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HL7 Implementation Guidance for Unique Object Identifiers, Release 1

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1 INTRODUCTION

The HL7 Clinical Document Architecture Release 2.0 (CDA R2) and HL7 Version 3 messaging specifications are standard formats for the communication of clinical information between healthcare IT systems. These standards based on the HL7 Version 3 (V3) Reference Information Model (RIM) have been promoted for use in the exchange of clinical information across the globe and are required in various national and regional programs.

One of the challenges in using the CDA and V3 messages is in understanding how to obtain and manage values used to label the different identifiers in the Clinical Document or within the V3 message. These values are known as Object Identifiers (OIDs), and are described in further detail in the overview section.

1.1 Purpose

The purpose of this document is to describe how to manage the various values needed to provide global uniqueness for identifiers used for patients, documents, providers and other entities when appearing in clinical documents or messages. This guide may assist organizations to develop an OID maintenance strategy where none already exists. It is not intended to replace existing strategies already in use.

1.2 Audience

The audience for this document includes software developers, implementers, architects and consultants responsible for implementation of Electronic Health Record (EHR) systems, Electronic Medical Record (EMR) systems, Personal Health Record (PHR) systems, dictation/transcription systems, document management applications, and local, regional and national health information exchange networks that create or process CDA documents or HL7 Version 3 Messages.

1.3 Approach

This document approaches the assignment of OIDs to a V3 document or message by first describing how healthcare organizations can acquire an OID that they may use as a root OID. Secondly it describes how that OID can then be used to generate new OIDs which can be used to label the different identifiers used within clinical documents or messages produced by that organization. Although this document primarily focuses on examples drawn from CDA documents, the same approach would also apply to V3 messages.

1.4 Scope

This document is intended for use by small, medium, or large healthcare organizations to provide guidelines for obtaining and using OIDs. It can be applied to any CDA implementation and most, if not all, HL7 Version 3 Message implementations that use the Data Types Release 1 specification.

This document is intended to help organizations develop processes to manage OIDs. When organizational structures change, the processes used to manage these OIDs may also need to change. This document does not describe a transition path between different processes. Organizations should consider possible transition paths when selecting a strategy for managing OIDs.

1.5 Terms used in this Document

Namespace	An identifier describing a context in which things are uniquely identified.
OID	An ISO Object Identifier. A globally unique identifier created using the rules established in the ISO 9834 series of standards
Registration Authority	A managed entity that can assign OIDs to other entities or for specific purposes.

2 EXECUTIVE SUMMARY

An OID is a special type of identifier that is already globally unique. It is used in conjunction with HL7 Version 3 data types in CDA and Version 3 messages to uniquely identify the context in which an identifier appears. OIDs can be constructed from other OIDs and having obtained an OID (e.g., through HL7), you can construct new OIDs of your own, becoming a registration authority.

Having become a registration authority, your organization must devise a way to manage the OIDs that will be used in the creation of HL7 Version 3 messages and documents.

This document:

- Explains how the HL7 II data type is divided into two parts
- Explains how OIDs are used in one part and the identifier in the other.
- Describes what an OID is.
- Tells you where you can obtain an OID.
- Describes how you can create new OIDs from one that has been assigned to you.
- Explains the variety of identifiers that are used in the HL7 CDA standard.
- Provides a scheme for managing OIDs that your organization creates to manage identifiers.

3 OVERVIEW

CDA documents and V3 messages need a wide variety of identifiers to uniquely identify patients, locations, providers, organizations, and other things. These are communicated in an HL7 data type called an Instance Identifier, or II as it is commonly known. An example of this is shown in XML below in Figure 1.

```
<id root='2.16.840.1.113883.19.3.933.2' extension='MRN0009'>
```

Figure 1 Identifier Example

This example shows an identifier with two parts. The part most commonly recognized as the identifier (MRN0009) appears in the `extension` attribute. However, this identifier could readily be used somewhere else to identify the medical record of a different patient, so it needs something extra to identify the context that makes it completely unique. That context is identified by the `root` attribute of the instance identifier.

A namespace uniquely identifies the context for a set of identifiers. Passports, driver's licenses, and credit card numbers are all unique when issued, but only within a given context. The contexts for these would identify the country of citizenship, state of residence, or bank with which a credit agreement is issued. The context is identified by the namespace in which these identifiers appear.

There are two choices for how this namespace can be identified in the `root` attribute. The preferred way is to use what is called an OID, or ISO Object Identifier, which is the focus of this document. An alternative scheme allowed by HL7 but not further described here uses what is known as the Universally Unique Identifier or UUID[1], which is also known as a Globally Unique Identifier of GUID. When the OID (see 3.1 What is an OID below) or UUID defines the namespace, the `extension` is used to store the rest of the identifier.

Implementors need to understand application behaviors with identifiers before assigning namespace identifiers. In some cases, multiple applications share a single namespace. There may be a single database they all use that's responsible for determining the next identifier to assign. In other cases, the same system might have use multiple namespaces for different types orders. Combinations of systems will also have an impact. Each pharmacy, lab and diagnostic imaging system might all have independent namespaces for order identifiers, for example. In some cases systems might have a limited range of identifiers (e.g., a six digit number) that "rolls over". A new OID would need to be assigned when the identifier rolls over.

In the definition of the II data type, the `root` attribute is required to be present and the `extension` is optional. In most cases both the `root` and the `extension` attributes will be present. In some cases, only the `root` attribute may be present. That's because the `root` attribute can be constructed in a way that makes it a globally unique identifier, meaning that no separate component is needed.

[1] A UUID is a string of 128 bits generated through one of several mechanisms. In the `root` attribute of an II it appears as 32 hexadecimal characters punctuated with hyphens like this: 2876086c-126c-41f1-942d-d5965c67e9b9.

```
<id root='2.16.840.1.113883.19.3.933.2.9999'>
```

Figure 2 Identifier Example using only the root attribute

There are also cases where an identifier is known, but the context associated with it cannot be identified. In these cases it is possible to communicate the `extension` alone without the `root` attribute. Since such an identifier is incomplete, it must recorded using a flavor of null as shown in the example below.

```
<id extension="identifer1" nullFlavor='UNK'/>
```

Figure 3 Communicating an identifier with an unknown registration authority

While the `root` attribute has limits on how it is represented, the `extension` attribute is an arbitrary string. The `extension` attribute holds the locally unique portion of the identifier. This part of the identifier is created by a variety of different external systems, and there are few realistic limits that can be placed on this string.

Identifiers are compared by comparing the `root` and `extension` attributes. If one identifier contains an `extension` attribute and the other does not, the identifiers are not the same. If both the `root` and `extension` components are identical (or the `root` attributes are identical and both are missing the `extension` attribute), then the identifiers are the same, and identify the same object.

When the identifiers are different it does not necessarily imply that these are different objects. A person can be identified by their driver's license number, a passport number or many other possible ways. But it's the same person regardless of which identifier you use. This example shows the importance of coordinating which identifiers are used when communicating between different facilities, organizations, regions or countries.

The same object can appear more than once in a document or message. These representations should use the same identifier for each representation, but as stated above, this is not an absolute requirement.

Given how HL7 messages and documents are structured, the objects may appear using different `typeCode` or `classCode` attributes. The `classCode` or `typeCode` attributes in a message or document indicates the RIM class of the object. HL7 standards often constrain values used in a model to a particular set attributes and legal values. This is one reason these values might differ. Because more specialized RIM classes are derived from more general RIM classes, (e.g., the Observation class is derived from the Act class), they may be represented in the message or document using the less specific values, so long as they obey other constraints on identity.

3.1 What is an OID?

An OID is globally unique identifier whose value is created by a registration authority according to the ISO 9834 series of standards. A registration authority is simply some entity that has been awarded the authority to create OIDs. That authority is granted by a preexisting registration authority. The original registration authorities are defined in the ISO standards.

OIDs are used in HL7 documents and messages to add global uniqueness to identifiers used within the document. OIDs are also used to identify the vocabulary terminology systems used in documents and messages. The term OID is short for Object Identifier,

and is specified in clause 28 of the ISO/IEC 8824:1990(E) standard describing the ASN-1 notation. The HL7 Abstract Data Types standard defines an OID data type[2] as being a globally unique string representing an ISO Object Identifier (OID). In practical use, an OID is a unique identifier that has a few simple rules around they how they are created and managed.

HL7 treats OIDs as opaque identifiers. The only meaningful comparison between two OIDs is that of equivalence. If two OIDs match character for character, they are equivalent. No other relationships should be inferred from any similarities, and no internal structure of an OID should ever be relied upon within an application.

Note: OIDs created through application of this guide or any other routine procedure will have an internal structure. This internal structure may tempt users of OIDs to interpret the contents. Avoid the temptation. This structure is merely a consequence of applying a regular mechanism for assigning new numbers.

OIDs are structured in the form of a tree. At each fork in the tree, the branches coming from that fork are labeled with a non-negative integer. The number of branches that can appear at each junction point except the first is unlimited, as is the size of the number used to label any branch. The path through the tree can be "written out" by listing the numbers of the branch that were taken in order, separated by periods. Since there is only one way to write out each label, and only one path to each position in the tree, each OID has a unique string representation.

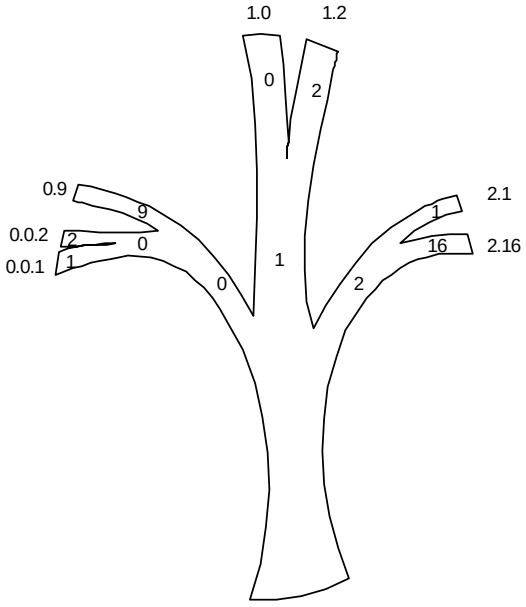


Figure 4 The Tree Structure of OIDs

The path to any position in the tree can easily be recorded as the sequence of branches traversed, in the order followed from the "trunk" of the tree. Each number is separated by a period symbol. This produces the dotted decimal representation as you see in the

[2] The OID data type is separate from the II data type described in the previous section.

example of Figure 1 above[3], and looks like an IP address on steroids. In the diagram above, the path to the left-most branch would be 0.0.1 and 2.16 would represent the path the right-most branch. Each decimal number in the string represents a single branch of the tree. These branches can be owned by a registration authority; usually interpreted in HL7 parlance as an "Assigning Authority." Two OIDs are identical if the strings produced by traversing the branches are identical.

There are some additional details. The ISO standard places some restrictions on the numbers that may be used for the branches at the first fork and who owns them. Symbolic names are also associated with each branch of the tree, but since they aren't used in HL7 communications, they are not discussed in this document.

In order to minimize the potential for misinterpreting what the identifiers mean, a combination of a good OID strategy and an implementation guide facilitates the sharing of information.

While the ISO/IEC specification does not place limits on the length of an OID, or the size of the numbers used in it, there are a few practical limitations. The first of these is the length of the string representing the OID. Billions of healthcare objects in imaging already use OIDs for identification via the DICOM standard. The DICOM standard calls an OID a UID (not to be confused with a UUID or GUID). The DICOM standard requires that OIDs be limited to no more than 64 characters. For most organizations, this is a reasonable limit.

Organizations that have a long root OID may need to be careful implementing the suggested OID partitioning schemes of this document. It is be possible using this scheme to create OIDs that approach or exceed 64 characters in length. Such organizations will need to decide if they want to continue to limit their OIDs to 64 characters by using a different partitioning scheme, obtaining a new root OID of lesser length, or simply ignoring the 64 character length suggestion (understanding that such OIDs may not be usable in some standards such as DICOM).

The second practical limit is on the internal OID representation. Although the digit sequences between the decimal points are unbounded by the standard, some implementations of the OID data type use integers (incorrectly) to represent each branch. This imposes a practical limit of 2^{31}-1 (slightly over 2 billion) for a branch label.

We recommend that managers of OIDs adhere to these limits when constructing OIDs, and that the applications they manage that use OIDs not be reliant upon either of these limits.

3.2 Identifiers in CDA Documents and V3 messages

The various kinds of identifiers appearing in CDA documents and V3 messages are described in more detail below. Please note that this is a guidance paper. Any specific use of OIDs should be described in an implementation guide.

[3] The particular OID we have used in this example is assigned by HL7 for the purpose of generating examples such as you see here. It should not be used for any other purpose.

3.2.1 Documents

The first identifier encountered in a CDA document is the first <id> element in the document. This is the one that explicitly identifies that document. There is only one of these identifiers in the document, and it uniquely identifies the specific document that contains it. No two CDA documents in the world have the same document ID. If there are two different versions of a document, each one has a different document ID.

Healthcare IT systems typically maintain a unique identifier for a collection of document versions. This may be communicated in the `<setId>` element in the document.

The example below shows the use of these two different identifiers in the header of a clinical document.

```
<ClinicalDocument xmlns="urn:hl7-org:v3">
 <realmCode code="US"/>
 <typeId extension="POCD_HD000040" root="2.16.840.1.113883.1.3"/>
 <templateId root="2.16.840.1.113883.10.20.1"/>
 <id root="2.16.840.1.113883.19.3.933.1.2219000"/>
 <code code="34133-9" displayName="SUMMARIZATION OF EPISODE NOTE"
  codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"/>
 <title>Good Health Clinic Care Record Summary</title>
 <effectiveTime value="20050303171504+0500"/>
 <confidentialityCode code="N" codeSystem="2.16.840.1.113883.5.25"/>
 <languageCode code="en-US"/>
 <setId extension="999021" root="2.16.840.1.113883.19.3.933.1"/>
 <versionNumber value="1"/>
 …
```

Figure 5 ClinicalDocument.id and ClinicalDocument.setId Example

The example above shows the document identifier using single OID with no extension attribute. This is permitted in the II data type by the HL7 standards. This facilitates exchange between standards such as DICOM that only use an OID to identify objects, and the HL7 CDA Standard. This is required behavior when it is necessary to support exchanges of persistent objects between a system using the DICOM standard and a system using HL7 Version 3 standards. Note that in these cases, the OID would be limited to 64 characters in length.

3.2.2 Patients

Several types of patient identifiers will likely need to be managed. An organization may use multiple identifiers for patients, for example, account identifiers, medical record numbers, and master patient identifiers. Each of these different types of identifier should have a separate OID.

Most common types of public identifiers (such as U.S. Social Security Numbers) have already had their namespaces associated with an assigned OID and registered through the HL7 OID registry. The HL7 assigned OIDs should be used for public identifiers to enable interoperability between organizations. Organizations should typically only need to assign OIDs for the namespaces for internally assigned identifiers.

First, organizationally assigned patient ids should have their own unique root OID that scopes them. Each type of id should have a separate OID (i.e. single system id vs. another system id vs. a master patient index id). These identifiers are found in the

<id> element under the <patientRole> element of the document, and identify the person in their role as a patient, as shown below.

```
  <patientRole>
   <id extension="12345" root="2.16.840.1.113883.19.3.933.2"/>
```

Figure 6 patientRole.id Example

In addition to organizationally assigned ids, it is likely that external ids for a person will also appear in CDA documents (i.e. Health Plan Identifier, driver's license numbers, etc.). For ids that already have OIDs, the existing ones should be utilized for interoperability. Otherwise an organizational OID should be created for each namespace to scope each type of id. Lastly, it should be noted that each patient will likely have multiple ids associated with them, so any OID management solution needs to take this into account.

These identifiers are often found in the <id> element of the <patient>, as they identify the person in the role, and not the role, as shown in the example below.

```
    <patient>
     <id root="2.16.840.1.113883.4.3.24" extension="0000000"/>
  …
```

Figure 7 patient.id Example using a Driver's License number

3.2.3 Personnel

Personnel includes licensed providers, non-licensed medical staff, clerical and other staff that may need access to, or who contribute to the development of the content in the document or message. These individuals may need to be identified within a clinical document (e.g. the transcriptionist may be recorded as the dataEnterer in a CDA document).

There are laws that mandate the use of certain identifiers for various classes of providers for various purposes, e.g., to prescribe restricted medications, or to identify a provider for the purpose of payment. HL7 has already assigned OIDs for many of these organizational namespaces, and these must be used instead of registering additional OIDs to refer to the same namespace. Appendix C —Common OIDs lists a number of these, and includes a link to the HL7 OID Registry where OIDs that have already been registered can be located. The example below shows an author being identified using the US national identifier for healthcare providers.

```
<author>
  <time value="20050329224411+0500"/>
  <assignedAuthor>
   <id extension="999999999" root="2.16.840.1.113883.4.6"/>
  …
```

Figure 8 assignedAuthor.id Example using a national provider identifier

In other cases where the organization (instead of some other authority) assigns an identifier to non-patient personnel, the issues surrounding OID management for those persons (authors, authenticators, informants, healthcare providers, and other document participants) are largely the same as for patients. The example below shows a locally assigned identifier used for a transcriptionist entering a report.


```
<dataEnterer>
  <time value="20050329222451+0500"/>
  <assignedEntity>
   <id extension="2" root="2.16.840.1.113883.19.3.933.3"/>
 …
```

Figure 9 assignedEntity.id Example using a personnel identifer assigned by an instituion

3.2.4 Locations

If facilities or locations will be listed in CDA documents, then each facility should have a unique id. Each facility can be assigned its own unique OID, or an organization can create an OID for facility ids and assign unique extensions for each facility. The example below shows the latter usage.

```
   <location typeCode="LOC">
    <healthCareFacility>
     <id extension="R123" root="2.16.840.1.113883.19.3.933.4"/>
 …
```

Figure 10 healthCareFacility.id Example

3.2.5 Organizations

There are laws mandating the use of certain identifiers for organizations, such as CLIA (Clinical Laboratory Improvement Amendments) laboratories in the U.S. reporting to state cancer registries. HL7 has already assigned OIDs for many of these organizational namespaces, and these should be used where possible. Some organizations recorded in a document or message may need to be assigned a local identifier where an external identifier does not already exist. In these cases, the local identifiers should have a unique OID that serves to identify that namespace of local identifiers for these organizations. The example below shows a provider organization being identified using a locally assigned identifier.

```
<providerOrganization>
     <id extension="M345" root="2.16.840.1.113883.19.3.933.5"/>
 …
```

Figure 11 providerOrganization.id Example using a locally assigned OID.

3.2.6 Devices and Systems

It will likely be very useful to assign OIDs to information systems that span multiple locations. These OIDs will be usable directly when they are listed as authors of a CDA document (/ClinicalDocument/author/assignedAuthor/id). The example below shows an identifier being used for a device authoring a report.

```
 <assignedAuthor>
  <id extension="1" root="2.16.840.1.113883.19.3.933.6"/>
 …
```

Figure 12 assignedAuthor.id example where the author is a device.

It may also be useful to assign OIDs to these information systems, and then create OID branches off that system OID for each of the other categories mentioned in this document.

3.2.7 Encounters

OIDs should be created to scope (or identify the namespace of) any identifiers found in encounters (assuming appropriate OIDs do not already exist). Identifiers for encounters can include visit identifiers or appointment identifiers. The example below shows an identifier for an encounter. The organization that creates the identifier should be the one providing the OID associated with it.

```
 <encompassingEncounter>
  <id extension="9937012" root="2.16.840.1.113883.19.3.933.7"/>
 …
```

Figure 13 encompassingEncounter.id Example

3.2.8 Orders

OIDs should be created to scope the different kinds of identifiers generated by an application for orders. Some applications generate a placer order number (identifying an order), others generate a filler order number (identifying a promise to fulfill the order), and yet others generate both. When receiving an order, order fillers should use the identifier (and OID) supplied by the order placer. When receiving a promise, order placers should use the identifier (and OID) supplied by the order filler.

The example below shows the use of both the placer and filler order number to identify an order, with different OIDs used for each identifier.

```
<inFulfillmentOf typeCode="FLFS">
  <order moodCode="RQO">
   <id extension="placer1" root="2.16.840.1.113883.19.3.933.8.1"/>
   <id extension="filler2" root="2.16.840.1.113883.19.3.933.8.2"/>
 …
```

Figure 14 order.id Example showing different OIDs used for the placer and filler order id for the same order.

In some cases the order placer or order filler may not supply an OID to identify a namespace. For example, the information sent in an HL7 V2 message may include identifiers that are only locally unique in the context of the message. In this situation, the receiver needs to be aware that there may be legal and patient safety issues around assigning OIDs for these identifiers since the receiver cannot guarantee the uniqueness

of the resulting identifier. HL7 has supported identification of assigning authorities[4] for identifiers since version 2.3. It is HL7's position that the responsibility for providing these assigning authorities resides with the originators of the identifiers, not the receivers of the identifiers.

3.2.9 Sections

Sections within a CDA document may be identified. An OID should be generated to identify the namespace of CDA sections. The example below shows an identifier used for a section of a clinical document.

```
<section>
  <id root='2.16.840.1.113883.19.3.933.1.999021.1.9' extension='1'/>
 …
```

Figure 15 Section.id Example

3.2.10 Entries

Entries within a CDA document may also be identified. The example below shows an identifier for an Act appearing in an entry of a clinical document. Note: The identifiers for these entries should be traceable back to the data in the health information system or clinical data repository used to produce them.

```
<entry>
 <act classCode='ACT' moodCode='EVN'>
  <id root='2.16.840.1.113883.19.3.933.1.999021.1.10' extension='1'/>
 …
```

Figure 16 Act.id example

3.2.11 Templates

Templates can also be identified. We recommend that each template have its own unique OID and not use an extension. The example below shows a clinical document using two templates, one defined by the HL7 Continuity of Care Document specification and the other locally defined.

[4] The HD data type replaced the used of strings for identifying the assigning authority in HL7 Version 2.3. The first two examples on page 2-34 of the HL7 Version 2.3.1 standard illustrate how an ISO OID is represented in the HD data type.

```
<ClinicalDocument xmlns="urn:hl7-org:v3" >
 <typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>
 <templateId root="2.16.840.1.113883.10.20.1"/>
 <templateId root="2.16.840.1.113883.19.3.933.11.17"/>
 …
```

Figure 17 ClinicalDocument.templateId example using a CCD and locally defined template

3.2.12 Local Vocabularies

OIDs are also used to uniquely identify vocabularies or coding systems in elements using the HL7 CD data type or its subtypes. These OIDs appear in the codeSystem attribute of the element, as shown in the figure below.

```
<code … >
  <translation code="CCD" codeSystem="2.16.840.1.113883.19.3.933.12.1"/>
</code>
```

Figure 18 translation.codeSystem Example

Whenever possible, existing code systems such as LOINC or SNOMED CT should be used. However, if it is necessary to use organizational specific vocabularies, then OIDs must be created and registered with HL7 to scope the local codes. The assigning organization should ensure that an existing global or local OID is not already available for the purpose before creating a new OID. Strategies should be established to avoid assignment of multiple OIDs for the same code systems.

The example above shows where an OID is used in a `translation` element for the local code system that is used to represent the type of a clinical document.

3.2.13 External References

A CDA document may reference external objects that use OIDs for identification. An example would be a reference to a DICOM image (DICOM commonly uses OIDs to identify objects).

3.3 Obtaining an OID

There are two reasons to obtain an OID. The first is to be able to use that OID as a namespace identifier for identifiers that you manage. This can be accomplished by asking a registration authority, such as HL7 for an OID to use for that purpose.

The second reason is to become a registration authority. Once you have a registration authority OID of your own, you become a registration authority and can create other OIDs and use them yourself or give them to others. A registration authority may delegate the registration authority for OIDs below it to another entity, which can then assign other OIDs beneath the assigned value, as specified in the ISO 8824 series of standards governing policies and procedures for registration authorities.

Organizations that do not already have a registration authority OID may obtain one from a number of different sources, including HL7. The process for obtaining an OID from HL7 is described in further detail below. There is no requirement that an organization obtain the OIDs used in their documents and messages from any particular source. However obtained, an OID owned by an organization should be

registered with the HL7 registry to enable others to identify your organization as the owner.

Note that an OID can never be changed to identify a different object once it has been assigned, even by the Registration Authority. In other words, OIDs must never be recycled. Rather, new OIDs should be created when and the old ones retired from use.

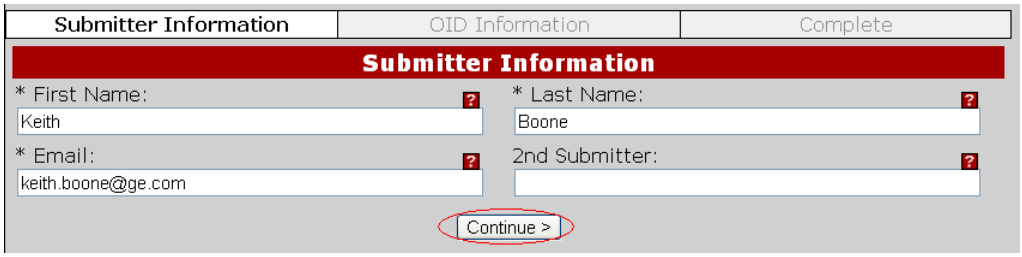
3.3.1 Registering or Obtaining an OID from HL7

OIDs for registration authorities or namespaces can be obtained from HL7 by using the HL7 OID Registry found on the web at http://www.hl7.org/oid/. Registering an OID follows the same process.

Under "COMMONLY ACCCESSED INFORMATION" click on "OID Registry".

That will display the OID registry page.

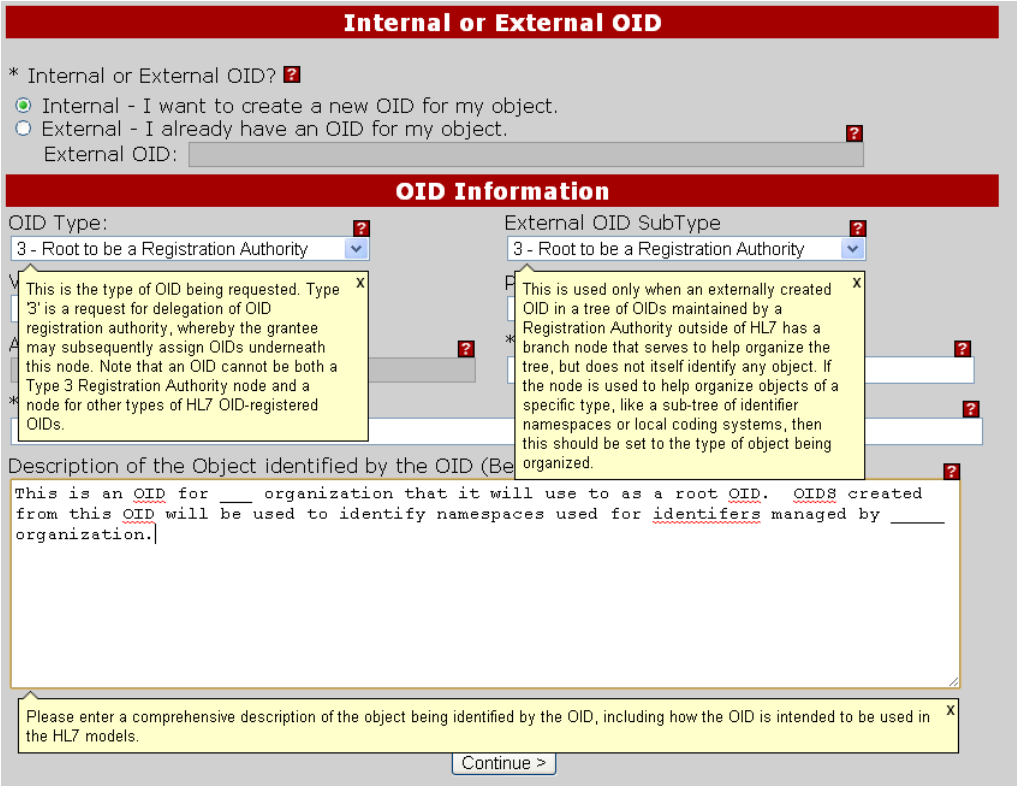
On the upper right corner of the OID Registry page, click on "Click to obtain or register an OID".



When you 'obtain' a new OID from HL7, it is automatically registered for you rather than requiring an additional step. You can update this data if someone else should be listed as the submitter. When finished, press the continue button.

If you are requesting an OID from HL7, select “Internal – I want to create a new OID for my object.” If registering an OID you have obtained elsewhere, select “External – I already have an OID for my object.”

When asked for the type of OID to create, select option “3 – Root to be a registration authority” to create an OID to use with this guide. This needs to be set in either the OID Type or External OID SubType field.



Press continue to register or request the OID.

Various HL7 international affiliates also maintain OID registries. Please check with your local affiliate home page for more information on using those registers.

3.4 Suggestions for Partitioning an OID for Use in an Organization

The following guidelines are for use by organizations that are new to OIDs and are looking for some guidance on OID implementation and management. This guide does not suggest that organizations that already have OIDs and have been managing them for some time should change to using the approaches outlined below.

The guidelines below are intended to enable organizations to manage the OIDs that they use. These are not intended to communicate organizational structures. Receiving systems should not assume that OIDs received from any particular organization will match the recommendations outlined in this guide, or that when they do that any given organizational structure is assumed. Many existing systems use OIDs in forms such as Manufacturer.serial-number.time or Manufacturer.serial-number.time-hash. Implementations receiving OIDs must be able to accept any and all possible OID

generation methods, and never depend on the OID tree having any structure whatsoever.

The partitioning scheme described below uses the rubric that objects of the same type (in the RIM) appear in the same namespace (use the same OID). You could manage a namespace so that it could include for example, identifiers for both patients and documents, but this presents a number of challenges and is not recommended.

3.4.1 Small to Medium Sized Organizations

There are several assumptions made in this section with regard to the way that OIDs are managed. If these assumptions do not apply in your situation, you should look to the OID partitioning scheme defined in section 3.4.2, Large Organizations.

- The organization uses the same identifier to uniquely identify a patient across different encounters and locations. This can either be the medical record number, or master patient identifier used by the organization to identify a patient.
- The organization makes use of a single electronic medical record system (EMR) across its various locations of care.
- The organization uses the same identifier to uniquely identify personnel regardless of location.
- There are a manageable number of locations, and a way to uniquely identify each of these locations within the scope of the organization.
- There are a manageable number of entities that the organization places orders with, and a way to uniquely identify each of these entities within the scope of the organization.

Once an organization receives a root OID of their own, it is recommended that they create new OIDs using the values in the table below. Please note that in some locales, national identifiers may be in use for patients, personnel or organizations. Nationally managed identifiers should be assigned an OID of their own, and that should be registered within the HL7 OID Registry. Where these nationally assigned identifiers are used, a locally managed OID should not be assigned.

Table 1: Recommended OID Arcs for Small/Medium Size Organizations

Branch	Description
.1	Documents
.2	Patients
.3	Personnel
.4	Locations
.5	Organizations
.6	Devices
.7	Encounters
.8	Orders
.9	Sections
.10	Entries and Clinical Statements
.11	Templates
.12	Local Vocabularies
.13	Other Participants

For example: if an organization had a root OID of 2.16.840.1.113883.19.3.933.19.4, then the OID for documents would be 2.16.840.1.113883.19.3.933.19.4.1, and patients would be 2.16.840.1.113883.19.3.933.19.4.2, etc.

3.4.2 Large Organizations

The recommended solution for managing OIDs for large organizations or organizations with the potential to expand is to start with the organization's OID and have a three node hierarchy for each particular OID.

The organizational OID would typically be the root. The first level is the assigned system ID. The second level is the site specific ID, and the third level is the OID category (1 for document ids, 2 for patient ids, 3 for provider ids, etc.). The OID categories should be predefined as much as possible, but if the local site needed an OID category that was not predefined, they would have the flexibility to define their own OID category. If possible, that new OID category should be added to this document so other sites can use the same OID category if needed.

In some instances, it may be necessary to have additional levels of ownership to manage OIDs within an organization. That may affect the OID structure described below but it may also be incorporated into the structure depending on your internal management strategy. Additional levels of structure can be incorporated to track, for example, the version of the organizations OID management scheme used to create the OID.

Assigning OIDs along organizational boundaries is a convenience mechanism for managing them. The OIDs are not meant to communicate organizational structures. Organizational structures are not necessarily stable, departments can be split, or merged or added or removed over time, especially in large organizations where this occurs frequently.

In order to completely explain how the recommended solution should work, here are a few fake pieces of information that will be used to create the organizational OIDs.

- Good Health Clinic has an organizational OID of 2.16.840.1.113883.19.3.933.999 and has multiple facilities in several locations.
- Each facility uses the same computer systems which they have identified as system 120 (outpatient care), 150 (inpatient care) and 170 (emergency care). Each of those systems operates independently.
- There is one central master patient index (MPI) that helps tie all of the records together. The MPI has been identified as system 2000 and is located at the main clinic which is clinic 1.
- Each of the clinics has been incrementally assigned an ID in the order that the clinic was opened. The first clinic has an ID of 1. The second clinic is 2, etc. Note that an OID cannot contain leading zeros.

Based on the information above, here are a few examples of how the OIDs would be created:

- 2.16.840.1.113883.19.3.933.999
  - Good Health organizational OID
- 2.16.840.1.113883.19.3.933.999**.120**
  - 120 is the outpatient system.
  - This is the first branch and the OID is not yet complete.
- 2.16.840.1.113883.19.3.933.999**.120.1**
  - The outpatient system (120) used at clinic 001 (1).
  - This is the second branch and the OID is not yet complete.
- 2.16.840.1.113883.19.3.933.999**.120.1.1**
  - A document ID (1) on that system.
  - This is the third and final branch- the complete OID

More examples of complete OIDs:

- 2.16.840.1.113883.19.3.933.999.**120.1.2**
  - Description: outpatient system (120), used at clinic 001 (1), with a patient ID (2)
- 2.16.840.1.113883.19.3.933.999.**120.5.2**
  - Description: outpatient system (120), used at clinic 005 (5), with a patient ID (2)
- 2.16.840.1.113883.19.3.933.999.**150.5.2**
  - Description: inpatient system (150), used at clinic 005 (5), with a patient ID (2)
- 2.16.840.1.113883.19.3.933.999.**2000.1.2**
  - Description: MPI system (2000), used at clinic 001 (1), with a patient ID (2)

Wherever possible, large organizations whose OIDs appear in documents and messages exchanged with external parties should register their OIDs with the HL7 OID registry so that they can be easily identified by those external parties.

APPENDIX A — CHECKLIST

The following checklist contains the key steps needed to

- ☐ Obtain an OID from a registration authority for the purpose of creating your own OIDs or register one you have obtained somewhere else in the HL7 OID registry. See section 3.3 Obtaining an OID in this document.
- ☐ Are you a multi-entity organization? If so, allocate a brand for the enterprise level and branches for each entity. See section on 3.4.2 Large Organizations
- ☐ Determine if your applications need a branch that it can internally manage for local identifiers and codes.
    - o If they do, work with the application providers and documentation to determine how to best assign OIDs to the applications.
- ☐ For those that do not:
    - o Define OIDs under the enterprise or entity branch:
        - ▪ Local Identifiers of each type (see Table 1: Recommended OID Arcs for Small/Medium Size Organizations)
        - ▪ Local code sets.
    - o Associate these OIDs in the applications following application provider instructions. These may be defined for example in mapping tables, or through application or interface engine configuration capabilities.

APPENDIX B — DIFFERENCES IN IDENTIFIERS IN HL7 VERSION 2.X AND 3

Introduction

The CDA makes use of HL7 Version 3.0 Reference Information Model, Data Types, and Vocabulary. The structure of identifiers has changed between HL7 Version 2.X and HL7 Version 3.

An advancement in the HL7 Version 3.0 data types over HL7 Version 2.X is a refinement in the way identifiers are communicated in documents and messages.

HL7 Version 2.X Identifiers

In HL7 Version 2.X, identifiers were sent using one of several data types, including the CK, CX, or EI data types, or along with names in the CN, PPN, XCN and XON data types. In each case, the identifier had at least two parts, the identifier itself, which is a string, and a field identifying the Assigning Authority for that identifier. An example is shown below for the HL7 Version 2.X CK data type.

```
<ID number (NM)> ^ <check digit (NM)> ^
 <code identifying the check digit scheme employed (ID)> ^ < assigning
authority (HD)>
```

Figure 19: HL7 Version 2.X CK Data Type

In HL7 Version 2.3 and beyond, the Assigning Authority is communicated in an "HD" data type. Many other parts of V2.X messages also use the HD data type, especially in the message header. The HD data type is described as follows:

HL7 Component Table - HD – Hierarchic Designator

SEQ	LEN	DT	OPT	COMPONENT NAME
1	20	IS	O	Namespace ID
2	199	ST	C	Universal ID
3	6	ID	C	Universal ID Type

Definition: The basic definition of the HD is that it identifies an (administrative or system or application or other) entity that has responsibility for managing or assigning a defined set of instance identifiers (such as placer or filler number, patient identifiers, provider identifiers, etc.). This entity could be a particular health care application such as a registration system that assigns patient identifiers, a governmental entity such as a licensing authority that assigns professional identifiers or drivers' license numbers, or a facility where such identifiers are assigned.

The HD data type allows the assigning authority to be identified with a string, and/or any one of the following:

- a DNS name,
- a UUID (also known as GUID),
- a CEN Healthcare Coding Scheme Designator,
- an ISO Unique Object Identifiers (also known as an OID),

- a random string of bits,
- an X.400 format identifier
- or an X.500 directory name.

There were several problems with the use of this data type to identify the assigning authority. The assigning authority could be identified in either or both of two different ways in the message, using a simple text string, and a specially formatted value. There were also numerous ways to generate an Assigning Authority identifier using the specially formatted string that did not always guarantee uniqueness.

HL7 Version 3.0 Identifiers

HL7 Version 3.0 uses the II data type to record identifiers. As in HL7 Version 2.X, the data type used for identifiers allows for the storage of both the identifier, and a value guaranteeing the uniqueness of the identifier.

```
<id extension="999021" root="2.16.840.1.113883.19.3.933.1.999021.1"
assigningAuthorityName='HL7' displayable='true'/>
```

Figure 20: II Data Type as used in a CDA Document

The value that guarantees the uniqueness is known as a universal identifier, and is defined as the HL7 Version 3 data type UID. A universal identifier is one which is generated in a way that guarantees that no other identifier will duplicate it. Two examples of universal identifiers are UUIDs (or GUIDs), and OIDs. Both of these formats specify a process for generating identifiers that will, if correctly followed, generate identifiers that will not be duplicated by any other system.

Another refinement was the recognition that a universal identifier could be used as an identifier for an entity that did not require the specification of any other information.

To accommodate these changes, the parts of an identifier in HL7 Version 3.0 include two main attributes, the root and the extension. The definitions of these parts are given in the table below.

Table 2: Parts of an Instance Identifier

Name	Type	Description
root	UID	A unique identifier that guarantees the global uniqueness of the instance identifier. The root alone may be the entire instance identifier.
extension	ST	A character string as a unique identifier within the scope of the identifier root.
assigningAuthorityName	ST	A human readable name or mnemonic for the assigning authority. The Assigning Authority Name has no computational value. The purpose of a Assigning Authority Name is to assist an unaided human interpreter of an II value to interpret the authority. Note: no automated processing must depend on the assigning authority name to be present in any form.
displayable	BL	Specifies whether the identifier is intended for human display and data entry (displayable = true) as opposed to pure machine interoperation (displayable = false).

In an HL7 Version 3.0 identifier, the root attribute often takes the place of the assigning authority identifier used in HL7 Version 2.X, and the extension often takes the place of the identifier string. The one exception to these cases is when the identifier itself is guaranteed to be unique and is either an OID or GUID, in which case an extension attribute is not required, and the root attribute contains the entire identifier.

Coded Concepts

The HL7 Version 3 CD data type (also called the Concept Descriptor data type) uses OIDs to identify coding systems. The CD data type can be thought of as an identifier for a specific concept. The table below describes the two attributes of the CD data type associated with OIDs.

Name	Type	Description
codeSystem	OID	A unique identifier that uniquely identifies the code system. This attribute is like the root attribute of the II data type described above.
codeSystemName	ST	A human readable name or mnemonic for the code System. The Code System Name has no computational value. The purpose of a Code System Name is to assist an unaided human interpreter of an CD value to interpret the code system. Note: no automated processing must depend on the code system name to be present in any form. This attribute is like the assigningAuthorityName attribute of the II data type described above.

APPENDIX C — COMMON OIDS

Below are a few example OIDs that are already defined and should be used when possible rather than defining additional OIDs that describe the same ID. For a complete list, visit the following site: www.hl7.org/oid

OID	Name	Notes
2.16.840.1.113883.4.1	United States Social Security Number (SSN).	Assigned by the U.S. Social Security Administration. Note: IRS assigned ITINs are often used as drop-ins for social security numbers.
2.16.840.1.113883.4.330.392	passportNumNS-JPN	Identifier of the namespace for Passport Numbers issued by the country of JAPAN. Used for II.root values for passport numbers.
2.16.840.1.113883.4.330.36	passportNumNS-AUS	Passport Numbers issued by the country of Australia
2.16.840.1.113883.3.42	DOD_MHS	This is the root OID for the U.S. Military Health System (MHS). It uses the OID hierarchy described in this document for large organizations.
2.16.840.1.113883.4.6	NPI	U.S. National Provider Identifier
2.16.840.1.113883.4.58	Yukon, Canada Personal Health Number	A unique number assigned by the Yukon territory, Canada to patients or clients who come into contact with their jurisdictional healthcare system.
2.16.840.1.113883.4.322	PPID	Alberta, Canada Provincial Provider Identifier (PPID)

OIDs are also used to identify coding systems. These OIDs are used in the HL7 Version 3 CD data type. The table below provides the OIDs for a number of common coding systems.

OID	Code System Name	Notes
2.16.840.1.113883.6.96	SNOMED-CT	Systematized Nomenclature in Medicine Clinical Terms
2.16.840.1.113883.6.103	ICD-9-CM Diagnoses	Diagnosis codes from the US ICD-9-CM Coding system.
2.16.840.1.113883.6.1	LOINC	Logical Observation Identifiers Names and Codes
2.16.840.1.113883.6.12	CPT-4	Common Procedure Terminology
2.16.840.1.113883.6.104	ICD-9-CM Procedures	Procedure codes from the US ICD-9-CM Coding system.
2.16.840.1.113883.6.88	RxNORM	Drug codes from the US National Library of Medicine RxNORM Code System
2.16.840.1.113883.6.69	NDC	US National Drug Codes

APPENDIX D — SAMPLE OIDS HIERARCHIES

Small and Medium Sized Organizations

The table below contains a sample set of OIDS that can be used by a small- to medium-sized organization.

Full OID	**Description**
2.16.840.1.113883.19.3.999.1	Documents
2.16.840.1.113883.19.3.999.2	Patients
2.16.840.1.113883.19.3.999.3	Personnel
2.16.840.1.113883.19.3.999.4	Locations
2.16.840.1.113883.19.3.999.5	Organizations
2.16.840.1.113883.19.3.999.6	Devices
2.16.840.1.113883.19.3.999.7	Encounters
2.16.840.1.113883.19.3.999.8	Orders
2.16.840.1.113883.19.3.999.9	Sections
2.16.840.1.113883.19.3.999.10	Entries and Clinical Statements
2.16.840.1.113883.19.3.999.11	Templates
2.16.840.1.113883.19.3.999.12	Local Vocabularies
2.16.840.1.113883.19.3.999.13	Other Participants

Large Organizations

The following page contains a sample OID hierarchy for a large organization. This material was derived from the structure created for the U.S. Military Health System (MHS). This structure uses the recommended solution for large organizations described in this document.

Table 3: Sample OID Hierarchy for a Large Organization

Full OID	**Type of OID**
2.16.840.1.113883.19.3.42	Organization RA OID: Military Health System
2.16.840.1.113883.19.3.42.**126**	System RA OID: the AHLTA System
2.16.840.1.113883.19.3.42.126.**100001**	Facility RA OID: Global IDs in AHLTA
2.16.840.1.113883.19.3.42.126.100001.**2**	Namespace OID: Patients
2.16.840.1.113883.19.3.42.126.100001.**16**	Namespace OID: Concepts
2.16.840.1.113883.19.3.42.126.100001.**19**	Namespace OID: Events
2.16.840.1.113883.19.3.42.**127**	System RA OID: CHCS
2.16.840.1.113883.19.3.42.127.**5**	Facility RA OID: Basset Army Community Hosp.
2.16.840.1.113883.19.3.42.127.5.**2**	Namespace OID: Patients
2.16.840.1.113883.19.3.42.127.5.**3**	Namespace OID: Providers
2.16.840.1.113883.19.3.42.127.**110**	Facility RA OID: Darnall Army Medical Center
2.16.840.1.113883.19.3.42.127.110.**2**	Namespace OID: Patients
2.16.840.1.113883.19.3.42.127.110.**3**	Namespace OID: Providers
2.16.840.1.113883.19.3.42.127.**1667**	Facility RA OID: Groton Naval Medical Center
2.16.840.1.113883.19.3.42.127.1667.**2**	Namespace OID: Patients
2.16.840.1.113883.19.3.42.127.1667.**3**	Namespace OID: Providers
2.16.840.1.113883.19.3.42.**144**	System RA OID: CIS
2.16.840.1.113883.19.3.42.144.**125**	Facility RA OID: Madigan Army Medical Center
2.16.840.1.113883.19.3.42.144.125.**1**	Namespace OID: Documents
2.16.840.1.113883.19.3.42.144.125.**4**	Namespace OID: Encounters/Visits
2.16.840.1.113883.19.3.42.144.**100001**	Facility RA OID: Global IDs in CIS
2.16.840.1.113883.19.3.42.144.100001.**17**	Namespace OID: Account Numbers
2.16.840.1.113883.19.3.42.**10005**	System RA OID: Document Management System
2.16.840.1.113883.19.3.42.10005.**10001**	Facility RA OID: Global IDs for Document Management
2.16.840.1.113883.19.3.42.10005.100001.**1**	Namespace OID: Document IDs
2.16.840.1.113883.19.3.42.10005.100001.**18**	Namespace OID: Document Set IDs

