

## Point-of-care testing

### Want to improve patient safety? Change work culture

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Interview with Dr J. Kenagy & D. Sundahl

In most hospitals, the amount of nursing time spent on actual patient care is only 33 %, while problem solving consumes 40 % of their time. That's the bad news. The good news is that inverting this ratio may be easier than you think. According to Dr John Kenagy and David Sundahl of the US-based Kenagy & Associates, applying basic principles that underlie lean tools can help hospitals reduce time wasted on redundant activities and channel the extra time into patient care, thus increasing patient safety.



John W.  
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One of the principles of lean as applied to medicine is that better patient treatment can come from reducing “waste” – time used on redundant activities (such as searching for results, correcting documentation, etc.) or on any unnecessary steps in a given process.

Hospitals are places where some work is done in a repetitive, sequential manner (e.g. taking a blood sample), but most work is complex and dynamic (e.g. deciding which test to ask for). Solutions to problems in repetitive sequential tasks are relatively easy to find; however, solving problems in complex, dynamic tasks requires a different approach, one derived from Toyota's lean philosophy and applied to the field of medicine; an approach Dr John Kenagy calls “Adaptive Design®”.

**bloodgas.org:** Dr Kenagy, you were first a surgeon, and now you run a team of consultants to hospitals that want to improve work processes. You are also a passionate speaker about “lean” in hospitals. How did a passion for providing care for critically ill patients turn into a passion for lean?

**Dr Kenagy:** In 1992, chasing my son up a tree, I fell and broke my neck. It was a high C2 fracture – the sort of thing that you either survive and recover from, or you don't. I was disabled for six months between the accident and my recovery. I had the experience of being a patient.

As a doctor, I knew that the system we worked in wasn't serving people as well as it could. As a patient, I saw that the wonderful experiences I had came at the price of people going the extra mile – and then some. I'm grateful for these people, but I don't think that providing patients with what they need should require superhuman effort.

When I returned to practice, I was determined to make things better for both patients and clinicians, so I joined the ranks of management. As a vice president in our very accomplished and progressive health system, I found myself making decisions that made my life as a surgeon more difficult. At the same time, what I needed as a surgeon made my job as manager more difficult.

I decided that I needed a different way to approach this problem. I went on a self-imposed sabbatical. As I like to say, I left the United States – I went to Harvard. Through a series of connections, I saw some early research being done on Toyota by a brilliant young doctoral student, Steve Spear and Harvard Business School Professor Kent Bowen. Their work struck me. Toyota had figured out an entirely different way to manage complex, dynamic work. And if anything is complex and dynamic, it's healthcare.

I apprenticed myself to Spear, Bowen and TPS experts for two years. I convinced them to start a pilot program in a local hospital. I then began to customize the principles and practices to healthcare – since we don't make cars. The results were and are continually amazing to me.

**David Sundahl:** Toyota will tell you they don't do “lean”. Really they do something very simple – they make continuous improvements in a scientific way. But simple doesn't mean easy – golf is simple, just hit a ball into a hole with a stick. If simple were easy, we would all be Tiger Woods.

Toyota builds cars and has evolved a system over time to be great at making cars. The medical world is much more complex than building cars, but the underlying principles can be used to improve healthcare.

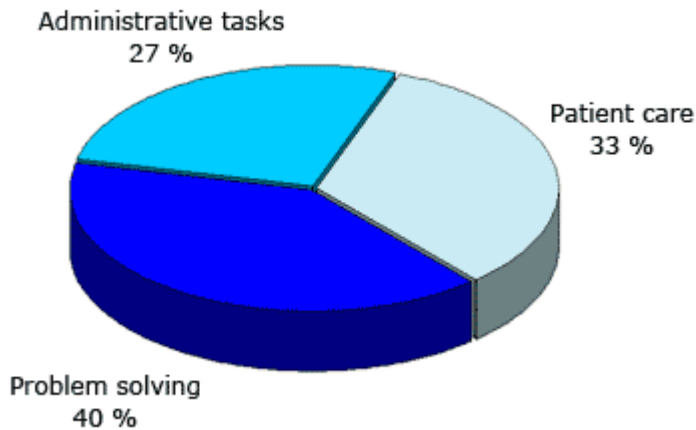
The difference between what we do and “lean” is that lean is about using tools to eliminate waste. Whereas what Toyota does, and what we do in our hospital consultative work, is something we call “adaptive design”. Simply put, adaptive design is about making a “lean” improvement and then changing the culture so that the improvement process is not a one-off event, but is reexamined for continuous improvement. Adaptive design means that any subsequent failure of the process provokes a review and redesign of the standard procedure. So, lean fixes a process, adaptive design keeps on fixing it – so to speak – in order to create a culture of continuous improvement.

**bloodgas.org:** In the process of implementing adaptive design at different hospitals, you have gathered some startling statistics on how much nursing time is actually spent on patient care.

*"The amount of nursing time spent on actual patient care is only 33 %.  
...40 % of their time is spent on problem solving"*

**David Sundahl:** We didn't set out to make a study of this, but after making hundreds, thousands of observations over the years, when we analyze how is time spent by nurses, doctors, technologists, we see a very consistent picture.

The amount of nursing time spent on actual patient care is only 33 %. Administrative tasks and documentation take a further 27 %, and the remaining 40 % of their time is spent on what we call "first-order", or short-term, problem solving, such as waiting on the phone, hunting supplies, searching and fetching, etc.



**FIGURE 1: Nurse activity time – How time is spent by nurses, grouped into three activity types**

Roughly speaking, the "problem solving" part of their time is anything that is not directly or indirectly a matter of patient care. Some common things we observe in this category include calling a physician (and consequently waiting on hold) to clarify an order, calling another department because something ordered – food, lab results, medications – has not arrived, hunting for supplies – linens, gauze, oxygen tubing, etc. These "run-around" and "work-around" activities consume the largest portion of most people's time in a typical healthcare organization.

The variation in the statistics is very small, but there are some interesting outliers. We've observed and worked with some sites that spend 50 % or more of their time on direct patient care. In these cases each nurse had a clear understanding that their job is to keep the patient's problems small. To quote Toyota again, solve the small problems close to you and the big ones will go away. In addition, at these sites, someone such as a unit manager is always on hand to solve system problems. If a problem occurs, fixing the immediate problem is the short-term, first-order fix, but fixing the underlying cause of the problem, a second-order fix, will prevent the problem from occurring again.

Nurses are actually very good at the hunting, searching and fetching, in order to solve a patient problem. They are so good at it that they are likely to not ever evaluate the cause of the problem. They will even go so far as to solve the immediate problem at the expense of a system solution.

For example, if a nurse needs a wheelchair to discharge a patient, and there are none available from the central wheelchair pool, they will "borrow" one from another department, solving the patient's immediate need, but moving the wheelchair problem to another department.

**bloodgas.org: Is this also true for other caregivers; doctors, specialists, etc.?**

**Dr Kenagy:** We docs really need to participate in improving work practices and cultural change. We spend even less than a third of our time on direct patient care. And healthcare will never be able to change unless we take an active role in process-improvement and culture-change activities.

We consider that in a hospital everyone is in a customer-supplier connection; technicians supply results to physicians, physicians supply care to patients, pharmacists supply patient medicines to nurses, and so on. The statistics for lab technicians, pharmacists, pharmacy techs, instrument techs, are essentially the same as for nurses. Instead of direct patient care, the technicians are spending a third of their time on directly adding value to their internal "customers".

**bloodgas.org: You say you didn't set out to make a formal study – could you describe how you gathered your data?**

**David Sundahl:** During our analysis of workflows, we go into a department and we'll get a sample of around 25, one-hour observations. In some cases, we've spread these around the clock, over a week, to catch all shifts and job tasks.

**bloodgas.org: Have you found any common solutions to improving this situation?**

**David Sundahl:** I know I'm repeating myself, but we really have found that if you solve the small problems close to you, the big ones go away. The problem of how a nurse's (or clinician's) time is allocated is an aggregate of all the system chokepoints they encounter. To improve the allocation of time to patient care, we need to work on solving some of the small problems close to each participant.

Just take the wheelchair example. It sounds petty, but time wasted searching for wheelchairs was conservatively estimated at 600,000 dollars (US) per year in the Centura Health System. Solve some of the small problems just related to wheelchairs, for example, and you will get more time for patient care.

**bloodgas.org: If I work in a hospital, for example in an intensive care, what kinds of projects could I start with?**

**David Sundahl:** I would suggest that you:

1. Pick something that the staff – nurses, doctors – care about.
2. Pick something that makes a difference to direct patient care.
3. Go and observe how things actually work – rather than asking for a report from someone else – there is no substitute for direct observation.
4. Now that you understand how things really work, the next time the process you've picked fails (e.g. no wheelchairs in the common wheelchair parking location), that is the time to study the problem.
5. Once you think you've understood the problem, figure out a simple and easy way to do something better.
6. Describe the steps to get from where you are now to a better outcome. It doesn't have to be perfect, just better.
7. Create a test that tells you when the solution fails. (For example, if you don't find a wheelchair in the common wheelchair parking location, then inform the unit leader.)
8. Reexamine the solution to see if it needs adapting.

**bloodgas.org: This method makes you reexamine a solution, not just use the solution, just like the continuous improvement system that Toyota uses?**

**Dr Kenagy:** People often follow a procedure, sometimes even when they know it does not work. They'll say, "we have a process – if only people would just follow it". Habits are very powerful, it's the way we have been trained. In hospitals, our training reinforces always working the same way. So, we cannot just fix problems, we need to change the culture.

Lean is efficient, but it is only a tool that can be used to fix a problem. Lean corrects a problem. Without a cultural change, we're stuck trying to enforce compliance, make people conform to the change. Over time, the change often loses its effect, because people go back to the old ways of working.

*"Lean is only ...a tool to fix a problem.  
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trying to enforce compliance..."*

So that is not enough; we need to change the culture in the hospital to one of continuous improvement. We need to reexamine processes whenever they don't work – to make an improvement and be dedicated to improving it as much or as often as it takes.

Our experience has shown us that for change to stick, the people doing the work must own not only the changes themselves, but the very process for changing. We'd say that by starting with a tangible change in culture – changing how people interact with each other and our patients – the work will follow.

**bloodgas.org: What kind of improvements could a hospital expect to achieve using the method you have described?**

**David Sundahl:** Generally we see improvements in three areas that healthcare organizations tend to care about: productivity/financial performance, patient satisfaction and safety, and staff satisfaction and safety.

We often use time allocation (of nurses, techs, aides) – since it's such a critical part of all of the "big three" concerns for healthcare – as the proxy measure for progress. A number of studies have shown that patients are safer in environments with higher nurse-to-patient ratios. We find that increased time for care – combined with greater ease of care, because the system presents fewer obstacles – tends to improve safety, productivity and satisfaction.

*“Nursing time spent on patient care will usually double in 18 months...”*

The results (summarized below) are fairly typical, though we haven't aggregated the data the way we have the “before” data. Nursing time spent on patient care will usually double in 18 months, with dramatic reductions in system “troubleshooting”. We also generally find that documentation time increases in the short run and then begins to go back down – though we're not certain why.

		March 2004	August 2004	May 2005
Time spent on:	troubleshooting the system	40 %	13 %	11 %
	administrative work	27 %	40 %	35 %
	patient care	33 %	47 %	54 %
Mercy Hospital, Allina Hospitals and Clinics, Minnesota, USA				

**TABLE 1: Time available for patient care increases when using adaptive design to reduce time spent troubleshooting.**

Overall, we have the view – and our experience supports this – that when clinicians have more time to do value-adding work with fewer obstacles, it's better for everyone.

**bloodgas.org: Technology is often touted as the answer to optimizing processes; however, you find that it often is not the answer; it can create more problems.**

**David Sundahl:** Every improvement should itself be improvable. Current ways of using technology don't do this very well. Typically, people think of technology as “big magic”, a machine that makes things better. However, our experience in healthcare and Toyota reveals that making changes to the small problems make a bigger impact, faster.

For example, a hospital in the Midwestern US implemented a new Clinical Information System (CIS), but it made the patient admission process harder to perform, even though the nurses who were to use it had input into the design. My earlier training and research (Visiting Scholar, Harvard Business School) strongly suggested that genuinely successful technological innovations come almost exclusively out of implementing trivial technologies or processes. Put another way, when I saw what Toyota was doing with customer-focused, incremental changes, it fit perfectly with our research on so-called Disruptive Technologies.

Hospitals are bewilderingly complex. It makes sense to start with the simple and easy and build to more complex processes.

One of the most important things we and our client learned in this experience was that before designing and implementing a new CIS, we should go and look at how the work is actually performed. There simply is no substitute for direct observation.

**bloodgas.org: You offer consultant services in the US, but “lean” consultants are not yet common in the healthcare industry, neither in the US or worldwide. Can you recommend any sources of literature or advice?**

**Dr Kenagy:** One of the best sources of “how to” information is an article by the student – now professor – I mentioned above, Steve Spear. His article, “Decoding the DNA of the Toyota Production System” [1] is a great guide for how to begin to work more adaptively. And in our experience, the best way to use the article is to read it, do observation, read again, try to make an improvement, read again, and so on. The article is densely packed with information that can become useful as one continually learns by doing.

Also, we expect to have a basic “how to” workbook, suited to general use, on our website for download by August.

## REFERENCES

1. Spear S, Bowen K. Decoding the DNA of the Toyota Production System. Harvard Business Review, 1999; 77 (5): 96-106.

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