## Revision History

<table>
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<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
<th>Author</th>
</tr>
</thead>
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<tr>
<td>7 September 2005</td>
<td>0.1</td>
<td>Initial version</td>
<td>Valerie Smothers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:valerie.smothers@medbiq.org">valerie.smothers@medbiq.org</a></td>
</tr>
<tr>
<td>17 July 2006</td>
<td>0.2</td>
<td>Modified to incorporate describing learning activities</td>
<td>Valerie Smothers</td>
</tr>
<tr>
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<td><a href="mailto:valerie.smothers@medbiq.org">valerie.smothers@medbiq.org</a></td>
</tr>
<tr>
<td>1 September 2006</td>
<td>0.3</td>
<td>Added contact and location to recommendations for live activities as well as note regarding dates. Changed recommendations for use of rights element in both instructional content and assets.</td>
<td>Valerie Smothers</td>
</tr>
<tr>
<td></td>
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<td><a href="mailto:valerie.smothers@medbiq.org">valerie.smothers@medbiq.org</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shona Dippie</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:sdippie@lib.med.utah.edu">sdippie@lib.med.utah.edu</a></td>
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<tr>
<td>10 May 2008</td>
<td>0.4</td>
<td>Updated guidelines to reflect current specification.</td>
<td>Valerie Smothers</td>
</tr>
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<td><a href="mailto:valerie.smothers@medbiq.org">valerie.smothers@medbiq.org</a></td>
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<tr>
<td>1 October 2009</td>
<td>1.0</td>
<td>Corrected examples to include hx prefix for keyword attributes.</td>
<td>Valerie Smothers</td>
</tr>
<tr>
<td></td>
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<td><a href="mailto:valerie.smothers@medbiq.org">valerie.smothers@medbiq.org</a></td>
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Guidelines for Describing Educational Resources Using Healthcare Learning Object Metadata

1. Acknowledgements

These guidelines were created by the members of the MedBiquitous Learning Objects Working Group, including:

- Morgan Bantly, Chair; Veterans Administration
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2. Introduction

The field of healthcare education – both for healthcare professionals and non-professionals – is evolving rapidly. Educators are increasingly using learning technologies to supplement more traditional forms of education and establishing multi-organization collaborations to support the costs of developing sophisticated e-learning resources. In addition, many educators are seeking to leverage existing educational content when possible to avoid duplicating previous effort, speed the development of new learning resources, and lower content development costs. The Web has also seen the explosion of healthcare education content for patients and caregivers. Many of these learners are unsure where to look for high-quality learning content.

In order for learners and educators to find relevant resources and activities that meet their needs, it’s necessary to have a consistent mechanism of describing healthcare learning content and activities. The MedBiquitous Learning Objects Working Group has developed Healthcare Learning Objects Metadata (Healthcare LOM) to address this need. Healthcare LOM provides a consistent XML format for describing healthcare education resources and activities so that learners can find relevant educational resources or activities when they need it, even if those resources are spread across multiple organizations or systems.

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 P1484.12.3-2005) developed by the IEEE Learning Technology Standards Committee. 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.

Many groups are developing multi-organization repositories of educational resources or catalogues of available educational activities. In order for these repositories and catalogues to work effectively both independently and with one another, a core set of metadata for healthcare learning is needed. This document recommends core metadata elements for specific educational contexts and provides guidance on what vocabularies or data to use within those recommended elements. In addition, this document provides guidance on using metadata to support other pedagogically important functions for healthcare education.

If you are developing SCORM conformant e-learning resources, please see the SCORM for Healthcare Specifications document. SCORM minimum requirements are greater than those provided in this document. The SCORM for Healthcare Specifications document provides recommendations on which additional metadata elements to use for SCORM conformant learning content.
3. **Core Healthcare LOM Recommendations for Instructional Content and Activities**

The following core Healthcare LOM elements are recommended for instructional resources related to undergraduate professional education, graduate professional education, and continuing professional development. Some of the recommended elements are container elements that have subelements that are recommended.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>lom</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>general</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>identifier</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>1.1.1</td>
<td>catalog</td>
<td>The cataloguing scheme for the unique identifier for this learning resource.</td>
<td>The recommended value is URI unless your organization uses Digital Object Identifiers (DOIs) or other persistent unique identifiers. Use this element with entry to indicate the unique identifier for the learning resource.</td>
</tr>
<tr>
<td>1.1.2</td>
<td>entry</td>
<td>The unique identifier for this learning resource.</td>
<td>The recommended value is a URI unless your organization uses Digital Object Identifiers (DOIs) or other persistent unique identifiers. Example: <a href="http://www.aamc.org/lo/12345678">http://www.aamc.org/lo/12345678</a></td>
</tr>
<tr>
<td>1.2</td>
<td>title</td>
<td>The name of the learning resource.</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>language</td>
<td>The human language used by the learning resource.</td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>description</td>
<td>A short description of the learning resource.</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>keyword</td>
<td>A word or phrase describing the subject or overall category of the learning resource.</td>
<td>Using MeSH terms for keywords is recommended; if the topic requires further description, UMLS, SNOMED, or another medical vocabulary may be used. Using the Healthcare LOM source and id attributes for keyword to specify the medical vocabulary and unique concept/term identifier of the term. For example: &lt;keyword hx:source = &quot;MeSH&quot; hx:id = &quot;D009203&quot;&gt; &lt;string language = &quot;en&quot;&gt;myocardial infarction&lt;/string&gt; &lt;/keyword&gt;</td>
</tr>
<tr>
<td>2</td>
<td>lifecycle</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>contribute</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Element</td>
<td>Description</td>
<td>Guidance</td>
</tr>
<tr>
<td>-----</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2.3.1</td>
<td>role</td>
<td>The role of an organization or person that has contributed to the development of this resource.</td>
<td>Use this element with entity to list authors, publisher, and reviewers for the resource. Recommended values are author, publisher, or reviewer.</td>
</tr>
<tr>
<td>2.3.2</td>
<td>entity</td>
<td>The entity or organization that has contributed to the development of this resource.</td>
<td>Use this element with role to list authors, publisher, and reviewers for the resource. Entity uses the vcard format. Example: &lt;entity&gt;BEGIN:VCARD fn:John Doe END:VCARD&lt;/entity&gt;</td>
</tr>
<tr>
<td>2.3.3</td>
<td>date</td>
<td>The date associated with the contribution.</td>
<td>When the role is publisher, this indicates the date of publication. When the role is author, this indicates the author completed authoring the resources. When the role is reviewer, the date indicates the date of review. Including a date of publication and authoring date is recommended.</td>
</tr>
<tr>
<td>3</td>
<td>meta-metadata</td>
<td>Container element</td>
<td>All Healthcare LOM conforming documents must indicate conformance with LOM and Healthcare LOM. Use LOMv1.0 and HEALTHCARE_LOMv1. Example: &lt;metadataSchema&gt; LOMv1.0 &lt;/metadataSchema&gt; &lt;metadataSchema&gt; HEALTHCARE_LOMv1 &lt;/metadataSchema&gt;</td>
</tr>
<tr>
<td>5</td>
<td>educational</td>
<td>Container element</td>
<td>Choose the appropriate context from one of the following values: patient education, caregiver education, primary education, secondary education, vocational training, undergraduate education, undergraduate professional education, graduate professional education, or continuing professional development.</td>
</tr>
<tr>
<td>6</td>
<td>rights</td>
<td>Container element</td>
<td>This element indicates whether or not copyright restrictions exist. The value yes is recommended as a default unless the resource is within the public domain. In that case, this value should be no.</td>
</tr>
<tr>
<td>No.</td>
<td>Element</td>
<td>Description</td>
<td>Guidance</td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>6.3</td>
<td>description</td>
<td>A description of any copyright restrictions or additional information related to copyright. Inclusion of copyright date and copyright holder contact information is recommended.</td>
<td>Enter copyright information in this element. Enter copyright information in this element. E.g., if your resource uses a Creative Commons License, indicate which type of license and include a link to more information. “This work is licensed under a Creative Commons Attribution-Noncommercial-ShareAlike License. Some Rights Reserved. To view a copy of this license, visit: <a href="http://creativecommons.org/licenses/by-nc-sa/2.0/.%E2%80%9D">http://creativecommons.org/licenses/by-nc-sa/2.0/.”</a> E.g., a specific copyright date or range of dates may be given here as “©2000-2005 Regents of the University of California, the University of Utah, and the University of Oklahoma. All rights reserved.” E.g., contact information for the copyright holder of the resource may be included as “U.S. and international copyright laws protect this digital image. Commercial use or distribution of the image is not permitted without prior permission of the copyright holder. Please contact the Spencer S. Eccles Health Sciences Library Intellectual Property Division via e-mail (<a href="mailto:rights@lib.med.utah.edu">rights@lib.med.utah.edu</a>) for permission to use the image.” E.g., for resources in the public domain inclusion of an explanation is recommended, such as “No Restrictions. You are free to copy, distribute, display, and perform this work, and derivative works based upon it, without restriction or attribution, in any way for any purpose” or “<a href="http://creativecommons.org/licenses/publicdomain.%E2%80%9D">http://creativecommons.org/licenses/publicdomain.”</a></td>
</tr>
<tr>
<td>9</td>
<td>classification</td>
<td>Container element</td>
<td>Use educational objective, learning outcome, or competency to indicate the purpose of this learning resource. The classification element may be repeated to indicate multiple objectives, competencies, or learning outcomes. Using educational objective, learning outcome, or competency to indicate the purpose of this learning resource. The classification element may be repeated to indicate multiple objectives, competencies, or learning outcomes. Tying learning resources and activities to a competency or learning outcome framework is highly recommended for health professions education. See section Tying Educational Resources to a Competency Framework for more information.</td>
</tr>
<tr>
<td>9.1</td>
<td>purpose</td>
<td>Defines the purpose of classifying the learning resource. For example, resources may be classified by educational objective, learning outcome, or competency.</td>
<td>Use educational objective, learning outcome, or competency to indicate the purpose of this learning resource. The classification element may be repeated to indicate multiple objectives, competencies, or learning outcomes. Tying learning resources and activities to a competency or learning outcome framework is highly recommended for health professions education. See section Tying Educational Resources to a Competency Framework for more information.</td>
</tr>
<tr>
<td>9.3</td>
<td>description</td>
<td>A description of the learning resource or activity relevant to the stated classification purpose.</td>
<td>If the purpose of classifying the learning resource or activity is to indicate an educational objective or learning outcome that is not part of a formal list of objectives or outcomes, indicate the objective or outcome using this element.</td>
</tr>
<tr>
<td>No.</td>
<td>Element</td>
<td>Description</td>
<td>Guidance</td>
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<td>healthcareEducation</td>
<td>Container element</td>
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<tr>
<td>10.1.9</td>
<td>participationModality</td>
<td>Defines the learner’s mode of participation, dictated by the activity medium. Valid values include conference/workshop, technology based, on the job, print.</td>
<td>If the resource being described is an online course (self-directed or instructor led), CD-ROM, video, or other resource requiring special technology, use technology-based. If the course uses multiple modalities or blended learning, indicate each modality used. A course may include a workshop and technology-based components, for example.</td>
</tr>
</tbody>
</table>

### 4. Core Healthcare LOM Recommendations for Images and Assets

The following core Healthcare LOM elements are recommended for images and other assets for healthcare education. Typically these assets can be used in many different educational contexts. Some of the recommended elements are container elements that have subelements that are recommended.

<table>
<thead>
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<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
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<tbody>
<tr>
<td>-</td>
<td>lom</td>
<td>Container element</td>
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</tr>
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<td>general</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>identifier</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>1.1.1</td>
<td>catalog</td>
<td>The cataloguing scheme for the unique identifier for this learning resource.</td>
<td>The recommended value is URI unless your organization uses Digital Object Identifiers (DOIs) or other persistent unique identifiers. Use this element with entry to indicate the unique identifier for the learning resource.</td>
</tr>
<tr>
<td>1.1.2</td>
<td>entry</td>
<td>The unique identifier for this learning resource.</td>
<td>The recommended value is a URI unless your organization uses Digital Object Identifiers (DOIs) or other persistent unique identifiers. Example: <a href="http://www.aamc.org/lo/12345678">http://www.aamc.org/lo/12345678</a></td>
</tr>
<tr>
<td>1.2</td>
<td>title</td>
<td>The name of the learning resource.</td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>description</td>
<td>A short description of the learning resource.</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Element</td>
<td>Description</td>
<td>Guidance</td>
</tr>
<tr>
<td>-----</td>
<td>-----------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 1.5 | keyword   | A word or phrase describing the subject or overall category of the learning resource. | Using MeSH terms for keywords is recommended; if the topic requires further description, UMLS, SNOMED, or another medical vocabulary may be used. Use the Healthcare LOM *source* and *id* attributes for keyword to specify the medical vocabulary and unique concept/term identifier of the term. For example:  
```xml
<keyword hx:source = "MeSH" hx:id = "D009203">  
    <string language = "en"> myocardiaretion  
</string>  
</keyword>
```

<table>
<thead>
<tr>
<th>2</th>
<th>lifecycle</th>
<th>Container element</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>contribute</td>
<td>Container element</td>
<td></td>
</tr>
</tbody>
</table>

| 2.3.1 | role   | The role of an organization or person that has contributed to the development of this resource. | Use this element with entity to list authors, publisher, and reviewers for the resource. Recommended values are author, publisher, or reviewer.  
Example:  
```xml
<entity>BEGIN:VCARD
    FN:John Doe
END:VCARD</entity>
```

| 2.3.2 | entity | The entity or organization that has contributed to the development of this resource. | Use this element with role to list authors, publisher, and reviewers for the resource. Entity uses the vcard format.  
Example:  
```xml
<entity>BEGIN:VCARD
    FN:John Doe
END:VCARD</entity>
```

| 2.3.3 | date    | The date associated with the contribution.                                    | When the role is publisher, this indicates the date of publication. When the role is author, this indicates the author completed authoring the resources. When the role is reviewer, the date indicates the date of review.  
Including a date of publication and authoring date is recommended. |

<table>
<thead>
<tr>
<th>3</th>
<th>meta-metadata</th>
<th>Container element</th>
<th></th>
</tr>
</thead>
</table>
| 3.3 | metadata schema | Metadata schema indicates the name and version of the specification used to create the metadata. | All Healthcare LOM conforming documents must indicate conformance with LOM and Healthcare LOM. Use LOMv1.0 and HEALTHCARE_LOMv1.  
Example:  
```xml
<metadataSchema>
    LOMv1.0
</metadataSchema>
<metadataSchema>
    HEALTHCARE_LOMv1
</metadataSchema>
```

<p>| 4   | technical | Container element                                                        |                                                                                                                                                                                                     |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>location</td>
<td>The location (URL) of the learning resource.</td>
<td>Example: <a href="http://www.aafp.org/diabetestreatment/">http://www.aafp.org/diabetestreatment/</a></td>
</tr>
<tr>
<td>5</td>
<td>educational</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>learning resource type</td>
<td>Describes what type of learning resource is being described.</td>
<td>Healthcare LOM adds to the LOM vocabulary for this element. See Healthcare Learning Object Metadata Specifications Document for more information.</td>
</tr>
<tr>
<td>6</td>
<td>rights</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>copyright and other</td>
<td>This element indicates whether or not copyright restrictions exist.</td>
<td>The value yes is recommended as a default unless the resource is within the public domain. In that case, this value should be no.</td>
</tr>
<tr>
<td></td>
<td>restrictions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>description</td>
<td>A description of any copyright restrictions or additional information related to copyright. Inclusion of copyright date and copyright holder contact information is recommended.</td>
<td>Enter copyright information in this element. E.g., if your resource uses a Creative Commons License, indicate which type of license and include a link to more information. “This work is licensed under a Creative Commons Attribution-Noncommercial-ShareAlike License. Some Rights Reserved. To view a copy of this license, visit: <a href="http://creativecommons.org/licenses/by-nc-sa/2.0/.%E2%80%9D">http://creativecommons.org/licenses/by-nc-sa/2.0/.”</a> E.g., a specific copyright date or range of dates may be given here as “©2000-2005 Regents of the University of California, the University of Utah, and the University of Oklahoma. All rights reserved.” E.g., contact information for the copyright holder of the resource may be included as “U.S. and international copyright laws protect this digital image. Commercial use or distribution of the image is not permitted without prior permission of the copyright holder. Please contact the Spencer S. Eccles Health Sciences Library Intellectual Property Division via e-mail (<a href="mailto:rights@lib.med.utah.edu">rights@lib.med.utah.edu</a>) for permission to use the image.” E.g., for resources in the public domain inclusion of an explanation is recommended, such as “No Restrictions. You are free to copy, distribute, display, and perform this work, and derivative works based upon it, without restriction or attribution, in any way for any purpose” or “<a href="http://creativecommons.org/licenses/publicdomain.%E2%80%9D">http://creativecommons.org/licenses/publicdomain.”</a></td>
</tr>
</tbody>
</table>

©MedBiquitous Consortium, 2009
5. Special Requirements

5.1 Additional Metadata for In-person Activities
The following recommendations supplement the Core Healthcare LOM recommendations for face to face activities that may be catalogued.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.5</td>
<td>activityLocation</td>
<td>Container element</td>
<td>Indicate the city, state, and country if this catalogue will be accessed internationally. Additional address, room, and building information may be added in the appropriate elements if necessary.</td>
</tr>
<tr>
<td>10.1.5.4</td>
<td>City</td>
<td>The city where the activity occurs.</td>
<td></td>
</tr>
<tr>
<td>10.1.5.5</td>
<td>StateOrProvince</td>
<td>The state or province where the activity occurs.</td>
<td></td>
</tr>
<tr>
<td>10.1.5.9</td>
<td>Country</td>
<td>The country where the activity occurs.</td>
<td></td>
</tr>
<tr>
<td>10.1.6</td>
<td>startDateTime</td>
<td>The data and time the activity begins.</td>
<td></td>
</tr>
<tr>
<td>10.1.7</td>
<td>endDateTime</td>
<td>The date and time the activity ends.</td>
<td></td>
</tr>
<tr>
<td>10.1.18</td>
<td>contact</td>
<td>The person or organization that serves as the main point of contact for questions about the activity.</td>
<td>Indicate the name, email address, and telephone number for the person that will answer questions regarding the in person activity.</td>
</tr>
</tbody>
</table>

5.2 Metadata for Digital Resources
The following recommendations supplement the Core Healthcare LOM recommendations for digital resources and activities that may be catalogued.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>technical</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>location</td>
<td>The location (URL) of the learning resource.</td>
<td>Example: <a href="http://www.aafp.org/diabetestreatment">http://www.aafp.org/diabetestreatment</a></td>
</tr>
</tbody>
</table>

5.3 Metadata for Patient and Caregiver Education
The following recommendations supplement the Core Healthcare LOM recommendations for patient and caregiver education.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>context</td>
<td>The principle learning environment for which this resource is intended.</td>
<td>Use patient education or caregiver education as the value for this element.</td>
</tr>
<tr>
<td>10</td>
<td>healthcare metadata</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>healthcare education</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Element</td>
<td>Description</td>
<td>Guidance</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10.1.4</td>
<td>target audience</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1.4.1</td>
<td>audience category</td>
<td>The intended audience for the learning resource.</td>
<td>Use general, patient, or caregiver depending on the audience for the learning resource.</td>
</tr>
<tr>
<td>10.1.4.4</td>
<td>reading level</td>
<td>The primary/secondary school grade reflecting the reading level of the target audience.</td>
<td>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>
</tr>
</tbody>
</table>

### 5.4 Metadata for Undergraduate Professional Education Resources

The following recommendations supplement the Core Healthcare LOM recommendations for undergraduate professional education in medicine, nursing, pharmacy, and other health professions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>context</td>
<td>The principle learning environment for which this resource is intended.</td>
<td>Use undergraduate professional education as the value for this element.</td>
</tr>
<tr>
<td>9</td>
<td>classification</td>
<td>Container element</td>
<td>See section Tying Educational Resources to a Competency Framework for information on tying learning resources to a framework of competencies or learning outcomes.</td>
</tr>
</tbody>
</table>

### 5.5 Metadata for Graduate Professional Education Resources

The following recommendations supplement the Core Healthcare LOM recommendations for graduate professional education in medicine, nursing, pharmacy, and other health professions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>context</td>
<td>The principle learning environment for which this resource is intended.</td>
<td>Use graduate professional education as the value for this element.</td>
</tr>
<tr>
<td>9</td>
<td>classification</td>
<td>Container element</td>
<td>See section Tying Educational Resources to a Competency Framework for information on tying learning resources to a framework of competencies or learning outcomes.</td>
</tr>
<tr>
<td>10</td>
<td>healthcare metadata</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>healthcare education</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1.4</td>
<td>target audience</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1.4.2</td>
<td>profession</td>
<td>The health profession for which this learning resource is intended.</td>
<td>See the list of health professions in Healthcare LOM Specifications Document, Appendix 2: Health Professions and Specialties. A value from this list is recommended.</td>
</tr>
</tbody>
</table>
### 5.6 Metadata for Continuing Professional Development Resources and Activities

The following recommendations supplement the Core Healthcare LOM recommendations for continuing professional development in medicine, nursing, pharmacy, and other health professions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>context</td>
<td>The principle learning environment for which this resource is intended.</td>
<td>Use continuing professional development as the value for this element.</td>
</tr>
<tr>
<td>9</td>
<td>classification</td>
<td>Container element</td>
<td>See section Tying Educational Resources to a Competency Framework for information on tying learning resources to a framework of competencies or learning outcomes.</td>
</tr>
<tr>
<td>10</td>
<td>healthcare metadata</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1</td>
<td>healthcare education</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1.1</td>
<td>expiration date</td>
<td>The date after which the activity or resource is no longer valid.</td>
<td></td>
</tr>
<tr>
<td>10.1.3</td>
<td>credits</td>
<td>Container element</td>
<td>Repeat the credits element if there are multiple types of CE credit that may be awarded for this activity.</td>
</tr>
<tr>
<td>10.1.3.1</td>
<td>accrediting body</td>
<td>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.</td>
<td>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, RCPath, and IACET.</td>
</tr>
<tr>
<td>No.</td>
<td>Element</td>
<td>Description</td>
<td>Guidance</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>10.1.3.2</td>
<td>activity certification</td>
<td>Identifies the category of credit awarded for the activity by the accredited medical education organization. Recommended values are: 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></td>
</tr>
<tr>
<td>10.1.3.3</td>
<td>credit type</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></td>
</tr>
<tr>
<td>10.1.3.4</td>
<td>credit unit</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></td>
</tr>
<tr>
<td>10.1.3.10</td>
<td>number of credits</td>
<td>numberOfCredits identifies the number of continuing education credits associated with this learning activity.</td>
<td></td>
</tr>
<tr>
<td>10.1.4</td>
<td>target audience</td>
<td>Container element</td>
<td></td>
</tr>
<tr>
<td>10.1.4.2</td>
<td>profession</td>
<td>The health profession for which this learning resource is intended.</td>
<td>See the list of health professions in Healthcare LOM Specifications Document, Appendix 2: Health Professions and Specialties. A value from this list is recommended.</td>
</tr>
<tr>
<td>10.1.4.3</td>
<td>specialty</td>
<td>The healthcare specialty within a profession for which this learning resource is intended.</td>
<td>See the list of specialties in Healthcare LOM Specifications Document, Appendix 2: Health Professions and Specialties. A value from this list is recommended.</td>
</tr>
<tr>
<td>10.1.12</td>
<td>off label use</td>
<td>Indicates whether or not the resource references off label drug use.</td>
<td></td>
</tr>
<tr>
<td>10.1.13</td>
<td>off label description</td>
<td>Describes any off label drug use referenced.</td>
<td>Only use this element if the off label use element has a value of yes.</td>
</tr>
</tbody>
</table>
### No. | Element | Description | Guidance
--- | --- | --- | ---
10.1.14 | commercial support | Indicates the existence of any commercial support. | 
10.1.15 | commercial support acknowledgement | Describes the commercial support provided. | Only use this element if the commercial support element has a value of yes. 
10.1.16 | relevant financial relationship | 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. | 
10.1.17 | relevant financial relationship disclosure | 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. | Only use this element if the relevant financial relationship element has a value of yes.

### 5.7 Tying Educational Resources to a Competency or Learning Outcomes Framework

Many organizations are developing formal descriptions of the competencies necessary for healthcare professionals and the learning outcomes expected of learners. These outcomes and competencies may serve as a framework for healthcare education to better integrate educational resources with other parts of the health professions curriculum, including self-assessment, and to ensure that an educational program is effectively teaching to required competencies or outcomes. Specifically, many educators are leveraging the Accreditation Council for Graduate Medical Education’s (ACGME) list of competencies and the Scottish Doctor list of learning outcomes.

The recommendations below supplement the Core Healthcare LOM recommendations for Instructional Content to better tie educational content to a framework of competencies or learning outcomes using metadata. Other mechanisms of typing content to competencies are also being researched.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>classification</td>
<td>Container element.</td>
<td></td>
</tr>
</tbody>
</table>
9.1 | purpose | Defines the purpose of classifying the learning resource. | Use learning outcome or competency to indicate the purpose of this learning resource. The classification element may be repeated to indicate multiple competencies or learning outcomes. |
9.2 | taxon path | Container element. This indicates a hierarchical set of terms within the classification system. | 
9.2.1 | source | The name of the classification system. | For learning resources, indicate the name of the competency or learning outcomes set. For example, ACGME Core Competencies or The Scottish Doctor. |
<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.2.2</td>
<td>taxon</td>
<td>A particular term within the taxonomy.</td>
<td>Indicate the competency or learning outcome in the taxon. For ACGME</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>competencies, this might be professionalism. For The Scottish Doctor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>learning outcomes, this might be health promotion and disease prevention.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Multiple taxons may be indicated to show a hierarchy of learning outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or competencies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If multiple competency/learning outcome paths must be identified (such</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>as clinical skills and professionalism), repeat the classification</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>element. Each instance of the classification element should describe one</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>competency/learning outcome path.</td>
</tr>
<tr>
<td>9.3</td>
<td>description</td>
<td>A description of the learning resource or activity relevant to the stated classification purpose.</td>
<td>Do not use the description element if you are tying educational resources to a formal competency framework.</td>
</tr>
</tbody>
</table>

6. References


7. Appendix: Sample Metadata

7.1 Sample Core Metadata for Instructional Content and Activities

```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://ns.medbiq.org/lom/extend/v1/
     xhtml:stylesheet="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.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>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>author</value>
    </role>
    <entity>BEGIN:VCARD
      FN:John Doe
      END:VCARD</entity>
    <date>
      <dateTime>2005-10-15</dateTime>
    </date>
  </contribute>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>publisher</value>
    </role>
    <entity>BEGIN:VCARD
      FN:Centers for Disease Control and Prevention
      END:VCARD</entity>
    <date>
      <dateTime>2005-10-30</dateTime>
    </date>
  </contribute>
</lifeCycle>
<metaMetadata>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>SCORM_CAM_v1.3</metadataSchema>
  <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
</metaMetadata>
<technical>
  <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>
<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>
  <purpose>
    <source>LOMv1.0</source>
    <value>educational objective</value>
  </purpose>
  <description>
    <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>

<taxonPath>
  <source>
    <string language="en">ACGME Core Competencies</string>
  </source>
  <taxon>
    <id>b</id>
  </taxon>
7.2 Sample Core Metadata for Images and Assets

<?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.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
FN:Anystate Medical SchoolEND:VCARD</entity>
<date>
<dateTime>2005-12-12</dateTime>
</date>
</contribute>
</lifeCycle>
</lom>
7.3 Sample Metadata for an In-person Activity

<?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>AAFP</catalog>
<entry>CA123454321</entry>
</identifier>
<title>
<string language="en">Family Centered Maternity Care</string>
</title>
</lom>
<title>en</title>
<language>en</language>
<description>
  <string language="en">State-of-the-art, evidence-based education in the knowledge, training and skills of caring for patients and their families during pregnancy and the birth process</string>
</description>
<keyword hx:source="MeSH" hx:id="D011295">
  <string language="en">prenatal care</string>
</keyword>
<keyword hx:source="MeSH" hx:id="D036801">
  <string language="en">parturition</string>
</keyword>
<general>
<lifeCycle>
<contribute>
  <role>
    <source>LOMv1.0</source>
    <value>author</value>
  </role>
  </entity>BEGIN:VCARD\nFN:John DoeEND:VCARD
<date>
  <dateTime>2005-10-15</dateTime>
</date>
</contribute>
<contribute>
  <role>
    <source>LOMv1.0</source>
    <value>publisher</value>
  </role>
  <entity>BEGIN:VCARD\nFN:American Academy of Family PhysiciansEND:VCARD
<date>
  <dateTime>2005-10-30</dateTime>
</date>
</contribute>
</lifeCycle>
<metaMetadata>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
</metaMetadata>
<educational>
  <context>
    <source>HEALTHCARE_LOMv1</source>
    <value>continuing professional development</value>
  </context>
</educational>
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>yes</value>
  </cost>
</rights>
Copyright 2006, The American Academy of Family Physicians. All rights reserved.

Discuss the role of the family physician in providing continuity of care during pregnancy and birth.

ACGME Core Competencies

Medical Knowledge
7.4 Sample Metadata for Patient and Caregiver Education

```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.cholesterollowdown.org/</entry>
    </identifier>
    <title>
      <string language="en">The Cholesterol Low Down</string>
    </title>
    <language>en</language>
    <description>
      <string language="en">A step-by-step process that can help you achieve and maintain your target cholesterol levels.</string>
    </description>
    <keyword hx:source="MeSH" hx:id="D002784">
      <string language="en">cholesterol</string>
    </keyword>
  </general>
  <lifeCycle>
    <contribute>
      <role>
        <source>LOMv1.0</source>
        <value>author</value>
      </role>
      <entity>BEGIN:VCARD\nFN:John DoeEND:VCARD</entity>
      <date>
        <dateTime>2006-08-15</dateTime>
      </date>
    </contribute>
    <contribute>
      <role>
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        <value>publisher</value>
      </role>
      <entity>BEGIN:VCARD\nFN:American Heart AssociationEND:VCARD</entity>
      <date>
        <dateTime>2006-08-15</dateTime>
      </date>
    </contribute>
  </lifeCycle>
  <metaMetadata>
    <metadataSchema>LOMv1.0</metadataSchema>
    <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
  </metaMetadata>
</lom>
```
<metaMetadata>
  <technical>
    <location>http://www.cholesterollowdown.org/</location>
  </technical>
  <educational>
    <context>
      <source>HEALTHCARE_LOMv1</source>
      <value>patient education</value>
    </context>
  </educational>
  <rights>
    <cost>
      <source>LOMv1.0</source>
      <value>no</value>
    </cost>
    <copyrightAndOtherRestrictions>
      <source>LOMv1.0</source>
      <value>yes</value>
    </copyrightAndOtherRestrictions>
    <description>
      <string language="en">Copyright 2006, The American Heart Association. All rights reserved.</string>
    </description>
  </rights>
  <classification>
    <purpose>
      <source>LOMv1.0</source>
      <value>educational objective</value>
    </purpose>
    <description>
      <string language="en">Identify the steps and barriers to lowering cholesterol.</string>
    </description>
  </classification>
  <hx:healthcareMetadata>
    <hx:healthcareEducation>
      <hx:targetAudience>
        <hx:audienceCategory>patient</hx:audienceCategory>
        <hx:readingLevel>
          <string language="en">grade 7</string>
        </hx:readingLevel>
      </hx:targetAudience>
      <hx:participationModality>technology based</hx:participationModality>
    </hx:healthcareEducation>
  </hx:healthcareMetadata>
</lom>
7.5 Sample Metadata for Undergraduate Professional Resources

```xml
<?xml version="1.0" encoding="UTF-8"?>
<lom xmlns="http://ltsc.ieee.org/xsd/LOM"
xmns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmns:hx="http://ns.medbiq.org/lom/extend/v1/"
xsi:schemaLocation="http://ltsc.ieee.org/xsd/LOM healthcarelom.xsd">
    <general>
        <identifier>
            <catalog>MedEdPortal ID</catalog>
            <entry>295</entry>
        </identifier>
        <title>
            <string language="en">A woman with newly diagnosed Crohn's disease</string>
        </title>
        <language>en</language>
        <description>
            <string language="en">A 26 year-old Mexican female with Crohn's disease, Osteoporosis, Osteopenia.</string>
        </description>
        <keyword hx:source="MeSH" hx:id="D003424">
            <string language="en">Crohn disease</string>
        </keyword>
        <keyword hx:source="MeSH" hx:id="D010024">
            <string language="en">Osteoporosis</string>
        </keyword>
        <keyword hx:source="MeSH" hx:id="D001851">
            <string language="en">Bone diseases, metabolic</string>
        </keyword>
    </general>
    <lifeCycle>
        <contribute>
            <role>
                <source>LOMv1.0</source>
                <value>author</value>
            </role>
            <entity>BEGIN:VCARD
                FN:John Doe
                END:VCARD</entity>
            <date>
                <dateTime>2006-05-30</dateTime>
            </date>
        </contribute>
        <contribute>
            <role>
                <source>LOMv1.0</source>
                <value>publisher</value>
            </role>
            <entity>BEGIN:VCARD
                FN:University of Pittsburgh
                END:VCARD</entity>
            <date>
                <dateTime>2006-05-30</dateTime>
            </date>
        </contribute>
    </lifeCycle>
</lom>
```
<contribute>
</contribute>
</lifeCycle>
<metaMetadata>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
</metaMetadata>
<technical>
  <location>http://girounds.pitt.edu/34_viewModule.asp</location>
</technical>
<educational>
  <context>
    <source>HEALTHCARE_LOMv1</source>
    <value>undergraduate professional education</value>
  </context>
</educational>
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>no</value>
  </cost>
  <copyrightAndOtherRestrictions>
    <source>LOMv1.0</source>
    <value>yes</value>
  </copyrightAndOtherRestrictions>
  <description>
    <string language="en">This work is licensed under a Creative Commons Attribution-Noncommercial-ShareAlike License. Some Rights Reserved. To view a copy of this license, visit: http://creativecommons.org/licenses/by-nc-sa/2.0/.</string>
  </description>
</rights>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>competency</value>
  </purpose>
  <taxonPath>
    <source>
      <string language="en">ACGME Core Competencies</string>
    </source>
    <taxon>
      <id>a</id>
      <entry>
        <string language="en">Patient Care</string>
      </entry>
    </taxon>
  </taxonPath>
</classification>
<value>competency</value>
</purpose>
<taxonPath>
  <source>
    <string language="en">ACGME Core Competencies</string>
  </source>
  <taxon>
    <id>b</id>
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      <string language="en">Medical Knowledge</string>
    </entry>
  </taxon>
</taxonPath>
</classification>
<hx:healthcareMetadata>
  <hx:healthcareEducation>
    <hx:participationModality>technology based</hx:participationModality>
  </hx:healthcareEducation>
</hx:healthcareMetadata>
</lom>

7.6 Sample Metadata for Graduate Professional Education Resources

<?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>RSVP</catalog>
      <entry>205</entry>
    </identifier>
    <title>
      <string language="en">Patient Confidentiality and Informed Consent</string>
    </title>
    <language>en</language>
    <description>
      <string language="en">A Web-Based System of Instruction and Self-Evaluation in Patient Confidentiality and Informed Consent</string>
    </description>
    <keyword hx:source="MeSH" hx:id="D003219">
      <string language="en">confidentiality</string>
    </keyword>
    <keyword hx:source="MeSH" hx:id="D007258">
      <string language="en">informed consent</string>
    </keyword>
  </general>
</lom>
<general/>
<lifeCycle>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>author</value>
    </role>
    <entity>BEGIN:VCARD\nFN:John Doe END:VCARD</entity>
    <date>
      <dateTime>2006-06-30</dateTime>
    </date>
  </contribute>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>publisher</value>
    </role>
    <entity>BEGIN:VCARD\nFN:University of Virginia END:VCARD</entity>
    <date>
      <dateTime>2006-06-30</dateTime>
    </date>
  </contribute>
</lifeCycle>
<metaMetadata>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>SCORM_CAM_v1.3</metadataSchema>
  <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
</metaMetadata>
<technical>
  <location>www.med.virginia.edu/med-ed/rad</location>
</technical>
<educational>
  <context>
    <source>HEALTHCARE_LOMv1</source>
    <value>graduate professional education</value>
  </context>
</educational>
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>no</value>
  </cost>
  <copyrightAndOtherRestrictions>
    <source>LOMv1.0</source>
    <value>yes</value>
  </copyrightAndOtherRestrictions>
  <description>
    <string language="en">Copyright University of Virginia, 2006. All rights reserved.</string>
  </description>
</rights>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>competency</value>
  </purpose>
  <taxonPath>
    <source>
      <string language="en">ACGME Core Competencies</string>
    </source>
    <taxon>
      <id>e</id>
      <entry>
        <string language="en">Professionalism</string>
      </entry>
    </taxon>
  </taxonPath>
</classification>

<hx:healthcareMetadata>
  <hx:healthcareEducation>
    <hx:targetAudience>
      <hx:profession>
        <string language="en">physician</string>
      </hx:profession>
      <hx:specialty>
        <string language="en">radiology-diagnostic</string>
      </hx:specialty>
    </hx:targetAudience>
    <hx:participationModality>technology based</hx:participationModality>
  </hx:healthcareEducation>
</hx:healthcareMetadata>
</lom>

### 7.7 Sample Metadata for Continuing Professional Development Activities

```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>

<string language="en">arsenic</string>
</keyword>
<string language="en">environmental medicine</string>
</keyword>
</general>
</lifeCycle>

<contribute>
<role>
<source>LOMv1.0</source>
<value>author</value>
</role>
<entity>BEGIN:VCARD
FN:John DoeEND:VCARD</entity>
<date>
<dateTime>2005-10-30</dateTime>
</date>
</contribute>

<contribute>
<role>
<source>LOMv1.0</source>
<value>publisher</value>
</role>
<entity>BEGIN:VCARD
FN:Centers for Disease Control and PreventionEND:VCARD</entity>
<date>
<dateTime>2005-10-30</dateTime>
</date>
</contribute>
</lifeCycle>

<metadatadescription>
<metadataschema>LOMv1.0</metadataschema>
<metadataschema>SCORM_CAM_v1.3</metadataschema>
<metadataschema>HEALTHCARE_LOMv1</metadataschema>
</metadatadescription>

<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>
</rights>
Discuss the major exposure route for arsenic

Describe two potential environmental and occupational sources of arsenic exposure

Identify evaluation and treatment protocols for persons exposed to arsenic

ACGME Core Competencies

Medical Knowledge
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata

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<th>Version: 1.0</th>
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