CQI of EMR project:

Personalized Cardiovascular Information Management
**improved communication / improved quality of care
for the cardiac patient**

Patients who develop cardiovascular disease enter a period in their lives during which, with proper treatment, they can expect long periods of asymptomatic activity. From time to time, however, they will likely encounter episodes of accelerated symptoms which require further evaluation by their primary care physician or cardiologist. Occasionally, an acute cardiovascular illness arises, necessitating prompt evaluation, more urgent diagnostic testing, and intervention to limit vascular compromise.

In the modern age of high-tech medical care, cardiac patients have become a *special category of individuals* since <u>their vascular anatomy</u> is altered over time by interventional procedures. A specific patient may have had coronary or carotid or aortic stents or bypass grafts placed to certain arteries, artificial heart valves, and/or a pacemaker or ICD. Furthermore, *diagnostic procedures* (cardiac echoes, vascular ultrasounds, stress tests, cardiac catheterizations) are periodically done. A patient's vascular anatomy and the results of diagnostic tests are <u>important for the treating physician to know, in some detail, when the patient is seen</u>, *right at the point-of-care*. That is where clinical evaluation is done, where decisions are made, where further diagnostic testing or interventions are planned. In those *few minutes* when the patient is interacting directly with the caregiver, the <u>specific detailed complexity of each patient should be clearly in the mind of the physician or cardiologist or NP</u>. Otherwise, there is a lack of clarity. ***Clinical decisions are best made in an information-rich clinical environment.***

Decades ago, the electronic medical record (EMR) was proposed (and then mandated) to provide caregivers an overview of each patient's prior diagnostic evaluations and interventions. This information was to be available whenever or wherever the patient presented for care. <u>Decades later (*now*) this promise remains incomplete</u>.   In current EMR interfaces, a patient's clinical information is scattered throughout a complex software maze, difficult to navigate quickly. Many details are hidden in out-of-the-way *information silos* and may be missed in the <u>time-pressured reality of the clinic or emergency room</u>.   Each patient, of course, expects a high standard of medical care. Compounding this confused situation, there is a persistent lack of *interoperability* among EMRs used by different hospitals and physician offices. With no interface to move digital documents from one hospital/office to another, the default has become *<u>sending digital clinical documents</u> as <u>faxed image files</u> from one EMR to the other EMR (!)*. These *image files* are bulky and difficult for the physician/cardiologist end-user to efficiently review. Details are missed and often overlooked. Clinical communication suffers. Realize that persistence of poorly functional EMR interfaces is a widespread problem, affecting physicians and cardiac patients throughout the country. See: **[*interoperability*](#)** page.

There is a path forward from this state of confusion, however, _using existing EMR interfaces_, by implementation of a simple process, in which efficiencies of digital automation are combined with the powerful communication value of human language, expressed in writing. A **Cardiology Clinic Note** template has been developed, crafted as a _hybrid document_, containing both discrete digital elements and human language (free text). Using this template, a completed **Cardiology Clinic Note** can communicate enough patient-specific organized clinical information so that the next clinician in line can comprehend _at-a-glance_ the issues even of a complex patient who might have a long history of cardiovascular disease and diagnostic testing and interventions.

Most cardiovascular patients enter adulthood with a normal anatomic state, then present with symptoms (angina, dyspnea, weakness) or a clinical event (MI, stroke). Thus, the _initial_ **Cardiology Clinic Note** is straightforward. As months and years go by, there is episodic accumulation of diagnostic testing, clinical events, and interventions. In subsequent **Notes**, these items are added incrementally to the chronological list, recorded in concise but adequate detail for communication. Using this **Note** template, an accurate image of the specific patient emerges for any clinician end-user viewing the _most recent_ **Cardiology Clinic Note** of that patient.

Realize that one specific section of the **Note** - the **Cardiovascular PMH** - becomes a _human language narrative_ of that specific patient's cardiovascular history. Since content of that specific section is initially entered (by _voice-to-text_ and/or _typing_) by a knowledgeable clinician (MD, NP, RN), it can contain enough detail to allow the viewer to comprehend efficiently the important elements of each procedure report. By including a reference to the location where the diagnostic test or intervention was performed (if done outside the index clinical system), the original document can be more easily located for review if needed (reports of testing or procedures done at offices or hospitals other than the index institution are stored as image files in various silos in the EMR).

A key feature of the improved **Cardiology Clinic Note** is _providing automation as much as possible for the cardiologist end-user interface_, so that when a **Cardiology Clinic Note** template for a new encounter is opened, a _nicely formatted preliminary document_ appears onscreen, ready to use. The cardiologist is then less distracted from his interaction with the most important person in the room, _the patient_. With a chronological summary of the **Cardiovascular PMH** in clear view, and with a _condensed version of the most recent previous **Note** already opened onscreen_, discussion with the patient can be directed toward corroborating and updating information, reviewing symptoms and medication changes since the previous visit, and completing the document. ***Less time searching and typing means more time for meaningful interaction with the cardiac patient. By providing an improved (and constantly improving) digital communication channel, this improved **Cardiology Clinic Note** template begins to deliver on the promise of the EMR. In today's sophisticated clinical environment, such clarity is necessary to optimize quality care for our increasingly complex cardiac patients.

As a beginning of the process to deliver a _more robust EMR interface for the end-user_, this cardiologist has contracted with software engineers to develop parsing software which automates template construction from information contained in the most recent previous cardiology **Note**. Once integrated into the clinic's EMR, a _single click_ will open this improved pre-completed **Cardiology Clinic Note** template. _With all needed clinical information onscreen, in a single scrollable document_, one can proceed with interaction with a returning cardiac patient in the exam room. Then, during and immediately following the patient encounter, updated information is entered, **Assessment** and **Plan** sections are filled out, and the **Note** is complete. As it is signed and completed, a copy of the **Note** is automatically sent to the patient's referring and primary care physicians, whose names appear at the bottom.