Background:

During the course of treating a patient, Healthcare practitioners have a need to aggregate pertinent patient data coming from different sources. Also, for continuity of care, secure transmission of this aggregated / relevant data to other medical settings is a must. Factors which are of primary importance while performing the above include the security of the data during transmission and its interoperability.

Description:

The project deals with Clinical Care Document (CCD), its description, structure, transfer and its accessibility to its users. Clinical Care Document is the result of the combination of Continuity Of Care Record (CCR) and Clinical Document Architecture (CDA).

Continuity of Care Record (CCR): CCR is a core data set of the most relevant administrative, demographic, and clinical information about a patient's healthcare covering one or more healthcare encounters. It provides a means for one healthcare practitioner, system, or setting to aggregate all of the pertinent data about a patient and transfer it to another practitioner, system, or setting to support the continuity of care.

Clinical Document Architecture (CDA): The HL7 Clinical Document Architecture (CDA) is a document markup standard that specifies the structure and semantics of clinical documents for the purpose of exchange.

Structure of CCD:

- Data exchange through CCD can be done in XML as well as in HTML format.
- CCD XML format, which the user can view and download and store on his/her computer.
- CCD HTML Format (XML + Style Sheet) which the user can view as a web page .

The structure of CCD comprises of two sections:

- Header Section
- Body Section

Header Section:

The CCD Header defines the document parameters, including its unique identifier, language, version, date/time, the patient whose data it contains, who or what has generated the CCR, to whom or what the CCD is directed, and the CCD's purpose.

Body Section:

The CCD Body contains the core patient-specific data, such as current and past medications, problems, procedures, allergies, vitals etc. Data are aggregated into sections based on common clinical conventions.

Technology:

ASP.Net, C#, Sql Server 2008, Entity Framework, Windows Service, XML, XSLT transform

Project Overview:

In EMR applications, CCD data transfer can be done in several ways. Below are a couple of those:

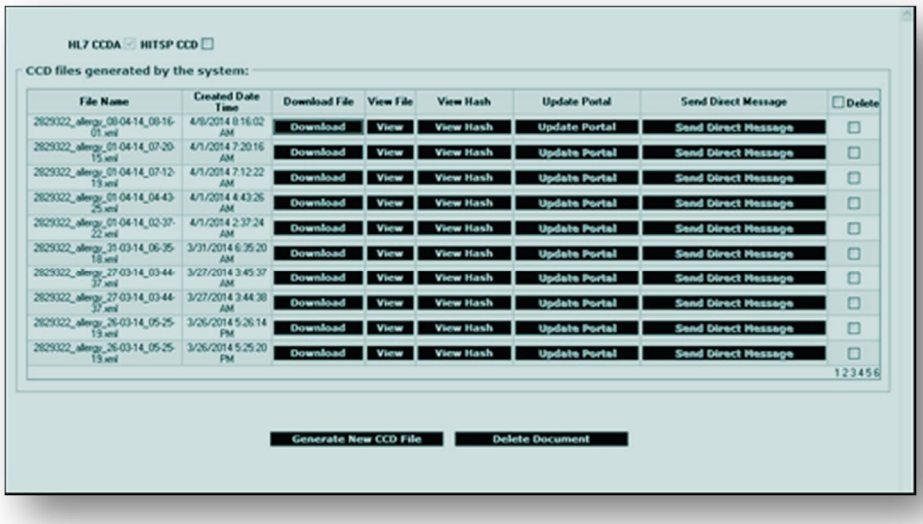
- CCD Summary
- Progress Note

1. CCD Summary:

- CCD summary document contains module data for the most recent visit for a particular patient.
- In an EMR application, CCD Summary document is generated via back-end windows service and through CCD menu UI.

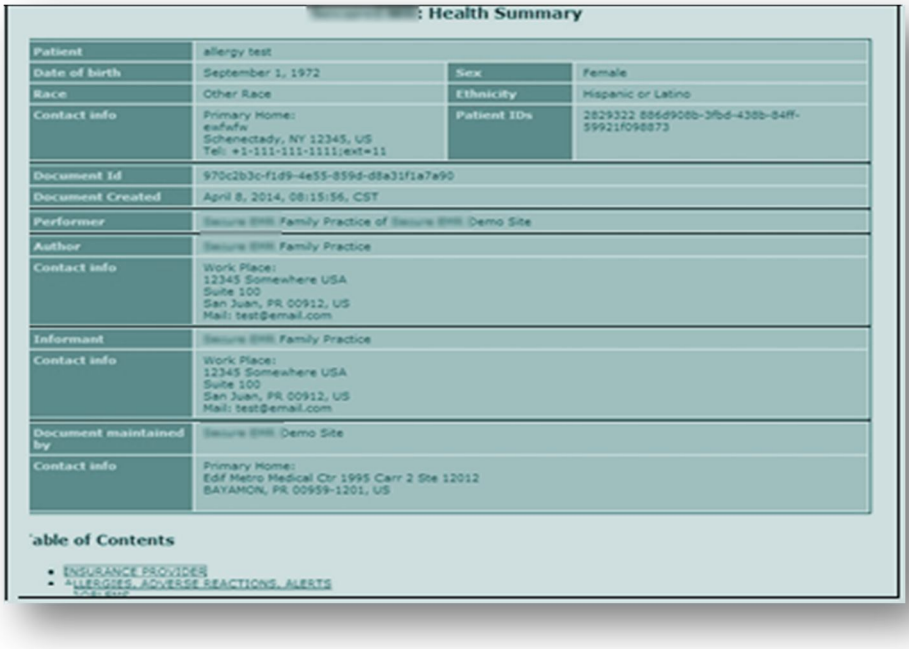
Below is the screen shot for CCD Summary UI, where a user can view, download and generate CCD Summary file.

Screen 1: CCD Summary UI



- User can view the generated CCD file in HTML format (user readable format)
- User can download the generated CCD file and save it in his/her computer
- User can view the hash structure of CCD file

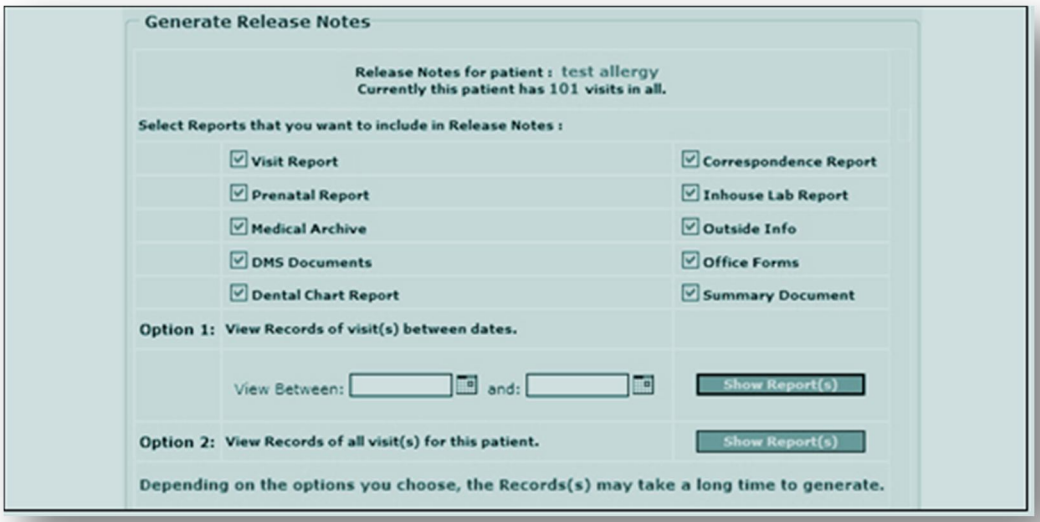
Screen 2: CCD Summary HTML Report



CCD Summary via Patient Dashboard:

- There is a back-end windows service which runs at certain fixed time intervals to generate CCD summary document for a particular patient via release note section in patient dashboard page. The generated CCD file gets added to the above CCD summary grid where the user can access the particular file.
- In Release note section, “Summary Document” box is by default checked.
- In this case, to generate the CCD summary document the user has to click “Show Report”. It results in the back-end windows service generating the CCD summary file for a particular patient which the user can access via CCD UI.

Screen 3: CCD Summary file generation via Release note section in Patient dashboard page



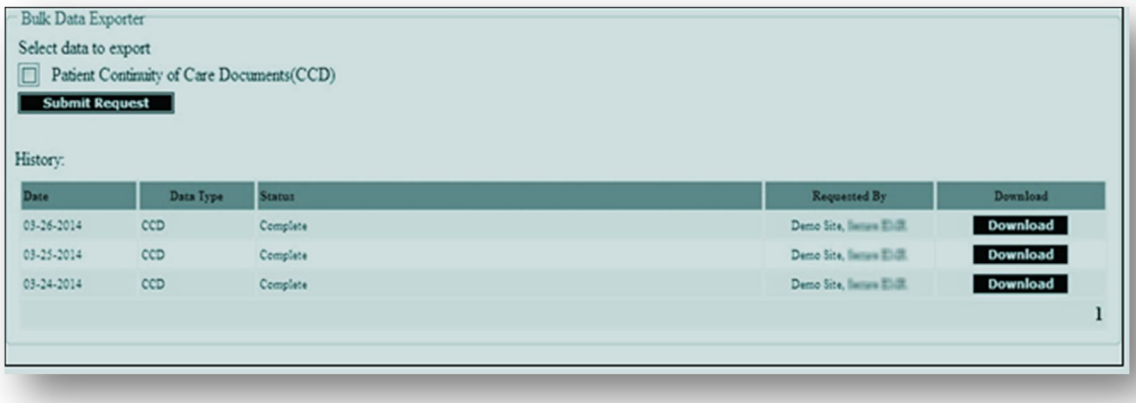
Practice-wide CCD summary file generation:

- There is a windows service in the back-end which runs at certain fixed time intervals to generate CCD summary files for requests raised in clinics for CCD summary file generation.

- Administrator of the clinic can request the CCD summary file generation for all active patients under all active physicians for the clinic through “Export Patient Data Utility”. After generation of all files, a user can download them corresponding to particular dates.

Below is the screen-shot to raise the request for CCD summary file generation for clinic.

Screen 4: Export Patient Data Utility



2. Progress Note :

- A Progress Note documents a patient's clinical status during a hospitalization or outpatient visit. It is associated with an encounter.
- Medical dictionary defines a Progress Note as "An ongoing record of a patient's illness and treatment. Physicians, nurses, consultants, and therapists record their notes concerning the progress or lack of progress made by the patient between the time of the previous note and the most recent note".
- On the event of an encounter signed by a physician, there is a windows service, which runs at certain fixed time intervals in back-end, that generates the progress note. This note contains a patient's health status for a particular visit.
- User can access the generated progress note in patient dashboard page through "View Summary Report" button and can view the report in HTML format, print the report and download it based on need.

Screen 5: Progress Note