

Creating a Lean

Scott Endsley, MD, MSc, Michael K. Magill, MD, and Marjorie M. Godfrey, MS, RN

Imagine a practice in which your patients get exactly what they want and need exactly when they want and need it. The quality of care you provide is demonstrably high, with no errors, no waiting and no hassles, and your office delivers all of the services recommended for disease management and health maintenance, as well as effective patient education. You and your staff are relaxed, and your office is calm. Your practice is so efficient, with overhead well below the norm, that you make a very comfortable living practicing family medicine. You are always on time for patient visits, and you are always home in time for dinner.

Is this a pipe dream? Not at all. Through initiatives such as the Institute for Healthcare Improvement's Idealized Design of the Clinical Office Practice¹ and Dartmouth-Hitchcock Medical Center's efforts to understand clinical "microsystems,"² physicians all across the country are redesigning their practices to meet most or all of the elements described above.³ (See "An example from the real world" on page 36.) In addition, the Future of Family Medicine project has issued a call for family physicians to redesign their practices around the "New Model" of family medicine, which is projected to dramatically increase a group's income.⁴

So how can you transform your current practice into one that's more efficient, productive and satisfying to you and your patients? The answer can't be found in any single technology or strategy, such as electronic health records or advanced-access scheduling. Although useful, these tools are not inherently valuable in themselves.

Instead, surprisingly, the answer comes from the automobile industry. Lean design, or lean thinking,⁵ is the term used to describe the radical improvement in manufacturing that Toyota developed decades ago to build ever-better automobiles at ever-lower costs. Lean design is now being incorporated into a wide range of industries,

including service industries, such as health care.^{6,7} Very simply, it is about simplifying processes by understanding what adds value and eliminating waste. For family physicians, this means seeing your practice as a system of processes, knowing what value your patients derive from your practice and eliminating steps or tasks that do not meet the needs of your patients.

Understanding what your patients value

In lean design, every step within every process within your practice – from the check-in process to the rooming process to the refill process – should add value for your customers: your patients. Of course, some steps or processes may not be directly valuable to patients but may be essential to operating your business. The point is simply to make the patient's experience as value-added as possible. When you create a value-added experience for the patient, something unexpected occurs: you end up more satisfied yourself, with a more efficient, effective practice.

To understand what is truly important to your patients, consider several ways of collecting their views.

The most obvious way to gain knowledge about what your patients want or need from your practice is simply to ask them. The "Primary Care

Practice Patient Viewpoint Survey," available as part of the *Assessing, Diagnosing and Treating Your Outpatient Primary Care Practice* workbook from the Dartmouth-Hitchcock Medical Center,⁸ is a helpful tool. You could also conduct focus groups or open-ended interviews with patients to elicit their opinions.

Mock patient visits can also be enlightening. To do this, call your practice just as a patient would and schedule a visit for yourself. Then, follow the patient process from registration to discharge, and record your observations,

**When you create
a value-added
experience for the
patient, something
unexpected occurs.**

Practice

A highly efficient practice is within your reach if you're willing to examine your processes and ruthlessly eliminate waste.

surprises and frustrations. (Again, see the Dartmouth workbook⁸ and turn to the "Through the Eyes of Your Patients" worksheet for help in conducting a walk-through.)

A final strategy is simply observing the care process. By stepping back from your normal role and observing how work is carried out in your practice, you can gain some astonishing insights. A useful tool to guide observation is the "Gaining Customer Knowledge" worksheet, found at <http://cms.dartmouth.edu/images/PDF%20Files/GainCust-KnowWrksht.pdf>.

Regardless of which strategy you employ, you'll find that every patient has unique values; however, there are a number of common themes. Studies from the Picker Institute⁹ have identified eight dimensions of patient-centered care: 1) respect for their values, preferences and needs, 2) information, communication and education, 3) access to care, 4) emotional support, 5) involvement of family and friends, 6) continuity of care and seamless transitions, 7) physical comfort and 8) coordination and integration of care.

The Picker Institute offers an online program (<http://nrcpicker.com/Default.aspx?DN=232,227,3,1,Documents>) that walks you through an assessment of your practice based

About the Author

Dr. Endsley is medical director of system design for the Health Services Advisory Group, Phoenix. Dr. Magill is professor and chairman of the Department of Family and Preventive Medicine, University of Utah, Salt Lake City. Marjorie Godfrey is instructor of community and family medicine at Dartmouth Medical School, Hanover, N.H., and director of clinical practice improvement at Dartmouth-Hitchcock Medical Center, Lebanon, N.H. Author disclosure: nothing to disclose.



on these eight dimensions and offers recommendations for improving in each area.

Cleaning up your processes

Once you understand what your patients want and need from your practice, you can select one aspect of care delivery (e.g., diabetes visits, prescription refills or preventive services) that you will focus on first. The process you select should be based on your assessment of patients' needs. Identify who will be involved in improving the process and how you intend to go about it. A key tenet of lean design is that those who do the work should design the work based on a deep knowledge of patients' needs.

Now, you can begin to examine your processes, also called "value streams," with the goal of eliminating any

steps that do not add value. Here's how:

First, map the current state. Determine the start and end points of the process from the patient perspective, and begin to map all the main steps in between. To get an accurate picture of the current process, you may actually need to walk the process, considering how, when and where people move during the process, who the customers and suppliers are, how information is recorded and exchanged, how technology is applied, how steps in the process are sequenced, what triggers the work, and how much time is spent at each step and for the entire process, including waiting time.¹⁰ Stay focused on high-level steps and focus on the usual process, not on the exceptions.

A map of a typical patient visit is shown on page 37. You can also download a mapping worksheet developed by one of the co-authors (Godfrey) from the online version of this article at <http://www.aafp.org/fpm/20060400/34crea.html>.

Second, identify waste. Looking at your map of the current process, identify any flow problems or any steps that do not bring value to patients. This is the waste in your process. Lean design identifies seven categories of waste, which can be applied to the practice setting:

- Overproduction involves completing any work that isn't needed right now, such as prescribing antibiotics for a viral infection.

- Motion refers to any unnecessary movement of patients, staff or physicians.

- Material movement refers to any unnecessary transfers of materials or information, such as the hand-off of patient intake forms from the front office to the back office to the physician.

- Waiting refers to any delays or idle time involving the patient, physician or staff, such as patients waiting for an exam room to be readied or staff waiting for a report to be faxed.

- Inventory involves any information or materials waiting to be used, such as a stack of unread laboratory reports or piles of patient booklets sitting in the waiting area.

- Inappropriate processing refers to handling work in a way that is excessive, such as completing all paperwork in triplicate or scheduling separate visits for acute care and wellness care when one visit would suffice.

- Rework involves any unnecessary work required because of an error, such as sending the patient back to the laboratory because a lab order was incomplete.

The table on page 38 provides more examples of common problems in medical practices.

Third, map the future state. Re-map your process, building in the changes that you believe will eliminate any waste problems and maximize value. Some design features to consider in rebuilding the process include the following:¹¹

- Don't move the patient. Instead, where it makes sense, make the work come to the patient.

- Eliminate needless work. Perhaps your process includes too many handoffs or outdated steps you're completing out of routine.

- Increase clinician support. Because face-to-face time with the doctor is often the most valuable part of the visit, do everything you can to make the physician more effective.

- Make sure your process involves direct communication between parties.

- Consider whether technology can play a role in improving your process.

- Create broad work roles so your staff can complete their work more efficiently and reduce the number of handoffs required.

The figure on page 37 shows a visit redesigned to be lean.

Fourth, test and revise the new process.

With the map of your redesigned process in hand, set a plan for testing it. Identify how you will test the change, who will be involved, how long the test will last, and how you will measure whether the change works. There are

Mapping your current process can help you identify flow problems or any steps that do not bring value to patients.

Waiting is a common form of waste in medical practices.

Once you've identified the changes in your process that will eliminate waste and maximize value, map the new process and then test it.

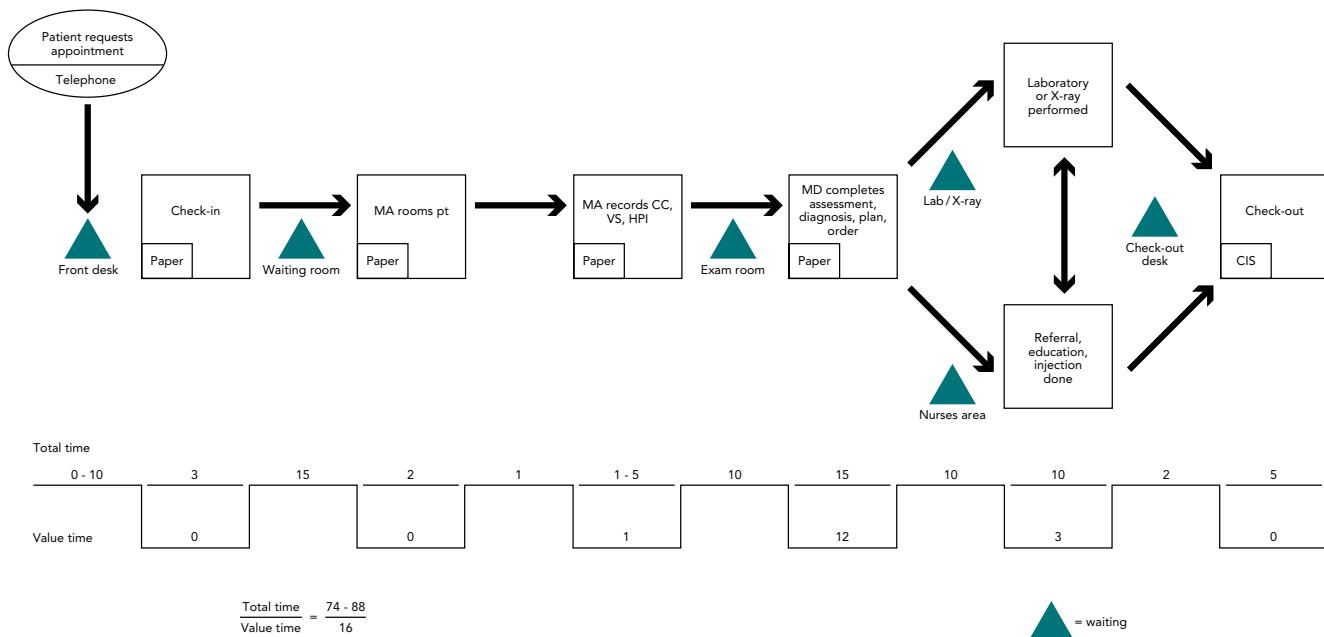
AN EXAMPLE FROM THE REAL WORLD

Charles Burger, MD, has integrated lean design methods into the quality improvement work at Norumbega Medical Specialists in Bangor, Maine. For instance, his front-office staff had been reporting a high volume of calls from patients who said they had not received their test results. A patient satisfaction survey also suggested that his patients were unhappy with the process of getting laboratory test results. With the help of his administrative and clinical quality improvement teams, he mapped the practice's process for managing laboratory test results and began looking for ways to improve it. The process was redesigned through elimination of several non-value-added steps and redirecting test results through direct, secure e-mail to patients through a Web-enabled system (Kryptiq) triggered within his electronic health record. He monitored the timeliness and accuracy of this redesigned process through daily audits. Overall, his patient satisfaction with test results management increased from 89 percent to 97 percent. Further, he has been able to decrease his results reporting error rate from 3 percent to nearly 0 percent.

A TYPICAL OFFICE VISIT

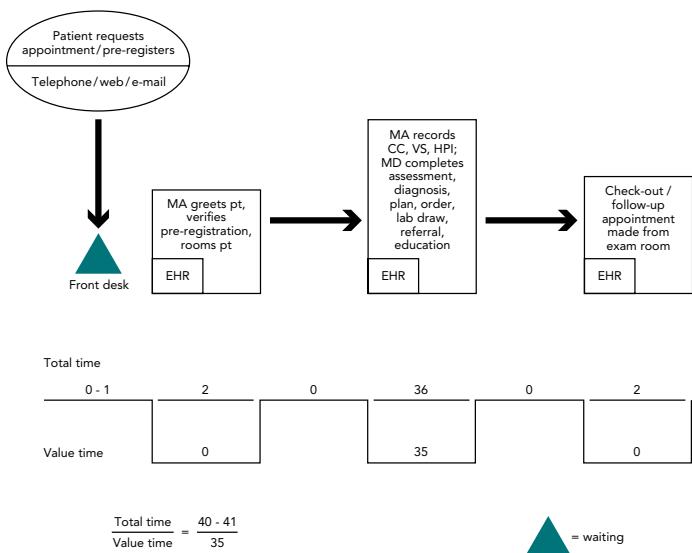
The map below shows the flow of a patient through a typical office visit. The arrows depict the movement of the patient, while the triangles depict a major form of waste: time the patient spends waiting for the next step in the sequence. The top row of time estimates shows the actual time that elapsed for each step – 74 to 88 minutes in all. The bottom row of time estimates shows the time spent delivering value to the patient – just 16 minutes.

The mode of communication (e.g., verbal, paper or clinical information systems) is depicted in the small box within each process step. Analyzing how information is shared can produce further opportunities to eliminate waste.



A LEAN OFFICE VISIT

In this redesigned office visit, the visit is brought to the patient in the exam room, significantly reducing the patient's waiting time, movement and interruptions. As a result, the patient's cycle time (the total time the patient spends in the office) has been cut in half, while the patient's value-added time has more than doubled.



COMMON PROBLEMS IN MEDICAL PRACTICES

Output problems	Examples
Following the wrong process	Ordering the wrong lab test
Following the process incorrectly	Doing a purified protein derivative test subcutaneously
Over-producing tasks that do not add value	Ordering multiple referrals for the same problem
Delaying a process	Ordering a mammogram after a breast mass has been palpated
Variation in output rate or quality	Processing referrals in one batch rather than steadily
Wide variations in demand	Seeing increased flu cases in the winter
Flow problems	Examples
Waiting for patients, information, materials and decisions	Not having lab results available at the time of the visit
Duplication of processes	Having the patient complete a symptom assessment that is later repeated by the nurse or physician
Rework	Having front-office staff rewrite a lab order
Work interruptions	Leaving the exam room to look for missing lab results
Unbalanced workload	Conducting school physicals only in August
Incomplete information	Not having up-to-date allergy information
Non-standardized work	Following different procedures at each diabetes visit

Common problems to avoid in your new process include duplication, interruptions and non-standardized work.

Process improvement is not a one-time event but a continuous process of assessing and improving.

The principles of lean design could help family physicians fulfill the vision of the New Model of family medicine.

a number of excellent resources for using the plan-do-study-act cycle for rapidly testing and implementing change.^{12,13}

Once you implement the new process, your work isn't finished. Achieving a lean process of care delivery requires continuous innovation and improvement. The goal should be nothing short of the pursuit of perfection. This will require that you continuously measure key aspects of the new process, map the process regularly to ensure it is still effective, and empower your staff to develop and test new designs of care.

Achieving the vision

Achieving the full vision of the New Model of family medicine will require more than a patchwork adoption of new strategies such as same-day scheduling, electronic health records, group visits and staff cross-training. It will require understanding the importance of systems within your practice and incorporating lean design. When combined with the "basket of services" described in the New Model, lean design could reinvigorate the practice of family medicine. **FPM**

Send comments to **fpmedit@aafp.org**.

1. Kilo CM, Endsley S. As good as it could get: remaking the medical practice. *Fam Pract Manag*. May 2000;48-52.

2. Nelson EC, Batalden PB, Huber TP, Mohr JJ, Godfrey MM, Headrick LA, Wasson JH. Microsystems in health care: part 1. Learning from high-performing front-line clinical units. *Jt Comm J Qual Improve*. 2002;28(9):472-493.

3. Endsley S, Kirkegaard M, Magill M, Hickner J. Innovation in practice: ways to harness the power of your ideas. *Fam Pract Manag*. June 2005;37-40.

4. Spann SJ. Report on financing the new model of family medicine. *Ann Fam Med*. 2004;2(suppl):1-21.

5. Womack JP, Jones DT. *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*. New York: Simon and Schuster; 1996.

6. Chalice R. *Stop Rising Healthcare Costs Using Toyota Lean Production Methods*. Milwaukee: Quality Press; 2005.

7. *Going Lean in Health Care* (white paper). Cambridge, Mass: Institute for Healthcare Improvement; 2005.

8. Center for the Evaluative Clinical Sciences at Dartmouth. *Assessing, Diagnosing and Treating Your Outpatient Primary Care Practice*. Hanover, NH: Dartmouth Medical School; 2005. Available at: <http://cms.dartmouth.edu/OPPC.htm>. Accessed March 1, 2006.

9. Gerteis M, Edgman-Levitin S, Daley J, Delbanco TL. *Through the Patient's Eyes: Understanding and Promoting Patient-Centered Care*. San Francisco: Jossey-Bass; 1993.

10. Shook J, Rother M. *Learning to See: Value Stream Mapping to Create Value and Eliminate Muda*. Brookline, Mass: Lean Enterprise Institute; 1998.

11. The Commonwealth Fund. *Achieving a New Standard in Primary Care for Low-Income Populations: Case Study 1: Redesigning the Patient Visit*. Available at: http://www.cmwf.org/publications/publications_show.htm?doc_id=235281.

12. Swartz M, Landis SE, Rowe JR. A team approach to quality improvement. *Fam Pract Manag*. April 1999;25-30.

13. Berwick DM. Developing and testing changes in delivery of care. *Ann Intern Med*. 1999;128(8):651-656.