Version: 1.1
Date: 30 September 2009
Author: Valerie Smothers
Author email: valerie.smothers@medbiq.org

Version History

<table>
<thead>
<tr>
<th>Version No.</th>
<th>Date</th>
<th>Changed By</th>
<th>Changes Made</th>
</tr>
</thead>
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<tr>
<td>1.0</td>
<td>10 May 2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>30 Sep 2009</td>
<td>Valerie Smothers</td>
<td>Corrected namespace prefix of keyword attributes in Appendix 3. Corrected healthcaremetadata,xsd file to reflect multiplicity of nonAccreditedProvider element.</td>
</tr>
</tbody>
</table>
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Acknowledgements

The MedBiquitous Consortium wishes to acknowledge the help of the MedBiquitous Consortium Education Working Group members and other individuals that contributed to the creation of this document, including:

- Morgan Bantly, Chair; Veterans Administration
- Patricia Abbott, Ph.D., Johns Hopkins University
- Suzanne Armstrong, American Academy of Otolaryngology-Head and Neck Surgery
- Mary Carol Badat, Radiological Society of North America
- Trupti Bakrania, St. George’s University of London
- Ravi Teja Bhupatiraju, MBBS, Oregon Health and Sciences University
- Gabrielle Campbell, Association of American Medical Colleges
- Chris Candler, M.D., Association of American Medical Colleges
- Antony Chan, American Academy of Pediatrics
- David Davies, Ph.D., IVIMEDS
- Nancy Davis, Ph.D., National Institute for Quality Improvement and Education
- Sharon Dennis, Ph.D., HEAL, University of Utah
- Nina Pasini Diebler, Carnegie Mellon University
- Shona Dippie, HEAL, University of Utah
- Rachel Ellaway, Ph.D., Northern Ontario School of Medicine
- Michael Fordis, M.D., Baylor College of Medicine
- Nancy Gathany, Centers for Disease Control and Prevention
- Stu Gilman, M.D., Veterans Administration
- Peter Greene, M.D., MedBiquitous
- Raja Habib, St. George’s University of London
- Gray Harriman, American Academy of Ophthalmology
- William Hersh, M.D., Oregon Health and Sciences University
- Lorena Hitchens, HighWire Press
- Jack Kues, Ph.D., University of Cincinnati
- Julie Lambla, American Association of Critical-Care Nurses
- Tao Le, M.D., MedSn
- Joy Leffler, WE MOVE
- Greg Long, Accelera
- Ross Martin, MD, BearingPoint
- Jim Martino, Ph.D., Johns Hopkins University
- Tarun Mathur, Medsn
- Jackie Mayhew, American Heart Association
- Sandra McIntyre, HEAL, University of Utah
- Leigh McKinney, American Academy of Family Physicians
- John Meyer, Elsevier Science
- Sean McKenna, CTSNet
- Jennifer Ott, HealthStream
• Morgan Passiment, Association of American Medical Colleges
• Jody Poet, MedBiquitous
• Laurie Posey, M.Ed., Association of Academic Health Centers
• Beth Powell, Centers for Disease Control
• Andrew Rabin, CE City
• Mike Rowan, LearnSomething
• Chris Rueger, HealthStream
• Jorge Ruiz, M.D., University of Miami
• Maureen Doyle Scharff, Johnson & Johnson
• Amy Scott, Joint ADL Co-Lab
• Deborah Sher, Veterans Administration
• Damon Silver, HighWire Press
• Carl Singer, CECity
• Valerie Smothers, MedBiquitous
• Sebastian Uijdehaage, Ph.D., HEAL, University of California, Los Angeles
• Debbie Ung, Accelera
• David Ward, American Association of Critical-Care Nurses
• Charles Willis, American Medical Association
• Walter Wolyniec, Boehringer Ingelheim
• Andrea Young, Centers for Disease Control and Prevention

This specification is an extension of 1484.12.3 standard XML binding for Learning Object Metadata data model, developed by the Institute of Electrical and Electronics Engineers (IEEE) Learning Technology Standards Committee. Specification authors also received technical guidance from members of the MedBiquitous Technical Steering Committee.

• Joel Farrell, IBM, Technical Steering Committee Chair
• Todd Freter, Sun Microsystems
• Scott Hinkelman, IBM
• Dan Rehak, ADL Workforce Co-lab
• Darin McBeath, Elsevier Science
**Documentation Conventions**

This document uses the following conventions.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>monospaced type</td>
<td>Sample XML tags, code, schema, or portion thereof</td>
</tr>
<tr>
<td><strong>BoldText</strong></td>
<td>When used with an XML tag name, indicates that the element contains subelements</td>
</tr>
<tr>
<td><em>Italicized Text</em></td>
<td>When used in an XML tag description, an attribute of the XML tag.</td>
</tr>
<tr>
<td><strong>Tag description</strong></td>
<td>Shading indicated that the tag is further described in a later part of the document</td>
</tr>
</tbody>
</table>

The following graphical standards are used for the XML diagrams in this document.

*Graphical Standards from TIBCO’s Turbo XML, Copyright TIBCO Software Inc.*
Introduction

This document describes Healthcare Learning Object Metadata (Healthcare LOM) in detail. It is intended for use by anyone who wants to develop tools or implement electronic systems for managing and describing healthcare education and educational assets, such as images. The status of the document is indicated at the bottom of the page; draft documents are subject to review and approval through the MedBiquitous standards development process (see http://www.medbiq.org/about_us/consortium_process/processdocument.pdf).

Healthcare LOM is based on and is a profile of the Institute of Electrical and Electronics Engineers (IEEE) 1484.12.1–2002 Standard for Learning Object Metadata (LOM) and the Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata (IEEE 1484.12.3-2005) developed by the IEEE Learning Technology Standards Committee.

LOM is one of the standards used by the SCORM reference model for interoperability of online learning content. LOM provides descriptive information about a learning object. Just as a label on a container provides information on what’s inside, learning object metadata provides information on a learning module, including the title, author, description, keywords, educational objective, and other relevant information. This information helps learners and content developers to find just the right piece of instruction. Learners can use the learning object as a mini-course, and content developers can include the learning object in a new course.

LOM does not address some of the special requirements for healthcare education, including disclosure of financial interests, implementation of medical taxonomies, and indication of continuing education credits. Healthcare LOM addresses these special requirements and others. Healthcare LOM extends the LOM standard and provides custom vocabularies for some metadata elements.

Learning Object Metadata (LOM)

Some familiarity with the LOM standard is essential to understand Healthcare LOM customizations. The figure below shows the nine categories LOM uses to organize its metadata elements plus the category used for healthcare extensions to LOM.
The elements within these categories provide general ways of describing aspects of a learning object. Some healthcare requirements for describing learning objects may be addressed by using elements within LOM, but several others are not. The requirements that are not addressed by existing LOM elements have been addressed by creating extensions to the LOM standard in the HealthcareMetadata category and by using custom vocabularies.
## Metadata Requirements for Healthcare

The following table outlines healthcare requirements for learning object metadata and corresponding elements in Healthcare LOM. Any elements within healthcareMetadata are MedBiquitous extensions to the LOM standard.

<table>
<thead>
<tr>
<th>Healthcare Requirements</th>
<th>Healthcare LOM Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date released</td>
<td>lifecycle:contribute:date</td>
</tr>
<tr>
<td></td>
<td>(use when describing the publishing organization’s contributions)</td>
</tr>
<tr>
<td>Date reviewed</td>
<td>lifecycle:contribute:date</td>
</tr>
<tr>
<td></td>
<td>(use when describing the individual reviewer’s contributions)</td>
</tr>
<tr>
<td>Date of expiry</td>
<td>healthcareMetadata:healthcareEducation:expirationDate</td>
</tr>
<tr>
<td>Subject (from Medical Taxonomy)</td>
<td>general:keyword</td>
</tr>
<tr>
<td></td>
<td>(Those wishing to include medical taxonomy references may do so using the MedBiquitous keyword attribute extensions)</td>
</tr>
<tr>
<td>Category</td>
<td>general:keyword</td>
</tr>
<tr>
<td>Intended audience (physician, patient, etc)</td>
<td>educational:context</td>
</tr>
<tr>
<td></td>
<td>(using MedBiquitous defined vocabulary)</td>
</tr>
<tr>
<td></td>
<td>and</td>
</tr>
<tr>
<td></td>
<td>healthcareMetadata:healthcareEducation:targetAudience</td>
</tr>
<tr>
<td>Learner reading level</td>
<td>healthcareMetadata:healthcareEducation:targetAudience:readingLevel</td>
</tr>
<tr>
<td>Credits (accrediting body, credit types, units, provider, pacing, activity certification, accredited and non-accredited providers, and number of credits)</td>
<td>healthcareMetadata:healthcareEducation:credits</td>
</tr>
<tr>
<td>Date credit is released</td>
<td>healthcareMetadata:healthcareEducation:credits:releaseDate</td>
</tr>
<tr>
<td>Date credit expires</td>
<td>healthcareMetadata:healthcareEducation:credits:expirationDate</td>
</tr>
<tr>
<td>Activity location</td>
<td>healthcareMetadata:healthcareEducation:activityLocation</td>
</tr>
<tr>
<td>Start date and time</td>
<td>healthcareMetadata:healthcareEducation:startDateTime</td>
</tr>
<tr>
<td>End date and time</td>
<td>healthcareMetadata:healthcareEducation:endDateTime</td>
</tr>
<tr>
<td>Activity sponsorship</td>
<td>healthcareMetadata:healthcareEducation:activitySponsorship</td>
</tr>
<tr>
<td>Activity format</td>
<td>healthcareMetadata:healthcareEducation:activityFormat</td>
</tr>
<tr>
<td>Participation modality</td>
<td>healthcareMetadata:healthcareEducation:participationModality</td>
</tr>
<tr>
<td>Activity delivery</td>
<td>healthcareMetadata:healthcareEducation:activityDelivery</td>
</tr>
<tr>
<td>Healthcare Requirements</td>
<td>Healthcare LOM Elements</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Curriculum classification</td>
<td>classification:taxonpath:source (using MedBiquitous defined vocabulary for classification purpose)</td>
</tr>
<tr>
<td>Educational Objectives</td>
<td>classification</td>
</tr>
<tr>
<td>Competencies, ACGME and others</td>
<td>classification</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>Classification (using MedBiquitous defined vocabulary for classification purpose)</td>
</tr>
<tr>
<td>Acknowledgement of commercial support</td>
<td>healthcareMetadata:healthcareEducation:CommercialSupport (yes/no)</td>
</tr>
<tr>
<td></td>
<td>and</td>
</tr>
<tr>
<td></td>
<td>healthcareMetadata:healthcareEducation:CommercialSupportAcknowledgement</td>
</tr>
<tr>
<td>Disclosure of relevant financial</td>
<td>healthcareMetadata:healthcareEducation: relevantFinancialRelationship (yes/no)</td>
</tr>
<tr>
<td>relationships</td>
<td>and</td>
</tr>
<tr>
<td></td>
<td>healthcareMetadata:healthcareEducation: relevantfinancialRelationshipDisclosure</td>
</tr>
<tr>
<td>Disclosure of off label content</td>
<td>healthcareMetadata:healthcareEducation:offLabelUse (yes/no)</td>
</tr>
<tr>
<td></td>
<td>and</td>
</tr>
<tr>
<td></td>
<td>healthcareMetadata:healthcareEducation:offLabelDescription</td>
</tr>
<tr>
<td>Mapping to guidelines</td>
<td>classification (using MedBiquitous defined vocabulary for purpose)</td>
</tr>
<tr>
<td>Mapping to formularies and drug lists</td>
<td>classification (using MedBiquitous defined vocabulary for purpose)</td>
</tr>
<tr>
<td>Level of Evidence</td>
<td>classification (using MedBiquitous defined vocabulary for purpose)</td>
</tr>
<tr>
<td>Healthcare Requirements</td>
<td>Healthcare LOM Elements</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Resource Types</td>
<td>educational:learningResourceType</td>
</tr>
<tr>
<td></td>
<td>(using MedBiquitous defined vocabulary)</td>
</tr>
<tr>
<td>Animation</td>
<td></td>
</tr>
<tr>
<td>Audio</td>
<td></td>
</tr>
<tr>
<td>Case Study</td>
<td></td>
</tr>
<tr>
<td>Collaborative Forum</td>
<td></td>
</tr>
<tr>
<td>Game</td>
<td></td>
</tr>
<tr>
<td>Image</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Tutorial</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td></td>
</tr>
<tr>
<td>Virtual Patient</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Image descriptors</th>
<th>healthcareMetadata:healthcareAsset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annotated</td>
<td></td>
</tr>
<tr>
<td>Clinical history</td>
<td></td>
</tr>
<tr>
<td>Magnification</td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
</tr>
<tr>
<td>Medical image</td>
<td></td>
</tr>
<tr>
<td>Specimen type</td>
<td></td>
</tr>
<tr>
<td>File height</td>
<td></td>
</tr>
<tr>
<td>File width</td>
<td></td>
</tr>
</tbody>
</table>
Healthcare LOM

This section describes the customizations made to the LOM standard, including the files provided in Healthcare LOM, extensions, custom vocabularies, and additional requirements of the Healthcare LOM standard.

Schema Definition Files

The Healthcare LOM specification is defined technically by XML Schema Definition files, also called XSDs. Many of the XSDs used in Healthcare LOM are from the IEEE XML binding for the LOM standard, one of the component standards of SCORM. To facilitate implementation of LOM and adherence to pre-existing descriptions of the LOM schema, the LOM standard separates definitions of datatypes, elements, and vocabularies into different XSDs. Healthcare LOM incorporates additional XSDs to customize LOM for healthcare. The healthcarelom.xsd file imports the other XSDs that describe the lom datatypes, elements, vocabularies, and healthcare extensions.

The XSD files for Healthcare LOM are a part of this standard. The files are not included in the printed version of this standard but are available on the Internet at: http://ns.medbiq.org/lom/extend/v1/

XML namespaces serve as labels that distinguish elements contained in the XSDs. Healthcare extensions to LOM use a MedBiquitous namespace.

The following diagram shows how healthcarelom.xsd unifies LOM files and healthcare extensions.
Healthcare LOM XML Schemas and Namespaces

Healthcare LOM files are described in the following table.
## Healthcare LOM Files

<table>
<thead>
<tr>
<th>File name</th>
<th>Description</th>
<th>Namespace</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>healthcarelom.xsd</td>
<td>The unifying schema file that provides a consistent structure for information describing healthcare and medical education.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM">http://ltsc.ieee.org/xsd/LOM</a></td>
<td>Imports:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>unique/strict.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>vocab/custom.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>extend/custom.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcare/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcaremetadata.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcare/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcarevocabularies.xsd</td>
</tr>
<tr>
<td>unique/strict.xsd</td>
<td>Supports validating the uniqueness of LOM elements within their container elements.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM/unique">http://ltsc.ieee.org/xsd/LOM/unique</a></td>
<td>—</td>
</tr>
<tr>
<td>vocab/custom.xsd</td>
<td>Joins custom vocabulary values with LOM vocabulary values to enable use of custom vocabularies.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM/vocab">http://ltsc.ieee.org/xsd/LOM/vocab</a></td>
<td>Imports:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcarelom.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcare/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>healthcarevocabularies.xsd</td>
</tr>
<tr>
<td>File name</td>
<td>Description</td>
<td>Namespace</td>
<td>Dependencies</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>extend/custom.xsd</td>
<td>Enables addition of custom elements to LOM.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM/extend">http://ltsc.ieee.org/xsd/LOM/extend</a></td>
<td>Imports: healthcarelom.xsd</td>
</tr>
<tr>
<td>healthcaremetadata.xsd</td>
<td>Provides a consistent structure for descriptive information unique to healthcare and medical education.</td>
<td><a href="http://ns.medbiq.org/lom/extend/v1/">http://ns.medbiq.org/lom/extend/v1/</a></td>
<td>Imports: healthcarelom.xsd</td>
</tr>
<tr>
<td>healthcarevocabularies.xsd</td>
<td>Provides a set of custom vocabularies specific to healthcare education.</td>
<td><a href="http://ns.medbiq.org/lom/vocab/v1/">http://ns.medbiq.org/lom/vocab/v1/</a></td>
<td>—</td>
</tr>
<tr>
<td>anyElement.xsd</td>
<td>Enables addition of custom elements to LOM.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM">http://ltsc.ieee.org/xsd/LOM</a></td>
<td>—</td>
</tr>
<tr>
<td>dataTypes.xsd</td>
<td>Defines datatypes used in defining several LOM elements.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM">http://ltsc.ieee.org/xsd/LOM</a></td>
<td>Imports: unique/strict.xsd extend/custom.xsd</td>
</tr>
<tr>
<td>elementNames.xsd</td>
<td>Declares each of the LOM elements except for lom.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM">http://ltsc.ieee.org/xsd/LOM</a></td>
<td>—</td>
</tr>
<tr>
<td>rootElement.xsd</td>
<td>Declares the lom element, which is the root element.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM">http://ltsc.ieee.org/xsd/LOM</a></td>
<td>—</td>
</tr>
<tr>
<td>File name</td>
<td>Description</td>
<td>Namespace</td>
<td>Dependencies</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>vocabTypes.xsd</td>
<td>Defines datatypes for those LOM elements whose values are taken from a defined vocabulary.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM/">http://ltsc.ieee.org/xsd/LOM/</a></td>
<td>Imports:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>extend/custom.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>vocab/custom.xsd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>unique/strict.xsd</td>
</tr>
<tr>
<td>vocabValues</td>
<td>Defines vocabularies for those LOM elements that require a defined vocabulary.</td>
<td><a href="http://ltsc.ieee.org/xsd/LOM">http://ltsc.ieee.org/xsd/LOM</a></td>
<td>—</td>
</tr>
<tr>
<td>address.xsd</td>
<td>Defines address fields for activity locations. This schema is part of the MedBiquitous Professional Profile.</td>
<td><a href="http://ns.medbiq.org/address/v1/">http://ns.medbiq.org/address/v1/</a></td>
<td>—</td>
</tr>
</tbody>
</table>

Healthcare LOM schema files are available for download from: [http://ns.medbiq.org/lom/extend/v1/](http://ns.medbiq.org/lom/extend/v1/)
**Metadata Extensions**

The following sections explain the grammar for the healthcaremetadata schema, which holds extensions to the LOM metadata schema. Values in bold under XML Tags column indicate that the element has subelements.

Datatypes not otherwise defined in the document, such as date, refer to datatypes defined within the XML 1.0 technical specification. For information on these datatypes, see the W3C Extensible Markup Language (XML) 1.0 (Fourth Edition).

All the elements having subelements will be defined in separate sections. All elements without subelements will be defined within the appropriate element sections that use them.

1 **healthcareMetadata**

healthcareMetadata is the root element. It contains metadata specific to healthcare education. healthcareMetadata must occur once if Healthcare LOM is being used.

healthcareMetadata has the subelements healthcareEducation, which describes healthcare metadata for educational offerings, and healthcareAsset, which describes healthcare specific metadata for images, multimedia files, and other types of assets. The uniqueElementName attribute ensures that only one instance of healthcareMetadata occurs in a Healthcare LOM document.

Example:

```xml
<healthcareMetadata>
  <healthcareEducation>
    ...
  </healthcareEducation>
  <healthcareAsset>
    ...
  </healthcareAsset>
</healthcareMetadata>
```
2 healthcareEducation

healthcareEducation is the subelement of healthcareMetadata that contains healthcare specific metadata for educational offerings. healthcareEducation is optional within a healthcareMetadata record.

healthcareEducation has several subelements.
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>healthcareEducation</strong></td>
<td>healthcareEducation is the subelement of healthcareMetadata and defines healthcare specific metadata for educational offerings.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Container</td>
</tr>
<tr>
<td>expirationDate</td>
<td>expirationDate indicates the date after which this educational offering is no longer considered valid.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Date</td>
</tr>
<tr>
<td>creditsAvailable</td>
<td>creditsAvailable indicates whether or not credits are offered for the educational offering. Valid values are yes and no.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>credits</td>
<td>credits defines the credits that may be awarded for this educational offering. For more information, see section credits.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Container</td>
</tr>
<tr>
<td>targetAudience</td>
<td>targetAudience contains subelements that describe the target audience for this educational offering. For more information, see section targetAudience.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Container</td>
</tr>
<tr>
<td>activityLocation</td>
<td>activityLocation indicates the geographical location in which an in person activity takes place. For more information, see section activityLocation.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Container</td>
</tr>
<tr>
<td>startDateTime</td>
<td>startDateTime indicates the date and time that a live activity begins.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Date time</td>
</tr>
<tr>
<td>endDateTime</td>
<td>endDateTime indicates the date and time that a live activity ends.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Date time</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>Required</td>
<td>Multiplicity</td>
<td>Datatype</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>activitySponsorship</td>
<td>activitySponsorship indicates the accredited provider’s role in planning and presenting the activity. Valid values are direct and joint. Direct indicates that the accredited provider planned and presented the activity directly. Joint indicates that the accredited provider planned and presented the activity together with a non-accredited provider.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>participationModality</td>
<td>participationModality defines the learner’s mode of participation, dictated by the activity medium. Valid values are conference/workshop, technology based, on the job, print.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Restricted</td>
</tr>
<tr>
<td>activityDelivery</td>
<td>activityDelivery indicates the temporal nature of the activity. Valid values are live and not live.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Restricted</td>
</tr>
<tr>
<td>activityFormat</td>
<td>activityFormat describes the type of learning activity described.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Language String (see section Language String datatype for more information)</td>
</tr>
<tr>
<td>commercialSupport</td>
<td>commercialSupport indicates the existence of any commercial support, from a manufacturer of a commercial product. Valid values are yes and no.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>commercialSupportAcknowledgement</td>
<td>commercialSupportAcknowledgement describes the commercial support provided from a manufacturer of a commercial product.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Language String (see section Language String datatype for more information)</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>Required</td>
<td>Multiplicity</td>
<td>Datatype</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>offLabelUse</td>
<td>offLabelUse indicates whether or not this educational offering references off label usage of a drug. Valid values are yes and no.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>offLabelDescription</td>
<td>offLabelDescription describes any off label drug use referenced in this educational offering.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Language String</td>
</tr>
<tr>
<td>relevantFinancialRelationship</td>
<td>relevantFinancialRelationship indicates the existence of any relevant financial interest or other relationship of a faculty member or other person in a position to influence the activity content with the manufacturer of any commercial product referenced in this activity. Valid values are yes and no.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>relevantFinancialRelationshipDisclosure</td>
<td>relevantFinancialRelationshipDisclosure describes any relevant financial interest or other relationship of a faculty member or other person in a position to influence the activity content with the manufacturer of any commercial product referenced in this activity.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Language String</td>
</tr>
<tr>
<td>contact</td>
<td>Contact identifies the person or organization that serves as the main point of contact for questions about the learning content.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Character String</td>
</tr>
</tbody>
</table>
Example:

```xml
<healthcareEducation>
  <expirationDate>2005-08-01</expirationDate>
  <hx:creditsAvailable>yes</hx:creditsAvailable>
  <credits>
    ...
  </credits>
  <targetAudience>
    <profession>
      <string language = "en">health educator</string>
    </profession>
  </targetAudience>
  <hx:activitySponsorship>direct</hx:activitySponsorship>
  <hx:participationModality>
    technology based
  </hx:participationModality>
  <hx:activityDelivery>not live</hx:activityDelivery>
  <hx:activityFormat>
    <string language="en">course</string>
  </hx:activityFormat>
  <commercialSupport>yes</commercialSupport>
  <commercialSupportAcknowledgement>
    <string language = "en">MedBiquitous gratefully acknowledges a grant from the XYZ Foundation to provide funding for this course.</string>
  </commercialSupportAcknowledgement>
  <relevantFinancialRelationship>
    no
  </relevantFinancialRelationship>
  <contact>Edgar Allan Poe, eapoe@medbiq.org</contact>
</healthcareEducation>
```

3 credits

Credits is the subelement of healthcareEducation that describes the continuing education credits that may be awarded for this educational offering. Note that if an activity is certified to provide more than one type of continuing education credit (i.e. CME and CNE), the credits element should be repeated for each type of credit that may be awarded.
For a glossary of acronyms used to describe credit, see Appendix 1.
## Credits Information

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>credits</td>
<td>credits is the subelement of healthcareEducation that describes continuing education credits that may be awarded for this activity.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Container</td>
</tr>
<tr>
<td>accreditingBody</td>
<td>accreditingBody identifies the organization that sets the quality standards for continuing education and is the source of the accreditation process for the provider of this educational activity. Recommended values for accreditingBody include: ACCME, AACN, ACPE, ANCC, AANA, AANP, AAPA, CCME, ASHA, AAA, FCLB, PACE, AGD PACE, CDR, CECBEMS, AOTA, COPE, APA, ARRT RCEEM, AARC, ACSM, BOC, EBAC, RCPTh, and IACET.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Character String</td>
</tr>
</tbody>
</table>

---

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Status: Approved Standard

Date: 30 September 2009
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<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>activityCertification</td>
<td>identifies the category of credit awarded for the activity by the accredited medical education organization. Recommended values include: AAFP Prescribed, AAFP Elective, AAP, AAP Prep, ACEP, ACOG, AMA PRA Category 1, AMA PRA Category 2, AOA, APA Category 1, CECBEMS First Responder, CECBEMS Basic, CECBEMS Advanced, CECBEMS Operational, CECBEMS Educator, CECBEMS Administrator, CPHQ, EBAC CE Credit Hours, NCHEC Category 1, NCHEC Category 2, Synergy CERPS A, Synergy CERPS B, Synergy CERPS C, RCP.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Character String (see section Character String datatype for more information)</td>
</tr>
<tr>
<td>creditType</td>
<td>indicates which type of credit is awarded for this educational activity. Valid values are: CME, CE, CNE, CPE, and CHES, CPD.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>creditUnit</td>
<td>indicates the unit of credit for this credit definition. Valid values are: CECH, CEH, CEU, Cognate, Contact Hour, Credit, Hour, Unit, Credit Hour, and Point.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>pacing</td>
<td>indicates who controls the pacing of the activity. Valid values are learner paced and provider paced.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>Required</td>
<td>Multiplicity</td>
<td>Datatype</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>----------</td>
<td>--------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>accreditedProvider</td>
<td>defines the entity serving as the accredited provider for this activity.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Character String (see section Character String datatype for more information)</td>
</tr>
<tr>
<td>nonAccreditedProvider</td>
<td>defines an educational provider for this activity that is not the accredited provider. Jointly sponsored activities have a non-accredited provider.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Character String (see section Character String datatype for more information)</td>
</tr>
<tr>
<td>releaseDate</td>
<td>releaseDate identifies the date this activity becomes available for credit.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Date</td>
</tr>
<tr>
<td>expirationDate</td>
<td>expirationDate identifies the date that the activity ceases to be available for credit.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Date</td>
</tr>
<tr>
<td>numberOfCredits</td>
<td>identifies the number of continuing education credits associated with this learning activity.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Decimal</td>
</tr>
</tbody>
</table>

Example:

```xml
<hx:credits>
  <hx:accreditingBody>ACCME</hx:accreditingBody>
  <hx:activityCertification>
    AAFP Prescribed
  </hx:activityCertification>
  <hx:creditType>CME</hx:creditType>
  <hx:creditUnit>Credits</hx:creditUnit>
  <hx:pacing>learner paced</hx:pacing>
  <hx:accreditedProvider>
    American Academy of Family Physicians
  </hx:accreditedProvider>
  <hx:releaseDate>2006-04-30</hx:releaseDate>
  <hx:expirationDate>2007-04-30</hx:expirationDate>
  <hx:numberOfCredits>1.5</hx:numberOfCredits>
</hx:credits>
```
targetAudience is the subelement of healthcareEducation that provides more information on the individuals for whom this learning content is intended.

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>targetAudience</td>
<td>targetAudience is the subelement of healthcareEducation that provides more information on the learners for which this educational offering is intended.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Container</td>
</tr>
<tr>
<td>audienceCategory</td>
<td>audienceCategory is a subelement of targetAudience that describes the intended audience for the educational offering in broad terms. Valid values are: general, patient, caregiver, professional.</td>
<td>Optional</td>
<td>0 or more</td>
<td>Restricted</td>
</tr>
<tr>
<td>profession</td>
<td>profession is the subelement of targetAudience that describes the health profession for which this educational offering is intended. For example, physician, registered nurse, etc. See Appendix 2 for a hierarchical list of recommended values.</td>
<td>Optional</td>
<td>0 or more</td>
<td>LanguageString (see section LanguageString datatype for more information)</td>
</tr>
<tr>
<td>specialty</td>
<td>specialty is the subelement of targetAudience that describes healthcare specialties within a profession that compose part of the target audience</td>
<td>Optional</td>
<td>0 or more</td>
<td>LanguageString (see section LanguageString datatype for more information)</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>Required</td>
<td>Multiplicity</td>
<td>Datatype</td>
</tr>
<tr>
<td>---------</td>
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<td>----------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td>readingLevel</td>
<td>readingLevel is the subelement of targetAudience that describes the primary/secondary school grade reflecting the reading level of the target audience. This is normally used for non-professional education. Recommended values are: grade 1, grade 2, grade 3, grade 4, grade 5, grade 6, grade 7, grade 8, grade 9, grade 10, grade 11, grade 12, above grade 12.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>LanguageString (see section LanguageString datatype for more information)</td>
</tr>
</tbody>
</table>

Example:

```xml
<targetAudience>
  <audienceCategory>professional</audienceCategory>
  <profession>
    <string language = "en">physician</string>
  </profession>
  <specialty>
    <string language = "en">cardiology</string>
  </specialty>
  <readingLevel>
    <string language = "en">above grade 12</string>
  </readingLevel>
</targetAudience>
```

5 activityLocation

activityLocation is the subelement of healthcareEducation that provides detailed information on the location of an in-person learning activity.
activityLocation information

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>activityLocation</td>
<td>activityLocation indicates the geographical location in which an in person activity takes place. activityLocation extends the AddressType datatype within the MedBiquitous Professional Profile. For information on the attributes and subelements associated with an address, please see MedBiquitous Address Specifications and Description Document, ver. 1.0.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Container</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>Required</td>
<td>Multiplicity</td>
<td>Datatype</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>room</td>
<td>Room is a subelement of activityLocation. It defines the room in which an activity takes place.</td>
<td>Optional</td>
<td>1</td>
<td>Character String (see section Character String datatype for more information)</td>
</tr>
<tr>
<td>building</td>
<td>Building is a subelement of activityLocation. It defines the building in which an activity takes place.</td>
<td>Optional</td>
<td>1</td>
<td>Character String (see section Character String datatype for more information)</td>
</tr>
</tbody>
</table>

Example:

```
<healthcareMetadata>
  <healthcareEducation>
    <activityLocation>
      <a:Organization>Portland VA Medical Center</a:Organization>
      <a:StreetAddressLine>3710 SW US Veterans Hospital Road</a:StreetAddressLine>
      <a:City>Portland</a:City>
      <a:StateOrProvince>Oregon</a:StateOrProvince>
      <a:PostalCode>97201</a:PostalCode>
      <a:Country>
      </a:Country>
      <room>Schaffer Auditorium</room>
      <building>Building 101</building>
    </activityLocation>
  </healthcareEducation>
</healthcareMetadata>
```

6 healthcareAsset

healthcareAsset is the subelement of healthcareMetadata that contains healthcare specific metadata for images, text, multimedia files, and other files that contribute to the creation of an educational offering. healthcareAsset is optional.
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>healthcareAsset</td>
<td>healthcareAsset is the subelement of healthcareMetadata that provides more information about images and other files that contribute to the creation of an educational offering.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Container</td>
</tr>
<tr>
<td>annotated</td>
<td>annotated is a subelement of healthcareAsset that indicates whether or not this resource features an annotated or labeled image. Valid values are: yes, no.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>clinicalHistory</td>
<td>clinicalHistory is a subelement of healthcareAsset that describes the clinical history of the patient or subject described in this resource.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>LanguageString</td>
</tr>
</tbody>
</table>

(see section LanguageString datatype for more information)
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>magnification</td>
<td>magnification is a subelement of healthcareAsset that describes the magnification of microscopic image(s) found in this resource. For example, 100.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Integer</td>
</tr>
<tr>
<td>orientation</td>
<td>orientation is a subelement of healthcareAsset that describes the orientation of image(s) found in this resource. Valid values are: axial, coronal, horizontal, longitudinal, sagittal, transverse.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>medicalImageType</td>
<td>medicalImageType is a subelement of healthcareAsset that describes the type of image, radiological or otherwise, Featured in this resource. Valid values are: angiogram, computed axial tomography scan, electrocardiogram, endoscopic image, magnetic resonance image, mammogram, micrograph, nuclear medicine scan, photograph, radiograph, ultrasound.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>specimenType</td>
<td>specimenType is a subelement of healthcareAsset that describes the type of specimen featured in this resource. Valid values are: cell, organ, organ system, organelle, tissue.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Restricted</td>
</tr>
<tr>
<td>fileHeight</td>
<td>fileHeight is the subelement of healthcareAsset that describes the height of the image in pixels.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>Integer</td>
</tr>
</tbody>
</table>
### Element Description | Required | Multiplicity | Datatype
---|---|---|---
fileWidth | fileWidth is the subelement of healthcareAsset that describes the width of the image in pixels. | Optional | 0 or 1 | Integer

Example:

```xml
<healthcareMetadata>
  <healthcareAsset>
    <annotated>No</annotated>
    <clinicalHistory>
      <string language="en">50 year old female with Cryptococcal Pneumonia</string>
    </clinicalHistory>
    <medicalImageType>radiograph</medicalImageType>
    <specimenType>organ</specimenType>
    <fileHeight>500</fileHeight>
    <fileWidth>600</fileWidth>
  </healthcareAsset>
</healthcareMetadata>
```

### 7 LanguageString Datatype

Many of the elements in Healthcare LOM use the LanguageString datatype from the IEEE LOM standard. LanguageString provides a way for LOM document creators to specify a value for an element in multiple languages. For example, document creators can specify a single keyword term in both French and English. Within the healthcare extensions, the faculty disclosure description can be encoded multiple languages, too. This functionality is important for those creating educational resources for a multilingual population.

Elements using the LanguageString datatype have the subelement of string, which is described in the following table.
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>string</td>
<td>string is the subelement of any element using the LanguageString datatype. It provides a word or phrase in a human language. If the string element is repeated within a particular element, each value should be semantically equivalent, such as a translation or alternative description. String has the following attribute: language language specifies the human language of the text string. If the language attribute is not present, the language will be determined by the value of the language element within the LOM metaMetadata container. Valid values are codes from the ISO-10646-1 standard. For example, en for English and fr for French.</td>
<td>Optional</td>
<td>0 or more</td>
<td>CharacterString</td>
</tr>
</tbody>
</table>

In the following example, the word physician is expressed in three languages:

```
<targetAudience>
  <profession>
    <string language = "en">physician</string>
    <string language = "fr">médecin</string>
    <string language = "sp">médico</string>
  </profession>
</targetAudience>
```

8 Character String Datatype

Many of the elements and attributes in Healthcare LOM use the CharacterString data type from the IEEE LOM standard. CharacterString indicates that the data value for the element or attribute is a character string but is NOT a word or phrase in a human language. For example, a name would be encoded using the CharacterString data type.
The characters represented by this data type are from the ISO/IEC 10646-1:2000 standard. This ISO standard, also known as UCS, attempts to include all characters used in all written languages in the world.

CharacterString uses the XML string data type.
Custom Attributes

Healthcare LOM provides attribute extensions to some LOM elements to facilitate the use of LOM in healthcare and to promote interoperability with non-healthcare systems when possible.

Using Clinical Terminologies to Indicate Keyword
Medical terminologies such as MeSH, SNOMED, and UMLS provide a structure for describing healthcare topics and can facilitate indexing, cataloging and discovery of healthcare learning content. This indexing/cataloging can in turn facilitate integration of content with clinical systems and workflow.

LOM provides the keyword element to describe the important concepts or topics related to learning content. To use the keyword element with terms from medical terminologies, Healthcare LOM adds attribute extension. The syntax of the keyword element with healthcare-specific attribute extensions follows.

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Required</th>
<th>Multiplicity</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>keyword</td>
<td>keyword is the subelement of general. Its subelements provide common keywords (important concepts or topics) that describe the educational offering.</td>
<td>Optional</td>
<td>0 or 1</td>
<td>LanguageString</td>
</tr>
</tbody>
</table>

Healthcare LOM adds the following attributes to keyword:

source
source specifies the terminology or vocabulary from which the keyword is taken. For example, UMLS, SNOMED, or MeSH.

Id
id defines the unique identifier associated with this term in the structured terminology or vocabulary. For example, D009203.

Example:

```
<keyword hx:source = "MeSH" hx:id = "D009203">
  <string language = "en">myocardial infarction</string>
</keyword>
```
## Custom Vocabularies

Healthcare LOM custom vocabularies supplement the LOM vocabularies to provide values useful for healthcare education. The table that follows describes the LOM elements for which custom vocabularies have been created, the LOM provided values for those elements, the Healthcare LOM vocabularies that serve as supplements, and the hierarchical path to the LOM element. **Values from both the LOM vocabularies or the Healthcare LOM vocabularies are considered valid values for these elements.**

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>LOM Vocabulary</th>
<th>Healthcare LOM Vocabulary</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>source</td>
<td>An indication of the source or owner of the vocabulary values.</td>
<td>LOMv1.0</td>
<td>HEALTHCARE_LOMv1</td>
<td>Occurs with value within any element that has a defined vocabulary</td>
</tr>
<tr>
<td>role</td>
<td>Defines the type of contribution made by a contributor.</td>
<td>Author publisher unknown initiator terminator validator editor graphical designer technical implementer content provider technical validator educational validator script writer instructional designer subject matter expert</td>
<td>other reviewer programmer producer director</td>
<td>lifecycle:contribute:role</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>LOM Vocabulary</td>
<td>Healthcare LOM Vocabulary</td>
<td>Path</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------</td>
<td>----------------</td>
<td>--------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>learningResourceType</td>
<td>Defines the type of educational content.</td>
<td>Exercise</td>
<td>animation</td>
<td>educational:learningResourceType</td>
</tr>
<tr>
<td></td>
<td></td>
<td>simulation</td>
<td>audio</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>questionnaire</td>
<td>collaborative forum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>diagram</td>
<td>game</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>figure</td>
<td>case study</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>graph</td>
<td>image</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>index</td>
<td>reference</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>slide</td>
<td>tutorial</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>table</td>
<td>video</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>narrative text</td>
<td>virtual patient</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>experiment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>statement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>self assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>lecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>context</td>
<td>The educational environment for which the learning activity is intended.</td>
<td>School</td>
<td>patient education</td>
<td>educational:context</td>
</tr>
<tr>
<td></td>
<td></td>
<td>higher education</td>
<td>caregiver education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>training other</td>
<td>primary education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>other</td>
<td>secondary education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>vocational training</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>undergraduate education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>graduate education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>continuing professional education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>continuing professional development</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
<td>LOM Vocabulary</td>
<td>Healthcare LOM Vocabulary</td>
<td>Path</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>purpose</td>
<td>Defines a purpose for classifying the learning activity.</td>
<td>Discipline idea</td>
<td>clinical guideline</td>
<td>classification:purpose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prerequisite</td>
<td>drug list</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>educational</td>
<td>level of evidence</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>objective</td>
<td>learning outcome</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>accessibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>restrictions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>educational</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>level</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>skill</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>level</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>competency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Custom Elements**

Healthcare LOM allows organizations to add new elements to those described in this document and in the IEEE LOM documentation. This allows organizations to further customize Healthcare LOM for their specific needs.

New elements can be added in the following ways.

**Adding Elements to Existing LOM Categories**

Healthcare LOM allows extensions to general, lifecycle, metaMetadata, technical; educational, rights, relation, annotation, classification, and any of their sub-elements that are also container elements. For more information on adding new elements to existing LOM category elements and their sub-elements, see IEEE Standard for Learning Technology—Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata (IEEE 1484.12.3).

**Adding Elements to a New Category**

Healthcare LOM defines a sub-element of lom called customElements. The customElements container may contain any new elements or new categories of elements as long as those elements are qualified by an XML namespace. Healthcare LOM does not permit extensions to healthcareMetadata or its subelements, so any new elements specific to healthcare should be placed in the customElements container.
Example:

```xml
<lom xmlns="http://ltsc.ieee.org/xsd/LOM"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xmlns:hx="http://ns.medbiq.org/lom/extend/v1/"
     xmlns:new="http://your.organization.org/lom/extend/v1/"
     xsi:schemaLocation="http://ltsc.ieee.org/xsd/LOM healthcarelom.xsd">
  <general>
    ...
  </general>
  ...
  <hx:customElements>
    <new:curriculumPlacement>
      <new:curriculumRequirementSatisfied>
        Pain Management
      </new:curriculumRequirementSatisfied>
      <new:medicalSchoolYear>1</new:medicalSchoolYear>
    </new:curriculumPlacement>
  </hx:customElements>
</lom>
```
Conformance

To be a conformant instance of Healthcare LOM, an XML document:

- Shall conform to the Additional Requirements stated in this document
- May include elements not defined in this document or in the IEEE Standard for Learning Technology--Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata (IEEE 1484.12.3) by using the customElements container defined in the section Custom Elements.

Additional Requirements

The metadata document must indicate that it is conformant with the LOM version 1.0, SCORM Content Aggregation Model version 1.3 (if applicable), and Healthcare LOM version 1 standards. To indicate this conformance, include the following XML code in the metaMetadata section of the metadata record:

```
<metadataSchema>LOMv1.0</metadataSchema>
<metadataSchema>SCORM_CAM_v1.3</metadataSchema>
<metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
```
References

http://ieeexplore.ieee.org/servlet/opac?punumber=8032

http://ieeexplore.ieee.org/servlet/opac?punumber=10263

MedBiquitous Address Specifications and Description Document v1.0,
http://www.medbiq.org/working_groups/professional_profile/AddressSpecification.pdf

MedBiquitous XML Schema Design Guidelines v1.3,

W3C Extensible Markup Language (XML) 1.0 (Fourth Edition), http://www.w3.org/TR/xml
# Appendix 1: Credit Related Acronyms

<table>
<thead>
<tr>
<th>Credit-related Acronyms</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>American Academy of Audiology</td>
</tr>
<tr>
<td>AACN</td>
<td>American Association of Critical-Care Nurses</td>
</tr>
<tr>
<td>AAFP</td>
<td>American Academy of Family Physicians</td>
</tr>
<tr>
<td>AANA</td>
<td>American Association of Nurse Anesthetists</td>
</tr>
<tr>
<td>AANP</td>
<td>American Academy of Nurse Practitioners</td>
</tr>
<tr>
<td>AAP</td>
<td>American Academy of Pediatrics</td>
</tr>
<tr>
<td>AAPA</td>
<td>American Academy of Physician Assistants</td>
</tr>
<tr>
<td>AARC</td>
<td>American Association for Respiratory Care</td>
</tr>
<tr>
<td>ACCME</td>
<td>Accreditation Council of Continuing Medical Education</td>
</tr>
<tr>
<td>ACEP</td>
<td>American College of Emergency Physicians</td>
</tr>
<tr>
<td>ACOG</td>
<td>American College of Obstetrics and Gynecology</td>
</tr>
<tr>
<td>ACPE</td>
<td>Accreditation Council for Pharmacy Education</td>
</tr>
<tr>
<td>ACSM</td>
<td>American College of Sports Medicine</td>
</tr>
<tr>
<td>ADA CERP</td>
<td>American Dental Association Continuing Education Recognition Program</td>
</tr>
<tr>
<td>AGD PACE</td>
<td>Academy of General Dentistry Program Approval for Continuing Education</td>
</tr>
<tr>
<td>AMA PRA</td>
<td>American Medical Association Physician Recognition Award</td>
</tr>
<tr>
<td>ANCC</td>
<td>American Nurses Credentialing Center</td>
</tr>
<tr>
<td>AOA</td>
<td>American Osteopathic Association</td>
</tr>
<tr>
<td>AOTA</td>
<td>American Occupational Therapy Association</td>
</tr>
<tr>
<td>APA</td>
<td>American Psychological Association</td>
</tr>
<tr>
<td>ARRT</td>
<td>American Registry of Radiologic Technologists Recognized Continuing Education Evaluation Mechanism</td>
</tr>
<tr>
<td>RCEEM</td>
<td>Continuing Education Recognition Program (for critical-care nurses)</td>
</tr>
<tr>
<td>ASHA</td>
<td>American Speech-Language-Hearing Association</td>
</tr>
<tr>
<td>BOC</td>
<td>Board of Certification (for athletic trainers)</td>
</tr>
<tr>
<td>CCME</td>
<td>Council on Continuing Medical Education (for osteopathic professionals)</td>
</tr>
<tr>
<td>CDR</td>
<td>Commission on Dietetic Registration</td>
</tr>
<tr>
<td>CECBEMS</td>
<td>Continuing Education Coordinating Board for Emergency Medical Services</td>
</tr>
<tr>
<td>CE</td>
<td>Continuing Education</td>
</tr>
<tr>
<td>CECH</td>
<td>Continuing Education Contact Hour</td>
</tr>
<tr>
<td>CEH</td>
<td>Continuing Education Hours</td>
</tr>
<tr>
<td>CERP</td>
<td>Continuing Education Recognition Point (for critical-care nurses)</td>
</tr>
<tr>
<td>CEU</td>
<td>Continuing Education Units</td>
</tr>
<tr>
<td>CHES</td>
<td>Certified Health Education Specialists</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>CME</td>
<td>Continuing Medical Education</td>
</tr>
<tr>
<td>CNE</td>
<td>Continuing Nursing Education</td>
</tr>
<tr>
<td>COPE</td>
<td>Council on Optometric Practitioner Education</td>
</tr>
<tr>
<td>CPE</td>
<td>Continuing Pharmacy Education</td>
</tr>
<tr>
<td>CPHQ</td>
<td>Certified Professional in Healthcare Quality</td>
</tr>
<tr>
<td>EBAC</td>
<td>European Board of Accreditation in Cardiology</td>
</tr>
<tr>
<td>FCLB PACE</td>
<td>Federation of Chiropractic Licensing Boards Providers of Approved Continuing Education</td>
</tr>
<tr>
<td>IACET</td>
<td>International Association for Continuing Education and Training</td>
</tr>
<tr>
<td>NCHEC</td>
<td>National Commission for Health Education Credentialing</td>
</tr>
<tr>
<td>RCPath</td>
<td>Royal College of Pathologists</td>
</tr>
</tbody>
</table>
Appendix 2: Health Professions and Specialties

Following are recommended terms for health professions and health specialties that should capture the needs of most health professions educators. They are intended to provide guidance for those organizations seeking to describe the professional audience for an educational offering in a consistent manner. The list of professionals is adapted from a list created by the US Health Resources and Services Administration. The list of health specialties is adapted from specialties and internal medicine/pediatric subspecialties as recognized by the Accreditation Council on Graduate Medical Education and the American Board of Medical Specialties. These lists may not be adequate to meet the needs of hospitals and large healthcare organizations requiring a highly detailed hierarchical list of professions. More detailed lists of healthcare professionals have been defined by HL7, SNOMED, the US Health Resources and Services Administration, the US Office of Program Management, and the National Center of Educational Statistics (Classification of Instructional Programs).

Either higher or lower level terms in the hierarchy may be used when describing health professions.

<table>
<thead>
<tr>
<th>Health Professions</th>
</tr>
</thead>
<tbody>
<tr>
<td>allied health professional</td>
</tr>
<tr>
<td>chiropractor</td>
</tr>
<tr>
<td>dietician</td>
</tr>
<tr>
<td>emergency medical services professional</td>
</tr>
<tr>
<td>laboratory professional</td>
</tr>
<tr>
<td>medical assistant</td>
</tr>
<tr>
<td>medical examiner / coroner</td>
</tr>
<tr>
<td>medical imaging professional</td>
</tr>
<tr>
<td>mental health counselor</td>
</tr>
<tr>
<td>occupational therapist</td>
</tr>
<tr>
<td>optician</td>
</tr>
<tr>
<td>optometrist</td>
</tr>
<tr>
<td>physical therapist</td>
</tr>
<tr>
<td>physician assistant</td>
</tr>
<tr>
<td>podiatrist</td>
</tr>
<tr>
<td>psychologist</td>
</tr>
<tr>
<td>rehabilitation professional</td>
</tr>
<tr>
<td>respiratory therapy professional</td>
</tr>
<tr>
<td>social worker</td>
</tr>
<tr>
<td>speech, language, audiology professional</td>
</tr>
</tbody>
</table>
### Health Professions (continued)

<table>
<thead>
<tr>
<th>Allied Health Professional (continued)</th>
<th>Substance Abuse Counselor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Professional</td>
<td>Dentist</td>
</tr>
<tr>
<td>Medical Professional</td>
<td>Physician</td>
</tr>
<tr>
<td>Nursing Professional</td>
<td>Advanced Practice Nurse</td>
</tr>
<tr>
<td></td>
<td>Licensed Practical Nurse</td>
</tr>
<tr>
<td></td>
<td>Registered Nurse</td>
</tr>
<tr>
<td>Pharmacy Professional</td>
<td>Pharmacist</td>
</tr>
<tr>
<td>Public Health Professional</td>
<td>Environmental Health Professional</td>
</tr>
<tr>
<td></td>
<td>Epidemiologist</td>
</tr>
<tr>
<td></td>
<td>Health Educator</td>
</tr>
<tr>
<td></td>
<td>Occupational Health and Safety Professional</td>
</tr>
<tr>
<td>Veterinary Professional</td>
<td>Veterinarian</td>
</tr>
</tbody>
</table>

### Health Specialties

- adolescent medicine
- allergy/immunology
- anesthesiology
- cardiology
- colon and rectal surgery
- critical care medicine
- dermatology
- developmental-behavioral
- emergency medicine
- endocrinology
- family practice
- gastroenterology
- geriatric medicine
- hematology and oncology
- infectious disease
- internal medicine
• medical genetics
• neonatal-perinatal medicine
• nephrology
• neurological surgery
• neurology
• nuclear medicine
• obstetrics and gynecology
• ophthalmology
• orthopaedic surgery
• otolaryngology
• pathology-anatomic and clinical
• pediatrics
• physical medicine and rehabilitation
• plastic surgery
• preventive medicine
• psychiatry
• pulmonology
• radiation oncology
• radiology-diagnostic
• rheumatology
• sports medicine
• surgery-general
• thoracic surgery
• urology
Appendix 3: Sample XML Documents

Sample XML for Describing a Learning Object or Course

<?xml version="1.0" encoding="UTF-8"?>
<lom xmlns="http://ltsc.ieee.org/xsd/LOM"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:hx="http://ns.medbiq.org/lom/extend/v1/
xsi:schemaLocation="http://ltsc.ieee.org/xsd/LOM healthcarelom.xsd">
<general>
  <identifier>
    <catalog>URL</catalog>
    <entry>http://www.aafp.org/x29766.xml</entry>
  </identifier>
  <title>
    <string language="en">Insulin Pump Therapy</string>
  </title>
  <description>
    <string language="en">Provides a general introduction to Continuous Subcutaneous Insulin Infusion for the family practice physician.</string>
  </description>
  <keyword hx:source="MeSH" hx:id="D007332">
    <string language="en">insulin infusion systems</string>
  </keyword>
  <keyword hx:source="MeSH" hx:id="D003920">
    <string language="en">diabetes mellitus</string>
  </keyword>
</general>
<lifeCycle>
  <version>
    <string language="en">1.0</string>
  </version>
  <status>
    <source>LOMv1.0</source>
    <value>final</value>
  </status>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>author</value>
    </role>
    <entity>BEGIN:VCARD
FN:John DoeEND:VCARD</entity>
  </contribute>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>publisher</value>
    </role>
    <entity>BEGIN:VCARD
FN:American Academy of Family PhysiciansEND:VCARD</entity>
  </contribute>
  <date>
    <dateTime>2004-08-01</dateTime>
    <description>
      <string language="en">Publication date</string>
    </description>
  </date>
</lom>
<description>
</description>
</date>
</contribute>
</lifeCycle>
<metaMetadata>
<identifier>
<catalog>URL</catalog>
<entry>http://www.aafp.org/metadata/001</entry>
</identifier>
<contribute>
<role>
<source>LOMv1.0</source>
<value>creator</value>
</role>
<entity>American Academy of Family Physicians</entity>
<date>
<dateTime>2004-08-01</dateTime>
</date>
</contribute>
<metaDataSchema>LOMv1.0</metaDataSchema>
<metaDataSchema>SCORM_CAM_v1.3</metaDataSchema>
<metaDataSchema>HEALTHCARE_LOMv1</metaDataSchema>
</metaMetadata>
<technical>
<format>application/http</format>
</technical>
<educational>
<context>
<source>HEALTHCARE_LOMv1</source>
<value>continuing professional development</value>
</context>
</educational>
<rights>
<cost>
<source>LOMv1.0</source>
<value>yes</value>
</cost>
<copyrightAndOtherRestrictions>
<source>LOMv1.0</source>
<value>yes</value>
</copyrightAndOtherRestrictions>
<description>
<string language="en">Copyright American Academy of Family Physicians, 2004. All Rights Reserved.</string>
</description>
</rights>
<classification>
<purpose>
<source>LOMv1.0</source>
<value>educational objective</value>
</purpose>
<description>
<string language="en">List the indications and advantages of Continuous Subcutaneous Insulin therapy.</string>
</description>
</classification>
<classification>
<purpose>
  <source>LOMv1.0</source>
  <value>educational objective</value>
</purpose>
<description>
  <string language="en">Manage the programming of the insulin pump and recognize problems when they occur.</string>
</description>
</classification>
<purpose>
  <source>LOMv1.0</source>
  <value>competency</value>
</purpose>
<taxonPath>
  <source>
    <string language="en">ACGME Core Competencies</string>
  </source>
  <taxon>
    <id>b</id>
    <entry>
      <string language="en">Medical Knowledge</string>
    </entry>
  </taxon>
</taxonPath>
</classification>
<hx:healthcareMetadata>
  <hx:healthcareEducation>
    <hx:expirationDate>2007-04-30</hx:expirationDate>
    <hx:creditsAvailable>yes</hx:creditsAvailable>
    <hx:credits>
      <hx:accreditingBody>ACCME</hx:accreditingBody>
      <hx:accreditingBody>AAFP</hx:accreditingBody>
      <hx:activityCertification>Prescribed</hx:activityCertification>
      <hx:creditType>CME</hx:creditType>
      <hx:creditUnit>Credits</hx:creditUnit>
      <hx:pacing>learner paced</hx:pacing>
      <hx:accreditedProvider>
        American Academy of Family Physicians
      </hx:accreditedProvider>
      <hx:releaseDate>2006-04-30</hx:releaseDate>
      <hx:expirationDate>2007-04-30</hx:expirationDate>
      <hx:numberOfCredits>1.5</hx:numberOfCredits>
    </hx:credits>
    <hx:targetAudience>
      <hx:audienceCategory>professional</hx:audienceCategory>
      <hx:profession>
        <string language="en">physician</string>
      </hx:profession>
      <hx:specialty>
        <string language="en">family practice</string>
      </hx:specialty>
      <hx:readingLevel>
        <string language="en">above grade 12</string>
      </hx:readingLevel>
    </hx:targetAudience>
  </hx:healthcareEducation>
</hx:healthcareMetadata>
<hx:participationModality>
  technology based
</hx:participationModality>
<hx:activityDelivery>not live</hx:activityDelivery>
<hx:activityFormat>
  <string language="en">course</string>
</hx:activityFormat>
<hx:commercialSupport>yes</hx:commercialSupport>
<hx:commercialSupportAcknowledgement>
  <string language="en">The Academy gratefully acknowledges a grant
  from the XYZ Foundation to provide funding for this course.</string>
</hx:commercialSupportAcknowledgement>
<hx:relevantFinancialRelationship>no</hx:relevantFinancialRelationship>
<hx:contact>John Doe, jdoe@aafp.org</hx:contact>
</hx:healthcareMetadata>
</lom>
Sample XML for Describing a Learning Object or Course with Multiple Types of Credit

```xml
<?xml version="1.0" encoding="UTF-8"?>
<lom xmlns="http://ltsc.ieee.org/xsd/LOM"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xmlns:hx="http://ns.medbiq.org/lom/extend/v1/"
     xsi:schemaLocation="http://ltsc.ieee.org/xsd/LOM healthcarelom.xsd">
  <general>
    <identifier>
      <catalog>URL</catalog>
      <entry>http://www.atsdr.cdc.gov/HEC/CSEM/arsenic/index.html</entry>
    </identifier>
    <title>
      <string language="en">Arsenic Toxicity</string>
    </title>
    <language>en</language>
    <description>
      <string language="en">Provides a general introduction to arsenic toxicity in the environment.</string>
    </description>
    <keyword hx:source="MeSH" hx:id="D001151">
      <string language="en">arsenic</string>
    </keyword>
    <keyword hx:source="MeSH" hx:id="D019550">
      <string language="en">environmental medicine</string>
    </keyword>
  </general>
  <lifeCycle>
    <version>
      <string language="en">1.0</string>
    </version>
    <status>
      <source>LOMv1.0</source>
      <value>final</value>
    </status>
    <contribute>
      <role>
        <source>LOMv1.0</source>
        <value>author</value>
      </role>
      <entity>BEGIN:VCARD
      FN:John DoeEND:VCARD</entity>
    </contribute>
    <contribute>
      <role>
        <source>LOMv1.0</source>
        <value>publisher</value>
      </role>
      <entity>BEGIN:VCARD\n      FN:Centers for Disease Control and PreventionEND:VCARD</entity>
    </contribute>
    <date>
      <dateTime>2005-10-30</dateTime>
      <description>
        <string language="en">Publication date</string>
      </description>
    </date>
  </lifeCycle>
</lom>
```
</lifeCycle>
<metaMetadata>
  <identifier>
    <catalog>URL</catalog>
    <entry>http://www.cd.gov/metadata/001</entry>
  </identifier>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>creator</value>
    </role>
    <entity>Centers for Disease Control and Prevention</entity>
    <date>
      <dateTime>2005-10-30</dateTime>
    </date>
  </contribute>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>SCORM_CAM_v1.3</metadataSchema>
  <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
</metaMetadata>
<technical>
  <format>application/http</format>
  <location>http://www.atsdr.cdc.gov/HEC/CSEM/arsenic/index.html</location>
</technical>
<educational>
  <context>
    <source>HEALTHCARE_LOMv1</source>
    <value>continuing professional development</value>
  </context>
</educational>
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>no</value>
  </cost>
  <copyrightAndOtherRestrictions>
    <source>LOMv1.0</source>
    <value>no</value>
  </copyrightAndOtherRestrictions>
</rights>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>educational objective</value>
  </purpose>
  <description>
    <string language="en">Discuss the major exposure route for arsenic</string>
  </description>
</classification>
</classification>
<string language="en">Describe two potential environmental and occupational sources of arsenic exposure</string>
</description>
</classification>
<classification>
<purpose>
<source>LOMv1.0</source>
<value>educational objective</value>
</purpose>
<description>
<string language="en">Identify evaluation and treatment protocols for persons exposed to arsenic</string>
</description>
</classification>
<classification>
<purpose>
<source>LOMv1.0</source>
<value>competency</value>
</purpose>
<taxonPath>
<source>
<string language="en">ACGME Core Competencies</string>
</source>
<taxon>
<string language="en">Medical Knowledge</string>
</taxon>
</taxonPath>
</classification>
<hx:healthcareMetadata>
<hx:healthcareEducation>
<hx:expirationDate>2006-10-30</hx:expirationDate>
 hx:creditsAvailable>yes</hx:creditsAvailable>
<hx:credits>
<hx:accreditingBody>ACCME</hx:accreditingBody>
<hx:activityCertification>AMA PRA category 1</hx:activityCertification>
<hx:creditType>CME</hx:creditType>
<hx:creditUnit>Credit</hx:creditUnit>
<hx:accreditedProvider>Centers for Disease Control and Prevention</hx:accreditedProvider>
</hx:credits>
<hx:expirationDate>2006-10-30</hx:expirationDate>
<hx:numberOfCredits>1.5</hx:numberOfCredits>
</hx:healthcareEducation>
</hx:healthcareMetadata>
</hx:credits>
<hx:targetAudience>
  <hx:audienceCategory>professional</hx:audienceCategory>
  <hx:profession>
    <string language="en">physician</string>
  </hx:profession>
  <hx:profession>
    <string language="en">registered nurse</string>
  </hx:profession>
  <hx:specialty>
    <string language="en">family practice</string>
  </hx:specialty>
  <hx:readingLevel>
    <string language="en">above grade 12</string>
  </hx:readingLevel>
</hx:targetAudience>
<hx:activitySponsorship>direct</hx:activitySponsorship>
<hx:participationModality>technology based</hx:participationModality>
<hx:activityDelivery>not live</hx:activityDelivery>
<hx:activityFormat>
  <string language="en">course</string>
</hx:activityFormat>
<hx:commercialSupport>no</hx:commercialSupport>
<hx:relevantFinancialRelationship>
  no
</hx:relevantFinancialRelationship>
<hx:contact>John Doe, jdoe@cdc.gov</hx:contact>
</hx:healthcareEducation>
</hx:healthcareMetadata>
</lom>
Sample XML for Describing an Asset

```xml
<?xml version="1.0" encoding="UTF-8"?>
<lom xmlns="http://ltsc.ieee.org/xsd/LOM"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ltsc.ieee.org/xsd/LOM healthcarelom.xsd">
  <general>
    <identifier>
      <catalog>URL</catalog>
      <entry>http://www.medicalschool.edu/images/dialysisdrainage.jpg</entry>
    </identifier>
    <title>
      <string language="en">Drainage of Dialysis Fluid from Peritoneal Cavity</string>
    </title>
    <description>
      <string language="en">Drainage of dialysis fluid in peritoneal cavity with catheter in pouch of Douglas.</string>
    </description>
    <keyword hx:source="MeSH" hx:id="D002404">
      <string language="en">Catheterization</string>
    </keyword>
    <keyword hx:source="MeSH" hx:id="D015314">
      <string language="en">Dialysis Solutions</string>
    </keyword>
  </general>
  <lifeCycle>
    <contribute>
      <role>
        <source>LOMv1.0</source>
        <value>publisher</value>
      </role>
      <entity>BEGIN:VCARD\nFN:Anystate Medical SchoolEND:VCARD</entity>
    </contribute>
  </lifeCycle>
  <metaMetadata>
    <identifier>
      <catalog>URL</catalog>
      <entry>http://www.medicalschool.edu/metadata/metadata010</entry>
    </identifier>
    <metadataSchema>LOMv1.0</metadataSchema>
    <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
  </metaMetadata>
  <technical>
    <format>image/jpg</format>
    <size>135090</size>
  </technical>
  <educational>
    <learningResourceType>
      <source>HEALTHCARE_LOMv1</source>
      <value>image</value>
    </learningResourceType>
  </educational>
</lom>
```
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>no</value>
  </cost>
  <copyrightAndOtherRestrictions>
    <source>LOMv1.0</source>
    <value>yes</value>
  </copyrightAndOtherRestrictions>
  <description>
    <string language="en">Creative Commons Attribution-Noncommercial-Sharealike license. Contact Joe Shmoe at jshmoe@medicalschool.edu for more information.</string>
  </description>
</rights>

<hx:healthcareMetadata>
  <hx:healthcareAsset>
    <hx:annotated>yes</hx:annotated>
    <hx:orientation>sagittal</hx:orientation>
    <hx:specimenType>organ system</hx:specimenType>
    <hx:fileHeight>736</hx:fileHeight>
    <hx:fileWidth>806</hx:fileWidth>
  </hx:healthcareAsset>
</hx:healthcareMetadata>
</lom>