IHE Framework

Here: General Eye Evaluation (GEE)

SCENARIO: Integrating Clinical Documents into your EHR

The ability to document patient care is an essential part of an electronic office. It's not only important to capture such information but also vital to exchange this information between EHR systems using open standards based solutions. One example of this type of situation might be where your clinic is contracted to perform follow up care for patients that have been seen in the local hospital emergency room for an eye related problem. The HL7 Clinical Document Architecture (CDA) provides the open standard for capturing patient care in clinical documents.

The CMS Final Rule for stage 1 and stage 2 Meaningful Use (MU) adopted the HL7 CDA standard to exchange a patient's summary of care record. For example, one document specified is HITSP C32-Summary Document using HL7 Continuity of Care Document (CCD). This HL7 based clinical document incorporates many IHE standards such as the definition of Chief Complaint, Medications, Active Problems, Allergies, etc. Certified EHRs are required to create and receive this clinical document.

IHE Eye Care expects further requirements for standardized exchange of patient information and these will likely rely upon CDA document standards. As a result we have begun development of appropriate CDA document standards for eye care.

The **first** type of CDA document defined by IHE Eye Care is called **General Eye Evaluation (GEE).** Its purpose is to capture data recorded by physicians in the course of an encounter with a patient.

Following GEE, IHE Eye Care has defined CDA documents related to eye care surgery. They are:

- **Cataract Pre-Operative Note (Cataract-PreOp) –** it defines the data that is collected during a patient's pre-operative eye examination for cataract surgery. This includes an ocular history and exam as well as relevant ancillary testing.

- **Cataract Operative Note (Cataract-Op) –** it defines the data that is collected during a patient's cataract surgery. It is a comprehensive description of the cataract surgery and associated procedures. This may include pre-and postoperative diagnoses, procedure, findings and unusual occurrences, fluids administered, implant(s), complications, postoperative expectations, and management plan, etc.

- **Cataract Post-Operative Note (Cataract-PostOp)** – it defines the data that is collected during a patient's post-operative cataract surgery eye examinations. It is a provider note that describes data such as post-operative findings, complications, medications and care plan.

- **General Eye Care Operative Note (Eye-Op)** – it defines data that is collected during a

patient's eye surgery. It is a general operative note that can be used for all types of eye care surgeries but is not intended to replace or substitute for a specific eye care operative note (e.g., Cataract Operative note, Glaucoma operative note, etc.). This may include pre- and postoperative diagnoses, procedure, findings and unusual occurrences, length of procedure, estimated blood loss, fluids administered, implant(s), specimen removed (if any), complications, postoperative expectations, and management plan.

While GEE and the surgery CDA documents follow the architecture and standards chosen by MU, there is no current requirement for them since eye care exams and surgeries have not yet been addressed in this regulation. However, the published MU strategy suggests that this is likely forthcoming so IHE Eye Care is preparing in our best judgment what is likely to be needed to satisfy future MU standards specific to eye care.

1. HL7 Clinical Document Architecture – a brief education

HL7 specifies the CDA standard for exchange of clinical documents. The CDA defined six characteristics of a clinical document, they are; persistence, stewardship, potential for authentication, content, wholeness and human readability.

- **Persistence** – documents exist in an unaltered state that can be queried and accessed (how long they exist is based upon policy, government regulations, etc.).

- **Stewardship** – documents are maintained by responsible organizations. That means responsible organizations must be able to produce the clinical documents for many years and not lose any clinical data captured. The CDA header requires the name of the steward organization be recorded at the time the document is created.

- **Potential for Authentication** – include the ability for the legally responsible provider to attest to the document with a signature. CDA supports the use of electronic signatures.

- **Content** – a clinical document tells a story about care being provided to the patient. This information is stored in the CDA header and provides default context for all the information in the body of the document. Information includes:
  - Document identifier
  - Relevant dates and times
  - Type and author of document
  - Legal authenticator
  - Patient whose care is describes
  - The clinical encounter(s)
  - Preceding document it may replace or amend (if they exist)
  - Intended recipient of the information (when the document was first written)
  - Sources of information contained with the document
  - Identity of clinicians providing the care documented

- **Wholeness** – the information contained within the document is expected to be understood in the context of the whole. For example, it may contain information about medication that the patient has been prescribed, but that may not be fully understood without also

providing the specific diagnosis for which the medication was described.

- **Human Readability** – documents are read by humans, this mean there must be a way to display the content in a way that allows humans to read it (how this is accomplished is quite often proprietary implementation strategy).

CDA documents are implemented via the XML standard and the CDA model maps closely to HTML and XHTML. These standards are widely supported across all medical specialties and therefore a large set of implementation tools are readily available to manage CDA documents.

1.1. CDA Document Structure

The CDA clinical document is comprised of a document header (sets the context for the document) and the body of the document (contains the human readable narrative text) and potentially machine readable semantic content.

1.1.1. CDA Header

The header contains metadata about the document, including the type of document, its identifier and the creation date. It also describes participants in the encounter being documented, including the author, patient, and legal authenticator (signer). It documents the encounter during which service(s) were performed, relates the document to the service and relates the document to any prior documentation of that encounter or those services (such as amendments or complete new document with additional information).

1.1.2. CDA Body

The body of a CDA clinical document contains narrative (human readable) data in sections of the document and machine readable data within section entries. The narrative content uses XML markup to identify paragraphs, lists, tables, multimedia content, and other common structures for communication of narrative information. The body of the document may be structured or unstructured.

Examples of unstructured data include external files such as MS RTF documents, PDFs, etc. This provides little if any semantic interoperability if unstructured data is used, as this is a human readable display solution only (i.e. not machine computable). However the CDA header provides some required context and minimum management metadata for its required data.

Structured data is encoded as XML structured content. This is the primary usage of IHE clinical documents such as GEE.

Clinical documents are organized into sections and subsections. Sections contain categories of information pertaining to a single specified concept; therefore the list of Sections within a document can be quite large. Examples include problems, medication, immunizations, vital signs, procedures, encounters, allergies, diagnosis results, assessment, plan of care, etc.

1.1.2.1. Sections

The list of Sections for GEE is defined in table shown below. GEE specifies constraints with respect to the sections that must be present and others which may be present (required,

conditional, or optional). Certain sections in GEE are text only while others include machine readable data (i.e. coded terms to define the context such as SNOMED codes). The coded data in a CDA document is contained in Entries, which are further described below.

1.1.2.2. Entries

Entries are used to document clinical observations. They are collections of data elements pertaining to a single instance of the specific concept. For example a refractive measurements entry describes all the data elements for one refractive measurement (sphere and cylinder power, cylinder axis, reading addition power, distance power, interpupillary distance, etc.)

A refractive measurement Section is a collection of Entries pertaining to all the refractive measurements for one eye of a patient at a particular point in time. For example, there may be one entry for the left eye and a second entry for the right eye.

1.1.2.3. Vocabulary

A vocabulary (also known as a terminology) is a collection of concepts along with their relationships to each other. In some vocabularies, the relationships are hierarchical (such as SNOMED, LOINC, ICD 9-CM, etc.

1.1.2.4. Templates

A general strategy for constraining clinical documents being used by IHE and HL7 is to create templates. A template can apply to a whole CDA document or to Sections and/or Entries within a document. It is common to define the Sections/Entries that are required for a specific document in a template. It is also common to define specific vocabulary restrictions.

IHE Eye Care has defined the "templates" for GEE, therefore enhancing interoperability of eye exam documentation for exchange between EHR systems.

2. IHE Actors and Roles

An EHR implementing an IHE CDA document can chose to create and/or consume the clinical document. IHE assigns actor names to those roles so it is clear what the EHR supports. The names of the actors are:

- Content Creator – a system that is able to create the IHE clinical document
- Content Consumer – a system that is able to consume (use) the IHE clinical document

The Content Creator builds CDA documents based upon the IHE eye care specifications. As discussed above both narrative and machine readable data are included. There should also be a "style sheet" to ensure a consistent rendering of the document content by the Content Consumer Actor. It is envisioned that the data will be captured as a by-product of routine physician documentation of care.

2.1.1. Content Consumer Actor Import options

EHRs that are able to consume IHE are required to document "how they consume" the document. IHE defines four options and it is important to understand which option(s) are implemented by the EHR you purchase. The options include:

- **View Option –** Able to render the document in human readable format. The Content Consumer Actor must be able to present a view of the document using the style sheet presented by the Content Creator and optionally can choose to render the document with its own style sheet. If it supports its own style sheet it must provide a mechanism to view the source style sheet. It also must be able to print the document to paper.
- **Document Import Option** – This Option requires that the View Option be supported. In addition, the Content Consumer that supports the Document Import Option must be able to support storage of the entire document. Proper tracking of the document origin is required. Once a document has been imported, the Content Consumer shall offer a means to view the document without the need to retrieve it again from the network.
- **Section Import Option** - This Option requires that the View Option be supported. In addition, the Content Consumer that supports the Section Import Option must be able to support the import of one or more sections of the document. Proper tracking of the section origin is required. Once sections have been selected, a Content Consumer shall offer a means to copy the imported section(s) into local data structures as free text. This is to support the display of section level information for comparison or editing in workflows such as medication reconciliation when discrete data import is not possible.
- **Discrete Data Import Option** - This Option does not require that the View, Import Document or Section Import Options be supported. The Content Consumer that supports the Discrete Data Import Option must be able to support storage of the structured content of one or more sections of the document. This Option requires that the user be able to import select structured content (e.g. a visual acuity or an allergy in a list) into the local patient record with proper tracking of its origin.

3. IHE Eye Care General Eye Evaluation (GEE)

Comprehensive eye care deals with a broad spectrum of specialty disciplines each with its own lexicon, examination techniques, and procedures. The highest volume and most central component of this is the routine adult eye examination. A patient presents for a general eye examination and demographic data is either created, retrieved from existing databases, or updated. The patient provides a chief complaint and historical information relevant to the eye,

and a partial or complete examination of the eye and visual system is performed using various optical devices. Multiple people may contribute to this process including receptionist, technician, and physician.

The nature of the data varies widely and may be discrete and defined by existing terminology standards (e.g., visual acuity, intra ocular pressure) or narrative and available only as free text (e.g., description of a lesion, description of morphology). After this data is collected the clinician will arrive at an assessment and management plan. All of this must be recorded in a fashion that will allow subsequent transfer across diverse information platforms without loss of content or meaning using existing standards and protocols.

The General Eye Evaluation (GEE) HL7 CDA Content Profile defines the structure for data that is collected during examination of a patient's by an eye care practitioner (i.e. exam note). The AAO has created a collection of recommended best practices for this and other aspects of eye care that it terms the Preferred Practice Patterns (PPP). The information in this document is based upon the "Comprehensive Adult Medical Eye Evaluation October 2010" PPP specification generated by the AAO. The comprehensive eye examination consists of an evaluation of the physiological function and the anatomical status of the eye, visual system and its related structures.

The following table provides a brief description of the data content in GEE:

GEE Data Content (Sections)	Brief Description
Header Module	Patient demographic data, eye care organization, contributing providers, author, creation date/time, etc.
Healthcare Providers and Pharmacies	Identity of the patient's other pertinent health care providers
Chief Complaint	Chief complaint
Functional Status	Present status of visual function
History of Present Illness	History of Present Illness
Ocular History	Ocular specific past history
History of Past Illness	Systemic history: pertinent medical conditions and previous surgery
List of Surgeries	
Coded List of Surgeries	
Review of Systems	Responses to questions about the function of various body systems
Medications	Systemic medication currently used
Ophthalmic Medications	Ophthalmic specific medications
Allergies and Other Adverse Reactions	Allergies or adverse reactions to medications
Active Problems	Problems currently being monitored for the patient
Family Medical History	Genetic relatives in terms of possible or relevant health risk factors
Coded Family Medical History	
Social History	Occupational, personal (e.g. lifestyle), social, and environmental history that have a potential impact on the patient's health
Coded Social History	

GEE Data Content (Sections)	Brief Description
Ocular Physical Exam	Detailed eye examination information
Assessment and Plan	Assessment of the patient condition and expectations for care

The ocular physical exam is often coded using vocabularies such as SNOMED, LOINC and DICOM. The data content is a follows:

- Visual Acuity
- Vision Testing
- Refractive Measurements
- Lensometry Measurements
- Intraocular pressure
- Confrontation Visual Field
- Eye External
- Lacrimal
- Pupils
- Ocular alignment and motility
- Anterior segment
- Posterior segment
- Ancillary testing

3.1. How to specify GEE in an RFP

In order to require an EHR to be able to create the IHE Eye Care General Eye Evaluation (GEE) document the following wording should be included in your RFP (request for proposal):

"The EHR shall support the IHE Eye Care General Eye Evaluation (GEE) Content Profile as a Content Creator."

In order to require an EHR to be able to consume the IHE Eye Care General Eye Evaluation (GEE) document the following wording should be included within your RFP (request for proposal):

"The EHR shall support the IHE Eye Care General Eye Evaluation (GEE) Content Profile as a Content Consumer with the following options supported:

<pick one or more of the import options (View Option, Document Import Option, Section Import Option and/or Discrete Data Import Option)>

Note – if the RFP requires the Section or Discrete Data Import options then it should document which sections and/or discrete data attributes are desired.

4. IHE Eye Care Cataract Surgery Documents

The IHE Eye Care Cataract Surgery profiles provide documentation of a process that occurs along a temporal continuum connecting planning, execution, and short-term and long-term

follow-up components. The constituent events of this continuum may take place in different locations (referring provider's office, surgeon's office, hospital/surgery center), can involve different staff using different information systems for different purposes (health care planning and service delivery, QA auditing, research) and can involve unanticipated changes that redirect outcome and workflow (change or termination of surgery, referral for alternate care, etc.). For this reason the clinical documents must provide the ability to transfer information between multiple systems.

In general, the cataract surgery process begins in the surgeon's office with a pre-operative assessment that produces a large amount of disparate data that is used to plan the cataract surgery, but may also be used to accommodate unplanned intraoperative events. This information (i.e., CDA pre-operative note) must be available in the operating room, but may also be needed by QA auditors at the surgical hospital or elsewhere to support outcome assessment.

Upon completion of the surgery the surgeon creates an operative note (i.e., CDA operative note) that must be available at the surgeon's office, hospital/surgical center, and QA auditor's office. During surgery events may occur that cause the surgery to be terminated and the patient to be referred to another site and provider who needs all pre-operative, operative, and post-operative data.

In the short-term following surgery the patient is evaluated by one or multiple providers in the same or separate sites, on one or several occasions, and a post-operative note is generated. These providers must refer to the pre-operative and operative documents and the string of documents which encapsulate the cataract surgery process would be accessible for planning future cataract or other ocular surgery. An auditor with access to these records can assess outcome in this and other instances of cataract surgery, and a researcher can address particular questions about the cataract process by evaluating aggregated data in documents derived from numerous cataract procedures.

In order to document this information IHE Eye Care has specified three clinical documents. The content profiles are:

1. Cataract Pre-Operative Note (Cataract-PreOp)
2. Cataract Operative Note (Cataract-Op)
3. Cataract Post-Operative Note (Cataract-PostOp)

The following table provides a brief description of the data content in Cataract-PreOp:

Cataract-PreOp Data Content (Sections)	Brief Description
Header Module	Patient demographic data, eye care organization, contributing providers, author, creation date/time, etc.
Operative Eye	Which eye (right or left) is the operative eye
Target Refraction	Planned post-operative refraction
Ocular Axial Length	Ocular axial length measurement value
Intraocular Lens	Narrative description and detailed information regarding the planned intraocular lens.
Planned IOL Cylindrical	The axis at which a toric IOL is intended to be placed in surgery

Cataract-PreOp Data Content (Sections)	Brief Description
Axis	
Assessment and Plan	Assessment of the patient condition and expectations for care
Ophthalmic Surgical Risk Factors	Describes risk factors that may impact choice of surgical technique, risk of intraoperative complications, or expectations for a good outcome
Ocular History	Ocular specific past history
History of Past Illness	Systemic history: pertinent medical conditions and previous surgery
List of Surgeries	
Coded List of Surgeries	
Medications	List of current medications
Ophthalmic Medications	Ophthalmic specific medications
Allergies and Other Adverse Reactions	Allergies or adverse reactions to medications or other allergens
Active Problems	Problems currently being monitored for the patient
Ocular Physical Exam	Detailed eye examination information
Visual Acuity	Best corrected visual acuity for the patient
External Document Reference	External document references

The following table provides a brief description of the data content in Cataract-Op:

Cataract-Op Data Content (Sections)	Brief Description
Header Module	Patient demographic data, eye care organization, contributing providers, author, creation date/time, etc.
Preoperative Diagnosis	Records the surgical diagnosis or diagnoses assigned to the patient before the surgical procedure that indicate the reason for the surgery
Postoperative Diagnosis	Records the diagnosis or diagnoses discovered or confirmed during the surgery
Operative Eye	Which eye (right or left) is the operative eye
Surgery Description	Records the particulars of the surgery with an extensive narrative. Local practice often identifies the level and type of detail required based on the procedure or specialty.
Cataract Coded Surgery Description	Records the particulars of the cataract surgery using coded terms.
Surgical Operation Note Findings	Records clinically significant observations confirmed or discovered during the surgery
Anesthesia	Records the type of anesthesia (e.g., general or local) and may state the actual agent used.
Estimated Blood Loss	Records the approximate amount of blood that the patient lost during the surgery. It may be an accurate quantitative amount, e.g., 250 milliliters, or may be descriptive, e.g., "minimal" or "none."
Complications	Records problems that occurred during surgery, the complications may have been known risks or unanticipated problems

Cataract-Op Data Content (Sections)	Brief Description
Specimens Removed	Records the tissues, objects, or samples taken from the patient during surgery, the narrative may include a description of the specimens
Medications	Records the medications used during the surgery
Planned Procedure	Records the procedure(s) that the surgeon thought would need to be done based on the preoperative assessment.
Indications	Further details about the reason for the surgery
Disposition	Records the status and condition of the patient at the completion of the surgery, it often also states where the patent was transferred to for the next level of care
Plan	Used to indicate follow-up that the patient needs including any planned or potential future surgeries
Operative Note Fluids	Record fluids administered during the surgical procedure.
Operative Note Surgical Procedure	Used to restate the procedures performed if appropriate for an enterprise workflow
Surgical Drains	Record drains placed during the surgical procedure.
Implants	Record implants placed during the surgical procedure
External Document References	External document references

The following table provides a brief description of the data content in Cataract-PostOp:

Cataract-PostOp Data Content (Sections)	Brief Description
Header Module	Patient demographic data, eye care organization, contributing providers, author, creation date/time, etc.
Operative Eye	Which eye (right or left) is the operative eye
Post-Operative Complications	Records problems that have occurred after a surgical procedure has been performed
Assessment and Plan	Assessment of the patient's condition and expectations for care
Ophthalmic Medications	Ophthalmic specific medications
Active Problems	Problems currently being monitored for the patient
Ocular Physical Exam	Detailed eye examination information
External Document Reference	External document references

4.1. How to specify the Cataract Surgery Documents in an RFP

In order to require an EHR to be able to create the IHE Eye Care Cataract Surgery documents one or more of the following statements should be included in your RFP (request for proposal):

"The EHR shall support the IHE Eye Care Cataract Pre-Operative Note (Cataract-PreOp)

Content Profile as a Content Creator."

"The EHR shall support the IHE Eye Care Cataract Operative Note (Cataract-Op) Content Profile as a Content Creator."

"The EHR shall support the IHE Eye Care Cataract Post-Operative Note (Cataract-PostOp) Content Profile as a Content Creator."

In order to require an EHR to be able to consume the IHE Eye Care Cataract Surgery documents one or more of the following statements should be included within your RFP (request for proposal):

"The EHR shall support the IHE Eye Care Cataract Pre-Operative Note (Cataract-PreOp) Content Profile as a Content Consumer with the following options supported:"

"The EHR shall support the IHE Eye Care Cataract Operative Note (Cataract-Op) Content Profile as a Content Consumer with the following options supported:"

"The EHR shall support the IHE Eye Care Cataract Post-Operative Note (Cataract-PostOp) Content Profile as a Content Consumer with the following options supported:"

<pick one or more of the import options (View Option, Document Import Option, Section Import Option and/or Discrete Data Import Option)>

Note – if the RFP requires the Section or Discrete Data Import options then it should document which sections and/or discrete data attributes are desired.

5. IHE Eye Care General Eye Care Operative Note (Eye-Op)

The General Eye Care Operative Note (Eye-Op) document defines the data that is collected during a patient's eye surgery. It is a general operative note that can be used for all types of eye care surgeries but is not intended to replace or substitute for a specific eye care operative note (e.g., Cataract Operative note, Glaucoma operative note, etc.). This may include pre-and postoperative diagnoses, procedure, findings and unusual occurrences, length of procedure, estimated blood loss, fluids administered, implant(s), specimen removed (if any), complications, postoperative expectations, and management plan.

The purpose of this document is to enable transfer of data found in an operative note for any type of eye surgery. This profile would preferably not be the one used when a more structured CDA profile is available for the procedure that was done.

In general, the eye care surgery process begins in the surgeon's office with a pre-operative assessment that produces disparate data that is used to plan the eye care surgery, but may also be used to accommodate unplanned intraoperative events. This information (i.e., CDA clinical document) must be available in the operating room, but may also be needed by QA auditors at the surgical hospital or elsewhere to support outcome assessment.

Upon completion of the surgery the surgeon creates an operative note (i.e., CDA operative note) that must be available at the surgeon's office, hospital/surgical center, and QA auditor's office. During surgery events may occur that cause the surgery to be terminated and the patient to be referred to another site and provider who needs all pre-operative, operative, and post-operative data.

The following table provides a brief description of the data content in Eye-Op:

Cataract-Op Data Content (Sections)	Brief Description
Header Module	Patient demographic data, eye care organization, contributing providers, author, creation date/time, etc.
Preoperative Diagnosis	Records the surgical diagnosis or diagnoses assigned to the patient before the surgical procedure that indicate the reason for the surgery
Postoperative Diagnosis	Records the diagnosis or diagnoses discovered or confirmed during the surgery
Operative Eye	Which eye (right or left) is the operative eye
Surgery Description	Records the particulars of the surgery with an extensive narrative. Local practice often identifies the level and type of detail required based on the procedure or specialty.
Surgical Operation Note Findings	Records clinically significant observations confirmed or discovered during the surgery
Anesthesia	Records the type of anesthesia (e.g., general or local) and may state the actual agent used.
Estimated Blood Loss	Records the approximate amount of blood that the patient lost during the surgery. It may be an accurate quantitative amount, e.g., 250 milliliters, or may be descriptive, e.g., "minimal" or "none."
Complications	Records problems that occurred during surgery, the complications may have been known risks or unanticipated problems
Specimens Removed	Records the tissues, objects, or samples taken from the patient during surgery, the narrative may include a description of the specimens
Medications	Records the medications used during the surgery
Planned Procedure	Records the procedure(s) that the surgeon thought would need to be done based on the preoperative assessment.
Indications	Further details about the reason for the surgery
Disposition	Records the status and condition of the patient at the completion of the surgery, it often also states where the patent was transferred to for the next level of care
Plan	Used to indicate follow-up that the patient needs including planned or potential future surgeries
Operative Note Fluids	Record fluids administered during the surgical procedure.
Operative Note Surgical Procedure	Used to restate the procedures performed if appropriate for an enterprise workflow
Surgical Drains	Record drains placed during the surgical procedure.
Implants	Record implants placed during the surgical procedure
External Document References	External document references

5.1. How to specify the Eye-Op Document in an RFP

In order to require an EHR to be able to create the IHE Eye Care General Eye Care Operative the following statement should be included in your RFP (request for proposal):

"The EHR shall support the IHE Eye Care General Eye Care Operative Note (Eye-Op) Content Profile as a Content Creator."

In order to require an EHR to be able to consume the IHE Eye Care General Eye Care Operative document the following wording should be included within your RFP (request for proposal):

"The EHR shall support the IHE Eye Care General Eye Care Operative Note (Eye-Op) Content Profile as a Content Consumer with the following options supported:"

<pick one or more of the import options (View Option, Document Import Option, Section Import Option and/or Discrete Data Import Option)>

Note – if the RFP requires the Section or Discrete Data Import options then it should document which sections and/or discrete data attributes are desired.

6. Transport of the Clinical Document Between Different Health Care Institutions

IHE content profiles define the ability to create and consume clinical documents. IHE has defined various Integration Profiles that apply to exchange of all types of clinical documents (i.e. not just eye care specific).

Meaningful Use Stage 2 uses IHE for defining the exchange of HL7 CDA clinical documents. It is called "Direct Messaging" and is specified in a document called "XDR and XDM for Direct Messaging Specification".

Below are the IHE profiles defining document exchange:

Cross-Enterprise Document Sharing (XDS) – provides standards based specification to manage the sharing of clinical documents (CDA) among healthcare enterprises. XDS provides the ability to register, query, and store/retrieve documents utilizing document registries and repositories. It is based upon Web services.

Cross-Enterprise Document Reliable Interchange (XDR) – permits clinical document interchange between EHRs, PHRs, and other health IT systems in the absence of XDS infrastructure. It utilizes the same web service used in XDS to "publish and register" the document; however exchange may be accomplished by connecting directly to a system that holds the documents (i.e. point to point document exchange). It is based upon Web services.

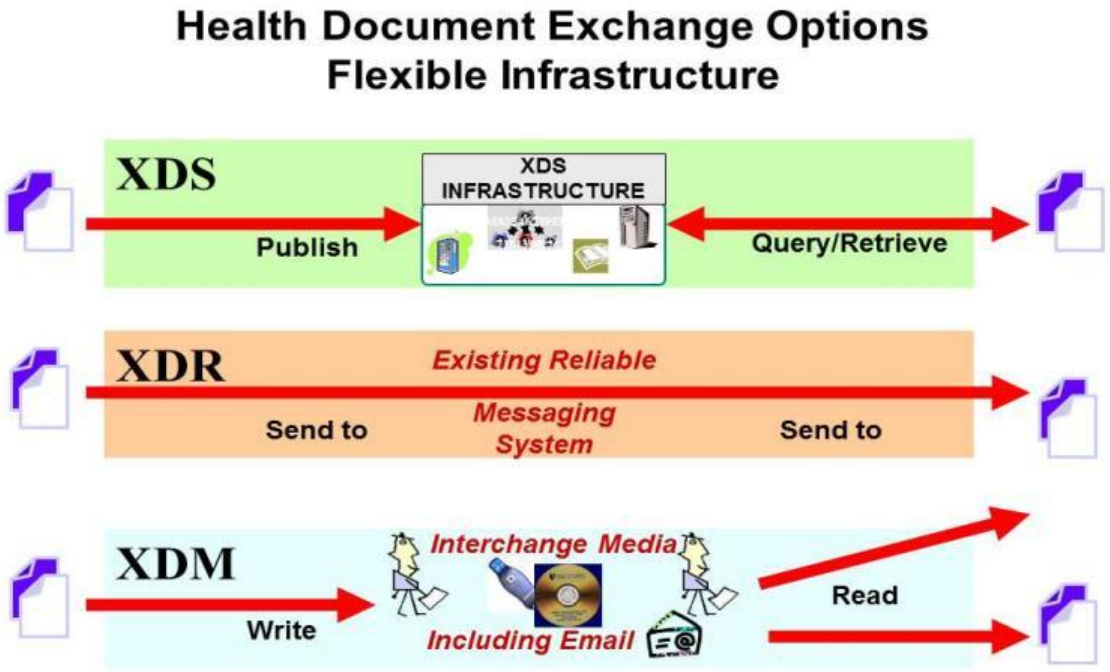
Note – The final stage 2 of Meaningful Use has defined the use of IHE XDR to exchange clinical

documents.

Cross-Enterprise Document Media Interchange (XDM) - provides document interchange using a common file and directory structure over several standard media. This permits the patient to use physical media to carry medical documents. This also permits the use of person-to-person secure email to convey medical documents.

Note – The final stage 2 of Meaningful Use has defined the use of IHE XDM ZIP over E-Mail option to exchange clinical documents.

Below is a simple illustration of the exchange options.



6.1.1. How to specify Transport Options in an RFP

In order to require an EHR to be able to exchange GEE using IHE standard web services the following wording should be included within your RFP (request for proposal).

For exchanging documents which this EHR has created (as a GEE Content Creator Actor), one or more of the following statements:

- ***"The EHR shall support IHE Cross-Enterprise Document Sharing (XDS) as a Document Source"***

- ***"The EHR shall support IHE Cross-Enterprise Document Reliable Interchange (XDR) as a Document Source"***

- ***"The EHR shall support Cross-Enterprise Document Media Interchange (XDM) as a Portable Media Creator supporting the ZIP over Email option"***

For receiving documents created elsewhere (as a GEE Content Consumer Actor), one or more of the following statements:

- ***"The EHR shall support IHE Cross-Enterprise Document Sharing (XDS) as a Document Consumer"***

- ***"The EHR shall support IHE Cross-Enterprise Document Reliable Interchange (XDR) as a Document Recipient"***

- ***"The EHR shall support Cross-Enterprise Document Media Interchange (XDM) as a Portable Media Importer supporting the ZIP over Email option"***