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**HL7 Version 3 Implementation Guide:   
URL-Based Implementations of the Context-aware Knowledge Retrieval (Infobutton) Domain, Release 4**

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**HL7 Informative Ballot**

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# Purpose

Clinicians face numerous knowledge needs during the course of patient care and the majority of these needs are not met, compromising the quality of care. Online health knowledge resources that are capable of solving many of these knowledge needs are now widely available, but a series of barriers hinder a more effective and frequent use of these resources at the point of care. *Infobuttons* are decision support tools that integrate knowledge resources into electronic health record (EHR) and personal health record (PHR) systems as an attempt to lower these barriers. To facilitate the integration of knowledge resources into EHR and PHR systems, the Clinical Decision Support Technical Committee developed the *Context-aware knowledge retrieval (Infobutton)* standard specification.

This implementation guide provides a specification for URL-based implementations of the *Context-aware knowledge retrieval (Infobutton)* standard. The intent of this specification is to support the majority of knowledge retrieval implementations that offer URLs as the primary or exclusive communication protocol. The ultimate goal is to enable a stepwise transition from URL-based implementations to a services-oriented approach. Release 4 of this implementation guide reflects changes made to its normative parent specification (*Context-aware Knowledge retrieval, Knowledge Request Standard*). It also includes clarifications regarding the use of coded attributes and provides a quick reference of code systems used in the implementation guide.

# Special notes and disclaimers

The URL-based specification is one alternative, not normative, implementation of the *Context-aware Knowledge retrieval standard*. The main goal of this implementation approach is to support compatibility with most EHR and knowledge resource implementations, maximizing adoption.

This document assumes knowledge of the *Context-aware Knowledge Retrieval* *(Infobutton)* standard normative specification. For a detailed description of the standard, readers should refer to the *Context-aware Knowledge Retrieval* *(Infobutton)* section in the HL7 Version 3 Standard documentation.

## Changes from Release 3

The following changes were introduced in the present specification:

1. Parameter cardinality rules on Section 3.2 were clarified and examples were added.
2. Parameter names for the *observation,* *locationOfInterest,* and *payor* classes were added to the *Appendix 1*. These classes were included in the parent normative specification (Release 2) of this URL\_based implementation guide.
3. Added *Appendix 3 – Constraints for the observation class.* This Appendixspecifies how to convey observations such as pregnancy status, renal function, vital signs, problems, medications, and medication allergies using the observation class.
4. Added *Appendix 2 – Terminology Reference*. This section lists all the code systems OIDs and value sets OIDs that are included in this specification. For small value sets, this section also enumerates the codes in the value sets.
5. The HTTP POST implementation specification (Section 3.5) was changed according to implementers feedback.
6. Three new examples were added to *Appendix 4*.
7. Examples were adapted to data types release 2.

# URL-based implementation

The URL-based representation is directly derived from the *Context-aware Knowledge Retrieval* *(Infobutton), knowledge request* message information model. The method described in the following sections allows *knowledge request* message payloads to be converted from XML to URL-based through a simple automated process. The set of rules described below SHALL be followed to convert an XML-based *knowledge request* payload into a set of parameter names that can be transmitted through the HTTP/HTTPS protocol, using the GET or POST methods.

## Conversion of XML entities into URL parameter names

**Rule #1:** All XML attribute and element names that contain values SHALL be converted to an HTTP/HTTPS parameter name. The parameter SHALL be named by concatenating the element / attribute antecessor names (2 levels up) with the element / attribute name. Element / attribute names shall be separated by a dot as follows: [name of the level 2 antecessor] + ‘.’ + [name of the level 1 antecessor] + ‘.’ + [name of the element or attribute]. A few of the XML element / attributes cannot be unambiguously converted to a parameter name using the proposed rule. The name translations listed in Table 1 SHALL be used to address these cases. For convenience, Appendix 1 contains an exhaustive list of XML entities and their respective parameter name translations.

Note: To provide backwards compatibility with the previous versions of the present implementation guide while in DSTU status, the *MainSearchCriteria.value.\** and *SubTopic.value.\** class attributes MAY still be converted to *mainSearchCriteria.c.\** and *subtopic.c.\** respectively*.* However, this option has been deprecated as off January 2010 and SHALL not be used in new implementations. Existing implementations SHALL plan to migrate from the previous version to the new one, in which the parameter names for those two classes SHALL be *mainSearchCriteria.v.\** and *subTopic.v.\*.*

Table 1 – Exceptions to the parameter name translation rule.\*

|  |  |
| --- | --- |
| **Xpath** | **URL parameter name** |
| //assignedEntity/  representedOrganization/id@root | assignedEntity. representedOrganization.id.root |
| //performer/healthCareProvider/ code@code | performer.healthCareProvider.c.c |
| //performer/healthCareProvider/ code@codeSystem | performer.healthCareProvider.c.cs |
| //performer/healthCareProvider/ code@displayName | performer.healthCareProvider.c.dn |
| //informationRecipient /healthCareProvider/code@code | informationRecipient. healthCareProvider.c.c |
| //informationRecipient /healthCareProvider/ code@codeSystem | informationRecipient. healthCareProvider.c.cs |
| //informationRecipient /healthCareProvider/ code@displayName | informationRecipient. healthCareProvider.c.dn |
| //performer// languageCommunication/  languageCode@code | performer.languageCode.c |
| //performer//languageCommunication/  languageCode@codeSystem | performer.languageCode.cs |
| //performer//languageCommunication/  languageCode@displayName | performer.languageCode.dn |
| //informationRecipient//  languageCommunication/  languageCode@code | informationRecipient.languageCode.c |
| //informationRecipient//  languageCommunication/  languageCode@codeSystem | informationRecipient.languageCode.cs |
| //informationRecipient//  languageCommunication/  languageCode@displayName | informationRecipient.languageCode.dn |
| //informationRecipient/  healthCareProvider/ | informationRecipient=PROV[[1]](#footnote-1) |
| //informationRecipient/patient/ | informationRecipient=PAT1 |
| //informationRecipient/payor/ | informationRecipient=PAYOR1 |
| //performer/healthCareProvider/ | performer=PROV1 |
| //performer/patient/ | performer=PAT1 |
| //performer/payor/ | performer=PAYOR1 |

\* Note that some of the parameter names listed above are abbreviated according to abbreviation rules defined below in Table 3.

## Parameter cardinality

**Rule #2:** Parameter cardinality SHALL follow the same restrictions defined in the *Knowledge request* RMIM, except for the following:

1. Attributes based on a coded data type and that are bound to a single fixed code in the knowledge request message information model SHOULD be completely omitted (i.e., *mainSearchCriteria.code*, *subtopic.code*, *ageGroup.code*, *age.code*).
2. Coded attributes that are bound to codes from one single code system MAY have the *codeSystem* omitted as long as the code is from the recommended value set (see Appendix 2). The only attributes that do not meet this criterion are *mainSearchCriteria.value, subTopic.value, observation.code,* and *observation.value.* Therefore, *codeSystem* SHALL be provided for these latter attributes if a *code* is present.
3. The *displayName* attribute MAY be omitted in all knowledge request parameters.
4. For the *Observation* class, if the *Observation* code is an ASSERTION (e.g., assertion that the patient has a specific problem, diagnosis, or symptom), observation.c.c MAY be omitted. If observation.c.c is absent, fillers of a knowledge request SHALL assume that observation.c.c=ASSERTION.

Note: Attributes that accept codes from multiple code systems SHALL include the *codeSystem* attribute (e.g., *mainSearchCriteria.value*, *subTopic.value, observation.code, observation.value*).

Example: *codeSystem* and *displayName* attributes properly omitted in *administrativeGender*, *task*, *performer*, and *informationRecipient*):

mainSearchCriteria.v.c=1202&mainSearchCriteria.v.cs=2.16.840.1.113883.6.88&

patientPerson.administrativeGenderCode.c=F&

task.c.c=MEDOE&

performer=PROV&informationRecipient=PAT&

subTopic.v.c=Q000009&subTopic.v.cs=2.16.840.1.113883.6.177

Verbose version with all *codeSystem* and *displayName* attributes included:

mainSearchCriteria.v.c=1202&mainSearchCriteria.v.cs=2.16.840.1.113883.6.88&

mainSearchCritieria.v.dn=atenolol&

patientPerson.administrativeGenderCode.c=F& patientPerson.administrativeGenderCode.cs=2.16.840.1.113883.5.1& patientPerson.administrativeGenderCode.dn=Female&

task.c.c=MEDOE&task.c.cs=2.16.840.1.113883.5.4&task.c.dn=Medication+Order+Entry&performer=PROV&informationRecipient=PAT&

subTopic.v.c=Q000009&subTopic.v.cs=2.16.840.1.113883.6.177&subTopic.v.dn=adverse+effects

**Rule #3:** Multiple instance parameters SHALL be suffixed with a sequential integer that denotes the cardinality of a particular parameter instance: the first instance in a given sequence SHALL not be suffixed; the second element SHALL be suffixed with the integer “1;” the third element SHALL be suffixed with “2;” and so forth. Table 2 shows an example with three instances of the *mainSearchCriteria* element. Other parameters that also follow the same rule are those derived from the *LocationOfInterest* and *Observation* classes.

Table 2 – Conversion example of multiple *mainSearchCriteria* elements\*.

|  |  |
| --- | --- |
| **XML node** | **URL parameter name** |
| <**mainSearchCriteria**> <**value** **code**="1202" **codeSystem**= "2.16.840.1.113883.6.88"  > <displayName value=”atenolol”/>  </**value**> </**mainSearchCriteria**>  <**mainSearchCriteria**> <**value** **code**="401.1" **codeSystem**= "2.16.840.1.113883.6.103">  <displayName value=”Benign essential hypertension”/> </**value**> </**mainSearchCriteria**>  <**mainSearchCriteria**> <**value** **code**="250" **codeSystem**= "2.16.840.1.113883.6.103"> <displayName value=” Diabetes mellitus”/> </**value**> </**mainSearchCriteria**> | **mainSearchCriteria.v.c**=1202&  **mainSearchCriteria. v.cs**=2.16.840.1.113883.6.88&  **mainSearchCritieria.v.dn**=atenolol  **mainSearchCriteria.v.c1**=401.1&  **mainSearchCriteria. v.cs1**=2.16.840.1.113883.6.103&  **mainSearchCritieria. v.dn1**=Benign+essential+hypertension  **mainSearchCriteria.v.c2**=250&  **maininSearchCriteria. v.cs2**=2.16.840.1.113883.6.103&  **mainSearchCritieria. v.dn2**=Diabetes+mellitus |

\* Note that some of the parameter names listed above are abbreviated according to abbreviation rules defined below in Table 3.

## Addressing length limitations of HTTP GET

**Rule #4:** To address URL length limitations imposed by the HTTP GET protocol, the attribute / element names listed in Table 3 SHALL be abbreviated. This list is intended to be immutable regardless of changes to the normative *knowledge request* RMIM.

Table 3 – List of required entity abbreviations.

|  |  |
| --- | --- |
| **Element / attribute** | **Abbreviation** |
| code | c |
| codeSystem | cs |
| codeSystemName | csn |
| displayName | dn |
| originalText | ot |
| value | v |
| unit | u |
| name | n |

## HTTP/HTTPS GET vs. POST

**Rule #5:** Clinical Information Systems MAY choose whether to implement an infobutton *knowledgeRequest* with HTTP/HTTPS GET, HTTP/HTTPS POST, or both. Despite the parameter abbreviations listed above, specific knowledge request payload instances may still lead to URLs that exceed the length limitations imposed by the HTTP/HTTPS GET protocol, especially when a payload contains multiple instances of a given parameter, such as *mainSearchCriteria*. In these cases, clinical information systems SHOULD use HTTP/HTTPS POST.

**Rule #6**: Knowledge resources and infobutton managers SHALL be able to consume a *knowledgeRequest* both as HTTP/HTTPS GET and HTTP/HTTPS POST.

**NOTE**: Implementers should consider whether to implement the request above using HTTP vs. HTTPS, for example depending on whether the knowledge resource resides on a trusted or untrusted network. This implementation guide does not require the implementation of one alternative vs. another from a security standpoint.

## Knowledge request via HTTP/HTTPS POST

The following rule should be followed to submit aknowledge request using the HTTP/HTTPS POST protocol:

**Rule #7:** Parameter names and values in an HTTP POST/HTTPS request SHALL be sent as a set of name-value pairs, using the same parameter names and values defined for GET requests.

## URL translation examples

Table 4 contains examples of XML representations extracted from an *knowledge request* message payload and the equivalent URL-based representations.

Table 4 – Examples of XML representations followed by the equivalent URL-based translation.

|  |  |
| --- | --- |
| **XML representation** | **URL-based representation** |
| <**patientPerson**>  <**administrativeGenderCode code**="F">  </**patientPerson**> | **patientPerson. administrativeGenderCode**.**c**=F |
| <**age**>  <**code** **code**="30525-0"/> <**value** **value**="77" **unit**="a"/>  </**age**> | **age**.**c**.**c**=30525-0&  **age**.**v**.**v**=77&  **age**.**v**.**u**=a |
| <**mainSearchCriteria**>  <**value** **code**="D018410" **codeSystem**="2.16.840.1.113883.6.177"  **codeSystemName**="MSH" >  <displayName value=”Bacterial Pneumonia”/>  <**originalText** value=”Pneumonia“/>  </**value**>  </**mainSearchCriteria**> | **mainSearchCriteria**.**v**.**c**=D018410&  m**ainSearchCriteria**.**v**.**cs**=2.16.840.1.113883.6.177&  **mainSearchCriteria.v.csn**=MSH&  **mainSearchCriteria**.**v**.**dn**=Bacterial+Pneumonia&  **mainSearchCriteria**.**v**.**ot=**Pneumonia |

# Appendix 1 – List of parameter names

Table 5 contains a comprehensive list of XML entities and their associated parameter name translations. Detailed descriptions of these parameters are outside the scope of this Implementation Guide. The reader should refer to the Context-aware knowledge retrieval (“Infobutton”) normative specification for a detailed description of the underlying message model and its attributes.

Table 5 – List of XML entities and their associated parameter name translations.

|  |  |
| --- | --- |
| **Xpath** | **URL parameter name** |
| //knowledgeRequestNotification/ effectiveTime@value | knowledgeRequestNotification.  effectiveTime.v |
| //holder/assignedEntity/name | holder.assignedEntity.n |
| //holder/assignedEntity/  certificateText | holder.assignedEntity. certificateText |
| //assignedEntity/  assignedAuthorizedPerson/id@root | assignedAuthorizedPerson. id.root |
| //assignedEntity/  representedOrganization/id@root | representedOrganization.id.root |
| //assignedEntity/  representedOrganization/name | assignedEntity.  representedOrganization.n |
| //patientPerson/  administrativeGenderCode@code | patientPerson.  administrativeGenderCode.c |
| //patientPerson/ administrativeGenderCode/displayName/@value | patientPerson.  administrativeGenderCode.dn |
| //age/code@value | age.v.v |
| //age/code@unit | age.v.u |
| //ageGroup/value@code | ageGroup.v.c |
| //ageGroup/value@codeSystem | ageGroup.v.cs |
| //ageGroup/value/displayName/@value | ageGroup.v.dn |
| //taskContext/code@code | taskContext.c.c |
| //taskContext/code/displayName/@value | taskContext.c.dn |
| //subTopic/value@code | subTopic.v.c |
| //subTopic/value@codeSystem | subTopic.v.cs |
| //subTopic/value/displayName/@value | subTopic.v.dn |
| //subTopic/value/originalText/@value | subTopic.v.ot |
| //subTopic/value@code | subTopic.c.c (deprecated) |
| //subTopic/value@codeSystem | subTopic.c.cs (deprecated) |
| //subTopic/value/displayName/@value | subTopic.c.dn (deprecated) |
| //mainSearchCriteria/value@code | mainSearchCriteria.v.c |
| //mainSearchCriteria/value@codeSystem | mainSearchCriteria.v.cs |
| //mainSearchCriteria/value /displayName/@value | mainSearchCriteria.v.dn |
| //mainSearchCriteria/value/ originalText/@value | mainSearchCriteria.v.ot |
| //mainSearchCriteria/value@code | mainSearchCriteria.c.c (deprecated) |
| //mainSearchCriteria/value@codeSystem | mainSearchCriteria.c.cs (deprecated) |
| //mainSearchCriteria/value /displayName/@value | mainSearchCriteria.c.dn (deprecated) |
| //mainSearchCriteria/value/ originalText/@value | mainSearchCriteria.c.ot (deprecated) |
| //severityObservation /interpretationCode@code | severityObservation. interpretationCode.c |
| //severityObservation/ interpretationCode@codeSystem | severityObservation. interpretationCode.cs |
| //severityObservation/ interpretationCode/displayName/@value | severityObservation. interpretationCode.dn |
| //informationRecipient/patient/ | informationRecipient=PAT |
| //informationRecipient/  healthCareProvider/ | informationRecipient=PROV |
| //informationRecipient/payor/ | informationRecipient=PAYOR |
| //performer/patient/ | performer=PAT |
| //performer/healthCareProvider/ | performer=PROV |
| //performer/payor/ | performer=PAYOR |
| //performer/healthCareProvider/ healthCarePerson/code@code | performer.healthCareProvider. c.c |
| //performer/healthCareProvider/ healthCarePerson/code@codeSystem | performer.healthCareProvider. c.cs |
| //performer/healthCareProvider/ healthCarePerson/code/displayName/@value | performer.healthCareProvider. c.dn |
| //informationRecipient/ healthCareProvider/healthCarePerson/ code@code | informationRecipient. healthCareProvider.c.c |
| //informationRecipient/ healthCareProvider/ healthCarePerson/code@codeSystem | informationRecipient. healthCareProvider.c.cs |
| //informationRecipient/ healthCareProvider/healthCarePerson/ code/displayName/@value | informationRecipient. healthCareProvider.c.dn |
| //performer//languageCommunication/  languageCode@code | performer.languageCode.c |
| //informationRecipient//  languageCommunication/ languageCode@code | informationRecipient.  languageCode.c |
| //encounter/code@code | encounter.c.c |
| //encounter/code@codeSystem | encounter.c.cs |
| //encounter/code/dysplayName/@value | encounter.c.dn |
| //serviceDeliveryLocation/id@root | serviceDeliveryLocation.id.root |
| //observation/code@code | observation.c.c |
| //observation/code@codeSystem | observation.c.cs |
| //observation/code/displayName/@value | observation.c.dn |
| //observation/value@code | observation.v.c |
| //observation/value@codeSystem | observation.v.cs |
| //observation/value/displayName/@value | observation.v.dn |
| //observation/value@value | observation.v.v |
| //observation/value@unit | Observation.v.u |
| //locationOfInterest/addr/part/[@code=”ZIP”]/@value | locationOfInterest.addr.ZIP |
| //locationOfInterest/addr/part/[@code=”CTY”]/@value | locationOfInterest.addr.CTY |
| //locationOfInterest/addr/part/[@code=”STA”]/@value | locationOfInterest.addr.STA |
| //locationOfInterest/addr/part/[@code=”CNT”]/@value | locationOfInterest.addr.CNT |

# Appendix 2 – Terminology Reference

**LAST DATE APPENDIX 2 WAS UPDATED: June 25th, 2012**

**IMPORTANT NOTE**: The content below is a quick reference to common codes and code systems that can be used in a knowledge request. **This list is not exhaustive and may not be current**. The complete and up-to-date reference for HL7 code systems is available in the HL7 Normative Edition vocabulary (under the Foundation>Vocabulary menu). The easiest way to find the value sets that are referred in the list below is by clicking on the attribute names of interest in the knowledge request Reference Message Information Model (R-MIM), which is available in the Knowledge Request Normative Edition (under the Universal Domains>Clinical Decision Support>Context-aware Knowledge Retrieval (Infobutton) Topic>Reference Message Information Model).

## administrativeGenderCode

Concept domain: AdministrativeGender

Code system: HL7 AdminstrativeGender

Code system OID: 2.16.840.1.113883.5.1

Value set: AdministrativeGender[2.16.840.1.113883.1.11.1]

Extensions to the value set allowed (CWE): No

|  |  |
| --- | --- |
| Concept code | Display name |
| F | Female |
| M | Male |
| UN | Undifferentiated |

## ageGroup

Concept domain: AgeGroupObservationValue

Code system: MeSH

Code system OID: 2.16.840.1.113883.6.177

Value set: AgeGroupObservationValue[2.16.840.1.113883.11.75]

Extensions to the value set allowed (CWE): Yes

|  |  |
| --- | --- |
| Concept code | Display name |
| D007231 | infant, newborn; birth to 1 month |
| D007223 | Infant; 1 to 23 months |
| D002675 | child, preschool; 2 to 5 years |
| D002648 | child; 6 to 12 years |
| D000293 | adolescent; 13-18 years |
| D055815 | young adult; 19-24 years |
| D000328 | adult; 19-44 years |
| D000368 | aged; 56-79 years |
| D008875 | middle aged; 45-64 years |
| D000369 | aged, 80 and older; a person 80 years of age and older |

## Age units

CodeSystem: Unified Code for Units of Measure (UCUM)

Code system OID: 2.16.840.1.113883.6.8

Value set: AgePQ\_UCUM [2.16.840.1.113883.11.20.9.21]

Extensions to the value set allowed (CWE): No

| Code | Display Name |
| --- | --- |
| min | Minute |
| h | Hour |
| d | Day |
| wk | Week |
| mo | Month |
| a | Year |

## taskContext

Concept domain: ActTaskCode

CodeSystem: HL7 ActCode (ActTaskCode value set)

Code system OID: 2.16.840.1.113883.5.4

Value set: ActTaskCode [2.16.840.1.113883.1.11.19846]

Extensions to the value set allowed (CWE): Yes

|  |  |
| --- | --- |
| Concept code | Display name |
| OE | order entry |
| **LABOE** | laboratory test order entry |
| **MEDOE** | medication order entry |
| **PATDOC** | patient documentation |
| **ALLERLREV** | allergy list review |
| **CLINNOTEE** | clinical note entry |
| **DIAGLISTE** | diagnosis list entry |
| DISCHSUME | discharge summary entry |
| PATREPE | pathology report entry |
| PROBLISTE | problem list entry |
| **RADREPE** | radiology report entry |
| **IMMLREV** | immunization list review |
| **REMLREV** | reminder list review |
| **WELLREMLREV** | wellness reminder list review |
| **PATINFO** | patient information review |
| ALLERLE | allergy list entry |
| CLINNOTEREV | clinical note review |
| **DISCHSUMREV** | discharge summary review |
| **DIAGLISTREV** | diagnosis list review |
| **IMMLE** | immunization list entry |
| **LABRREV** | laboratory results review |
| **MICRORREV** | microbiology results review |
| **MICROORGRREV** | microbiology organisms results review |
| **MICROSENSRREV** | microbiology sensitivity test results review |
| **MLREV** | medication list review |
| **MARWLREV** | medication administration record work list review |
| **OREV** | orders review |
| **PATREPREV** | pathology report review |
| **PROBLISTREV** | problem list review |
| **RADREPREV** | radiology report review |
| REMLE | reminder list entry |
| WELLREMLE | wellness reminder list entry |
| **RISKASSESS** | risk assessment instrument |
| **FALLRISK** | falls risk assessment instrument |

## encounter

Concept domain: ActEncounterType

Code system: HL7 ActCode (ActEncounterCode value set)

Code system OID: 2.16.840.1.113883.5.4

Value set: ActEncounterCode [2.16.840.1.113883.1.11.13955]

Extensions to the value set allowed (CWE):

|  |  |
| --- | --- |
| Concept code | Display name |
| AMB | Ambulatory |
| EMER | Emergency |
| **FLD** | Field |
| HH | Home health |
| IMP | Inpatient encounter |
| ACUTE | Inpatient acute |
| NONAC | Inpatient non-acute |
| SS | short stay |
| VR | Virtual |

## performer.languageCode & informationRecipient.languageCode:

Concept domain: HumanLanguage

Code system: tags for the identification of languages (ietf3066)

Code system OID: 2.16.840.1.113883.6.121

<http://en.wikipedia.org/wiki/List_of_ISO_639-1_codes>

Value set: HumanLanguage [2.16.840.1.113883.1.11.11526]

Extensions to the value set allowed (CWE): No

|  |  |
| --- | --- |
| Concept code | Display name |
| en | English |
| es | Spanish |
| … | … |

## performer.healthCareProvider.code & informationRecipient.healthCareProvider.code

Concept domain: HealthCareProviderRoleType

Code system: NUCC Health Care provider taxonomy

Code system OID: 2.16.840.1.113883.6.101

<http://www.nucc.org/index.php?option=com_wrapper&Itemid=50>

Value set: NUCCProviderCodes [2.16.840.1.113883.1.11.19465]

Extensions to the value set allowed (CWE): No

Examples:

|  |  |
| --- | --- |
| Concept code | Display name |
| 200000000X | Allopathic & Osteopathic Physicians |
| 163W00000X | Registered nurse |
| … | … |
|  |  |

## mainSearchCriteria

Concept domain: KnowledgeSubjectObservationValue

Code systems [OIDs]:

* ICD9-CM [2.16.840.1.113883.6.103]
* ICD10-CM [2.16.840.1.113883.6.90]
* ICD10 [2.16.840.1.113883.6.3]
* SNOMED-CT [2.16.840.1.113883.6.96]
* RxNorm [2.16.840.1.113883.6.88]
* MeSH [2.16.840.1.113883.6.177]
* NDC [2.16.840.1.113883.6.69]
* LOINC [2.16.840.1.113883.6.1]

Value set: KnowledgeSubjectObservationValue [2.16.840.1.113883.11.76]

Extensions to the value set allowed (CWE): Yes

## severityObservation.interpretationCode

Concept domain: SeverityObservation

Value set: ObservationInterpretationNormality [2.16.840.1.113883.1.11.10206]

Code system: ObservationInterpretation

Code system OID: 2.16.840.1.113883.5.83

Extensions to the value set allowed (CWE): Yes

|  |  |
| --- | --- |
| Concept code | Display name |
| A | Abnormal |
| AA | Abnormal alert |
| H | High |
| HH | High alert |
| L | Low |
| LL | Low alert |
| N | Normal |

## subTopic

Concept domain: KnowledgeSubTopicObservationValue

Value set: KnowledgeSubtopicObservationValue [2.16.840.1.113883.11.77]

Code system: MeSH

Code system OID: 2.16.840.1.113883.6.177

Extensions to the value set allowed (CWE): Yes

|  |  |
| --- | --- |
| Concept code | Display name |
| Q000008 | administration & dosage |
| Q000744 | contraindications |
| Q000009 | adverse effects |
| D004347 | drug interaction |
| Q000145 | classification |
| Q000209 | etiology |
| Q000175 | diagnosis |
| Q000628 | therapy |
| D011379 | prognosis |
| Q000627 | therapeutic use |
| Q000493 | pharmacokinetics |
| Q000494 | pharmacology |
| Q000633 | toxicity |
| Q000506 | poisoning |

Code system: SNOMED CT

Code system OID: 2.16.840.1.113883.6.96

|  |  |
| --- | --- |
| Concept code | Display name |
| 79899007 | Drug interaction |
| 47965005 | Differential diagnosis |
| 404204005 | Drug interaction with drug |
| 95907004 | Drug interaction with food |
| 95906008 | Drug interaction with alcohol |

## locationOfInterest (country)

Concept domain: Country

Value set: Country [2.16.840.1.113883.1.11.171]

Code system: ISO 3166 Part 1 Country Codes, 2nd Edition, Alpha-3 (<http://en.wikipedia.org/wiki/ISO_3166-1_alpha-3>)

Code system OID: 1.0.3166.1.2.3

Extensions to the value set allowed (CWE): No

|  |  |
| --- | --- |
| Concept code | Display name |
| USA | United States |
| CAN | Canada |
| MEX | Mexico |
| BRA | Brazil |
| ARG | Argentina |
| GBR | United Kingdom |
| ESP | Spain |
| DEU | Germany |
| DNK | Denmark |
| NLD | Netherlands |
| FRA | France |
| ITA | Italy |
| NOR | Norway |
| AUT | Austria |
| AUS | Australia |
| NZL | New Zealand |
| CHN | China |
| IND | India |
| … | … |

# Appendix 3 – Constraints for the Observation Class

This section describes specific use cases for the knowledge request *Observation* class and the constraints associated with each of these use cases. The list is not exhaustive, hence implementers MAY use the observation class for other use cases not described below. However, to implement the use cases described below, implementers SHALL follow their respective constraints.

## Renal function

A patient’s impaired renal function may affect recommendations for the use of several kinds of medications. For example, specific medication classes may be contraindicated when the patient’s has impaired renal function, or the dose of these medications need to be adjusted. Therefore, knowledge resources can use the patient’s renal function to adjust the content that is retrieved for this particular patient. One of the most commonly used measures of renal function is *creatinine clearance*. The constraints below specify how to convey the patient’s creatinine clearance using the knowledge request *Observation* class.

|  |  |
| --- | --- |
| observation.c.c | SHALL use the SNOMED-CT code “*102811001*” |
| observation.c.cs | SHALL use the SNOMED-CT code system OID: “*2.16.840.1.113883.6.96*” |
| observation.v.v | SHALL be a numeric value that denotes the creatinine clearance measurement for the patient (e.g., 110) in mL/min or in mL/min/1.73m2. |
| observation.v.u | SHALL use the UCUM code “*mL/min*” or “*mL/min/1.73m2*” |

XML and URL fragments for a Creatinine Clearance of 65 mL/min:

<observation>

<code code="102811001" codeSystem="2.16.840.1.113883.6.96">

<displayName value="Creatinine renal clearance"/>

</code>

<value xsi:type="PQ" value="65" unit="mL/min"/>

</observation>

observation.c.c=102811001

observation.c.cs=*2.16.840.1.113883.6.96*

observation.v.v=65

observation.v.u=mL/min

## Pregnancy Status

The treatment/management of certain conditions is very different when a patient is pregnant. Therefore, knowledge resources can use a patient’s pregnancy status to adjust the content that is retrieved. The constraints below specify how to convey that a patient is pregnant using the knowledge request *Observation* class.

|  |  |
| --- | --- |
| observation.v.c | SHALL use the SNOMED-CT code “*77386006*” (patient currently pregnant) |
| observation.v.cs | SHALL use the SNOMED-CT code system OID: “*2.16.840.1.113883.6.96*” |

XML and URL fragments indicating that the patient is pregnant:

<observation>

<code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>

<value xsi:type="CD">

<code code="77386006" codeSystem="2.16.840.1.113883.6.96">

<displayName value="patient currently pregnant"/>

</code>

</value>

</observation>

observation.c.c=ASSERTION

observation.c.cs=*2.16.840.1.113883.5.4*

observation.v.c=77386006

observation.v.cs=*2.16.840.1.113883.6.96*

## Vital Signs

Implementers can use multiple instances of the Observation class to represent the patient’s vital signs following the constraints described below. The source of the observation codes is the HITSP *Vital Sign Result Value Set* [2.16.840.1.113883.3.88.12.80.62].

|  |  |
| --- | --- |
| observation.c.c | SHALL be one of the LOINC codes below   * 8310-5 [Body Temperature] * 8462-4 [BP Diastolic] * 8480-6 [BP Systolic] * 8287-5 [Head Circumference] * 8867-4 [Heart Rate] * 8302-2 [Height] * 8306-3 [Height (Lying)] * 59408-5 [O2 Saturation in Arterial Blood] * 9279-1 [Respiratory Rate] * 3141-9 [Weight Measured] * 39156-5 [BMI (Body Mass Index)] * 3140-1 [BSA (Body Surface Area)] |
| observation.c.cs | SHALL use the LOINC code system OID: “*2.16.840.1.113883.6.1*” |
| observation.v.v | SHALL be a numeric value that denotes one of the measurements listed above. |
| observation.v.u | SHALL be one of the UCUM codes below that represents the unit in which the observation is measured. For vital signs in which more than one unit is allowed, the sender SHALL be able to send one of the allowed units. The receiver SHALL be able to process all the allowed units.   * Body Temperature: *Cel; [degF]* * Blood Pressure: *mm[Hg]* * Head Circumference: *cm; [in\_i]* * Heart Rate & respiratory rate: */min* * Height: *cm; [in\_i];* * O2 Saturation: *%* * Weight Measured: *kg*; *g; [lb\_av]; [oz\_av]* * BMI (Body Mass Index): *kg/m2* * BSA (Body Surface Area): *m2* |

XML and URL fragments for a body temperature of 39.2oC:

<observation>

<code code=“8310-5" displayName=“Body temperature"

codeSystem="2.16.840.1.113883.6.1" codeSystemName=“LOINC"/>

<value xsi:type=“PQ" value=“39.2” unit=“Cel”/>

</observation>

observation.c.c=8310-5

observation.c.cs=*2.16.840.1.113883.6.1*

observation.v.v=39.2

observation.v.u=Cel

## Problems, medications, and medication allergies

To enhance content retrieval, implementers can augment the patient context by adding to a knowledge request the patient’s active problems, active medications, and/or medication allergies. This can be done via one or more instances of the *Observation* class as specified below.

NOTE on *MainSearchCriteria* vs. *Observation* class: Both classes may be used to convey the patient’s problems or medications. However, *MainSearchCriteria* conveys the main concept of interest in a knowledge request, while the *Observation* class conveys secondary information that may help make the knowledge retrieval more specific to the patient’s needs. For example, *MainSearchCriteria* may indicate that the concept of interest is *warfarin* and *Observation* may convey that the patient has *atrial fibrillation* and is also on five other medications. In such a request, a knowledge resource will focus on warfarin, but may attempt to narrowing the knowledge retrieval to the use of warfarin specifically for atrial fibrillation.

### Problems

|  |  |
| --- | --- |
| observation.c.c | SHALL be the HL7 code “ASSERTION” |
| observation.c.cs | SHALL use the HL7 code system OID: “2.16.840.1.113883.5.4” |
| observation.v.c | A code that represents the patient’s problem. |
| observation.v.cs | The code system used to represent the patient’s problem (e.g., SNOMED-CT, ICD9-CM, ICD10). |

XML and URL fragments for a patient with *hypertension* and *heart* *failure*:

<observation>

<code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>

<value xsi:type="CD">

<code code="38341003" codeSystem="2.16.840.1.113883.6.96">

<displayName value="Hypertensive+disorder"/>

<originalText value="Hypertensive+disorder"/>

</code>

</value>

</observation>

<observation>

<code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>

<value xsi:type="CD">

<code code="84114007" codeSystem="2.16.840.1.113883.6.96">

<displayName value="Heart+failure"/>

</code>

</value>

</observation>

observation.c.c=ASSERTION

observation.c.cs=*2.16.840.1.113883.5.4*

observation.v.c=38341003

observation.v.cs=*2.16.840.1.113883.6.96*

observation.v.dn=Hypertensive+disorder

observation.v.ot=hypertension

observation.c.c1=ASSERTION

observation.c.cs1=*2.16.840.1.113883.5.4*

observation.v.c1=84114007

observation.v.cs1=*2.16.840.1.113883.6.96*

observation.v.dn1=Heart+failure

### Medications

|  |  |
| --- | --- |
| observation.c.c | SHALL be the SNOMED-CT code: “410942007” [Drug or medicament] |
| observation.c.cs | SHALL use the SNOMED-CT code system OID: “2.16.840.1.113883.6.96” |
| observation.v.c | A code that represents the patient’s medication. |
| observation.v.cs | The code system used to represent the patient’s medication. MAY use the RxNorm code system: “2.16.840.1.113883.6.88” |

XML and URL fragments for a patient with *hypertension* and *heart* *failure*:

<observation>

<code code="410942007" codeSystem="2.16.840.1.113883.6.96"/>

<value xsi:type="CD">

<code code="855350" codeSystem="2.16.840.1.113883.6.88">

<displayName value="Warfarin Sodium 0.5 MG Oral Tablet"/>

</code>

</value>

</observation>

<observation>

<code code="410942007" codeSystem="2.16.840.1.113883.6.96"/>

<value xsi:type="CD">

<code code="858813" codeSystem="2.16.840.1.113883.6.88">

<displayName value="Enalapril Maleate 5 MG Oral Tablet"/>

</code>

</value>

</observation>

observation.c.c=410942007

observation.c.cs=*2.16.840.1.113883.6.96*

observation.v.c=855350

observation.v.cs=*2.16.840.1.113883.6.88*

observation.v.dn=Warfarin+Sodium+0.5+MG+Oral+Tablet

observation.c.c1=410942007

observation.c.cs1=*2.16.840.1.113883.6.96*

observation.v.c1=858813

observation.v.cs1=*2.16.840.1.113883.6.88*

observation.v.dn1=Enalapril+Maleate+5+MG+Oral+Tablet

### Medication allergies

|  |  |
| --- | --- |
| observation.c.c | SHALL be the SNOMED-CT code “416098002” [Drug allergy] |
| observation.c.cs | SHALL use the SNOMED-CT code system OID: “2.16.840.1.113883.6.96” |
| observation.v.c | A code that represents the medication ingredient or medication class that the patient is allergic to. |
| observation.v.cs | The code system used to represent the medication ingredient or medication class. |

XML and URL fragments for a patient allergic to penicillin:

<observation>

<code code="416098002" codeSystem="2.16.840.1.113883.6.96"/>

<value xsi:type="CD">

<code code="70618" codeSystem="2.16.840.1.113883.6.88">

<displayName value="penicillin"/>

</code>

</value>

</observation>

observation.c.c=416098002

observation.c.cs=*2.16.840.1.113883.6.96*

observation.v.c=70618

observation.v.cs=*2.16.840.1.113883.6.88*

observation.v.dn=penicillin

### Negation and unknown values in observations

Observations like problems can be associated with a negation or unknown value. For example, a knowledge request may indicate that a patient does not have a “prior history of delivery with Group B Strep Infection of the infant” or such as previous history for this patient is unknown. The following specitications indicate how to convey observations with a negated or unknown value. When processing observations, implementers SHALL check for the presence of the *observation.valueNegationInd* and *observation.nullFlavor* attributes.

|  |  |
| --- | --- |
| observation.c.c | SHALL be the HL7 code “ASSERTION” |
| observation.c.cs | SHALL use the HL7 code system OID: “2.16.840.1.113883.5.4” |
| observation.v.c | A code that represents the patient’s problem. |
| observation.v.cs | The code system used to represent the patient’s problem (e.g., SNOMED-CT, ICD9-CM, ICD10). |
| observation.valueNegationInd | SHALL be “true” if the observation is negated. |
| observation.nullFlavor | SHALL be ”UNK” if the observed value is unknown. |

XML and URL fragments for a patient who does not have *hypertension*:

<observation valueNegationInd=”true”>

<code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>

<value xsi:type="CD">

<code code="38341003" codeSystem="2.16.840.1.113883.6.96">

<displayName value="Hypertensive+disorder"/>

<originalText value="Hypertensive+disorder"/>

</code>

</value>

</observation>

observation.valueNegationInd=true

observation.c.c=ASSERTION

observation.c.cs=*2.16.840.1.113883.5.4*

observation.v.c=38341003

observation.v.cs=*2.16.840.1.113883.6.96*

observation.v.dn=Hypertensive+disorder

observation.v.ot=hypertension

XML and URL fragments for a patient for whom the diagnosis of *hypertension* is unknown:

<observation nullFlavor=”UNK”>

<code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>

<value xsi:type="CD">

<code code="38341003" codeSystem="2.16.840.1.113883.6.96">

<displayName value="Hypertensive+disorder"/>

<originalText value="Hypertensive+disorder"/>

</code>

</value>

</observation>

observation.nullFlavor=UNK

observation.c.c=ASSERTION

observation.c.cs=*2.16.840.1.113883.5.4*

observation.v.c=38341003

observation.v.cs=*2.16.840.1.113883.6.96*

observation.v.dn=Hypertensive+disorder

observation.v.ot=hypertension

# Appendix 4 - Examples

Each of the following examples contains an *Infobutton event notification* XML message payload and its equivalent URL-based representation.

## Example 1

In this example the user is looking at a coded problem list of a male, 77 years-old patient with Bacterial Pneumonia. The user clicks on an infobutton that presents a series of questions. The user selects “How do I treat Bacterial Pneumonia?” The following message payload represents the communication between the EHR systems and knowledge resources.

*XML representation:*

<?xml version="1.0" encoding="UTF-8"?>

<knowledgeRequestNotification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" classCode="ACT" moodCode="DEF">

<effectiveTime value="20120706001023"/>

<subject1 typeCode="SBJ">

<patientContext classCode="PAT">

<patientPerson classCode="PSN" determinerCode="INSTANCE">

<administrativeGenderCode code="M" codeSystem="2.16.840.1.113883.5.1" codeSystemName="AdministrativeGender"/>

</patientPerson>

<subjectOf typeCode="SBJ">

<age classCode="OBS" moodCode="DEF">

<code code="30525-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LN"/>

<value value="77" unit="a"/>

</age>

</subjectOf>

</patientContext>

</subject1>

<subject2 typeCode="SUBJ">

<mainSearchCriteria classCode="OBS" moodCode="DEF">

<code code="KSUBJ" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="385093006" codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED-CT">

<displayName value="Community acquired pneumonia"/>

</value>

</mainSearchCriteria>

</subject2>

<subject3 typeCode="SUBJ">

<taskContext classCode="ACT" moodCode="DEF">

<code code="PROBLISTREV" codeSystem="2.16.840.1.113883.1.11.19846" codeSystemName="ActTaskCode"/>

</taskContext>

</subject3>

<subject4 typeCode="SUBJ">

<subTopic classCode="OBS" moodCode="DEF">

<code code="KSUBT" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="Q000628" codeSystem="2.16.840.1.113883.6.177" codeSystemName="MSH">

<displayName value="therapy"/>

</value>

</subTopic>

</subject4>

</knowledgeRequestNotification>

*URL representation (678 characters):*

http://www.e-resource.com/api?

**knowledgeRequestNotification.effectiveTime**.**v**=20060706001023&

**patientPerson.administrativeGenderCode**.**c**=M&**patientPerson.administrativeGenderCode**.**dn**=Male&

**age**.**v**.**v**=77&**age**.**v**.**u**=a&

**ageGroup**.**v**.**c**=D000368&**ageGroup**.**v**.**cs=**2.16.840.1.113883.6.177&**ageGroup**.**v**.**dn=**Aged&

**taskContext.c.c**=PROBLISTREV&**taskContext.c.dn**=Problem+list+review&

**subTopic.v.c**=Q000628&**subTopic.v.cs**=2.16.840.1.113883.6.177&**subTopic.v.dn**=therapy&

**mainSearchCriteria.v.c**=D018410&**mainSearchCriteria.v.cs**=2.16.840.1.113883.6.177& **mainSearchCriteria.v.dn=**Bacterial+Pneumonia&  
**mainSearchCriteria.v.ot=**Pneumonia

*HTTP POST example:*

knowledgeRequestNotification.effectiveTime.v=20060706001023

patientPerson.administrativeGenderCode.c=M

age.v.v=77

age.v.u=a

ageGroup.v.c=D000368

taskContext.c.c=PROBLISTREV

subTopic.v.c=Q000628

subTopic.v.cs=2.16.840.1.113883.6.177

subTopic.v.dn=therapy

mainSearchCriteria.v.c=D018410

mainSearchCriteria.v.cs=2.16.840.1.113883.6.177

mainSearchCriteria.v.ot=Bacterial+Pneumonia

mainSearchCriteria.v.ot=Pneumonia

## Example 2

The user (an RN) is looking at a medications list of a female, Spanish speaker, 8 years-old patient who came for an outpatient appointment. The user clicks on the infobutton next to “albuterol sulfate” and is presented with a series of links. The user selects the “patient education" link.

*XML representation:*

<?xml version="1.0" encoding="UTF-8"?>

<knowledgeRequestNotification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" classCode="ACT" moodCode="DEF">

<effectiveTime value="20120706001023"/>

<subject1 typeCode="SBJ">

<patientContext classCode="PAT">

<patientPerson classCode="PSN" determinerCode="INSTANCE">

<administrativeGenderCode code="F" codeSystem="2.16.840.1.113883.5.1" codeSystemName="AdministrativeGender"/>

</patientPerson>

<subjectOf typeCode="SBJ">

<age classCode="OBS" moodCode="DEF">

<code code="30525-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LN"/>

<value value="8" unit="a"/>

</age>

</subjectOf>

</patientContext>

</subject1>

<performer typeCode="PRF">

<healthCareProvider classCode="PROV">

<code code="163W00000X" codeSystem="2.16.840.1.113883.6.101" codeSystemName="NUCC Health Care Provider Taxonomy">

<displayName value="Registered Nurse"/>

</code>

<healthCarePerson classCode="PSN" determinerCode="INSTANCE">

<languageCommunication>

<languageCode code="en" codeSystem="2.16.840.1.113883.6.121" codeSystemName="Tags for the Identification of Languages"/>

</languageCommunication>

</healthCarePerson>

</healthCareProvider>

</performer>

<informationRecipient typeCode="IRCP">

<patient classCode="PAT">

<patientPerson classCode="PSN" determinerCode="INSTANCE">

<languageCommunication>

<languageCode code="es" codeSystem="2.16.840.1.113883.6.121" codeSystemName="Tags for the Identification of Languages"/>

</languageCommunication>

</patientPerson>

</patient>

</informationRecipient>

<subject2 typeCode="SUBJ">

<mainSearchCriteria classCode="OBS" moodCode="DEF">

<code code="KSUBJ" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="49502-693-03" codeSystem="2.16.840.1.113883.6.69" codeSystemName="NDC">

<displayName value="Albuterol sulfate inhalation solution 1.25 mg"/>

<originalText value="Albuterol sulfate"/>

</value>

</mainSearchCriteria>

</subject2>

<subject3 typeCode="SUBJ">

<taskContext classCode="ACT" moodCode="DEF">

<code code="MEDLISTREV" codeSystem="2.16.840.1.113883.1.11.19846" codeSystemName="ActTaskCode"/>

</taskContext>

</subject3>

<subject4 typeCode="SUBJ">

<subTopic classCode="OBS" moodCode="DEF">

<code code="KSUBT" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="Q000008" codeSystem="2.16.840.1.113883.6.177" codeSystemName="MSH">

<displayName value="administration and dosage"/>

</value>

</subTopic>

</subject4>

</knowledgeRequestNotification>

*URL representation (626 characters):*

http://www.e-resource.com/api?

**knowledgeRequestNotification.effectiveTime**.**v**=20060706001023&

**patientPerson.administrativeGenderCode**.**c**=F

**age**.**v**.**v**=8&  
**age**.**v**.**u**=a&

**taskContext.c.c**=MEDLISTREV&

**performer**=PROV&

**informationRecipient**=PAT&

**performer.languageCode.c**=en&

**informationRecipient.languageCode.c**=es&

**performer.healthCareProvider.c.c**=163W00000X&

**mainSearchCriteria.v.c**=49502-693-03&**mainSearchCriteria.v.cs**= 2.16.840.1.113883.6.69&**mainSearchCriteria.v.dn=** Albuterol+sulfate+inhalation+solution+1.25+mg&**mainSearchCriteria.v.ot=** Albuterol+sulfate

*HTTP POST example:*

**knowledgeRequestNotification.effectiveTime**.**v**=20060706001023

**patientPerson.administrativeGenderCode**.**c**=F

**age**.**v**.**v**=8

**age**.**v**.**u**=a

**taskContext.c.c**=MEDLISTREV

**performer**=PROV

**informationRecipient**=PAT

**performer.healthCareProvider.languageCode.c.c**=en

**informationRecipient.patientPerson.languageCode.c**=es

**performer.healthCareProvider.c.c**=163W00000X

**performer.healthCareProvider.c.dn=**Registered Nurse

**mainSearchCriteria.v.c**=49502-693-03

**mainSearchCriteria.v.cs**=2.16.840.1.113883.6.69

**mainSearchCriteria.v.dn=** Albuterol+sulfate

**mainSearchCriteria.v.ot=** Albuterol+sulfate+inhalation+solution+1.25+mg

## Example 3 – Observation class

### – Example 3.a - Observation class with value as a code

A nurse would like to know more about the treatment of hypertension in a 28 year-old pregnant patient.

*XML representation*:

<?xml version="1.0" encoding="UTF-8"?>

<knowledgeRequestNotification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" classCode="ACT" moodCode="DEF">

<effectiveTime value="20120706001023"/>

<subject1 typeCode="SBJ">

<patientContext classCode="PAT">

<patientPerson classCode="PSN" determinerCode="INSTANCE">

<administrativeGenderCode code="F" codeSystem="2.16.840.1.113883.5.1" codeSystemName="AdministrativeGender"/>

</patientPerson>

<subjectOf typeCode="SBJ">

<observation classCode="OBS" moodCode="DEF">

<code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>

<value xsi:type="CD" code="77386006" codeSystem="2.16.840.1.113883.6.96">

<displayName value="Patient currently pregnant"/>

</value>

</observation>

</subjectOf>

<subjectOf typeCode="SBJ">

<age classCode="OBS" moodCode="DEF">

<code code="30525-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LN"/>

<value value="28" unit="a"/>

</age>

</subjectOf>

</patientContext>

</subject1>

<subject2 typeCode="SUBJ">

<mainSearchCriteria classCode="OBS" moodCode="DEF">

<code code="KSUBJ" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="38341003" codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED-CT">

<displayName value="Hypertensive disorder"/>

<originalText value="Systemic arterial hypertension"/>

</value>

</mainSearchCriteria>

</subject2>

<subject3 typeCode="SUBJ">

<taskContext classCode="ACT" moodCode="DEF">

<code code="MEDOE" codeSystem="2.16.840.1.113883.1.11.19846" codeSystemName="ActTaskCode"/>

</taskContext>

</subject3>

<subject4 typeCode="SUBJ">

<subTopic classCode="OBS" moodCode="DEF">

<code code="KSUBT" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="Q000628" codeSystem="2.16.840.1.113883.6.177" codeSystemName="MSH">

<displayName value="therapy"/>

</value>

</subTopic>

</subject4>

</knowledgeRequestNotification>

*URL representation (562 characters):*

http://www.e-resource.com/api?

**knowledgeRequestNotification.effectiveTime**.**v**=20120706001023&

**patientPerson.administrativeGenderCode**.**c**=F&

**age**.**v**.**v**=28&  
**age**.**v**.**u**=a&

**taskContext.c.c**=MEDOE&

**performer**=PROV&

**performer.healthCareProvider.c.c**=163W00000X&

**mainSearchCriteria.v.c**=38341003&  
**mainSearchCriteria.v.cs**=2.16.840.1.113883.6.96& **mainSearchCriteria.v.dn=**Hypertensive disorder& **mainSearchCriteria.v.ot=**Systemic+arterial+hypertension&

**observation.v.c=77386006&  
observation.v.cs=2.16.840.1.113883.6.96&**

**subtopic.v.c=Q000628&   
subtopic.v.cs=2.16.840.1.113883.6.177&  
subtopic.v.dn=therapy**

### – Example 3.b Observation class with value as a physical quantity

A physician is planning to prescribe a medication (atenolol) for a female, 67 years-old patient who came for an outpatient appointment. The patient’s creatinine clearance is 65 mL/min. The physician would like to check dosing information of atenolol.

*XML representation:*

<?xml version="1.0" encoding="UTF-8"?>

<knowledgeRequestNotification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" classCode="ACT" moodCode="DEF">

<effectiveTime value="20120706001023"/>

<subject1 typeCode="SBJ">

<patientContext classCode="PAT">

<patientPerson classCode="PSN" determinerCode="INSTANCE">

<administrativeGenderCode code="F" codeSystem="2.16.840.1.113883.5.1" codeSystemName="AdministrativeGender"/>

</patientPerson>

<subjectOf typeCode="SBJ">

<observation classCode="OBS" moodCode="DEF">

<code code="102811001" codeSystem="2.16.840.1.113883.6.96"><displayName value="Creatinine renal clearance"/></code>

<value xsi:type="PQ" value="65" unit="mL/min"/>

</observation>

</subjectOf>

<subjectOf typeCode="SBJ">

<age classCode="OBS" moodCode="DEF">

<code code="30525-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LN"/>

<value value="67" unit="a"/>

</age>

</subjectOf>

</patientContext>

</subject1>

<performer typeCode="PRF">

<healthCareProvider classCode="PROV">

<code code=" 200000000X" codeSystem="2.16.840.1.113883.6.101" codeSystemName="NUCC Health Care Provider Taxonomy">

<displayName value="Allopathic &amp; Osteopathic Physicians"/>

</code>

<healthCarePerson classCode="PSN" determinerCode="INSTANCE">

<languageCommunication>

<languageCode code="en" codeSystem="2.16.840.1.113883.6.121" codeSystemName="Tags for the Identification of Languages"/>

</languageCommunication>

</healthCarePerson>

</healthCareProvider>

</performer>

<subject2 typeCode="SUBJ">

<mainSearchCriteria classCode="OBS" moodCode="DEF">

<code code="KSUBJ" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="197379" codeSystem="2.16.840.1.113883.6.88" codeSystemName="RxNorm">

<displayName value="Atenolol 100 mg Oral Tablet"/>

<originalText value="Atenolol"/>

</value>

</mainSearchCriteria>

</subject2>

<subject3 typeCode="SUBJ">

<taskContext classCode="ACT" moodCode="DEF">

<code code="MEDOE" codeSystem="2.16.840.1.113883.1.11.19846" codeSystemName="ActTaskCode"/>

</taskContext>

</subject3>

<subject4 typeCode="SUBJ">

<subTopic classCode="OBS" moodCode="DEF">

<code code="KSUBT" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value code="Q000008" codeSystem="2.16.840.1.113883.6.177" codeSystemName="MSH">

<displayName value="administration and dosage"/>

</value>

</subTopic>

</subject4>

</knowledgeRequestNotification>

*URL representation (631 characters):*

http://www.e-resource.com/api?

**knowledgeRequestNotification.effectiveTime**.**v**=20120706001023&

**patientPerson.administrativeGenderCode**.**c**=F&

**age**.**v**.**v**=67&  
**age**.**v**.**u**=a&

**taskContext.c.c**=MEDOE&

**performer**=PROV&

**performer.healthCareProvider.c.c**=200000000X&

**encounter.c.c=AMB&**

**mainSearchCriteria.v.c**=197379&  
**mainSearchCriteria.v.cs**=2.16.840.1.113883.6.88& **mainSearchCriteria.v.dn=**Atenolol 100 mg Oral Tablet& **mainSearchCriteria.v.ot=**Atenolol&

**observation.v.c=** **102811001&  
observation.v.cs=2.16.840.1.113883.6.96&  
observation.v.v=65&  
observation.v.u=mL/min&**

**subtopic.v.c=Q000008&  
subtopic.v.cs=2.16.840.1.113883.6.177&  
subtopic.v.dn=administration+and+dosage**

## Example 4 - use of location of interest

A physician enters a chief complaint of “fever“ for a male, 39 years-old patient at the emergency room. The patient was had been traveling across several locations in the US recently.

*XML representation:*

<?xml version="1.0" encoding="UTF-8"?>

<knowledgeRequestNotification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:hl7-org:v3 file:///C:/Guilherme/HL7/Infobutton/Documentation/Knowledge%20request%20R2/schemas/knowledgeRequest.xsd" xmlns="urn:hl7-org:v3" classCode="ACT" moodCode="DEF">

<effectiveTime value="20120706001023"/>

<subject1 typeCode="SBJ">

<patientContext classCode="PAT">

<patientPerson classCode="PSN" determinerCode="INSTANCE">

<administrativeGenderCode code="M" codeSystem="2.16.840.1.113883.5.1" codeSystemName="AdministrativeGender"/>

</patientPerson>

<subjectOf typeCode="SBJ">

<age classCode="OBS" moodCode="DEF">

<code code="30525-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LN"/>

<value value="39" unit="a"/>

</age>

</subjectOf>

</patientContext>

</subject1>

<performer typeCode="PRF">

<healthCareProvider classCode="PROV">

<code code=" 200000000X" codeSystem="2.16.840.1.113883.6.101" codeSystemName="NUCC Health Care Provider Taxonomy">

<displayName value="Allopathic &amp; Osteopathic Physicians"/>

</code>

<healthCarePerson classCode="PSN" determinerCode="INSTANCE">

<languageCommunication>

<languageCode code="en" codeSystem="2.16.840.1.113883.6.121" codeSystemName="Tags for the Identification of Languages"/>

</languageCommunication>

</healthCarePerson>

</healthCareProvider>

</performer>

<location typeCode="LOC">

<locationOfInterest classCode="EXLOC">

<addr>

<part code="ZIP" codeSystem="2.16.840.1.113883.5.16" value="02368"/>

<part code="CNT" codeSystem="2.16.840.1.113883.5.16" value="USA"/>

</addr>

</locationOfInterest>

</location>

<subject2 typeCode="SUBJ">

<mainSearchCriteria classCode="OBS" moodCode="DEF">

<code code="KSUBJ" codeSystem="2.16.840.1.113883.1.11.20385" codeSystemName="ActCode"/>

<value>

<originalText value="fever"/>

</value>

</mainSearchCriteria>

</subject2>

<subject3 typeCode="SUBJ">

<taskContext classCode="ACT" moodCode="DEF">

<code code="PROBLISTE" codeSystem="2.16.840.1.113883.1.11.19846" codeSystemName="ActTaskCode"/>

</taskContext>

</subject3>

</knowledgeRequestNotification>

*URL representation (408 characters):*

http://www.e-resource.com/api?

**knowledgeRequestNotification.effectiveTime**.**v**=20120706001023&

**patientPerson.administrativeGenderCode**.**c**=M&

**age**.**v**.**v**=39&  
**age**.**v**.**u**=a&

**taskContext.c.c**=PROBLISTE&

**performer**=PROV&

**performer.healthCareProvider.c.c**=200000000X&

**encounter.c.c=EMER&**

**mainSearchCriteria.v.ot**=fever&

**locationOfInterest.addr.ZIP=90001&  
locationOfInterest.addr.ZIP1=84081&  
locationOfInterest.addr.ZIP2=89044**

1. ***PROV,*** *PAT, and PAYOR* correspond to the the respective class codes obtained from the RoleClass code system [2.16.840.1.113883.5.110]. [↑](#footnote-ref-1)