

# Interpreting and Creating Process Diagrams

## Component 10 Unit 3a Introduction

Component 10/Unit 3a

Health IT Workforce Curriculum  
Version 1.0/Fal 2010

Slide 1

Unit 3 examines different diagramming methods for developing graphical representations of processes in the health care settings. Throughout the last century, different diagrams and notations have arisen. There is considerable overlap between them. Some have fallen by the way-side and others remain in use. Some have become international standards, while others exist in textbooks and articles. In this section, we present major formalisms for process diagramming in use today, and the process aspects that each covers.

Unit 3 is composed of several sub-units, one for each diagramming method. Based on feedback from practitioners, we recommend using two methods (data flow diagrams in Yourdon notation, and flowcharts). In this introduction presentation, we review the process aspects that each diagram type covers. In separate presentations, we cover each diagram type. For the two recommended methods, the presentation covers concepts and skills from reading and interpreting the diagrams to actually creating them. For the rest of the diagrams, we cover only background, use, and notation, i.e., the presentation prepares the student to read and interpret the diagram but not to create them.

## Upon successful completion of this Component the student is able to:

- Create context and data flow diagrams for a health care system (or system component) using appropriate Yourdon symbols and conventions
- Create a process flowchart for a health care system (or system component) using appropriate ISO 5807 symbols and conventions.
- Choose the correct scope and detail level for a process flowchart and data flow diagram
- Read and interpret Gane-Sarson data flow diagram
- Read and interpret UML class, activity, and state diagrams
- Read and interpret an entity relationship diagram in crow's foot notation

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Create context and data flow diagrams for a health care system (or system component) using appropriate Yourdon symbols and conventions

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Choose the correct scope and detail level for a process flowchart and data flow diagram

Read and interpret Gane-Sarson data flow diagram

Read and interpret UML class, activity, and state diagrams

Read and interpret an entity relationship diagram in crow's foot notation

# So Many to Choose From

- Several methods and notations for diagramming processes exist. Main ones include:
  - ISO 5807 Flow Charting
  - Yourdon (including Yourdon code, and Yourdon DeMarco)
  - Gane-Sarson
  - Unified Modeling Language (UML)
  - E-R diagram
- They differ in notation and in the process aspects covered.

There are several methods and notations for diagramming or mapping the clinical workflow processes, including:

ISO 5807 information processing diagrams, the same symbols used for Flow Charting, Yourdon notation for data flow diagrams, Gane-Sarson notation for data flow diagrams, Unified Modeling Language (UML) that represents several different aspects of processes, and Entity relationship (E-R) diagrams that concentrate solely on information content. These methods differ in notation used, and most importantly, the aspects of processes and information flow that each is designed to cover.

In this section, we will review the process aspects that each notation covers and show an example of each type of diagram.

# Process Features

- Context
- Process steps
- Information flow
- Information content
- Information transformation
- Step sequence, control, and status
- Who or what performs the process steps

The process aspects to be featured will determine the type of diagram to be used, i.e. the diagram that best represents the process aspects that you are interested in. The are six important process aspects are:

Context

Process steps

Information flow

Information content

Information transformation

Sequence and other control

Who or what role performs the step

The following table indicates which process aspects are covered by the notations / diagramming methods.

Note: The health care setting in which you work may have standardized on one particular notation/method for their process representation. Further, healthcare facilities may have participated in quality improvement or software development efforts, in which case, there may be existing process diagrams that may be of use to you. So, while you may prefer a particular method and can select that method of use in this course, it is important to be aware the major notations/methodologies, and to understand the basic uses and notation of each.

# Methods for Diagramming Processes

Process Aspects	ISO 5807	Yourdon	Gane-Sarson	UML	E-R diagram
Context		X	X	X	
Process steps	X			X	
Data flow steps	X	X	X	X	
Information content		text	text	X	X
Data transformation	X	X	X	X	
Flow control and state	X		text	X	
Roles involved	X			X	

This unit covers five notations that are commonly used to diagram processes: ISO 5807, Yourdon, Gane-Sarson, UML, and E-R diagrams. ISO 5807 can be used to represent process steps and their sequence and control, as well as information transformation and roles involved in the process. Yourdon represents context, process steps, and information transformation. Gane-Sarson represents the latter two process aspects. Unified Modeling language, developed a few decades after and heavily influenced by the earlier methods was designed to represent all but the Yourdon-style context diagram. The Entity-relationship diagram is designed to represent only information content.

Supplemental material for this unit will cover each of these five methodologies.

# Process Features

- **Context** → Yourdon data flow diagram
- **Process steps** → ISO 5807 Flowchart
- Information content
- Information transformation
- **Step sequence, control** and status
- **Roles (who or what) performs the steps**

Not all of the process aspects noted earlier are critical for the work we will be doing. For the workflow process representation we recommend the following:

Yourdon – Context diagrams

ISO 5807 – Flowcharts Process steps, and step sequence and other control diagrams as well as roles performing the steps

Yourdon Context Diagrams and ISO 5807 Flowcharts are covered in Unit 10.3. 2 and 10.3.1 respectively. Detailed instructions are provided on how to create and use the diagrams. We also provide additional symbols that are needed to diagram more complex processes.

Information content and information transformation and state are important to information systems design. They are less important to process analysis and re-design, especially where relevant aspects of data content are covered in data flow diagrams. This is why information content, transformation and state diagrams are not covered in detail here.

# Typical Workflow Diagramming Scenario

Need to diagram the process as it is

Context diagram to capture:

- the whole
- high-level data flow so that necessary data exchange is documented

ISO 5807 Flowchart to capture:

- Process steps
- Sequence and control of steps
- Roles performing steps

The goal of workflow analysis and process redesign is to represent aspects of the process that help the analyst and healthcare facility staff identify areas where the process can be improved.

The diagrams recommended here met this need by concentrating on process steps data flow, roles, and visualizing the whole. There are other process aspects that are not critical to this analysis and thus will not be considered.

Other efforts where these methods have been used to successfully analyze and redesign health care processes include the Public Health Institute's Business Process Analysis and Redesign program to improve the performance of the U. S. public health system.<sup>1</sup> We strongly recommend that you review this reference.

# Subsequent slide sets in Unit 3 cover:

ISO 5807 Flow Charting  
Yourdon Data Flow Diagrams  
Gane-Sarson  
Unified Modeling Language (UML)  
E-R diagram



# References

1. Public Health Informatics Institute. (2006). *Taking Care of Business: A Collaboration to Define Local Health Department Business Processes*. Decatur, GA: Public Health Informatics Institute