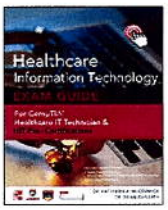

Chapter 6 - An Overview of Processes Associated with Healthcare Payment Within Ambulatory Provider Organizations

Healthcare Information Technology Exam Guide for CompTIA Healthcare IT Technician and HIT Pro Certifications

by Kathleen A. McCormick and Brian Gugerty

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Recommend? yes no

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Patient Use of the Practice Web Site

There are a number of opportunities for physician practices to incorporate the organization's web site into the claims revenue cycle and improve both cash flow and patient satisfaction.

Producing paper patient statements not only is time-consuming but costs the practice money to print and mail. E-mailing statements and permitting patients to access their statements via the practice web site are highly efficient methods of getting patients the information they need. Certain considerations are important, however. Protecting the security of the information and safeguarding the privacy of the patient should be the underlying goals for the practice. This includes either getting permission from the patient to post their statement online or permission to send them their statement through e-mail. It is important to remind patients that in most cases, the employer owns the e-mail, and the practice cannot be responsible for any disclosure of the patient's information should the employer look at the e-mail. To avoid this issue, it may be best to get a personal e-mail address from the patient.

Tip Further enhancing cash collections, some practices have moved to online bill payment systems for their patients. More and more individuals, especially younger ones, are routinely paying bills online, and some don't even own a checkbook. While it should not be the practice's only bill payment method, offering this option to patients may decrease days in accounts receivable while at the same time can increase patient satisfaction.

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Chapter Review

As you have seen, there are numerous steps and potential roadblocks on the path to payment for physician practices. The federal government has done its part by crafting a broad set of administrative simplification standards aimed at streamlining the claims revenue cycle. HIPAA, enacted in 1996, was the first of these efforts, leading to a wide array of privacy and security provisions designed to safeguard a patient's health information, national identification numbers, and the standardization of a number of critical electronic transactions such as the claim, eligibility verification, and remittance advice. A voluntary industry effort started in 2006 to enhance the usefulness of electronic transactions led to the development of "operating rules" for eligibility verification and claim status. In 2010, these operating rules and several other administrative simplification provisions were included in Section 1104 of the ACA.

From the time the patient schedules an appointment to be seen by the practice clinicians, practice staff must take steps to ensure that care is delivered effectively and that payment is received for the service. Successful practices have front-end workflow processes to ensure that patient intake and insurance eligibility verification are completed effectively. Similarly, claims submission, payment posting, and patient collections must be accomplished efficiently. Should the practice experience administrative errors caused by poor revenue cycle management, the organization runs the risk of claims rejections and a resultant cash flow disruption.

Leveraging HIT is an excellent method of automating the entire claims revenue cycle. Deploying a PMSS product that can electronically record patient demographic and insurance information, generate a real-time eligibility verification, submit claims for payment, send a claim status inquiry, capture payment information, and assist in patient collections can produce significant efficiencies for the practice. Effective use of standards and technology can greatly assist practices in navigating the complex billing and collections process.

Questions and Answers

To test your comprehension of the chapter, answer the following questions and then check your answers against the list of correct answers at the end of the chapter.

1. Which of the following national identifiers was *not* mandated by the Health Insurance Portability and Accountability Act (HIPAA) of 1996? ?

   A. National Employer Identifier

   B. National Provider Identifier

   C. National Clearinghouse Identifier

   D. National Health Plan Identifier

2. What legislation mandated the development of standards for the electronic funds transfer (EFT) transaction in healthcare? ?

   A. Americans with Disabilities Act (ADA)

   B. Health Insurance Portability and Accountability Act (HIPAA)

   C. Health Information Technology for Economic and Clinical Health (HITECH)

   D. Patient Protection and Affordable Care Act (ACA)

3. What was the entity that created the voluntary set of operating rules to enhance the existing HIPAA electronic transaction standards for eligibility verification and claim status? ?

   A. CMS

   B. CAQH CORE

   C. WEDI

   D. ANSI X12

4. Which of the following is *not* a potential benefit attributable to use of a standardized, machine-readable patient identification card? ?

   A. More efficient patient intake

   B. Faster paid claims

   C. Decreased need for nursing triage

   D. Reduced number of administrative staff

5. Which of the following does the HIPAA Privacy Rule *not* require in regards to the Notice of Privacy Policies and Procedures (NPP)? ?

   A. That the revised NPP be provided at the patient's request

   B. That the NPP be posted in a public area of the practice

   C. That the NPP be posted on the practice's web site, if it has one

   D. That the NPP be written in Times Roman 12-point font

6. Which of the following is *not* considered a benefit of establishing patient insurance coverage prior to the office visit? ?

   A. Guarantees higher payment from the health plan

   B. Establishes patient financial responsibility

   C. Leads to fewer denied claims

   D. Reduces practice outstanding debt

7. Which of the following steps is *not* considered an effective approach to dealing with changes to patient insurance coverage? ?

   A. Including the issue in the practice–health plan contract

   B. Verifying insurance coverage prior to the patient visit

   C. Putting in place a process to collect outstanding patient balances

   D. Relying solely on the patient to inform the practice of coverage changes

8. Which of the following steps is *not* one of the key workflow steps involved in verifying patient insurance coverage? ?

   A. Process the patient's insurance card

   B. Request the patient copay payment ahead of the visit

   C. Review capitation lists

   D. Communicate with the patient

9. Which organization created and maintains the Current Procedural Terminology (CPT) code set? ?

   A. American Medical Association

   B. American Hospital Association

C. American Academy of Professional Coders

D. American Health Information Management Association

10. As of 2012, what is the diagnosis code set currently used in the United States for claims submission? ?

A. ICD-10-PCS

B. ICD-10-CM

C. ICD-9-PCS

D. ICD-9-CM

11. The X12N standard for the electronic claim is known as what? ?

A. 835

B. 270

C. 837

D. 271

12. Under the law, are health plans required to pay the exact amount that the physician charges for the patient service? ?

A. Yes

B. No

13. Typically, what is *not* a step in the patient collections workflow process? ?

A. Informing the health plan of the outstanding patient balance

B. Sending a letter to the patient establishing the outstanding balance

C. Calling the patient to discuss the outstanding balance

D. Tracking the length of time the patient has had an outstanding balance

14. In the claims revenue cycle, what is a CARC? ?

A. Claim Adjustment Refusal Code

B. Claim Adjustment Resubmission Code

C. Claim Adjustment Response Code

D. Claim Adjustment Reason Code

15. Typically, what function is *not* available to the patient on a physician practice web site? ?

A. Ability to pay outstanding balances

B. Ability to review the physician's medical school transcript

C. Ability to review the organization's Privacy Notice of Policies and Procedures (NPP)

D. Ability to schedule an appointment

Answers

1. **C.** A National Clearinghouse Identifier was not mandated by HIPAA.
2. **D.** Section 1104 of the Patient Protection and Affordable Care Act (ACA) included the mandate to develop standards for the EFT transaction.
3. **B.** The Council for Affordable Quality Healthcare, Committee on Operating Rules for Information Exchange (CAQH CORE) created the voluntary set of operating rules.

4. **C.** A decreased need for nursing triage is not a potential benefit of a standardized, machine-readable patient identification card.
5. **D.** Although the Privacy Rule stipulates that the NPP must be written in "plain language," it does not stipulate the font type or size.
6. **A.** While establishing patient insurance coverage prior to the office visit has many advantages, it does not guarantee higher payment from the health plan.
7. **D.** Relying solely on the patient to inform the practice of coverage changes is not considered an effective approach to dealing with changes to patient insurance coverage.
8. **B.** Requesting the patient copay payment ahead of the visit typically is not one of the key workflow steps involved in verifying patient insurance coverage.
9. **A.** The American Medical Association created and maintains the Current Procedural Terminology (CPT) code set.
10. **D.** ICD-9-CM is the diagnosis code set currently used for claims submission.
11. **C.** The X12N standard for the electronic claim transaction is known as the 837.
12. **B.** No, the health plan is not required to pay the exact amount charged by the physician for the patient service.
13. **A.** Informing the health plan of the outstanding patient balance is not considered a step in the patient collections workflow process.
14. **D.** In the claims revenue cycle, a CARC is a Claim Adjustment Reason Code.
15. **B.** A physician's medical school transcript is not typically available to the patient on a physician practice web site.

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Chapter 21: Fundamentals of Health Workflow Process Analysis and Redesign

J. Michael Kramer, Sheila Ochylski, Jane Brokel

In this chapter, you will learn how to

- Design processes and information flows for the practice that accommodate quality improvement and reporting
- Develop a plan for a revised and optimized clinical workflow within a healthcare system that integrates meaningful use of information technology
- Develop a process map for given clinical process workflows within a complex healthcare system
- Analyze clinical workflows to design information technology that supports clinical decision making and care coordination
- Critically analyze the workflow processes in a selected clinical setting, taking into account potential gaps, areas of redundancy, delays, manual work, work volume, task time, and elapsed time
- Facilitate decision making necessary for optimizing healthcare processes
- Document clinic processes to facilitate workflow analysis and redesign
- Design and implement information technology that supports effective teamwork, fosters open communication, and enables shared decision making to achieve quality patient care
- Design and apply information technology and standardized practices that support safety and quality

Implementing health information systems across an organization brings an unprecedented magnitude of change to those organizations. This chapter reviews two major tools necessary to manage such change: process modeling and organizationwide change management. Before we discuss utilizing these tools, we will review the life cycle of change. Traditional "project management" considers project closure as a phase of a change. At this point, the project team is redeployed to other work, and the change is considered complete. In a large-scale HIT implementation project, it is necessary to sustain resources in order to manage major HIT systems in an ongoing manner after the system has been implemented. This is largely because of the rapidly evolving nature of healthcare including ever-increasing scientific evidence, regulatory updates, national healthcare quality measures, and upgrades to the system. The skills and the teams to manage ongoing change are necessary to control the ongoing work. Therefore, the concept of project closure is obsolete if organizations expect to leverage their newly implemented information systems to achieve higher levels of quality and safety.

Life Cycle of Major Information Technology Implementation and Organizational Change

To understand how health information technology can be managed, you must understand the larger context of change. As the nation implements electronic health records (EHRs) in every hospital and medical practice,[1], [2] EHRs become central to each organization's operations. Therefore, the responsibility and need to sustain

systems in a practice or hospital does not end with the initial implementation. Each organization will choose how to support and maintain their systems differently with varying leadership models, teams, and reporting structures. See Chapter 20 for a more detailed discussion on governance.

No matter the model of support, we have observed a very clear life cycle in implementing EHRs across our combined experience in 30 hospitals and several large ambulatory practices. The phases of large-scale HIT change can be described as planning, implementation, stabilization, optimization, and transformation. This is depicted in the first row of Figure 21-1. Planning and implementation require a great deal of diligence and traditional project management, which is clear to most organizations. The time it takes postimplementation to return to normal operations and productivity with obvious benefits of the EHR is not always appreciated. In our experience, the movement from implementation to transformation varies across organizations. The characteristics, risks, and benefits of each phase are listed and further described in Table 21-1. Despite rigorous planning and thoughtful implementation, there is still the risk of end-user workarounds.

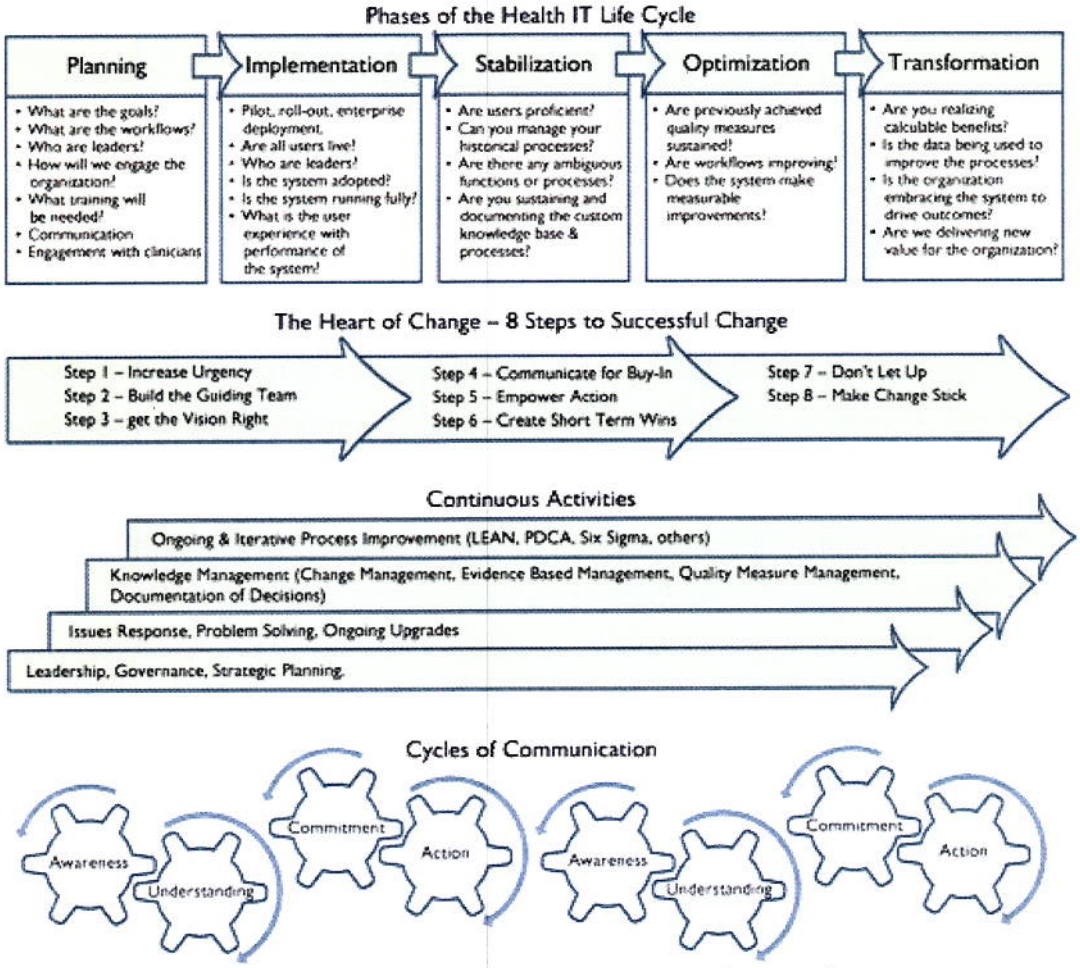

Figure 21-1: Activities across the life of a major health IT implementation

Table 21-1: Summary of the Life Cycle of Large-Scale HIT Change

Phase	Characteristics	Risks/Benefits
Planning	Traditional project management approaches include project conception, initiation, planning, and project tracking.	Implementation requires carefully identifying and tracking project activities.
Implementation	Go-live and activation of the software. May be phased or all at once.	User support and training must be carefully planned. Monitoring usage and tracking unexpected outcomes or harms.
Stabilization	This is the period in which an organization has not yet returned to normal operations.	This is a period of greatest user frustration and highest risk for

	Support resources may be less numerous. Users are finding gaps between previous workflows and new workflows.	workarounds and identifying recurring issues.
Optimization	After weeks or months, an organization returns to the new normal level of patient care. Clinicians and support personnel have identified most of the workarounds or best practices in order to continue operations.	Without careful management, users will circumvent major safety and other benefits of the system to manage day to day. This will place the system benefit at risk.
Transformation	Organizations begin to understand how to manage the system. They embrace change and leverage data in the system to inform stakeholders of their performance.	Transformation elevates an organization to a higher level. Failure to recruit or train experts on the new technology will limit this opportunity.

HIT Pro Exam Tip A *workaround* is a way to use the system in a fashion that it was not designed or intended. Workarounds result in unplanned and unexpected outcomes.[3] A physician might not find a lab test so instead enters an electronic order to the nurse with a typed comment to order the blood test. This results in a delay in the lab completing the test because of the extra steps required for the nurse to clarify the order for completing the test.

Figure 21-1 introduces three additional organizational approaches to managing large-scale change that are illustrated in the second through fourth levels: organizational change management, ongoing continuous activities, and communication. Change management planning can reduce provider dissatisfaction, a prolonged stabilization phase, and a number of workarounds. Organizational change management is discussed later in this chapter. Kotter and Cohen provide a framework to develop four core activities that will help manage large change. The three long arrows, within the life cycle of change, display how organizations must develop approaches to ongoing evolution and change in the system. These activities include maintaining the system knowledge base. Chapter 20 discussed the importance of maintaining and updating the system's content (e.g., order sets, rules, and workflows) to stay current with advances in medical science, health regulation, and quality measures. Finally, with each change, organizations must maintain multiple cycles and methods of communication with all stakeholders. This is represented by the cogs in the last row of Figure 21-1.[4] Effective communication increases the awareness of the need to change, the understanding of the processes, the commitment to change, and the actions to achieve the desired changes and outcomes. These concepts are part of a theoretical model of change that is very helpful in creating a sequence of communications around major change.

Tip *The Heart of Change* by John Kotter and Dan Cohen[4] provides an excellent overview of change management across diverse stakeholders and an organization.

[1]Blumenthal, D. (2009). Launching HITECH. *New England Journal of Medicine, 362*, 382–385.

[2]American Recovery and Reinvestment Act of 2009 (ARRA). (2009). Accessed on June 17, 2010, from http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:hlenr.pdf.

[3]Halbesleben, J. R., Wakefield, D. S., & Wakefield, B. J. (2008). Work-arounds in health care settings: Literature review and research agenda. *Health Care Management Review, 33*, 2–12.

[4]Kotter, J. P., & Cohen, D. S. (2002). *The heart of change: Real life stories of how people change their organizations*. Harvard Business School Press.

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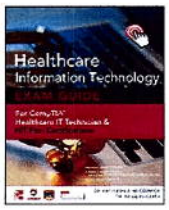

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Process Management and Process Improvement

Process mapping for healthcare takes complex patient-care delivery services and organizes the collection and uses of patient information for decisions that guide patient services. This section describes a process hierarchy for workflow analysis that design HIT professionals can use to support stakeholder's planning and implementing changes. A central theme to workflow analysis and redesign of care is keeping the patient and their information centered in the approach. This section discusses five levels of process mapping, (see Table 21-2) which guide designers to consider the scope and standards of practice for key healthcare professionals, the accreditation and regulatory requirements, the Centers for Medicare and Medicaid Services (CMS) EHR meaningful use incentive program requirements, and the quality and patient safety goals.

Table 21.2: Descriptions for Levels of Mapping Process

Level	Description
Level 1: Enterprise to Enterprise	This workflow describes referrals, full service, and community care among multiple locations for a population of patients.
Level 2: Venue to Venue	This workflow describes care for a service line in a given setting (e.g., emergency services or obstetrics).
Level 3: Roles to Patient	This workflow describes the interactions of providers with patients and with each other (role-based, patient-centered).
Level 4: Task to Task	This workflow describes the detailed steps for a procedure of care (e.g., ordering).
Level 5: Application Function	This workflow describes the use of data or information within an EHR, decision support, or exchange application.

Process Hierarchy: Levels of Mapping Process

In this section, a process hierarchy for workflow analysis and design is described to meet stakeholder needs in planning and implementing ongoing changes. The stakeholders include administrators, clinicians, department staff, and individuals who have specific tasks and functions. The first level is used by senior leaders who organize care among multiple settings for a population that will need full-service healthcare through community and referral providers. This first level is described as enterprise-to-enterprise mapping with the patient viewpoint. This viewpoint ensures there are services available and that statewide health information exchanges (HIEs) can share and move data between entities to accommodate the patient's needs for healthcare. This first level will capture the patient's broad experience of moving in and out of provider venues and processes that support the clinical practice and patient needs, financial compensation and accounting, and public obligations. Figure 21-2 illustrates what the patient may experience using healthcare services starting with the call for help and ending with a return home to self-manage their health.

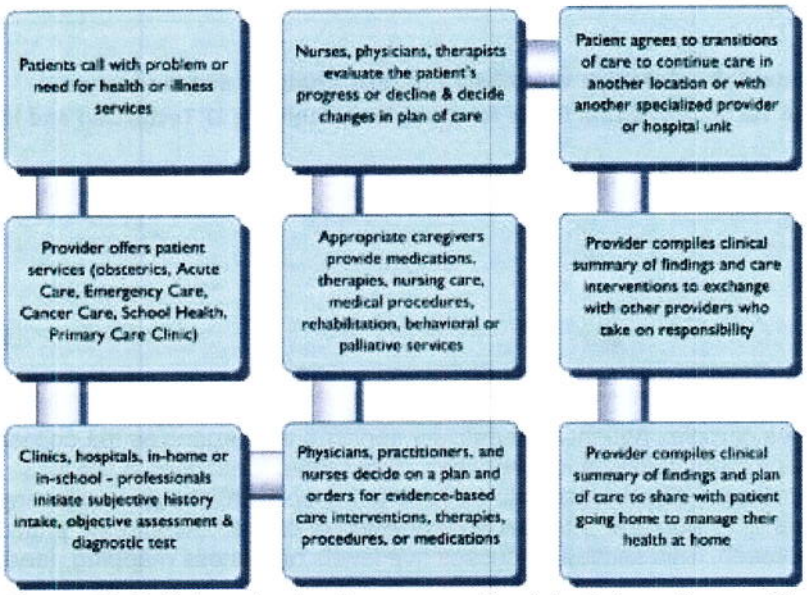

Figure 21-2: Enterprise-level processes for data, information, and knowledge use

While the patients perceive their care as being across visits and encounters with the healthcare system, many providers focus on care within one site such as an institution or clinic. The second level is described as venue to venue, which consists of major service lines such as emergency, surgical, or oncology services. The service line director and clinical team are stakeholders who understand care delivery. This level advances from the first level by explaining the clinical processes the patient and family are involved in. Reuse of common processes reduces variation in the healthcare professional's workflow such as medication management that applies to most venues and all service lines of care.

HIT Pro Exam Tip For a patient undergoing surgery, typical processes include registration, admission activities, surgical preparations, shift change or handoff activities, daily care coordination, transfer and/or discharge, quality monitoring, and reporting, as well as diagnostic radiology, laboratory, and pharmaceutical services. Viewing the delivery of care as a modular activity allows reuse of defined processes within multiple venues and across multiple scenarios.

The third level is engineering role-based workflows within those clinical processes. This level will assist the healthcare professionals and leaders in emphasizing interactions with the patient while specifying multiple process requirements established by federal agencies and states who license physicians, nurses, pharmacists, therapists, and technicians. In the third level, the medication management process is viewed in more specific detail as a person-to-person workflow where three or more professional roles interact using patient data, information, and evidence-based knowledge for clinical decisions. One decision may include an order/prescription for a specific patient's diagnoses and whether to administer the medication when the patient is unstable. Later in the chapter, examples of these workflows are illustrated.

Tip Level 3 focuses on the role of clinicians with patients and within the workflow.

HIT Pro Exam Tip Level 3 is a patient-centered workflow, with the patient's role in the center of the swim-lane rows using a cross-functional flowchart.[5] This workflow defines the steps in each role where the communication of data, information, and knowledge within professional practices flows seamlessly to ensure proper handoffs across shifts or on a daily basis to safeguard care continuously for a patient.

Communication of information can be accomplished via electronic methods, direct conversation, or paper methods. These person-to-person handoffs identify the professional's scope of practice to care for patients, which includes their use of trended and aggregated information to evaluate patient status over time. The role-based (person-to-person) workflows use action verbs in the process steps (rectangles) to describe the activities each healthcare professional performs in a given venue (e.g., admission, clinic visit, surgery). This workflow displays questions to describe which physician or nurse decisions (diamonds) have to be made (e.g., medication management, transfer, discharge). This level of workflow is used to support the training of the healthcare professionals and support personnel.

As an example, the nurse will see the nursing process steps displayed within the workflow and can relate nursing practice steps in their use of the EHR system. Randell et al. found nurses are more likely to change their actions when they understand why the nursing process is better when using the EHR system.[6] Physicians respond similarly when they know why a given step is important. This level of workflow provides a far better illustration of the steps for each role when working with patients.

The fourth level is task to task. At this level, the detailed use of a function is described. To illustrate, how does a physician order a radiologic test that requires pretest preparations and the holding of a medication prior to and 24 hours after the test? These workflows are modular in that they are specific to a task being completed by someone. This computerized ordering step can vary from other ordering processes, and therefore a task-oriented workflow provides the orientation to the additional steps necessary. These unique tasks are limited to a few professionals or support personnel to complete, while most others don't require this level of detail.

The last and fifth level of workflow is described as functional and application flow for using patient information. These workflows are modular with less human involvement because the tracking function or decision-support logic applications are using the information based on programming. For example, the EHR's problem list may be used in several summary views, such as the continuity of care document (CCD) when extracting data for exchange with another organization or provider or within the care-planning function for nurses or ordering by physicians.

Tip The flow of information in an EHR application, such as clinical decision support applications (covered in more detail in Chapter 5), are typically more automated than paper-based system and often require less human interaction.

Workflow for a functional application has a very limited focus such as clinical decision support or documenting allergies or supporting a specific decision. This workflow lacks the perspective of care delivery.

HIT Pro Exam Tip The person-to-person development of workflows displays the time-oriented interaction and steps taken for all the interdisciplinary team's processes occurring with patients.

Role-based workflows—such as those for physicians or nurses or pharmacists—identify the timely collection and documentation of patient information providing access to the data for subsequent clinical decisions. This provides a framework for how EHRs are designed to manage information for decision makers and those coordinating care with other providers or departments. The availability of patient data along with evidence-based knowledge resources (e.g., drug and disease databases, nurse procedure/intervention databases, cancer protocols) are necessary resources in the workflow to support clinical decisions and appropriate treatment steps. Person-to-person and patient-centered service-line workflows minimize the stress and better coordinate the complex activities of implementations.[7]

HIT Pro Exam Tip Standardizing the venues and the various workflows (role-based person-to-person, task, and functional) is useful to transfer process knowledge from one setting to the next.

[5]Brokel, J. M., & Harrison, M. I. (2009). Redesigning care processes using an electronic health record: A system's experience. *Joint Commission Journal of Patient Safety and Quality, 35*, 82–92.

[6]Randell, R., Mitchell, N., Thompson, C., McCaughan, D., & Dowding, D. (2009). Supporting nurse decision making in primary care: Exploring use of and attitude to decision tools. *Health Informatics Journal, 15*, 5–16.

[7]Brokel, J. M., Ochylski, S., & Kramer, J. M. (2011). Re-engineering workflows: Changing the life cycle of an electronic health record system. *Journal of Healthcare Engineering, 2*, 303–320.

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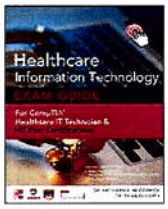

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Methodologies for Understanding Processes

There are several methods for understanding processes:

- Observation of current daily workflow
- Modeling workflow based on the formal scope of professional practice standards
- Simulation of the proposed workflow steps
- Quality-based deployment strategies such as Lean and Six Sigma
- Continuous workflow improvement with functional technology advances

Most organizations use business process management and modeling tools such as Microsoft Visio or others. Benefits and limitations for each method are described in the following sections. In this section, you will critically analyze the workflow processes in a selected clinical setting, taking into account potential gaps, areas of redundancy, delays, manual work, work volume, task time, and elapsed time.

Observation

Use of observation provides an opportunity to view settings and observe various patient scenarios within each setting. This method is very good for understanding the task time, manual work, delays, and multiple variations that exist within care processes for a discipline. Observation is beneficial to highlight the typical time it takes to complete a task and to identify variations in practice among professionals. While there may be a good reason for variation, a common result is unnecessary cost and inefficiency. The Lean principle of Gemba is a tool to observe workflow. "Gemba" is a Japanese word that refers to the location where value is created. The principle behind "going to Gemba" (meaning the "place where the work is being done") is commonly used by Lean experts. The foundation of this principle is to observe the actual process to get the facts and data.[8]

Modeling Workflows for Scope of Professional Practice Standards

A second method for understanding processes is modeling that is informed by the scope of healthcare professional practice. Data, information, and evidence-based knowledge are used to analyze clinical decision-making requirements.

Professional practice standards are sources to identify who, what, when, how, and where information is needed. Information technology professionals may not understand or appreciate the differences, unique responsibilities, and accountabilities for each of the healthcare disciplines that are central to patient services. The processes followed by each clinical discipline or role (such as medical assistant, nurse, or physician) are equally important to the patient's care and treatment.

HIT Pro Exam Tip Spending time with clinicians (or, "Going to the Gemba,") as they provide care can help IT professionals appreciate the time and other resource constraints caregivers encounter and identify and take into account potential functionality or other gaps of the EHR or HIE.

Physicians examine, diagnose, and order medications and therapies to treat diseases and injuries or perform noninvasive or invasive procedures to improve a disease process or medical condition over time. Physicians

can be specialized by the age groups they treat or in primary-care practice for all ages, while many more physicians focus on a specific body system such as cardiovascular, orthopedics, or psychiatry. (You can find more detail on care within and across venues and various medical roles and specialties roles in Chapter 1.) EHRs aggregate patient information and historical information along with drug and disease databases, laboratory, radiology and other diagnostic references, and evidence-based guidelines to support physician decisions on diagnoses, plan for care, referrals, consultations, treatment, and follow-up. Table 21-3 describes processes and decisions for different healthcare professionals. When the EHR system lacks the ability to organize and aggregate pertinent data for a specialized practice, the professional frequently finds workaround alternatives to accomplish the same function and come up with a treatment plan individualized to the patient's condition.

Table 21-3: Processes and Decisions in Scope of Healthcare Professional Practices and Patient

Roles	Activities and Decisions
Physician	■ Reviews medical history (subjective); examines body systems (objective) ■ Orders diagnostic testing and focused assessments and care restrictions or limitations ■ Diagnoses disease or medical condition (e.g., diabetes, renal insufficiency) ■ Orders medications and treatment plan; consults other disciplines to evaluate and/or treat ■ Documents steps in procedures performed ■ Evaluates the resolution of the disease
Nurse	■ Interviews and assesses human responses for functional health patterns ■ Diagnoses problems, risks, and needs for health enhancement ■ Determines what the patient and family desire for outcomes (i.e., their priorities) ■ Organizes and coordinates the plan of care ■ Schedules, educates, monitors, and documents performed interventions ■ Evaluates the effects for progress/decline in patient's outcomes
Pharmacist	■ Reviews the patient's profile of medications, appropriate dosing, and known interactions ■ Verifies the medication as appropriate for indications ■ Consults with physician when discrepancies in drug choice, dosing, or interactions ■ Dispenses prescription medications ■ Educates and validates patient's understanding of dosing and side effects ■ Reviews lab tests and refills prescriptions
Therapist	■ Accepts order and schedules evaluation and treatments ■ Evaluates current patient skills for physical, social occupation, respiratory, and speech ■ Shares the therapy plan and timeline for patient activities ■ Evaluates the patient pre- and postpatient activities ■ Trends the progress or lack of progress in physical or occupational abilities

	■ Reports the progress to the provider
Technician	■ Identifies and changes schedule based on order urgency ■ Determines appropriateness of test procedure with radiologist, consults with ordering physician ■ Prepares the patient by way of at home education or utilizes nursing when in facility ■ Conducts diagnostic test or therapeutic procedure ■ Evaluates patient cooperation and tolerance through test procedure ■ Reports critical findings to physician or nurse
Patient	■ Decides to contact a healthcare professional or service ■ Expresses preferences and decides what patient outcomes are priorities ■ Learns how to recognize symptoms and manages the condition(s) ■ Learns when and who to contact for follow-up ■ Identifies who in the family is going to support them ■ Identifies what health resources or pharmacies to use

Nurses are the largest group of healthcare professionals in acute care and other facilities and predominant users of the EHR, providing around-the-clock coverage for patients in a number of venues. Table 21-3 highlights the major activities of the nursing process and decisions for the patient. While physicians are usually responsible for the overall management of a given disease, the nurses typically carry out the recommendations made by the physician and also address a number of patient responses including fear, agitation, confusion, nausea, acute or chronic pain, impaired skin integrity (which can lead to pressure ulcers), impaired mobility (a risk for accidental falls), and a lack of knowledge about their condition. In addition, they watch for patients who might become suicidal or aspirate (accidental entry of food or stomach contents in the airway). Nurses develop and are responsible for implementing a plan of care with evidence-based interventions to prevent problems, avoid risks and promote healthy lifestyle changes, and use evidence-based databases for nursing decisions about care that are usually different from those used by physicians. Finally, given the amount of time they spend with the patient, they tend to have a more holistic view of their care.

Patients and their families have an important role in workflows because most information from assessments and ultimately the patient's outcome is gathered from them. Table 21-3 highlights the patient's role in learning about diagnostic results and changes in treatment activities. Any workflow that doesn't include the patient is missing the most important stakeholder in patient care. Given the time they spend and their training and skills in collecting detailed assessments, nurses frequently obtain the information to evaluate the patient to detect positive and negative outcomes of a given treatment.

Pharmacists are educated in helping physicians find the best medication options for patients and are responsible for verifying the safety of medications that patients will take. Data is important to pharmacists because the age, gender, height, weight, pregnancy status, and patient's condition(s) are all relevant to medication dosing. Pharmacists and physicians rely heavily on laboratory results and vital signs and assessments from observations of signs and symptoms. Table 21-3 provides some scope of practice considerations for pharmacists.

Another broad category critical to the care of patients consists of the assorted therapies: dietitians, social workers, respiratory, physical, occupational, speech pathology, behavioral, and recreational professionals. Professionals in these groups normally focus on a specific aspect of the patient's care and, while normally autonomous, are typically involved and directed by physicians. Examples include increasing a patient's mobility and optimizing their diet and respiratory function. Table 21-3 provides some scope of practice considerations for therapists.

Technicians within laboratory, radiology, neurological testing, cardiovascular diagnostics, and other areas need information to prepare patients for a test or diagnostic exam and to ensure safe transport to perform the tests. A key responsibility of these clinicians and departments is prompt reporting of the results and timely notification to nurses and physicians when the findings are critical because these findings can dramatically alter the course of care and treatment for the patient.

Simulation

HIT technology simulation can provide a safe testing environment that allows practitioners to test new clinical processes using simulation of the technology before implementing with patients. Many simulation applications involve artificial "patients" and "providers" that can test tasks and functions to simulate care and treatment, like flight simulators used by pilots.[9] The simulation environment provides a real-life opportunity to evaluate clinical and management information systems such as EHRs, secure messaging, and exchanges with health information exchange networks in a realistic environment without the possible harm associated with real patient care. Research using simulation approaches helps inform the design and development of electronic systems.

Lean Strategy

The Lean/Six Sigma strategy has been used extensively in manufacturing and production lines to identify the most efficient production practice using less costly resources and fewer tasks and still retain the optimal value for customers. The goal when using the Lean approach is to eliminate waste or redundancies in practices while providing the best possible patient outcomes. In general, that usually means the safest care at the lowest cost with the shortest stay and no complications (i.e., eliminating unnecessary tests and complications, hospital-acquired infections, pressure sores, injuries from falls, etc.). When Lean strategies are fully leveraged, the result is optimal outcome for the patient with less work volume and minimal to no redundancy in care.

HIT Pro Exam Tip When workflow is optimized, human interactions with the technology increase efficiency, decrease waste, and rely on scientific methods to decide which data are relevant rather than accepting prior methods, often based on paper or unique to an individual clinician.

The Lean approach poses critical questions to subject matter experts in a process undergoing improvement. These questions are helpful in identifying what matters most and avoiding the distraction of variation and waste. These who, what, where, how, and why questions highlight gaps, variations, unnecessary tasks, and redundancy in current practice and allow the clinical team to decide the safest and quickest ways to get to equivalent or better patient outcomes.

Business Process Management

Business process management (BPM) uses engineering activities to represent processes for the healthcare enterprise. BPM in healthcare settings often involves clinical informaticians and service-line leaders working with IT professionals and business process managers or quality managers to analyze and improve current processes. Process improvements are part of everyday activities in healthcare. IT professionals should identify and work closely with business analysts and quality staff members who are involved with improving practices for accreditation and certification.

HIT Pro Exam Tip Healthcare organizations and clinics should designate someone who is accountable for managing a central database of process maps/workflows. Management of workflows facilitates decision making regarding when and where workflows apply, allows for the reuse of standardization workflows across service lines, and allows for the continuous optimizing of healthcare processes (workflows). Chapter 7 covers workflow and process management in more detail.

[8]Wheeler, D. J. (2004). *The Six Sigma practitioner's guide to data analysis.* SPC Press.

[9]Improving patient safety through simulation research. (2012). Accessed on June 19, 2012, from www.ahrq.gov/qual/simulproj.htm.

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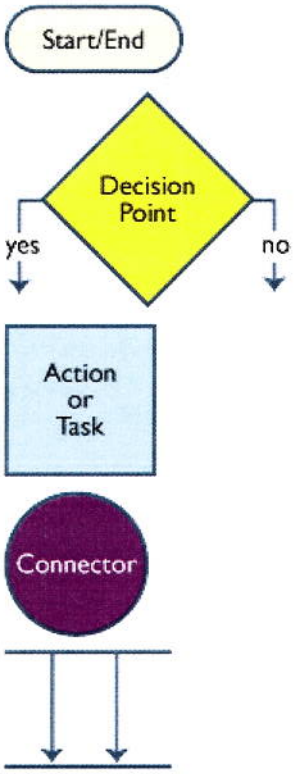
Workflow Mapping Tools

Figure 21-3 is an example of the basic tools associated with process mapping. A structured approach can enable efficient, effective problem solving and can enhance decision making. Specific diagrams and shapes correspond to different types of activities performed to visually represent workflow.



An oval represents the start and end of the process.

Decision points are represented by diamonds, with decisions indicated by the different flow lines that emerge from the diamond.

Actions or tasks are represented by rectangles. Once the action is complete, a single flow line indicates the next action or decision.

Circles function as connectors between multiple pages, indicating that the flow continues on (or from) another page.

Arrows indicate the direction of flow in the process.

Figure 21-3: Graphic representation of workflow mapping

- An oval shows where the workflow begins and where the workflow ends.
- Rectangles represent a process activity, task, or analysis necessary.
- Diamonds signify a decision-making process, usually resulting in two possible workflow directions. Most diamonds reflect a yes or no decision that has to be made; if the decision is yes, the workflow continues on the intended route, but if the answer is no, the workflow may have to go through another route to solve the problem.
- Circles represent connectors from one activity to another activity.

Workflow Diagram Example

Workflow diagrams are a graphic depiction of a course of action showing the steps in the process to accomplish a goal. Many work processes can be complex, so it is important to visually represent in detail how tasks are being completed to improve understanding and efficiency. Depending on the purpose of the map, it can be high level (abstract) or detailed. Figure 21-4 is an example of a high-level clinic visit workflow diagram.

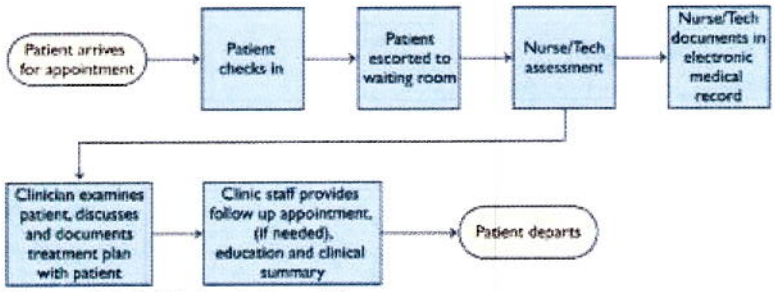


Figure 21-4: Clinic visit workflow

Role-Based Swim-Lane Workflow

Figure 21-5 is an example of a role-based swim-lane workflow. Role-based swim lanes describe who is responsible for each stage, what documentation is needed, and the relationship to resources at each stage. Knowing employee roles and resource requirements allows management to easily determine weaknesses and alleviate bottlenecks. Bottlenecks represent any aspect of the workflow that impede overall cycle time of the process.

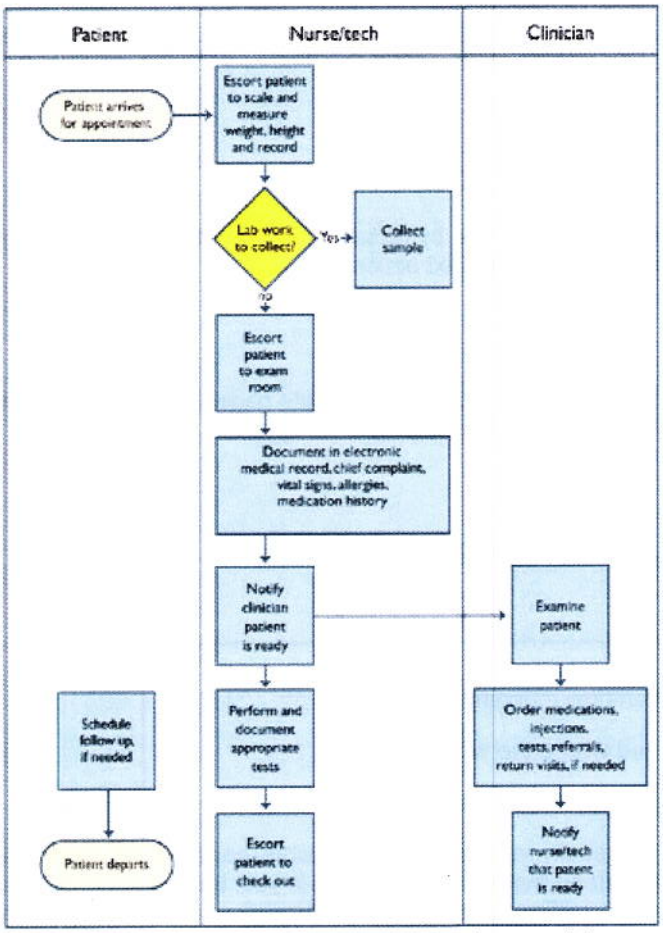


Figure 21-5: Clinic visit role-based swim-lane workflow

Value Stream Mapping

Figure 21-6 shows a value stream map. Value stream mapping is a type of process mapping or flowcharting of the

value stream, which includes all of the steps (both the value-added and the non-value-added steps) in producing and delivering a service. A value stream map shows workflow from a systems perspective and can help in determining how to measure and improve the system or process of interest. Without a view of the entire stream, it is possible that individual aspects of the system will be optimized according to the needs of those parts, but the resulting total system will be suboptimal. Value stream mapping in healthcare is typically done from the perspective of the patient, where the goal is to optimize the journey through the system. Information, materials, and patient flows are captured in the value stream map. The key question to ask when determining whether an activity is value added is if the customer would be willing to pay for it. If the answer is no, the activity is nonvalue added. In healthcare, an example of a non-value-added activity is waiting time. Value stream mapping is a recognized Six Sigma methodology.[9]

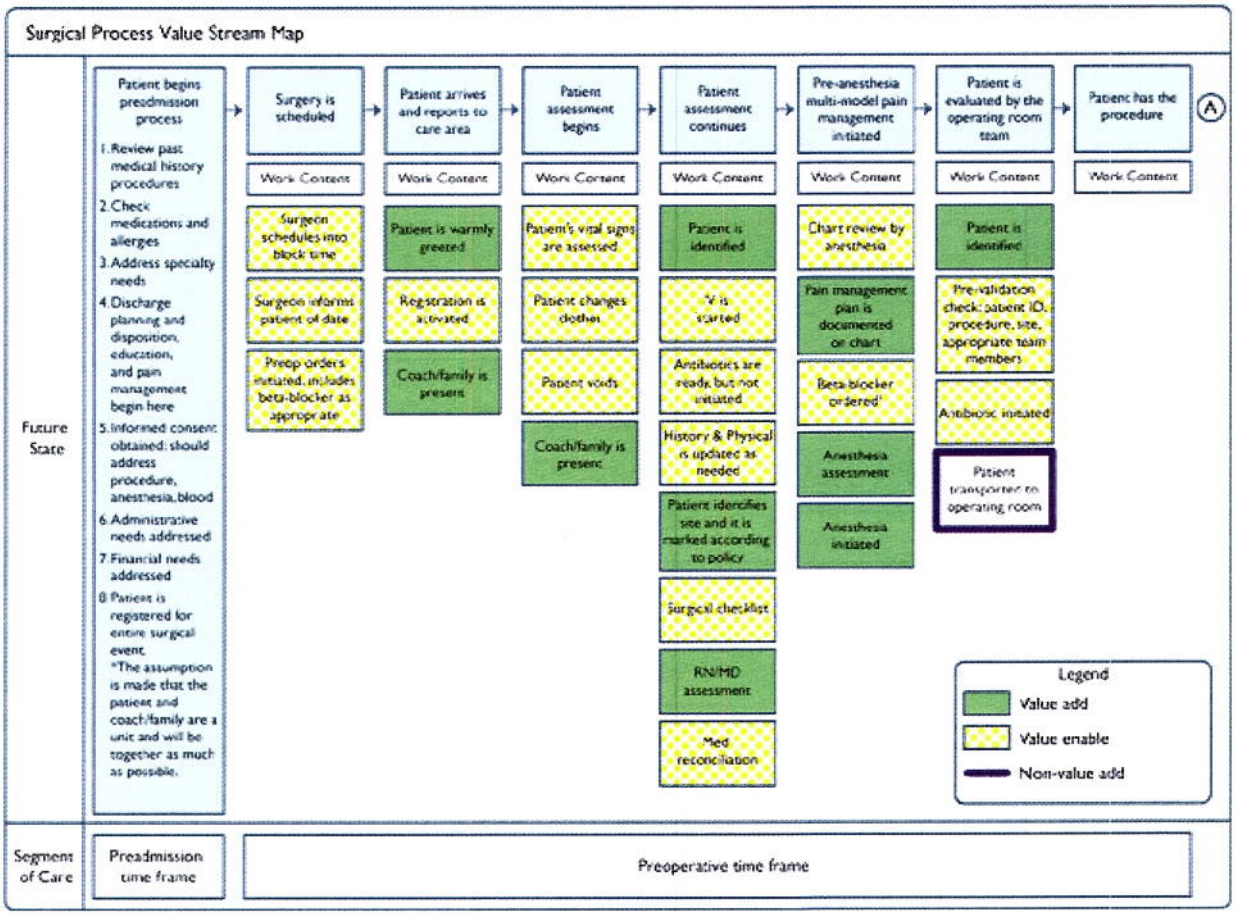


Figure 21-6: Value stream mapping

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Success Factors for Implementing Clinical Process Change

Designing and applying information technology using standardized practices can be an extensive, time-consuming process. When possible, leverage the vendor's standardized tools and process descriptions. When these are not suitable, incomplete, or need to be extended, you must assemble a process change team with the right skill sets, as well as subject-matter experts. A moderate-sized hospital may have 200 to 300 third-level process flows. A typical ambulatory clinic may have 50 to 75 process flows. It is useful to name each of the processes and assign a priority to map these processes explicitly. One question to ask is, Is this process well defined? If not, it may require a higher priority to determine a possible future state. Complex and ambiguous processes typically create a great deal of confusion, concern, and even risk to the patient during the implementation. The ideal implementation has *no* ambiguous processes at go-live. A knowledge manager assigned to track and manage these processes can minimize the risk. These individuals may also be experts in facilitating problem-solving events or in managing gaps in the vendor-supplied content.

Tip Use the SIPOC Figure 21-7 instrument (a Six Sigma tool) to simplify problem solving or to plan a large process change event. A SIPOC form identifies all aspects of a process, including the beginning, the end, and all high-level steps in between. Outside of the core process, you should also identify suppliers and customers. This high-level description can be used before a more detailed process improvement activity is used.

SIPOC Diagram for Physician Specialist Procedure Consult				
Revised: (date) **Author: (name)**				
Suppliers	**Inputs**	**Process Row**	**Outputs**	**Customers**
Specialist physician		Process Trigger: Clinician needs a specialist consult for a procedure.		Ordering physician
Ward clerk				Patient
Scheduling clerk		↓		Primary Care Physician
Transcriptionists		Step 2		Nurse
Patient		↓		
Nursing provider		Step 3		
		↓		
		Step 4		
		↓		
		Step 5		
		↓		
		Step 6		
		↓		
		Done: Consulting physician communicates to ordering clinician the results of the		

		procedure		

Figure 21-7: SIPOC chart for planning workflow mapping or problem-solving event

The implementation of the actual new steps represented in a workflow diagram is the hardest aspect of process change. Organizations often do not realize the importance of understanding processes and mistakenly rely instead on technology to resolve problems. With paper-based records, many organizations had thousands of individual order sets, many unique to specific physicians and frequently outdated. With computerized provider order entry (CPOE), most organizations appreciate the need for standardization in workflow and reducing variation among physicians. Organizationwide recognition of process improvement is imperative, and leadership support and understanding is key; simply posting a workflow diagram on a nursing unit won't significantly impact day-to-day activities. Most workflow diagrams should include a workflow improvement theory such as Lean, Six Sigma, or Total Quality Management as well as clear instructions on how to follow them.

Exercise 21-1: Create a Simple Process Model Using the SIPOC Tool

In this exercise, review Use Case 21-1, and develop a process model and overview.

1. Describe the steps in the process including trigger and completion.
2. Identify inputs into the process.
3. Identify desired outcomes.
4. Develop a plan to engage customers and suppliers in the future state process design.
5. Advanced: After completing a process map, enhance the map by utilizing role-based swim lanes or a value stream approach.
6. Advanced: What measurement could you use to determine that the new process was being used and not the workaround?

Use Case 21-1: Physician Consult for Specialty Procedure

Mrs. Hurst is a 35-year-old woman who presented to her primary-care physician with early-onset high blood pressure. In the office she was found to have significant high blood pressure without a strong family history or other explanation. On examination, she had evidence of an abdominal bruit (an abnormal sound heard with a stethoscope over the abdomen and a sign of a narrowed renal artery). The primary-care physician treated the patient with blood pressure medications and ordered an abdominal ultrasound that identified a condition called *renal artery stenosis*. Since her blood pressure did not respond to multiple medications, the primary-care physician consults a specialist who could enlarge the renal artery using balloon angioplasty.

The doctor recently started using an EHR and is unsure how to order such a procedure. Is this an "order" like one might write for an X-ray, or is it a consult for the specialist to see the patient and then determine the appropriate course of action? Previously, the physician would communicate the intent to the nurse or office manager who would manage the details of such a workflow. Unfortunately, the physician and office manager do not know how to order the same test using the new EHR. After calling the supervisor superuser (an individual with addition training) and the EHR implementation team, everyone involved realizes that they had not developed a process to manage this type of problem. The implementation team needs to develop this process and communicate it to all involved quickly. While the team works on defining and implementing an electronic version of the paper process, the office returns to the previous method of handwriting the order and faxing it to the specialist office. In addition, the office manager calls the hospital surgical scheduling clerk who enters the request into the surgical scheduling system.

Additional Techniques

When workflow processes are viewed in isolation, they often appear quite logical and efficient enough to accomplish the end goal. When viewed more broadly across multiple disciplines, complexities arise.

Frequently missed are conflicts in the priorities of different roles in an organization (e.g., tasks that nursing is accountable for versus the pharmacy).

The suggested steps for creating a process map or workflow are as follows:

1. Assemble a stakeholder planning team. The team should consist of individuals from all clinical areas and all levels with the goal of ensuring the true process is captured.
2. Determine the level of detail desired, the methodology you will employ, and the participants needed (e.g., value stream mapping, role based, SIPOC, or simple diagramming). The level of detail will depend on the problem the team is addressing and the number of handoffs between disciplines.
3. Schedule the mapping event and adequate venue, and obtain the appropriate supplies.
4. Begin the event by giving the team sufficient background on the approach you will be using. Provide an initial training in the weeks before or at the start of the event.
5. Complete the mapping event. Identify the activities in your current and future state. List them and arrange them in order.
6. Create a formal chart with standard symbols for process mapping using Microsoft Visio or Excel.
7. Create an accurate picture, and check for accuracy.
8. Identify problem areas and gaps between the current and future state.
9. Prioritize projects that will address the gaps.

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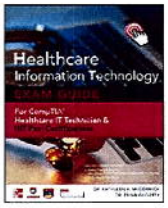

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Identification and Prioritization of Targets for Workflow Improvement

Information technology should be designed to support effective teamwork, foster open communication, and enable shared decision making to achieve optimal, quality patient care. Once the process is mapped, gaps between the current process and best practices will become apparent. Members of the team with the most detailed understanding of the best practices can recognize gaps and highlight them for the team. A simple approach to ranking gaps using two dimensions includes "ease of implementation" and "value to the organization." Value should be defined early in the life cycle of the program. Three common objectives for many organizations are safety, quality, and overall patient experience, with financial and provider experience as secondary benefits.

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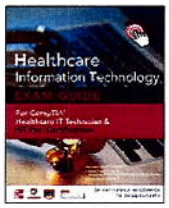

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Change Management

Change management describes a structured approach to transition individuals, teams, and organizations from a current state to a desired future state. Considered an organization imperative, change management helps employees cope with and adapt to the numerous changes every industry faces. One reason change initiatives fail is because they rely on "data gathering, analysis, report writing, and presentations" instead of human, political, and symbolic elements.

Kotter defines change management as the utilization of basic structures and tools to control any organizational change effort. Change management refers to a set of basic tools or structures intended to keep the change effort under control. Ultimately, the goal is to minimize the impact on workers and avoid distractions.

Change Management Principles

Four principles for change management are as follows:

- Elicit support from people within the system (system = environment processes, culture, relationships, and behaviors, both personal and organizational).
- Understand the current state of the organization.
- Understand where you want to be, when, why, and what the measures will be.
- Communicate, involve, enable, and facilitate involvement from people, as early, openly, and completely as possible.

Kotter's Eight Steps to Successful Change

John Kotter, a leading thinker and author on organizational change management, describes an eight-stage model for understanding and managing change.[4]

Kotter's eight-stage approach to realizing significant change includes the following:

1. **Establish a sense of urgency** Inspire people to move, and make objectives real and relevant.
2. **Build the guiding coalition** Put the right people in place with the right emotional commitment and the right mix of skills.
3. **Develop a vision and strategy** Create a team to establish a simple vision and strategy and focus on emotional and creative aspects necessary to direct the change effort.
4. **Communicate the change vision for buy-in** Involve as many people as possible, communicate the essentials simply, and respond to people's needs. Declutter communications; make technology work for you rather than against you.
5. **Empower action** Remove obstacles, and enable constructive feedback and support from leaders. Reward and recognize progress and achievements, and encourage risk taking.
6. **Generate short-term wins** Set aims that are easy to achieve. Recognize and reward people who made the wins possible. Finish current stages before starting new ones.
7. **Don't let up** Foster and encourage determination and persistence, and encourage new projects,

themes, and change agents.

8. **Make change stick** Reinforce the value of successful change via recruitment and promotion, and develop new change leaders. Weave change into the culture.

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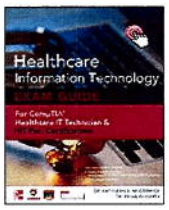

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Chapter Review

Ignoring or inadequately understanding workflows can lead to a decline in use of the EHR over time and the development of workaround steps. Workarounds can include both those within and outside an automated process. Analyzing workflows can help discover key factors to success: underuse and misuse of the EHR, workarounds clinicians find to collect or use patient information, and the need for aggregated information or reports to be available for decision making and sharing beyond the organization (often via health information exchange [HIE]). Working together, IT professionals as members of an interdisciplinary team must review existing clinical workflows when technology upgrades or the clinical evidence advances to make necessary adjustments. Creating a culture focused on process and change management and understanding workflow will help guide organizations through new technology implementations and inevitable upgrades.[9]

Questions and Answers

To test your comprehension of the chapter, answer the following questions and then check your answers against the list of correct answers at the end of the chapter.

1. Which of the following describes using health information systems in a manner not originally designed that results in unplanned and unexpected outcomes. ?

   A. Workflows

   B. Workarounds

   C. Tracking issues

   D. Flowcharts

2. Which of the following are life-cycle phases of large-scale health information technology changes? ?

   A. Workflows with workarounds and testing the technology with users

   B. Planning, implementation, quality monitoring, and improvement

   C. Planning, training, testing, and implementation

   D. Planning, implementation, stabilization, optimization, and transformation

3. Healthcare services are organized by many service lines of care such as surgical or obstetrical (i.e., maternal-child) services. Within each service, processes are organized such that they can be replicated across many services. Which of the following does not describe the healthcare general processes within venues of services healthcare? ?

   A. Registration, admission, daily care coordination, shift change, discharge

   B. Surgical preoperative visit, surgery, postoperative, same-day discharge

   C. Registration, dining, coding, billing, reporting

   D. Check-in, laboratory testing, radiology test, chemotherapy infusion visit, depart

   E. Emergency triage, registration, assessment, examination, education, discharge

4. The role-based workflow describes the steps in the care and information flow or evidence-based knowledge used by which of the following? ?

   A. Patient

   B. Physician

   C. Pharmacists

   D. Nurse and nursing assistants

   E. All of the above

5. Person-to-person cross-functional workflow describes the steps for which of the following? ?

   A. Electronic information collection/documentation

   B. Direct person-to-person conversation

   C. Viewing displayed reports in HIT

   D. Providing the patients a paper clinical summary

   E. All of the above

6. The role-based (person-to-person) workflow describes processes by which of the following? ?

   A. Using swim lanes to show the roles

   B. Describing steps in the process (rectangles) with action verbs

   C. Organizing into venues for care (e.g., admission, clinic visit, surgery)

   D. Displaying physician or nurse decisions (diamonds)

   E. All of the above

7. Which is a type of workflow with a limited ability to support a given decision that requires less human interaction and lacks the perspective of care delivery? ?

   A. Functional or application

   B. Role based

   C. Enterprise to enterprise

   D. Venue to venue

   E. Task to task

8. Which workflow best describes the clinical scenario of a nurse sending a secure message for follow-up to a home-care provider on research protocols involving medication administration at specific times for three days in the patient's home setting using the health information exchange network? ?

   A. Functional or application workflow

   B. Role-based workflow

   C. Enterprise to enterprise workflow

   D. Venue-to-venue workflow

   E. Task-to-task workflow

9. Which type of workflow describes the clinical teams as they collect and use patient information and, as a result, the decisions that coordinate care with other providers and departments? ?

   A. Functional or application workflow

   B. Person-to-person workflow

C. Enterprise-to-enterprise workflow

D. Venue-to-venue workflow

E. Task-to-task workflow

10. Analyzing workflows can help discover which of the following? ?

A. Underuse of the EHR

B. Clinician workarounds

C. Need to aggregate information or reports for decision making

D. Need to extract health information for exchange

E. All of the above

11. Identify a method that is not particularly useful in workflow analysis and redesign. ?

A. Modeling workflow based on scope of professional practice standards

B. Simulation

C. Observing existing paper documents and replicating in electronic format

D. Lean strategy, Six Sigma, and continuous improvement

E. Business process management and modeling tools

12. Which is a method to articulate the tasks, time, manual work, delays, and multiple variations that exist within care processes for a discipline or with reporting process associated with many departments? ?

A. Modeling workflow based on scope of professional practice standards

B. Simulation

C. Observation of daily activities

D. Lean strategy, Six Sigma, and continuous improvement

E. Business process management and modeling tools

Answers

1. **B.** A workaround is using the electronic health records, other information system, or paper-based alternatives in an unintentional way. A common example is the use of nursing communication orders in place of actual departmental orders to communicate the need for a specific test. A delay occurs while the nurse contacts the physician to determine and place the correct order with the continued risk of miscommunication. The department misreads the test and completes the test incorrectly resulting in invalid results, and the patient needs a repeat test for diagnostic accuracy.
2. **D.** In summary, with large HIT change, the stakeholders are involved from project conception with planning; activating the software, a period of time where users are unable to complete their scope of work because of gaps in workflows leading to workarounds; feeling a sense of normalcy within the clinic or hospital and optimizing practices; and embracing the change and fully using the data to determine performance to advance practice with transformation.
3. **C.** Processes within most venues have a well-defined start and endpoint and include a number of service lines during the episode of care. This option does not include any processes for care delivery, whereas the others depict general processes to consider where patient data and information are being collected from the patient and used to plan and deliver care.
4. **E.** The person-to-person role-based workflows include the patient, healthcare professionals, department staff, and support staff working collectively to identify and share the data used to make decisions in a collaborative way.
5. **E.** Role-based workflows include decisions and practice steps that may or may not make use of the

technology services to ensure the critical steps of direct communication are identified in daily workflow. At some point in the future the optimization of steps not supported by technology could be supported by an application or additional information that is collected and stored.

6. **E.** All four answers describe how workflow is designed to display the steps and decisions within a process for those with a role in taking care of patients.
7. **A.** Functional workflows make use of information technology applications to assist in performing notifications automatically or to track events within the emergency center.
8. **E.** Task-to-task workflows provide additional detailed steps for less frequent activities that might occur during care delivery (e.g., a nurse identifies a patient who could receive an immunization while in the hospital). While not required per se during the hospitalization, it represents an intervention that may require coordination between the physician, nurse, and pharmacist.
9. **B.** Person-to-person or role-based workflows describe in detail the many care activities and many decisions that healthcare professionals and support staff provide. A critical step is including the patient and, frequently, family members in those decisions.
10. **E.** A workflow analysis is useful when technology is upgraded or when clinical evidence changes. In these situations it's necessary to evaluate the where, how, and when information technology supports clinical decision making and affects care coordination.
11. **C.** Existing paper-based documents are not particularly useful in designing optimal use of data, information, and knowledge for HIT systems. Providers expect significant improvements to the standardization and integration of professional processes with the EHR functions to better represent and improve patient care. This reduces the variations that lead to omissions or commissions of errors.
12. **C.** Observation of workflow will help identify some gaps, but this method alone will not help clinicians and IT professionals in discerning all potential interactions and gaps in practice workflows.

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