DICOM Correction Proposal

<table>
<thead>
<tr>
<th>STATUS</th>
<th>Letter Ballot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Last Update</td>
<td>2021/11/10</td>
</tr>
<tr>
<td>Person Assigned</td>
<td>Harry Solomon</td>
</tr>
<tr>
<td>Submitter Name</td>
<td>Harry Solomon</td>
</tr>
<tr>
<td>Submission Date</td>
<td>2021/05/17</td>
</tr>
</tbody>
</table>

Correction Number: CP-2147

Log Summary: Relax requirement on discriminators and XML IDs in CDA

Name of Standard
PS3.20

Rationale for Correction:
The Imaging Reports in CDA specification describes use of Business Name discriminators for multiple instantiations of a data element. Such discriminators are generally only required when Business Name-based production logic is used (recognized by, but outside the scope of, the Standard), and only when there are in fact multiple instantiations of an element. Remove the shall requirement, and add a note on single instantiations not requiring discriminators.

The specification requires XML ID discriminators in several types of text blocks. This is necessary only if there is a link from a coded content section. Relax the shall requirement.

Also, incorrect parentheses in Business Names in Section 9.1.1 are replaced by square brackets to conform to the specification convention.

And while we are updating the template, a Business Name is needed for internal reference hyperlink attributes.

Correction Wording:

Note to Editor: in the table of Section 9.1.1, the Business Name IntRef[*] should be made boldface in the publication of PS3.20 as it now has a subsidiary Business Name, and its subsidiary Business Name URL should be normal font.

5.2.1.1 Multiple Instantiations

Some templates or elements may be invoked multiple times in a document instance; for example, the 10.5 Quantity Measurement template is instantiated for each numeric measurement in a report. Each instantiation shall may have an identifying string, unique within the document, used as a discriminator between those multiple instantiations. The Business Name for each element that may have multiple instantiations has a suffix [*], indicating the use of a discriminator string. This allows Business Name based production logic for authoring applications to identify specific instances of an element.

Note

Production logic based on Business Names should allow single instantiations of elements without a discriminator; for instance, 8.1 General Header specifies Patient[*], allowing multiple patients to be recorded in special cases, although the vast majority of reports will be for a single patient for which a discriminator is unnecessary.

…
9.1.1 Section Text

Template ID 1.2.840.10008.9.19
Name Section Text
Effective Date 2015/03/24 yyyy/mm/dd
Version Label DICOM-20150324yyyymmdd
Status Active
Description This template specifies the common set of narrative block markup that may be included in a CDA imaging report section.
Classification CDA Element Set
Relationships Included in all sections
Context parent node
Open/Closed Open
Revision History DICOM-20150324: Initial version
DICOM-yyyymmdd: Relax requirement on XML ID

<table>
<thead>
<tr>
<th>Business Name</th>
<th>Nest Level</th>
<th>Element/Attribute</th>
<th>Card</th>
<th>Elem/Attr Conf</th>
<th>Data Type</th>
<th>Value Conf</th>
<th>Value</th>
<th>Subsidiary Template</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td></td>
<td>content</td>
<td>0..*</td>
<td>MAY</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>&gt;</td>
<td>@ID</td>
<td>1..1</td>
<td>SHALL</td>
<td>XML ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Style</td>
<td>&gt;</td>
<td>@styleCode</td>
<td>0..1</td>
<td>MAY</td>
<td>XML NMTOKENS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IntRef[*]</td>
<td>&gt;</td>
<td>linkHtml</td>
<td>0..*</td>
<td>MAY</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URL</td>
<td>&gt;</td>
<td>@href</td>
<td>1..1</td>
<td>SHALL</td>
<td>ST (URL - XML IDREF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GraphicRef[*]</td>
<td>&gt;</td>
<td>renderMultiMedia</td>
<td>0..*</td>
<td>MAY</td>
<td>XML IDREF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;</td>
<td>@href</td>
<td>1..1</td>
<td>SHALL</td>
<td>ST (URL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paragraph[*]</td>
<td>&gt;</td>
<td>paragraph</td>
<td>0..*</td>
<td>MAY</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caption</td>
<td>&gt;&gt;</td>
<td>caption</td>
<td>0..1</td>
<td>MAY</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ExtRef[*]</td>
<td>&gt;</td>
<td>linkHtml</td>
<td>0..*</td>
<td>MAY</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URL</td>
<td>&gt;</td>
<td>@href</td>
<td>1..1</td>
<td>SHALL</td>
<td>ST (URL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table[*]</td>
<td>&gt;</td>
<td>table</td>
<td>1..1</td>
<td>SHALL</td>
<td>XML ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>&gt;</td>
<td>@ID</td>
<td>1..1</td>
<td>SHALL</td>
<td>XML ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordered</td>
<td>&gt;</td>
<td>@listType</td>
<td>0..1</td>
<td>MAY</td>
<td>XML NMTOKENS</td>
<td>SHALL</td>
<td>ordered</td>
<td></td>
</tr>
<tr>
<td>Caption</td>
<td>&gt;&gt;</td>
<td>caption</td>
<td>0..1</td>
<td>MAY</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item[*]</td>
<td>&gt;&gt;</td>
<td>item</td>
<td>1..*</td>
<td>SHALL</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>&gt;&gt;@</td>
<td>@ID</td>
<td>1..1</td>
<td>SHALL</td>
<td>XML ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table[*]</td>
<td>&gt;&gt;</td>
<td>Tr</td>
<td>1..1</td>
<td>SHALL</td>
<td>CS</td>
<td>SHALL</td>
<td>Bold</td>
<td></td>
</tr>
<tr>
<td>ColumnHead[*]</td>
<td>&gt;&gt;</td>
<td>@styleCode</td>
<td>1..1</td>
<td>SHALL</td>
<td>CS</td>
<td>SHALL</td>
<td>Bold</td>
<td></td>
</tr>
<tr>
<td>Row[*]</td>
<td>&gt;&gt;</td>
<td>Tr</td>
<td>1..*</td>
<td>SHALL</td>
<td>ST</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The text element within the section stores the narrative to be rendered, as described in the CDA R2 specification, and is referred to as the CDA narrative block.

COND: The text element SHALL be present if the section content is not completely represented by subsections.

As noted in the CDA R2 specification, the document originator is responsible for ensuring that the narrative block contains the complete, human readable, attested content of the section. Structured entries support computer processing and computation, and are not a replacement for the attestable, human-readable content of the CDA narrative block.

Additional specification information for the CDA narrative block can be found in the CDA R2 specification in sections 1.2.1, 1.2.3, 1.3, 1.3.1, 1.3.2, 4.3.4.2, and 6.

The narrative block allows a variety of markup. The markup that implements various types of internal and external linkage is shown in the table, and is included in the conformance specifications for each section narrative block that invokes this template. The markup elements may occur in any order and at any point within the narrative block text as allowed by the CDA R2 specification.

9.1.1.1 <content> Markup and Links From Entries

The CDA narrative block may contain the <content> markup element to wrap a block of text so that it can be explicitly identified using its XML ID attribute, and referenced from elsewhere in the document. Specifically, structured entries may link to their equivalent narrative rendering in a content block using the XML ID (see CDA R2 Specification, section 4.3.5.1).

COND: The XML ID attribute SHALL be present if the content is referenced from elsewhere in the document.

Additionally, a content block may include a styleCode attribute to suggest rendering (see CDA R2 Specification, section 4.3.5.11). For example, Bold could also be used to highlight actionable findings in the text of the 9.5 Findings and/or 9.6 Impression sections.

9.1.1.2 <linkHtml> Markup and Internal References

The CDA narrative block MAY contain the <linkHtml> markup to provide a link between narrative text in one section and a content block in another section (see CDA R2 specification section 4.3.5.2). The XML ID of the target content block is used in the linkHtml href attribute, with a prefixed ‘#’ to indicate the reference is in the current document.

For example, a linkHtml reference could be used to link an actionable finding in the 9.6 Impression section to the specific, detailed measurement evidencing a problem that was identified in the text of the 9.5 Findings section.

9.1.1.3 <renderMultiMedia> Markup and Graphical Content

The CDA narrative block MAY contain the <renderMultiMedia> markup element to include graphical content, e.g., a coronary tree diagram or myocardial wall motion “bulls-eye chart”. The renderMultiMedia element SHALL link to an observationMedia structured entry using the XML ID of that entry (see Section 10.3.1 and CDA R2 Specification section 4.3.5.6).

Note

Production logic using the Business Name GraphicRef should assign the associated value to the referencedObject attribute.

9.1.1.4 <linkHtml> Markup and External References

The CDA narrative block MAY contain the <linkHtml> markup to provide a link between narrative text and an external (non-attested) resource (see CDA R2 specification section 4.3.5.2).

Note

For radiology reports, this capability may be used to tag concepts in the narrative block to concepts defined in the RadLex terminology (http://www.radlex.org), developed by the Radiological Society of North America. The RadLex coded vocabulary is a useful tool for indexing report content for data mining purposes. It is not
intended to be a complete grammar for expression of clinical statements, but rather a lexicon for tagging concepts of interest.

Within the report section narrative blocks, RadLex codes may be included using the `<linkHtml>` element and a URI pointing to the RadLex resource. `<linkHtml>` elements may be embedded in the text at the location of the concept (within the scope of a content tag), or may be provided in a list at the end of the narrative block.

Example 9.1.1.4-1. Example - linkHtml references at point of use for RadLex

```xml
<section>
  ...
  <text>
    ...
    <content ID="find1">There is focal opacity at the right lung
      <linkHtml href="http://www.radlex.org/RID/RID28530"/>
      base most likely representing right lower lobe atelectasis
      <linkHtml href="http://www.radlex.org/RID/RID28493"/>
    </content>
    ...
  </text>
  ...
</section>
```

Example 9.1.1.4-2. Example - linkHtml references at end of narrative block for RadLex

```xml
<section>
  <title>Findings</title>
  <text>
    <content ID="find1">Pleura normal... </content>
    <linkHtml href="http://www.radlex.org/RID/RID1362"/>
  </text>
</section>
```

9.1.1.5 `<linkHtml>` Markup and Image References

The text elements (and their children) MAY contain Web Access to DICOM Persistent Object (WADO) references to DICOM objects by including a `linkHtml` element where @href is a valid WADO URL. The text content of `linkHtml` MAY be either the visible text of the hyperlink, or a descriptor or identifier of the image.

The `linkHtml` may be associated with a `<renderMultiMedia>` markup element to specify a (limited resolution) copy of the image to be rendered in the narrative (e.g., a thumbnail); the `renderMultiMedia` element SHALL link to an observationMedia structured entry using the XML ID of that entry. As CDA does not allow use of an image as the `linkHtml` displayable hyper-linked content, the `linkHtml` should immediately follow the `renderMultiMedia` for the thumbnail.

Example 9.1.1.5-1. Example `linkHtml` reference for WADO image access

```xml
<text>
  ...
  <paragraph>
    <caption>Source of Measurement</caption>
    <renderMultiMedia referencedObject="#thumb1"/>
    <linkHtml href="http://www.example.org/wado?requestType=WADO
      &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
      &amp;seriesUID=1.2.840.113619.2.62.994044785528.2006082323142485051
      &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.20060823.20060823232322.3
      &amp;contentType=application/dicom">Chest_PA</linkHtml>
  </paragraph>
  ...
</text>
```

9.1.1.6 list

This template specifies a structure and Business Names for list markup in the narrative text, as described in the CDA Specification section 4.3.5.8. Inclusion of the listType="ordered" attribute specifies a numbered list of items.
Each list is identified by an XML ID attribute, and each list item also is identified by an XML ID attribute.

COND: The XML ID attribute SHALL be present for a list or a list item if the content is referenced from elsewhere in the document.

The list items contain human readable displayable text using any of the narrative text structures permitted in section/text, including internal, external, or image references, or graphics. Processable structured data may be encoded in 10.1 Coded Observation or 10.5 Quantity Measurement entries in the section. Such observation entries SHOULD be linked to the corresponding item through the ID attribute of the item (see Section 10.1.2 and Section 10.5.1).

9.1.1.7 table

This template specifies a structure and Business Names for table markup in the narrative text, as described in the CDA Specification section 4.3.5.9, typically used for a table of measurements. The table may be of arbitrary size.

Note


Each table is identified by an XML ID attribute, and each table row also is identified by an XML ID attribute.

COND: The XML ID attribute SHALL be present for a table or a table row if the content is referenced from elsewhere in the document.

The table cells contain human readable displayable text using any of the narrative text structures permitted in section/text, including internal, external, or image references, or graphics. Processable structured data may be encoded in 10.1 Coded Observation or 10.5 Quantity Measurement entries in the section. Such observation entries SHOULD be linked to the corresponding row through the ID attribute of the row (see Section 10.1.2 and Section 10.5.1).

Example 9.1.1.7-1. Measurements Table Example 1

As displayed

<table>
<thead>
<tr>
<th>Measurement name</th>
<th>Value</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left ventricular ejection fraction</td>
<td>40 %</td>
<td>LOW</td>
</tr>
<tr>
<td>Left ventricle end diastolic volume</td>
<td>120 ml</td>
<td></td>
</tr>
<tr>
<td>Left ventricle end systolic volume</td>
<td>72 ml</td>
<td></td>
</tr>
</tbody>
</table>

As encoded in CDA instance

```xml
<text>
  <table ID="T-C">
    <caption>Cardiac Measurements</caption>
    <tr styleCode="Bold">
      <th>Measurement name</th>
      <th>Value</th>
      <th>Flag</th>
    </tr>
    <tr ID="Q1">
      <td>Left ventricular ejection fraction</td>
      <td>40 %</td>
      <td styleCode="Bold">LOW</td>
    </tr>
    <tr ID="Q2">
      <td>Left ventricle end diastolic volume</td>
      <td>120 ml</td>
    </tr>
    <tr ID="Q3">
      <td>Left ventricle end systolic volume</td>
      <td>72 ml</td>
    </tr>
  </table>
</text>
```
Example 9.1.1.7-2. Measurements Table Example 2

As displayed

<table>
<thead>
<tr>
<th>Ref</th>
<th>Measurement name</th>
<th>Current Value</th>
<th>Prior Value</th>
<th>Image Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Left periaortic lymph node size (mm)</td>
<td>12 x 8</td>
<td>15 x 10</td>
<td>Ser:3, Img:67</td>
</tr>
<tr>
<td>L2</td>
<td>Segment 2 left lobe lesion size (mm)</td>
<td>6 x 8</td>
<td>10 x 9</td>
<td>Ser:3, Img:79</td>
</tr>
<tr>
<td>L3</td>
<td>Left common iliac lymph node size (mm)</td>
<td>12 x 3</td>
<td>16 x 5</td>
<td>Ser:3, Img:139</td>
</tr>
</tbody>
</table>

As encoded in CDA instance

<text>
<table ID="Table2">
<tr style="Bold">
<td>Ref</td>
<td>Measurement name</td>
<td>Current Value</td>
<td>Prior Value</td>
<td>Image Reference</td>
</tr>
<tr ID="lesRow1">
<td>L1</td>
<td>Left periaortic lymph node size (mm)</td>
<td>12 x 8</td>
<td>15 x 10</td>
<td>Ser:3, Img:67</td>
</tr>
<tr>
<td>L2</td>
<td>Segment 2 left lobe lesion size (mm)</td>
<td>6 x 8</td>
<td>10 x 9</td>
<td>Ser:3, Img:79</td>
</tr>
<tr>
<td>L3</td>
<td>Left common iliac lymph node size (mm)</td>
<td>12 x 3</td>
<td>16 x 5</td>
<td>Ser:3, Img:139</td>
</tr>
</table>
</text>
<td><linkHtml href="http://wado.pacs.guh.org/..." >Ser:3, Img:67</linkHtml></td>
</tr>
...
</table>
</text>