of health care service delivery. Virginia Mason leaders believe that freedom to innovate is everyone's privilege—not just that of a separate work group—and frontline staff regularly take advantage of the opportunity to be innovative.

The voices of patients and families also inspire innovation within VMPS. Innovation is often triggered when we deeply understand the experience of patients and families, but that requires that we observe and listen well, and to the right things. Bringing into its lean efforts an innovative approach called experience-based design, Virginia Mason is showing that patient and family experience can be measured and improved upon in ways that patients and families truly appreciate.

Standard Work and Innovation

A critically important principle in lean thinking is *standard work*. Standard work captures the current best-known way to do something. Typically, this has been carefully worked out based on evidence and testing and takes into account the coordination of flow with others in the value stream. Variation from standard work simply based on the personal preferences of the one doing the work is considered waste.

Standard work is a particularly troublesome concept to many health care professionals. Standard work, some say, stifles creativity and the foundational freedom to think and do differently, which is at the heart of innovation.

So, to many in health care, it is remarkable that the Virginia Mason has *integrated* innovation and lean at both the strategic and operational levels. Lean thinking and innovation are addressed systematically and deliberately, with involvement of the whole organization, from the board to the frontline. The organization has also developed an innovative culture that encourages clinical and operational associates, at all levels, to challenge traditions and assumptions, freewheel in thinking from time to time, manage the risks inherent in trying out new things, learn from failure, and develop ideas into practical realities. Virginia Mason has aligned the concepts, methods, and elements of innovation with their counterparts from lean thinking to create a powerful engine for transformation.

CEO Gary Kaplan, MD, calls standard work "the foundation for innovation." Standardization provides a stable substrate on which to generate and experiment with innovative ideas for transformation. It makes clear what the current thinking is, so that one can purposefully "think outside the box." Furthermore, without standardization, baseline performance measurement has so much variation that it is difficult to determine if an innovative new way is better. Finally, as one Virginia Mason physician observed, "once you start standardizing the day-to-day work, those become sort of automatic and it gives you the benefit of time and energy that you can invest in new ideas."

In a sophisticated organizational culture, like that at Virginia Mason, leaders and staff have no difficulty understanding that they sometimes need to be in the zone of standardization, and sometimes in the zone of challenging the current standard and testing innovative new ways. There is complexity, but no dichotomy. One follows the other naturally.

When an innovation has proven its value, it then makes perfect sense to standardize the practice and spread it widely, which is the hallmark of lean thinking. However, the culture of lean and innovation does not allow this new standard to become the proverbial "we have always done it this way" that blocks subsequent innovation and change. Rather, it is just another temporary phase on the upward journey to better and better performance. Transformation emerges over the various cycles of this spiral of innovation across a value stream.

Example

The natural synergy between standard work and innovation is illustrated well in the work on multimodal pathway pain management, led by Dr. Francis Salinas and the anesthesiology team.

During hip and knee replacement surgery, pain signals are generated at the surgical site and transmitted through the peripheral nerve to the spinal cord and then on to the brain. There had been a longstanding history of using regional anesthesia to block the pain signals as they try to move along the peripheral nerve (continuous peripheral nerve block). Care must be taken, however, to use only the minimum effective amount of anesthesia in order to avoid leg weakness that could result in a fall during the postoperative period. Further, the blocking effect wears off over time, allowing pain signals through eventually. Salinas points out, "We used to think that pain was a necessary part of surgery. But that is archaic thinking."

Applying better thinking to the daily practice for anesthesiologists, Dr. Salinas recommended giving these patients a combination of medications to target multiple sites along the *whole* pain pathway. This cocktail of medications could begin before surgery and then continue through the surgery and after, allowing them to work synergistically to decrease the patient's pain and inflammation.

The VMPS infrastructure of *kaizen* events and rapid process improvement workshops (multidisciplinary improvement team efforts) helped turn these creative thoughts into standard work that is now practiced on all hip and knee replacement patients, and is also being applied to many other types of surgery. Benefits of this approach include reducing the risk of falls, earlier mobilization following surgery, and reduced lengths of stay.

Dr. Salinas points out that the mechanisms of the various pain medications have been well known for quite some time. The innovation lies in combining them all, thinking about the *entire* patient journey (pre-, during, and post-operation), and having the disciplined infrastructure to get agreement and practice change among all of the clinical disciplines involved.

Since daily work never stops, thinking about how to innovate in daily work should never stop. Having rethought pain management in the case of *elective* hip and knee surgery, Salinas and his colleagues pressed on in their thinking.

Every year, Virginia Mason takes care of close to 300, mostly elderly, patients who fall and need urgent surgery for a hip fracture. These patients come to the emergency department, get admitted to the floor, and then get worked up by medicine, surgery, and anesthesia clinicians prior to surgery. Many of these elderly patients have multiple comorbid medical conditions and are at particular risk for the respiratory depressant effects of narcotic-based pain medications, which are often not fully effective for hip fractures anyway. As a consequence, they often get inadequate pain control in the hours prior to their surgical procedure.

Salinas and his colleagues reasoned, "We know that the hip joint is supplied by three main nerves, and the easiest to get to is the femoral nerve. A continuous femoral nerve block is a well-known, well-validated technical procedure that we're all good at now. So, we asked the question, 'What if we did a femoral nerve block as soon as the patient was stabilized in the emergency department, and then continue that block through whenever they get their procedure, and into the next day or two beyond that?'" The infrastructure

of VMPS again helped turned this idea from a provocative question in daily work into vastly improved pain control for hip fracture patients, via the establishment of the standard work across the multiple departments and clinical disciplines needed to make it happen.

Conclusion

While stories of success are already evident, the journey of the integration of lean and innovation has only just begun at Virginia Mason, and within American health care in general. Virginia Mason has come a long way, but knows that it still has a long way to go.

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