

Enabling Test Compendium Efficiencies

Test Compendium Framework Electronic Directory of Services (eDOS)

A structured format for the automated delivery of Directory of Services for systems ordering lab services



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Introduction

A significant challenge in establishing a laboratory order and result interface is population of the reference laboratory's Directory of Services (DOS) within an Ordering Provider's System. Historically, laboratories have provided DOS information via proprietary solutions. Until the introduction of the eDOS Implementation Guide (IG), there have been no standards for the provision of a laboratory's DOS. These solutions include both manual and electronic proprietary processes, are time consuming and costly to update the DOS for the ordering provider.

The electronic transfer of laboratory order and result messages between a reference laboratory and the systems that order lab-testing services has been available for over 20 years. The ordering systems include, but are not limited to, Physician Office Systems (POS), Hospital Laboratory Information Systems (HLIS), Laboratory Information Systems (LIS), Practice Management Systems (PMS), Electronic Health Records (EHR), and Electronic Medical Records (EMR). Here, these systems collectively will be referred to as the Ordering Provider's System.

Historical Perspective and Background

In 2008, the American Clinical Laboratory Association (ACLA), including over 30 participating laboratory members, tasked its Health Information Technology (HIT) Committee to create a standard for the delivery of a laboratory's DOS. Using Health Level Seven's (HL7)¹ version 2.6, the HIT Committee began the development of an Implementation Guide (IG) constraining the Master File from Chapter 8 to create the framework for the test compendium. The framework defines the fields in the Master File that will be used to message the various elements of the Directory of Services and also defines the concepts of how the content would be presented to an Ordering Provider's System. This framework includes the message elements that should be presented to the clinician in order to assist in determining the appropriate test in light of a patient's diagnosis.

Over 20 proposals to resolve shortcomings within the HL7 version 2.6 standard were created and presented to HL7 for implementation in HL7 version 2.8. For example, one of these proposals was the requirement to create separate order messages for tests with different transport temperatures or to request special handling for specimens. These proposals were then adopted early into the eDOS Implementation Guide. The Implementation Guide was opened for public comment² before being turned over to HL7 for ballot as an ANSI Informative



¹Health Level Seven (HL7) International - A standard for Clinical and administrative data - <http://www.hl7.org>

²[http://www.acla.com/sites/default/files/ACLA%20eDOS%20INITIATIVE%20-%20draft%20ACLA%20web%20page%20\(2\).docx](http://www.acla.com/sites/default/files/ACLA%20eDOS%20INITIATIVE%20-%20draft%20ACLA%20web%20page%20(2).docx)

MU3 proposed rules
are anticipated to be published in January 2014 with final rule anticipated to be published in summer 2014.

Document. The final draft of the IG was published by HL7 in January 2011 as the "Implementation Guide: ACLA Test Compendium Framework (eDOS), Release 1". The final draft IG can be found at: <http://www.hl7.org/implement/standards/v2messages.cfm> under the section called "Version 2.x Informative Documents." Please note that an HL7 membership is necessary to download the current document; or a copy can be purchased through the HL7 bookstore for \$50.00 USD. The HL7 bookstore can be found at <https://www.hl7.org/store/index.cfm?ref=nav>. This guide assumes HL7 knowledge and understanding of Chapter 2 conformance requirements.

Each ACLA member laboratory informed its preferred list of vendors to begin the socialization of this new industry standard. The EHR-Lab Interoperability and Connectivity Specification (ELINCS) Order Message Implementation Guide makes reference to eDOS as a recommended solution for communicating the Directory of Services. The U.S. Department of Health and Human Services' Standards and Interoperability Framework Initiative (S&I Framework) also has referenced eDOS³ but has not yet placed it in their list of Implementation Guides. This likely is a requirement that will be published in Meaningful Use Stage 3 (MU3) rules. MU3 proposed rules are anticipated to be published in January 2014 with final rule anticipated to be published in summer 2014.

Key concepts of the Implementation Guide

eDOS is built on HL7 version 2.6⁴ using the same message envelope used for laboratory orders and results messages, thereby allowing for existing communications to be used to exchange the DOS information. eDOS provides for initial download as well as interval maintenance updates.

For the purpose of this report, the identifier for a laboratory test will be called Order Codes. Order Codes can order individual tests defined as an analyte, order a battery of analytes, or order multiple tests and/or batteries that make up a profile. Examples of a battery would be an Electrolyte Panel which includes Potassium, Sodium, Chloride, and Carbon Dioxide. An example of a profile would be a Cardiac Profile that includes the Electrolyte Panel, the Cardiac Enzymes, and a number of other individual chemistry tests.

Key Message constructs for maintenance updates

The message structure supports separate messages as updates, new Order Codes, and Order Code obsolescence. This allows the vendor to direct each message to the appropriate application for the task at hand.

³HL7 Press release for eDOS, joint with ACLA http://www.hl7.org/documentcenter/public/pressreleases/HL7_PRESS_20110627.pdf

⁴HL7 made no changes to chapter 8 from version 2.4 through version 2.8. This makes the eDOS consistent with the Implementation Guides developed by ONC for Lab Results (LRI IG) and Lab Orders (LRO IG) which are developed based on HL7 version 2.5.1. for more details regarding these guides go to: <http://wiki.siframework.org/>

Key data elements in eDOS

The hierarchical structure of the eDOS message allows the Ordering Provider's System to differentiate between Order Codes for a single test, battery, or profile. This structure also differentiates between orderable and non-orderable Order Codes. Some Order Codes are provided in the DOS, but cannot be ordered as stand-alone tests. An example of a non-orderable Order Code is any test that can only be ordered as a reflex test. A reflex test is added by the performing laboratory when an ordered test is reported with one or more analytes that meet a specified criterion. The addition of a sensitivity panel after a microorganism has been identified is an example of a reflex test. eDOS provides for the following information:

- Order Code name and description
- List of analytes that will be reported
- List of information that must be provided with the order before testing can be completed by the laboratory; these are defined as Ask at Order Entry results
- Specimen(s) that must be collected; including alternate specimen if acceptable for the Order Code
- Collection requirements and patient prep information
- Specimen transport temperature
- Recommended Current Procedural Terminology (CPT) code
- Analyte Logical Observation Identifiers Names and Codes (LOINC®) Code Cross Reference

Why tests are made obsolete rather than deleted

eDOS does not enable the deletion of tests, but instead it supports changing a test's status to obsolete. By marking a test as obsolete, key information remains available if needed for reporting patient data. Also, the original information about an obsolete test is helpful in determining the best replacement test when trying to order a similar test in the future.

Ordering Provider System Display Recommendations

The high-level file format provides an identifier for the performing laboratory that is the source of the DOS, including the laboratory's name, address, and phone number. The laboratory Order Code should be the key index to the file structure. However, for the benefit of users who are familiar with test description names, the eDOS implementation also allows for the creation of a separate index with the Order Code description as the key. Ordering Providers typically order lab tests based on test descriptions. The patient's insurance carrier sometimes directs which laboratory should be used. Therefore, by displaying the available tests for a specific performing laboratory, using an alphabetical listing of Order Codes Descriptions for that laboratory allows

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within the implementation guide that allow for these cross-laboratory automated updates are
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2) the agreement from over 30 major U.S. laboratories.

the clinician to quickly select the appropriate tests to order. If the clinician is looking for Complete Blood Count with Differential, he or she would search Order Codes whose description begins with “c” or the clinician may type-in “Complete.” The Complete Blood Count with Differential is what the laboratory will require in the lab order message. If the Ordering Provider’s System can maintain the DOS by performing laboratory, and by Order Code, with an associated index that is sorted by Order Code Description, most of the functionality for the construction of laboratory orders will be available to system users.

Lab Results

Some Ordering Provider’s Systems create relationships between the referral laboratory’s DOS and the Ordering Provider’s System internal database elements in order to provide trending reports for patients. The creation of this cross reference is typically a separate function managed by the Ordering Provider’s staff. Updates to the referral laboratory DOS could impact this feature, such that when tests become obsolete, this cross-reference feature may no longer match.

Automated Updates

We anticipate that the eDOS will facilitate the automation of database updates in an Ordering Provider’s System across performing laboratories. Two key factors within the implementation guide that allow for these cross-laboratory automated updates are 1) the use of an international healthcare standard (HL7), and 2) the agreement from over 30 major U.S. laboratories to support eDOS. The eDOS format can be used to download the DOS from all performing laboratories used by the practice using the same Ordering Provider System feature. Key elements within the eDOS files allow construction of consistent pointers in the Ordering Provider System database for each individual performing laboratory. The Ordering Provider’s staff effectively will be relieved from the burden of managing database updates This will increase staff effectiveness because obsolete tests will be flagged and new tests will be immediately available. The only database burden on the Ordering Provider’s staff will be the cross-reference on the result-reporting side of the system, which is necessary in order to support trending reports. The result is that initial uploads from the performing laboratories using eDOS will initiate population of the Ordering Provider’s System DOS across all labs they use and the “updates” messages automatically will maintain the DOS.

eDOS Structure

The following message structure helps drive the architecture of the DOS on the Ordering Provider's System.

MSH - Message header

MFI - Master File Identification

- Contains the identifier of the lab that the DOS represents and the description of the lab with address and phone number

MFE - Master File Entry

- Defines if this contains adds, deactivated or updates
- Contains the primary key values for the data base elements described in the OM1, OM2/OM3, OM4, OM5 and CDM segments

OM1 - General Segment

- Begins the Order Code structure with order code and description

OM2/OM3 - Numeric Observation

Categorical Service/test/Observations Segment

- Analyte information including description

OM4 - Observations that require specimen

- Specimen information

OM5 - Observations Batteries segment

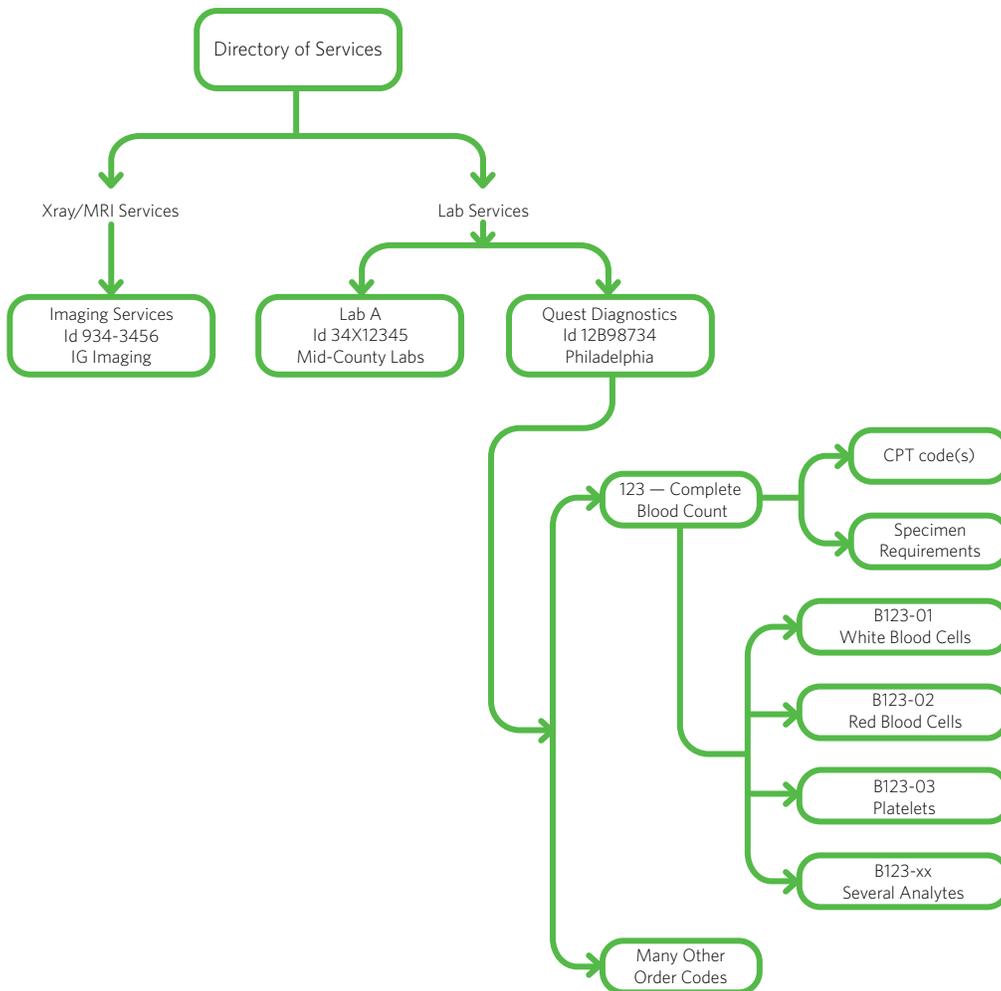
- Battery and Profile information

CMD - Charge Description Master

- Provides the CPT codes (Procedure Codes)



This structure is represented below⁵:



One component not illustrated in this structure is the manner in which the clinician practically searches for services, which is typically by a service name. Below is an example of how services for a particular test would be displayed to the physician for selection.

Service Request		
Service Description	Service Provider	Order ID
Complete Blood Count	Quest Diagnostics — Philadelphia	123 — Hit Enter to Select
Complete Blood Count w/Diff	Quest Diagnostics — Philadelphia	124
Complete Blood Count	Lab-A — Mid County Labs	9834-3
Complete Blood Count w/Diff	Lab-A — Mid County Labs	3413-4

⁵Codes in the graphics are for example only and should not be considered correct.

An alternate solution is presented when the Ordering Provider's System offers the ability to look-up services by provider, by alternate names, or by diagnosis. To provide a look-up-by-diagnosis-code feature, the Ordering Provider's System would include a table that cross-references the Current Procedural Terminology (CPT) code to the International Classification of Diseases ICD-9 or ICD-10 codes. This capability is offered by many organizations as discussed by Brouch's article⁶ in American Health Information Management Association (AHIMA's) journal and web site. Using the CPT codes provided in eDOS messages and the ICD-9 or ICD-10 table that must be available within the Ordering Provider's System for ordering lab work, the Ordering Provider would be able to order the medically appropriate testing based on diagnosis code, thereby avoiding inappropriate ordering.

CPT Codes provided in eDOS

In the current manual database build process, due to the large number of data elements that require manual entry by the Ordering Provider's Staff, the CPT codes rarely are entered into the Ordering Provider's System. The advantage of the automated eDOS format with integrated CPT Codes is entry automaton of the CPT codes into the Ordering Provider's System. The inclusion of CPT codes increases the value of the Ordering Provider's System significantly by facilitating more precise ordering.

eDOS Advantages

Advantages for Labs:

- Rapid initial download
- Timely updates available to the Ordering Provider
- Rapid response to the emerging needs of the healthcare industry through streamlined delivery of new services to Ordering Providers.

The lab industry constantly improves the quality of the diagnostic tests. Some of these diagnostics tests have critical but short life cycles such as the H1N1 virus test:

- Need identified and test developed in 2009
- First available in August of 2009⁷
- No longer needed by October 2009⁸

The lab industry continues to discover new tests from its research. A recent example was outlined by Quest Diagnostics in 2009⁹ at the 51st American Society of Hematology (ASH) Annual Meeting in New Orleans, for a new screening test for leukemia and lymphoma.

⁶Brouch, Kathy. "AHIMA Project Offers Insights into SNOMED, ICD-9-CM Mapping Process." Journal of AHIMA 74, no.7 (July/August 2003): 52-55. or at http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_019256.hcsp?dDocName=bok1_019256

⁷Quest Diagnostics News release (August 2009). http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_019256.hcsp?dDocName=bok1_019256

⁸Quest Diagnostics News Release (November 2009) <http://ir.questdiagnostics.com/phoenix.zhtml?c=82068&p=irol-newsArticle&ID=1357948&highlight=>

⁹ Quest Diagnostics News Release (December 2009) <http://ir.questdiagnostics.com/phoenix.zhtml?c=82068&p=irol-newsArticle&ID=1361916&highlight=>

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Alarming stories are often reported in the media about new diagnostic screening tests that are not offered to patients, such as suggesting colon cancer screening to those age 50 and over¹⁰. This risk for the Ordering Provider results from not being able to find these tests in their system, typically because the information regarding the tests has not yet been entered manually.

This manual work often is a low priority. Therefore, when Providers are searching for a specific test within their system it would be helpful to them to readily see the latest technologies in diagnostic testing. A data sheet sitting in the “to be entered” basket waiting for the Provider’s office administration staff to enter it into the EHR, will likely diminish the Provider’s patient-care standard. These screening tests will be more readily accessible through automated download into the Ordering Provider’s System. With eDOS an automated update message can reduce or eliminate the risk of omission.

Advantages to the Ordering Provider

Typically, the Ordering Provider receives monthly update bulletins from the laboratory describing updated tests, new test offerings, and obsolete tests. The DOS information is combined with many other pieces of reading material, all of which the Ordering Provider may not timely review. Because eDOS offers tests based on diagnosis (ICD-9/ICD-10) and the CPT code (provided by eDOS), clinicians will see new tests that they might not have had time to read about in the bulletins provided by the various reference labs. A real-time update places the Ordering Provider at the leading-edge of new diagnostic solutions offered by the labs that support these IT solutions, such as Quest Diagnostics.

The Ordering Provider’s staff will no longer need to manually update, add new tests, or remove obsolete tests from their database and database cross-references. This effort can be a significant savings in time and other resources, and streamline the workflow within a small office environment.

Under eDOS, the Ordering Provider will no longer order testing that is obsolete thus mitigating unnecessary communication with the reference laboratory and possible patient specimen redraws.

Advantages to Vendors of Ordering Provider Systems

There are many proprietary solutions offered for the delivery of a DOS. eDOS is based on the International HL7 standard that has been in place for over 20 years. This singular solution normalizes the many different practices for the delivery of a DOS, thereby reducing the cost-per-lab to build a unique process. This also normalizes data across the various lab systems to a standard,

¹⁰Quest Diagnostics news Release (June 2011) <http://ir.questdiagnostics.com/phoenix.zhtml?c=82068&p=ir-ol-newsArticle&ID=1574731&highlight=>

consistent format, which, in turn, reduces costs and improves efficiency of gathering Test Compendia from the many providers of lab services. This also normalizes data across the various lab systems to a standard, consistent format, which, in turn, reduces costs and improves efficiency of gathering Test Compendia from the many providers of lab services.

Advantages to the Patient

Knowing that the physician is getting real-time updates of the latest offerings from Quest Diagnostics provides a high level of patient comfort. Patients will avoid the need to submit to occasional redraws caused by an Ordering Provider choosing an obsolete test.

Summary

eDOS has the potential to improve patient care with real-time delivery of an updated laboratory directory of services. Based on the functionality of the Ordering Provider's System, it has the potential to assist in the ordering process by correlating the CPT codes provided in eDOS to the diagnosis codes (ICD-9/ICD-10) that must already be resident on the system. This combination offers the opportunity to avoid ordering the wrong test or missing the availability of new or updated tests, omissions which ultimately could lead to missed or erroneous diagnosis. Real-time updates provide immediate information on new test-offerings including specimen collection and transportation requirements. This is particularly important for situations like the 2009 H1N1 breakout when the breakout window is narrow.

