

# IHE Profile Proposal (Short)

## 1 Proposed Profiles: Nuclear Cardiology QRDA Content (NCQ) and Cardiology Registry Submission (CRS)

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Domain: Cardiology (coordinate with QRPH)

## 2 The Clinical Problem

Unnecessary imaging procedures are a particular target for healthcare spending control measures. Additionally, procedures that utilize ionizing radiation are being subject to additional scrutiny. There is a need for broad evidentiary basis for the outcomes-related effectiveness of imaging procedures to establish norms of appropriateness.

The American Society of Nuclear Cardiology (ASNC) is establishing a registry for nuclear cardiology exams to establish such evidence on outcomes, effectiveness, and adherence to society guidelines.

Support for such registries is found in the U.S. regulations on Meaningful Use of EHRs. One of the Stage 2 menu criteria for attesting to Meaningful Use is continuing submission from the provider's EHR to such a specialty registry.

There is currently no established workflow for how the various systems, including image analysis apps, cardiovascular information systems, and EHRs, cooperate to produce the registry submission, and no established data format for submission of such records to a non-invasive cardiac imaging registry.

## 3 Key Use Case Storyboards

### 3.1 SPECT Cardiac Exam and Registry Submission

After several years under the care of his cardiologist Dr. Pumpen, Joe Angina complains of chest pain of increasing frequency, severity and duration, despite an aggressive medical regime. Before proceeding to an invasive catheterization procedure, Dr. Pumpen orders a NM stress test at Ginormous University Hospital. NM is appropriate since Joe's leg problems are a contraindication for a treadmill stress test.

Joe is registered in the GUH EMR system, and the order for the exam is placed to the GUH CVIS. The CVIS manages the workflow for performing the stress test by radiology tech Nancy Nuctecq under the supervision of Dr. Art Skann. The images are stored to the CV-PACS, and reviewed on a NM workstation by Nancy. Nancy uses a third-party NM image analysis package to perform a set of measurements on the images. Dr. Skann reviews the images and the measurements, accepts the measurements and uploads them to the CVIS, then completes the study report on the CVIS.

At the end of the month, nurse informaticist Jess Intime gets a list of the NM cardiac procedures for the month. On the CVIS, she calls up Joe Angina's patient record for his procedure, and clicks on a "Registry Data Prep" button. The system pops up the ASNC registry data entry form, prepopulated with data from the procedure report. Jess also opens Joe's record in the GUH EMR, and copies a few items from there about his insurance. She clicks on the "Save" button, and the form is sent to a Registry Submission application database on the EMR.

When all the procedures for the month have been processed, Jess opens the Registry Submission application, verifies the number of cases and the monthly aggregate statistics, and clicks on the "Submit" button. The aggregate submission is sent to the ASNC registry.

## **4 Participating Systems**

EMR (ADT Source, Order Placer, Form Receiver, Registry Reporter)

CVIS (Department System Scheduler, Order Filler, Report Creator, Form Manager, Form Filler)

NM Camera (Acquisition Modality)

CV-PACS (Image Archive/Manager)

NM Workstation (Image Display, Evidence Creator)

NM Image Analysis Package (Evidence Creator)

ASNC Registry (Registry)

## **5 Standards Currently Available**

Following are available base standards and associated profiles or templates:

- HL7 v2 ADT, Orders, Observations
  - IHE Patient Administration Management, Scheduled Workflow
- DICOM Modality Worklist, Performed Procedure Step, Image Storage, Structured Report
  - DICOM TID 3300 Stress Testing Report
  - IHE Stress Test Workflow, Evidence Documents
- HL7 CDA, QRDA
  - IHE Cardiac Imaging Report Content
- IHE Retrieve Form for Data Entry

## **6 Discussion**

This proposal includes two related Profiles – Nuclear Cardiology QRDA (NCQ) for the content of the ASNC registry submission, and Cardiology Registry Submission (CRS) for the workflow associated with preparation

### **6.1 Nuclear Cardiology QRDA**

While ASNC is currently developing the conceptual data elements for their registry, the data element encoding and submission format has not yet been established. However, the Cardiac Imaging Report

Content Profile defines specific encodings of similar data elements appropriate for CDA structured entries. Since reporting of quality measures to CMS under Meaningful Use requires the QRDA format, which is a specialization of CDA, it is proposed that this project should profile QRDA for use as the ASNC Registry submission format. (ASNC is favorable to this approach).

## **6.2 Cardiology Registry Submission**

There are several challenges with the registry submission workflow. First, there are multiple independent systems that need to cooperate in the production and submission of the data set, including third-party image analysis packages that will produce many of the detailed data elements, but do not have the full context of the patient record; the CVIS which is the primary focal point for department operations; and potentially the general institutional EMR. A tentative approach is outlined below.

The image analysis packages will need to send their results in a standard format. For consistency with cath QCA and echo measurements, this should use DICOM SR in accordance with the IHE Evidence Documents Profile. Since no nuclear cardiology packages currently support DICOM SR, we may want to facilitate an HL7v2 or XML integration with a transform to SR for permanent archive with the exam images in the CV-PACS. We will need to evaluate whether DICOM TID 3700 is adequate for the purposes of the ASNC registry data elements, and whether it can support a simple (flat) structure for an HL7v2 or XML integration.

The Report Creator (typically the CVIS) will assemble the procedure report as a CDA document. Note that under Meaningful Use, systems must produce a clinical summary in accordance with the Consolidated CDA Implementation Guide (which includes Procedure Report). The IHE Cardiac Imaging Report Content Profile is a proper extension of the CCDA Procedure Report with additional detailed content.

The CDA procedure report serves as the prepopulation data set for the registry data capture. Using the IHE Retrieve Form for Data Entry Profile, the Form Manager extracts the prepopulation data and presents to form to the user at the Form Filler (presumably hosted on the CVIS). The Form Manager is also potentially hosted in the CVIS, as the CVIS developers have better business contact with the cardiac registry systems. A general Form Manager capability could support any number of specialized registry forms.

A question to be considered is whether the registry organization is responsible for providing the base form to the Form Manager, and if so, how the form identifies the fields for prepopulation, and how that links to the CDA structured entries. We should consult with the ITI and QRPH domains.

After the form is filled in, it is sent to a Form Receiver. This project will need to consider whether the Form Receiver is the registry directly, or an intermediate system that batches the forms for aggregate submission to the registry. Batching allows aggregate statistics to be computed, and provides a quality control point (ensuring that all submissions for the time period are indeed ready to go). Note that under Meaningful Use, submission to a registry must use “Certified EHR Technology” – i.e., it must be tested and validated in accordance with the ONCHIT EHR certification program; this capability may be available as a “modular certification” for a CVIS, or it may be part of an EMR “complete certification”. Therefore, if a batching/aggregate submission function is used, it would be part of the Certified EHR Technology, and thus potentially a general function of an EMR.

Note that this is proposed as a “Cardiology Registry Submission” Profile, not a “*Nuclear* Cardiology Registry Submission” Profile. Hopefully the process will be sufficiently generalized that a single profile can address other registries as well (e.g., NCDR).