



Standard Specification for Clinical XML DTDs in Healthcare¹

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1. Scope

1.1 This specification defines an electronic representation that includes the varying information required for broad exchange in health care both today and in the future. eXtensible Markup Language (XML) is a convergence of data processing, communication, and publishing technology. XML is a platform, vendor, and application independent technology for describing document content and structure in tags or elements. The names of the tags and the rules for using them are contained in the Document Type Definition (DTD). The DTD describes the structure of the document and defines the names of tags it contains. Additionally the DTD declares the order in which the tags occur and how often the tags can appear; that is, the DTD defines the hierarchy of the tags. A DTD for a prescription might contain structural elements for the medication prescribed <medication>, the dosage <dosage>, the form <form>, the quantity <quantity>, and so forth. This specification is in the form of a set of standard XML DTDs that match the electronic document requirements in the health care industry.

1.2 This specification refers to and makes use of recommendations from the World Wide Web consortium, the W3C (<http://www.w3.org>).

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

E1239 [Practice for Description of Reservation/Registration-Admission, Discharge, Transfer \(R-ADT\) Systems for Electronic Health Record \(EHR\) Systems](#)²

E1384 [Practice for Content and Structure of the Electronic Health Record \(EHR\)](#)²

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² *Annual Book of ASTM Standards*, Vol 14.01.

E1633 [Specification for Coded Values Used in the Electronic Health Record](#)²

E2183 [Guide for XML DTD Design, Architecture and Implementation](#)

2.2 *W3C World Wide Web Consortium Recommendations*, (<http://www.w3.org>)

XML 1.0 Recommendation, <http://www.w3.org/TR/REC-xml>

XHTML Basic Recommendation, <http://www.w3.org/TR/xhtml-basic>

XML Linking (Xlink) 1.0 Recommendation, <http://www.w3.org/TR/xlink>

XML Namespaces Recommendation, <http://www.w3.org/TR/REC-xml-names>

XPointer, <http://www.w3.org/TR/xptr>

XSLT, <http://www.w3.org/TR/xslt>

2.3 *HL7 Standards*, (<http://www.HL7.org>)

Informative Document: Using XML as an Alternative Message Syntax for HL7 Version 2.3.x

[Clinical Document Architecture: Level 1](#)

2.4 *IETF Specifications*, (<http://www.ietf.org>)

[RFC 2396](#): Uniform Resource Identifiers (URI), <http://ietf.org/rfc/rfc2396>

3. Terminology

3.1 Definitions:

3.1.1 *clinical document, n*—defined in terms of the native XML architecture. The Document Type Definition (DTD) is the base method of defining the structure of a clinical document. XML schema languages such as the W3C XML Schema Language and the OASIS RELAXNG Schema language provide alternative methods of defining clinical document structures.

3.1.2 *document type definition (DTD), n*—the formal definition of the elements, structures, and rules for enabling platform independent data access via XML or for marking up a given type of SGML document.

3.1.3 *extensible markup language (XML), n*—a standard from the World Wide Web Consortium (W3C) that provides for tagging of information content within documents, offering a means for representation of content in a format which is both human and machine readable. Through the use of customizable style sheets and schemas, information can be represented in a

uniform way, allowing for interchange of both content (data) and format (metadata).

3.1.4 *Health Level 7 (HL7)*, *n*—a standards organization traditionally focused on message-oriented standards for health-care. HL7 messages are the dominant standard for peer-to-peer exchange of clinical, text-based information. HL7 has recently introduced a document-oriented standard, the *Clinical Document Architecture*.

3.1.5 *HL7 clinical document architecture (CDA)*, *n*—the HL7 CDA is a document markup standard for the structure and semantics of exchanged clinical documents. A clinical document is a documentation of observations and other services with the following characteristics: Persistence, Stewardship, Potential for Authentication, Wholeness, and Human Readability. A clinical document is a defined and complete information object that can exist outside of a message, and can include text, sounds, and other multimedia content.

3.1.6 *hypertext markup language (HTML)*, *n*—the language used in creating a web page. Its origin is an implementation of SGML DTD, but whose most recent update is defined in XML (XHTML). It provides tags regarding the way a document should be displayed in the text of an HTML document, which act as commands that a browser interprets when downloading an HTML file.

3.1.7 *namespaces*, *n*—a simple method for qualifying element and attribute names used in XML documents. This method is accomplished by associating a particular tag set by associating a prefix with a URI reference. XML Namespaces provides a mechanism for authoring compound documents (documents consisting of elements and attributes from multiple DTDs or schemas) in such a way that will provide global identification without collisions of names that are the same but are used differently.

3.1.8 *parser*, *n*—a specialized software program that recognizes markup in a document and differentiates the content from the markup. A parser that reads a DTD and checks and reports on markup errors is a validating XML parser. A parser can be built into an XML editor to prevent incorrect tagging and to check whether a document contains all the required elements.

3.1.9 *schema*, *n*—defines the elements that can appear within the document and the attributes that can be associated with an element. It also defines the structure of the document: which elements are child elements of others, the sequence in which the child elements can appear, and the number of child elements. It defines whether an element is empty or can include text. The schema can also define default values for attributes. Schema is a W3C term for the next generation of DTDs.

3.1.10 *stylesheet*, *n*—the XSL Transformations (XSLT) describes a vocabulary recognized by an XSLT processor to transform information from an organization in the source file into a different organization suitable for continued downstream processing. The Extensible Stylesheet Language (XSL) describes a vocabulary recognized by a rendering agent to reify abstract expressions of format into a particular medium of presentation.

3.1.11 *URI*—identifies a Web resource according to IETF RFC 2396. Used in practice to form links between, to name and to locate web documents. Also used to name XML namespaces.

3.1.12 *valid XML document*, *n*—well-formed with internal or DOCTYPE reference to element definition of tags within the document.

3.1.13 *World Wide Web Consortium, (W3C)*, *n*—develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential as a forum for information, commerce, communication, and collective understanding.

3.1.14 *well-formed XML document*, *n*—a XML document that conforms to the syntax as specified by the W3C XML 1.0 recommendation.

3.1.15 *XHTML*, *n*—HTML documents that are well formed and can be processed by an XML parser.

3.1.16 *XLINK*—the W3C XML Linking Language defines a method for specifying links between documents and parts of documents using URIs. Links may be simple, representing a 1:1 mapping or extended, representing an *N:N* mapping.

3.1.17 *XPointer*, *n*—the XML Pointer Language, defines how individual parts of a document are addressed. XLinks point to a URI (in practice, a URL) that specifies a particular resource. The URL may include an XPointer part that more specifically identifies the desired part or section of the targeted resource or document. XPointer, the XML Pointer Language, defines an addressing scheme for individual parts of an XML document. XLinks point to a URI (in practice, a URL) that specifies a particular resource. The URI may include an XPointer part that more specifically identifies the desired part or element of the targeted resource or document. XPointers use the same XPath syntax familiar to XSL transformations to identify the parts of the document they point to, along with a few additional pieces.

4. Scope

4.1 *Clinical XML DTDs*—This specification defines standard XML DTDs (see [Annex A1](#)) for:

- 4.1.1 Admission Notes,
- 4.1.2 Discharge Summaries,
- 4.1.3 History and Physical Examinations,
- 4.1.4 Operative Reports,
- 4.1.5 Pathology Reports,
- 4.1.6 Radiology Reports, and
- 4.1.7 Radiation Therapy Summaries.

5. Significance and Use

5.1 *Conformance*—A document is tested for conformance to this specification by a validating XML parser according to the W3C XML 1.0 recommendation, <http://www.w3.org/TR/2000/REC-xml-20001006>. A conformant document must validate without either well-formedness or validity errors according to XML 1.0. A conformant document must also conform to constraints expressed within the prose of this specification; however, this specification does not express a formal means of testing conformance to such additional constraints. A document must validate according to one of the DTDs specified in this specification in order to conform to this specification.

6. Procedure

6.1 Clinical Document Structure—The architecture of the clinical document is described in a companion ASTM standard, Guide [E2183](#). Each clinical document has a header and a body. The structure of the clinical header is the same across the clinical DTDs defined in this specification. The structure of the clinical body is unique to each document type. The clinical header format is defined in “clinical.header.dtd.” Elements of the clinical body may contain content or serve as XLinks to external content. Additionally, the DTDs may make use of namespaces to resolve conflicts with other XML standards and XHTML tags.

6.2 Content—The DTDs define templates for clinical content. Clinical content may take the form of character data or elements from the XHTML Basic 1.0 DTD. For interoperability with XHTML Basic and possible future content vocabularies, these DTDs have defined namespaces though the elements are not prefixed. Although the DTDs provide namespace defaulting, for interoperability with non-validating parsers (which need not default attribute values present in an external DTD), namespace declarations must be explicitly declared in the document element. XHTML Basic elements must always be namespace qualified in the XHTML Namespace (<http://www.w3.org/1999/xhtml>).

6.3 History and Physical Module—The Admission Note, Discharge Summary, History, and Physical DTDs are modularized. They allow flexibility in the document structure containing character data, XHTML, or more highly structured data. When allowing for either character data or elements as content, an XML DTD may not constrain child element order. In many cases, clinical documents have a natural order, which should be followed. For example, a physical examination is usually documents roughly from head to toe, in that order. In many cases, the structures are widespread, such as the vasculature, and the order may be arbitrary, but in other cases the order is natural. For example, the chest is documented before the abdomen. Such constraints are not expressible in XML DTDs but may be expressed in schemata. Later versions of this specification may contain such schemata. This version of DTDs is designed for pediatric applications.

6.4 Operative Report, Pathology Report, Radiology Report, Radiation Therapy Summary—These specialty reports are structured according to common practice.

7. Precision and Bias

7.1 Architecture—Precision to the DTD architecture is determined by XML validating parsers and conformance to this specification.

7.2 Testing—The DTDs have been tested against several validators. An online XML document validator produced by the Brown University Scholarly Technology Group (STG) is available at the URL: <http://www.stg.brown.edu/service/xmlvalid/>. Other online validators include:

7.2.1 Language Technology Group at University of Edinburgh: <http://www.ltg.ed.ac.uk/~richard/xml-check.html>.

7.2.2 The W3C web validator: <http://validator.w3.org>.

7.3 Facilitation of Validation—In order to facilitate such online testing, the DTDs and sample documents have been placed in the directory <http://www.openhealth.org/ASTM/>; for example, `operative.report.example.xml`. This directory will contain links software demonstrating use of the E2182 DTDs and Schemata as they are developed.

7.4 XML Tools—There is a good deal of inconsistency in parsing and validating against the W3C XHTML Basic 1.0 recommendation. In particular, XML Authority 2.0 reports many warnings as errors (for example, undefined elements). Many warnings are generated from the XHTML Basic DTDs, for example, regarding DTD defaulted namespace declarations. These are correctly warnings, not errors, and do not affect document validity.

7.5 XML Browsers—Furthermore, Microsoft’s IE5 frequently hangs when attempting to parse XML files with external DTD subsets. The solution is to remove the declaration when browsing XML files using IE5 and use the MSXML as a non-validating parser. For this reason, compliant documents must not depend on DTD attribute defaulting and must explicitly include attribute values for #FIXED attributes.

8. Keywords

8.1 architecture; DTD; health care; healthcare; namespaces; XHTML; XLink; XML; XPointer

ANNEXES

(Mandatory Information)

A1. CLINICAL DTDs

A1.1 Clinical Header

```
<!--
PUBLIC "-//ASTM//DTD Clinical Header 1.0//EN"
SYSTEM "http://www.openhealth.org/ASTM/clinical.header.dtd
This DTD defines an ASTM E2182 Clinical Document Header,
this DTD is included by the Base ASTM DTD.
-->

<ENTITY % NS.prefixed "IGNORE">
<ENTITY % CH.prefixed "%NS.prefixed;">
```

```

<!ENTITY % astm-xlink.mod
  PUBLIC "-//ASTM//ENTITIES XLink 1.0//EN"
  "astm-xlink.mod">
%astm-xlink.mod;
<!ENTITY % ch.namespace.uri "'http://www.openhealth.org/
ASTM/clinical.header'">
<!ENTITY % ch "ch">

<![ %CH.prefixed; [
<!ENTITY % ch.prefix "%ch;:">
<!ENTITY % ch.namespace.attrib "
xmlns:%ch; CDATA #FIXED 'http://www.openhealth.org/ASTM/
clinical.header'
">
]]>

<!ENTITY % ch.prefix " ">
<!ENTITY % ch.namespace.attrib "
xmlns CDATA #FIXED 'http://www.openhealth.org/ASTM/
clinical.header'
">

<!ENTITY % ch.attrib "
  ID ID #IMPLIED
  confidentiality IDREF #IMPLIED
  note CDATA #IMPLIED
  xml:lang NMTOKEN #IMPLIED
">
<!--<!ENTITY % ch.xmlns.attrib.name "xmlns:%ch;"-->
<!ENTITY % ch-qname.mod
  PUBLIC "-//ASTM//ENTITIES Clinical Header QName Module
  1.0//EN"
  "clinical.header-qname-1.mod">
%ch-qname.mod;

<!ENTITY % ch.person.type
"%person.name.qname;,(%id.qname;)*,(%addr.qname;)*">
<!ENTITY % ch.organization.type
"(%organization.name.qname;)?,(%id.qname;)*,(%addr.qname;)*">
<!ENTITY % ch.actor.type
"%ch.person.type;,(%type.code.qname;)?,(%date.time.qname;)">
<!ENTITY % ch.authenticator.type
"%ch.actor.type;,(%signature.qname;)">

<!ENTITY % ch.datetime.model "(#PCDATA)">
<!ENTITY % coded.value.model "(#PCDATA)">
<!ENTITY % coded.value.attrib.list "
  code.system NMTOKEN #IMPLIED
  code.system.name CDATA #IMPLIED
  version NMTOKEN #IMPLIED
">

<!ENTITY % clinical.header.model "(
  (%id.qname;)*,
  (%version.number.qname;)?,
  (%confidentiality.code.qname;)*,
  (%patient.encounter.qname;)?,
  (%authenticator.qname;)*,
  (%legal.authenticator.qname;)*,
  (%intended.recipient.qname;)*,
  (%originator.qname;)?,
  (%originating.organization.qname;)?,
  (%transcriptionist.qname;)?,
  (%provider.qname;)+,
  (%service.actor.qname;)*,
  %patient.qname;,
  (%events.qname;)?,
  (%codes.qname;)?,
  (%related.document.qname;)*
)">

<!ENTITY % text.model "(#PCDATA)">
<!ENTITY % id.attrs "%ch.attrib;
  root CDATA #IMPLIED
  authority CDATA #IMPLIED
  type CDATA #IMPLIED
  valid.time CDATA #IMPLIED ">

```

```

<!ENTITY % patient.encounter.model "(
(%id.qname)?,
(%practice.setting.qname)?,
(%date.time.qname)?,
(%location.qname)?
)">
<!ENTITY % patient.encounter.attrib "%ch.attrib;">
<!ENTITY % service.actor.model "(
(%person.name.qname;!%organization.name.qname),
(%id.qname)*,
(%addr.qname)*,
(%type.code.qname)?,
(%function.qname)?,
(%date.time.qname)? )">
<!ENTITY % provider.model
"(%ch.actor.type;,(%function.qname)?
)">
<!ENTITY % service.target.model "(%ch.actor.type;,
(%birth.date.qname)?,
(%gender.qname)?
)">
<!ENTITY % events.model "("%event.qname;)">
<!ENTITY % event.model
"(%event.name.qname;%date.time.qname;,(%staff.qname)?,(%comments.qname;?))">
<!ENTITY % person.name.model "(
%family.qname;l
%given.qname;l
%middle.qname;l
%prefix.qname;l
%suffix.qname;l
%delimiter.qname;
)*
">
<!ENTITY % addr.model "(
%country.qname;l
%city.qname;l
%state.qname;l
%street.qname;l
%zip.qname;l
%house.number.qname;l
%direction.qname;l
%post.office.box.qname;l
%telephone.qname;l
%uri.qname;l
%delimiter.qname;
)*"
>

<!ELEMENT %clinical.header.qname; %clinical.header.model;>
<!-- clinical.header.qname;
%ch.attrib;
%ch.namespace.attrib;
-->
<!-- id -->
<!-- id.qname; %text.model;>
<!-- id.qname; %id.attribs; %xlink.attrib;>
<!-- version.number.qname; %text.model;>
<!-- version.number.qname; %ch.attrib;>

<!-- confidentiality.code.qname;
%coded.value.model;>
<!-- confidentiality.code.qname; %ch.attrib;
%coded.value.attrib.list;>
<!-- patient.encounter.qname;
%patient.encounter.model;>
<!-- patient.encounter.qname;
%patient.encounter.attrib;>
<!-- service.actors -->
<!-- authenticator.qname; (%ch.authenticator.type;)>
<!-- authenticator.qname; %ch.attrib;>
<!-- legal.authenticator.qname;
(%ch.authenticator.type;)>
<!-- legal.authenticator.qname; %ch.attrib;>
<!-- originator.qname; (%ch.actor.type;)>
<!-- originator.qname; %ch.attrib;>
<!-- intended.recipient.qname; (%ch.actor.type;)>
<!-- intended.recipient.qname; %ch.attrib;>
<!-- transcriptionist.qname; (%ch.actor.type;)>

```

```

<!ATTLIST %transcriptionist.qname; %ch.attrib;>
<!ELEMENT %provider.qname; %provider.model;>
<!ATTLIST %provider.qname; %ch.attrib;>
<!ELEMENT %service.actor.qname; %service.actor.model;>
<!ATTLIST %service.actor.qname; %ch.attrib; %xlink.attrib;>
<!-- service targets -->
<!ELEMENT %patient.qname; %service.target.model;>
<!ATTLIST %patient.qname; %ch.attrib; %xlink.attrib;>
<!ELEMENT %events.qname; %events.model;>
<!ATTLIST %events.qname; %ch.attrib;>
<!ELEMENT %codes.qname; (%coded.value.qname;)*>
<!ATTLIST %codes.qname; %ch.attrib;>
<!ELEMENT %related.document.qname; ANY>
<!ATTLIST %related.document.qname; %xlink.simple.attrib;>
<!ELEMENT %practice.setting.qname; %text.model;>
<!ATTLIST %practice.setting.qname; %ch.attrib;>
<!ELEMENT %date.time.qname; %ch.datetime.model;>
<!ATTLIST %date.time.qname; %ch.attrib;>
<!ELEMENT %location.qname; %text.model;>
<!ATTLIST %location.qname; %ch.attrib;>

<!ELEMENT %event.qname; %event.model;>
<!ATTLIST %event.qname; %ch.attrib;>
<!ELEMENT %event.name.qname; %text.model;>
<!ATTLIST %event.name.qname; %ch.attrib;>
<!ELEMENT %staff.qname; (%ch.person.type;)>
<!ATTLIST %staff.qname; %ch.attrib;>
<!ELEMENT %comments.qname; %text.model;>
<!ATTLIST %comments.qname; %ch.attrib;>
<!--
    person.name
-->
<!ELEMENT %person.name.qname; %person.name.model;>
<!ATTLIST %person.name.qname; %ch.attrib; type CDATA
#IMPLIED>
<!ELEMENT %family.qname; %text.model;>
<!ATTLIST %family.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %given.qname; %text.model;>
<!ATTLIST %given.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %middle.qname; %text.model;>
<!ATTLIST %middle.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %prefix.qname; %text.model;>
<!ATTLIST %prefix.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %suffix.qname; %text.model;>
<!ATTLIST %suffix.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %delimiter.qname; %text.model;>
<!ATTLIST %delimiter.qname; %ch.attrib; type CDATA
#IMPLIED>
<!--
    organization
-->
<!ELEMENT %organization.name.qname; %text.model;>
<!ATTLIST %organization.name.qname; %ch.attrib;>
<!--
    addr
-->
<!ELEMENT %addr.qname; %addr.model;>
<!ATTLIST %addr.qname; %ch.attrib; type CDATA #IMPLIED>
<!--
    elements required for addr
-->
<!ELEMENT %country.qname; %text.model;>
<!ATTLIST %country.qname; %ch.attrib; type CDATA
#IMPLIED>
<!ELEMENT %city.qname; %text.model;>
<!ATTLIST %city.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %state.qname; %text.model;>
<!ATTLIST %state.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %zip.qname; %text.model;>
<!ATTLIST %zip.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %street.qname; %text.model;>
<!ATTLIST %street.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %house.number.qname; %text.model;>
<!ATTLIST %house.number.qname; %ch.attrib; type CDATA
#IMPLIED>
<!ELEMENT %direction.qname; %text.model;>
<!ATTLIST %direction.qname; %ch.attrib; type CDATA
#IMPLIED>

```

```

<!ELEMENT %address.locator.qname; %text.model;>
<!ATTLIST %address.locator.qname; %ch.attrib; type CDATA
#IMPLIED>
<!ELEMENT %post.office.box.qname; %text.model;>
<!ATTLIST %post.office.box.qname; %ch.attrib; type CDATA
#IMPLIED>
<!--
  allows <uri type="email">jonathan@openhealth.org</uri>
        <uri type="homepage">http://www.openhealth.org</uri>

  alternatively
        <uri type="home">mailto:jonathan@openhealth.org</uri>
        <uri type="work">mailto:jborden@lifespan.org</uri>
-->
<!ELEMENT %uri.qname; %text.model;>
<!ATTLIST %uri.qname; %ch.attrib; type CDATA #IMPLIED>
<!ELEMENT %telephone.qname; %text.model;>
<!ATTLIST %telephone.qname; %ch.attrib; type CDATA
#IMPLIED>

<!ELEMENT %coded.value.qname; %coded.value.model;>
<!ATTLIST %coded.value.qname; %ch.attrib;
%coded.value.attrib.list; %xlink.attrib;>

<!ELEMENT %signature.qname; %coded.value.model;>
<!ATTLIST %signature.qname; %ch.attrib;
%coded.value.attrib.list;>

<!ELEMENT %type.code.qname; %coded.value.model;>
<!ATTLIST %type.code.qname; %ch.attrib;
%coded.value.attrib.list; %xlink.attrib;>
<!ELEMENT %function.qname; %coded.value.model;>
<!ATTLIST %function.qname; %ch.attrib;
%coded.value.attrib.list; %xlink.attrib;>

<!ELEMENT %birth.date.qname; %ch.datetime.model;>
<!ATTLIST %birth.date.qname; %ch.attrib;>
<!ELEMENT %gender.qname; %text.model;>
<!ATTLIST %gender.qname; %ch.attrib;>

<!ELEMENT %originating.organization.qname;
(%ch.organization.type);>
<!ATTLIST %originating.organization.qname; %ch.attrib;>

```

A1.2 Clinical Header Qname Module

```

<!--
  PUBLIC "-//ASTM//DTD ASTM XHTML Clinical Header Qname
  Module 1.0/EN" SYSTEM "http://www.openhealth.org/ASTM/
  clinical.header.qname.mod"
-->
<!ENTITY % clinical.header.qname "%ch.prefix;clinical.header">
<!ENTITY % id.qname "%ch.prefix;id">
<!ENTITY % version.number.qname "%ch.prefix;version.number">
<!ENTITY % confidentiality.code.qname
"%ch.prefix;confidentiality.code">
<!ENTITY % patient.encounter.qname
"%ch.prefix;patient.encounter">
<!ENTITY % authenticator.qname "%ch.prefix;authenticator">
<!ENTITY % legal.authenticator.qname
"%ch.prefix;legal.authenticator">
<!ENTITY % intended.recipient.qname
"%ch.prefix;intended.recipient">
<!ENTITY % originator.qname "%ch.prefix;originator">
<!ENTITY % originating.organization.qname
"%ch.prefix;originating.organization">
<!ENTITY % transcriptionist.qname "%ch.prefix;transcriptionist">
<!ENTITY % provider.qname "%ch.prefix;provider">
<!ENTITY % service.actor.qname "%ch.prefix;service.actor">
<!ENTITY % patient.qname "%ch.prefix;patient">
<!ENTITY % events.qname "%ch.prefix;events">
<!ENTITY % codes.qname "%ch.prefix;codes">
<!ENTITY % related.document.qname
"%ch.prefix;related.document">
<!ENTITY % date.time.qname "%ch.prefix;date.time">
<!ENTITY % event.qname "%ch.prefix;event">

```

```

<!ENTITY % event.name.qname "%ch.prefix;event.name">
<!ENTITY % staff.qname "%ch.prefix;staff">
<!ENTITY % comments.qname "%ch.prefix;comments">
<!ENTITY % related.document.qname
"%ch.prefix;related.document">
<!ENTITY % person.name.qname "%ch.prefix;person.name">
<!ENTITY % given.qname "%ch.prefix;given">
<!ENTITY % middle.qname "%ch.prefix;middle">
<!ENTITY % prefix.qname "%ch.prefix;prefix">
<!ENTITY % suffix.qname "%ch.prefix;suffix">
<!ENTITY % delimiter.qname "%ch.prefix;delimiter">
<!ENTITY % family.qname "%ch.prefix;family">
<!ENTITY % organization.name.qname
"%ch.prefix;organization.name">
<!ENTITY % addr.qname "%ch.prefix;addr">
<!ENTITY % country.qname "%ch.prefix;country">
<!ENTITY % city.qname "%ch.prefix;city">
<!ENTITY % state.qname "%ch.prefix;state">
<!ENTITY % street.qname "%ch.prefix;street">
<!ENTITY % zip.qname "%ch.prefix;zip">
<!ENTITY % house.number.qname "%ch.prefix;house.number">
<!ENTITY % post.office.box.qname "%ch.prefix;post.office.box">
<!ENTITY % direction.qname "%ch.prefix;direction">
<!ENTITY % telephone.qname "%ch.prefix;telephone">
<!ENTITY % uri.qname "%ch.prefix;uri">
<!ENTITY % address.locator.qname "%ch.prefix;address.locator">
<!ENTITY % coded.value.qname "%ch.prefix;coded.value">
<!ENTITY % practice.setting.qname "%ch.prefix;practice.setting">
<!ENTITY % location.qname "%ch.prefix;location">
<!ENTITY % type.code.qname "%ch.prefix;type.code">
<!ENTITY % signature.qname "%ch.prefix;signature">
<!ENTITY % function.qname "%ch.prefix;function">
<!ENTITY % birth.date.qname "%ch.prefix;birth.date">
<!ENTITY % gender.qname "%ch.prefix;gender">

<!ENTITY % xlink.type.qname "%XLINK.prefix;type">
<!ENTITY % xlink.arccrole.qname "%XLINK.prefix;arccrole">
<!ENTITY % xlink.href.qname "%XLINK.prefix;href">

```

A1.3 Admission Discharge Module

```

<!--
  This module includes element and content definitions for
  general history and physical exam related documents.

  %astm.content defaults to (#PCDATA | %Flow.mix;)* and is a
  candidate for addition of extended coded vocabularies.
  Modules which include this module can override content models
  on an element by element basis by defining
  <!ENTITY % xxx.model "...">

  PUBLIC "-//ASTM//DTD Admission/Discharge Summary Module
  1.0//EN"
  SYSTEM "http://www.openhealth.org/ASTM/
  admission.discharge.module.dtd"
-->
<!-- summary of situation at admission
  admitting diagnosis (by admitting physician)
  chief complaint (by patient or relatives)
  reason for admission (by referring physician)
  summary of history
    history of present illness
    past history
    family history
    social history
  summary of physical examination
  summary of lab data
  known allergies

-->
<!ENTITY % NS.prefix "IGNORE">
<!ENTITY % ADS.prefix "%NS.prefix;">

<!ENTITY % ASTM.base.module PUBLIC "-//ASTM//DTD E2182
Base 1.0//EN"
"ASTM.E2182.dtd">

```

```

<!ENTITY % astm.physical.examination.module PUBLIC "-//ASTM/DTD
Physical Examination Module 1.0//EN"
"physical.examination.module.dtd">
<!ENTITY % astm.history.module PUBLIC "-//ASTM/DTD History
Module 1.0//EN"
"history.module.dtd">
<!ENTITY % ads.namespace.uri
"http://www.openhealth.org/ASTM/admission.discharge.summary">

%ASTM.base.module;

<!ENTITY % astm.content "(#PCDATA)">

<!ENTITY % ads "ads">

<![ %ADS.prefixed; [
<!ENTITY % ads.prefix "%ads;:">
<!ENTITY % ADS.xmlns.attrib "xmlns:ads CDATA #FIXED
'http://www.openhealth.org/ASTM/
admission.discharge.summary'">
]]>

<!ENTITY % ADS.xmlns.attrib "xmlns CDATA #FIXED
'http://www.openhealth.org/ASTM/
admission.discharge.summary'">

<!ENTITY % ads.prefix "">
<!ENTITY % ads.xmlns.attrib.name "xmlns:%ads;">

<!ENTITY % admission.note.qname
"%ads.prefix;admission.note">
<!ENTITY % discharge.summary.qname
"%ads.prefix;discharge.summary">
<!ENTITY % history.and.physical.examination.qname
"%ads.prefix;history.and.physical.examination">
<!ENTITY % clinical.body.qname "%ads.prefix;clinical.body">

<!ENTITY % admission.qname "%ads.prefix;admission">
<!ENTITY % diagnoses.qname "%ads.prefix;diagnoses">
<!ENTITY % diagnosis.qname "%ads.prefix;diagnosis">
<!ENTITY % chief.complaint.qname "%ads.prefix;chief.complaint">
<!ENTITY % reason.for.admission.qname
"%ads.prefix;reason.for.admission">

<!ENTITY % history.of.present.illness.qname
"%ads.prefix;history.of.present.illness">
<!--
<!ENTITY % history.qname "%ads.prefix;history">

<!ENTITY % past.medical.history.qname
"%ads.prefix;past.medical.history">
<!ENTITY % past.surgical.history.qname
"%ads.prefix;past.surgical.history">
<!ENTITY % family.history.qname "%ads.prefix;family.history">
<!ENTITY % social.history.qname "%ads.prefix;social.history">
<!ENTITY % review.of.systems.qname
"%ads.prefix;review.of.systems">
<!ENTITY % known.allergies.qname
"%ads.prefix;known.allergies">
<!ENTITY % medications.qname "%ads.prefix;medications">
<!ENTITY % medication.qname "%ads.prefix;medication">
<!ENTITY % physical.examination.qname
"%ads.prefix;physical.examination">
-->

<!ENTITY % laboratory.data.qname "%ads.prefix;laboratory.data">
<!ENTITY % diagnostic.studies.qname
"%ads.prefix;diagnostic.studies">

<!-- hospital course
    diagnoses
        main diagnosis
        secondary diagnosis
    operations and procedures
    complications
    consultations
-->

```

```

<!ENTITY % hospital.course.qname
"%ads.prefix;hospital.course">
<!ENTITY % description.qname "%ads.prefix;description">
<!ENTITY % procedures.qname "%ads.prefix;procedures">
<!ENTITY % complications.qname "%ads.prefix;complications">
<!ENTITY % consultations.qname "%ads.prefix;consultations">
<!ENTITY % procedure.qname "%ads.prefix;procedure">
<!ENTITY % complication.qname "%ads.prefix;complication">
<!ENTITY % consultation.qname "%ads.prefix;consultation">
<!--
situation at discharge
    status of patient
    cause of death
    diagnosis at discharge
    medications at discharge
discharge plans
    medication plan
    follow-up activities
instructions to patient and family
    diet and physical activity (restrictions)
    return to work
-->

<!ENTITY % discharge.qname "%ads.prefix;discharge">
<!ENTITY % patient.status.qname "%ads.prefix;patient.status">
<!ENTITY % cause.of.death.qname "%ads.prefix;cause.of.death">
<!ENTITY % discharge.plan.qname "%ads.prefix;discharge.plan">
<!ENTITY % medication.plan.qname
"%ads.prefix;medication.plan">
<!ENTITY % followup.qname "%ads.prefix;followup">
<!ENTITY % restrictions.qname "%ads.prefix;restrictions">
<!ENTITY % return.to.work.qname "%ads.prefix;return.to.work">
<!-- for admission note -->

<!ENTITY % assessment.model "%astm.content;">
<!ENTITY % plan.model "%astm.content;">
<!ENTITY % problem.list.model "(%problem.qname;)*">
<!ENTITY % problem.description.model "%astm.content;">
<!ENTITY % problem.model
"(%problem.description.qname;,(%assessment.qname;)?,(%plan.qname;))?">
<!ENTITY % assessment.and.plan.model "(
#PCDATA | %Flow.mix; |
%assessment.qname; | %plan.qname;
)*">
<!ENTITY % assessment.qname "%ads.prefix;assessment">
<!ENTITY % plan.qname "%ads.prefix;plan">
<!ENTITY % problem.list.qname "%ads.prefix;problem.list">
<!ENTITY % problem.qname "%ads.prefix;problem">
<!ENTITY % problem.description.qname
"%ads.prefix;problem.description">
<!ENTITY % assessment.and.plan.qname
"%ads.prefix;assessment.and.plan">
<!ENTITY % history.and.physical.qname
"%ads.prefix;history.and.physical">

<!-- include physical exam vocabulary -->
%astm.physical.exam.module;
<!-- include history vocabulary -->
%astm.history.module;
<!-- now define models -->
<!ENTITY % history.and.physical.mix "
    %chief.complaint.qname;,
    %history.of.present.illness.qname;,
    %known.allergies.qname;,
    %medications.qname;,
    %history.qname;,
    %physical.examination.qname;,
    (%laboratory.data.qname;)?,
    (%diagnostic.studies.qname;)? " >
<!ENTITY % admission.model "(
    %history.and.physical.mix;,
    %diagnoses.qname;,
    (%reason.for.admission.qname;)?
)">

<!ENTITY % history.and.physical.model
"(%history.and.physical.mix;)">

```

```

<!ENTITY % diagnoses.model "(%diagnosis.qname;)*">
<!ENTITY % diagnosis.model "%astm.content;">
<!ENTITY % chief.complaint.model "(#PCDATA)">
<!ENTITY % reason.for.admission.model "%astm.content;">

<!ENTITY % history.of.present.illness.model "%astm.content;">
<!ENTITY % past.medical.history.model "%astm.content;">
<!ENTITY % past.surgical.history.model "%astm.content;">
<!ENTITY % family.history.model "%astm.content;">
<!ENTITY % social.history.model "%astm.content;">
<!ENTITY % review.of.systems.model "%astm.content;">
<!ENTITY % known.allergies.model "%astm.content;">
<!ENTITY % medications.model "(#PCDATA | %ASTM.Mix; |
%medication.qname; )*">
<!ENTITY % medication.model "%astm.content;">
<!ENTITY % physical.examination.model "%astm.content;">
<!ENTITY % laboratory.data.model "%astm.content;">
<!ENTITY % diagnostic.studies.model "%astm.content;">

<!ENTITY % hospital.course.model "(
%description.qname;,
(%diagnoses.qname;)?,
(%procedures.qname;)?,
(%complications.qname;)?,
(%consultations.qname;)?
)">
<!ENTITY % description.model "%astm.content;">
<!ENTITY % procedures.model "(%procedure.qname;)*">
<!ENTITY % complications.model "(%complication.qname;)*">
<!ENTITY % consultations.model "(%consultation.qname;)*">
<!ENTITY % procedure.model "%astm.content;">
<!ENTITY % complication.model "%astm.content;">
<!ENTITY % consultation.model "%astm.content;">

<!ENTITY % discharge.model "(
(%assessment.and.plan.qname;)?,
(%patient.status.qname;)?,
(%diagnoses.qname;)?,
(%cause.of.death.qname;)?,
(%medications.qname;)?,
(%discharge.plan.qname;)?
)">

<!ENTITY % patient.status.model "%astm.content;">
<!ENTITY % cause.of.death.model "%astm.content;">
<!ENTITY % discharge.plan.model "(
(%description.qname;)?,
(%medication.plan.qname;)?,
(%followup.qname;)?,
(%restrictions.qname;)?,
(%return.to.work.qname;)?
)">

<!ENTITY % medication.plan.model "%astm.content;">
<!ENTITY % followup.model "%astm.content;">
<!ENTITY % restrictions.model "%astm.content;">
<!ENTITY % return.to.work.model "%astm.content;">
<!ENTITY % assessment.model "%astm.content;">
<!ENTITY % plan.model "%astm.content;">
<!ENTITY % problem.list.model "(%problem.qname;)*">
<!ENTITY % problem.description.model "%astm.content;">
<!ENTITY % problem.model
"(%problem.description.qname;,(%diagnosis.qname;)?,(%assessment.qname;),(%plan.qname;))">
<!ENTITY % assessment.and.plan.model "(
#PCDATA | %ASTM.Mix;|
%diagnosis.qname;|
%assessment.qname;|
%plan.qname;|
%problem.qname;)*">

<!ELEMENT %admission.note.qname;
(%clinical.header.qname;,%clinical.body.qname;)>
<ATTLIST %admission.note.qname;
%astm.document.attrib;
%ADS.xmlns.attrib;
>

<!ELEMENT %admission.qname; %admission.model;>

```