

PROFESSION

## Cardiac treatment improves after taking page from Toyota playbook

■ The carmaker's approach to continuous quality improvement yields results at hundreds of cardiac care units. "Lean management" also improves primary care, proponents say.

By KEVIN B. O'REILLY ([HTTP://WWW.AMEDNEWS.COM/APPS/PBCS.DLL/PERSONALIA?ID=KOREILLY](http://www.amednews.com/apps/pbcs.dll/personalia?id=koreilly)) amednews staff —  
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The management principles used to improve quality and efficiency at Toyota Motor Corp. and other manufacturers also are linked to better delivery of cardiac care and lower death rates from heart attacks, according to research that demonstrates for the first time how well the so-called lean production system functions across a wide swath of U.S. hospitals.

Leading proponents of this approach in medicine have reported big quality improvement successes at integrated health systems such as Virginia Mason Health System and Group Health Cooperative in Seattle and ThedaCare in northeastern Wisconsin. A March 18 study posted online in *JAMA Internal Medicine*, formerly *Archives of Internal Medicine*, that examined heart-attack care at nearly half of the country's cardiac units is being seen as significant evidence that the lean management method can work in diverse health care settings.

"This is probably the most comprehensive study of lean-type management in a really large survey of health care organizations," said K. John McConnell, PhD, the study's lead author and director of the Center for Health Systems Effectiveness at Oregon Health & Science University in Portland. "The research so far has been four or eight sites, or something like that, and we tried to do this on a larger scale and quantify it."

McConnell and his colleagues surveyed nurse managers at nearly 600 interventional cardiac care units about their implementation of 18 management practices that emphasize lean, waste-free operations, standardized care, performance measurement, target-setting and employee incentives. Researchers graded the answers from one to five, with five representing high adoption and maintenance of lean methodology.

Nearly 25% of cardiac units earned overall scores of four or five. The 149 highest-scoring hospitals had 30-day, risk-adjusted mortality rates that were 2.7% lower than the lowest-scoring 150 hospitals.

The most lean-friendly cardiac units also did better on nearly all other metrics of heart attack care examined, providing percutaneous coronary interventions within 90 minutes at a 4.3% higher rate and using angiotensin-converting enzyme inhibitors for left ventricular dysfunction nearly 2% more often. There was no statistically significant difference found in 30-day readmission rates. McConnell said that is probably because rehospitalization is greatly affected by factors such as patients' socioeconomic status that are outside the direct control of cardiac care units.

### From cars to cardiac care

The lean approach is derived from the management philosophy known as the Toyota Production System that helped the Japanese company become the world's largest carmaker. Hallmarks of the lean method include reducing variation and just-in-time production, with the overarching goal of cutting waste while preserving productivity.

As applied to cardiac care, the method leads to practices such as standardizing admission order sets for patients presenting with chest pain and immediately alerting the cardiac catheterization team when an ST-segment elevated myocardial infarction is identified through electrocardiography. Another example of going lean, the study said, is regular monitoring of clinical processes and adherence to checklists for all key procedures.

The research shows that the lean-management principles of carefully studying medical processes and protocols to cut wasted steps and improve reliability can work for patients as well as for automobiles, said A. Wellesley Chapman, MD, a practicing family physician who helps implement the lean methodology at Group Health's clinics in the Seattle area.

“One thing we hear all the time is, 'We don't make cars,' and this idea comes from people who make cars,” said Dr. Chapman, who co-wrote a *JAMA Internal Medicine* invited commentary responding to McConnell's study. “But all your best improvements are going to come from people who actually do the work. All we do is help engage them and help teach them how to take that step back from it, get up on the balcony to see it and improve it.

“What we bring in lean is a methodology that talks about value versus waste, and how do you see in your daily work where there's value in those things that are good for patients versus where there's waste — time wasted trying to find people, find equipment, or making errors and trying to correct errors. When you see those things clearly, they become intolerable, and you develop practices to try to fix those things.”

### **Lean applied to primary care**

That the management method works in interventional cardiology should come as no surprise, given the need in heart attack care for quick assessments and fast action to save lives, said proponents of the Toyota approach in medicine. It also can help improve primary care, they added.

In 2006, Group Health entirely redesigned the practice at one of its Seattle-area clinics by allowing patients to make same-day appointments, installing an electronic health record system that lets patients message physicians securely, and increasing the physician-to-patient ratio to enable standard in-person visits lasting 30 minutes. The changes led to 29% fewer emergency department visits and 6% fewer hospitalizations compared with 19 other Group Health clinics, according to a May 2010 *Health Affairs* study. The medical home model practice also saved \$123.60 annually per patient through the redesign, which has since spread to Group Health's 25 other clinics.

At Virginia Mason, the lean-management approach led to the creation of protocols for treatment of problems commonly seen in primary care. The so-called clinical pathways were formulated in collaboration with practicing physicians, and there is always a way for doctors to veer from the protocol or tap on-call specialists if necessary, said Craig Blackmore, MD, MPH, a practicing radiologist who also directs the Virginia Mason Center for Health Services Research.

After Virginia Mason implemented the pathways, rates of inappropriate imaging for patients fell by about 25% for patients with uncomplicated low back pain, headaches or sinusitis, according to a January 2011 study in the *Journal of the American College of Radiology*. The changes were accompanied by a 95% rate of same-day appointments and 91% patient satisfaction, a September 2011 *Health Affairs* study said.

“This isn't cookbook medicine,” Dr. Blackmore said. “This is about providing the most appropriate care.”

At ThedaCare's 25 primary care locations in northeastern Wisconsin, the lean-management approach helped streamline the often-chaotic process of delivering primary care, said John Toussaint, MD, the health system's former CEO. Physicians, nurses and managers aimed to achieve what Dr. Toussaint calls “one-piece flow,” in which patients get blood tests, x-rays and other tests performed in the minutes before their visits with physicians, and leave with clear documentation of their care plan and next steps.

“By using lean principles to reduce wait time, we take the waste out of the system and do in one visit what might take three or four visits and playing phone tag for a week. That's what usually goes on,” said Dr. Toussaint, now CEO of the ThedaCare Center for Healthcare Value, an Appleton, Wis.-based consultancy. “Every one of those handoffs, wait times or extra visits results in the potential for a mistake happening. There's a lack of follow-up, wrong medication doses, missed diagnoses. It happens every day.”

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#### ADDITIONAL INFORMATION

### 6 ways cardiac care units use lean management

The lean methodology, borrowed from Toyota Motor Corp., emphasizes continuous quality improvement, standardization and efficiency. About 10% of U.S. hospitals' interventional cardiology units are fully implementing the approach. In these settings:

- 1 Protocols are known and used by all staff and regularly monitored for compliance; unit has predefined, standardized assessments and admission order sets for all critical pathways (ST-segment elevation myocardial infarction and non-STEMI).
- 2 Protocols exist for all patients, are known and used by all clinical staff and are regularly followed up through some form of monitoring or oversight.
- 3 Inter-area protocols are known and used by all staff and regularly followed up; handoff information is documented; communication is interactive; and contingency plans are in place.
- 4 Physicians' and nurses' communication is interactive, and input occurs across work domains; multiple channels exist for soliciting concerns.
- 5 Multiple means are in place to capture patient and family concerns; systems are in place to capture and respond to positive and negative feedback.
- 6 Protocols and discharge order sets exist for all patients, including, for example, a formal plan for handoffs between hospital and primary care physician; medication reconciliation plans are in place and monitored.

Source: Data supplement to “Management Practices and the Quality of Care in Cardiac Units,” *JAMA Internal Medicine*, formerly *Archives of Internal Medicine*, published online March 18 ([link](#))

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#### EXTERNAL LINKS

“To Meet Health Care's Triple Aim, Lean Management Must Be Applied Across the Value Stream,” *JAMA Internal Medicine*, formerly *Archives of Internal Medicine*, published online March 18 ([link](#):

<http://archinte.jamanetwork.com/article.aspx?doi=10.1001/jamainternmed.2013.4080> )

“The promise of Lean in health care,” *Mayo Clinic Proceedings*, January ([link](#):

<http://www.ncbi.nlm.nih.gov/pubmed/23274021> )

“At Virginia Mason, Collaboration Among Providers, Employers, And Health Plans To Transform Care Cut Costs And Improved Quality,” *Health Affairs*, September 2011 ([link](#):

<http://content.healthaffairs.org/content/30/9/1680.abstract> )

“Effectiveness of clinical decision support in controlling inappropriate imaging,” *Journal of the American College of Radiology*, January 2011 (link: <http://www.ncbi.nlm.nih.gov/pubmed/21211760> )

“The Group Health Medical Home At Year Two: Cost Savings, Higher Patient Satisfaction, And Less Burnout For Providers,” *Health Affairs*, May 2010 (link: <http://content.healthaffairs.org/content/29/5/835.abstract> )

“Management Practices and the Quality of Care in Cardiac Units,” *JAMA Internal Medicine*, posted online March 18 (link: <http://archinte.jamanetwork.com/article.aspx?doi=10.1001/jamainternmed.2013.3577> )

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