



## ELINCS: Developing a National Lab Data Standard for EHRs

February 2006

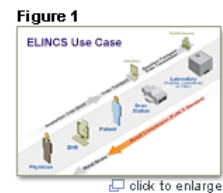
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The adoption of electronic health records (EHRs) is a key step toward improving the quality, safety, and efficiency of health care delivery. Yet the vast majority of physician practices still rely on antiquated paper records. The purchase of EHR systems can be prohibitively expensive and technically daunting to physician practices that generally have little to no information technology resources. Equally important, the real and perceived benefits of EHRs to physician practices are still limited. Improving EHR features such as real-time access to lab results data would increase the incentive to adopt EHR technology.

The EHR-Lab Interoperability and Connectivity Standards (ELINCS) project will develop a national standard for the delivery of real-time laboratory results from a lab's information system to an electronic health record. Typically this process can be a fractured one in which lab results are sent to the ordering doctor's office via fax or mail. The results must be filed in the patient's paper chart or manually entered into the physician's EHR.

Figure 1 shows how the ELINCS data standard would improve this process. In this example, a lab requisition form is written by the provider on behalf of the patient and delivered (typically by the patient) to the lab draw station. The specimen is drawn and transported to the lab for analysis. With the ELINCS standard, results will be transmitted electronically to the ordering provider's EHR system where they can be reviewed with the rest of the patient's history, including past lab results.

While this is just one example of how the lab test is carried out, the ELINCS standard would always be used to speed the results back to the patient's electronic health record. Additional variations on the lab test procedure can be found in the slide presentation available for download below.



The creation and adoption of a national standard will simplify the use of electronic health records systems. This will help physician practices reap tangible benefits early in EHR implementation and reduce costs associated with EHR system installation and configuration. ELINCS will work closely with other national and international efforts to develop clinical data standards for EHRs to ensure widespread adoption of its standard. These include the Certification Commission for Health Information Technology (CCHIT); Connecting for Health (Markle Foundation); eHealth Initiative (eHI); DOQ-IT (Centers for Medicare and Medicaid Services); Integrating the Healthcare Enterprise (IHE); Public Health Information Network (CDC/PHIN); and Health Level Seven (HL7).

CHCF has engaged Sujansky and Associates LLC to lead the ELINCS technical specification development. As technical lead, Sujansky and Associates is managing the multiple-disciplinary Technical Working Group, analyzing and documenting relevant use cases and technical documentation, and helping support vendor implementations.

For further details and the status of the specification development, see the resources available through the links below.

### Document Downloads

- [PDF ELINCS Project Overview, Second Edition](#) (64K)
- [PDF ELINCS Slide Presentation](#) (768K)
- [PDF ELINCS Learning Session Slide Show](#) (188K)

### Related CHCF Pages

- [HTML ELINCS Specifications](#)
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- [HTML Request for Proposals to Implement and Test ELINCS](#)
- [HTML CALINX vs. ELINCS: What's the Difference?](#)
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## ELINCS Specifications

December 2005

The EHR-Lab Interoperability and Connectivity Specification (ELINCS) project has published ELINCS Specification version 1.0 and a Draft ELINCS Specification version 2. The specifications are HL7 v2.4-based message profiles for the reporting of lab results from laboratory information systems to electronic health records (EHRs) in the outpatient setting. The goal of the ELINCS project is to provide precise and generally applicable lab-reporting specifications that can be adopted as an industry standard, thereby obviating the need for clinical laboratories and ambulatory EHR systems to define anew each interface that is implemented.

The ELINCS specifications were developed via a collaborative process that involved representatives from EHR vendors, commercial laboratories, hospital lab information system vendors, government bodies, and industry collaboratives. [See the ELINCS Committee members.](#)

ELINCS v1.0 was submitted to the Certification Commission for Healthcare Information Technology (CCHIT) and has been included in their proposed final certification criteria for ambulatory electronic health records. The California HealthCare Foundation has also issued an RFP to test ELINCS version 1.0 implementations in five clinical settings in California. Grants for these implementations will be awarded on Monday, February 6, 2006. [See details on the RFP.](#)

The public comment period on the ELINCS Version 2 Specification draft closed on December 15, 2005. ELINCS version 2 is an extension of version 1 that adds features to and is backward-compatible with version 1. New features include an expanded set of LOINC-coded tests and a structured method for reporting microbiology results.

If you are interested in commenting on future drafts of the ELINCS specification, send your email address to [ELINCScomments@sujansky.com](mailto:ELINCScomments@sujansky.com).

### Document Downloads

[PDF ELINCS Specification v2.0 Draft](#) (2.743MB)

[PDF ELINCS Specification v1.0](#) (604K)

### Related CHCF Pages

[HTML ELINCS Frequently Asked Questions](#)

[HTML ELINCS Sample Message Dataset](#)

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### External Links

[Certification Commission for Healthcare Information Technology \(CCHIT\)](#)

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## ELINCS Frequently Asked Questions

September 2005

### Q1: What is ELINCS v1.0?

**A1:** ELINCS is a detailed specification for the formatting and coding of lab results messages from laboratory information systems to ambulatory electronic health records. The specification is based on the HL7 version 2.4 ORU message type and uses standardized LOINC coding for common lab tests.

### Q2: Who should use ELINCS v1.0?

**A2:** ELINCS v1.0 is designed to standardize the electronic transmission of lab test results from laboratories to electronic health record systems used in the ambulatory setting. Hence, the specification should be used by commercial labs and hospital labs that perform outpatient testing and want to send results electronically to ambulatory-care providers in the community. The specification should also be used by the developers and vendors of electronic health record systems that are deployed in the ambulatory setting and can receive laboratory test results electronically. The goal of ELINCS v1.0 is to simplify and facilitate the interface of these systems for the exchange of outpatient lab results. Although ELINCS v1.0 may be used for the exchange of lab results among EHR systems or between a laboratory and a regional data-sharing repository, the specification is not expressly designed for these uses.

### Q3: Does ELINCS v1.0 provide "plug-and-play" interoperability?

**A3:** No. ELINCS v1.0 addresses and standardizes the *application-level* representation of lab-result data and the *application-level* rules for exchanging lab-result messages only. This scope includes the formatting and coding of lab-result data in electronic messages, and the responsibilities of sending and receiving applications that exchange such messages. ELINCS v1.0 does not address or standardize aspects of computer networking at the transport and security levels, such as choice of transport technologies, encryption/authentication methods, and message addressing and routing. Although the standardization of all of these aspects is required for full plug-and-play interoperability, the application-level standardization provided by ELINCS v1.0 significantly facilitates interoperability and moves disparate applications much closer to plug-and-play.

### Q4: How many laboratories and EHR vendors have implemented ELINCS v1.0?

**A4:** As of May 2006, five electronic health record systems, three hospital laboratories, and two national commercial laboratories are developing ELINCS-compliant interfaces as part of a pilot implementation program sponsored by the California HealthCare Foundation. Other EHR vendors and labs are preparing to integrate ELINCS into their software systems, pending selection of ELINCS as an EHR interoperability criterion of the Certification Commission for Health Information Technology (CCHIT).

### Q5: Why does ELINCS v1.0 not address the format and coding of laboratory orders?

**A5:** Many laboratory information systems and electronic health record systems in the ambulatory settings already support the electronic reporting of laboratory results, but relatively few support electronic ordering. Also, the electronic conveyance and processing of laboratory results has greater impact on the quality of patient care (through the improved display and decision-support capabilities of EHRs) than the electronic conveyance of laboratory orders. Hence, the ELINCS project chose to specify and promote the widespread adoption of a lab-reporting implementation guide prior to attempting to standardize electronic lab ordering. Nevertheless, the ELINCS v1.0 specification does include the requirement that certain data elements (such as a patient identifier) be included on all laboratory orders, regardless of the format or conveyance of the orders.

### Q6: Why does ELINCS v1.0 require that only the most common tests be coded using LOINC?

**A6:** The LOINC coding system contains over 25,000 codes for laboratory tests. However, the vast majority of tests actually ordered and reported are covered by a small subset of these codes. To accelerate the adoption of ELINCS v1.0 by laboratories that have not yet mapped their test sets to LOINC codes, the specification requires that only the top 80 percent of performed tests (based on data collected from three large provider organizations in California) be reported using LOINC codes. At the same time, ELINCS allows laboratories that have completed their LOINC mapping to send all test results using LOINC codes.

### Q7: Why is the California HealthCare Foundation sponsoring the development of a national implementation guide for electronic laboratory reporting?

**A7:** In late 2004, the California HealthCare Foundation (CHCF) was asked by the Office of the National Coordinator of Health Information Technology (ONCHIT) to sponsor and lead the development of the ELINCS implementation guide. Earlier that year, CHCF had developed an implementation guide for the batch reporting of laboratory results in California, to facilitate local quality-improvement programs. That implementation guide (CALINX) was well received and is being adopted by commercial labs, provider organizations, and health plans in California. The need for a national interoperability standard for lab reporting and the similarity of the CALINX and ELINCS use cases prompted ONCHIT to ask CHCF to adapt CALINX for real-time lab reporting, with the input of national stakeholders.

### Q8: Will the California HealthCare Foundation maintain ELINCS v1.0 and future versions in the long run?

**A8:** The California HealthCare Foundation plans to transition the maintenance of the ELINCS implementation guide to another suitable organization as ELINCS v1.0 is finalized through implementation testing and when another organization agrees and is prepared to take over. CHCF is in discussion with several organizations to arrange and plan this transition. Until an orderly transition is completed, CHCF will continue to manage ELINCS v1.0.

### Q9: Which organizations are involved in the development of ELINCS?

**A9:** ELINCS was developed by a technical committee made up of electronic health record vendors, laboratory information system vendors, commercial labs, government, and other health care associations. A complete list of the Steering Committee and Technical Working Group participants can be found at [ELINCS Committees](#).

Last updated: May 18, 2006

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## ELINCS v1.0 Sample Message Dataset

February 2006

The purpose of the ELINCS Sample Message Dataset is to provide adopters of the ELINCS v1.0 standard specification (such as laboratory system and EHR vendors) with a collection of ELINCS conformant messages that can be used as a learning tool and testing resource. The messages contained in the dataset cover each of the three major ELINCS message types:

1. Result status (MT-ORU-1);
2. Result available (MT-ORU-2); and
3. Result correction (MT-ORU-3).

Within each major message type is broad coverage for the possible variations of test messages that support the ELINCS use cases. Effort was made to ensure adequate variety within each message type to cover a broad range of HL7 data-type variations. Examples of numeric, free-text, and coded data are all included in the dataset. Accurate acknowledgement messages that should be generated by any system receiving messages from this dataset are also included. These messages conform to the HL7 message type MT-ACK-1.

The Sample Message Dataset file under Document Downloads below provides a complete package of sample messages with an index and a clear description of each of the messages in the dataset. Messages included in this index are organized by message type. Samples of the three primary message types appear in the sections: Result Status (MT-ORU-1), Results Available (MT-ORU-2), and Result Correction (MT-ORU-3). A fourth section titled Related Scenario Messages contains several messages that span the three message types and comprise a single result reporting scenario. All of these messages are based on the same original lab order data. Click the image to the right to view a screen capture of an excerpt from the Sample Message Dataset.



Each message section contains a link to the result file that would be sent by a lab and a link to the acknowledgment file that should be generated by a receiving application (such as an EHR system). Additionally, each message section provides a written description detailing the scenario in which the message was generated. A window displaying each message is provided which allows users to review the actual message data in the sample message (.txt) file. Finally, a tabular view of the message is displayed below each of the message windows. The tabular view is meant to give users a way of quickly viewing the contents of the message that is both intuitive and easy to read.

### Instructions for Viewing the ELINCS Sample Message Dataset

To download and unzip the ELINCS v1.0 sample messages:

1. Download the file "ELINCS\_Messages.zip" to your computer.
2. Extract all files contained in the ZIP file to a directory (for example, C:\Program Files\ELINCS Sample Message).
3. Open the "index.htm" file.

The "index.htm" file contains descriptions, summaries, and links to all of the sample messages in the dataset. The file may be viewed using a Web browser. You may open and view each ELINCS message separately by going to the message sub-directories (combo, MT-ORU-1, MT-ORU-2, MT-ORU-3) and opening any of the ".txt" files with a text editor such as Microsoft Notepad.

Send your questions and comments about the ELINCS v1.0 Sample Message Dataset to [ELINCS-Support@suiansky.com](mailto:ELINCS-Support@suiansky.com).

### Document Downloads

[ZIP ELINCS Sample Message Dataset](#) (46K)

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