Integrating the Healthcare Enterprise
White Paper

Retrieve ECG for Display Integration Profile

This white paper provides information regarding the <u>Retrieve ECG for Display</u>, or simply "ECG Display", Integration Profile of IHE Cardiology Year 1.

Problem Statement: Clinicians need a simple means to access and view electrocardiograms (ECGs) from anywhere within and beyond the hospital enterprise. The ECGs should consist of "diagnostic quality" waveforms, measurements, and interpretations. The primary goal is to retrieve resting 12-lead ECGs, but retrieving ECG waveforms gathered during stress, Holter, and other diagnostic tests is also desirable. Typically, these ECGs are already stored in an ECG management system. The focus of this Profile is on retrieval and display, not the process of ordering, acquiring, storing, interpreting, or analyzing the ECGs.

Use Case: There are several use cases within a hospital. The cardiologist is in the cath lab reviewing the procedure schedule for the next day.   Part of this preparation includes reviewing previous catheterization images at a cardiology workstation. While looking at the images, she would like to know if ECGs are available.   Today, that would include a phone/paper chase. With this IHE Profile, she clicks on the ECG link on the cath workstation retrieving ECGs for that patient on the same workstation and within the same patient context.

For another patient in coronary care unit (CCU), the cardiologist would like to simultaneously review the most recent ECG for a patient and compare it to the ECG immediately prior to the cath procedure yesterday.   Today, that may include several paper chases. With this IHE Profile, a list of ECGs can be presented for "advanced display" in comparison mode allowing direct comparison between the two ECGs. It should be noted that this is an "option" for this Profile which must be specifically requested from a vendor as part of the request for proposal (RFP) process.

In another use case, a cardiologist has seen a patient with minimal coronary artery disease in his office and ECGs were performed regularly.   The patient has just been admitted to the emergency department at a local hospital. The cardiologist on call would like to see the ECGs from the office prior to initiating treatment. Using this Profile, perhaps while viewing the patient record at an electronic healthcare record (EHR) system, the on-call cardiologist is able to view the previous ECGs performed at the cardiologist's office.

The report, diagnosis, and signature are typically part of the waveform and ECG report. To ensure the efficacy of the ECG display this Profile includes basic display requirements to ensure a minimum set of information for the cardiologist. This includes:

- Patient name and id
- Local date and time of the recording
- Report status (e.g., confirmed or unconfirmed)
- Signing physician's name
- Labeling of the leads
- Diagnostic quality ECG waveform representation
- Voltage and timescale per lead
- Frequency content
- A fixed aspect ratio display (cannot make the ECG oblong, for example)

This Integration Profile documents how ECGs can be selected, retrieved, and displayed, for example, by simple Web browser based systems, without requiring specialized cardiology software or workstations.   Network security and user authentication are assumed to be addressed, but is outside the scope of this profile Refer to other IHE Integration Profiles on these topics.

ECG Display Profile Benefits: IHE provides benefits to clinicians and administrative staff focusing on patient care and reducing inefficiencies, specifically:
- Make ECG viewing available in many locations, increasing the access to the ECG information

- Simplify and standardize the ECG access and viewing process
- Remove the need to "find the printed ECG" (lost on a piece of paper or moving to a special ECG-only workstation)
- Allow multiple clinicians to view the ECG simultaneously for real-time conferencing
- Provide diagnostic display resolution
- Allow clinicians to view ECGs from outside of the physical hospital walls (in coordination with hospital security policies)
- Reduce the need for duplicate procedures
- Ensure that a multi-vendor environment will function correctly
- Manage and simplify the purchasing process
- Reduce "switching costs" when a new system is purchased
- Select the "best solutions" from multiple vendors and reduce vendor integration issues rather than restriction to a single vendor all-encompassing solution

How the ECG Display Integration 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 ECG Display and examples of real-world products which might implement these roles are:

- Display – Electronic Healthcare Record, Echo or Cath Imaging Viewing workstation, Cardiology Information System, any simple web application which understands how query the Information Source
- Information Source – ECG Management and Archiving System

The ECG Display model is very simple and is shown in the following diagram:

Figure 1: IHE Cardiology Retrieve ECG for Display
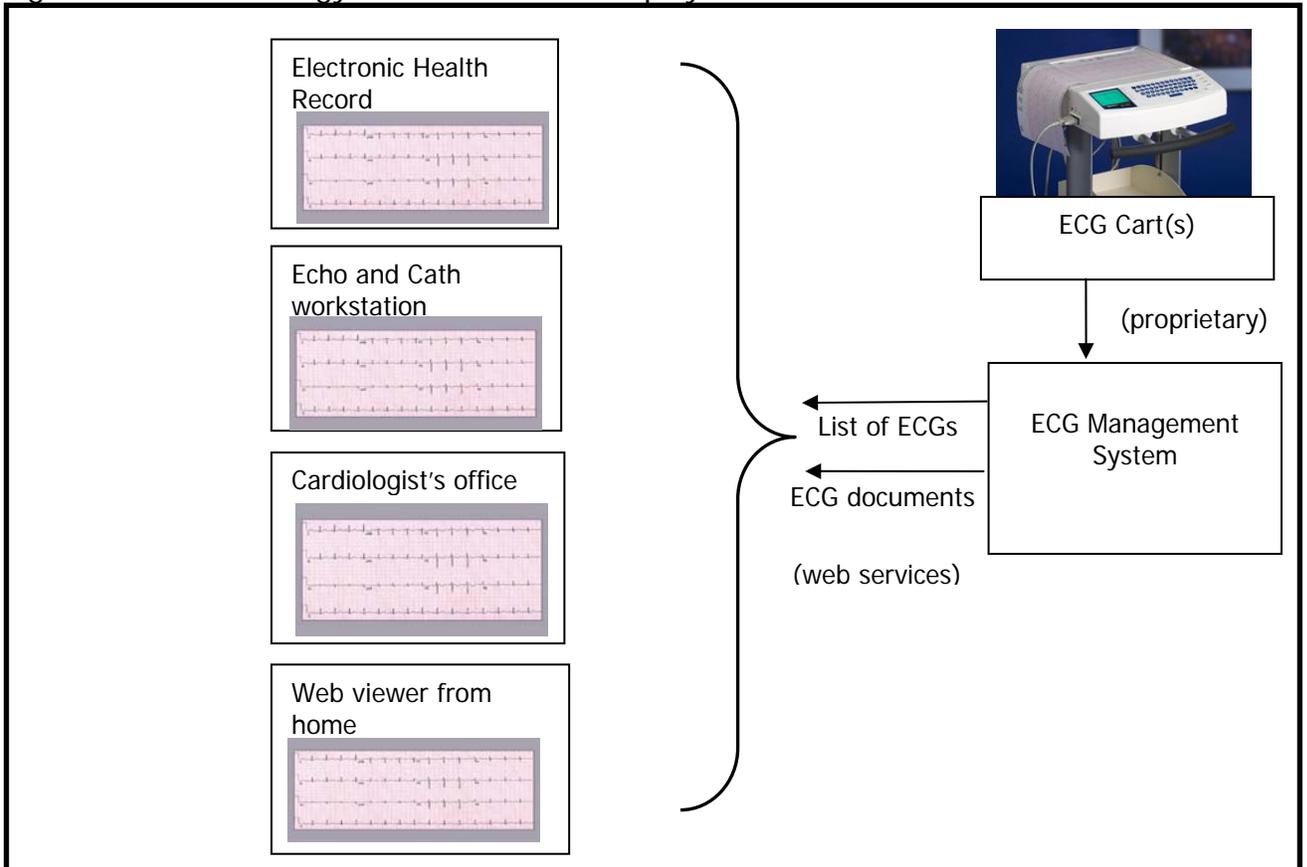
The transactions in this diagram use existing web standards for communication. For additional information please refer to the IHE Cardiology Technical Framework documents.

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 thousands 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) workstation** system shall support the IHE Retrieve ECG for Display Profile as the Display Actor, including the Advanced Display Option."

"The **cardiology PACS Echo and Cath reading workstation** system shall support the IHE Retrieve ECG for Display Profile as the Display Actor, including the Advanced Display Option."

"The **ECG Management** system shall support the IHE Retrieve ECG for Display Profile as the Information Source Actor."

Other related Profiles to consider for these types of systems include Displayable Reports (DRPT), Evidence Documents (ED), Retrieve Information for Display (RID), Audit Trail and Node Authentication (ATNA), Consistent Time, Portable Data for Imaging with Cardiology Option (PDI), and Cross-Enterprise Document Sharing (XDS and XDS-MS).

Summary: IHE Integration Profiles improve patient care and improve effectiveness. It is worth your time to learn more about IHE and time to demand it from your equipment vendors.   See www.ihe.net or www.acc.org/ihe.htm .

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