CHAPTER SEVENTEEN

PROCESS MAPPING

Chapter Purpose

Aim. To define process-mapping techniques, with a specific focus on high-level flowcharts and deployment flowcharts.

Objectives. At the completion of this unit, you will be able to

- Define process mapping.
- Describe the differences between high-level flowcharts and deployment flowcharts.

- Describe the relationship between the global aim statement for improvement and the flowcharting process.
- Create a high-level flowchart or deployment flowchart using several techniques.
- Develop a process to engage all members of the microsystem in the creation and modification of the flowchart.

Process mapping follows creation of a global aim (see Figure 17.1). A good global aim states where the process begins and where it ends, and therefore points out where the process map should start and where it should finish. This chapter will guide you in creating a process map that is based on the global aim and that will provide insight for the lead improvement team as it determines a more specific aim.

FIGURE 17.1. IMPROVEMENT RAMP: PROCESS MAPPING.
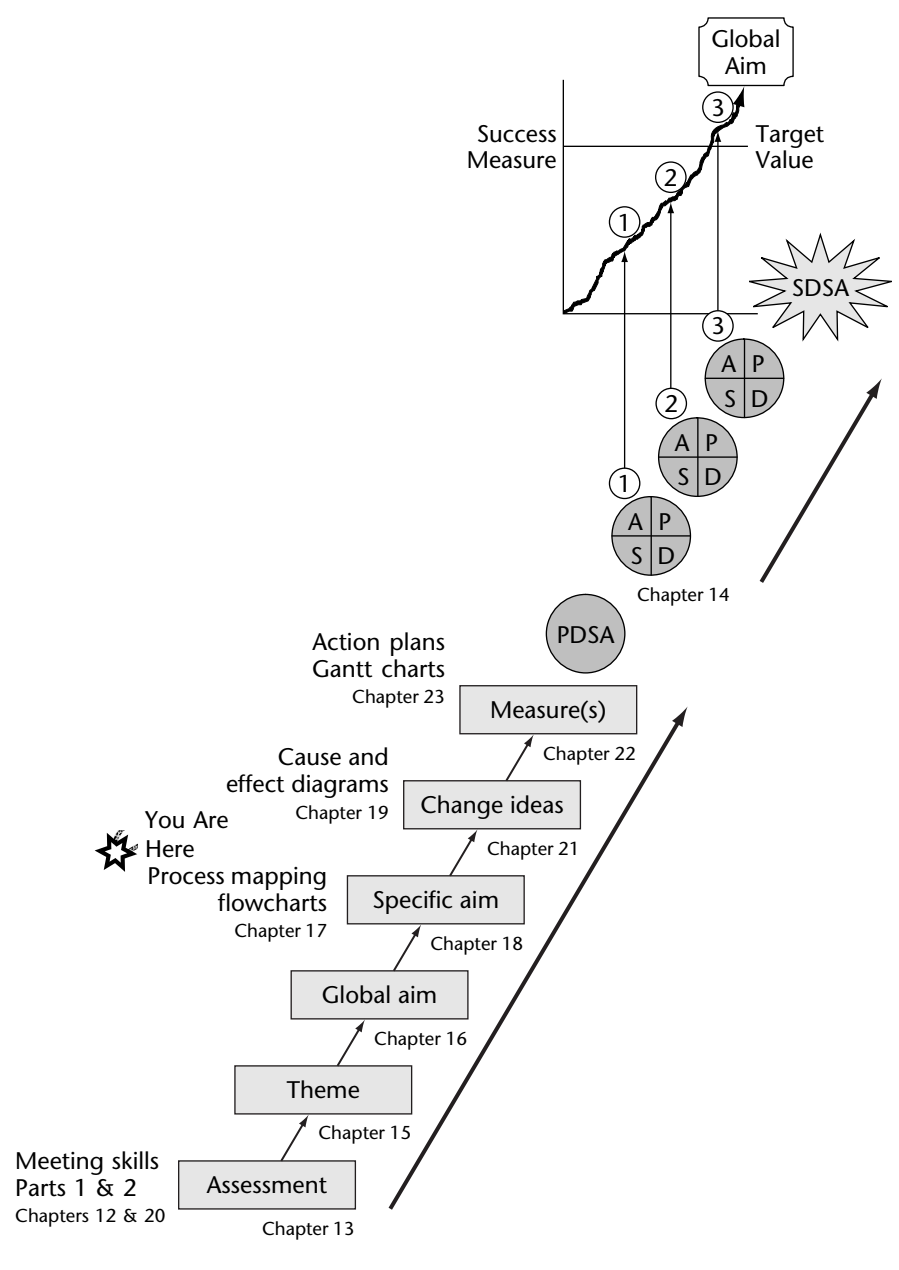
What Is Process Mapping?

Process mapping is a method for creating a diagram that uses graphic symbols to show the steps and the flow of a process. Other commonly used names for a process map are *flow diagram* and *flowchart.*

Why Use Process Mapping?

Most health care professionals know their part of each process they are involved in, but they do not know, and do not take the time to know, how the rest of the process works. This can lead to confusion, mistakes, needless complexity, undesired variation, and a general lack of agreement on how care and services are actually processed and delivered. Unwanted variation, waste, delays, and rework exist within the processes of care. This is the result of a lack of thoughtful design and of common agreement on how the process currently works.

The benefits of creating a flowchart for a process include

- Engaging interdisciplinary members in the creation of a process map
- Gaining agreement about the sequence of steps in the process
- Correcting misunderstandings about how the process works
- Spotting places where the same things are done differently for no rational reason
- Explaining the steps pictorially to promote better understanding than written procedures give
- Replacing pages of words with a picture of a process
- Identifying problem areas based on an understanding of variation, waste, delays, and rework
- Identifying supplier-customer relationships in a process (for example, who provides what to whom as the process rolls forward)

Before improvements can be identified for a process, the process's *anatomy,* or steps, must be understood. Gene Nelson (2006) points out that "just like you should know anatomy before you do surgery, you should know the detailed steps of a process before improving it."

Definition of a Process

A *process* is a series of related work activities that together transform *inputs* into *outputs* for the benefit of someone. In mainstream health care the inputs are the needs of a patient, a family, or a population of patients, and the processes we wish to

have deeper understanding of are the processes of health care service delivery. The outputs are the outcomes of the health care delivered: clinical results, functional outcomes, patient satisfaction, and costs. Keep in mind that "every system is perfectly designed to get the results it gets" (personal communication to Donald Berwick, IHI president and CEO, 1996). To stimulate our thinking and to get better results, we need to design processes and systems with the desired results in mind.

Definition of a Flowchart

A *flowchart* is a picture of the sequential steps and the directional flow of those steps in a process. The different types of steps and events are represented by various symbols. This step-by-step picture can be used to describe a current process, depict an improved process, document a standard method for doing a process, or specify an ideal process. It can even be used to make a plan for a project. It is important for improvement work to begin with a representation of the current process—the way the process actually works now.

What Are the Commonly Used Flowchart Symbols?

Many of the symbols commonly used to make flowcharts are shown in Figure 17.2.

- The *oval* indicates the beginning point and the ending point of the process you are mapping. When you first start to make a flowchart of a process, it becomes very obvious why having a global aim statement with a clearly stated start point

FIGURE 17.2. FLOWCHART SYMBOLS.
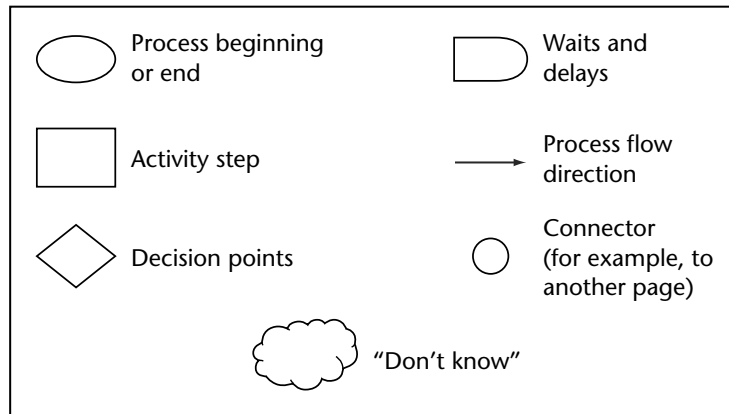
and end point is fundamental to process improvement work. The beginning and the end of the process, as specified in this statement, define the boundaries of the flowchart you will create.

- The *box* represents an activity step.
- The *diamond* shows a decision point in the process, where one must respond *yes* or *no*. A yes or no decision point leads to a distinct flow for each of its two options.
- The *elongated D* depicts delays in the process. This symbol should alert you to further evaluate this step to understand the sources of waits and delays.
- The *arrow* shows the directional flow of the process.
- The *circle* indicates that the steps continue on another page or on another part of a larger flowchart. A letter placed in the circle tells you where to pick up the process on the next page.
- The *cloud* represents *don't know;* what happens in this step is not known or understood. When an interdisciplinary team cannot describe a step, it is a signal that one or more people who are part of the process are not contributing to the discussion. Further discussion should follow with those involved in this step. You may wish to add people to the lead improvement team to ensure that all who have a role in the current process are involved in flowcharting that process. Alternatively, you may simply need to review the flowchart with others to get all parts of the process mapped correctly and accurately. Note also that differing views about a process are normal and reflect the differing ways that the various health professions do their work. It is helpful to reconcile those differences from the viewpoint of the patient and family whenever possible.

What Does a High-Level Flowchart Look Like?

A *high-level flowchart* is used to show the "big picture," the view from 30,000 feet. Making a high-level flowchart is a good place to start mapping a process, and then you can proceed to determine what steps need detailed descriptions and need to be shown on a more detailed flowchart. Figure 17.3 shows a simple, high-level flowchart of a medical office visit.

What Does a Detailed Flowchart Look Like?

A *detailed flowchart* provides a more refined picture of a high-level flowchart step, breaking that step into smaller steps or smaller clusters of actions. Detailed flowcharts are usually necessary to support improvement work in moving forward to

FIGURE 17.3. HIGH-LEVEL FLOWCHART OF A MEDICAL OFFICE VISIT.
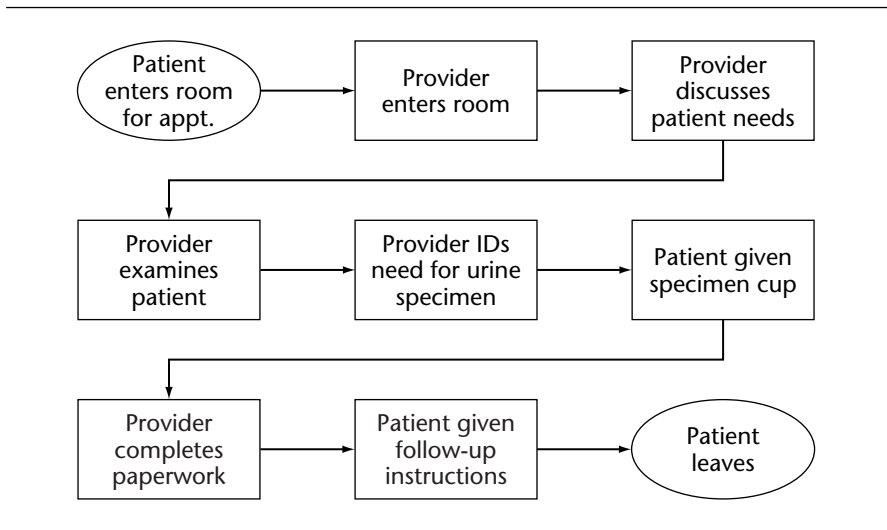
meet sharp, specific aims and to run useful tests of change. Figure 17.4 shows a detailed flowchart of a treatment process.

What Are Some Tips for Creating a Flowchart?

Begin with the global aim statement to determine where the process starts and where the process ends. This determines the boundaries of the flowchart. It is important to have the flowchart boundaries align with the aim statement and to have the aim align with the selected improvement theme in your domain of responsibility.

Also remember that you are creating a flowchart of the *current* process. Oftentimes people will create a flowchart that mixes reality with wishful thinking and guesses. To avoid this trap, frequently remind everyone of the need to understand the current state of the process in order to properly identify improvement opportunities.

A good way to start listing the steps is to ask what happens *first,* then what happens *next,* then what happens *next,* and so on. When the next step "depends" (if this happens, then that happens), pick the most common next step and follow what happens after it, and then go back to follow the other next step. Keep it simple when you first start. Finally, turn the list of steps into a flowchart, using the

FIGURE 17.4. DETAILED FLOWCHART OF TREATMENT PROCESS FOR CYSTIC FIBROSIS–RELATED DIABETES (CFRD).

Goal: Early detection of CFRD and excellent treatment
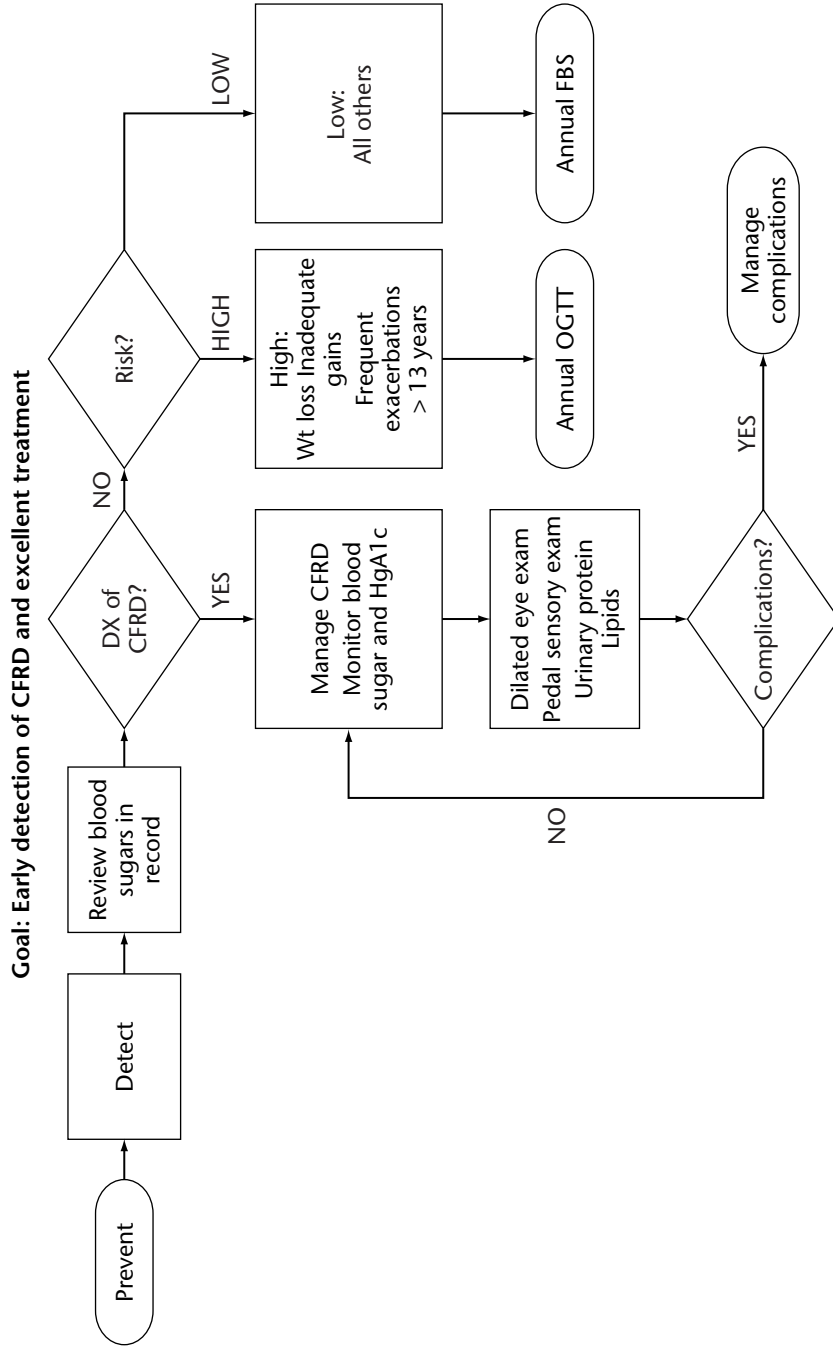
basic symbols. The flowchart can be drawn on a flipchart so the entire team can see the process unfold as described.

Some teams find Post-it Notes helpful for creating a process flow diagram. Post-its eliminate the need to erase and redraw steps as you work out the process because you can simply move the Post-its as needed.

It is always helpful to observe the current process after you complete the first draft of your high-level flowchart of that process. You can modify the flowchart as you *observe the current state* and as you talk to others involved in the process who understand the details, nuances, exceptions, conditional branch points, and sources of variation that are desired or undesired.

After finishing the high-level flowchart, display it in the relevant clinical area and invite other staff members to review and modify. This step is a good way to engage staff in improvement activities and to expand everyone's overall knowledge of the process.

What Does a Deployment Flowchart Look Like?

A *deployment flowchart* shows the process flow in relation to the people or groups involved in each step (see Figure 17.5). This type of flowchart shows how people fit into the process sequence and how they relate to one another. Deployment flowcharts highlight places in a process where work moves from one group or person to another and reveals how groups or individuals relate to one another throughout the process. The deployment flowchart is particularly useful when the goal is to optimize roles and functions within a process.

Deployment flowcharts are read both vertically and horizontally.

• The vertical dimension shows how the process is progressing.
• The horizontal dimension shows who does what and the handoffs between individuals or between groups.

What Are Some Tips for Creating a Deployment Flowchart?

Start by drawing a table with columns for the people, roles, or groups that the process flows through. Enter the name of a person, role, or group at the top of each column.

After you have created the table, insert the sequential flowchart steps to show which person, role, or group is responsible for which action. The horizontal lines define internal customer-supplier relationships. Correct identification of these

FIGURE 17.5. SECTION OF DEPLOYMENT FLOWCHART FOR ENROLLMENT IN
OUTPATIENT CYSTIC FIBROSIS CLINIC.

customer-supplier relationships is important if the handoffs are to become defect free. It is very useful to use a deployment flowchart when you are beginning to explore customer requirements within a process that must be actively designed to produce value-added activities and outcomes.

Case Studies

Intermediate Cardiac Care Unit (ICCU)

The ICCU lead improvement team members made a high-level flowchart of the process of admission to the ICCU. They used their global aim to identify the start point and end point of their work. Their high-level flowchart is shown in Figure 17.6.

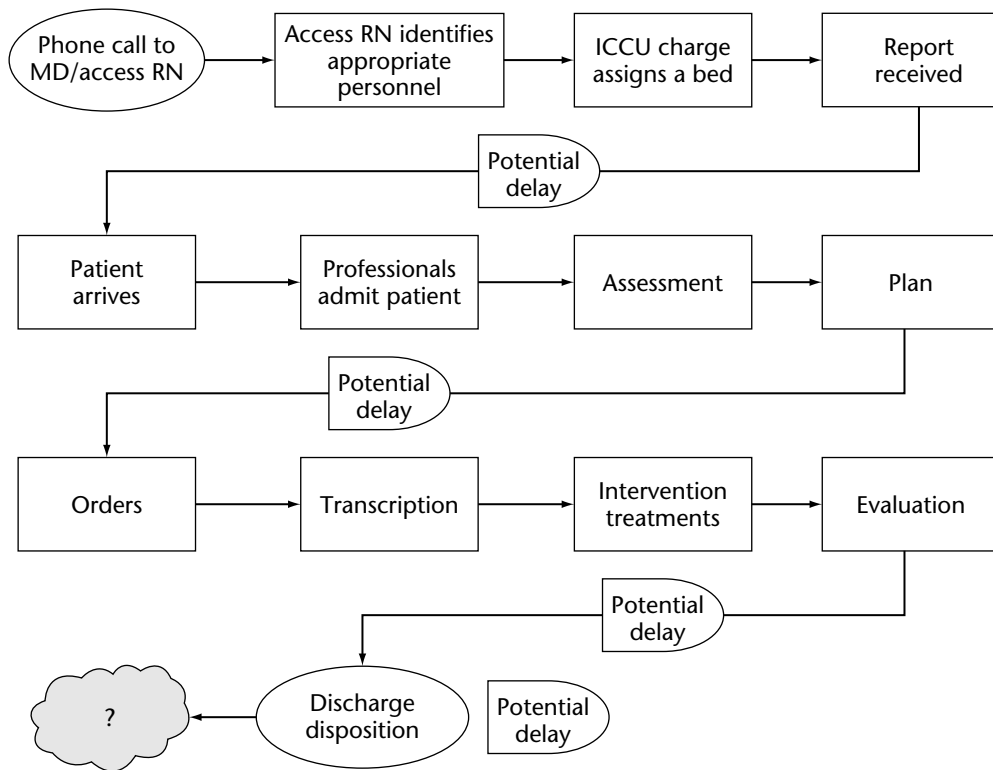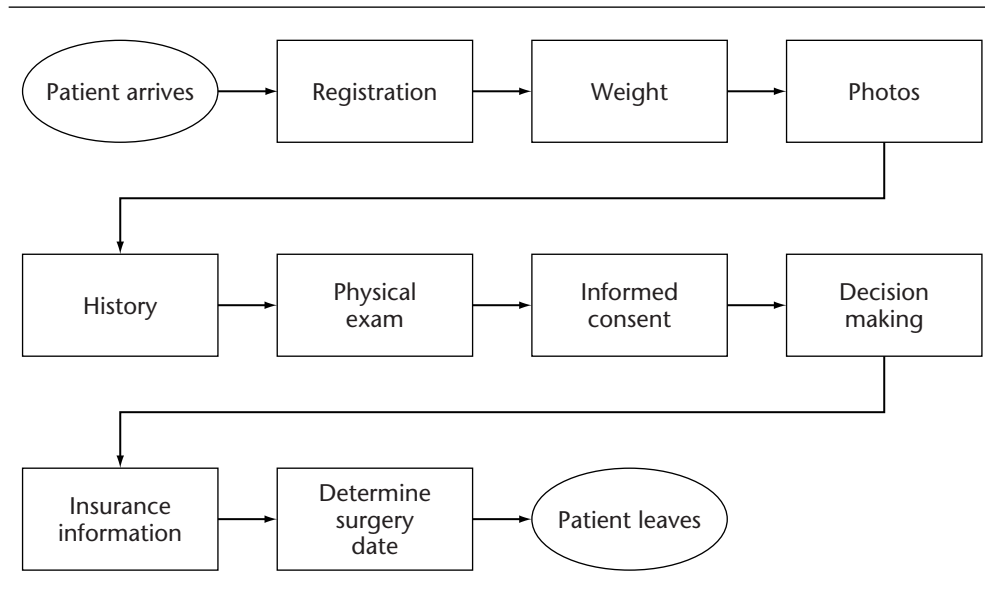**FIGURE 17.6. HIGH-LEVEL FLOWCHART OF ICCU ADMISSION PROCESS.**

**FIGURE 17.7. HIGH-LEVEL FLOWCHART FOR BEGINNING
OF BREAST REDUCTION PROCESS.**

Plastic Surgery Section

To improve access to care, the Plastic Surgery Section lead improvement team members reviewed the current state of appointments for one subpopulation of patients. They chose the breast reduction procedure patients because the lead physician did that procedure with high frequency. It is usually wise to start with an interested physician who can test new ideas with the interdisciplinary team and then you can spread the improvement effort to other physicians and processes. The process shown in Figure 17.7 was completed one breast reduction patient at a time repeatedly throughout the workday. The lead improvement team started to think that there might be a better way to provide care to this special population that might improve access to care and overall quality, satisfaction, and efficiency.

Review Questions

1. What is process mapping?
2. What is the difference between high-level flowcharts and deployment flowcharts?

3. How does the global aim statement inform the flowchart process?
4. What are the common symbols used in flowcharts?
5. How would you create a high-level flowchart?
6. How would you create a deployment flowchart?
7. What does the horizontal dimension highlight in a deployment flowchart? What does the vertical dimension highlight?
8. Who should be involved in the flowcharting process?
9. How might you engage all members of your clinical setting in this process?

Between Sessions Work

1. Draft a flowchart of the process identified in your global aim statement.
2. Display the flowchart draft for all the staff to review and add to.
3. Modify the flowchart based on feedback.

Reference

Nelson, E. C. (2006). Teaching session delivered to Cincinnati Children's Hospital Learning Collaborative, Cincinnati, OH.