



Integrating the Healthcare Enterprise White Paper

Cross-Enterprise Document Sharing Integration Profile - Cardiology Use Cases

This white paper provides information regarding the Cross-Enterprise Document Sharing Profile, or simply "XDS". Cardiology Use Cases are specifically explored. This Integration Profile was developed by the IHE IT Infrastructure Committee and adopted by IHE Cardiology. This Profile, in a basic format, will be demonstrated in Year 2 (2006) IHE demonstrations.

Problem Statement:

Even as hospitals and clinics begin to implement electronic healthcare record (EHR) systems, the problem of sharing data *between* EHRs and facilities persists. The Cross-Enterprise Document Sharing Profile was developed to enable document sharing between institutions within a mutually agreed "clinical affinity domain"¹, while allowing individual institutions to retain ownership of the primary copy. This problem is particularly relevant in cardiology for the following reasons:

- Cardiovascular disease is a chronic condition, and a patient may be seen in a variety of institutions, including primary care, a cardiologist's office practice, in-patient or out-patient diagnostic labs, hospital emergency departments, rehabilitation facilities, etc. For quality of

¹ A "clinical affinity domain" could be, e.g., an Integrated Delivery Network (IDN), a community of care supported by a Regional Health Information Organization (RHIO), or a disease-oriented care community (e.g., a regional diabetes care organization). The profile allows a variety of business relationships to be supported by the same technical infrastructure.

patient care, it is essential that the documents representing a patient's medical record be shared across these various care settings.

- Cardiologists typically see patients in both their own office or group practice, as well as in secondary and tertiary care facilities where they provide specialty or consultative services. For efficiency of practice, it is important that cardiologists be able to access clinical documents from whichever location they happen to be in.
- Cardiology data sets, such as imaging exams, tend to be very large and require specialized storage and archiving systems. It is critical that the cross-enterprise data sharing mechanism efficiently handle these data sets by reference and on-demand retrieval, rather than replicating them to multiple locations.

Use Cases:

Unlike some other specialists, cardiologists tend to follow the same patient over long periods of time and across different facilities. This leads to the situation where critical data may be known but not accessible, or not accessible in a timely manner. Examples of typical cardiology use cases include:

- A patient with chest pain is admitted to the Emergency Department (ED) after normal business hours and the cardiologist on call sees her. This patient knows she saw her cardiologist at the office the previous week. Her medication regimen was changed at that time. The patient is unable to tell the cardiologist on call the new medication and dosages that were prescribed, and that information is locked away in the clinic office. If the EHR systems had been integrated using XDS, it would have been possible to immediately access the medications list.
- A 62-year-old woman presents to the emergency department with dyspnea and orthopnea. She has a history of congestive heart failure, but cannot further elucidate on her cardiac condition. She was complaining of substernal chest pain that has continued for the last 15 minutes. Physical exam is remarkable for a II/VI systolic murmur heard best at the base. ECG is remarkable only for left ventricular hypertrophy. The emergency room attending electronically receives a copy of the report for an echo Doppler done 3 weeks ago at the patient's cardiologist's office. That study shows severe aortic stenosis and normal systolic function. The patient does not receive nitroglycerine. The pain resolves, and the cardiologist is called in for further evaluation and treatment. Prior to IHE integration, if the attending physician had not received the echo information and had less information, it is possible that nitroglycerine would have been administered, resulting in less optimal outcomes.

- A cardiologist physically located in a clinic office is scheduled to see a patient for a follow up visit in that office, but the cardiologist does not have immediate access to the cath report and discharge summary created the previous week in the hospital. If the EHR systems had been integrated using XDS, the cardiologist would have been able to immediately access the hospital reports.
- A patient is seen at a rural hospital for routine cardiac care, and later presents with an emergent cardiac event. When stabilized, the patient is taken by ambulance to a tertiary care hospital with a cardiac center. A business relationship exists between the two facilities to provide acute cardiac care. Once at the tertiary care site, the cardiologist on staff needs access to all of the records currently located at the rural hospital, both for the current episode, as well as for prior cardiac care. If the two hospitals' EHR systems had been integrated using XDS, the information would have been able immediately accessible at the tertiary care site.

Today, cardiologists are faced with a process of "telephone tag" and faxing of information, which is often incomplete since selection of the data to be sent is in the hands of the clerk faxing the document, not the cardiologist. Cardiologists have to "make do" with the information that they have, which is hardly optimal and may have negative outcomes. Using the XDS Profile of IHE, this situation could be improved significantly, resulting in substantially better patient care.

Profile Benefits:

The XDS profile allows institutions in an affinity domain to electronically share documents, with a central directory providing document search and location services. Following are some examples of improvements in efficiency and patient care that can be achieved.

- The cardiologist will no longer need to call the referring facility or their office to find and fax over pertinent records for the patient.
- The cardiologist can improve the efficiency and effectiveness of care by having all information available for diagnosis and treatment planning.
- The cardiologist can avoid potential complications that would have resulted from drug or other allergies.
- Nursing personnel can care for patients instead of calling for and receiving faxes.
- Throughput of the facility improved as the result of immediate access to patient information.

- Administrative cost of reproducing and distributing multiple copies of the patient records to all necessary care entities is decreased.
- IT does not have to store all records from other facilities as part of their permanent chart, since the records are readily accessible during the next patient visit.

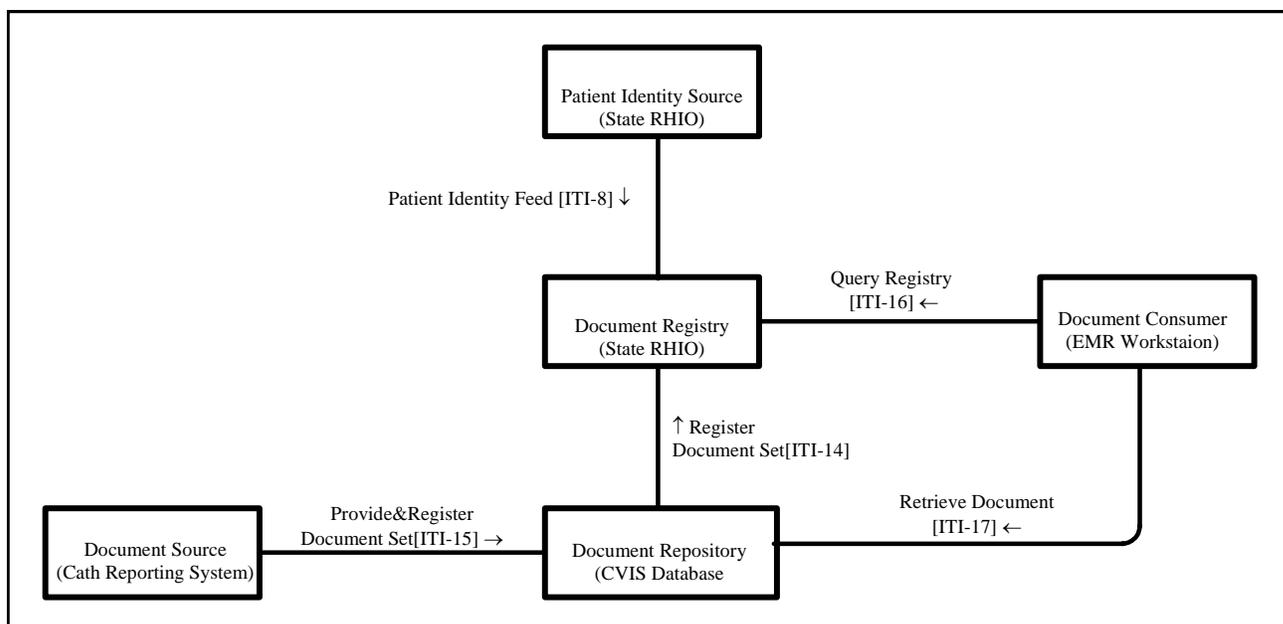
How the Profile actually works:

IHE defines "actors" which are responsible for performing certain roles. Vendor products in the marketplace often implement more than one IHE actor.

The key Actors in the XDS Integration Profile, and examples of products which might implement them, are:

- Document Source, for example a cath reporting program, that submits documents to be shared.
- Document Repository, for example a cardiology department information system, that stores documents and provides secure network access to them. There may be several Document Repositories in a document sharing domain, e.g., one or more per institution; the domain may also provide a common server so that smaller institutions or offices do not need to maintain a 24x7 repository capability.
- Document Registry, for example the directory server of a state regional health information organization (RHIO) or large healthcare system, that maintains a searchable list of shared documents.
- Patient Identity Source, for example a state regional health information organization (RHIO), that manages the patient IDs used within the document sharing domain.
- Document Consumer, for example an EHR system, that can query the Document Registry to find documents, and retrieve those documents from the various Document Repositories.

The diagram below illustrates the interaction between the Actors. For additional details, please refer to the [IHE IT Infrastructure Technical Framework](#) document.



There are further IHE “Content Profiles” based on XDS that provide additional details on specific types of documents to be shared. The following are particularly important for the Cardiology use case:

- ***Cross-Enterprise Document Sharing – Medical Summary (XDS-MS)*** defines the content of care record summaries, i.e., the most relevant clinical information for a patient when care is transferred, e.g., on referral or on discharge. Care record summaries include sections for problems, medications, allergies, history, procedures, etc.
- ***Cross-Enterprise Document Sharing – Imaging (XDS-I)*** defines an imaging study manifest, i.e., the list of images produced in an imaging study, and the network access addresses to retrieve those images (via DICOM or Web network transfers).

Finally, it should also be noted that, for any EHR, the data accessibility is only as good as the accuracy of the data going into the EHR. In other words, the data entered into the EHR must be properly identified to be able to “find” this data later. IHE Cardiology began to address this problem in Year 1 (2005) with the Cardiac Catheterization Workflow and Echocardiography Workflow Profiles. These Profiles, along with several others under development, such as Stress Testing, are critical to data identification accuracy and should be considered in conjunction with XDS.

Purchasing Using IHE:

One of the key concepts of IHE is the ability to definitively describe interfaces with a single sentence. Using the statements below mitigates the need for hundreds of pages of technical documentation, interface engines, and on-site testing. For example, the following statements should be included in any request for proposal (RFP):

“The **Electronic Healthcare Record (EHR) System** shall support the IHE Cross-Enterprise Document Sharing (XDS) Profile, and the XDS-Medical Summary and XDS-Imaging Profiles, as the Document Source and Document Consumer Actors.”

Other Profiles must be considered departmentally to ensure that information can be accurately submitted to an EHR. These include Displayable Reports (DRPT), Evidence Documents (ED), Cardiac Catheterization Workflow (Cath), Echocardiography Workflow (Echo), Nuclear Medicine (NM), Stress Testing (Stress), and Electrophysiology Lab Workflow (EP Lab), and Orders and Observations Workflow.

In addition to the cardiology departmental Profiles, there are fairly extensive additional Profiles which have been developed by the IT Infrastructure Technical Committees to address issues such as security, user log in, node authentication, audit tracking, and others. Please refer to the [IT Infrastructure Technical Framework](#) for additional information.

Summary:

The Cross-Enterprise Document Sharing Integration Profile facilitates the registration, distribution and access across healthcare enterprises of patient electronic health records. Cross-Enterprise Document Sharing provides a standards-based specification for managing the sharing of documents between any healthcare enterprises, ranging from private physician offices, to clinics, to acute care in-patient facilities.

Consider joining the “IHE Cardiology Users’ Group” which provides web seminars, teleconferences, and other educational opportunities on an informal basis. For more information, send an email to ihe@acc.org.

It is worth your time to learn more about IHE and it is time to demand IHE Profiles from your vendors. See www.ihe.net or www.acc.org/ihe.htm .