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## The NLM Value Set Authority Center

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### Abstract

The Value Set Authority Center (VSAC) at the National Library of Medicine (NLM) provides downloadable access to all official versions of vocabulary value sets contained in the Clinical Quality Measures (CQMs) used in the certification criteria for electronic health record systems ("Meaningful Use" incentive program). Each value set consists of the numerical values (codes) and human-readable names (descriptions), drawn from standard vocabularies such as LOINC, RxNorm and SNOMED CT<sup>®</sup>, that are used to define clinical data elements used in clinical quality measures (e.g., patients with diabetes, tricyclic antidepressants). The content of the VSAC will gradually expand to incorporate value sets for other use cases, as well as for new measures and updates to existing measures.

### Keywords

Value sets; Clinical quality measures

### Methods

#### Value set validation

All the codes used in value sets from the clinical quality measures investigated were validated for referential integrity against current versions of the corresponding reference code systems. Types of errors include obsolete codes, errors in codes and code/description mismatch. Feedback was provided to the measure developers, including suggestions for fixing errors. The value sets were validated iteratively until all errors had been fixed.

#### Value set delivery

VSAC delivers reference value sets in both human-readable format (through a web application) and machine-readable format (through an application programming interface (API)). For convenience, the value sets can also be downloaded in the form of spreadsheets. The web application supports a variety of search mechanisms (by code, by value set and by measure). The API is based on RESTful web services and uses the Sharing Value Sets (SVS) profile developed by the Integrating the Healthcare Enterprise<sup>®</sup> (IHE) consortium.

The value sets are also provided in the Common Terminology Services (CTS-2) format through collaboration with the Mayo Clinic.

## Results

### VSAC content

As of December 21, 2012, VSAC contains 1520 unique value sets used in 93 clinical quality measures, representing 83,723 unique codes from standard vocabularies including LOINC, RxNorm, SNOMED CT, ICD-9CM, ICD-10-CM, ICD-10-PCS and CPT.

### Value set validation

Errors were identified in some 5% of the 83,723 unique codes, the main common type of which was the presence of obsolete codes. Suggestions were provided to the measure developers whenever possible. All the errors had been corrected by the time the value sets were publicly released.

### Value set delivery

The NLM Value Set Authority Center (VSAC) web application and web services were officially launched on October 25, 2012 (<https://vsac.nlm.nih.gov/>). VSAC provides access to all the value sets for the FY 2014 clinical quality measures. Because of intellectual property restrictions in some of the code systems, viewing and/or downloading value sets requires a free Unified Medical Language System<sup>®</sup> Metathesaurus License. Figure 1 illustrates the interface of the web application.

Future development includes the integration of the measure authoring environment with terminology services. VSAC will also provide a standalone value set authoring environment. Finally, VSAC plans to expand its repository beyond the domain of Meaningful Use into other areas (for which it could be used outside the U.S), including patient assessment instruments, Common Data Elements for research, and public health.

The screenshot displays the Value Set Authority Center (VSAC) web application interface. At the top, it identifies the 'Value Set Authority Center' as part of the 'U.S. National Library of Medicine'. A search bar contains the query 'gestational diabetes'. The main content area is divided into 'Search Results' and 'Value Set Details'. The 'Value Set Details' section shows the following information:

- Value Set Information:** Definition: 20121025
- Metadata:** Name: Gestational Diabetes, OID: 2.16.840.1.113883.3.464.1003.103.12.1010
- Measure:** Type: Grouping, Developer: National Committee for Quality Assurance
- Grouping:** Note:

The 'Value Set Members' section shows an 'Expansion: 20121025' and a 'Dependent Code List' table. The table lists codes from SNOMED CT and ICD10CM:

Code	Description	Code System	Version
11887002	Gestational diabetes mellitus (disorder)	SNOMEDCT	2012-07
420491007	Gestational diabetes mellitus, class H (disorder)	SNOMEDCT	2012-07
420738003	Gestational diabetes mellitus, class T (disorder)	SNOMEDCT	2012-07
420989005	Gestational diabetes mellitus, class K (disorder)	SNOMEDCT	2012-07
034.429	Gestational diabetes mellitus in childbirth, unspecified control	ICD10CM	2012
034.430	Gestational diabetes mellitus in the puerperium, diet controlled	ICD10CM	2012
034.434	Gestational diabetes mellitus in the puerperium, insulin controlled	ICD10CM	2012
034.439	Gestational diabetes mellitus in the puerperium, unspecified control	ICD10CM	2012

The footer of the page includes contact information for the U.S. National Library of Medicine, the USA.gov logo, and update dates: 'Last updated: 25 October 2012' and 'First published: 23 October 2012'.

**Figure 1.** Value set “Gestational Diabetes” with codes from SNOMED CT and ICD10CM displayed in the VSAC web application