



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

Version 1.0

**October 1, 2009
MedBiquitous Learning Objects Working Group**

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

Revision History

Date	Version	Description	Author
7 September 2005	0.1	Initial version	Valerie Smothers valerie.smothers@medbiq.org
17 July 2006	0.2	Modified to incorporate describing learning activities	Valerie Smothers valerie.smothers@medbiq.org
1 September 2006	0.3	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.	Valerie Smothers valerie.smothers@medbiq.org Shona Dippie sdippie@lib.med.utah.edu
10 May 2008	0.4	Updated guidelines to reflect current specification.	Valerie Smothers valerie.smothers@medbiq.org
1 October 2009	1.0	Corrected examples to include hx prefix for keyword attributes.	Valerie Smothers Valerie.smothers@medbiq.org

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

MedBiquitous Consortium XML Public License and Terms of Use

MedBiquitous XML (including schemas, specifications, sample documents, Web services description files, and related items) is provided by the copyright holders under the following license. By obtaining, using, and or copying this work, you (the licensee) agree that you have read, understood, and will comply with the following terms and conditions.

The Consortium hereby grants a perpetual, non-exclusive, non-transferable, license to copy, use, display, perform, modify, make derivative works of, and develop the MedBiquitous XML for any use and without any fee or royalty, provided that you include the following on ALL copies of the MedBiquitous XML or portions thereof, including modifications, that you make.

1. Any pre-existing intellectual property disclaimers, notices, or terms and conditions. If none exist, the following notice should be used: "Copyright © [date of XML release] MedBiquitous Consortium. All Rights Reserved. <http://www.medbiq.org>"
2. Notice of any changes or modification to the MedBiquitous XML files.
3. Notice that any user is bound by the terms of this license and reference to the full text of this license in a location viewable to users of the redistributed or derivative work.

In the event that the licensee modifies any part of the MedBiquitous XML, it will not then represent to the public, through any act or omission, that the resulting modification is an official specification of the MedBiquitous Consortium unless and until such modification is officially adopted.

THE CONSORTIUM MAKES NO WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, WITH RESPECT TO ANY COMPUTER CODE, INCLUDING SCHEMAS, SPECIFICATIONS, SAMPLE DOCUMENTS, WEB SERVICES DESCRIPTION FILES, AND RELATED ITEMS. WITHOUT LIMITING THE FOREGOING, THE CONSORTIUM DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY, EXPRESS OR IMPLIED, AGAINST INFRINGEMENT BY THE MEDBIQUITOUS XML OF ANY THIRD PARTY PATENTS, TRADEMARKS, COPYRIGHTS OR OTHER RIGHTS. THE LICENSEE AGREES THAT ALL COMPUTER CODES OR RELATED ITEMS PROVIDED SHALL BE ACCEPTED BY LICENSEE "AS IS". THUS, THE ENTIRE RISK OF NON-PERFORMANCE OF THE MEDBIQUITOUS XML RESTS WITH THE LICENSEE WHO SHALL BEAR ALL COSTS OF ANY SERVICE, REPAIR OR CORRECTION.

IN NO EVENT SHALL THE CONSORTIUM OR ITS MEMBERS BE LIABLE TO THE LICENSEE OR ANY OTHER USER FOR DAMAGES OF ANY NATURE, INCLUDING, WITHOUT LIMITATION, ANY GENERAL, DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING LOST PROFITS, ARISING OUT OF ANY USE OF MEDBIQUITOUS XML.

LICENSEE SHALL INDEMNIFY THE CONSORTIUM AND EACH OF ITS MEMBERS FROM ANY LOSS, CLAIM, DAMAGE OR LIABILITY (INCLUDING, WITHOUT LIMITATION, PAYMENT OF ATTORNEYS' FEES AND COURT COSTS) ARISING OUT OF MODIFICATION OR USE OF THE MEDBIQUITOUS XML OR ANY RELATED CONTENT OR MATERIAL BY LICENSEE.

LICENSEE SHALL NOT OBTAIN OR ATTEMPT TO OBTAIN ANY PATENTS, COPYRIGHTS OR OTHER PROPRIETARY RIGHTS WITH RESPECT TO THE MEDBIQUITOUS XML.

THIS LICENSE SHALL TERMINATE AUTOMATICALLY IF LICENSEE VIOLATES ANY OF ITS TERMS AND CONDITIONS.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

Table of Contents

MedBiquitous Consortium XML Public License and Terms of Use	3
1. Acknowledgements	5
2. Introduction	6
3. Core Healthcare LOM Recommendations for Instructional Content and Activities	7
4. Core Healthcare LOM Recommendations for Images and Assets	10
5. Special Requirements	13
5.1 Additional Metadata for In-person Activities	13
5.2 Metadata for Digital Resources	13
5.3 Metadata for Patient and Caregiver Education	13
5.4 Metadata for Undergraduate Professional Education Resources	14
5.5 Metadata for Graduate Professional Education Resources	14
5.6 Metadata for Continuing Professional Development Resources and Activities	15
5.7 Tying Educational Resources to a Competency or Learning Outcomes Framework	17
6. References	18
7. Appendix: Sample Metadata	18
7.1 Sample Core Metadata for Instructional Content and Activities	18
7.2 Sample Core Metadata for Images and Assets	21
7.3 Sample Metadata for an In-person Activity	22
7.4 Sample Metadata for Patient and Caregiver Education	25
7.5 Sample Metadata for Undergraduate Professional Resources	27
7.6 Sample Metadata for Graduate Professional Education Resources	29
7.7 Sample Metadata for Continuing Professional Development Activities	31

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

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
- 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, MD, 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

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

- 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

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.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

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.

No.	Element	Description	Guidance
-	lom	Container element	
1	general	Container element	
1.1	identifier	Container element	
1.1.1	catalog	The cataloguing scheme for the unique identifier for this learning resource.	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.
1.1.2	entry	The unique identifier for this learning resource.	The recommended value is a URI unless your organization uses Digital Object Identifiers (DOIs) or other persistent unique identifiers. Example: http://www.aamc.org/lo/12345678
1.2	title	The name of the learning resource.	
1.3	language	The human language used by the learning resource.	
1.4	description	A short description of the learning resource.	
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 <i>source</i> and <i>id</i> attributes for keyword to specify the medical vocabulary and unique concept/term identifier of the term. For example: <pre><keyword hx:source = "MeSH" hx:id = "D009203"> <string language = "en"> myocardial infarction </string> </keyword></pre>
2	lifecycle	Container element	
2.3	contribute	Container element	

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
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.
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: <entity>BEGIN:VCARD\nFN:John DoeEND: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.
3	meta-metadata	Container element	
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: <metadataSchema> LOMv1.0 </metadataSchema> <metadataSchema> HEALTHCARE_LOMv1 </metadataSchema>
5	educational	Container element	
5.6	context	The principle learning environment for which this resource is intended.	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.
6	rights	Container element	
6.2	copyright and other restrictions	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.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
6.3	description	A description of any copyright restrictions or additional information related to copyright. Inclusion of copyright date and copyright holder contact information is recommended.	<p>Enter copyright information in this element.</p> <p>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: http://creativecommons.org/licenses/by-nc-sa/2.0/.”</p> <p>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.”</p> <p>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 (rights@lib.med.utah.edu) for permission to use the image.”</p> <p>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 “http://creativecommons.org/licenses/publicdomain/.”</p>
9	classification	Container element	
9.1	purpose	Defines the purpose of classifying the learning resource. For example, resources may be classified by educational objective, learning outcome, or competency.	<p>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.</p> <p>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.</p>
9.3	description	A description of the learning resource or activity relevant to the stated classification purpose.	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.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
10	healthcareMetadata	Container element	
10.1	healthcareEducation	Container element	
10.1.9	participationModality	Defines the learner's mode of participation, dictated by the activity medium. Valid values include conference/workshop, technology based, on the job, print.	<p>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.</p> <p>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.</p>

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.

No.	Element	Description	Guidance
-	lom	Container element	
1	general	Container element	
1.1	identifier	Container element	
1.1.1	catalog	The cataloguing scheme for the unique identifier for this learning resource.	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.
1.1.2	entry	The unique identifier for this learning resource.	<p>The recommended value is a URI unless your organization uses Digital Object Identifiers (DOIs) or other persistent unique identifiers.</p> <p>Example: http://www.aamc.org/lo/12345678</p>
1.2	title	The name of the learning resource.	
1.4	description	A short description of the learning resource.	

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
1.5	keyword	A word or phrase describing the subject or overall category of the learning resource.	<p>Using MeSH terms for keywords is recommended; if the topic requires further description, UMLS, SNOMED, or another medical vocabulary may be used.</p> <p>Use the Healthcare LOM <i>source</i> and <i>id</i> attributes for keyword to specify the medical vocabulary and unique concept/term identifier of the term.</p> <p>For example:</p> <pre><keyword hx:source = "MeSH" hx:id = "D009203"> <string language = "en"> myocardial infarction </string> </keyword></pre>
2	lifecycle	Container element	
2.3	contribute	Container element	
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.
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: <pre><entity>BEGIN:VCARD\nFN:John DoeEND:VCARD</entity></pre>
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.
3	meta-metadata	Container element	
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: <pre><metadataSchema> LOMv1.0 </metadataSchema> <metadataSchema> HEALTHCARE_LOMv1 </metadataSchema></pre>
4	technical	Container element	

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
4.3	location	The location (URL) of the learning resource.	Example: http://www.aafp.org/diabetestreatment/
5	educational	Container element	
5.2	learning resource type	Describes what type of learning resource is being described.	Healthcare LOM adds to the LOM vocabulary for this element. See <i>Healthcare Learning Object Metadata Specifications Document</i> for more information.
6	rights	Container element	
6.2	copyright and other restrictions	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.
6.3	description	A description of any copyright restrictions or additional information related to copyright. Inclusion of copyright date and copyright holder contact information is recommended.	<p>Enter copyright information in this element.</p> <p>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: http://creativecommons.org/licenses/by-nc-sa/2.0/.”</p> <p>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.”</p> <p>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 (rights@lib.med.utah.edu) for permission to use the image.”</p> <p>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 “http://creativecommons.org/licenses/publicdomain/.”</p>

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 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.

No.	Element	Description	Guidance
10.1.5	activityLocation	Container element	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.
10.1.5.4	City	The city where the activity occurs.	
10.1.5.5	StateOrProvince	The state or province where the activity occurs.	
10.1.5.9	Country	The country where the activity occurs.	
10.1.6	startDateTime	The data and time the activity begins.	
10.1.7	endDateTime	The date and time the activity ends.	
10.1.18	contact	The person or organization that serves as the main point of contact for questions about the activity.	Indicate the name, email address, and telephone number for the person that will answer questions regarding the in person activity.

5.2 Metadata for Digital Resources

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

No.	Element	Description	Guidance
4	technical	Container element	
4.3	location	The location (URL) of the learning resource.	Example: http://www.aafp.org/diabetestreatment

5.3 Metadata for Patient and Caregiver Education

The following recommendations supplement the Core Healthcare LOM recommendations for patient and caregiver education.

No.	Element	Description	Guidance
5.6	context	The principle learning environment for which this resource is intended.	Use patient education or caregiver education as the value for this element.
10	healthcare metadata	Container element	
10.1	healthcare education	Container element	

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
10.1.4	target audience	Container element	
10.1.4.1	audience category	The intended audience for the learning resource.	Use general, patient, or caregiver depending on the audience for the learning resource.
10.1.4.4	reading level	The primary/secondary school grade reflecting the reading level of the target audience.	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.

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.

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

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.

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

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
10.1.4.3	specialty	The healthcare specialty within a profession for which this learning resource is intended.	See the list of specialties in <i>Healthcare LOM Specifications Document</i> , Appendix 2: Health Professions and Specialties. A value from this list is recommended.

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.

No.	Element	Description	Guidance
5.6	context	The principle learning environment for which this resource is intended.	Use continuing professional development as the value for this element.
9	classification	Container element	See section Tying Educational Resources to a Competency Framework for information on tying learning resources to a framework of competencies or learning outcomes.
10	healthcare metadata	Container element	
10.1	healthcare education	Container element	
10.1.1	expiration date	The date after which the activity or resource is no longer valid.	
10.1.3	credits	Container element	Repeat the credits element if there are multiple types of CE credit that may be awarded for this activity.
10.1.3.1	accrediting body	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, RCPATH, and IACET.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
10.1.3.2	activity certification	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.	
10.1.3.3	credit type	Indicates which type of credit is awarded for this educational activity. Valid values are CME, CE, CNE, CPE, and CHES, CPD.	
10.1.3.4	credit unit	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.	
10.1.3.10	number of credits	numberOfCredits identifies the number of continuing education credits associated with this learning activity.	
10.1.4	target audience	Container element	
10.1.4.2	profession	The health profession for which this learning resource is intended.	See the list of health professions in <i>Healthcare LOM Specifications Document</i> , Appendix 2: Health Professions and Specialties. A value from this list is recommended.
10.1.4.3	specialty	The healthcare specialty within a profession for which this learning resource is intended.	See the list of specialties in <i>Healthcare LOM Specifications Document</i> , Appendix 2: Health Professions and Specialties. A value from this list is recommended.
10.1.12	off label use	Indicates whether or not the resource references off label drug use.	
10.1.13	off label description	Describes any off label drug use referenced.	Only use this element if the off label use element has a value of yes.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

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 tying content to competencies are also being researched.

No.	Element	Description	Guidance
9	classification	Container element	
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.

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

No.	Element	Description	Guidance
9.2.2	taxon	A particular term within the taxonomy.	<p>Indicate the competency or learning outcome in the taxon. For ACGME competencies, this might be professionalism. For The Scottish Doctor learning outcomes, this might be health promotion and disease prevention.</p> <p>Multiple taxons may be indicated to show a hierarchy of learning outcomes or competencies.</p> <p>If multiple competency/learning outcome paths must be identified (such as clinical skills and professionalism), repeat the classification element. Each instance of the classification element should describe one competency/learning outcome path.</p>
9.3	description	A description of the learning resource or activity relevant to the stated classification purpose.	Do not use the description element if you are tying educational resources to a formal competency framework.

6. References

Healthcare Learning Object Metadata Specifications and Descriptions Document, April 14, 2006. Available at: http://medbiq.org/working_groups/learning_objects/HealthcareLOMSpecification.pdf

Institute of Electrical and Electronics Engineers (IEEE) XML Binding for Learning Object Metadata , standard 1484.12.3, <http://ieeeltsc.org/wg12LOM/1484.12.3/>

7. Appendix: Sample Metadata

7.1 Sample Core Metadata for Instructional Content and Activities

```
<?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>
```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

    <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\nFN:John DoeEND:VCARD</entity>
    <date>
      <dateTime>2005-10-15</dateTime>
    </date>
  </contribute>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>publisher</value>
    </role>
    <entity>BEGIN:VCARD\nFN:Centers for Disease Control and
PreventionEND: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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

<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>
  <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>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>competency</value>
  </purpose>
  <taxonPath>
    <source>
      <string language="en">ACGME Core Competencies</string>
    </source>
    <taxon>
      <id>b</id>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

        <entry>
          <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>

```

7.2 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\nFN:Anystate Medical SchoolEND:VCARD</entity>
      <date>
        <dateTime>2005-12-12</dateTime>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

    </date>
  </contribute>
</lifeCycle>
<metaMetadata>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>HEALTHCARE_LOMv1</metadataSchema>
</metaMetadata>
<technical>
<location>http://www.medicalschool.edu/images/dialysisdrainage.jpg
</location>
</technical>
<educational>
  <learningResourceType>
    <source>HEALTHCARE_LOMv1</source>
    <value>image</value>
  </learningResourceType>
</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>
</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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

</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</entity>
    <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</entity>
    <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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

</cost>
<copyrightAndOtherRestrictions>
  <source>LOMv1.0</source>
  <value>yes</value>
</copyrightAndOtherRestrictions>
<description>
  <string language="en">Copyright 2006, The American Academy of Family
Physicians. All rights reserved.</string>
</description>
</rights>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>educational objective</value>
  </purpose>
  <description>
    <string language="en">Discuss the role of the family physician in
providing continuity of care during pregnancy and birth.</string>
  </description>
</classification>
<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:activityLocation>
      <a:City>Monterey</a:City>
      <a:StateOrProvince>California</a:StateOrProvince>
    </hx:activityLocation>
    <hx:startDateTime>2008-06-10T09:00:00</hx:startDateTime>
    <hx:endDateTime>2008-06-10T12:00:00</hx:endDateTime>
    <hx:participationModality>conference/workshop</hx:participationModality>
    <hx:contact>John Doe, jdoe@cdc.gov</hx:contact>
  </hx:healthcareEducation>
</hx:healthcareMetadata>
</lom>

```


MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

7.4 Sample Metadata for Patient and Caregiver Education

```
<?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.cholesterolldown.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>
        <source>LOMv1.0</source>
        <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>
```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

</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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

7.5 Sample Metadata for Undergraduate Professional 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>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\nFN:John DoeEND:VCARD</entity>
      <date>
        <dateTime>2006-05-30</dateTime>
      </date>
    </contribute>
    <contribute>
      <role>
        <source>LOMv1.0</source>
        <value>publisher</value>
      </role>
      <entity>BEGIN:VCARD\nFN:University of PittsburghEND:VCARD</entity>
      <date>
        <dateTime>2006-05-30</dateTime>
      </date>
    </contribute>
  </lifeCycle>
</lom>
```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

    </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>
<classification>
  <purpose>
    <source>LOMv1.0</source>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

        <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: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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

</general>
<lifeCycle>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>author</value>
    </role>
    <entity>BEGIN:VCARD\nFN:John DoeEND: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 VirginiaEND: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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

<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 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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

    <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\nFN: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\nFN:Centers for Disease Control and
PreventionEND: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>
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>no</value>
  </cost>

```


MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

    </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>
    <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>
  <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>

```

MedBiquitous	Version: 1.0
Guidelines for Describing Educational Resources and Activities Using Healthcare Learning Object Metadata	Date: 1 October 2009

```

    </taxonPath>
  </classification>
  <hx:healthcareMetadata>
    <hx:healthcareEducation>
      <hx:expirationDate>2006-10-30</hx:expirationDate>
      <hx:credits>
        <hx:accreditingBody>ACCME</hx:accreditingBody>
        <hx:activityCertification>AMA PRA category
1</hx:activityCertification>
        <hx:creditType>CME</hx:creditType>
        <hx:creditUnit>Credits</hx:creditUnit>
        <hx:numberOfCredits>1.5</hx:numberOfCredits>
      </hx:credits>
      <hx:credits>
        <hx:accreditingBody>ANCC</hx:accreditingBody>
        <hx:creditType>CNE</hx:creditType>
        <hx:creditUnit>Contact Hours</hx:creditUnit>
        <hx:numberOfCredits>1.7</hx:numberOfCredits>
      </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:targetAudience>
      <hx:participationModality>technology
based</hx:participationModality>
      <hx:offLabelUse>no</hx:offLabelUse>
      <hx:commercialSupport>no</hx:commercialSupport>
      <hx:relevantFinancialRelationship>no</hx:relevantFinancialRelationship>
      <hx:contact>John Doe, jdoe@cdc.gov</hx:contact>
    </hx:healthcareEducation>
  </hx:healthcareMetadata>
</lom>

```