

1 HL7 INTRODUCTION, MESSAGING & THEORY



9 Hours

Overview

“HL7” refers to Health Level Seven, Inc., an all-volunteer, not-for-profit organization involved in development of international healthcare standards. “HL7” is also used to refer to some of the specific standards created by the organization (i.e., HL7 v2.x, v3.0, HL7 RIM etc.).

Health Level Seven is one of several American National Standards Institute (ANSI) - accredited Standards Developing Organizations (SDOs) operating in the healthcare arena. Most SDOs produce standards (sometimes called specifications or protocols) for a particular healthcare domain such as pharmacy, medical devices, imaging or insurance (claims processing) transactions. Health Level Seven’s domain is clinical and administrative data.

Hospitals typically have many different computer systems used for everything from billing records to patient tracking. All of these systems must communicate with each other (a.k.a. "interface") when they receive new information. The HL7 messaging standard, as expressed in Version 2.x, defines a messaging protocol and syntax, which can be considered a “language” by which various healthcare systems can interoperate. Healthcare systems need to communicate a wide variety of information in real time, such as broadcasting that a new patient was admitted or placing a pharmacy order. Connecting various healthcare systems is difficult without a common standard such as HL7.

HL7 and its members are dedicated to providing a comprehensive framework (and related standards) for the exchange, integration, sharing and retrieval of electronic health information. The HL7 standards, which support clinical practice and the management, delivery, and evaluation of health services, are the most commonly used in the world for this purpose.

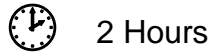
Section Learning Objectives

At the end of this section, the reader should have:

- ★ An introduction to HL7.
- ★ An understanding of why HL7 is a necessity for any healthcare institution with multiple information systems.

- ★ An understanding of how HL7 works.
- ★ An understanding of the communication environment for HL7.
- ★ An overview of the various application areas of HL7.
- ★ An overview of an HL7 message.
- ★ An overview of message types.

1.1 What is HL7?



1.1.1 Learning Objectives

The reader will acquire an overview of the Health Level Seven (HL7) V2.x messaging standard, which provides a series of predefined logical formats for packaging healthcare data in clinical and administrative environments, in the form of messages to be transmitted among various information systems.

1.1.2 Study Assignments



Enterprise Integration Using HL7, Slides 4 - 14

HL7 Standard V2.5, Chapter 1, Section 1.1 and 1.2

HL7 Messaging, Chapter 1, pages 11 - 12

1.1.3 Key Terminology

| | |
|----------------------------------|--|
| Health Level Seven (HL7) | |
| Clinical and Administrative Data | |
| Open System Interconnection | |
| Data Content | |
| Interrelationship of Messages | |
| Patient Identifier | |
| Clinician Identifier | |
| Laboratory Test Information | |
| Test Results | |
| Administrative Data | |

| | |
|---------------|--|
| Communication | |
| Formation | |

1.1.4 Summary

- ❑ The Health Level Seven (HL7) Version 2.x messaging standard is a standard series of formats for packaging healthcare data in the form of messages to be transmitted among computer systems.
- ❑ HL7 is not a commercial software or data transfer package, but instead is a defined set of rules for sending printable text characters in groups that represent patient identifiers, clinician identifiers, laboratory test information, test results, and other clinical and administrative data.
- ❑ HL7 is primarily concerned with the data content and interrelationship of messages and with communicating certain application level error conditions.
- ❑ The Standard allows communication between separate and different types of information systems. These systems may range from small, highly specialized laboratory analyzers to large inter-enterprise information repositories.
- ❑ The term "Level 7" refers to the highest level of the Open System Interconnection (OSI) model of the International Standards Organization (ISO). Note that it does not conform exactly to ISO defined protocol elements and definitions of the OSI's seventh level.
- ❑ It is one of several American National Standards Institute (ANSI) - accredited Standards Developing Organizations (SDOs) operating in the healthcare arena.
- ❑ Any system that asserts compliance with HL7 must follow the rules that are laid out in the Standard. These rules cover two broad areas.
 - The **formation** of messages: what elements constitute a message and how these elements are put together in a message.
 - The actual **communication** of these messages: how systems send messages back and forth, and how they verify the receipt and custody of the data in the messages.

1.2 Why is HL7 Required?




1 Hour

1.2.1 Learning Objectives

Messaging standards like HL7 are important because they define how information is packaged and communicated from one party to another. Such standards enumerate the language, structure and data types required for seamless integration from one system to another. The reader should know the significance of HL7 in integrating health care solutions.

1.2.2 Study Assignments

 HL7 Standard V2.5, Chapter 1, Section 1.4

1.2.3 Key Terminology

| | |
|--------------------------|--|
| Information Connectivity | |
| Applications Development | |
| Information Formats | |
| Critical Data | |
| Network Technology | |
| Interfacing Applications | |

1.2.4 Summary

- HL7 provides a detailed framework for achieving information connectivity between any systems that have the same, common concept - the patient.
- It is common today for the average hospital to have installed computer systems for admission, discharge, and transfer; clinical laboratories; radiology; billing and accounts receivable, to cite a few. These systems are often developed by different vendors or in-house groups, with each product having highly specific information formats.
- As hospitals have gradually expanded information management operations, a need to share critical data among the systems has emerged.
- Network technology has enabled the integration of functionally and technically diverse computer applications in healthcare environments.
- Extensive site-specific programming and program maintenance are often necessary for interfacing proprietary applications in a network environment. This work is greatly reduced using the HL7 standard for interfacing, which has been developed and balloted by vendors and users alike.
- HL7 is an essential part of the healthcare information technology superstructure, facilitating both a common specification and a specification methodology.

1.3 Communication Environment for HL7



2 Hours

1.3.1 Learning Objectives

The reader should acquire knowledge of the communication environment supported by the HL7 Standard and the capabilities it provides.

1.3.2 Study Assignments



Enterprise Integration Using HL7, Slides 5 - 21



HL7 Standard V2.5, Chapter 2, Section 2.4

1.3.3 Key Terminology

| | |
|-----------------------------|--|
| ISO Model – Seventh Level | |
| OSI protocols | |
| <i>Ad hoc</i> environments | |
| RS-232 links | |
| Modems | |
| LANs | |
| Lower Level Protocols (LLP) | |
| TCP/IP | |
| DECNET | |
| Proprietary networks | |
| IBM's SNA LU6.2 | |
| SUN Microsystems' NFS | |

| | |
|-------------------------|--|
| Error-free transmission | |
| Character conversion | |
| Message length | |

1.3.4 Summary

- ❑ HL7 conceptually operates at the seventh level of the ISO model for Open System Interconnection (OSI).
- ❑ Since the OSI protocols are not universally implemented, the HL7 Working Group is interested in providing standards that will be useful in the interim.
- ❑ Some of the network environments supported by the HL7 Standard are listed below. Note that this is not an exhaustive list. It is only a partial list of the universe of environments that the standard supports.
 - *Ad hoc* environments that do not provide even basic transport reliability. Such environments consist of point-to-point RS-232 links, modems, and even LANs, if their connection to host computers is made via RS-232 communications links. Until OSI high-level standards became prevalent, many healthcare interfaces were implemented over such links. In an *ad hoc* environment, the HL7 Lower Level Protocols (LLP) may be used between systems to enhance the capabilities of the communications environment. (The HL7 Lower Level Protocols are defined in the HL7 Implementation Guide, which is not an official part of the Standard.)
 - Environments that support a robust transport level, but do not meet the high level requirements. This includes environments such as TCP/IP, DECNET, and SNA.
 - ISO and proprietary networks that implement up to presentation and other high level services. IBM's SNA LU6.2 and SUN Microsystems's NFS are examples of complete proprietary networks.
 - Two or more applications running on the same physical and/or logical machine that are not tightly integrated. In these environments, messaging capabilities may be provided by inter-process communications services (e.g., pipes in a UNIX system).
- ❑ The HL7 Standard assumes the communications environment will provide the following capabilities:
 - Error-free transmission: Applications can assume that they correctly received all of the transmitted bytes in the order in which they were sent. This implies that error checking is done at a lower level. However, sending applications may not assume that the message was actually received without receiving an acknowledgment message.
 - Character conversion: If the two machines exchanging data use different representations of the same character set, the communications environment will convert the data from one representation to the other. This might include, for example, conversion between EBCDIC and ASCII.
 - Message length: HL7 sets no limits on the maximum size of HL7 messages. The Standard assumes that the communications environment can transport messages of any length that might be necessary. In practice, sites may agree to place some upper bound on the size of

messages and may use the message continuation protocol, described later in this guide, for messages that exceed the upper limit.

- Start and end of message: HL7 relies on the lower layer protocol to signal when the last byte of a message has been received. There is no specific content in the message that serves as an "end" statement. Lower layer protocol implementations use special characters to indicate the start and end of a message. Start of message and end of message characters come as a pair in the HL7 Minimal Lower Layer Protocol. Strictly speaking this is not a part of the HL7 standard but was a "recommendation" to be used in the absence of the full functional support from the lower layers in real-world environments. It was thought to be necessary for TCP which is a stream-oriented protocol but not for LU6.2 which inherently provides message blocking. One function of these characters was to provide the receiving routines with a way to signal when the message was complete, without waiting for another message to start. For some environments another function was to deal with the possibility that partial messages had slipped through. This latter problem was more prevalent when HL7 messages were being sent over Local Area Networks and then from a communications server into a serial port of the receiving system. Because the Minimal LLP is not part of the Standard there is nothing that requires a system to use it. Minimal LLP is used quite frequently in TCP environments. Whether it is best or not, there is considerable advantage to doing what most other people do. For vendors it reduces the likelihood that you will be compelled to do something different than your normal product. For institutions it is usually faster, cheaper, and more reliable to have the vendors install code that has been developed and field-tested at others' expense.
- Section 2.4 of the HL7 Standard discusses the communication environment for HL7.

1.4 Application Areas of HL7



2 Hours

1.4.1 Learning Objectives

To get an overview of the application areas such as Patient Administration, Order Entry, Financial Management, Observation Reporting, Master Files and Indexes, Medical Records/Information Management, Scheduling and Logistics, Patient Care, and Patient Referral. The reader should know each of the application areas that the HL7 Standard encompasses.

1.4.2 Study Assignments



HL7 Standard V2.5, Chapters 3, 4, 6, 7, 8, 9, 10, 11, and 12

1.4.3 Key Terminology

| | |
|--|--|
| Patient Administration | |
| Order Entry | |
| Financial Management | |
| Observation Reporting | |
| Master Files and Indexes | |
| Medical Records/Information Management | |
| Scheduling and Logistics | |
| Patient Care | |
| Patient Referral | |

1.4.4 Summary

The HL7 standard contains messages for almost every conceivable healthcare area including the following:

□ Patient Administration

- The Admission, Discharge and Transfer (ADT) transaction set provides for the transmission of new or updated demographic and visit information about patients.
- Generally, information is entered into an ADT system and passed to the nursing, ancillary and financial systems either in the form of an unsolicited update or as a response to a record-oriented query.
- For example; **ADT/ACK - admit/visit notification (event A01)**
 - An A01 event is sent as a result of a patient undergoing the admission process, which assigns the patient to a bed.
 - It signals the beginning of a patient's stay in a healthcare facility.
 - An A01 event can be used to send notifications to:
 - The pharmacy system that a patient has been admitted and may be legitimately prescribed drugs.
 - The nursing system that the patient has been admitted and needs a care plan prepared.
 - The finance system to indicate the start of the billing period.

- The dietary system that a new patient has been admitted and requires dietary services.
- The laboratory, pathology, and radiology systems that a patient has been admitted and is entitled to receive services.
- The clinical repository that an admission has taken place and that information will be forthcoming for the purpose of populating the EMR (electronic medical record).

□ **Order Entry**

- The Order Entry transaction set allows the transmission of orders and order-related information between applications that capture the order, those that fulfill the order, and other applications as needed.
- An order is a request for material or services, usually for a specific patient. These services include:
 - Medications from the pharmacy,
 - Clinical observations from the nursing service,
 - Tests in the laboratory,
 - Food from dietary,
 - Images from radiology,
 - Linens from housekeeping,
 - Supplies from central supply,
 - An order to give a medication, to deliver it to the ward, etc.

□ **Financial Management**

- The Finance Management transaction set describes patient accounting transactions. Other financial transactions may be added in the future.
- Financial transactions can be sent between applications either in batches or in real time.
- The Financial Management chapter (Chapter 6) of the Standard includes all of the data defined in the National Uniform Billing Field Specifications (as adapted by the National Uniform Billing Commission, May 21, 1982 and revised on November 8, 1984 and in 1992).
- Chapter 6 of the Standard defines an extensive set of transaction segments in order to accommodate a comprehensive range of billing and accounts receivable systems.
- The patient accounting message set provides for the entry and manipulation of information on:
 - Billing account establishment,
 - Charges,
 - Payments,
 - Adjustments,
 - Insurance, and
 - Other related patient billing transactions.

□ **Observation Reporting**

- The Observation Reporting transaction set allows sending of structured patient-oriented clinical data from one computer system to another.
- This transaction set also provides mechanisms for registering clinical trials and methods for linking orders and results to clinical trials and for reporting experiences with drugs and devices.

- It carries information that is reported as text, numeric or categorical values.
- These transaction sets permit the transmission of any kind of clinical observations including (but not limited to) the following:
 - clinical laboratory results,
 - results of imaging studies,
 - EKG pulmonary function studies,
 - measures of patient status and condition,
 - vital signs,
 - intake and output,
 - severity and/or frequency of symptoms,
 - drug allergies,
 - problem lists,
 - physician and nursing history,
 - diagnostic lists,
 - physicals,
 - progress or operative notes.

□ **Master Files and Indexes**

- In an open-architecture healthcare environment, there often exists one or more sets of common reference files used by one or more application systems; such files are called master files.
- Some common examples of master files in the healthcare environment include:
 - Doctor master file,
 - System user (and password) master file (such information should be strongly encrypted for security),
 - Location (census and clinic) master file,
 - Device type and location (e.g., workstations, terminals, printers, etc.),
 - Lab test definition file,
 - Exam code (radiology) definition file,
 - Charge master file,
 - Patient status master,
 - Patient type master,
 - Personnel/staff master file.

□ **Medical Records/Information Management**

- The Medical Document Management (MDM) transaction set supports transmission of new or updated documents or information about their status(es).
- The main purpose of the medical record is to facilitate production, storage, and retrieval of accurate, legal, and legible documents that collectively serve as a comprehensive account of healthcare services provided to a patient.
- In the future, the MDM transaction set, along with adjuncts such as the Clinical Document Architecture (CDA), is intended also to support the data exchange needs of applications supporting other medical record functions, including chart location and tracking, deficiency analysis, consents, and release of information.

□ Scheduling and Logistics

- The Scheduling transaction set defines abstract messages for the purpose of communicating various events related to the scheduling of appointments for services or for the use of resources.
- Schedules control the occurrence of certain services and the use of particular resources.
- They consist of a set of open, booked and blocked slots for each particular service or resource.
 - *Services* are real-world events, such as clinic appointments.
 - *Resources* are tangible items whose use is controlled by a schedule. These “items” are often people, locations, or things low in supply but highly in demand.
- There are three basic types of messages defined in this transaction set: **request transactions** and their responses, **query transactions** and their responses, and **unsolicited transactions** and their responses.
 - Request transactions communicate requests for the scheduling of appointments for services or for the use of resources.
 - These transactions occur between placer (requesting) applications and filler (processing) applications.
 - The query and unsolicited transaction sets provide for the exchange of scheduling information between systems.
- The exchange of this information is achieved either **actively** or **passively**.
 - The **active** gathering of scheduling information is performed by issuing query transactions to a filler application from a querying application.
 - The **passive** gathering of this information is performed by accepting unsolicited transactions issued by a filler application.

□ Patient Care

- The Patient Care transaction set describes messages that need to be communicated between clinical applications to facilitate the provision of care for a given individual.
- The word "patient" is used here to represent any individual who receives healthcare in a variety of settings including, but not limited to, acute care, clinical care, long-term care, residential care, home healthcare, office practices, school-based care, and community settings.
- The HL7 Patient Care Technical Committee has designed messages to support the communication of problem-oriented events, including clinical problems, goals, and pathway information between computer systems.
 - A **goal** refers to an objective to be achieved as a consequence of healthcare interventions applied to a patient.
 - A **problem** of a given patient can be described by formal diagnosis coding systems as well as by narrative descriptions of healthcare issues affecting an individual.
 - A **clinical pathway** is a standardized plan of care against which progress towards health is measured.
 - **Variances** are documented deviations, either positive or negative.

❑ **Patient Referral**

- The Patient Referral message set is used in patient referral communications between mutually exclusive healthcare entities that jointly (either concurrently or sequentially) assume responsibility for particular aspects of a patient's care.
- These referral transactions frequently occur between entities with different methods and systems of capturing and storing data.
- Such transactions frequently traverse a path or network connecting primary care providers, specialists, payers, government agencies, hospitals, labs, and other healthcare entities.
- Events that trigger Patient Referral messages are not restricted to a hospital environment, but have a community-wide area of impact in which precise, accurate, and unique identification of patients and healthcare providers is needed.
- Therefore, a referral must contain adequate identification information to meet the broadly varying requirements of the dissimilar systems within the community.

1.5 Definition of a Message



1 Hour

1.5.1 Learning Objectives

In the message definition, each segment or group of segments can be either required or optional, depending on how it is marked up in the Abstract Message Syntax. Each message starts with an MSH segment that is always required. When an HL7 message is received, the MSH segment is parsed first to determine the message type. The reader should know the definition of a *message* and of a *segment*.

1.5.2 Study Assignments



HL7 Messaging Chapter 2, pages 15 - 19
 HL7 Standard V2.5, Chapter 2, Section 2.5

1.5.3 Key Terminology

| | |
|------------------------------|--|
| Message | |
| Segments | |
| Message type | |
| MSH (Message Header) segment | |

| | |
|--------------------|--|
| ASCII character 13 | |
| Array of segments | |

1.5.4 Summary

- ❑ A message is the atomic unit of data transferred between systems. It is a collection of data that sends information about an event in the healthcare enterprise.
- ❑ An HL7 message is intended to pass information about a distinct event from one computer to another.
- ❑ Each message is comprised of a group of segments in a defined sequence.
- ❑ Each message has a message type that defines its purpose.
- ❑ An HL7 message is composed of HL7 segments.
 - The first segment of an HL7 message must be the MSH (Message Header) segment.
- ❑ Each HL7 segment should end with ASCII character 13 (carriage return). Some non-standard systems use character 10 or a combination of character 10 and 13. If character 13 is not used, standard systems will be unable to parse the message.
- ❑ Segments, as well as groups of segments, in an HL7 message may be required or optional. They may or may not be allowed to repeat. Thus, message instances of the same type may have a different number of segments. Under certain conditions (most particularly in order messages), some segments are required if a previous optional segment is used

1.6 Types of Message



1 Hour

1.6.1 Learning Objectives

The reader should understand message types and how these are associated to specific application areas.

1.6.2 Study Assignments



HL7 Messaging, Chapter 3, pages 23-24
 HL7 Standard V2.5, Chapter 2, Section 2.5

1.6.3 Key Terminology

| | |
|---|--|
| ADT Message (Patient's Admission, Discharge and Transfer) | |
|---|--|

| | |
|--|--|
| ORU Message (Unsolicited observation results) | |
| Unsolicited messages | |
| Message type | |

1.6.4 Summary

- A *message type* is the general category of the message.
- A message is caused by a real-life event, a.k.a. “trigger event.”
- A message type may be associated with more than one trigger event.
- There is a one-to-many relationship between trigger event codes and message types.
- HL 7 has defined various message types to meet the requirements of specific application areas.




For example,

- The ADT Message type is used to transmit portions of a patient’s Admission, Discharge and Transfer data from one system to another.
 - The ORU Message type is used to transmit unsolicited observation results.
 - *Note: Unsolicited messages are those which are not sent in response to a specific query from a user or an application.*
- A three character code contained within each message identifies its type. These are listed in the Message Type list, Appendix A, Section A.2 of the HL7 Standard.
- The following is a table of some of the commonly used message types and the chapters in the HL7 Standard where each of the types is explained in greater detail:

| Message | Description | Chapter |
|---------|--|---------|
| ACK | General acknowledgement message | 2 |
| ADT | Admission, Discharge and Transfer message for patient administration | 3 |
| ORM | Pharmacy/Treatment order message | 4 |
| ORR | General order response message | 4 |
| ORU | Unsolicited transmission of an observation message | 7 |

ESSAY QUESTIONS

Write an article of at least one page that involves any of the following topics:

-  Imagine you broke your leg, and visit the local ER. Give the scenario and describe how the HL7 Standard might be used in a health care environment using the various transactions.
-  Explain to a CFO of a small hospital, who has currently 15 clinical information systems using proprietary interfaces, and needs to buy a new information system (for laboratory), why he should convert his infrastructure to use HL7.
-  Research the latest developments with regard to the HL7 CDA (Clinical Document Architecture), its relationship with the CCR (Clinical Care Record) and explain how it could impact patient care.

TEST QUESTIONS

HL7 Introduction, Messaging and Theory

1. A _____ is the atomic unit of data transferred between systems and is a collection of data that sends information about an event in the healthcare enterprise.
 - a. Message
 - b. Field
 - c. Element
 - d. Segment

2. An HL7 Message is intended to pass information about a distinct event from one computer to another.
 - a. True
 - b. False

3. What should the first segment of an HL7 Message be?
 - a. EVN (Event Information) segment
 - b. MSH (Message Header) segment
 - c. PID (Patient Information) segment
 - d. PV1 (Patient Visit) segment

4. Using the default encoding, each HL7 Segment should end with _____.
 - a. ASCII character 04 (End of transmission)
 - b. ASCII character 06 (Acknowledge)
 - c. ASCII character 08 (Backspace)
 - d. ASCII character 13 (carriage return)

5. When defining an HL7 Message, the segments may be _____.
 - a. Optional or repeated
 - b. Required or optional
 - c. Required, optional or repeated
 - d. None of the above

6. If a message type contains optional and/or repeating segments, two instances of the message type may contain different numbers of segments.
 - a. True
 - b. False

7. A message type may be associated with more than one _____.
 - a. Field
 - b. Component
 - c. Trigger event
 - d. Element

8. There is a one-to-many relationship between trigger event codes and message types.
 - a. True
 - b. False

9. The ADT Message type is used to transmit information related to a patient's _____.
 - a. Admission, Discharge and Transfer
 - b. Appointment preferences
 - c. Observation results
 - d. Unsolicited display update message

10. The ORU Message type is used to transmit information related to a patient's _____.
 - a. Admission, Discharge and Transfer
 - b. Appointment preferences
 - c. Observation results
 - d. Unsolicited display update message

11. Which messages are not sent in response to a specific query from a user or an application?
 - a. Unsolicited
 - b. Solicited
 - c. Both A and B
 - d. None of the above

12. Which standard defines a series of predefined logical formats for packaging healthcare data in the form of messages to be transmitted among computer systems?
 - a. LOINC
 - b. SNOMED
 - c. Health Level Seven (HL7)
 - d. DICOM

13. Which chapter of the HL7 Standard contains rules that are used by originating systems to build messages and by destination systems to interpret the message data they receive and the formation and communication of messages in general?
- a. Chapter 1
 - b. Chapter 2
 - c. Chapter 3
 - d. Chapter 4
14. HL7 conceptually operates at the seventh level of the ISO model for Open System Interconnection (OSI).
- a. True
 - b. False
15. Name the environments that support a robust transport level, but do not meet the high level requirements?
- a. TCP/IP
 - b. DECNET
 - c. SNA
 - d. All of the above
16. Which are the ISO and proprietary networks that implement up to presentation level and other high level services?
- a. IBM's SNA LU6.2
 - b. SUN Microsystems's NFS
 - c. DECNET
 - d. SNA
17. In an environment where two or more applications running on the same physical and/or logical machine are not tightly integrated, messaging capabilities may be provided by inter-process communications services (e.g., Pipes in a UNIX System).
- a. True
 - b. False
18. The chapter of the HL7 Standard that defines message structures for the transmission of new or updated demographic and visit information about patients is called ____
- a. Financial Management
 - b. Observation Reporting
 - c. Order Entry
 - d. Patient Administration

19. A P01 event is sent as a result of a patient undergoing the admission process which assigns the patient to a bed.
- a. True
 - b. False
20. Which chapter of the HL7 Standard defines message structures for the transmission of orders or information between applications that capture the order, by those that fulfill the order, and other applications as needed?
- a. Financial Management
 - b. Observation Reporting
 - c. Order Entry
 - d. Patient Administration
21. The Financial Management transaction set describes patient accounting transactions.
- a. True
 - b. False
22. In an open-architecture healthcare environment there often exists a set of common reference files used by one or more application systems. Such files are called _____.
- a. Master files
 - b. Medical records/Information Management files
 - c. Scheduling files
 - d. Order Entry files
23. Which are the basic types of messages defined in the scheduling transaction set?
- a. Request transactions
 - b. Query transactions
 - c. Unsolicited transactions
 - d. All of the above
24. Which chapter of the HL7 Standard defines message structures for medical document management?
- a. Master files
 - b. Medical records/Information Management
 - c. Scheduling
 - d. Order Entry

25. Which chapter of the HL7 Standard defines message structures for sending structured patient oriented clinical data from one computer system to another?
- e. Financial Management
 - f. Observation Reporting
 - g. Order Entry
 - h. Patient Administration
26. The main purpose of the medical record is to produce an accurate, legal, and legible document that serves as a comprehensive account of healthcare services provided to a patient.
- a. True
 - b. False
27. Which transaction sets define abstract messages for the purpose of communicating various events related to appointments for services or for the use of resources?
- a. Master files
 - b. Medical records/Information Management
 - c. Scheduling
 - d. Order Entry
28. The purpose of the Patient Care transaction set is to describe healthcare messages that need to be communicated between clinical applications for a given individual.
- a. True
 - b. False
29. Which transaction set defines the message set used in patient-oriented communications between mutually exclusive healthcare entities?
- a. Medical records/Information Management
 - b. Scheduling
 - c. Order Entry
 - d. Patient referral