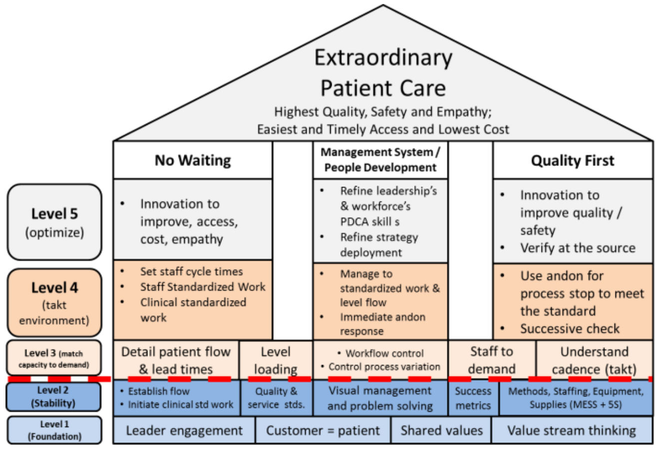

Chapter 8: Level 4—A Takt-Driven Environment

At level 1, we focused on education and alignment around the patient. At level 2, we set the stage for ballet, and at level 3, we created the cadence of the ballet (takt time). Now that we are at level 4, we can choreograph the entire cast (staff, clinicians, and managers) so that their performances lead to the same precise outcome every time. The organization's members need individual scripts that, when executed correctly, lead to *consistently* low-cost and high-quality outcomes. The key is consistency. High-quality, low-cost outcomes can occur at any level of lean, but these outputs can occur consistently only through the integration of individual scripts.

The individual scripts, which are a type of standard for how staff members do their jobs, are called standardized work. Creating standardized work is the critical first step to level 4, because it defines what processes should be followed so when there are deviations from the standard, they can be easily identified. In addition to adding standardized work, this level requires significant changes to the management structure. Clinicians and staff will not be able to follow their standards for every patient. This is why management's top priority is to keep the frontline workers on track (apply quick countermeasure problem solving) and then apply continuous improvement resources to fix the issues so that they don't stop the flow for future patients (root-cause problem solving). This alignment has three requirements:

1. Manage to takt and cycle time in order to focus all support on helping the patient have the smoothest possible journey while minimizing or eliminating staff overburden.
2. Provide immediate andon response where flow stoppages exist.
3. Continuously focus on improving issues that are impeding flow via root-cause problem solving.

Linking Efficiency and Quality: The Concept of Process Stop

Once a business area has been level loaded (i.e., capacity and demand are matched throughout the day), we can begin to implement no-waiting, just-in-time service (flow) with ensured quality. The link between the quality pillar and the no-waiting pillar of the lean house comes from a special feature called process stop, which must to be built into the system at this step. Process stop is analogous to line stop in manufacturing; it allows work to proceed only if the quality is correct (with a goal of perfection). If it is not, the process stops so that problems can be addressed by area management.

Taiichi Ohno famously said, “Without a standard, there can be no improvement.” The idea is that once a standard exists, it is easy to see deviation from that standard. At this level of lean, when a deviation to the staff’s standardized work happens, the process needs to stop and the root cause of the deviation identified so that it can be fixed and prevented.

The mechanism of process stop ensures high quality, but it seems counterintuitive that it would help with efficiency. If the line continually stops, fewer patients will be served, which is not the goal. To understand how process stop can benefit just-in-time service, we must remember that more than 90 percent of a typical work stream is non-value-added work, much of which lies in rework, so anything that eliminates rework will greatly benefit just-in-time service for patients (Figure 8.1).

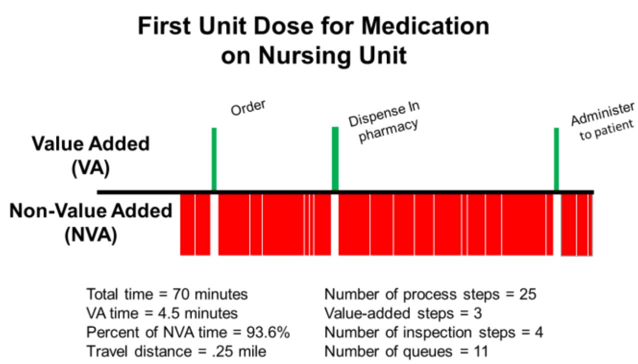

Figure 8.1: Value added / non-value added timeline

For example, when administering a medication, wasteful processes such as incorrect orders and lack of supplies on the unit require a nurse to do extra work (rework) to get to the value-added job (administering the medication to the patient). With a process stop mechanism and immediate response by management to fix the issues as they occur, the patient flow is much faster than if the nurse repeatedly addresses the issues on his/her own.

As a result of rework (or work-around) cycles, systems without process stop take longer than stopping the work and fixing issues the moment they are encountered. With process stop, each patient’s progression occurs with ensured quality. Over time, the processes get better, adding more value and incurring less waste, due to this continuous improvement effort.

Staff and Clinician Standardized Work

Standardized work can be a confusing term, because it is often used to mean a variety of things. You may remember that in chapter 6 we showed examples of work sequences called reliable methods. “Reliable methods” and “standardized work” are often used as interchangeable terms, and until this point, that blurred definition has worked fine, though it is not entirely accurate. Now that we are building a takt-driven environment, our definition of standardized work needs to encompass four things:

1. The standardized work sequence for one frontline worker (staff or clinician)
2. The standardized supplies needed for the job outlined in that work sequence
3. Quality standards or gates that have to be met for the patient’s journey to continue
4. The standardized cycle time required to do the job outlined in the work sequence

Note that the first three points are identical to the definition of a reliable method in chapter 6, but the fourth point, cycle time, is needed to meet the definition of standardized work. All four elements must be present. Otherwise, the work is not standardized, and level 4 work cannot be done (Figure 8.2).

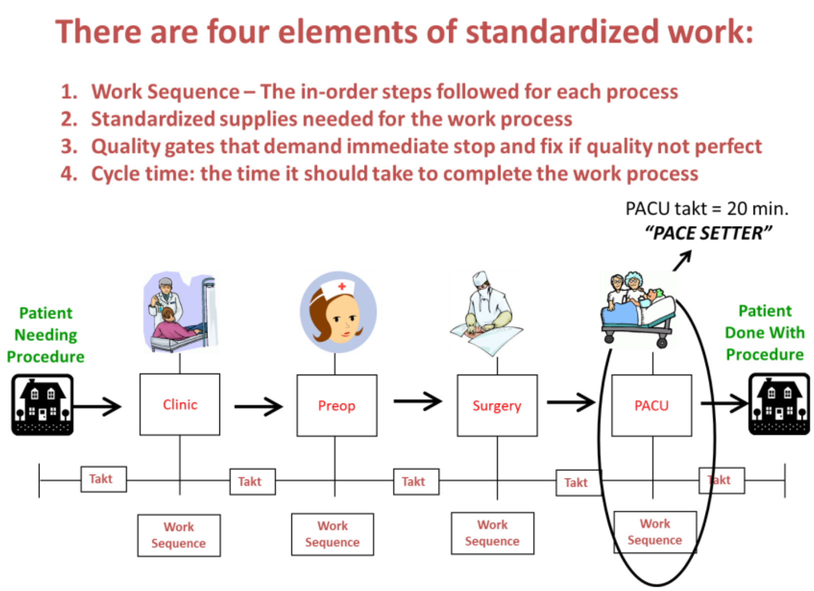

Figure 8.2: Elements of standardized work

The idea is to see where deviations from the standard occur. If we know the sequence people are supposed to follow and what supplies they will need, along with how much time the procedure should take and where or when the process should stop if quality isn’t perfect, it will be easy to see where issues that block patient flow exist. The system can then be improved. The visual nature of standardized work provides management with a feedback loop when things don’t go according to plan, assuming that management is readily available on the unit to receive the feedback.

Understanding Cycle Time and Patient Lead Time

“Cycle time” is the amount of time it takes a person or machine to do a single job. In chapter 7, we talked about a nurse whose admission process on an inpatient ward takes fifteen minutes to do properly. That fifteen-minute work cycle is called the nurse’s cycle time for the admission process; it is one of the four elements of standardized work.

Cycle time must be distinguished from patient lead time, although the two are related. Patient lead time is the time the patient spends in any one area of the healthcare system (i.e., the time related to the patient care experience). As an example, patient lead time for a clinic visit could be 115 minutes, and this number would include the time it takes for a patient to park their car at the clinic, walk to the registration desk, fill out appropriate paperwork, wait prior to the examination, and receive care in the examination room. Patient lead time is related to staff cycle time in that the staff will have time-based standardized work for registering, rooming, and examining the patient. All staff cycle times, plus any waiting or transportation time, comprise the lead time that the patient experiences.

It is the function of all lean systems to decrease the non-value-added time that patients experience when receiving care. As we decrease waste and support staff in meeting or improving their cycle times, patient lead times will improve. With this in mind, we will focus on understanding staff cycle time as a critical metric for a level 4 operating system. We can begin to understand the relationship between takt time, which was introduced in level 3, and cycle time, which is set and managed in level 4.

In a level 4 takt-based environment, cycle time and takt time can be used to calculate how many staff members are needed to complete work at the rate necessary to meet patient demand. For example, if it takes a nurse sixty minutes to prep a patient in the periop intake unit, we can then say that the nurse’s cycle time is sixty minutes. If the takt time (patient demand rate) is twenty minutes per patient, the facility would need three nurses (60 nurse*minutes/patient ÷ 20 minutes/patient) to maintain a takt time of one patient being served every twenty minutes (Figure 8.3).

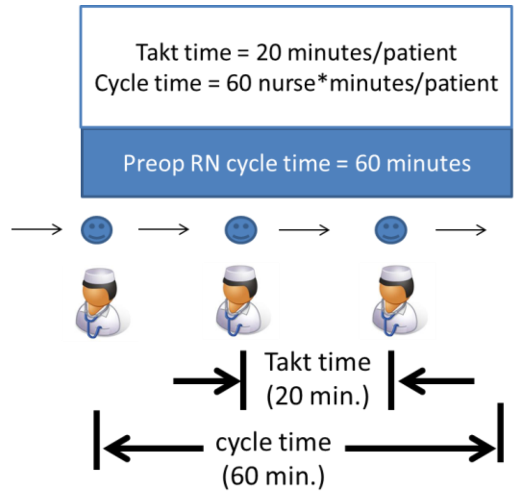

Figure 8.3: Cycle time vs. takt time

Cycle times can be used not only in one small area of a unit or service (e.g., the OR intake area) but in an entire unit or service. Figure 8.4 illustrates how to calculate staffing needs in three units of perioperative services: intake, the OR, and the PACU. The space between each patient denotes a takt time of twenty minutes per patient. As in the example above, intake needs three nurses based on the cycle and takt times. With a surgery length (cycle time) of 40 nurse*minutes/patient, two OR nurses would be needed (40 nurse*minutes/patient ÷ 20 minutes/patient). If the average stay (cycle time) in PACU is 80 nurse*minutes/patient, four PACU nurses would be needed (80 nurse*minutes/patient ÷ 20 minutes/patient).

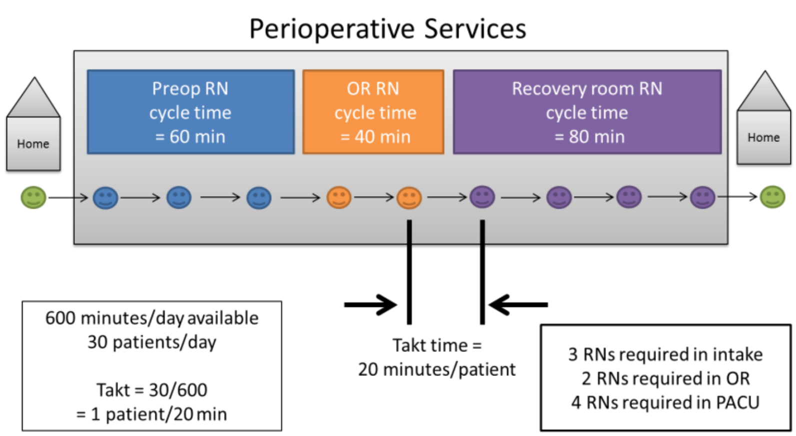

Figure 8.4: Calculating staffing using cycle and takt times

Setting Staff Cycle Times

When working with staff to set cycle times for their work, it is important for them to be comfortable with the proposed cycle times. The last thing anyone would want is for any staff member to believe the time is unattainable or feel rushed to meet it. Unfortunately, when cycle times are introduced, it is common for staff to be reticent and even angry about having time pitted against their work sequences. This is a natural reaction to a relatively new concept in healthcare, but it can be minimized.

First, it is important to explain cycle time by emphasizing that the time allotted to an individual task will be determined by the staff and clinicians themselves, not forced upon them. It has been our experience that quibbling over staff cycle times is not worth the effort as long as they are reasonable. It is far more important to set reasonable times that people believe they can meet than to have endless conversations about unfair standards. (For lean purists reading this, don't worry; as the staff become more proficient at their standardized work, cycle times will drop by virtue of the area's continuous improvement efforts. This is why we do not condone lofty cycle time targets initially.)

Second, the organization must emphasize that cycle times are never to be met at the expense of poor quality, rushing, or cutting corners. To ensure this, missed cycle times should never be addressed punitively. It is most important for management to work with staff to understand *why* the cycle time was missed, because continuous improvement will be based on the root cause(s) of the missed cycle times.

Lastly, note that allotting a standard cycle time to processes is a way to ensure management support. This is, at first, counterintuitive for some, but without defining a cycle time for each process, how will management know when to help? A system without time allotments risks calls for help coming too late or not at all, thus overburdening staff and leaving patients dissatisfied. The foundation of a lean system is having appropriate management leaders in the area who are ready to respond immediately to any abnormalities so that optimal patient flow can be maintained.

Choosing Easy-to-Manage Work Segments

The visual nature of standardized work allows for a feedback loop for managers, who can address issues or processes that don't go according to plan, if they are readily available at the unit to do so. As with all systems, the more refined the standardization, the easier it is to detect variances, so it will be important to break work sequences into small enough chunks to see issues as they occur.

Let's illustrate this concept by a hypothetical example of a process that was not broken into small enough segments. Management for an inpatient unit determined that one nurse should round on an average of three patients per hour. This statement told the nurse what the average expected rate was, but the duration of one hour and the quantity of three made it hard for anyone to see if the normal operating condition was being met while the process was underway. Additionally, because three was an average, if the nurse didn't make the expected rate, it was easy for management to assume that one patient had an unavoidable issue that made the nurse's stay run long, and thus a manager may not deem it necessary to investigate what happened. This potential lack of response to an abnormality violated the continuous improvement principle of lean.

We will need to change our approach if we want a different outcome. We need to refine the normal operating condition into short, specific quantities of time and work sequence. A level 4 management paradigm uses smaller work sequences to allow for more accurate and timely oversight and identification of abnormalities.

Breaking the work into ten- to thirty-minute segments is a good starting point (although not a hard rule). Because management expects rounding on three patients per hour, we will set the work to twenty-minute increments so that all steps of one patient's care can be completed in a cycle time of twenty minutes. Note that this new standard time *is not an average*; if the nurse gets behind during the twenty-minute cycle, immediate investigation is required.

Creating the Script: Swim Lanes

Once the staff standardized work is defined, it is important to connect the staff's standardized work to the patient's progression. (Refer to chapter 7, where patient flow was identified.)

Suppose that a patient's journey has been mapped through a perioperative services unit. The value stream in the figure 8.5 (top) demonstrates patient flow without identifying processes or patient lead times. The stream in the figure below 8.5 (bottom) demonstrates the processes that need to occur in each subunit of perioperative services.

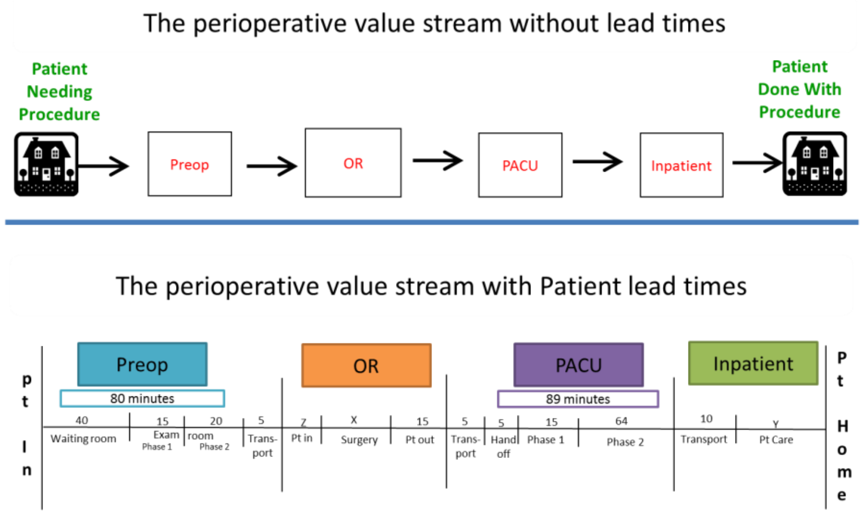

Figure 8.5: Adding lead time to the value stream map

Representing the value stream with patient lead times is an important step in choreographing the clinical staff work processes. The goal is to align the work sequences of staff and clinicians around the patient's flow. This can be done using a "swim lane" document that has patient lead times at the top (figure 8.6, narrow red oval) and individual clinical staff's cycle times added horizontally (figure 8.6, wider red oval). These map to the patient's journey through the area (in this case, perioperative services).