



The
Center for
Health
Information
Technology

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The
ASTM Continuity of Care Record, CCR,
A Tool for Health Data Exchange

New York City Dept. of Health
United Hospital Fund

May 18, 2005

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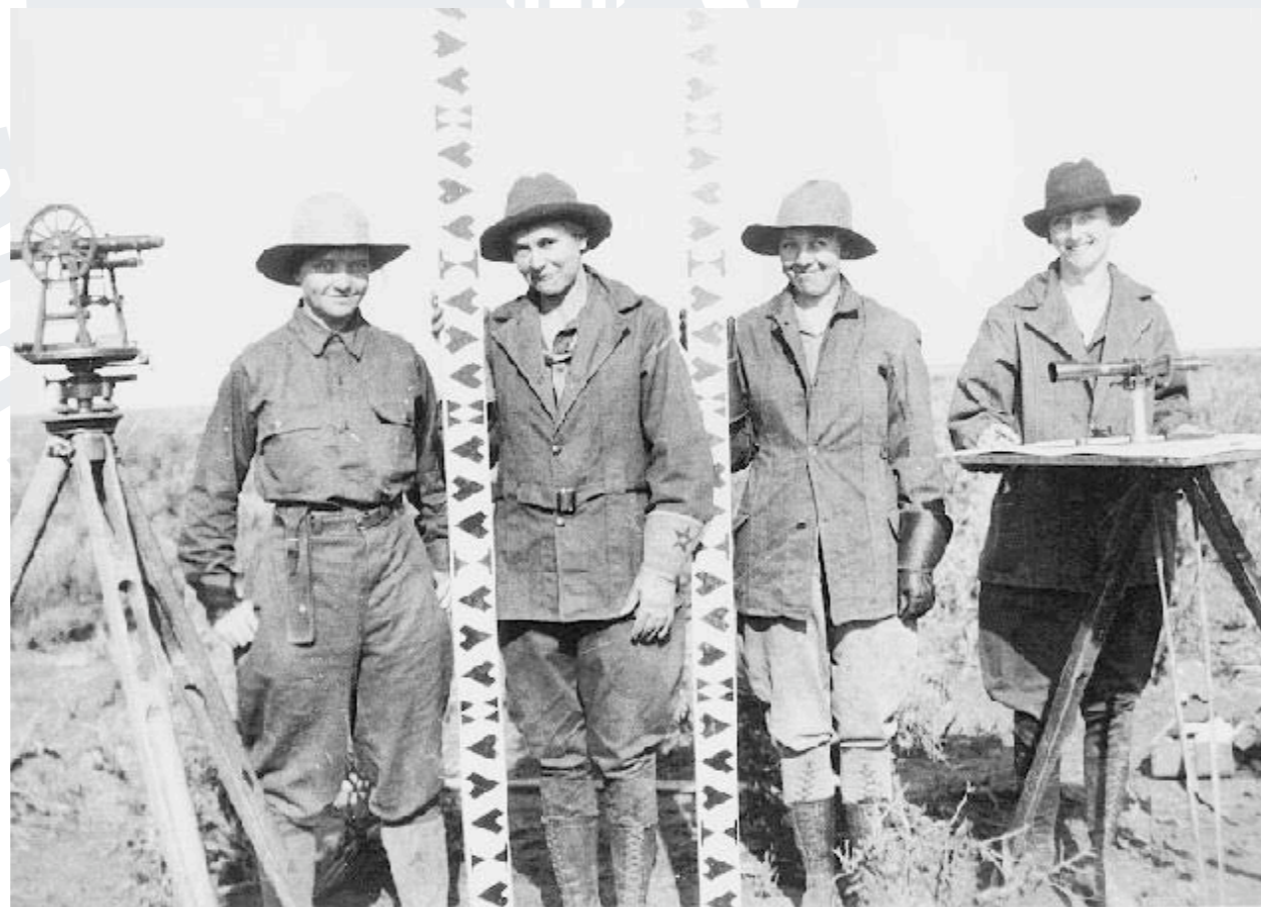
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For discussion today



- Rationale for developing the ASTM CCR
- A general overview with use cases
- A technical overview of CCR implementations for health data exchange

Surveying the CCR in the Context of the National Health IT Landscape






The Future of Family Medicine



- 📍 Interoperable IT systems are at the core of this collaborative project to design and implement a New Model of Primary Care
- 📍 Innovation in primary care requires a large audience for data exchange and sharing to effectively manage care, especially for those with multiple chronic illnesses

Interoperability means systems that share information

-  Lack of interoperability is a hallmark characteristic of our healthcare system
-  One should not need an expensive EHR program to interoperate or share health information electronically: paper and web-based systems can be a start
-  Quality, safety, and cost could be affected by even marginal improvements in interoperability



AAFP CCR overview



Design standard to facilitate summary health information exchanges in the office setting

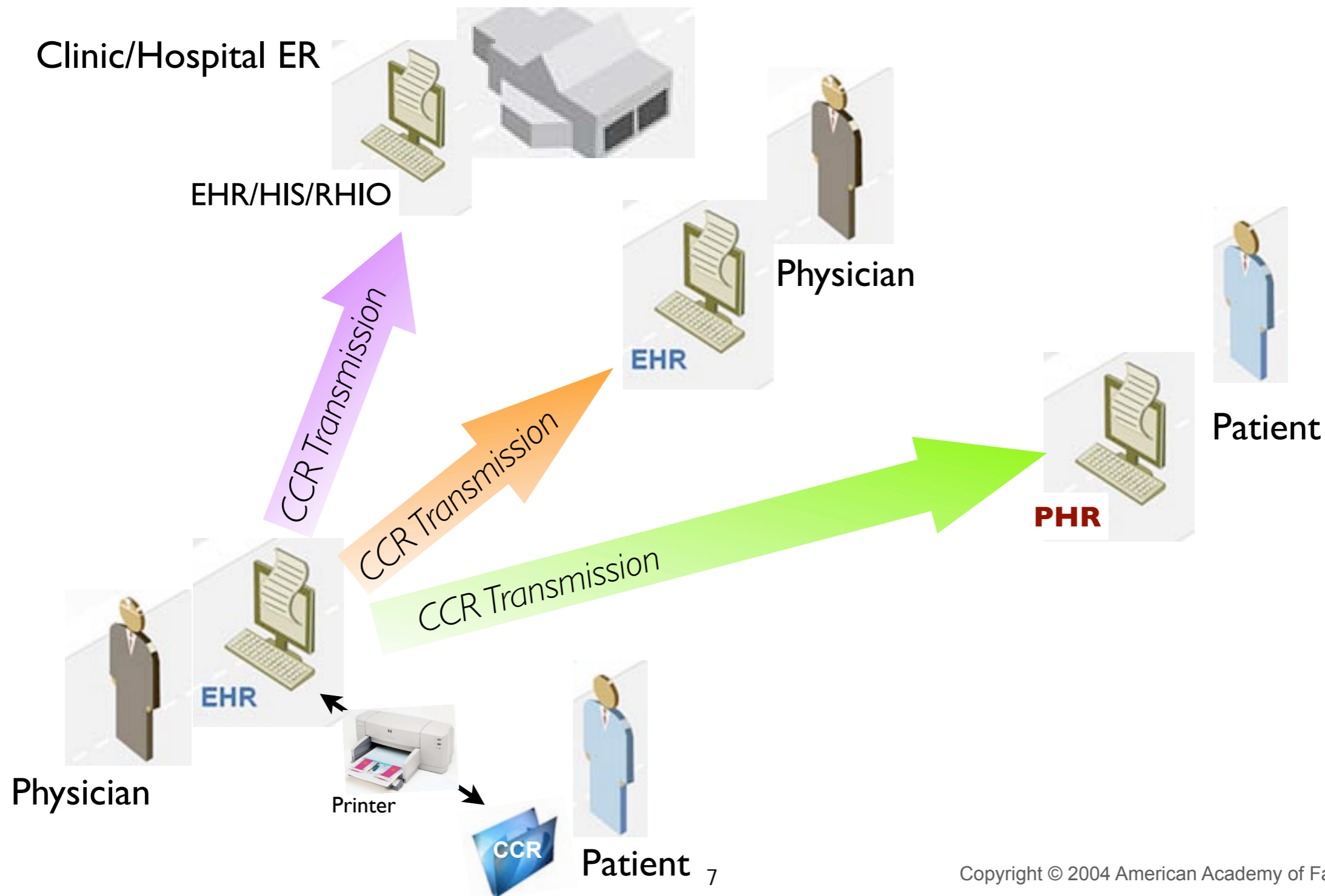


Increase the value of EHRs by enabling widespread electronic continuity



Encourage adoption of EHRs by improving immediate clinical value to providers and patients

CCR use cases








General ambulatory use cases...

- Provider to patient at end of encounter...
- Through PEHR from patient to provider at time of visit...
- Provider-to-provider on transfer, discharge, referral, or consult...
- Provider-to/from-institution on admission and/or discharge...
- Extraction of data from EHR-to/from-PEHR and from EHR-to/from-EHR...
- Regulatory and pay-for-performance reporting...
- MD-to/from-pharmacist...

Additional value from interoperability




-  Patient safety
-  Community health information exchange
-  Practice-based research
-  Patient health records
-  E-prescribing

The Evolving and Emerging Market for HIT Products and Services

Partners for Patients



 AAFP-HIT Industry initiative, based on the guiding principles that physician HIT must be based on:

Affordability | Compatibility | Interoperability | Data stewardship

 Valuable relations with 85+ companies

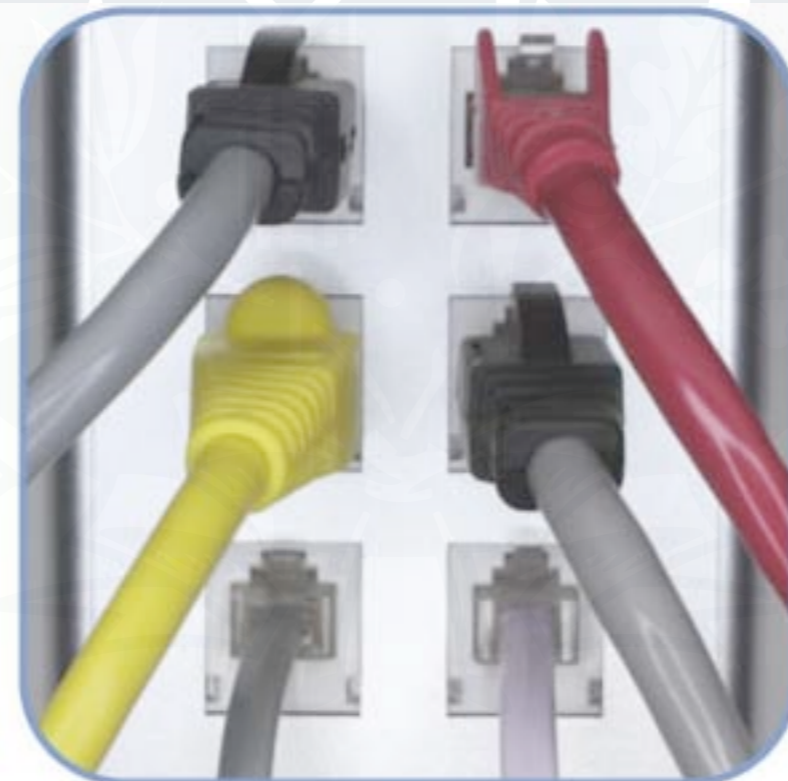
- ◆ EHR and PMS vendors
- ◆ Hardware and networking firms
- ◆ Laboratory and pharmacy industry representatives
- ◆ Web services, medical devices, and others

 Projects and collaborations

- ◆ Discounts on products and services
- ◆ Standards for connectivity and interoperability
- ◆ Exhibits and conferences
- ◆ Surveys and education





Overview of the ASTM CCR

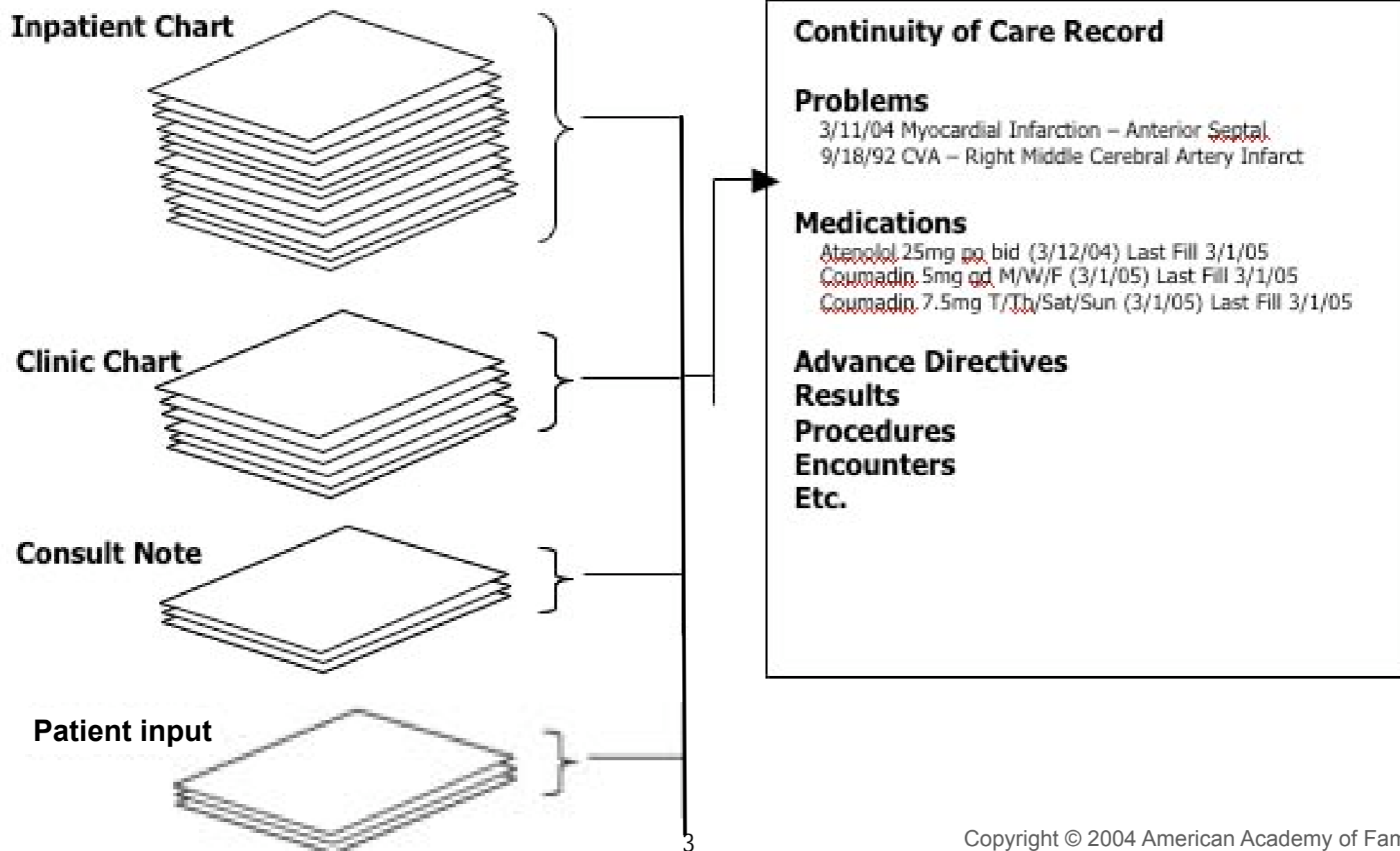


CCR description

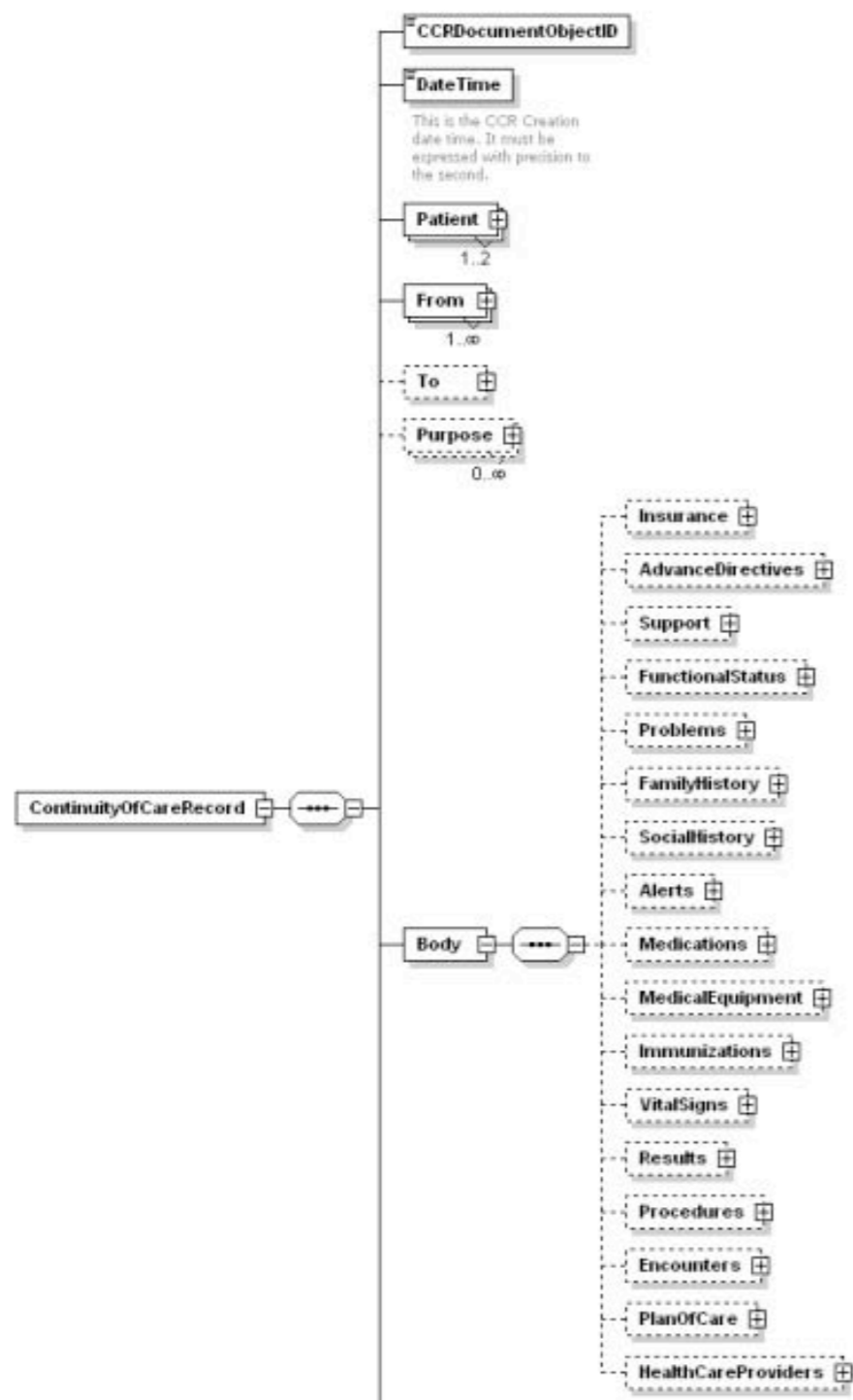


-  The ASTM CCR is a patient health summary standard expressed in XML. It is a way to create flexible documents that contain the most relevant and timely core clinical information about a patient, and to send these electronically from one care giver to another or to provide them directly to patients.
-  The best way to understand a ASTM CCR is as a collection of data from many clinical documents – documents such as Clinic Notes, H&Ps, Discharge Summaries, Prescriptions, Orders, Results documents, Operative Reports, Procedure Notes, etc.

CCR concept



CCR structure



XML document
data objects = sections

```
<?xml version="1.0" encoding="UTF-8" ?>
```

```
- <ContinuityOfCareRecord xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:astm-org:CCR CCR9.xsd" xmlns="urn:astm-org:CCR">
  <CCRDocumentObjectID>632485590297343750</CCRDocumentObjectID>
  <DateTime>2005-04-08T12:10:29Z</DateTime>
  - <Patient>
    <ActorID>AA0001</ActorID>
  </Patient>
  - <From>
    - <ActorLink>
      <ActorID>AA0002</ActorID>
      - <ActorRole>
        <Text>Primary Care Provider</Text>
      </ActorRole>
    </ActorLink>
  </From>
  - <Purpose>
    - <Description>
      <Text>Data Transfer</Text>
    </Description>
  </Purpose>
  - <Body>
    - <Problems>
      - <Problem>
        <CCRDataObjectID>BB0001</CCRDataObjectID>
        - <DateTime>
          - <Type>
            <Text>Onset</Text>
          </Type>
          <ExactDateTime>1999-04-01T05:00:00Z</ExactDateTime>
        </DateTime>
```



Continuity of Care Record

Date Created: 4/8/2005 8:11 AM

From: Dr. John Smith
Role: Primary Care Provider

To:

Purpose: Data Transfer

Patient Demographics

Name	Date of Birth	Gender	Marital Status	Language	Religion	Race	Ethnicity
Doqit, John B	1/16/1938	Male					

Problems

Type	Code	Description	Onset	Comment	Status
Diagnosis	402.11 (ICD9-CM)	Congestive Heart Failure	4/1/1999		Active
Diagnosis	250.02 (ICD9-CM)	Diabetes Mellitus	3/1/1984		Active
Diagnosis	403.10 (ICD9-CM)	Hypertension	8/8/1990		Active
Diagnosis	410.80 (ICD9-CM)	Myocardial Infarction	1/25/2003		Active

Alerts

Type	Code	Description	Agents	Reaction	Comment	Initial Occurrence
Allergy	V14.0 (ICD9-CM)	Penicillin	Environmental Agents: Penicillin			1/1/1970
Allergy	995.2 (ICD9-CM)	Sulfa				3/29/2005

Medications

Medication	Prescription Date	Form	Strength	Quantity	SIG	Indications	Instruction	Refills
Furosemide (furosemide)	12/9/2003	tablet	80 mg	100 tablet	1 tablet PO bid	402.11	May increase dose by one tablet qd prn shortness of breath.	0
Glucophage XR (metformin)	3/29/2005	tablet, extended release	500 mg	100 tablet	1 tablet PO bid	250.02	Hold dose if patient becomes markedly light headed.	0
Lopressor (metoprolol)	3/29/2005	tablet	100 mg	100 tablet	1 tablet PO tid	403.10	Hold dose if Systolic Blood Pressure drops below 100, or Diastolic Blood Pressure drops below 50.	0

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Your Health Information Rights

Starting a Personal Health Record

Frequently Asked Questions

Additional Resources

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myPHR Personal Health Record

A guide to understanding and managing your personal health information



CCR standard development process status



-  The CCR has been developed under the auspices of ASTM International, one of the oldest SDOs. Co-sponsors include the AAFP, the AAP, the AAN, the AMA, the Mass Medical Society, and several other non-profit clinical organizations.

CCR Technical Overview




Basic CCR Architecture And Structure

- The CCR uses XML as an object-model and data description language to represent clinical and administrative health care data.
- CCR XML is W3C compliant and supports .net and Java architectures and all the major XML parsers, editing and development tools, and proprietary XML tools such as Microsoft's InfoPath.
- In the culture wars in the IT world, CCR is decidedly 'new-school' versus traditional OMG, UML, and ER data and object modeling.

CCR XML rules



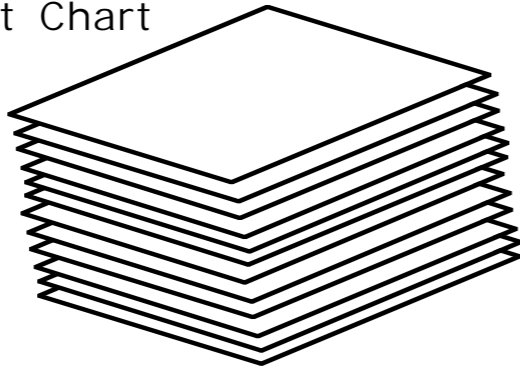
 The ASTM CCR Subcommittee defined that the following rules were requirements of CCR XML:

- 1) All data must be content of tags (elements).
- 2) No data were allowed in tag attributes. Tag attributes were reserved for processing instructions only.
- 3) All tags must be humanly readable and correspond to easily and clearly understandable concepts using recognizable terms.
- 4) All use of XML should conform to W3C XML best practices and correspond to general usage within the overall computer industry.
- 5) CCR XML would follow an explicit object-oriented approach and would use tags and tag hierarchies as the object description language for the expression of all data as objects, and all data attributes as object attributes. Mixed content cannot is not allowed in the schema.
- 6) CCR XML cannot contain data formatting instructions. All formatting must be defined in XSLT scripts.

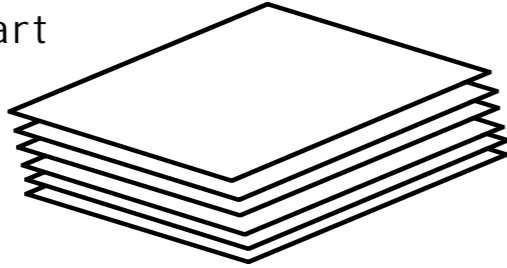
CCR Data Mapping

- CCR XML is a superset of (and therefore can represent any data from) existing string and EDIFACT health care general use and de facto standards:
 - HL7 2.x (including the new ELINCS 2.4 Draft Implementation Guide)
 - ASN X12N 837
 - NCPDP and NCPDPScript
 - Surescripts and RxHub
 - HL7 CDA and V3.0

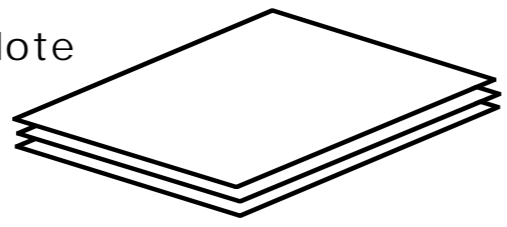
Inpatient Chart



Clinic Chart



Consult Note



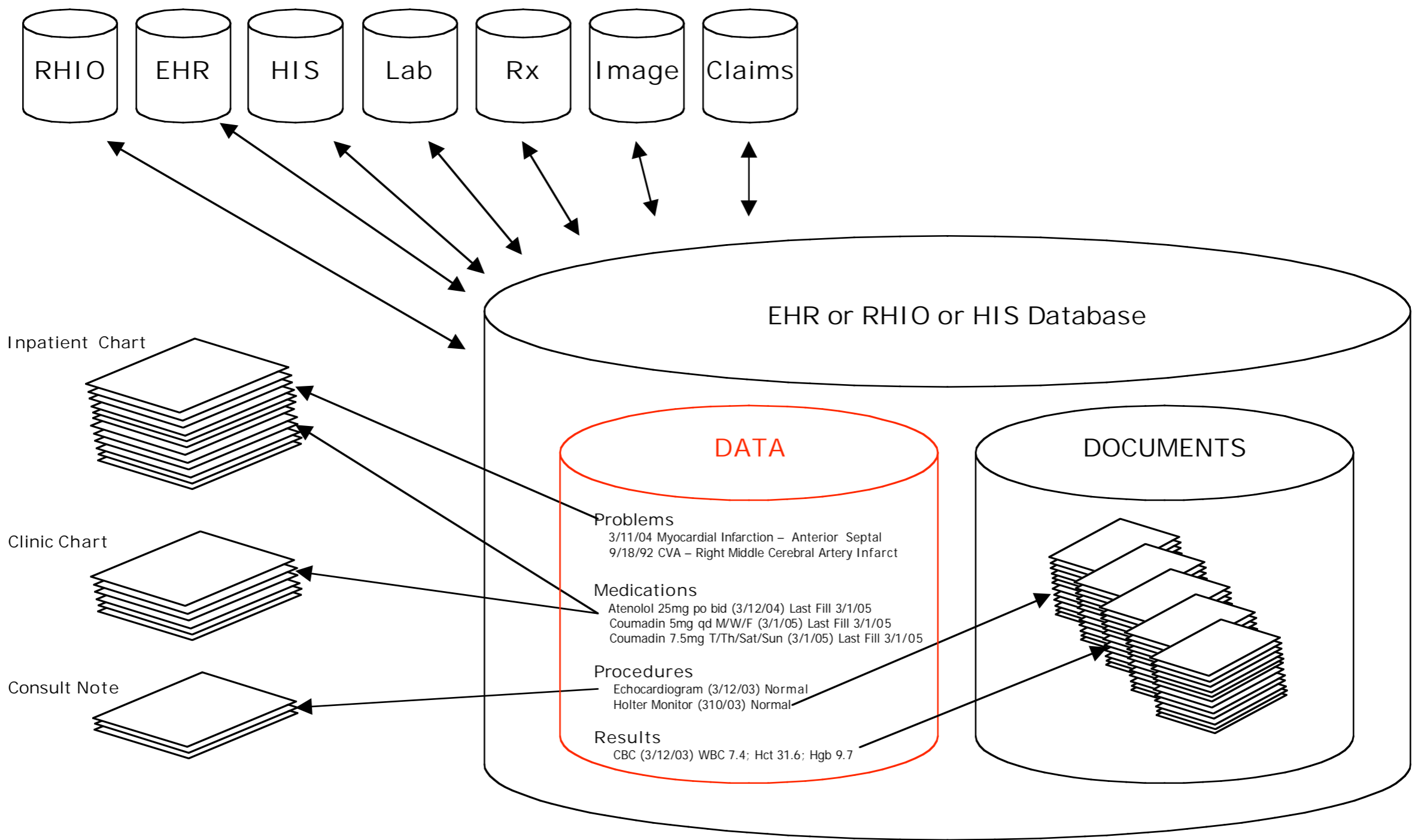
EHR

Problems

- 3/11/04 Myocardial Infarction – Anterior Septal
- 9/18/92 CVA – Right Middle Cerebral Artery Infarct

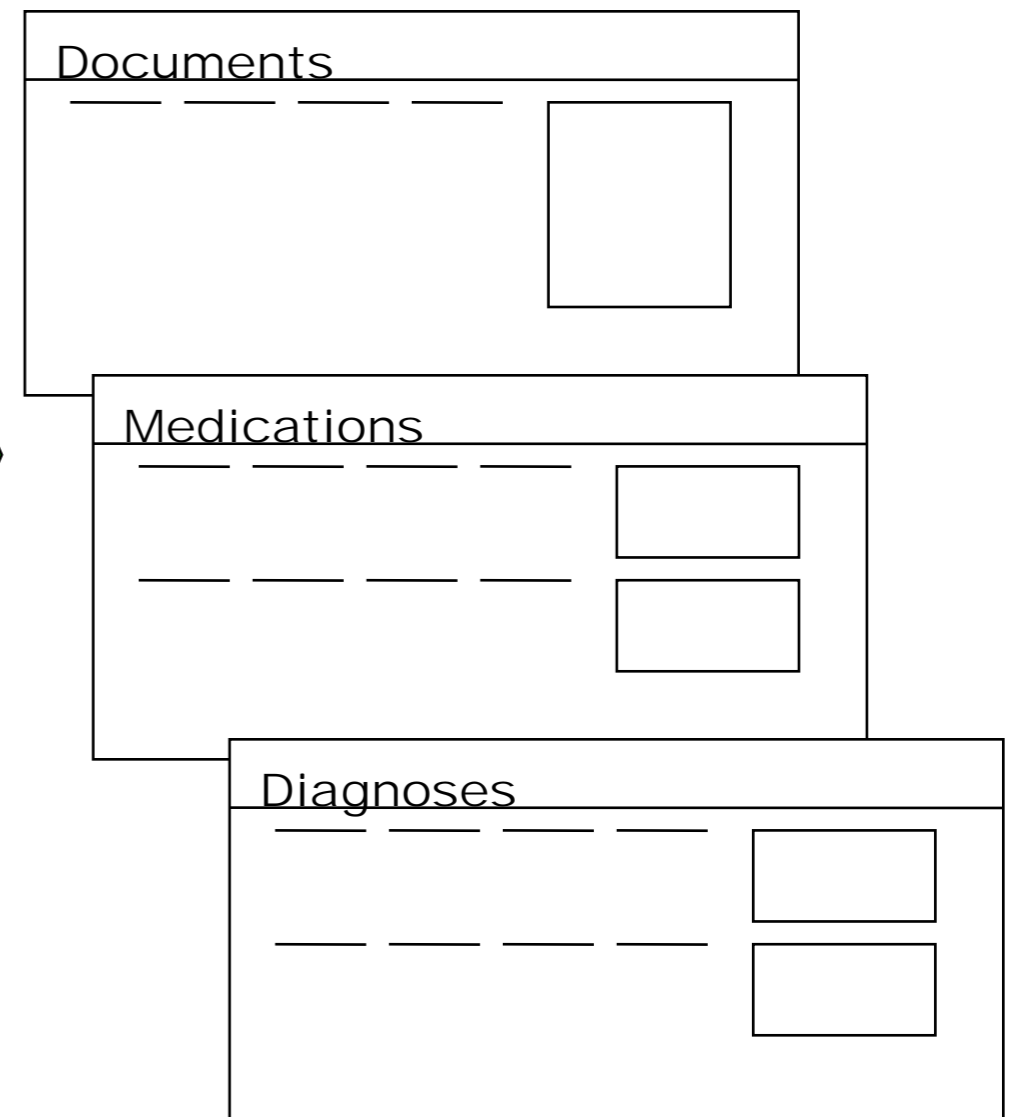
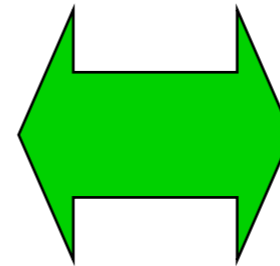
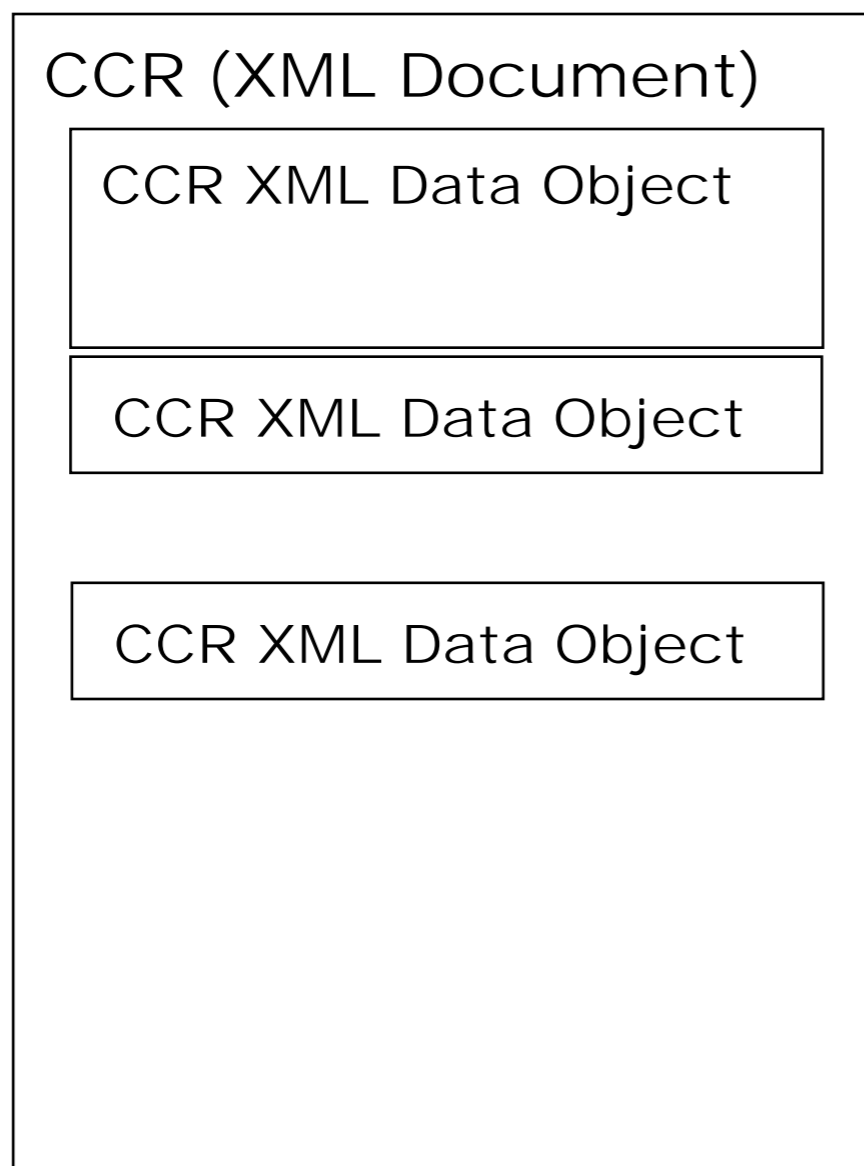
Medications

- Atenolol 25mg po bid (3/12/04) Last Fill 3/1/05
- Coumadin 5mg qd M/W/F (3/1/05) Last Fill 3/1/05
- Coumadin 7.5mg T/Th/Sat/Sun (3/1/05) Last Fill 3/1/05



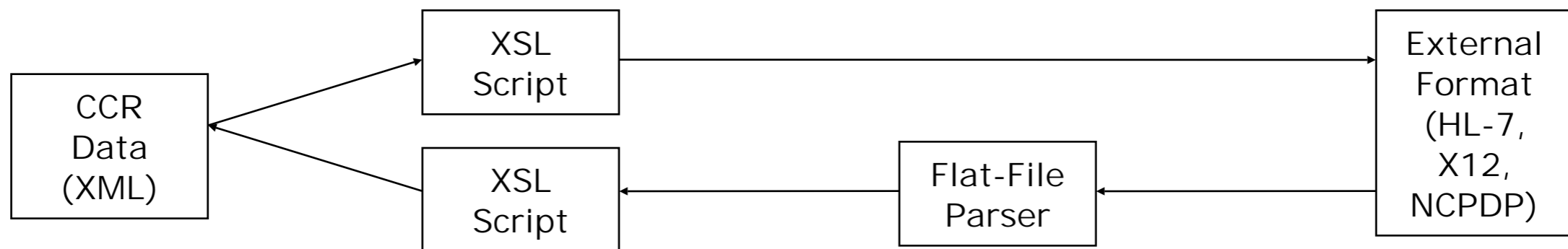
CCR XML Object Representation

- XML is used as the document, data object, data model, and object representation language



Data Extraction, Conversion, and Legacy System Interfaces

- The CCR is designed to leverage XML as the data exchange standard.
- CCR maps to and from any data format with a simplified set of data parsers and translators (XML/XSLT).
- Data feeds can be real-time or batch.



CCR-based Data Mapping and Deployment Projects

- Real-time device data interface (open source).
- Performance and quality reporting.
- XSLT validation and test suites + standardized XSLT print output scripts (.doc, .pdf., .xls, FAX, HTML) (open source).
- Cell Phone, PDA, and portable device implementations (open source).
- Secure (PKI) inter/intranet infrastructures (SAML Federated Authority).
- Patient-based data access control and audit.
- Aggregated data analysis, profiling, and reporting.
- Protocol engines.

Sample Production CCR RHIO Architecture

