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To Fix Health Care, Hospitals Take Tips From Factory Floor

Adopting Toyota Techniques Can Cut Costs, Wait Times; Ferreting Out an Infection
What Paul O'Neill's Been Up To

By **BERNARD WYSOCKI JR.**
Staff Reporter of THE WALL STREET JOURNAL
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PITTSBURGH -- In the factories of **Toyota Motor** Corp., any worker who spots a serious problem can pull a cord and stop the assembly line. Richard Shannon, chairman of medicine at Allegheny General Hospital, is applying the Toyota technique to an intensive-care unit here.

Just the other day, a nurse brought the medical "production line" to a halt. Candice Bena thought a 76-year-old patient needed a new intravenous line but couldn't get the radiology department to install one immediately. Fearing the patient would develop an infection, the nurse phoned Dr. Shannon.

That was the equivalent of pulling "the 'andon' cord," says Dr. Shannon, using the Japanese word for "lantern." He immediately called the hospital's chairman of radiology, who within two hours installed the new IV line himself. "That's the Toyota production system. No problem should be left unsolved."

It's good medicine, he says. Using the Toyota approach, for instance, the hospital traced problematic infections in some patients to their source, prompting two intensive-care units to change the way they insert intravenous lines. The result: a 90% drop in the number of infections after just 90 days of using the new procedures.

It's also good business: By reducing infections, the new procedures have saved almost \$500,000 a year in intensive-care-unit costs. "It's not in my interest to be putting in lines all day long," says Paul Kiproff, chairman of radiology. But with infections down, "this is clearly advantageous."

Similar things are happening in at least a dozen hospitals across the country. The Toyota system emphasizes the smoothest possible flow of work -- accomplished by, say, mapping out work processes and eliminating unnecessary steps, and using teamwork to identify and fix problems as soon as they crop up. Hospitals are using the tactics to reduce patient waiting times, slash wheelchair inventories, prepare operating rooms faster and move patients through a hospital stay or doctor visit quickly, seamlessly and error free.

CAR MODEL

How Toyota's production techniques are applied to hospitals

- **Flow:** In a factory, the Toyota approach emphasizes the smooth flow of people, gear and finished goods. In hospitals, it emphasizes rapid flow of patients, staff.

- **Root-Cause Analysis:** In a factory or hospital, errors are examined immediately, and countermeasures taken to avoid a repetition.

- **Value Stream Mapping:** Workers diagram work processes, aiming to eliminate steps that aren't valuable to customers -- or patients.

- **Kaizen:** This Japanese term for continuous improvement involves constant small steps to improve efficiency.

Sources: John Black, consultant to Virginia Mason Medical Center; James Womack, "Lean Thinking" (Free Press)

The techniques have taken a roundabout path to reach the hospitals. Toyota and other Japanese companies learned many of them from the late W. Edwards Deming, an American statistician and industrial engineer who worked in their country during the post-World War II reconstruction. They then melded his insights with their own home-grown waste-cutting techniques. Taught in business schools and promoted by consultants, variations became the rage among U.S. manufacturers several decades later, after Toyota had become the envy of the manufacturing world.

Now, some U.S. manufacturers are pushing the Toyota approach from factory floor to hospital ward, as part of their continuing effort to hold down rising employee health-care costs. Local industrial executives, who have been through wrenching Toyota-inspired changes in their own businesses, are promoting the techniques to their counterparts in hospitals.

In Pittsburgh, a driving force behind this new application is Paul O'Neill, the former Treasury secretary and ex-Alcoa Inc. chief. He now heads a consortium of hospitals, insurers and businesses devoted to improving health care while reducing costs. His Pittsburgh Regional Healthcare Initiative, founded six years ago, offers a five-day training course based largely on the Toyota system. Dr. Shannon is one of 325 graduates so far.

Employers are looking at steep increases in health-care costs and saying, "Hey, guys, this is broken. You really have to fix it," says John Toussaint, chief executive of ThedaCare Inc., a three-hospital nonprofit group in Appleton, Wis. ThedaCare's board "demands this of me," Mr. Toussaint says. Board members include executives of Kimberly-Clark Corp., Bemis Co. and Banta Corp., companies that pay the tab for employees treated by ThedaCare hospitals. ThedaCare recently hired consultants steeped in the Toyota system after seeing their results at a nearby snowblower maker.

Meanwhile, 30 executives of Seattle's Virginia Mason Medical Center spent two weeks in Japan visiting Toyota car factories and Hitachi Ltd. air-conditioning plants. They visited at the urging of a former Boeing Co. executive who had used the Toyota methods at the aircraft maker. After embracing the Toyota changes years ago, window and door maker Pella Corp. now has plans to loan employees for "hot teams" at a hospital in its home town of Pella, Iowa, to scrutinize medical operations.

Hospitals aren't factories, though. Doctors, nurses and other hospital staffers don't think of themselves as assembly-line workers or their patients as anything resembling a Camry under construction. Sarah Klahsen, a hospital manager who helped teach the Toyota techniques at Pella Regional Health Center, says employees were initially skeptical of the experts who soon would arrive from the window company. "I think there's a fear, a sense that, 'We save lives. What do you do?'" says Ms. Klahsen, who left Pella in mid-March for a similar quality-control job in Des Moines.

To ease the potential culture clash, many hospitals play down the Toyota name. But the conflict

between the culture of efficiency and the culture of caring is never far from the surface.

One recent afternoon, eight ThedaCare employees struggled to cut the 14 days it takes to send bills for certain surgeries to insurers. They mapped every step in the process, and saw an obvious bottleneck: A medical technician held onto patient-billing records until making a call to the discharged patient to check on post-surgical health. Skipping that step would save 72 hours.

When Jean Muhowski, the surgery-department manager, met with a group of managers and presented a plan to drop the follow-up call, many protested. "My wife had surgery five times and appreciated those calls," said public-affairs manager John Gillespie.

So Ms. Muhowski and her team surveyed 40 patients, and discovered more than half did value the call. The eventual compromise: Upon discharge, patients are offered the option of a follow-up call. And the staffers who call get summary sheets, not actual patient records, so bills can go to insurers more quickly.

Such front-line problem solving is a big piece of the "Total Quality Management" taught by Dr. Deming in the early 1950s. Then, Japan was still struggling to rebuild its shattered industrial base. In his seminars, he typically drew flow charts stretching from suppliers to consumers. Dr. Deming was little known in the U.S. before the 1980s, when many U.S. companies sought to catch up with Japanese quality, and he became a popular lecturer and widely read author.

Some of the Toyota techniques date to Henry Ford's methods for waste-cutting on his assembly lines, to which the Japanese added their own ideas. Now, Toyota is widely considered an exemplar of what has been popularized as "lean" management.

The term spans a wide variety of practices, including "mistake-proofing" -- or digging for the root cause of mistakes in real time and taking countermeasures. Another is "value stream mapping," in which front-line workers map the many steps in a production process, then cut out those that customers -- or patients -- don't value. The auto maker, under the direction of Taiichi Ohno, a factory manager who went on to become a Toyota executive vice president, also helped pioneer the now-famous just-in-time approach to obtaining supplies from vendors only as they are needed in the factory.

To executives steeped in the lean values of the Toyota system, hospitals seem full of waste. "In the pharmacy, for example, do we need that much inventory?" asks Karin Peterson, Pella's vice president of human resources.

ThedaCare, the Wisconsin hospital, already ranks near the top of U.S. hospitals in certain performance areas, such as providing beta blockers after heart attacks, as measured by a leading independent quality-assurance group for the health-care field. Still, Dr. Toussaint, the chief executive, was intrigued when he learned about the Toyota methods last year from the chief executive of snowblower maker Ariens Corp., in Brillion, Wis. After a three-hour visit to the equipment factory, Mr. Toussaint and his nine top lieutenants were sold. "It was the only time in memory we all agreed on something," he says.

ThedaCare brought in Ariens's consultants from Simpler Consulting Inc., of Ottumwa, Iowa. The consultants sometimes wear green jackets with the Simpler insignia, and inside ThedaCare's hospitals they initially were considered aliens. One employee asked: "Who is this guy in the green jacket telling us how we're going to do our business?"

Tuesday in early March at a clinic on the town's north side, the dozen staffers were trying to cut a typical 61-minute office visit, as well as staff overtime, by 50%. They produced a 25-foot wall map charting a pneumonia patient's typical office visit. With help from the consultants, they concluded that 17 steps are valuable and 51 aren't. In the latter category, for instance, patients walk to a separate laboratory to get blood drawn.

ThedaCare had promised that nobody would be laid off as a result of the cost cutting. But by the end of the day, the team had concluded that six assistants no longer should be assigned to individual doctors; instead, they should be pooled. The team also proposed that assistants do blood work-ups in examining rooms.

Doctors were among the most skeptical. They "don't want to be told how to do things," says David Anderla, 38 years old, the physician in charge. "Especially the older providers, the baby boomers. They don't want to hear about this Toyota stuff." Dr. Anderla himself had qualms but thought the ideas were worth trying.

He presented the plan to fellow physicians, and two weeks later, he shared their reactions with ThedaCare's top 35 executives. "Why change?" he said one doctor had asked. "Things are working pretty well. I am very sensitive to anything that will affect my schedule." Another doctor, he added, had said: "Sure, there is value to getting through a visit faster, but what about the value of getting better? Why not measure that?"

Nevertheless, Dr. Anderla became a believer. Almost immediately upon trying the techniques, he cut patient waiting time to nine minutes from 30. Still, he fretted about the other doctors' lack of cooperation. "I was thinking, 'God, we're failing here. We got a lot of pushback,' " he recalls.

But his bosses and the experts urged patience, noting that it can take several years before the full impact of change becomes clear. "They said it takes up to four years," he says. "So we're probably right on track."

At Allegheny General in Pittsburgh, the two intensive-care units had been averaging about 5.5 infections per 1,000 patient days, mostly blood-stream infections from catheters inserted into patients. That infection rate was a bit higher than the Pittsburgh average but a bit lower than the national average, says Dr. Shannon.

Over the prior 12 months, 37 patients, already some of the sickest people in the hospital, had 49 infections. Of those, 51% died. Dr. Shannon and the staff in the two units -- doctors, residents, nurses -- applied the Toyota "root-cause analysis" system, investigating each new infection immediately.

Their main conclusion: A femoral intravenous line, inserted into an artery near the groin, had a particularly high rate of infections. So the team made an all-out effort to replace these lines with less-risky ones in the arm or near the collarbone. Dr. Shannon, who oversees the two units, gave the directive to keep femoral lines to an absolute minimum.

"I was one of those naysayers in the beginning," Connie Cibrone, the hospital's chief executive officer, says of the overall Toyota approach. "I wondered: What is he talking about?" she says of Dr. Shannon. But "it really made sense."

As chief executive of the Pittsburgh Regional Healthcare Initiative, Mr. O'Neill has visited the intensive-care units several times. He has pressed Ms. Cibrone to spread the system to all the

"It's the frustration of trying to transfer knowledge even 50 feet," says Mr. O'Neill.

Write to Bernard Wysocki Jr. at bernie.wysocki@wsj.com¹

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(1) <mailto:bernie.wysocki@wsj.com>

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