Fundamentals of Health Workflow Process Analysis and Redesign

Unit 10.1a

The Concepts of Health Care Processes and Process Analysis

Welcome to the Concepts of Processes and Process Analysis Unit. This unit is from the Fundamentals of Health Workflow Process Analysis and Redesign component. In two parts, this unit covers the need for Health Care Workflow Analysis and Redesign; the processes common in the Health Care setting; and the Role of Health Care Workflow Analysis and Redesign Specialist.

Procedure, like dance, resists description.

-- Tom DeMarco 1979

Tom DeMarco, an early pioneer and thought leader in process analysis said in his 1979 book, Structured Analysis and System Specification, that “Procedure, like dance, resists description”. One of the workforce roles described by the Office of the National coordinator for Health IT (ONC), is the Health Care Workflow Analysis and Redesign Specialist. Using this analogy, individuals in process analysis and re-design jobs are experts at both “describing the dance”, and, at “choreographing a better one”.

This Curriculum component, over several units, covers the concepts of processes, process analysis, and process redesign, and provides the information and practice necessary to develop process analysis and re-design skills.

Topics – Unit 10.1

- Role of Health Care Workflow Analysis and Redesign Specialist
  - Definitions
  - Healthcare Roles and Responsibilities
- IOM 6 Quality Areas
- Importance of HIT to Health Care - Meaningful Use

Second Lecture starts here

- The Clinical Setting
- Common Health Care Processes
- Clinical Workflow
- Summary: What a Process Analysis and Redesign Specialist Does

The topics covered in Unit 1 of the Fundamentals of Health Workflow Process Analysis and Redesign Component include:

- Defining the Role of Health Care Workflow Analysis and Redesign Specialist
- Related Healthcare Roles and Responsibilities that analysts will encounter
- Institute of Medicine 6 Quality Areas
- Important characteristics of the Clinical Setting and Clinical Workflow
- Common Health Care Processes
- Systems and Systems Thinking
- Levels of process maturity (CMMI)
- Concepts and Examples of Process optimization (the goal of redesign)
- Information Technology in Health Care – Meaningful Use
- Overview of Process Analysis and Redesign

Unit Objectives

Upon successful completion of this unit the student is able to:

- Describe the purpose for process analysis and redesign in the clinical setting
- Describe the role of a workflow process analyst and redesign specialist and contrast it with other roles such as technical support and implementation management
- Explain how health process analysis and redesign and meaningful use are related
- Analyze a healthcare scenario and identify the components of clinical workflow
- Given a scenario of a health care analysis and redesign, analyze the responsibilities of each participant in the process and how the roles complement or overlap with one another
- Describe how the workflow processes used by a healthcare facility might differ depending on the type of facility

Upon successful completion of this unit you should be able to:

- **Describe**
  - the purpose for process analysis and redesign in the clinical setting, and
  - the role of a workflow process analyst and redesign specialist and contrast it with other roles such as technical support and implementation management
- **Explain** how health process analysis and redesign and meaningful use are related
- **Analyze** a healthcare scenario and identify the components of clinical workflow
- Given a scenario of a health care analysis and redesign, **analyze the responsibilitie**s of each participant in the process and how the roles complement or overlap with one another, and finally,
- **Describe** how the workflow processes used by a healthcare facility might differ depending on the type of facility

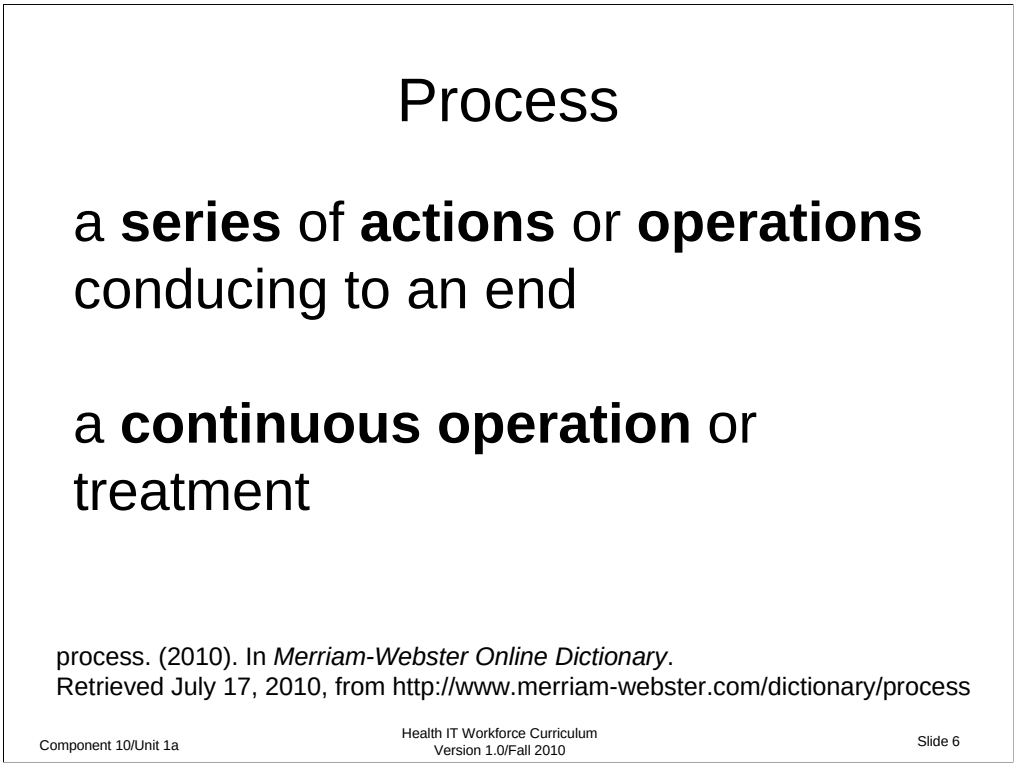
Definitions

Definitions:

- Process
- Process Analysis
- Process Redesign
- Workflow
- Workflow Analysis
- Data, Information, and Knowledge
- Data and Information flow

Before we start, and in a way, as an introduction, we will cover the following definitions:

- Process
- Process Analysis
- Process Redesign
- Workflow
- Workflow Analysis
- Data, Information, and Knowledge
- Data and Information flow



Merriam-Webster defines process as a **series** of **actions** or **operations** conducing to an end; especially, a **continuous operation** or treatment. Similarly, the American Society for Quality defines Process as "a set of interrelated work activities characterized by a set of specific inputs and value added tasks that make up a procedure for a set of specific outputs".

The word Procedure is related to process. ASQ defines a **Procedure** as: The steps in a process and how these steps are to be performed for the process to fulfill a customer's requirements; usually documented.

Important characteristics of Processes for our work are that processes have 1) sequence or order, 2) steps, also called activities, actions, operations, or tasks, 3) inputs and outputs, and 4) happen over and over, i.e., are ongoing. For example, appointment scheduling is a common process in healthcare facilities.

Process Analysis

1) understanding process elements and the relationships between them

AND

2) identification of opportunities for improvement

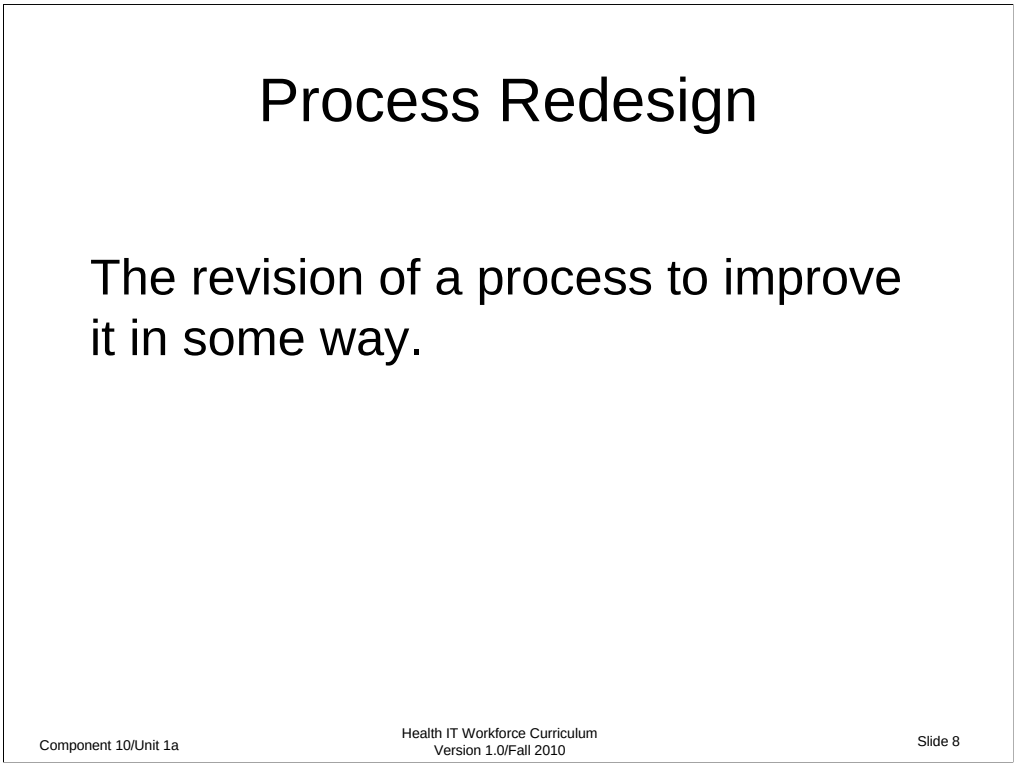
Merriam-Webster provides several definitions for the word analysis. The one most relevant for our work here is: an examination of a complex process, its elements, and their relations or a statement of such an analysis.

So, a **Process Analysis** is an examination of a process to understand it's elements such as steps and actions; and the relationships between them, including:

- the order of steps,
- what things can be done in parallel versus sequentially,
- who or what performs the steps, and
- maybe where they are performed.

However, because the goal of our "analysis" is to ultimately improve a process, we also look for things like gaps, lack of conformity with best practice, undue delays, redundancy, rework, and lack of efficiency. For us, the combination of 1) understanding process elements and the relationships between them AND **2)** identification of opportunities for improvement comprise Process Analysis !

analysis. (2010). In *Merriam-Webster Online Dictionary*. retrieved July 17, 2010, from http://www.merriam-webster.com/dictionary/analysis



Merriam-Webster defines redesign as: to revise in appearance, function, or content.

Process Redesign, then is the revision in appearance, function, or content of a Process. Like process analysis, the ultimate goal for us is to improve the process. So for our work, process redesign is driven by the need to make a process better. And introduce the electronic health record (EHR) into the process.

A report published by the Institute of Medicine offers six key areas in which healthcare in general can be improved, and ultimately these six areas discussed in detail later, are our goal. For now, we will think of better as safer, more efficient, more convenient, less errors, and more cost effective.

In quality improvement,

Process redesign, also called process re-engineering, sometimes has the connotation of, i.e., drastic and major changes expected to result in breakthrough improvements. The American Society for Quality defines **Process Re-engineering** as: A strategy directed toward major rethinking and restructuring of a process; often referred to as the “clean sheet of paper” approach. This is in contrast to **Process Improvement** which sometimes takes on the connotation of more incremental change, is defined more specifically by the American Society for Quality as: the application of the plan-do-check-act cycle to processes to produce positive improvement and better meet the needs and expectations of customers. We will cover more about both of these different approaches in the unit on Process Redesign.

redesign. (2010). In *Merriam-Webster Online Dictionary*.
Retrieved July 17, 2010, from http://www.merriam-webster.com/dictionary/redesign

Workflow

… “the *flow* of *work*” …

The way in which work progresses, including order of steps and selection between alternative steps.

The Workflow topic on Wikipedia defines workflow as: “a pattern of activity enabled by a systematic organization of resources, defined roles and mass, energy, and information flows, into a work process that can be documented and learned”.

The term workflow is used in the information technology and related fields to denote the interactions between human and machine in accomplishing a task.

In everyday use, the terms workflow and process are used interchangeably. Workflow is often more specifically thought of as the flow or path of the work steps, i.e., the way in which work progresses, including things like order of steps and selection between alternative steps. Like a process, a workflow has inputs and outputs, i.e., resources (mass, energy, information) and the people or things that perform the steps or activity that comprise the work are considered.

What is Clinical Workflow?

- Workflow is an established business process describing how the tasks are done, by whom, in what order and how quickly
- Workflow is defined as the coordination of tasks, data, and people to make a business process more efficient, effective, and adaptable to change

For our purposes in this class:

Workflow is an established business process describing how the tasks are done, by whom, in what order and how quickly

As well as:

the coordination of tasks, data, and people to make a business process more efficient, effective, and adaptable to change

Thus Clinical Workflow is

an established clinical business process describing how the tasks in the health care setting are done, by whom, in what order and how efficiently

As well as:

the coordination of the tasks, data, and people to make the workflow in the health care setting more efficient, effective, and adaptable to change

Workflow Analysis

1. understanding workflow elements and the relationships between them

AND

2. identification of opportunities for improvement

Like a Process Analysis, a workflow analysis is an examination of a workflow to understand it's elements (steps, flow control) and the relationships between them, including the order of steps, what things can be done in parallel versus sequentially, who or what performs the steps, maybe physically where they are performed. However, because the goal of our "analysis" is to ultimately improve a process, we also look for things like gaps with best practice, undue delays, redundancy, rework, and efficiency.

For us, workflow and process analysis are interchangeable: the combination of 1) **understanding workflow elements and the relationships between them AND 2) identification of opportunities for improvement comprise Workflow Analysis !**

Data, Information and Knowledge

Data: a difference

Information: data + meaning

Knowledge: justified true belief

- Declarative knowledge
- Procedural knowledge

Many different definitions for data, information and knowledge exist. Many of these definitions conflict. Here we will briefly mention some of the more common definitions, and then we choose a set of definitions for use in this component. There are other equally valid choices.

Data, according to Merriam-Webster, are 1. factual information, or 2. information in numerical form.

Information in common use (Merriam-Webster) has definitions that encompass both data and knowledge. Other sources, such as Enrico Coeria, think of information as aggregated data. These common use definitions overlap and thus are not specific for professionals that deal with data and information systems. Further, thinking of information as aggregated data overlooks meaning, and the degree of aggregation is relative. For our purposes here, we use definitions for data and information from the field of Information Science, the *General Definition of Information* (GDI) explained by Luciano Floridi in his 2005 paper Semantic Concepts of Information.

Data is a difference, for example, a colored dot on a white sheet of paper, or the number 78. More specifically, "A putative fact regarding some difference or lack of uniformity within some context"

Information is data plus meaning, for example, "a heart rate of 78 beats per minute".

Thus, we can think of **Knowledge** (commonly defined as justified true belief) as information plus justification.

Knowledge can be further divided into declarative knowledge and procedural knowledge. Declarative knowledge consists of facts, True Assertions of who, what, when, where. Procedural knowledge is the true assertion of how.

Following from the definition set that we adopt here, Data are the numerical values and characters (represented in computers as the presence or absence of electric or magnetic charge, i.e. bits) that we collect, store, and exchange. Where we have done a good job of defining the data, we preserve the meaning and have information.

knowledge. (2010). In *Merriam-Webster Online Dictionary*. retrieved July 17, 2010, from http://www.merriam-webster.com/dictionary/knowledge

information. (2010). In *Merriam-Webster Online Dictionary*.
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Floridi, Luciano, "Semantic Conceptions of Information", *The Stanford Encyclopedia of Philosophy (Summer 2009 Edition)*, Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/sum2009/entries/information-semantic/>.

Data and Information Flow

the steps or path by which data are moved through a work process or a system or some combination of both, including the order of steps, and operations performed on the data (or information)

Because of the different definitions in use, one person's data flow may be another person's information flow … what I am trying to say is that significant ambiguity is introduced due to the non-specific use of the terms data and information. Unfortunately, thinking on the topic has changed over time, for example, early work done in the 1960's and 1970's uses the term "data flow", but the term is used with respect to defined values, i.e., data + meaning in well defined data systems. By today's thinking (and the general definition of information - GDI), the early work would be called "information flow". For this component, to maintain consistency with the source material for given topics, we will give in to the vagaries of natural language and use the terms interchangeably.

When we use the terms data flow and information flow, we mean the steps or path that the data takes through a work process or a system or some combination of both, including the order of steps, and operations performed on the data (or information).

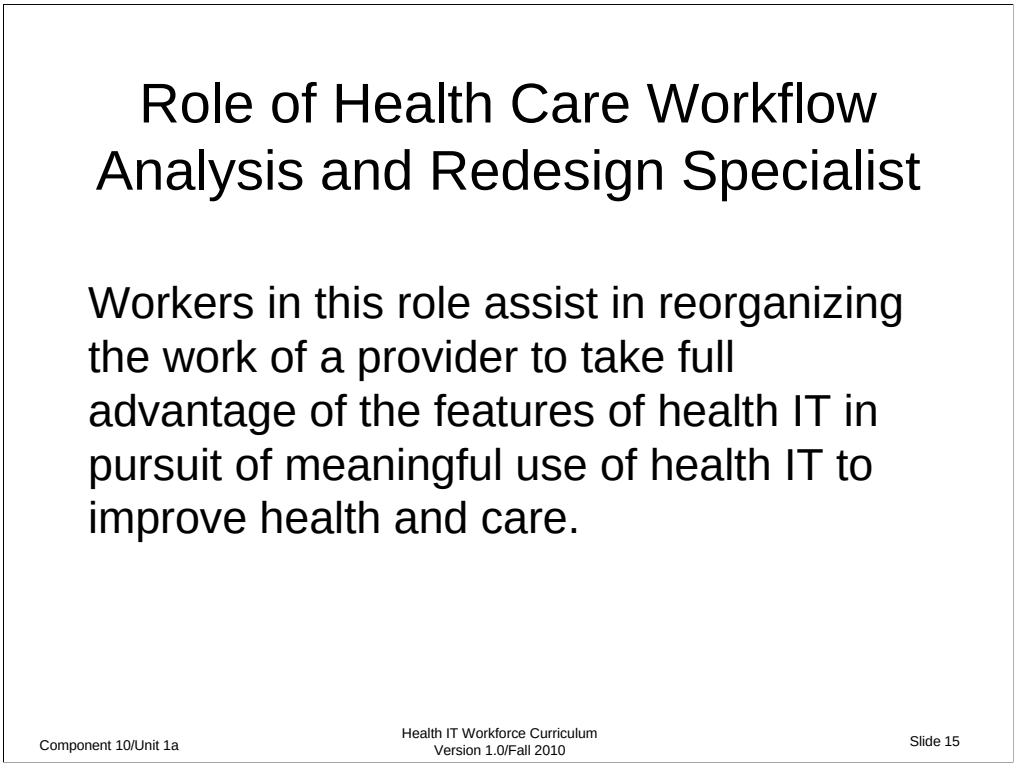
A Workflow Process Analyst and Redesign Specialist

combines

1. Understanding of an organizations objectives, structure and procedures, and
2. Knowledge of how to exploit information technology

to improve how an organization operates and achieves it's goals

A Workflow Process Analyst and Redesign Specialist combines knowledge of two key things 1) an organizations objectives, structure and procedures, and 2) how to use that information technology **for the purpose of** improving how the organization, or health care facility, operates and achieves it's goals.



The role of Health Care Workflow Analysis and Redesign Specialist is one of 12 roles defined as necessary by the Office of the National Coordinator for Health IT to achieve meaningful use of health information technology using Electronic Health Records - - - a goal for all Americans by 2014. This component covers material critical for the workflow analysis and redesign specialist role. Other roles such as implementation specialist will also benefit from this material.

The description, expected background and competencies for the role are provided in a supplemental handout sheet.

Process Analyst Role

- Describe the Dance
- Overcome communications problems in analysis
  1. Natural difficulty in describing procedure
  2. Inappropriateness of narrative text for describing procedures
  3. Lack of common language between the user and analyst

Tom DeMarco, introduced earlier as a pioneer and thought leader in process analysis likens process analysis to describing a dance. He adds further insight to the role of the Process Analyst by emphasizing the requirement of intensive communication of the role, and by describing the following three key communications challenges that process analysts face:

The first is the Natural difficulty in describing procedure,

The second is the Inappropriateness of narrative text for describing procedures, and finally there is a Lack of common language between the user and analyst

Process Analysis Skills

- At ease with data and data system concepts
- At ease with clinical workflow concepts
- Able to communicate such concepts
- Able to identify problem areas

DeMarco further outlines Process analysis skills helpful to overcome the challenges inherent in Process Analysis. These are:

- Knowledge of data and data system concepts
- Knowledge of clinical workflow concepts, and the
- Ability to communicate these concepts

We added the ability to identify problem areas.

Process Re-design

- Role: Choreographing a new dance between humans, information, and computers
- Skills: Ability to combine organizational knowledge and technology to create a better way

If Process Analysis is describing the dance, Process Redesign is choreographing or planning a new dance. For us, the dance is the interaction between humans, information and computers in the clinical setting. The key skill a Process Redesign specialist needs is the ability to combine, analyze and synthesize, the organizational knowledge, including knowledge of clinical workflow, and technology to create a “better way”.

Why is Health Care Process Analysis and Redesign Important?

- 98,000 or more people die annually in the US due to medical errors[3]
- Lack of information and care fragmentation called out as leading contributors[2, 3, 4]
- Meaningful use of Health IT will decrease this number [4]

Component 10/Unit 1a

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Slide 19

Why do we need to analyze and redesign the processes currently used in the health care organization? Why are we implementing health information technology in the clinical setting at all?

A 1999 Institute of Medicine report estimated that 98,000 or more people die annually in the US due to medical errors[3]

This is

- More than die from motor vehicle accidents, breast cancer or AIDS, and
- More than die from Alzheimer's, diabetes or pneumonia

The 2001 report, Crossing the Quality Chasm specifically listed five imperatives for increasing quality of healthcare in the United States. This list included

1) Reengineered care processes,
2) Effective use of information technologies,
3) Knowledge and skills management,
4) Development of effective teams, and
5) Coordination of care across patient conditions, services, sites of care over time.

Most of these involve or depend on Health IT,

And, Process Analysis and Redesign is at the heart of increasing the quality of healthcare.

As the great thought leader of quality, Edwards Deming stated, “You can only elevate individual performance by elevating that of the entire system.” thus, this effort is focused on the entire health care system.

Process Analysis Involves

1) understanding process elements and the relationships between them

AND

2) identification of opportunities for improvement

A Process or Workflow Analyst combines

1) understanding process elements and the relationships between them AND
2) identification of opportunities for improvement including the ways to leverage health IT

Unit 10.1c provides an overview of clinical workflow and ways in which Health IT can be employed to improve healthcare.

IOM 6 Quality Areas

1. Safe
2. Effective
3. Efficient
4. Timely
5. Patient centered
6. Equitable

Crossing the Quality Chasm provided 6 aims and simple rules for redesign of health care. They are:

1. Care should be safe, as safe for patients in their health care facilities as in their homes.
2. The science and evidence behind health care should be applied and served as the standard in the delivery of care.
3. Care and service should be cost effective and waste should be removed from the system.
4. Patients should experience no waits or delays in receiving service.
5. The system of care should revolve around the patient, respect patient preferences, and put the patient in control.
6. Unequal treatment should be a fact of the past; disparities in care should be eradicated.

Importantly, increasing the quality of care is our goal. Implementing **technology** is a way to achieve this goal.

EHR Meaningful Use

- Term coined by the framers of the American Recovery and Reinvestment Act of 2009 (ARRA)
- Addresses five national health policy priorities

"Meaningful Use" of EHRs is used to collectively describe those criteria established by ARRA to qualify health care providers for the electronic health record incentives to be provided. The purpose of these incentives is to encourage the greater health care community to implement EHRs. The expectation is that the coordinated adoption of EHR use across health care providers will address the 5 established national health policy priorities.

5 National Health Priorities

- Improve quality, safety and efficiency and reduce health disparities
- Engage patients and families
- Improve care coordination
- Improve population and public health
- Ensure adequate privacy and security protections for personal health information (PHI)

The Health Information Technology for Economic and Clinical Health (HITECH) Act incentives and assistance program seeks to improve . . . the performance of the U.S. health care system through "meaningful use" of EHRs to achieve five national health care goals:

1. Improve quality, safety and efficiency and reduce health disparities
2. Engage patients and families
3. Improve care coordination
4. Improve population and public health
5. Ensure adequate privacy and security protections for personal health information (PHI)

Ref.: CMS and ONC Final Regulations Define Meaningful Use and Set Standards for Electronic Health Records Incentive Program, 13 July 2010

www.cms.gov/apps/media/press/factsheet

Meaningful Use Topics

- Data Capture
- Data Standards
  - ICD, SNOMED, RxForm, LOINC
- Effective Clinical Workflows
- Computer-based Order Entry
- E-Prescribing
- Clinical Decision Support
- Patient Health Information Exchange
- Privacy and Security
- eMAR (Medication Administration Records)

Meaningful use of Health IT includes the following things:

1. Data Capture
2. Data Standards

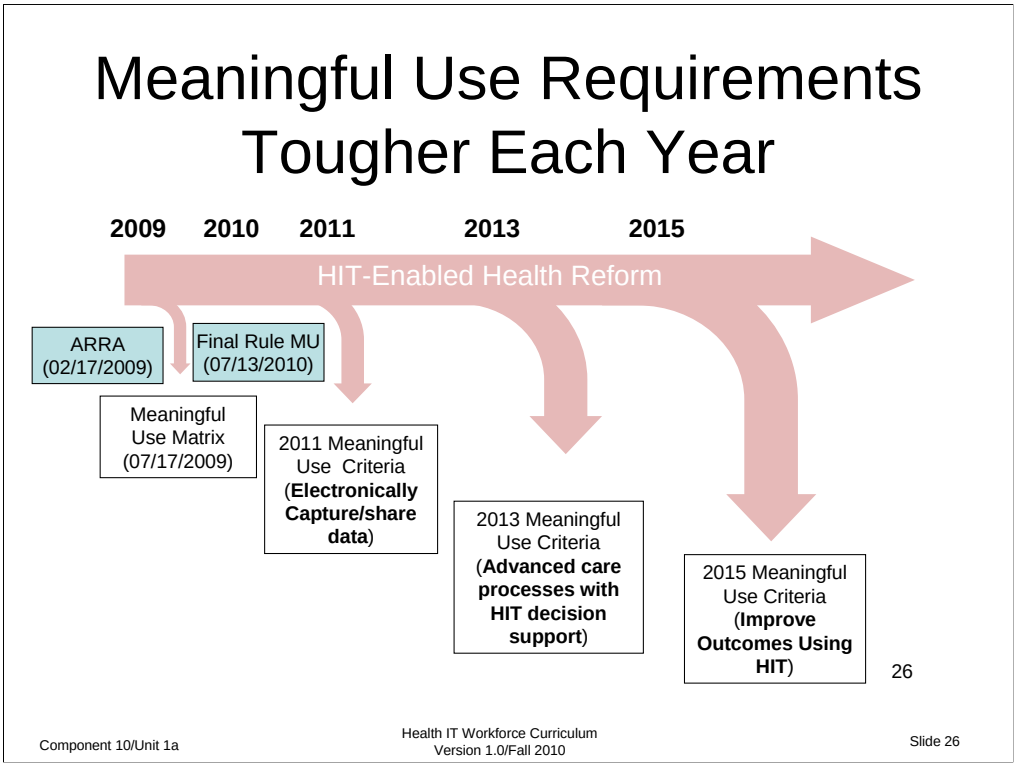
   ICD, SNOMED, RxForm, LOINC
3. Effective Clinical Workflows
4. Computer-based Order Entry
5. E-Prescribing
6. Clinical Decision Support
7. Patient Health Information Exchange
8. Privacy and Security
9. eMAR (Medication Administration Records)

Meaningful Use Requirements Examples

- >= 80% of all orders directly entered by authorizing provider
- >= 75% of all permissible medication orders are electronically prescribed
- . . .

For a provider to meet or successfully claim that they are using Health IT meaningfully, they must achieve the requirements stated in the meaningful use rule. An example of such a requirement is, “greater than or equal to 80% of all orders directly entered by authorizing provider”, another example is “greater than or equal to 75% of all permissible medication orders are electronically prescribed”.

A reference to the full criteria is given at the end of this Unit.



Meaningful Use requirements get tougher each year. There are incentives in early years for those that achieve Meaningful Use, and in later years, there are penalties for not meeting it. The incentives are a fixed dollar amount for the initial years while the penalties for not meeting the requirements are in the form of several percentage decrease in the reimbursement payments from the Center for Medicaid and Medicare (CMS) in later years. To a large hospital, this means millions of dollars. To small and large practices and healthcare facilities alike, the MU incentives considerably offset the cost of obtaining and implementing Health IT.

References

1. DeMarco, Tom. Structured Analysis and System Specification. Yourdon Press, Prentice-Hall, New Jersey 1979
2. *To Err is Human: Building a Safer Health System 1999* available from the National Academy Press (NAP) at http://www.nap.edu/books/0309068371/html/
3. *Crossing the Quality Chasm: A New Health System for the 21st Century 2001* available from the National Academy Press (NAP) The full text of this report is available at http://www.nap.edu/books/0309072808/html/
4. Willam W. Stead and Herbert S. Lin, editors; 2009 Computational Technology for Effective Health Care: Immediate Steps and Strategic Directions, Committee on Engaging the Computer Science Research Community in Health Care Informatics; National Research Council available online at http://www.nap.edu/catalog/12572.html
5. Medicare and Medicaid Programs: Electronic Health Record Incentive Program at https://www.cms.gov/InpatientPsychFacilPPS/Downloads/CMS1306Pdisplay.pdf

These references were used in this unit.

This concludes the first of two lectures for the Concepts of Processes and Process Analysis unit.

You may go on to the second lecture or stop and return to the second lecture at a later time.