HL7 Clinical Document Architecture

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Bob Dolin, MD;
Kaiser Permanente
About me...

- Kaiser Permanente, Department of Internal Medicine, National Clinical Information Systems
- Co-chair HL7 Structured Documents committee; Co-editor HL7 CDA
- SNOMED Editorial Board
Outline

- CDA Overview
- CDA + Templates

See also:
Wednesday, May 19th, Session G.
HIPAA Claims Attachments: The Revised Proposal.
Presented by: Maria Ward and Wes Rishel.

X12 and HL7 have cooperated to create a revised proposal for HIPAA claims attachments, based on XML and CDA. Session G will describe the approach, and provide an update on where it stands in the regulatory process.
Approximate CDA timelines

ANSI/HL7 CDA R1.0-2000

~CDA, Release Two ballot period

2001 2002 2003 2004 2005
Allergies and Adverse Reactions

- Penicillin - Hives
- Aspirin - Wheezing
- Codeine – Itching and nausea

ANSI/HL7 CDA R1.0-2000

```
<section>
  <caption>
    <caption_cd V="11496-7" S="LOINC"/>
    Allergies and Adverse Reactions
  </caption>
  <list>
    <item><content ID="A1">Penicillin - Hives</content></item>
    <item><content>Aspirin - Wheezing</content></item>
    <item><content>Codeine - Itching and nausea</content></item>
  </list>
  <coded_entry>
    <coded_entry.value ORIGTXT="A1" V="DF-10074" S="SNOMED" DN="Allergy to Penicillin"/>
  </coded_entry>
</section>
```
<section>
  <code code="10123-x" codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"/>
  <title>Allergies and Adverse Reactions</title>
  <text>
    <list>
      <item><content ID="A1">Penicillin – Hives</content>
      <item>Aspirin – Wheezing</item>
      <item>Codeine – Itching and nausea</item>
    </list>
  </text>
</section>

CDA, Release Two
What is the CDA?

The CDA is a document markup standard for the structure and semantics of exchanged "clinical documents".

A clinical document is a documentation of observations and other services with the following characteristics:

• Persistence
• Stewardship
• Potential for authentication
• Context
• Wholeness
• Human readability

A CDA document is a defined and complete information object that can exist outside of a message, and can include text, images, sounds, and other multimedia content.
Key Aspects of the CDA

• CDA documents are encoded in Extensible Markup Language (XML).

• CDA documents derive their meaning from the HL7 Reference Information Model (RIM).

• The CDA specification is richly expressive and flexible. Templates and implementation guides can be used to constrain the generic CDA specification.
CDA Guiding Principles

• Give priority to documents generated by clinicians involved in direct patient care.

• Minimize the technical barriers needed to implement the Standard.

• Promote longevity of all information encoded according to this architecture.

• Promote exchange that is independent of the underlying transfer or storage mechanism.

• Enable policy-makers to control their own information requirements without extension to this specification.
Major Components of a CDA Document

---

**ClinicalDocument**
- classCode: `= DOCCLIN`
- moodCode: `= EVN`
- id: `SET<II>[1..1]`
- code: `CE CWE [1..1] <DocumentType`
- title: `ST [0..1]`
- effectiveTime: `TS [1..1]`
- confidentialityCode: `CE CWE [0..1]`
- languageCode: `CS CNE [0..1] <HumanLanguage`
- setId: `II [0..1]`
- versionNumber: `INT [0..1]`

**NonXMLBody**
- classCode: `= DOCBODY`
- moodCode: `= EVN`
- text: `ED [1..1]`

**StructuredBody**
- classCode: `= DOCBODY`
- moodCode: `= EVN`
- component
  - typeCode: `= COMP`
  - contextConductionInd: `BL [0..1] "TRUE"`

**Section**
- classCode: `= DOCSCT`
- moodCode: `= EVN`
- id: `SET<II>[0..1]`
- code: `CE CWE [0..1] <DocumentSectionType`
- title: `ST [0..1]`
- text: `ED [0..1]`
- confidentialityCode: `SET=CE CWE [0..1]`
- languageCode: `CS CNE [0..1] <HumanLanguage`

**Entry**
- typeCode: `= _ActRelationshipEntry`
- contextConductionInd: `BL [0..1] "TRUE"`

**Observation**
- classCode: `= OBS`
- moodCode: `= _ActRelationshipDocumentObservation`
- id: `II [0..1]`
- code: `CD CWE [1..1] <ObservationType`
- negationInd: `BL [0..1]`
- derivationExpr: `ST [0..1]`
- text: `ED [0..1]`
- statusCode: `SET<CS> CNE [0..1] #actStatus`
- effectiveTime: `TVL<TS> [0..1]`
- priorityCode: `SET<CE CWE [0..1] #actPriority`
- repeatNumber: `TVL<INT> [0..1]`
- uncertaintyCode: `CE CWE [0..1] #actUncertainty`
- languageCode: `CS CNE [0..1] <HumanLanguage`
- value: `ANY [0..1]`
- interpretationCode: `SET<CS> CNE [0..1]`
- methodCode: `CE CWE [0..1]`
- targetSiteCode: `CD CWE [0..1]`
Major Components of a CDA Document

```xml
<ClinicalDocument>
  ...
  <StructuredBody>
    <section>
      <text>...
    </section>
    <Observation>
      ...
    </Observation>
    <Observation>
      <reference>
        <ExternalObservation>
          ...
        </ExternalObservation>
      </reference>
    </Observation>
  </StructuredBody>
</ClinicalDocument>
```
• The purpose of the CDA header is to enable clinical document exchange across and within institutions; facilitate clinical document management; facilitate compilation of an individual patient's clinical documents into a lifetime electronic patient record; and set the context for the document as a whole.
Good Health Clinic Consultation note

Consultant: Robert Dolin, MD
Date: April 7, 2000
Patient: Henry Levin, the 7th
MRN: 12345
Sex: Male
Birthdate: September 24, 1932

<ClinicalDocument>
  <id extension="c266" root="2.16.840.1.113883.3.933"/>
  <code code="11488-4" codeSystem="&LOINC;" displayName="Consultation note"/>
  <title>Good Health Clinic Consultation Note</title>
  <effectiveTime value="20000407"/>
  <custodian><assignedCustodian><representedOrganization>
    <id extension="M345" root="2.16.840.1.113883.3.933"/>
    <name>Good Health Clinic</name>
  </representedOrganization></assignedCustodian></custodian>
  <recordTarget><patientRole>
    <id extension="12345" root="2.16.840.1.113883.3.933"/>
    <patientPatient>
      <name>
        <given>Henry</given><family>Levin</family><suffix>the 7th</suffix>
      </name>
      <administrativeGenderCode code="M" codeSystem="2.16.840.1.113883.5.1"/>
      <birthTime value="19320924"/>
    </patientPatient></patientRole></recordTarget>
  <componentOf><encounter>
    <id extension="KPENC1332" root="2.16.840.1.113883.3.933"/>
    <effectiveTime value="20000407"/>
    <encounterPerformer typeCode="CON"><assignedEntity>
      <id extension="KP00017" root="2.16.840.1.113883.3.933"/>
      <assignedPerson>
        <name><given>Robert</given><family>Dolin</family><suffix>MD</suffix></name>
      </assignedPerson></assignedEntity></encounterPerformer>
  </componentOf></encounter></ClinicalDocument>
The CDA body can be either an unstructured blob, or can be comprised of structured markup.

The NonXMLBody clone represents a document body that is in some format other than XML. The text slot of this clone is used to reference data that is stored externally to the CDA document. Rendering requires a software tool that recognizes the particular MIME media type of the blob.

The StructuredBody clone represents a CDA document body that is comprised of one or more document sections. Document sections can nest, they have participants that can override the participants propagated from the header, and they contain a single narrative block, and any number of CDA entries and external references.

The Section.text component is known as the “CDA Narrative Block”, used to store text to be rendered.
<ClinicalDocument>
 ... CDA Header ...
 <component><bodyChoice>
  <StructuredBody>
   <component>
    <section>
     <code code="11496-7" codeSystem="&LOINC;"/>
     <title>Assessment</title>
     <text>
      <list>
       <item>Asthma, with prior smoking history.
         Difficulty weaning off steroids.</item>
       <item>Hypertension, well-controlled.</item>
       <item>Contact dermatitis on finger.</item>
      </list>
     </text>
    </section>
   </component>
  </StructuredBody>
 </bodyChoice></component>
</ClinicalDocument>
CDA Body Entries

• Within a document section, the narrative block represents content to be rendered, whereas CDA entries represent structured content provided for a computer. CDA entries encode content present in the narrative block of the same section.

• **Act**: A derivative of the RIM Act class, only to be used when the other more specific entries aren’t appropriate.

• **FutureEncounter**: A derivative of the RIM Encounter class, used to represent follow-up visits.

• **Observation**: A derivative of the RIM Observation class, used for representing structured observations.

• **ObservationMedia**: A derivative of the RIM Observation class that represents multimedia that is logically part of the current document.

• **Procedure**: A derivative of the RIM Procedure class, used for representing procedures.

• **RegionOfInterest**: A derivative of the RIM Observation class that represents a region of interest on an image.

• **SubstanceAdministration**: A derivative of the RIM SubstanceAdministration class, used for representing medication-related events.
Allergies and Adverse Reactions

Penicillin – Hives
Aspirin - Wheezing

<section>
  <code code="10123-x" codeSystem="&LOINC;"/>
  <title>Allergies and Adverse Reactions</title>
  <text>
    <list>
      <item>Penicillin – Hives</item>
      <item>Aspirin - Wheezing</item>
    </list>
  </text>
  <entry><entryChoice>
    <Observation>
      <code code="48318009" codeSystem="&SNOMEDCT;"
        displayName="Prior dx"/>
      <value xsi:type="CD" code="91936005"
        codeSystem="&SNOMEDCT;" displayName="Allergy to penicillin"/>
      <entryRelationship typeCode="MFST"><entryChoice>
        <Observation>
          <code code="48318009" codeSystem="&SNOMEDCT;"
            displayName="Prior dx"/>
          <value xsi:type="CD" code="247472004" codeSystem="&SNOMEDCT;"
            displayName="Hives"/>
        </Observation>
      </entryChoice></entryRelationship>
    </Observation>
  </entryChoice></entry>
</section>
CDA Document Exchange

• From the perspective of a V2.x or V3 message, a CDA document is a multimedia object, to be exchanged as a Multipurpose Internet Mail Extensions (MIME, RFC 2046) package, encoded as an encapsulated data type (ED).

• CDA recommends the use of Internet standard RFC 2557 "MIME Encapsulation of Aggregate Documents, such as HTML (MHTML)" (http://www.ietf.org/rfc/rfc2557.txt).

• In V2.x, CDA documents are to be exchanged in the OBX segment, in any message that can exchange documents (such as MDM). Within the OBX segment, the MIME package is placed in OBX.5 (Field 00573 Observation value), encoded as a V2.x encapsulated data type.

• In V3, CDA documents can be exchanged in any message that can exchange documents. The Act.text RIM attribute contains the MIME package, encoded as an encapsulated data type.
<someMessage>
  <Act.Code code="11488-4"
codeSystem="&LOINC;" displayName="Consultation note"/>
  <Act.text type="multipart/related">
    MIME-Version: 1.0
    Content-Type: multipart/related; boundary="HL7-CDA-boundary";
type="text/xml"; start="10.12.45567.43"
    Content-Transfer-Encoding: BASE64

    --HL7-CDA-boundary
    Content-Type: text/xml; charset="US-ASCII"
    Content-ID: &lt;10.12.45567.43>
    ...
    Base 64 of of base CDA document, which contains
    ...
    <ObservationMedia>
      <id root="10.23.4567.345"/>
      <value mediaType="image/jpeg">
        <reference value="canned_left_hand_image.jpeg"/>
      </value>
    </ObservationMedia>
    ...

    --HL7-CDA-boundary
    Content-ID: &lt;10.23.4567.345>
    Content-Location: canned_left_hand_image.jpeg
    Content-Type: image/JPEG
    ...
    Base64 image ...
    --HL7-CDA-boundary--
  </Act.text></someMessage>

• This is a non-normative valid use of RFC 2557 in a V3 message.
  Several other valid representations are possible.
Outline

• CDA Overview

• CDA + Templates
• Evidence-based medicine often manifests through the creation of Clinical Practice Guidelines.

• Clinical Practice Guidelines are most useful when integrated into the process of care.

• Integration options include:
  • Templates
  • Alerts

• Clinical Practice Guidelines can be transformed into HL7 Templates that sit atop CDA documents, to guide the collection of key data elements.
The “A” in “CDA”

• CDA, Release One, anticipated a hierarchical set of XML DTDs or XML Schemas to both extend and constrain the markup provided in the first release of the standard. This hierarchy would form an “architecture”, hence the “A” in “CDA”.

• CDA, Release Two consists of a single CDA XML Schema, and the architecture arises from the ability to apply one or more of a hierarchical set of HL7 Templates*, which serve to constrain the richness and flexibility of CDA.

• There are many kinds of HL7 Templates that might be created. Among them, two are particularly relevant for clinical documents: (1) those that constrain the document sections based on the type of document (section-level templates); (2) those that constrain the entries within document sections (entry-level templates).

*HL7 Templates are in a draft state at the time of this writing. Local implementation guides can serve much the same purpose as HL7 Templates, constraining the standard to better meet local needs. HL7 Templates will formalize the constraint mechanism, but are not required in order to locally constrain CDA.
CDA Schema
    CDA Schema :: Progress Note section-level template applied.
    CDA Schema :: Progress Note section-level and Vital Signs entry-level template applied.
    CDA Schema :: Endocrinology Progress Note section-level and Vital Signs entry-level template applied.
    CDA Schema :: Progress Note section-level and Intensive Care Unit Vital Signs entry-level template applied.
    CDA Schema :: Cardiology Progress Note section-level template applied.
    CDA Schema :: Cardiology Progress Note section-level and Cardiac Physical Examination entry-level template applied.
    CDA Schema :: Endocrinology Progress Note section-level template applied.
    CDA Schema :: Endocrinology Progress Note section-level and Vital Signs entry-level template applied.
An HL7 V3 Template is a constraint against an HL7 V3 (message or document) specification.

Here’s an abstract representation of a template that might be applied to a CDA document:

A “Comprehensive Review” document contains:

• [1..1] "objective" section
• [1..1] "physical-exam" section
• [1..1] "vital-signs" section
• [0..1] "lab" section
• [0..1] “CBC” template
The intent of the HL7 V3 Template specification is to define a normative representation for HL7 V3 Templates. It does not propose building or voting on actual templates.

The HL7 Template proposal is applicable to any of the V3 family of standards. There are no special considerations for CDA vs. V3 messages.

HL7 instances will need to conform to the normative standard, and in addition, can be validated against the constraints expressed in one or more templates.

Instances can explicitly point to referenced templates.
History
Henry Levin, the 7th is a 67 year old male referred for further asthma management. Onset of asthma in his teens. He was hospitalized twice last year, and already twice this year. He has not been able to be weaned off steroids for the past several months.

Past Medical History
• Asthma
• Hypertension

Medications
• Theodur 200mg BID
• Proventil inhaler 2 puffs QID PRN
• Prednisone 20mg qd
• HCTZ 25mg qd

Allergies
• Penicillin - Hives
• Aspirin - Wheezing

Social History
Smoking :: 1 PPD between the ages of 20 and 55, and then he quit.

cont...
Physical Exam
• Vital Signs :: BP 196/100; Wt 185lb; Resp 16 and unlabored; T 98.6F; HR 86 and regular.
• Lungs :: Clear with no wheeze. Good air flow.
• Cardiac :: RRR with no murmur, no S3, no S4.

Labs
• PFTs 02/03/1999: FEV1 1.2; FVC 1.9; FEV1/FVC = 0.63.
• CBC 02/03/1999: Hgb 15.1; WBC 7.2; PLT 279k; MCV 88.
• ABG 02/03/1999: (room air) pO2 78; pCO2 48; pH 7.38.
• CXR 02/03/1999: Hyperinflated. Normal cardiac silhouette, clear lungs.
• PFTs today: FEV1 1.4; FVC 2.0; FEV1/FVC = 0.70.
• Peak Flow today: 260 l/m.

Assessment
• Asthma, with prior smoking history. Difficulty weaning off steroids. Will try gradual taper.
• Hypertension, poorly controlled. Add lopressor.

Plan
• Complete PFTs with lung volumes.
• Chem-7
• Provide educational material on inhaler usage and peak flow self-monitoring.
• Decrease prednisone to 20qOD alternating with 18qOD.
• Lopressor 25mg BID.
• RTC 1 week.
Lab Order Form
- CBC with Differential Count
- Chem-7
  - Liver Enzymes
  - Calcium
  - Magnesium
  - Urinalysis
  - Theophylline level

Cardiopulmonary Order Form
Test:
- Complete Pulmonary Function Study with Lung Volumes
  - Arterial Blood Gas
  - Treadmill Stress Test, Routing
  - Echocardiogram
  - Other (Specify) :: _______________________________________________

Indications:
- Baseline evaluation

Specific Questions:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
## A typical day in the office…

### Health Summary Form

<table>
<thead>
<tr>
<th>Screening</th>
<th>DATE</th>
<th>DATE</th>
<th>DATE</th>
<th>DATE</th>
<th>DATE</th>
<th>DATE</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammogram</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pap Smear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunizations</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
</tr>
<tr>
<td>Pneumovax</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
<td>DATE</td>
</tr>
<tr>
<td>Cholesterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat Belts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

31
Am I following the NHLBI guidelines?

• Which environmental and occupational triggers did I ask about?
  • I forgot to ask about triggers.

• Have I provided proper patient education?
  • Information to answer this question is in the narrative portion of my note.

• Is my assessment of asthma severity consistent with the NHLBI guidelines?
  • NHLBI asthma severity is based on several factors, the worst of which determines diagnosis.
• HL7 Templates are defined as constraints on balloted V3 specifications – messages or CDA documents.

• The NHLBI Asthma Guidelines can be expressed as a data entry and/or validation template that sits on top of the CDA specification.

• A CDA document that is authored with the NHLBI Asthma Template will conform to the CDA standard AND will conform to the additional constraints in the template.
NHLBI Asthma Template

History
Frequency of wheezing:
- Daily and continual.
- Daily but not continual.
Episodes per week :: ______________________

Labs
Peak Flow :: __________ l/m.

Assessment
- Asthma, Intermittent.
- Asthma, Mild Persistent.
- Asthma, Moderate Persistent.
- Asthma, Severe Persistent.

Plan
- Pneumococcal Vaccine
- Complete PFTs with lung volumes.
- Provide education on peak flow self-monitoring.
- Environmental and Occupational screening questionnaire.
- Teach inhaler/spacer/holding chamber technique.
- Discuss environmental control measures to avoid exposure to known allergens and irritants.
- Teach self-monitoring.
Plan
- Pneumococcal Vaccine
- Complete PFTs with lung volumes.
- Provide education on peak flow self-monitoring.
- Environmental and Occupational screening questionnaire.
- Teach inhaler/spacer/holding chamber technique.
- Discuss environmental control measures to avoid exposure to known allergens and irritants.
- Teach self-monitoring.

X

<SECTION TEMPLATEID="2.16.840.1.113883.3.27.354">
  <TITLE>Plan</TITLE>
  <TEXT>Complete PFTs with lung volumes; Provide education on peak flow self-monitoring; ...</TEXT>
  <ENTRY>
    <ENTRYCHOICE>
      <PROCEDURE MOODCODE="INT">
        <CODE CODE="23426006" CODESYSTEM="&SNOMEDCT;"
          DISPLAYNAME="Pulmonary function test"/>
      </PROCEDURE>
    </ENTRYCHOICE>
    <ENTRYCHOICE>
      <PROCEDURE MOODCODE="INT">
        <CODE CODE="223468009" CODESYSTEM="&SNOMEDCT;"
          DISPLAYNAME="Teaching of skills">
          <QUALIFIER>
            <NAME CODE="363702006" DISPLAYNAME="has focus"/>
            <VALUE CODE="29893006"
              DISPLAYNAME="Peak flow rate measurement"/>
          </QUALIFIER>
        </CODE>
      </PROCEDURE>
    </ENTRYCHOICE>
  </ENTRY>
</SECTION>
• NHLBI Guideline defines the Template.

• HL7 RIM defines the fields.

• Standard terminologies define the field values.

• And it’s all packaged together in a standardized way within the CDA.
• NHLBI Guideline defines the Template.
• HL7 RIM defines the fields.
• Standard terminologies define the field values.

<section templateId="2.16.840.1.113883.3.27.354">
  <title>Plan</title>
  <text>
    Complete PFTs with lung volumes; Provide education on peak flow self-monitoring; ...
  </text>
  <entry>
    <entryChoice>
      <Procedure moodCode="INT">
        <code code="23426006" codeSystem="&SNOMEDCT;"
          displayName="Pulmonary function test"/>
      </Procedure>
    </entryChoice>
  </entry>
  <entry>
    <entryChoice>
      <Procedure moodCode="INT">
        <code code="223468009" codeSystem="&SNOMEDCT;"
          displayName="Teaching of skills">
          <qualifier>
            <name code="363702006" displayName="has focus"/>
            <value code="29893006"
              displayName="Peak flow rate measurement"/>
          </qualifier>
        </code>
      </Procedure>
    </entryChoice>
  </entry>
</section>
NHLBI Asthma Template atop CDA

• NHLBI Guideline defines the Template.
• HL7 RIM defines the fields.

• Standard terminologies define the field values.
• And it's all packaged into CDA.

```xml
<section templateId="2.16.840.1.113883.3.27.354">
  <title>Plan</title>
  <text>
    Complete PFTs with lung volumes; Provide education on peak flow self-monitoring; ...
  </text>
  <entry><entryChoice>
    <Procedure moodCode="INT">
      <code code="23426006" codeSystem="&SNOMEDCT;"
             displayName="Pulmonary function test"/>
    </Procedure>
  </entryChoice>
  <entry><entryChoice>
    <Procedure moodCode="INT">
      <code code="223468009" codeSystem="&SNOMEDCT;"
             displayName="Teaching of skills">
        <qualifier>
          <name code="363702006" displayName="has focus"/>
          <value code="29893006"
                 displayName="Peak flow rate measurement"/>
        </qualifier>
      </code>
    </Procedure>
  </entryChoice></entry>
</section>
```
• Which environmental and occupational triggers did I ask about?
• Have I provided proper patient education?

Plan
- Pneumococcal Vaccine
- Complete PFTs with lung volumes.
- Provide education on peak flow self-monitoring.
- Environmental and Occupational screening questionnaire.
- Teach inhaler/spacer/holding chamber technique.
- Discuss environmental control measures to avoid exposure to known allergens and irritants.
- Teach self-monitoring.

• Which environmental and occupational triggers did I ask about?
• Have I provided proper patient education?
**Symptoms** *(cough, wheeze, shortness of breath, chest tightness)*

<table>
<thead>
<tr>
<th>Severe Persistent</th>
<th>Symptoms</th>
<th>Nighttime Symptoms</th>
<th>Lung Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Continual symptoms</td>
<td>Frequent (at least 4 nights per week)</td>
<td>FEV₁ or PEF ≤ 60% predicted</td>
</tr>
<tr>
<td></td>
<td>Daily limited physical activity</td>
<td></td>
<td>PEF variability &gt;30% (AM/PM)</td>
</tr>
<tr>
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<td>Maintenance oral corticosteroids</td>
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<tr>
<td></td>
<td>More than 1 steroid burst the past month</td>
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</tbody>
</table>

**History**

Frequency of wheezing:
- Daily and continual.
- Daily but not continual.

**Labs**

Peak Flow :: 260 l/m.

**Assessment**

- Asthma, Intermittent.
- Asthma, Mild Persistent.
- Asthma, Moderate Persistent.
- Asthma, Severe Persistent.
**CAP Cancer Reporting Guidelines as Templates atop CDA**

### CARCINOMA OF LUNG

<table>
<thead>
<tr>
<th>Specimen type</th>
<th>Select...</th>
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<tbody>
<tr>
<td>Biopsy</td>
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<tr>
<th>Tumor location</th>
<th>Right lower lobe</th>
<th>Left lower lobe</th>
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<tr>
<td>Lobectomy</td>
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<tr>
<td>Pneumonecetomy</td>
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</tr>
<tr>
<td>Not specified</td>
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<tr>
<td>Other</td>
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<table>
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<th>Histologic type</th>
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<table>
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<tr>
<th>Histologic grade</th>
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**Images**

- **Sample image.**
- **Double-click to add your own image.**

<table>
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<tr>
<th>Image Description</th>
<th>Click here and type.</th>
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<th>Magnification</th>
<th>Select...</th>
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<tbody>
<tr>
<td>Stain</td>
<td>Select...</td>
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</tbody>
</table>

**Extent of invasion**
For more details...

• CDA, Release 2 Ballot Distribution Package:

• HL7 Structured Documents Listserver (www.hl7.org)