PHIN VADS RESTFUL SERVICES

TECHNICAL DOCUMENTATION

Version *2.1*

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INTRODUCTION

1.1 PURPOSE OF VADS CODESYSTEM AND VALUESET RESTFUL DOCUMENTATION

This technical documentation discusses how to use the CodeSystem and ValueSet vocabulary RESTful services. It also discusses the technical architecture and mapping of fields from the database to the JSON output.

2 OVERVIEW

PHIN VADS vocabulary currently has a Web based interface located at https://phinvads.cdc.gov/vads/SearchVocab.action. There is also a Hessian Web service that has existed for a number of years where applications can download a value set programmatically by providing the valueset code (i.e. PHVS_ActPriority_HL7_V3). The Hessian service URL is https://phinvads.cdc.gov/vocabService/v2.

More modern RESTful services are based on the HL7 FHIR v3 standard. **FHIR** (pronounced Fire) stands for **Fast Healthcare Interoperability Resources**. FHIR is based on a modern Web services approach. The services described in this document been created to provide a JSON interface to CodeSystems and ValueSets. Currently, these RESTful services are read-only and not secured.

3 FHIR SERVICES

Services were developed to retrieve CodeSystems and ValueSets. The following subsections discuss how to call these services.

3.1 IDENTIFIER REQUESTS

3.1.1 ValueSet Get Request Simple Identifier

The following call will retrieve a ValueSet in JSON format:

https://phinvads.cdc.gov/baseStu3/ValueSet/PHVS_AdministrativeGender_HL7_V3

The format is baseStu3/ValueSet/<identifier>. The identifier can be the ValueSet code or the OID.

https://phinvads.cdc.gov/baseStu3/ValueSet/2.16.840.1.113883.1.11.1 will retrieve the same data as the above example.

Note that when using the name (ValueSet Code) you can pass part of the name:

https://phinvads.cdc.gov/baseStu3/ValueSet/AdministrativeGender However with OID the exact OID must match. For example:

https://phinvads.cdc.gov/baseStu3/ValueSet/2.16.840.1.113883

will return an HTTP 404 Not Found error with the message:

ValueSet id:2.16.840.1.113883 not found

You can also specify a specific version and/or code:

https://phinvads.cdc.gov/baseStu3/ValueSet/AdministrativeGender?version=1&code=F

ValueSet Identifier calls return a single ValueSets described in http://hl7.org/fhir/valueset.html. This format will be discussed in detail in subsequent sections. An example of the start of the returned message is:

{"resourceType":"ValueSet","id":"2.16.840.1.113883.1.11.1","text":{"status":"generated","div":"Administrative Gender based upon HL7 V3 vocabulary. This value set

Later in the message are the codes grouped by System:

[{"system":"http://hl7projects.hl7.nscee.edu/frs/download.php/622/hl7_rimrepos-2.26.2.zip","version":"20090501","concept":[{"code":"F","display":"Female"},{"code":"M","display":"Male"},{"code":"UN","display":"Undifferentiated"}]}]}}

The ValueSet format will be discussed in detail in subsequent subsections.

3.1.2   CodeSystem Get Request Simple Identifier

The following call will retrieve a CodeSystem in JSON format:

https://phinvads.cdc.gov/baseStu3/CodeSystem/PH_AdministrativeSex_HL7_2x

The format is baseStu3/CodeSystem/<identifier>. The identifier can be the CodeSystem code or the OID.

https://phinvads.cdc.gov/baseStu3/CodeSystem/2.16.840.1.113883.12.1   will retrieve the same data as the above example.

As with value set you can pass only part of the name but you must pass the full OID. If more than one name matches, it will only return the first one.

You can request a specific code:

https://phinvads.cdc.gov/baseStu3/CodeSystem/PH_AdministrativeSex_HL7_2x?code=F?code=F

An example of the start of the returned message is:

{"resourceType":"CodeSystem","id":"2.16.840.1.113883.5.1","text":{"status":"generated","div":"Administrative Gender (HL7 V3) - The gender of a person used for

Later in the message are the codes:

"concept":[{"code":"F","display":"Female","definitation":"Female"},{"code":"M","display":"Male","definitation":"Male"},{"code":"UN","display":"Undifferentiated","definitation":"The gender of a person could not be uniquely defined as male or female, such as hermaphrodite."}],"count":3}

The CodeSystem format will be discussed in detail in subsequent subsections.

3.2 BUNDLE REQUEST

If you do not put a slash and an identifier but pass query parameters you are returned a bundle. A bundle is described in http://hl7.org/fhir/bundle.html. A FHIR Bundle is a container used to return one or more resources. The resources in this case being one or more CodeSystems or one or more ValueSets.

3.2.1 CodeSystem Bundle Request

An example CodeSystem bundle requests is:

https://phinvads.cdc.gov/baseStu3/CodeSystem. This request specifies ALL code systems. Currently there are over two hundred code systems. It could not be practical to return all of them. A parameter stored as a VADS.properties determines how many to return.

```
#############################################
# RESTful Services
#############################################
restws.codesystem.threshold = 5
restws.valueset.threshold = 5
```

Note that you can use JSONLint to pretty print the JSON output so it is easy to read. https://jsonlint.com/

```
{
    "resourceType": "Bundle",
    "id": "2.16.840.1.113883.12.78-2.16.840.1.113883.5.4",
    "meta": {
                "lastUpdated": "2018-03-16T19:28:37Z"
    },
    "type": "searchset",
    "total": 206,
    "link": [{
                "relation": "self",
                "url": "https://phinvads.cdc.gov/baseStu3/CodeSystem"
    }, {
                "relation": "next",
                "url":
"https://phinvads.cdc.gov/baseStu3/CodeSystem?_getpages=2.16.840.1.113883.12.323"
    }],
```

Not that this bundle specifies 206 codesets. But only a few are contained in the bundle. The next link indicates how to get the next bundle. If there is no "next" link. Then we are at the end of the bundle.

3.2.2 CodeSystem Bundle Name, Title and Identifier requests

With the code system bundle you can also request the search parameter name:

https://phinvads.cdc.gov/baseStu3/CodeSystem?name=PH_AdministrativeSex_HL7_2x

Name is the computer readable name or Code System Code in VADS terminology.

Title is the human readable name:

https://phinvads.cdc.gov/baseStu3/CodeSystem?title=Administrative sex (HL7)

https://phinvads.cdc.gov/baseStu3/CodeSystem?title=Administrative%20sex%20(HL7)

Which is the Code System Name in VADS terminology. Note that partial names or titles are allowed and if there is more than one match, more than one resource will be returned in the bundle.

If nothing is found an error is returned.

Identifier requires an exact match.

https://phinvads.cdc.gov/baseStu3/CodeSystem?identifier=2.16.840.1.113883.5.1

Note that an individual code can be retrieved by specifying a code:

https://phinvads.cdc.gov/baseStu3/CodeSystem?identifier=2.16.840.1.113883.5.1&code=Ml

The output in this case is:

{"resourceType":"Bundle","id":"2.16.840.1.113883.5.1-
2.16.840.1.113883.5.1","meta":{"lastUpdated":"2018-03-
16T20:02:14Z"},"type":"searchset","total":1,"link":[{"relation":"self","url":"https://phinvads.cdc.gov/baseStu3/CodeSystem?identifier=2.16.840.1.113883.5.1&code=M"}],"entry":[{"fullUrl":"https://phinvads.cdc.gov/baseStu3/CodeSystem/2.16.840.1.113883.5.1","resource":{"resourceType":"CodeSystem","id":"2.16.840.1.113883.5.1","text":{"status":"generated","div":"Administrative Gender (HL7 V3) - The gender of a person used for administrative purposes (as opposed to clinical gender)"},"url":"https://phinvads.cdc.gov/baseStu3/CodeSystem/2.16.840.1.113883.5.1","identifier":{"system":"OID","value":"urn:oid:2.16.840.1.113883.5.1"},"version":"20090501","name":"PH_AdministrativeGender_HL7_V3","title":"AdministrativeGender","status":"active","experimental":false,"publisher":"HL7 (Health Level Seven, Inc., 3300 Washtenaw Avenue, Suite 227, Ann Arbor, MI 48104. USA: (+1) 734-677-7777 (phone) (+1) 734-677-6622 (fax). E-mail: hq@hl7.org)","contact":[{"telecom":[{"system":"url","value":"http://www.hl7.org/"}]}],"date":"2009-07-02T20:34:07Z","description":"Administrative Gender (HL7 V3) - The gender of a person used for administrative purposes (as opposed to clinical gender)","content":"complete","concept":[{"code":"M","display":"Male","definitation":"Male"}],"count":1}}]}

Only one code is returned.

Note that the version parameter is available for ValueSets but not CodeSystem. This is because CodeSystem has only one version, the latest.

3.2.3 ValueSet Bundle Request

An example ValueSet bundle requests is:

https://phinvads.cdc.gov/baseStu3/ValueSet

There are over 1500 valuesets so the system cannot return them all in the bundle so it returns the number of ValueSets specified in the restws.valueset.threshold property and a next link for the next set of valuesets.

```
    "link": [{
                "relation": "self",
                "url": "https://phinvads.cdc.gov/baseStu3/ValueSet"
    }, {
                "relation": "next",
                "url":
"https://phinvads.cdc.gov/baseStu3/ValueSet?_getpages=1.3.6.1.4.1.19376.1.7.3.1.1.13.8.12"
    }],
```

3.2.4   ValueSet Bundle Name, Title, Identifier, version requests

With the ValueSet bundle you can also request the search parameter name:

https://phinvads.cdc.gov/baseStu3/ValueSet?name=PHVS_AdministrativeGender_HL7_V3

Name is the computer readable name or Value Set Code in VADS terminology.

Title is the human readable name:

https://phinvads.cdc.gov/baseStu3/ValueSet?title=Administrative%20Sex%20(HL7).
Which is the ValueSet Name in VADS terminology. Note that partial names or titles are allowed and if there is more than one match, more than one resource will be returned in the bundle.

If nothing is found an error is returned.

Identifier requires an exact match.

https://phinvads.cdc.gov/baseStu3/ValueSet?identifier=2.16.840.1.114222.4.11.927.

A specific version can be specified. If a version is specified, a name, title or identifier must be specified,

https://phinvads.cdc.gov/baseStu3/ValueSet?name=PHVS_AdministrativeGender_HL7_V3&version=1

If a version is not found, a 404 error code is returned.

4   MAPPING SPECIFICATIONS:

This section describes the mapping that populates the JSON elements.

Bundle Mapping

4.1   BUNDLE MAPPING

Element Name	Mapping	Notes
resourceType	always "Bundle"	
id	Starting and ending OID.	Same if only one.
meta.lastUpdated	Date of extract	
type	Always searchset	
total	Count of all resources that match query.	
link.self	url for this bundle	
link.next	url for next bundle	Only present if not at end.
entry.fullUrl	url to retrieve this resource	
entry.resource	Either a CodeSystem or ValueSet	

4.2   CODE SYSTEM MAPPING

Element Name	Mapping	Notes
resourceType	always "CodeSystem"	
id	OID for Code System	
text.status	Always "generated"	
text.div	CodeSystem.CodeSystemDefinitionText	text is null if null
url	Code system identity url	
identifier.system	urn:oid:<oid value>	
version	CodeSystem.CodeSystemVersion	
name	CodeSystem.CodeSystemCode	
title	CodeSystem.CodeSystemName	
status	StatusCode=2=active, 1=draft, 3=retired	
experimental	always "false"	
publisher	VocabularySourceReference.SourceName and SourceContactInformation	
contact.telecom.system	always "url"	
contact.telecom.value	VocabularySourceReference.SourceURL	
date	CodeSystem.StatusDateTime	
description	CodeSystem.CodeSystemDefinitionText	
content	If search concept code specified then fragment else 'complete'	required field
code	CodeSystemConcept.ConceptCode	
display	CodeSystemConcept.ConceptName	
definition	CodeSystemConcept.DefinitionText	sometimes null

4.3 VALUESET MAPPING

Element Name	Mapping	Notes
resourceType	always "ValueSet"	
id	ValueSet.ValueSetOid	
text.status	Always "generated"	
text.div	ValueSet.DefinitionText	If null set to ValueSet.ValueSetCode
url	ValueSet identity url	
identifier.system	urn:oid:<oid value>	
version	ValueSetVersion.ValueSetVersion	Latest version unless version specified.
name	ValueSet. ValueSet Code	
title	ValueSet. ValueSet Name	
status	StatusCode=2=active, 1=draft, 3=retired	
experimental	always "false"	
publisher	VocabularyAuthorityReference.AUthorityName and AuthorityContactInformation	
contact.telecom.system	always "url"	
contact.telecom.value	VocabularyAuthorityReference.AuthorityURL	
description	ValueSet.DefinitionText	
compose.lockedDate	ValueSetVersion.EffectiveDate or if null ValueSetVersion.StatusDate	
include.system	CodeSystem.CodeSystemSourceURL	For each CodeSys in ValueSet
include.version	CodeSystem.CodeSystemVersion	
concept.code	ValueSetConcept.ConceptCode	
concept.display	ValueSetConcept. CDCPreferredDesignation if null then ValueSetConcept.CodeSystemConceptName	

5 RETURNED ERRORS

This section describes the errors that can be returned in the response.

5.1   VALUESET AND CODE SYSTEM ERRORS

5.1.1   ValueSet not found

https://phinvads.cdc.gov/baseStu3/ValueSet?name=PHVS_Hogwash_Symptoms

If the specified value set is not found the HTML header contains a 404 Not Found response:

> ValueSet Failed to load resource: the server responded with a status of 404 (Not Found)

What is displayed in the HTML content is:

> ValueSet name:PHVS_Hogwash_Symptoms not found

5.1.2   Code for ValueSet not found

https://phinvads.cdc.gov/baseStu3/ValueSet?name=PHVS_AdministrativeGender_HL7_V3&code=Z

If a code is passed that is not in the valueset a 404 (Not Found) is returned.

> Invalid Concept Code Parameter Z for ValueSet Identifier:2.16.840.1.113883.1.11.1 not found

5.1.3   Bad Request

https://phinvads.cdc.gov/baseStu3/ValueSet?name=PHVS_AdministrativeGender_HL7_V3&version=A1

If a version is passed that is not numeric a 400 (Bad Request) is returned with the message:

> Version must be a numeric integer for Valuesets.

5.1.4   Unexpected Internal Error

If an unexpected exception occurs Internal Server Error 500 is returned. The user is given a message:

> Internal Server Error: Check log file: <error message>

5.1.5   Code System Errors

CodeSystem has similar errors. If a code is specified and it is not found in the CodeSet a 404 is returned with an error message:

> Concept Code Parameter Z for CodeSystem Identifier:2.16.840.1.113883.5.1 not found

If a CodeSystem is not found a 404 (No Content) is returned:

> Error: Code System Name: AdministrativeManager not found

If a concept code is specified. A code system name or identifier must be specified or a Bad Request (400) is returned:

> If a concept code is specified one parameter either name=<i.e. PH_AdministrativeGender_HL7_V3> or title=<i.e. AdministrativeGender> or Identifier=<i.e. 2.16.840.1.113883.5.1> is required.
> CodeSystem Failed to load resource: the server responded with a status of 400 (Bad Request)

If you have any questions or feel that you need additional information, feel free to contact phinvs@cdc.gov